AGENDA
CITY OF GLENWOOD SPRINGS
REGULAR CITY COUNCIL MEETING
JULY 16, 2020
101 W. 8TH STREET
6:15 PM

The agenda is subject to *change, including the addition of items 24 hours in advance or the deletion of items at any time.*
The order and times of agenda items listed are approximate and intended as a guideline for the City Council.

ZOOM INSTRUCTIONS

1. You are invited to a Zoom webinar.
   When: Jul 16, 2020 06:15 PM Mountain Time (US and Canada)
   Topic: 2020/07/16 Regular Council Meeting

   Please click the link below to join the webinar:
   https://us02web.zoom.us/j/84096172815

   Or iPhone one-tap :
   US: +12532158782,,84096172815# or +13462487799,,84096172815#
   Or Telephone:
   Dial(for higher quality, dial a number based on your current location):
   US: +1 253 215 8782 or +1 346 248 7799 or +1 669 900 6833 or +1 301 715 8592 or +1 312 626 6799 or +1 929 205 6099
   Webinar ID: 840 9617 2815
   International numbers available: https://us02web.zoom.us/u/kzaOjFja0

REGULAR SESSION

6:15pm	2.	Roll Call	Quorum
	3.	Pledge of Allegiance	
	4.	Agenda Changes & Conflicts	Information
	5.	Citizens Appearing Before Council (for items not on the Agenda-comments limited to 3 minutes)	Information
	6.	Council Comments	Information
6:20 pm	7.	Consent Agenda	Discussion and/or Action

All matters under consent are considered to be routine and will be enacted by one motion and vote. The titles will not be read aloud.

A. Award of Fuel Depot Construction Contract

B. May 14 Special City Council Meeting Minutes

C. RFSD IGA for South Midland Property Acquisition

D. Broadband Vehicle Purchase

E. Ordinance No 19, Series of 2020; An Ordinance of the City Council of the City of Glenwood Springs, Colorado Amending the Powers of the Glenwood Springs Downtown Development Authority (SECOND READING)

ACTIONS AND/OR PRESENTATIONS

6:30pm	8.	Planning Item 04-20 Consideration of a Major Site/Architectural Plan Review, Rezoning from RH Residential High-Density to RT Residential Transitional for the construction of 100 Multifamily multi-family apartment and duplex units on approximately 5.74 acres (PIN 2185-153-04-001, 2185-153-02-008, and 2185-211-00-002)	Information/Discussion
		A. Ordinance No. 20, Series of 2020; An Ordinance of the City Council of the City of Glenwood Springs, Colorado, Rezoning Property Owned by Bell Rippy Glenwood, LLC Known as 2710 Blake Avenue, Glenwood Springs Colorado, from Residential High-Density(RH) to Residential Transitional (RT) Zoning (FIRST READING)	Discussion and/or Action
8:00pm	9.	Ordinance No 21, Series of 2020; An Ordinance of the City Council of the City of Glenwood Springs, Colorado, Amending Section 070.010.070 of the Glenwood Springs Municipal Code Regarding Nonconforming Use Regulations and Section 070.040.020(d)(24) of the Municipal Code Relating to Riparian Setbacks (FIRS READING)	Discussion and/or Action
9:30pm	10.	Electric Building Design Contracts	Discussion and/or Action
9:45pm	11.	Infrastructure Discussion	Information/Discussion
9:55pm	12.	CARES Funding Options	Discussion and/or Action
10:10pm	13.	Report from City Administration	
		A. City Manager	
		B. City Attorney	
		C. Correspondence Incoming/Outgoing	
10:20pm	14.	Adjournment	

City Council
STAFF REPORT
City of Glenwood Springs
July 16, 2020

Agenda Item: Award of Fuel Depot Construction Contract

Action Requested: Award of Bid 2020-20 to Gould Construction for $248,509 to Construct a Fuel Depot for the City of Glenwood Springs at 2222 Devereux Road.

Department: Public Works

Presented By: Matthew Langhorst, Public Works Director

Background Info: The City of Glenwood Springs is moving its Fuel Depot, which supplies diesel and unleaded gas for the entirety of the City fleet, to 2222 Devereux Road from its current location at the MOC building. The existing fuel tanks, pumps and key system at the MOC are almost 20 years old and the City was already looking into upgrade a good portion of that system when the MOC settlement issue was determined to be a loosing financial situation. A new fuel depot is has been proposed and bid out at the new Fleet location at 2222 Devereux Road and Gould Construction was determined to be the qualified low bidder on the project at $248,509. Bidders were asked to break out the cost of a DEF fuel tank from the overall bid so that if the project were deemed over budget that the DEF line item could be easily removed from the bid. Gould and Johnson Construction both completed this request, Seneca did not. Overall bids, including the DEF fueling system still had Gould Construction as the low bidder. The City Enterprise funds had budgeted $265,000 for 2020 to construct a Wash Bay, but the Fuel Depot is considered a more important item to have on hand than a wash bay, which will be budgeted for 2021.

Issues: None

Staff Recommendation: Staff is recommending award of Bid 2020-20 to Gould Construction for $248,509 to Construct a Fuel Depot for the City of Glenwood Springs at 2222 Devereux Road.

FUEL DEPOT
BD 2020-020

	GOULD CONSTRUCTION	JOHNSON CONSTRUCTION	SENECA COMPANIES
ITEMS:			
Bidding for Fuel Depot	**$248,509.00**	**$290,625.00**	**$281,893.50**
	$21,450.00 (ALTERNAT 1)	**$25,000.00 (ALTERNATE 1)**	
Bid bond	**YES**	**YES**	**YES**
Bid form	**YES**	**YES**	**YES**
Received addenda	**YES**	**YES**	**YES**
Addendum to Professional Services	**YES**	**YES**	**YES**
Total Bid	**$269,959.00**	**$315,625.00**	**$ 281,893.50**

MINUTES
CITY OF GLENWOOD SPRINGS
SPECIAL CITY COUNCIL MEETING
May 14, 2020
101 W. 8TH STREET
6:15 P.M.

2. Roll Call

Mayor Jonathan Godes called the meeting to order at 6:15pm. Present at roll call: Charlie Willman, Rick Voorhees, Tony Hershey, Jonathan Godes, Shelley Kaup, Paula Stepp and Steve Davis.
Also present were Debra Figueroa; City Manager, Karl Hanlon; City Attorney, Catherine Fletcher; City Clerk, Jenn Ooton; Assistant City Manager, Steve Boyd, COO; Yvette Gustad; Finance Director, Terri Partch; City Engineer, Matt Langhorst; Public Works Director, Gretchen Ricehill; and Assistant Director for Economic and Community Development.

3. Pledge of Allegiance

Mayor Godes led in the Pledge of Allegiance.

ACTIONS AND/OR PRESENTATIONS

4. Blue Star Recycling

Mayor Pro Tem Kaup, seconded by Councilor Stepp moved to continue this item until the next meeting when the representatives from Blue Star can present.

Motion passed unanimously.

5. Continued from May 7, 2020 Resolution 2020-9; A Resolution of the City of Glenwood Springs, Colorado Amending Resolution 2018-61 and Approving the Amended West Glenwood Springs Urban Renewal Plan

Karl Hanlon, City Attorney – Gave background on this resolution. Staff recommended to remove the condemnation authority and passage of Resolution 2020-9.

Mayor Godes opened the item for public comment.

No comments were made.

Mayor Godes closed the item for public comment.

Councilor Pro Tem Kaup moved, seconded by Councilor Voorhees to approve Resolution 2020-9; A Resolution of the City of Glenwood Springs, Colorado Amending Resolution 2018-61 and Approving the Amended West Glenwood Springs Urban Renewal Plan to include the revisions as proposed by Councilor Willman.

Ayes: Davis, Stepp, Godes, Voorhees, Willman, Kaup
Nays: Hershey

Motion passed.

6. Continued from May 7, 2020 Resolution 2020-10; A Resolution of the City Council of the City of Glenwood Springs, Colorado, Amending Resolution 2018-60, relating to the creation of the Glenwood Springs Urban Renewal Authority

Karl Hanlon, City Attorney – Presented on this item.

Mayor Godes opened the item for public comment.

No comments were made.

Mayor Godes closed the item for public comment.

Councilor Voorhees, seconded by Councilor Stepp moved to approve Resolution 2020-10; A Resolution of the City Council of the City of Glenwood Springs, Colorado, Amending Resolution 2018-60, relating to the creation of the Glenwood Springs Urban Renewal Authority.

Ayes: Willman, Davis, Stepp, Kaup, Voorhees, Godes
Nays: Hershey

Motion passed.

7. IGA between the City of Glenwood Springs and RFTA for the Purchase of Property and the Performance of Transportation Projects

Karl Hanlon, City Attorney – Gave background on this item. He noted the contract discussions with RFTA.

Mayor Godes opened the item for public comment.

No comments were made.

Mayor Godes closed the item for public comment.

Councilor Stepp, seconded by Mayor Pro Tem Kaup moved to move forward with the IGA between the City of Glenwood Springs and RFTA for the Purchase of Property and the Performance of Transportation Projects.

Ayes: Godes, Willman, Voorhees, Stepp, Davis, Kaup
Abstained: Hershey

Motion passed.

8. Ordinance No. 12, Series of 2020; An Ordinance of the City Council of the City of Glenwood Springs, Colorado, Amending Section 040.010.010 s of the Glenwood Springs Municipal Code related to Sales Tax Collection from Online Retailers (FIRST READING)

Karl Hanlon, City Attorney – Presented on this ordinance. He discussed the implementation process within Colorado for online sales tax.

Mayor Godes opened the item for public comment.

No comments were made.

Mayor Godes closed the item for public comment.

Councilor Willman, seconded by Mayor Pro Tem Kaup moved to approve Ordinance No. 12, Series of 2020; An Ordinance of the City Council of the City of Glenwood Springs, Colorado, Amending Section 040.010.010 of the Glenwood Springs Municipal Code related to Sales Tax Collection from Online Retailers (FIRST READING).

Motion passed unanimously.

9. Resolution 2020-21; A Resolution of the City Council of the City of Glenwood Springs, Colorado Authorizing the exercise of Eminent Domain Powers to Acquire Property Interests Necessary to Facilitate the Reconstruction of South Midland Avenue

Karl Hanlon, City Attorney – Presented on this item. He discussed right of way necessities for the South Midland Avenue project.

Councilor Willman noted a conflict of interest on this item and recused himself from this discussion.

Mayor Godes opened the item for public comment.

No comments were made.

Mayor Godes closed the item for public comment.

Mayor Pro Tem Kaup, seconded by Councilor Voorhees moved to approve Resolution 2020-21; A Resolution of the City Council of the City of Glenwood Springs, Colorado Authorizing the exercise of Eminent Domain Powers to Acquire Property Interests Necessary to Facilitate the Reconstruction of South Midland Avenue.

Ayes: Davis, Stepp, Hershey, Voorhees, Kaup, Godes.
Abstained: Willman

Motion passed.

10. G4 Grant Review Committee

Debra Figueroa, City Manager – Presented on this item. She requested the Mayor appoint a member of Council to the review committee.

Councilor Stepp, seconded by Mayor Pro Tem Kaup, moved to nominate Councilor Willman as the City Council designated liaison for the G4 Grant Review Committee.

Ayes: Davis, Stepp, Voorhees, Kaup, Godes.
Nays: Hershey
Abstained: Willman

Motion passed.

11. COVID- 19 Updates

Debra Figueroa, City Manager – Discussed this item. Councilors were encouraged to ask questions or comment.

Councilor Hershey moved to remove emergency authorities from the City Manager on May 14, 2020 or at the next Council meeting.

Motion died for lack of second.

EXECUTIVE SESSION

12. Executive Session to Conduct a Conference with the City Manager and City Attorney for the Purpose of Discussing the City's Purchase, Acquisition, Lease, Transfer or Sale of Real Property; Determining Positions Relative to Matters That May be Subject to Negotiations, Developing Strategy for Negotiations, and Instructing Negotiators; and to Conduct a Conference with the City Attorney to Receive Legal Advice in Accordance with C.R.S. 24-6-402(4)(a), (b), and (e) related to 27th Street.

Councilor Willman moved to go into Executive Session to Conduct a Conference with the City Manager and City Attorney for the Purpose of Discussing the City's Purchase, Acquisition, Lease, Transfer or Sale of Real Property; Determining Positions Relative to Matters That May be Subject to Negotiations, Developing Strategy for Negotiations, and Instructing Negotiators; and to Conduct a Conference with the City Attorney to Receive Legal Advice in Accordance with C.R.S. 24-6-402(4)(a), (b), and (e) related to 27th Street. At the conclusion of the Executive Session, the public meeting for May 14, 2020 will be adjourned.

Motion passed unanimously.

13. Adjourned at 7:08 PM.

City Council
STAFF REPORT
City of Glenwood Springs
July 16, 2020

Agenda Item: RFSD IGA for South Midland Property Acquisition

Action Requested: Approval of the Intergovernmental Agreement with the Roaring Fork School District for land exchange for the reconstruction of South Midland.

Department: Engineering

Presented By: Terri Partch, City Engineer

Background Info: The City has been working on funding, designing and acquiring the property needed to reconstruct South Midland from 27th Street to Four Mile Road, including a new waterline, broadband, sidewalk, rockfall mitigation and drainage.

The school district land exchange will allow the City to construct a roundabout at the intersection of Midland and Four Mile Road, as well as a new southern access from the roundabout to Sopris Elementary and a detention pond adjacent to the roundabout for large flow events.

The School District Board has reviewed and approved the IGA.

Issues: None at this time.

Staff Recommendation: Approval of the agreement.

INTERGOVERNMENTAL AGREEMENT
BETWEEN THE CITY OF GLENWOOD SPRINGS AND THE ROARING FORK SCHOOL DISTRICT RE-1 RELATING TO SOUTH MIDLAND ROUNDABOUT

THIS INTERGOVERNMENTAL AGREEMENT ("Agreement") is made and entered into effective as of the ___ day of _____ 2020, regardless of the day actually signed, by and between the CITY OF GLENWOOD SPRINGS, COLORADO (the "City") and the ROARING FORK SCHOOL DISTRICT RE-1 ("RFSD"), together "the Parties."

WHEREAS, the City is designing a critical infrastructure project, the "South Midland Road Reconstruction Project," a public right-of-way reconstructing South Midland Avenue from the 27th Street Roundabout to the intersection of Four Mile Road (the "South Midland Road Reconstruction Project"); and

WHEREAS, the South Midland Road Reconstruction Project contemplates the construction of a roundabout at the three-way intersection of Midland Avenue, Four Mile Road and Airport Road;

WHEREAS, the RFSD is the owner of real property in Glenwood Springs, Colorado known as Parcel Number 218527208003 (the "Property"); and

WHEREAS, the RFSD desires to grant and convey to the City a portion of the Property as more particularly described on Exhibit A, attached hereto and incorporated herein by reference, to be used by the City as a right of way ("RW-17"); and

WHEREAS, the RFSD also desires to grant and convey to the City a portion of the Property as more particularly described on Exhibit B, attached hereto and incorporated herein by reference, to be used by the City as a temporary construction easement ("TE-17") for purposes of constructing the roundabout and the access from the roundabout to Sopris Elementary School (the "School") located on the Property; and

WHEREAS, in exchange for RFSD's grant of RW-17 and TE-17 to the City shall construct a secondary access from the new roundabout to the west side of the School with various improvements as more fully described herein.

NOW, THEREFORE, in consideration of the mutual covenants and agreements identified below, the Parties agree to this IGA as follows:

1. **Incorporation of Recitals.** The forgoing recitals are incorporated herein as if set forth in full.

2. **Conveyance of Property to the City**. The RFSD shall execute the Warranty Deed in the form attached as Exhibit C to effectuate the grant and conveyance of RW-17 to the City. The RFSD shall also execute the Temporary Easement Agreement in the form attached as Exhibit D to grant the City a temporary construction easement over TE-17.

3. **Construction of Access and Improvements.** The City agrees to the complete the following:

a. The City shall construct a secondary access from the new roundabout to the west side of the School as generally depicted in the Roundabout Plan attached as Exhibit E.

b. The City shall install a landscape buffer, a guard rail and signage within RW-17 and landscaping within TE-17 as described and depicted on Exhibit F.

c. The City assumes all responsibility for and liability associated with the construction contemplated by this Agreement and agrees to complete it in a manner that does not unreasonably disturb RFSD operations. If disturbance is anticipated, the City will work with RFSD to mitigate the disturbance.

4. **Maintenance of Improvements.** The City shall maintain all improvements placed within RW-17, and the RFSD shall maintain the landscaping installed within TE-17.

5. **Public Record.** The Parties shall cause all documents necessary to fulfill the purposes of this IGA, to be recorded in the Office of the Garfield County Clerk and Recorder.

6. **Preservation of Purpose and Survival.** No portion of this IGA shall be read or understood to alter, amend, or terminate the purpose and intent of the IGA or the rights and responsibilities of the Parties created therein. Any conflict between the provisions of this IGA shall be resolved by the Parties in a manner agreed to be the least disruptive to the preservation of the IGA's purpose.

7. **Breach and Notice.** If either Party fails to perform its respective obligations under this Agreement, the non-breaching Party shall provide thirty (30) days' notification of such failure to the breaching Party's representative as provided in paragraph 19. If the breaching Party fails to correct or remedy the breach, the non-breaching Party may proceed in law or equity to seek injunctive relief, specific performance, and/or damages incurred as a result of the Breach.

8. **Good Faith.** There is an obligation of good faith on the part of the Parties, including the obligation to make timely communication of information that may reasonably be believed to be material to the other Party.

9. **No Waiver of Governmental Immunity Act.** Nothing herein shall be deemed a waiver of the Colorado Governmental Immunity Act for or by either Party. C.R.S. § 24-10-101 *et seq.*

10. **No Joint Venture.** Nothing in this Agreement shall be construed to create a joint venture, partnership, employer/employee or other relationship between the Parties other than independent contracting parties. Except as permitted under the remedies provisions hereunder, neither Party shall have the express or implied right to act for, on behalf of, or in the name of the other Party.

11. **No Third-Party Beneficiary.** No third party may enforce or rely upon this IGA.

12. **Term of Agreement.** This IGA shall become effective upon signature of the last Party to sign and will terminate upon completion of the South Midland Road Reconstruction Project except as otherwise provided for herein. All rights concerning remedies, fees and costs shall survive termination of this IGA.

13. **Amendment and Assignment.** This IGA may be amended by the Parties solely through a written agreement signed by both Parties. This IGA may not be assigned by either Party.

14. **Counterparts.** This IGA may be executed in counterparts, each of which shall be deemed an original, and all of which, when taken together, shall be deemed the same instrument. Electronic or photographic signatures of either Party to this IGA or subsequent modifications thereto, shall be effective for all purposes.

15. **Governing Law, Venue and Survival.** The laws of the State of Colorado to the extent not preempted by federal law shall govern the validity, performance and enforcement of this IGA. Should either Party institute legal action for enforcement of this IGA, venue of such action shall be in the United States District Court for the District of Colorado, if the court has jurisdiction; otherwise, any such action shall be filed in Garfield County, Colorado.

16. **Whole Agreement.** This IGA sets forth the whole agreement of the Parties. No representations, either verbal or written, shall be considered binding on either Party to the extent not set forth herein.

17. **Section Headings.** The section headings in this IGA are inserted only for the purpose of convenient reference and are in no way to define, limit or prescribe the scope or intent of this Agreement or any part thereof.

18. **Authority.** Each Party signing this IGA represents and warrants that the individual is fully authorized to enter into and execute this IGA and to bind the Party it represents to the terms and conditions thereof.

19. **Notice and Representatives.** All notices required under this IGA shall be transmitted in writing and shall be deemed duly given when hand-delivered or sent by certified mail, return receipt requested and postage prepaid, or by electronic communication, addressed to the designated representative(s) as follows:

To City: City of Glenwood Springs
Attn.: City Manager
101 West 8th Street
Glenwood Springs, CO 81601

With copy to: City of Glenwood Springs.
Attn.: City Attorney
101 West 8th Street
Glenwood Springs, CO 81601

To RFSD: Roaring Fork School District RE-1
Attn.: Chief Executive Officer

400 Sopris Avenue

Carbondale, CO 81623

With copy to: RFSD General Counsel

Brent Case, Semple, Farrington, Everall & Case, 1120 Lincoln St., Ste. 1308, Denver, CO 80238; bcase@semplelaw.com

20. **Change of Representatives.** Either Party may, in its sole discretion, change its individual designated representative and the address to which future notices shall be sent by providing written notice to the other Party.

21. **Severability.** Should any provision of this IGA be found to be in conflict with any law of the United States or the State of Colorado or to otherwise be unenforceable, the remaining provisions shall be deemed severable and the validity of such shall not be affected provided that the remaining provisions can be construed in substance to constitute the agreement which the

IN WITNESS WHEREOF, the City and RFSD have executed duplicate originals of this Agreement.

CITY OF GLENWOOD SPRINGS, COLORADO

ATTEST:

_____ By: _____

Catherine Mythen Fletcher, City Clerk Jonathan Godes, Mayor

Date: _____

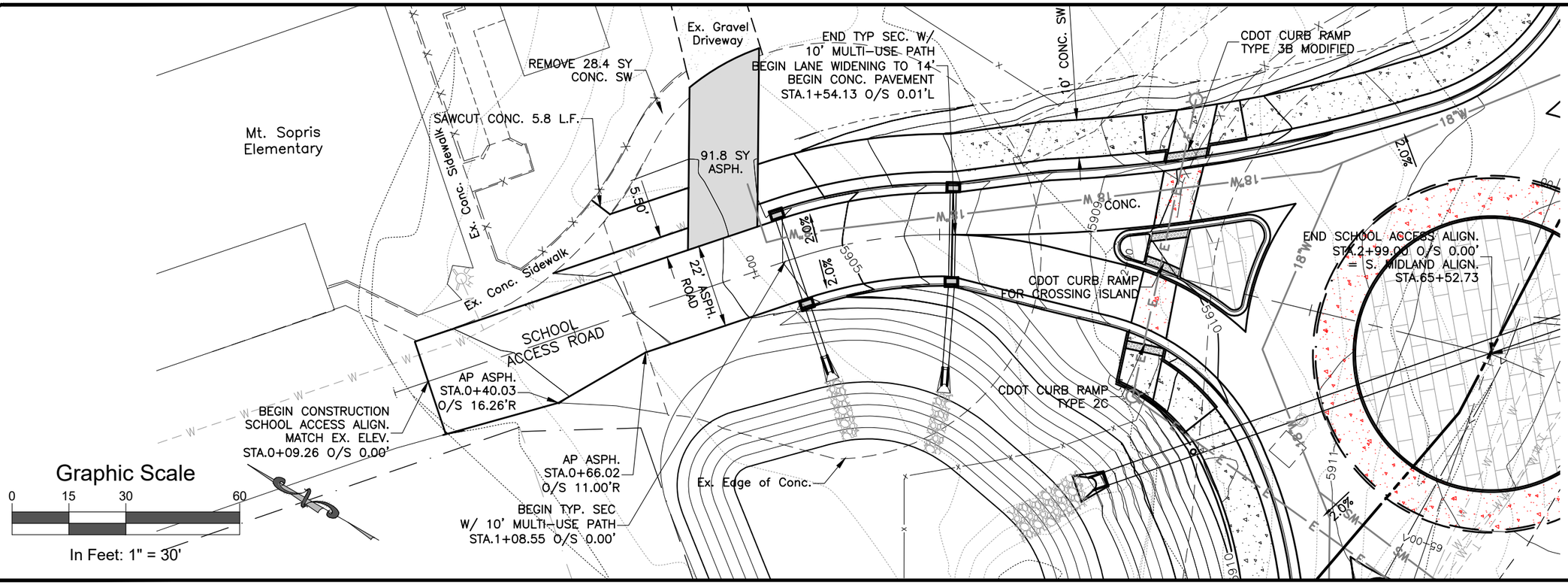
ROARING FORK SCHOOL DISTRICT RE-1

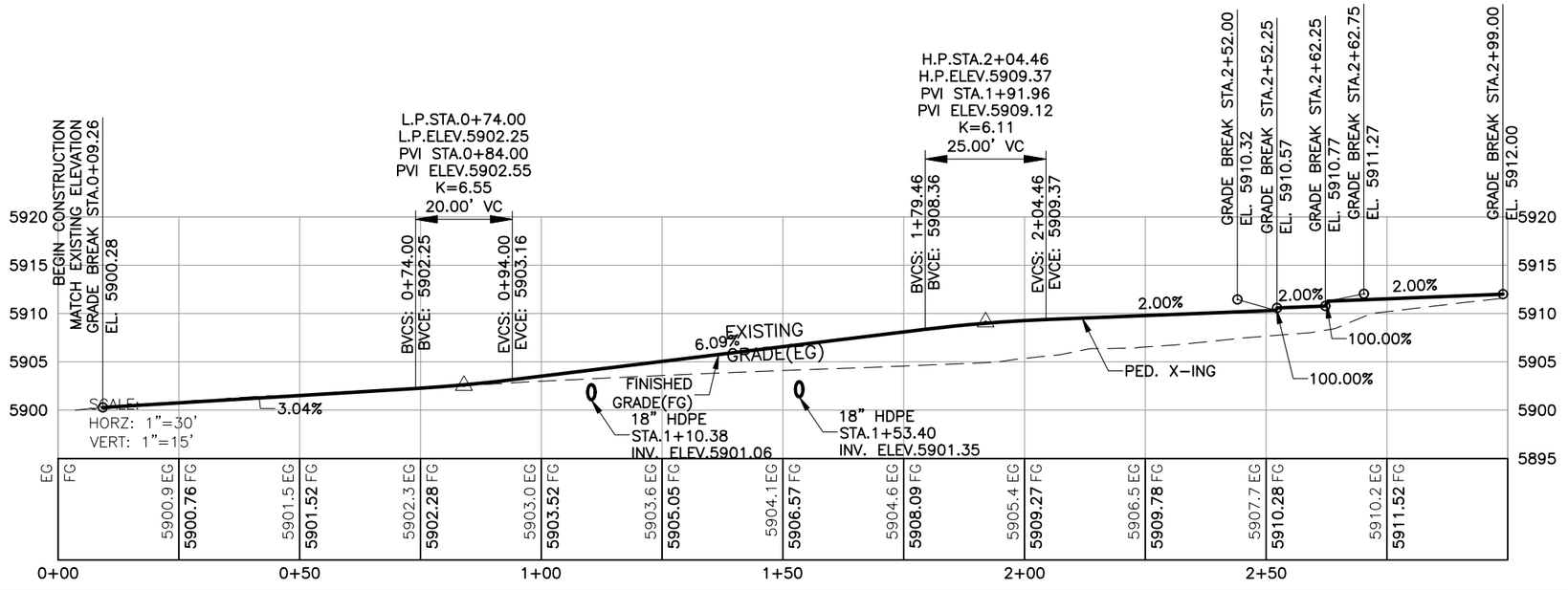
ATTEST:

_____ By: _____

Secretary Rob Stein, Superintendent Jennifer Rupert, President

Date: _____





Computer File Information		Sheet Revisions					As Constructed		South Midland Ave. Improvements				Project No./Code
Print Date: 12/13/18		Rev.	Date	Comments	Init.		No Revisions:	-	School Access Plan & Profile				No.: ____
Last Modification Date: 1/18/2018		1				GLENWOOD SPRINGS COLORADO	Revised:	-	Engineer: MDF	Structure	---		Code: --
Drawing File Name: SMidland-PP(3)						SGM 118 West Sixth Street, Suite 200 Glenwood Springs, CO 81601 970.945.1004 www.sgm-inc.com	Void:	-	Drawn By: AMC	Numbers	---		Sheet Number: 63
Autocad Ver. 2018 Scale: As Shown Units: English									Sheet Subset: RDWY	Subset Sheets:	19 of 40		
SGM Project No.: 2017-211.001 Quality Control: RGN													

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GLENWOOD SPRINGS COLORADO

Sheet Revisions		
Date	Description	Initials
08/03/19	Parcel 14 Ownership change	reb

Sheet Revisions		
Date	Description	Initials

Sheet Revisions		
Date	Description	Initials

SGM
118 West Sixth Street, Suite 200
Glenwood Springs, CO 81601
970.945.1004 www.sgm-inc.com

RIGHT OF WAY PLANS
PLAN SHEET

Project Number: BUILD M535-006
Project Location: South Midland Ave, Glenwood Springs
South Midland Avenue Improvement Project

Project Code:	Last Mod. Date	Subset Sheets	Sheet No.	Total Sheets
22933	8/03/19	7.15 of 7.17	31	37

NW1/4 SECTION 27, TOWNSHIP 6 SOUTH, RANGE 89 WEST, 6TH P.M.

Parcel Number: 218527206001
Owner: MOUNTAIN VALLEY DEVELOPMENTAL SERVICES

Parcel Number: 218527200014
Owner: MOUNTAIN VALLEY DEVELOPMENTAL SERVICES

Mtn Valley Dev. Services

Tract C
Glenwood Park Sub.

Mt. Sopris Drive

30' Roadway and Utility Easement dedicated to City of G.S. Book 577, Page 129

5.0 Utility Esmt.

20' Sidewalk Easement & Construction License Unrecorded

Public Access Easement (Pedestraian, bicycle, non-motorized) dedicated to City of G.S. Rec. 776533

MATCH LINE STA. 63+00

N80°59'40"E 225.42'

RW-17

Parcel Number: 218527208003
Owner: ROARING FORK SCHOOL DISTRICT RE-1

Existing ROW

S Midland Ave

Existing ROW

Existing ROW

MATCH LINE STA. 58+75

TE-13

TE-14

TE-15A

TE-15B

Parcel Number: 218527200008
Owner: ASPEN COMMUNITY HOUSING FUND LLC

Parcel Number: 218527200013
Owner: MORTON, G THOMAS & RIVERA, DEBRA E

Parcel Number: 218527200006
Owner: PORTILLO, RUMILDA & CUBIAS, ILIANA & MAIRA

P.O.B. TE-13 POINT NO. 338
NORTHWEST CORNER SEC. 27
BEARS N74°43'15"W, 832.01'

P.O.B. TE-14 POINT NO. 339
NORTHWEST CORNER SEC. 27
BEARS N73°06'22"W, 855.22'

P.O.B. TE-15A POINT NO. 344
NORTHWEST CORNER SEC. 27
BEARS N70°57'14"W, 890.14'

TE-13 Line Table		
Line #	Direction	Length
L75	S28°13'35"E	33.23'
L76	S46°45'14"W	31.38'
L77	N66°06'45"W	17.36'

TE-14 Line Table		
Line #	Direction	Length
L78	S28°49'53"E	47.89'
L79	S88°03'00"W	24.03'
L80	N43°14'46"W	6.31'

TE-15A Line Table		
Line #	Direction	Length
L81	S29°02'49"E	54.53'
L82	S88°03'00"W	6.53'

NOTE: EXISTING RIGHT OF WAY OF S. MIDLAND AVE. ACQUIRED, DEDICATED, AND/OR MEMORIALIZED PER RECEPTION NO.'S 466209, 512550, 411579, 546750 & BOOK 20 PAGE 499, Book 181 Page 140

Graphic Scale
0 15 30 60
In Feet: 1" = 30'

I:\2017\2017-211-GWSSoMidland\001-Midland4MileRd27thSt\H-Dwgs\Surv\Dwgs\BaseMaps\midlandROW-Plans.dwg

GLENWOOD SPRINGS COLORADO

Sheet Revisions		
Date	Description	Initials

Sheet Revisions		
Date	Description	Initials

Sheet Revisions		
Date	Description	Initials

SGM
118 West Sixth Street, Suite 200
Glenwood Springs, CO 81601
970.945.1004 www.sgm-inc.com

RIGHT OF WAY PLANS
PLAN SHEET

Project Number: BUILD M535-006
Project Location: South Midland Ave, Glenwood Springs
South Midland Avenue Improvement Project

Project Code:	Last Mod. Date	Subset Sheets	Sheet No.	Total Sheets
22933	6/05/19	7.16 of 7.17	32	37

NW1/4 SECTION 27, TOWNSHIP 6 SOUTH, RANGE 89 WEST, 6TH P.M.

Graphic Scale
0 15 30 60
In Feet: 1" = 30'

TE-17 Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Length
C16	20.82'	87.19'	013°40'55"	S49°46'36"E	20.77'
C17	50.53'	176.60'	016°23'39"	S51°07'57"E	50.36'
C18	41.24'	44.00'	053°42'22"	S31°43'02"E	39.75'
C19	70.58'	384.00'	010°31'53"	S01°26'19"E	70.48'
C20	37.80'	111.00'	019°30'35"	S01°11'59"W	37.61'

P.O.B. TE-17 POINT NO. 361
NORTHWEST CORNER SEC. 27
BEARS N68°42'42"W, 1353.33'

TE-17 Line Table		
Line #	Direction	Length
L90	S08°09'31"W	31.66'
L91	S80°39'08"W	1.14'
L92	S09°00'18"E	21.99'
L93	S58°34'13"E	11.41'
L94	S05°47'11"E	2.58'
L95	N80°59'40"E	15.92'

RW-17 Line Table		
Line #	Direction	Length
L93	S58°34'13"E	11.41'
L94	S05°47'11"E	2.58'
L96	S21°07'31"E	9.87'
L97	S50°32'12"W	20.00'

RW-17 Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Length
C16	20.82'	87.19'	013°40'55"	S49°46'36"E	20.77'
C17	50.53'	176.60'	016°23'39"	S51°07'57"E	50.36'
C18	41.24'	44.00'	053°42'22"	S31°43'02"E	39.75'
C19	70.58'	384.00'	010°31'53"	S01°26'19"E	70.48'
C20	37.80'	111.00'	019°30'35"	S01°11'59"W	37.61'
C21	37.21'	57.41'	037°08'09"	S38°02'58"E	36.56'

P.O.B. RW-17 POINT NO. 135
NORTHWEST CORNER SEC. 27
BEARS N63°33'40"W, 1177.19'

NOTE: EXISTING RIGHT OF WAY OF S. MIDLAND AVE. ACQUIRED, DEDICATED, AND/OR MEMORIALIZED PER RECEPTION NO.'S 466209, 512550, 411579, 546750 & BOOK 20 PAGE 499, Book 181 Page 140

Parcel Number: 218527200014
Owner: MOUNTAIN VALLEY DEVELOPMENTAL SERVICES

Parcel Number: 218527208003
Owner: ROARING FORK SCHOOL DISTRICT RE-1

20' Sidewalk Easement & Construction License Unrecorded

MATCH LINE STA 6+00

I:\2017\2017-211-GWSSoMidland\001-Midland4MileRd27thSt\H-Dwgs\Surv\Dwgs\BaseMaps\midlandROW-Plans.dwg

City Council
STAFF REPORT
City of Glenwood Springs
July 16, 2020

Agenda Item: Broadband Vehicle Purchase

Action Requested: Approval to Purchase Two Vehicles for the Broadband Department for $152,858.20.

Department: Public Works

Presented By: Matthew Langhorst, Public Works Director

Background Info: The City of Glenwood Springs Broadband Department is looking to move forward with purchasing two vehicles for the new employees and for system construction/maintenance needs. The first vehicle is a small Ford Escape for employees use which wold be purchased at the Colorado State bid pricing of $25,419.20. The second vehicle is a Dodge 5500 bucket truck for construction/maintenance of the system and to be used by our newly hired Fiber Plant Technician. The bucket truck will be purchased through the Sourcewell bidding per bid number N-2166 and has been approved by procurement.

The Broadband proforma/business plan has $145,000 budgeted for these two items to be purchased in 2020, total pricing for the equipment is slightly over the proforma/budget at the $152,858.20, but all other expenditures/bids this year have been well under budget allowing for this $7,858 proposed budget overrun. Both of these vehicles are being purchased off of a bid processes allowing us to procure them quickly and at a bid price.

Issues: None

Staff Recommendation: Staff is Recommending Approval to Purchase Two Vehicles for the Broadband Department for $152,858.20.

City Council
STAFF REPORT
City of Glenwood Springs
July 16, 2020

Agenda Item: Ordinance No 19, Series of 2020; An Ordinance of the City Council of the City of Glenwood Springs, Colorado Amending the Powers of the Glenwood Springs Downtown Development Authority (SECOND READING)

Action Requested: Approval of Ordinance No 19, Series of 2020; amending the powers of the Glenwood Springs Downtown Development Authority to include all of the powers within state statute

Department: Economic and Community Development

Presented By:

Background Info: On June 4, 2020, City Council voted unanimously to direct staff to work with the Downtown Development Authority and its Executive Director to expand its focus to include economic development.

Ordinance No. 13, Series of 2005, limited the powers of the Downtown Development Authority to those relating to development and implementation of a Capital Improvement Plan.

Ordinance No. 19, Series 2020, would grant the DDA all of the powers within state statute, including to:

To implement ... any plan of development, whether economic or physical, in the downtown development area as is necessary to carry out its functions; and,

In cooperation with the planning board and the planning department of the municipality, develop long-range plans designed to carry out the purposes of the authority as stated in section 31-25-801 and to promote the economic growth of the district and may take such steps as may be necessary to persuade property owners and business proprietors to implement such plans to the fullest extent possible;

Downtown Development Authorities are allowed to undertake development projects within their approved plan of development. Currently, the DDA plan is extremely out of date. Executive Director Laura Kirk is working with Downtown Colorado Inc. on a strategy to update the DDA work plan. This work is anticipated to happen over the next several months. Once completed, the plan would be presented to City Council for approval (with Planning Commission recommendations).

Issues: NA

Staff Recommendation: Approveof Ordinance No 19, Series of 2020; amending the powers of the Glenwood Springs Downtown Development Authority to include all of the powers within state statute.

ORDINANCE NO. 19

Series of 2020

AN ORDINANCE OF THE CITY OF GLENWOOD SPRINGS, COLORADO, AMENDING THE POWERS OF THE GLENWOOD SPRINGS DOWNTOWN DEVELOPMENT AUTHORITY.

WHEREAS, by Ordinance No. 44, Series 2000, and pursuant to C.R.S. §31-25-800, et seq., City Council established the powers, duties, board size and administration of the Downtown Development Authority; and

WHEREAS, Ordinance No. 44, Series 2000 granted the downtown Development Authority any and all powers and duties specified in Sections 31-25-807 and 31-25-808 of the Colorado Revised Statutes not inconsistent with other provisions of Ordinance No. 44, Series of 2000; and

WHEREAS, by Ordinance No. 13, Series of 2005, City Council limited the powers of the Downtown Development Authority to those set forth in Exhibit A to Ordinance No. 13, Series of 2005 relating to the development and implementation of a Capital Improvement Plan; and

WHEREAS, the City Council determines it is in the best interest of the City to expand the powers and duties of the Downtown Development Authority and grant it all powers and duties set forth in CRS §§ 31-25-807 and 31-25-808; and

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF GLENWOOD SPRINGS, COLORADO, ORDAINS THAT:

Section 1. The forgoing recitals are incorporated herein as if set forth in full.

Section 2. Section I of Exhibit A to Ordinance No. 30, Series of 2009, is hereby deleted and replaced with the following language:

> Section I. Powers-Duties. The D.D.A. shall have all powers and duties set forth in Sections 31-25-807 and 31-25-808 of the Colorado Revised Statutes.

Section 3. Any and all ordinances or parts of ordinances in conflict herewith shall hereby be repealed to the extent of the conflict only.

INTRODUCED, READ ON FIRST READING, PASSED AND ORDERED PUBLISHED BY TITLE ONLY THIS 2ND DAY OF JULY 2020.

CITY OF GLENWOOD SPRINGS, COLORADO

_____

Jonathan Godes, Mayor

ATTEST:

_____
Catherine Mythen Fletcher, City Clerk

INTRODUCED, READ ON SECOND READING, PASSED AND ORDERED PUBLISHED BY TITLE ONLY TO BE EFFECTIVE TEN DAYS FOLLOWING THE DATE OF SECOND PUBLICATION THIS ____ DAY OF JULY 2020.

CITY OF GLENWOOD SPRINGS, COLORADO

_____
Jonathan Godes, Mayor

ATTEST:

_____
Catherine Mythen Fletcher, City Clerk

City Council
STAFF REPORT
City of Glenwood Springs
July 16, 2020

Agenda Item: Planning Item 04-20 Consideration of a Major Site/Architectural Plan Review, Rezoning from RH Residential High-Density to RT Residential Transitional for the construction of 100 Multifamily multi-family apartment and duplex units on approximately 5.74 acres (PIN 2185-153-04-001, 2185-153-02-008, and 2185-211-00-002)

Action Requested: **Action 1 –Ordinance No. 20, Series of 2020 Rezoning** – of 2710 Blake Avenue (PIN: 2185-211-00-002) from RH Residential High-Density to RT Residential Transitional.

Action 2 – Major Site/Architectural Plan Review – to allow for the construction of 100-unit multi-family apartment and duplex units.

Department: Economic and Community Development

Presented By: Trent Hyatt, Senior Planner

Background Info: The subject proposal was first considered by the Planning and Zoning Commission (Commission) at their April 28, 2020 regular meeting which was followed by a special meeting on May 5 to allow for the receipt of additional public comment. Technical difficulties interrupted the May 5 meeting and consideration of the application was continued to the May 26 regular meeting.

At the May 26 meeting, the Commission considered two variance requests, voting to approve one related to the location of interior parking lots adjacent to public rights-of-way while denying another related to the requirement for a minimum of two housing types for developments of this size. A recommendation for approval of the requested rezoning was also provided at the May 26 meeting. However, prior to acting on the Major Site/Architectural Plan Review application (City Council Action Item 2), the Commission requested the applicant and staff conduct a neighborhood meeting to discuss the options for access and circulation in the area as it relates to the project. In order to allow time for the separate traffic related neighborhood meeting, the Commission continued consideration of the request to July 28, 2020.

Following the meeting on May 26, the applicant informed staff of their need to move forward with review of the application prior to the July 28 Commission meeting due to financing constraints. Therefore, the access and circulation neighborhood meeting was quickly scheduled and noticed for June 8. The neighborhood access and circulation meeting, hosted by the City via Zoom on June 8, was attended by approximately 25 citizens. While numerous options for traffic control/calming were discussed, the City, applicant, and those in attendance supported a site layout and street redesign referred to as Option C. The street redesign includes an elimination of a full extension of Palmer Avenue from 26th Street to Blake Avenue and restricts access to the development site to the intersection of Palmer and Blake Avenues only. The remainder of the street construction in the Palmer Avenue right-of-way, above and to the north of driveway aisles, is limited to a bicycle and pedestrian path which allows fire/emergency access only. In this scenario, the City supports the addition of speed bumps on both Blake and Palmer Avenues between 23rd and 26th Streets. Some members of the public also support a one way along Blake Avenue between the same numbered streets, as per the 2018 development approval. However, the City prefers two-way traffic circulation along both avenues. Revisions associated with the site layout changes are depicted in the attachment tilted "June 17 2020 Revised/Option C Site Plans Elevations Landscaping Plans".

Option C also revises the layout and sizes of site buildings. Former building F, as depicted in the "April

28 2020 Original Triumph-Bell Rippy Civil Plan Set", is eliminated and the associated units are relocated to other site buildings addressing concerns about its proximity to the Oakhurst Townhomes. Parking previously proposed at the north end of the site has been converted to public park space. Finally, a duplex site has been designated just south of the new park space in response to the Commission's denial of the related variance request. A total of 100 units are still provided.

Minutes from each Commission meeting related to the proposed are attached for your review. Additionally, a copy of the presentation and a recording of the June 8 neighborhood access and circulation meeting are located at http://cogs.us/285/Planning-Department. A revised site plan, building elevations, and landscaping plans related to option C are attached as well as revised recommended conditions of approval addressing the proposed changes. All other provided plans, reports, minutes, etc. are also included. As a response to requests for a site visit to the subject property, staff, has provided a drone video of the property to help City Council visualize the proposed layout here: https://www.youtube.com/watch?v=Kjky7BhJBbg&feature=youtu.be.

Issues:

Planning and Zoning Commission Discussion
As detailed above, most of the Commission's discussion surrounded the access/circulation/traffic (including future improvements to Blake Avenue and the opening of the Blake gate) associated with the development. However, the Commission spent their meetings discussing the location and design of site buildings and parking, landscaping and screening/retaining walls, open space and amenities, etc.

Planning and Zoning Commission Recommendations
On May 26, 2020, the Commission voted unanimously 7-0 to recommend **approval** of the Rezoning application to City Council. On June 23, 2020, the Commission voted unanimously 5-0 to recommend **approval** of the Major Site/Architectural Plan Review application to City Council.

Staff Recommendation:

Action Alternatives
Section 070.060.030(g)(1)d of the Code outlines the review and decision procedures for applications being considered by City Council stating, “The applicable review body shall approve, approve with conditions, or deny the application based on the applicable approval criteria listed in the application specific procedures. The body may also continue the hearing or refer the application to another authority as provided in 070.060.050(a)(2)c, Referral and Call- Up Procedures."

Action 1 – Rezoning – of 2710 Blake Avenue (PIN: 2185-211-00-002) from RH Residential High-Density to RT Residential Transitional.

Staff Recommendation
Staff recommends **approval** of the Rezoning application with the findings below.

Recommended Findings
1. The rezoning is consistent with the City's comprehensive plan and the purpose of this Code;
2. The rezoning is consistent with the proposed purpose statement of the RT- Residential Transitional zone district;
3. Substantial changes in the subject area warrant a zoning change; and/or
4. The intensity of development in the new zoning district is not expected to create significantly adverse impacts to surrounding properties or the neighborhood.Action 2 – Major Site/Architectural Plan Review – to allow for the construction of 100-unit multi-family apartment and duplex units.

Action 2 – Major Site/Architectural Plan Review – to allow for the construction of 100-unit multi-family apartment and duplex units.

Staff Recommendation
Staff recommends **approval** with conditions of the Major Site/Architectural Plan Review application

with the findings and conditions below.

Recommended Findings

1. The applicant revised the site layout and street design (referred to as Option C) in response to the Planning and Zoning Commission's request for additional information related to access and circulation in the neighborhood, concerns regarding the location of various buildings, and the Commission's denial of a variance related to the number of housing types provided as follows:
a. Eliminate the full extension of Palmer Avenue from 26th Street to Blake Avenue and restrict access to the development site to the intersection of Palmer and Blake Avenues only. The remainder of the street construction in the Palmer Avenue right-of-way, above and to the north of driveway aisles, is limited to a bicycle and pedestrian path which allows fire/emergency access only. Add speed bumps along both Blake and Palmer Avenues, between 23rd and 26th Streets;
b. Revise the locations and sizes of site buildings and number of multi-family units provided to 98;
c. Eliminate building F;
d. Provide a public park as the north end of the subject property; and
e. Provide a duplex site between the proposed public park and multi-family buildings.
2. The site/architectural plan is consistent with the general purpose and intent of the Code;
3. The site/architectural plan is consistent with the dimensional, design, development, and all other standards of this Code;
4. The site/architectural plan is not in conflict with precedent land use approvals; and
5. The site/architectural plan is substantially consistent with the Comprehensive Plan and other adopted City policies and plans.

Recommend Conditions

1. Prior to occupancy of any related residential units, the applicant adhere to the following:
a. Applicant shall install/construct all traffic improvements required to accommodate the access and circulation plan outlined in Option C above, as per the City Engineer and Public Works Director.
b. The City shall open the Blake Avenue gate located south of the project site.
c. The applicant shall be responsible for improvements necessary to temporarily restrict access to one-way southbound on Blake Avenue, between 24th Street and 26th Street, until such time the City can obtain additional public input related to circulation and determine an alternative which is acceptable to the City Engineer and Public Works Director.
2. The Palmer Avenue right-of-way shall be reserved for any future circulation needs of the City, as determined necessary;
3. Prior to approval of a Construction Plans Review application, the applicant shall work with the Fire Marshall to address the design details related to the Palmer Avenue bicycle/pedestrian/emergency access road (i..e exact grade, width, surface type, etc.), the exact number and location of fire hydrants, and the location of bollards (or similar easily removable impediments) to restrict vehicular access to the bicycle/pedestrian/emergency access road;
4. Prior to the approval of a Construction Plan Review application, the applicant will enter into a maintenance agreement for the pedestrian path/fire lane, include snow removal;
5. Prior to approval of a Construction Plans Review application, the applicant shall work with staff to revise all drawings and reports, as is necessary, relative to the changes outlined in Option C in accordance with all applicable Municipal Code and Engineering Standards.
6. Applicant shall work with staff to revise the conditions list between Planning and Zoning Commission and City Council meetings to remove any duplicate or irrelevant conditions as recommended by staff for the original site plan;
7. The development shall comply with the requirements of the Code except where specific variances have been granted. Any future physical changes or improvements to the property or buildings on the parcel are subject to the review and approval of the Community Development Director for compliance with applicable requirements of the Glenwood Springs Municipal Code;
8. The applicant shall comply with all verbal representations made in the public hearings, as outlined in all application materials, and/or as revised per conditions herein and approved by the Community Development Director;

9. Prior to submitting a building or grading permit application, the applicant shall
a. Submit a Construction Plans application in accordance with Municipal Code section 070.060.050(c);
b. Enter into a development agreement with the City which shall be recorded with the Garfield County Clerk and Recorder;
c. Submit an engineer's estimate of all public improvement and submit a financial security for any required improvement not yet completed;
d. Schedule a pre-construction meeting with applicable City departments;
e. Submit combination of lots plat for the three subject parcels;
f. Submit a landscaping plan in compliance with applicable regulations at that time;
10. Prior to approval of a Construction Plans application, the applicant shall amend and obtain approval of CDOT access permits, as required.

Planning and Zoning Commission Report

Date: June 23, 2020

To: Planning and Zoning Commission

From: Trent Hyatt, Senior Planner

Subject: A. 04-20 Consideration of a Major Site/Architectural Plan Review, Rezoning from RH Residential High-Density to RT Residential Transitional, and Variance applications for the construction of 100 Multifamily apartment units in 6 buildings on approximately 5.8 acres (PIN 2185-153-04-001, 2185-153-02-008, and 2185-211-00-002)

REQUEST	Major Site/Architectural Plan Review, Rezoning, and Variances related to a 100-unit multi-family apartment development
APPLICANT	Triumph Development West, LLC
OWNER	Bell Rippy Glenwood LLC
LOCATION	Adjacent to Palmer Avenue between 26th Street and Blake Avenue (PIN: 2185-153-04-001, 2185-153-02-008, and 2185-211-00-002)
ZONE	RH Residential High-Density and RT Residential Transitional
SURROUNDING LAND USES	North: Mixed residential South: Retail East: Vacant, Bureau of Land Management West: Multi-family residential, mixed commercial
LOT SIZE	Approximately 250,034 square feet (5.74 acres)

ACTION ITEMS

Action 4 – Major Site/Architectural Plan Review – to allow for the construction of 100-unit multi-family apartment units in six buildings.

BACKGROUND

The subject proposal was first considered by the Commission at the April 28, 2020 regular meeting which was followed by a special meeting on May 5 to allow for the receipt of additional public comment. Technical difficulties interrupted the May 5 meeting and consideration of the application was continued to the May 26 regular meeting.

At the May 26 meeting, the Commission voted to approve one of the variance requests related to the location of interior parking lots while denying another related to the requirement for a minimum of two housing types. A recommendation for approval of the requested rezoning was also provided. However, prior to acting on the Major Site/Architectural Plan Review application (Action Item 4), the Commission requested the applicant and staff conduct a neighborhood meeting to discuss the options for access and circulation in the area as it relates to the project. In order to allow time for the separate traffic related neighborhood meeting, the Commission continued consideration of the request to July 28, 2020.

Following the meeting on May 26, the applicant informed staff of their need to move forward with review of the application prior to the July 28 Commission meeting. Therefore, the access and circulation neighborhood meeting was quickly scheduled and noticed for June 8. Details of the meetings are addressed below. In order, to proceed with consideration of the proposal, the applicant has re-noticed for the June 23

Commission meeting.

The neighborhood access and circulation meeting, hosted by the City via Zoom on June 8, was attended by approximately 25 citizens. While numerous options for traffic control/calming were discussed, the City, applicant, and those in attendance supported a site layout and street redesign referred to as option C. The street redesign includes an elimination of a full extension of Palmer Avenue from 26th Street to Blake Avenue and restricts access to the development site to the intersection of Palmer and Blake Avenues only. The remainder of the street construction in the Palmer Avenue right-of-way, above and to the north of driveway aisles, is limited to a bicycle and pedestrian path which allows fire/emergency access only. In this scenario, the City supports the addition of speed bumps on both Blake and Palmer Avenues between 23rd and 26th Streets. Some members of the public also support a one way along Blake Avenue between the same numbered streets, as per the 2018 development approval. However, the City prefers two-way traffic circulation along both avenues.

Option C also revises the layout and sizes of site buildings. Former building F is eliminated and the associated units are relocated to other site buildings addressing concerns about its proximity to the Oakhurst Townhomes. Parking previously proposed at the north end of the site has been converted to public park space. Finally, a duplex site has been designated just south of the new park space in response to the Commission's denial of the related variance request. A total of 100 units are still provided.

Minutes from the June 8 meeting are attached for your review. Additionally, a copy of the presentation and a recording of the meeting are located at http://cogs.us/285/Planning-Department. A revised site plan, building elevations, and landscaping plans related to option C are attached as well as revised recommended conditions of approval addressing the proposed changes. All other previously provided plans, reports, minutes, etc. are also included.

PROJECT SUMMARY

REVIEW CRITERIA AND STAFF ANALYSIS

REVIEWING AGENCY COMMENTS

ACTION ITEMS & STAFF RECOMMENDATIONS

Suggested Findings:

Suggested Motion
Planning Item #04-20, Triumph-Bell Rippy
Planning and Zoning Commission
June 23, 2020

Action 4 – Major Site/Architectural Plan Review – to allow for the construction of 100-unit multi-family apartment units in six buildings.

Motion to Approve:
I move to recommend City Council approve the Major Site/Architectural Plan Review application for the construction of 100 multi-family and duplex units, as amended in Option C, with the findings and conditions outlined on pages 1 and 2 of the June 23, 2020 revised suggested motions included of the staff report packet.

Findings:

1. The applicant has revised the site layout and street design (referred to as Option C) in response to the Planning and Zoning Commission's request for additional information related to access and circulation in the neighborhood, concerns regarding the location of various buildings, and the Commission's denial of a variance related to the number of housing types provided as follows:
   a. Eliminate the full extension of Palmer Avenue from 26th Street to Blake Avenue and restrict access to the development site to the intersection of Palmer and Blake Avenues only. The remainder of the street construction in the Palmer Avenue right-of-way, above and to the north of driveway aisles, is limited to a bicycle and pedestrian path which allows fire/emergency access only. Add speed bumps along both Blake and Palmer Avenues, between 23rd and 26th Streets;
   b. Revise the locations and sizes of site buildings and number of multi-family units provided to 98;
   c. Eliminate building F;
   d. Provide a public park as the north end of the subject property; and
   e. Provide a duplex site between the proposed public park and multi-family buildings.
2. The site/architectural plan is consistent with the general purpose and intent of the Code;
3. The site/architectural plan is consistent with the dimensional, design, development, and all other standards of this Code;
4. The site/architectural plan is not in conflict with precedent land use approvals; and
5. The site/architectural plan is substantially consistent with the Comprehensive Plan and other adopted City policies and plans.

Conditions of Approval:
1. Prior to occupancy of any related residential units, the applicant shall install/construct all traffic improvements required to accommodate the access and circulation plan outlined in Option C above, as per the City Engineer and Public Works Director. Additionally, the City shall open the Blake Avenue gate located south of the project site;
2. The Palmer Avenue right-of-way shall be reserved for any future circulation needs of the City, as determined necessary;
3. Prior to approval of a Construction Plans Review application, the applicant shall work with the Fire Marshall to address the design details related to the Palmer Avenue bicycle/pedestrian/emergency access road (i..e exact grade, width, surface type, etc.), the exact number and location of fire hydrants, and the location of bollards (or similar easily

removable impediments) to restrict vehicular access to the bicycle/pedestrian/emergency access road;

4. Prior to the approval of a Construction Plan Review application, the applicant will enter into a maintenance agreement for the pedestrian path/fire lane, include snow removal;
5. Prior to approval of a Construction Plans Review application, the applicant shall work with staff to revise all drawings and reports, as is necessary, relative to the changes outlined in Option C in accordance with all applicable Municipal Code and Engineering Standards.
6. Applicant shall work with staff to revise the conditions list between Planning and Zoning Commission and City Council meetings to remove any duplicative or irrelevant conditions as recommended by staff for the original site plan;
7. The applicant shall comply with/address all City staff comments related to specific Code requirements prior to approval of a Construction Plans application;
8. The development shall comply with the requirements of the Code except where specific variances have been granted. Any future physical changes or improvements to the property or buildings on the parcel are subject to the review and approval of the Community Development Director for compliance with applicable requirements of the Glenwood Springs Municipal Code;
9. The applicant shall comply with all verbal representations made in the public hearings, as outlined in all application materials, and/or as revised per conditions herein and approved by the Community Development Director;
10. Prior to submitting a building or grading permit application, the applicant shall
    a. Submit a Construction Plans application in accordance with Municipal Code section 070.060.050(c);
    b. Enter into a development agreement with the City which shall be recorded with the Garfield County Clerk and Recorder;
    c. Submit an engineer's estimate of all public improvement and submit a financial security for any required improvement not yet completed;
    d. Schedule a pre-construction meeting with applicable City departments;
    e. Submit combination of lots plat for the three subject parcels;
    f. Submit a landscaping plan in compliance with applicable regulations at that time;
11. Prior to approval of a Construction Plans application, the applicant shall amend and obtain approval of CDOT access permits, as required.

Motion to Deny:

I move to recommend City Council deny the Major Site/Architectural Plan Review application for the construction of 100 multi-family units finding [**please state your findings here**]:….

From: Gretchen E Ricehill
To: Jennifer Ooton; Trent Hyatt
Subject: FW: Bell Rippy / Triumph Development by Walmart
Date: Monday, June 8, 2020 8:05:58 AM

FYI

-----Original Message-----
From: Clara Trujillo <clarajtrujillo@hotmail.com>
Sent: Monday, June 8, 2020 12:42 AM
To: Gretchen E Ricehill <gretchen.ricehill@cogs.us>
Subject: Bell Rippy / Triumph Development by Walmart

Dear Ms. Ricehill,

I write to you today to express my concern regarding the traffic flow proposal of routing traffic along Blake Avenue and Palmer Avenue, that accompanies the Bell Rippy / Truimph Development plan.

I am a resident of 2203 Crestwood Drive and the mother of four young children. As do many other residents of the neighborhood, we frequently walk and ride our bikes around the park of Crestwood Drive and Palmer Avenue where the traffic flow changes have been proposed. There are no sidewalks along that section of road and it is very narrow which makes it very difficult to avoid the traffic that currently uses it.

When the Grand Avenue bridge was closed last year, we experienced a huge increase in traffic on this section of road. It made for very unsafe conditions for pedestrians due to speeding vehicles and drivers not following the rules of the stop sign at the end of the road. If the traffic flow is directed through Palmer Avenue then these unsafe conditions will become worse and permanent.

I am not against the development, however, routing traffic through Palmer and Blake Avenue will be detrimental for the entire neighborhood surrounding this area, and I would like to put my support forward for a different solution.

Thank you very much for your time,

Sincerely,

Clara Trujillo
2203 Crestwood Drive
970-319-5808

Sent from my iPhone

From:	Jennifer Ooton
To:	Gretchen E Ricehill; Trent Hyatt
Subject:	FW: Traffic access and circulation on Blake Avenue between 24th and 27th St. and opening Blakegate
Date:	Monday, June 8, 2020 7:52:39 AM

Please add this to the upcoming agenda for P&Z.
Thanks,
Jenn

-----Original Message-----
From: Mary Anne Taylor <taylor.maryanne@gmail.com>
Sent: Monday, June 8, 2020 7:41 AM
To: Jennifer Ooton <jenn.ooton@cogs.us>
Subject: Traffic access and circulation on Blake Avenue between 24th and 27th St. and opening Blakegate

As our family has lived on Blake Avenue for over 70 years we are very concerned about the city's proposal to open Blake to 2 way traffic and opening the gate. We would like to have our comments on record.

I would hope that your committee has spent time in this area both driving and walking and can appreciate that the street is in extremely poor condition, is very narrow and there are no sidewalks or street lights. No maintenance has occurred on this street for probably 30 years except for the occasional filling of a pothole or two. It is like driving down a mine field. With the RFTA station and Walmart there are a number of pedestrians trying to walk and dodge potholes and oncoming cars. With the pandemic, more and more people are walking which can be dangerous with increased traffic.

As previous Bell Rippy LLC owners, when the gate was installed the property owners were assured it would only be opened for emergencies. After earlier discussions at meetings with city for the last developer, it was our understanding that the gate would not open until the project was completed. With the gate open we can only imagine the increase in traffic and speed. During the bridge construction there was a steady stream of traffic morning and night. It was very difficult for two cars to pass on such a narrow thoroughfare.
The speed limit is 15 mph which is never enforced and the 3 way stop at 24th and Blake seems to be optional.

Perhaps our subdivision could go back to the original with a gate across 26th and all traffic from Oakhurst and the new development and Walmart area could access Glen Avenue on 27th.

Otherwise the only option we could support would be the one way south bound with speed deterrents. As mentioned above the pedestrians and children are at risk with the narrow street and increased two way traffic. We would also hope that improvements are made to the street.

Mary Anne and Paul Taylor
2418 Blake
Glenwood Springs

From:	Jennifer Ooton
To:	Gretchen E Ricehill; Trent Hyatt
Cc:	Terri Partch
Subject:	FW: Traffic impacts and circulation surrounding the proposed Triumph Bell Rippy project
Date:	Monday, June 8, 2020 9:56:12 AM

Please include with the P&Z packet.

From: Phil Harris <Phil@bu-inc.com>
Sent: Monday, June 8, 2020 9:55 AM
To: Jennifer Ooton <jenn.ooton@cogs.us>; Hannah Klausman <hannah.klausman@cogs.us>
Subject: Traffic impacts and circulation surrounding the proposed Triumph Bell Rippy project

To the City of Glenwood Springs regarding the traffic impacts and circulation surrounding the proposed Triumph Bell Rippy project: Please read into the record for tonight's virtual meeting:

My name is Phil Harris and we have lived at 2501 Blake Avenue for 23 years.

Blake Avenue between 24th and 26th Streets is a neighborhood road with a posted speed limit of 15 MPH. The road is in dire condition; it is very narrow (only 16 feet wide in one section) and has no sidewalks. It is not a safe corridor for pedestrians, and especially our local children and animals and those of us walking our pets. The ROW width is not standard and I am under the impression that a full road reconstruction with standard drive lanes, curb and gutter, sidewalks and drainage improvements can not physically fit within the available ROW.

The 'old timers' of the neighborhood told us that when Walmart was built and the gate on Blake was installed there was an agreement that that gate would never be opened permanently. Time has evolved and this no longer appears to be the case. The gate will be opened. When this happens, it will inevitably increase traffic on this potion of roadway.

Although there currently is a City Council agreement to turn the stretch of road between 24th and 26th Streets into a one-way south designation, there is discussion that this portion of Blake should be kept as two way to help with traffic circulation and Highway 82 bypass traffic.

The written stated GOAL of the City Street Design Standards is to encourage walking and biking and a safe balance for all street users. The first FIVE written OBJECTIVES of the City street standards are to optimize safer routes and create intermodal connections with enhanced pedestrian safety and encourage non-motorized modes of travel.

Increasing traffic and allowing this portion of Blake to become even more of a Highway 82 bypass than it currently is, is an intenable situation. It defeats the goals and all of the objectives of the City's policies by sacrificing the neighborhood for additional traffic circulation. Traffic should be concentrated on Highway 82 where it was intended and not invited to the back streets of a 15 MPH neighborhood.

When the Blake gate is opened, this section of roadway should be designated as one-way south. Assuming one day the road may be upgraded, the future design should be for a single lane with a bicycle path and a sidewalk that will be wide enough for emergency access and will support all the goals and objectives of the City and keep the neighborhood residents safe.

Thank you.

From:	Jennifer Ooton
To:	Gretchen E Ricehill; Trent Hyatt
Cc:	Terri Partch
Subject:	FW: Triumph Bell Rippy Project Access and Circulation Discussion for Monday June 8, 2020
Date:	Monday, June 8, 2020 10:55:56 AM

Please include in the upcoming P&Z packet.

From: Carol Turtle <c.turtle@icloud.com>
Sent: Monday, June 8, 2020 10:52 AM
To: Jennifer Ooton <jenn.ooton@cogs.us>
Subject: Triumph Bell Rippy Project Access and Circulation Discussion for Monday June 8, 2020

To: Jenn Ooton and Hannah Klausman

I was informed that some in our community are revisiting an upgraded 2-way street on Blake Avenue, which has prompted my letter. I own two properties that will be impacted by enlarging Blake Avenue to accommodate 2-way traffic and the much needed curb and gutter, sidewalks, and necessary drainage structures. My properties are located at 2429 Blake and 501 Easy Street. While this obviously concerns me, I believe there is a better solution that will benefit the City of Glenwood Springs, and the neighborhood.

Since zero notice was given to me (I just found out about the Zoom Meeting Saturday from a neighbor), I haven't had the necessary time to investigate whether the width of the Blake Avenue right-of-way will support these changes. Without confirming this first, if the current right-of-way is not adequate enough, portions of properties would have to be acquired through eminent domain, which would force the owners to sell to the city to make room for the infrastructure improvements. This would increase the costs of the project substantially.

Instead, I suggest we revisit the original proposal of one-way traffic flow south from 23rd Street to 26th Street. That proposal was put forth to affected residents along Blake by the first developers and was the major reason I and a number of residents gave our approval to the project 2 years ago.

If a 2-way road is built, not only would this section of Blake have increased traffic accessing the new 102 units at Triumph Bell Rippy, BRT Station, and Walmart, but it would generate additional commuter traffic trying to avoid the Grand Avenue congestion. This phenomenon has already degraded other neighborhoods in Glenwood Springs.

Additionally, I suggest adding a dedicated bicycle lane, which would be more congruent with the City's overall push to increase bicycle use. This would not only reduce traffic congestion but also the number of vehicles parking at the BRT Station, which already has inadequate parking. Unfortunately, the city has allowed the only bicycle corridor on the east side of town to deteriorate making it unsafe. Please consider being more forward thinking by not putting more vehicles into another quiet and established neighborhood.

I plan to join the Zoom Meeting, but we are on a congested CenturyLink Network and I might be unable to stay connected. This letter is my only opportunity to voice my concerns and to give suggestions.

Best,

David J. Turtle
Glenwood Springs, CO

From:	Jerry and Jamie Raehal
To:	Trent Hyatt; Terri Partch
Subject:	follow up questions
Date:	Monday, June 8, 2020 6:51:45 PM

Good evening,
First, allow me to say thank you for facilitating the meeting this evening. I have a few follow up questions regarding Option C.

I assume based off the comments made this evening that Option C will be presented at the P&Z meeting, is that correct?

Will it be possible (or likely) to create a regular city street on the portion of Palmer that will be a walking/biking path (in the project area) at a future date, say 5-20 years in the future?

It has been said something to the effect of 'the developers will go ahead with the plan that is already approved if this more recent one is not allowed to move forward by a certain date.' Can you tell me what that date is and what needs to occur by this date?

Sincerely,
Jamie Raehal

June 8, 2020

Public Comment Re: Triumph Bell Rippy Project Access & Circulation Discussion of June 8, 2020

From: Annie Hoghaug, Owner of 519 Easy Street, Glenwood Springs

Contact Info: 970-945-5649 (home)
970-948-7888 (mobile)
3milebooks@comcast.net
678 County Rd 127, Glenwood Spgs, CO 81601

To: Trent Hyatt

Thank you to city staff; to the P&Z Commissioners; and to Michael O'Connor and his team for, not only listening to the plethora of public comment associated with the Bell Rippy proposal, but ACTING on making this a project that the existing neighborhood can feel better about.

I own 519 Easy Street and have some additional comments regarding access and circulation – specifically regarding Blake Avenue, but also regarding Palmer Avenue because I care about my neighbors.

My big concern at this point is related to Terri Partch stating that she would like to see Blake Avenue remain open to 2-way traffic – yikes! I was starting to think I would get through this meeting without my blood pressure rising, but nope… 2-way traffic on this section of Blake Avenue WITH an OPEN Blake Gate will severely compromise alternate modes of transportation (i.e. walking & biking) and be devastating to our sense of neighborhood as well as the safety of our children.

Again, before I go on, I STILL have some lingering confusion about whether the proposed 1-way section is from 23rd to 26th OR from 24th to 26th. The maps shown at the meeting certainly seem to indicate 23rd as the 1-way start point. My below comments are consistent with either start point, so irrelevant to my comments. It would just be nice to know. And to be clear, Easy Street intersects Blake Ave between 24th and 26th streets.

Some background: I do not currently live in my Easy Street house though I plan to move back to Easy Street on a 1 to 2-year time frame. I did live in my Easy Street house from 2003 through 2005 when my daughter was in Kindergarten, First and Second grades. The nearest school bus stop was at 23rd and Blake so we made the trek along Blake Avenue. Even then I was grateful for the potholes, bumps and rocks that slowed drivers down and allowed me, my daughter, my dog and other neighborhood school kids to feel good about walking to and from the school bus stop.

An open Blake Gate and 2-way traffic along this section of Blake Ave will be an open invitation to "cheater" northbound Hwy 82 traffic to hop onto Blake Ave at McDonalds and just stay on it ALL the way through town! Some (Terri?) may consider this an effective way to move traffic headed to points west of Glenwood Spgs through our town. Others, myself included, see this as a huge negative impact to affected neighborhoods throughout Glenwood Springs, INCLUDING the proposed Bell Rippy project! AND, the section of Blake Avenue from 26th to 24th streets is narrow! Potentially, the city of Glenwood Spgs could take full advantage of existing right of ways along this section of Blake, but I suspect there

would still be inadequate room for 2 lanes of traffic; sidewalk & gutter; AND a bike lane! I am compelled to remind all of us of the developer's intent for their project to be walk, bike and public transit friendly. I would add that their plan for this type of project IS consistent with stated goals of the 2011 City of Glenwood Spgs Comprehensive Plan.

How does the open Blake Gate and 2-way traffic along this section of Blake Ave enhance those goals? Simply put, it would be devastating to those goals!

So, to summarize:

- It is clear to me that the Blake Gate **will** open.
- I strongly support Blake Avenue between 23rd and 26th streets becoming a ONE-WAY southbound!
- A one-way southbound could possibly allow space for a sidewalk & gutter and a dedicated bike lane at some point.

Again, anyone involved here should walk this section of Blake Avenue prior to passing judgement.

Regarding Palmer Avenue… I understand that "cheater" traffic does and will continue to utilize Palmer Ave as an alternate route through Glenwood Spgs. However, I believe that it is not going to be quite the obvious open invite that a non-gated Blake Ave would provide. Additionally, I believe the Bell Rippy alternate plan 'C' that limits the northeast portion of Palmer Avenue to non-motorized travel and emergency uses only will be a huge stride toward preserving the Palmer Ave neighborhood and discouraging "cheater" traffic from opting for this route.

So, to summarize re Palmer Ave:

- Triumph goes with alternate plan 'C'
- Palmer Ave remains a 2-way street
- Utilize speed bumps to slow traffic and discourage cheaters.

Respectfully,

~ Annie Hoghaug

From:	Gretchen E Ricehill
To:	Jennifer Ooton; Trent Hyatt
Cc:	Anna S. Itenberg
Subject:	FW: The Bell-Rippy / Triumph proposal
Date:	Monday, June 1, 2020 8:07:55 AM

From: Marilyn Shettel <shettellbs@gmail.com>
Sent: Saturday, May 30, 2020 10:30 PM
To: Gretchen E Ricehill <gretchen.ricehill@cogs.us>
Subject: Re: The Bell-Rippy / Triumph proposal

Dear Gretchen,

It is unlawful to make any decisions on a property development during an international Pandemic when the affected neighbors and those who are most vulnerable to the virus cannot meet in person with the Planning Commission and other city authorities.

Sincerely,

Marilyn Shettel
970-945-7048

MINUTES
City of Glenwood Springs
Planning and Zoning Commission
Regular Meeting
June 23, 2020
Zoom
6:00PM

1. **Roll Call**

Present at roll call were Commissioners:	Marco Dehm, George Shaver, Carolyn Cipperly, Kathryn Grosccup, Sumner Schachter
Absent at roll call were Commissioners:	Amber Wissing, Ingrid Wussow, Ben West, Dean Kinkel
Also present were:	Jenn Ooton Asst. City Manager, Gretchen Ricehill Asst. Economic/Community Development Director, Terri Parch City Engineer, Trent Hyatt Senior Planner, Anna Itenberg City Attorney, Emery Ellingson Planner I, Jessica Bowser Asst. City Engineer, Matt Langhorst Public Works Director

2. **Receipt of Minutes- Receipt of May 26, 2020 minutes.**

   Commissioner Shaver made the motion to receive the May 26, 2020 minutes. Commissioner Schachter seconded the motion.

   Motion passed unanimously

3. **Public Comments**
   Comments from citizens appearing for items not on the agenda. No citizens appeared for items not on the agenda.

DRAFT

4. **Continued Items –**

   a. *04-20 Consideration of a Major Site/Architectural Plan Review, Rezoning from RH Residential High-Density to RT Residential Transitional, and Variance applications for the construction of 100 Multifamily apartment units in 6 buildings on approximately 5.8 acres (PIN 2185-153-04-001, 2185-153-02-008, and 2185-211-00-002)*

Applicant: Triumph Development
Owner: Bell Rippy Glenwood, LLC
Location: Adjacent to Palmer Avenue between Blake and 26th
Zone: RH Residential High-Density and RT Residential Transitional

Trent Hyatt provided an update on the progression of the review of the application. Hyatt summarized that the application was first heard on April 28th, 2020 and was continued to the May 5th meeting to allow for more public input. The May 5th meeting was cut short due to an internet outage and was continued to the May 26th meeting. At the May 26th meeting the Commission requested that staff hold a neighborhood meeting to gather more input regarding the project and proposal.

Hyatt stated that a neighborhood meeting was held on Monday, June 8th with the neighborhood to discuss options for the neighborhood regarding traffic circulation and other concerns. Hyatt indicated that there were approximately 20 individuals in attendance at this meeting. The new site plan that resulted from this meeting included, as summarized by Hyatt, the elimination of a building, expanded footprint of other buildings, changes to Palmer Avenue by creating a non-through street, adding emergency access and pedestrian access to only the upper section of Palmer, and changes to existing parking areas. Hyatt indicated that the proposed changes and input from this meeting were all contained in the staff report.

Commissioner Schachter expressed his opinion on the new proposal's improvements to the transportation network. City Engineer Terri Partch addressed Schachter's concerns and stated that staff conducted a site visit to investigate possible improvement options. Partch suggested that Blake could be signed one way southbound until improvements occurred and stated some concerns that traffic coming off Highway 82 could funnel to Palmer.

Commissioner Grosscup also expressed concerns about the status of the Blake gate being open in conjunction with this project. Commissioner Shaver asked for the width of the right-of-way of Blake between 24th and 26th Street. Assistant Engineer Jessica Bowser confirmed that the right-of-way was 50'. Terri Partch confirmed that the asphalt at that part of Blake was approximately 20'. Shaver asked if the right-of-way extended near the houses on that street, which Partch confirmed. Partch mentioned the possibility of a temporary one-way on Blake and explained that if that would be a permanent change, that additional solutions would be considered. Shaver also asked if speed bumps would be considered for Blake. Partch explained that temporary speed bumps which can be installed for a summer and removed during the winter could be an option. Trent Hyatt also explained that there was concern from the neighborhood about possible effects of creating a one-way street in the neighborhood.

Commissioner Cipperly expressed concern about two-way traffic on Blake Avenue and the dangerous environment for pedestrians in that area. Cipperly also asked about any previous City Council direction to make Blake one way.

Commissioner Shaver asked if the one-way on Blake would extend from 24th or 23rd. Terri Partch confirmed that a one-way for this project would likely extend from 24th to 26th rather than from 23rd to 26th.

Commissioner Schachter asked if the local transportation plan had a draft and Partch confirmed there was a draft that would go before City Council at an upcoming meeting. Partch also indicated that any plan regarding turning Blake into a one-way street would likely require more public input, specifically to involve more of the Palmer neighborhood in the discussion.

Commissioner Dehm asked if there were any previous documents that prohibited the removal or alteration of the Blake Gae. Assistant City Engineer Jessica Bowser confirmed that nothing had been documented or recorded during the installation of the Blake Gate to prohibit the removal or alteration of the Blake Gate.

Commissioner Dehm asked if Staff would have issues with the reconfigured plan. Partch explained that Palmer was not on a schedule for improvements and explained the situations that would likely trigger that being added to that schedule such as a rapid increase in property value in the area.

Dehm then invited the applicants to share their comments.

Michael O'Connor from Triumph Development, LLC presented on the changes to the plan based on the results of the previous Planning & Zoning meeting and neighborhood meeting held on June 8th. provided a summary of the questions and comments from Planning & Zoning and public feedback that would be addressed.

O'Connoer explained how a traffic management plan was created by combining staff and public input, which resulted in the creation of four different options for traffic management. These four options that were created included:

- Existing current entitlements
- Option A: Neighborhood speed calming with speed bumps
- Option B: Coupled one-way streets with striped pedestrian and bike lane on Blake southbound and Palmer northbound
- Option C: Redesign of Palmer Avenue through the site.

At the public meeting held on June 8th, there was substantial support for the current plan with support for adding speed calming on Palmer as well as redesigning Palmer through the site.

Mike Foster, Triumph West Architecture, spoke to explain proposed site plan modifications which include the following changes:

- Elimination of Building F resulting in five apartment buildings with a total of 98 units
- Decrease in size of Building B from 12 units to 10 units
- Enlargement of Buildings A & E
- Addition of a duplex building to replace Building F
- Elimination of north parking lot to be replaced with green space

- Enhanced landscape buffers between the project and existing Oakhurst townhomes
- Reconstruction of Palmer Avenue within the site including 10' bike path
- Location of Community Room and management office

O'Connor also explained that with the change in units and parking configuration that the property now exceeds parking requirements by 11%. O'Connor stated that there will be a property manager on-site that will manage community parking through tools such as lease requirements, assigned parking, and paid parking. O'Connor also provided Commission a summary table of how the proposed plan compares to the previously approved plan. O'Connor continued to explain that since this project is based in an opportunity zone, that the project was under a time constraint due to financing requirements and deadlines. O'Connor concluded by thanking Commission for their time and expressed the opinion that the new proposed plan was superior to previous versions.

Stephanie Copeland, Triumph Development, voiced support for the proposed plan of the applicant.

Commissioner Grosscup asked how peak hour traffic would impact this site and if there would be queuing up at the entrance. Grosscup asked to confirm that the park part of the design would be open to the public and maintained by the applicant. Grosscup also asked about the surface of the proposed bike trail. O'Connor confirmed that the park would be open to the public and maintained by the applicant and that the bike trail surface was still under consideration. Grosscup also asked to confirm the one-way status of Blake Avenue. O'Connor confirmed that the proposal was to have Blake be one-way.

Commissioner Shaver asked the applicant to confirm about a specific area on the site plan that was indicated by cross-hatching. O'Connor explained that area was an additional debris flow area. Shaver also asked about designated snow storage areas. Foster explained that there were existing snow storage areas which would be included in the final plan. Shaver also asked about coordination with other Departments including Fire and Emergency. Hyatt confirmed that final plans would need to receive approval from those Departments and were in support of the general details of the plan.

Community Development Director Jen Ooton asked for Commission to clarify if the condition to designate a one-way street on Blake would be temporary or permanent.

Commissioner Schachter asked to confirm that the condition of approval would include one-way Blake.

Commissioner Dehm asked for clarification if approval of the proposed project tonight would be the resulting development. Hyatt explained that the vested right of the previous approval expires January 2021 and believed that either the proposed plan or the previously approved plan could be developed by the applicant. City Attorney Anna Itenberg explained that this proposal could not have a condition placed on it that would undo the approval of the previous plan. Michael O'Connor confirmed that the proposed plan was what the applicant would be looking to build. Stephanie Copeland also confirmed that the proposed project, in its most recent version, is what the applicant was looking to build.

Dehm also asked to confirm that this plan would result in the removal of the Blake Gate which was confirmed by Hyatt.

Dehm stated that public comment portion had already been closed and that there would be no additional public comment on the item.

Commissioner Schachter made a motion to pass with the findings and conditions of the revised suggested motions and staff report from June 23rd with a modification that Condition of Approval #1 include that Blake from 24th to 26th be made one-way south bound until a more permanent solution is devised. Commissioner Cipperly seconded the motion. Commissioner Shaver asked about the finding and conditions listed in the staff report.

Motion was called to a vote. Commissioner Grosscup, Shaver, Cipperly, Schacher, and Dehm voted to approve the motion.

Motion passed 5-0

5. New Items

a. *14-20 Consideration of a Minor Site/Architectural Plan Review for a 2,838 square foot expansion of an existing commercial building (PIN: 2185-053-41-001 and 002)*

Applicant: Kinetic Design (formerly EI Design)
Owner: Halle Properties, LLC
Location: 51537 Highway 6
Zone: M1 Mixed Use Corridor

Planner I Emery Ellingson briefly explained the proposed project and proposed location.

Commisisoner Dehm opened the discussion to the applicant for questions. Steve Appel, 1260 Corona Point Court, Corona, CA, representing Kinetic Design explained the extension of the building was to create more space for tire storage. This extension would result in moving the current transformer and trash enclosure. Appel also noted that this addition would result in the removal of some storage containers currently used for tire storage, which is a zoning code violation.

Commissioner Dehm asked if the proposed addition would match the existing building's design, which was confirmed by the applicant.

Commissioner Grosscup asked staff regarding the procedure of Planning & Zoning Commission in reviewing this application since the existing building was less than 10,000 square feet. Emery Ellingson explained that because the addition created a building that was over 10,000 square feet that would require it to go before Planning & Zoning Commission. Grosscup stated that in the future, it might be a good idea to reconsider this requirement in code revisions as this project was a basic build out addition.

Commissioner Cipperly asked for confirmation about changes to the building design had been addressed. Emery Ellingson explained that under code, since this addition was less than 50% of the original footprint, the applicant is not required as condition of approval to meet all design requirements.

Gretchen Ricehill commented that changing the language on square foot threshold for additions that push a building over 10,000 square feet would be a future code revision amendment.

Commissioner Schachter had a question regarding the landscape plan about the number of trees

indicated in the landscape plan as indicated in the staff report. Emery Ellingson confirmed that there were 36 proposed trees in the landscape plan and 30 trees were required by code.

Commissioner Dehm opened the discussion for public comment.

Anne Leuter, 51579 Highway 6, asked about the development of the back lot on the property as they had received public notice regarding this application.

Bryce Christensen, 1600 Kerns Road, Snowmass, CO representing Kimley-Horn explained that the back lot on the property was not for sale or part of the property.

Commissioner Dehm closed the public comment portion.

Commissioner Grosscup made a motion to approve the item. Motion was seconded by Commissioner Schachter.

Motion was called to a vote. Commissioner Grosscup, Shaver, Cipperly, Schacher, and Dehm voted to approve the motion.

Motion passed 5-0

At approximately 7:45 PM, Commissioner Dehm called for a five-minute recess.

b. *30-20 Consideration of a Location & Extent Review application for construction of an 1,800 sf covered storage building, a 5-bay 2,250 s.f. garage storage building, a 3,200 s.f. temporary canvas covered buildings, and temporary mobile and storage units. The application includes moving and extending an existing chain link fencing on the north property line and constructing a concrete pad for street sweeper use.*

    Applicant: City of Glenwood Springs, Public Works Department
    Owner: City of Glenwood Springs
    Location: 811 Airport Road and is legally described as a 61.735 acre tract in Section 22 & 27, twp 6, Range 89, Garfield County, Colorado
    Zone: IL- Light Industrial

Assistant Director Ricehill explained that this application is a location and extent review that this is an opportunity for Planning & Zoning Commission to review projects by public entities. Ricehill described the status and use of the area, colloquially known as “The Boneyard”. Ricehill explained the City proposal to add buildings as described in the application for use by City departments.

The current use of the property is office, sign shop, and outdoor storage. The application calls for the following improvements:

- Covered storage
- 5-bay garage/storage
- Canvas-covered temporary storage
- 20 x 20 concrete pad
- Extension of existing fence

Ricehill stated that the proposed use does conform to the future land use map shown in the Comprehensive Plan and that the proposed project complied with zoning district standards. Ricehill also explained that the proposal does not meet the nonresidential design standards, fencing standards, or landscaping. Ricehill proposed approval with suggested conditions as listed in the staff report.

Commissioner Cipperly asked to confirm which buildings on the site plan were existing compared to a photograph from the staff report. Ricehill confirmed which buildings were in the photos compared to the site plan.

Commissioner Schachter asked if this project was related to existing excavation on south end of the airport. Matt Langhorst, Public Works explained that some of the vegetation on the site had been removed and there was some reworking of the northeast corner of the site as preliminary site preparation. Commissioner Schacter also asked if these improvements were intended to be temporary or permanent in the face of possible future development and improvements associated with the airport and South Bridge. Matt Langhorst explained that regardless of surrounding development that the functions of these buildings would be to supply storage that will be lost with the elimination of the MOC. Commissioner Schachter also asked if this application were approved if it could be criticized as an example of the City not following its own standards.

Commissioner Grosscup asked how many staff would be based at the site. Matt Langhorst explained that there would be 12 staff members based on site as well as additional employees visiting the site to utilize the storage. Langhorst also explained that if and when the South Bridge improvements were completed, the road to access this site would not be a part of that project and that the gate to the access to the site would allow for a semi-trailer to be able to enter and exit the facility.

Commissioner Shaver commented that there seemed to be a double standard in terms of this project not adhering to code design requirements. Shaver also asked if there were concerns over the capacity of the road to accommodate heavy vehicle traffic. City Engineer Terri Partch explained that the road is currently maintained by Public Works and that this proposed project would not cause a large impact on the road. Partch also mentioned that there will be future road improvements in the area as part of the South Bridge project. Shaver also asked how permanent some of these improvements would be given the possibility of future development.

Commissioner Dehm opened the public comment portion of the meeting.

Greg Rippy, 213 Creekside Court, Glenwood Springs, and owner 61 116 Road, a property across the road from this development. Rippy expressed general support for the project and had questions about the existence of temporary storage containers in use on a City site. Rippy had questions why the Airport and other private entities had not been able to use similar temporary storage containers.

Commissioner Dehm closed the public comment portion of the meeting.

Commissioner Cipperly asked to confirm the location of project in comparison to the proposed road of the South Bridge project. Cipperly had concerns about how close this site would be to the new road, which would be an entrance to Glenwood Springs and stated some concerns about the visuals of the site.

Commissioner Schachter stated, in response to the public comment, that he did not recall the current Planning & Zoning Commission considering any temporary storage containers at the Airport.

Jenn Ooton mentioned that there was a planned joint session with City Council and the Airport Commission which would discuss hanger space and other storage space. Ooton explained that was scheduled for the month of August.

Commissioner Dehm asked for an update on the status of the South Bridge project. Terri Partch explained that the project was starting preliminary design processes in cooperation with CDOT and anticipated that plans would be complete sometime in 2021. Dehm also asked if the reason why most of these buildings were temporary was due to budget restraints, which was confirmed by Matt Langhorst. Langhorst also explained that the temporary storage containers would be painted and be made to look more like buildings rather than a plain storage container on the site.

Commissioner Schachter asked if there would be any difficulty to approve with a condition to recognize that approval would be conditional on the applicant to return to review for compliance with code. Jen Ooton explained that it could be a condition to revisit this application again within a specific timeframe. Schachter explained that the condition would not necessarily require the project to meet code, but at least an additional review within a five year period since this application has been submitted under emergency circumstances given City finances and the physical condition of the MOC building.

Commissioner Grosscup explained that this project, in comparison to the previous location and extent review at Devereux, was different due to its location and that Grosscup did not find as much of an issue with the compliance issues in terms of design. Grosscup stated that this location is out of the way and it is likely that if this were a private applicant, that some concessions on design could be made. Langhorst commented that budget was a severe constraint with the project which is why the proposal does not fully meet all design requirements.

Commissioner Shaver asked if the location and extent review was required for the temporary buildings already on site. Langhorst explained that those structures were placed in response to the short timeline of having to relocate from the MOC. Langhorst explained that they did not go through location and extent but did have a permit to install.

Commissioner Shaver made a motion to approve the item with all findings and conditions listed in the staff report with the additional condition that the application be required for another review within five years. Commissioner Schachter seconded the motion.

Grosscup asked to confirm about the additional condition and Schacter explained that the condition would require a re-application. City Attorney Anna Itenberg also asked about the specifics of the condition as well.

Commissioner Cipperly asked if the north and west fences should be required to have wind slats for additional screening as they face the road. Commissioner Shaver expressed support for the additional condition to require applicant to come back within five years. Commissioner Dehm expressed support for the application given the current state of the MOC and budget constraints.

Motion was called to a vote. Commissioner Grosscup, Shaver, Cipperly, Schacher, and Dehm voted to approve the motion.

Motion passed 5-0

6. Commissioner Comments

Commissioner Cipperly commented that it will be interesting to see within five years how the development around the area will progress. Cipperly also expressed thanks to all involved with the Bell-Rippy project. Commissioner Schachter stated support for another future joint workshop with Planning & Zoning Commission with the Housing Commission. Schachter also asked about future development in West Glenwood. Commissioner Grosscup stated that part of the reason behind the Bell-Rippy development was due to their location within an opportunity zone and was glad to see additional housing coming to the community. Commissioner Shaver stated appreciation to the applicant of the Bell-Rippy development for making such an effort to gather public input and incorporate it with their application. Commissioner Dehm also expressed appreciation of all parties involved with the Bell-Rippy application for their patience and willingness to adapt the application. Commissioner Dehm also expressed support for a future joint workshop on housing. Dehm also expressed a desire to have a discussion on the existing variance criteria.

Jen Ooton expressed appreciation for everyone involved with the Bell-Rippy application. Jen Ooton also invited commission members to join the City listening session on COVID-19.

7. Adjournment

Meeting was adjourned at 9:03 PM.

DRAFT

TRIUMPH

Triumph Development
www.triumphdev.com

To: COGS Planning Staff

From: Triumph Development West, LLC

Date: June 17, 2020

RE: Bell Rippy Community Meeting Update and Revised Traffic Mitigation Proposal

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On June 8, 2020 COGS Staff, in conjunction with Triumph, hosted an online community meeting with the Oakhurst neighborhood to discuss potential traffic impacts from the development of the Bell Rippy Apartment Community.

Prior to this meeting, Triumph and Staff spent several days brainstorming possible traffic mitigation options and refining this list down to options that have Staff support.

All these options were presented to the Community at the beginning of the meeting, with particular focus on the options supported by Staff and the logic behind these conclusions. The community was then given the opportunity to provide feedback on the alternatives. Nine neighbors spoke at the meeting, each providing feedback on the alternatives discussed.

Based on this feedback, Triumph is proposing to construct the following traffic mitigation measures as a component of our application:

1. Maintain the traffic mitigation of the current approvals including opening the Blake Gate and the one-way south configuration of Blake Ave between 23rd and 26th Street. Triumph will construct an island the formalizes the one-way configuration of Blake at the intersection of 26th and Blake, as well as one-way signage required at the intersections along Blake.

   This option had community support from the neighbor that addressed this condition and had not opposition.

2. Addition of two sets of speed bumps on Palmer Ave between 23rd and 26th Street. Several speed control options were discussed, but two sets of speed bumps evenly spaced along Palmer was the preferred solution of staff.

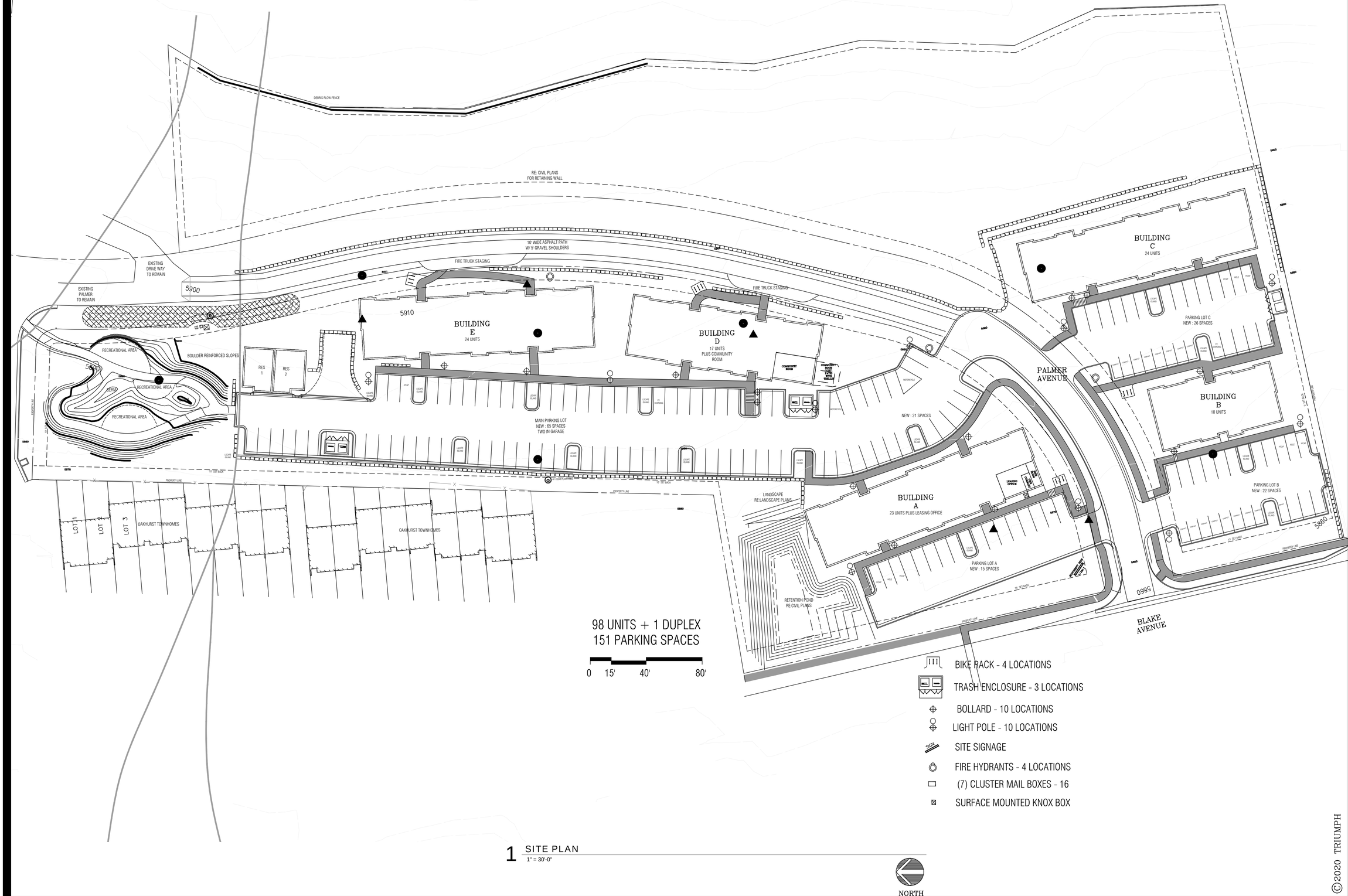
   Several participants with residences on and near Palmer supported the idea of speed control measures along Palmer, and no one opposed this alternative.

P. 970.688.5057 12 Vail Road, Suite 700, Vail, CO 81657

TRIUMPH

3. Revised Site Plan that directs all vehicular access to the Bell Rippy Apartments to the new Blake and Palmer intersection, and construct the existing Palmer Avenue right of way as a pedestrian and bike path through the northern portion of the site. This path would be engineered to provide emergency vehicle access to Bell Rippy and the Oakhurst neighborhood, and would continue to carry the utilities servicing the neighborhood. There will be no means of through-traffic into the Oakhurst neighborhood via the right of way through the new development

   This revised site plan option had unanimous and enthusiastic support from all neighbors who spoke.



1 SITE PLAN
1" = 30'-0"

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BELL RIPPY NEIGHBORHOOD
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GLENWOOD SPRINGS COLORADO

Revisions:
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 3-3-20
DD PRICING PACKAGE 5-13-20
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 6-16-20

Sheet title: SCHEMATIC SITE PLAN

Stamp

Date: 6/10/2020
Project No:
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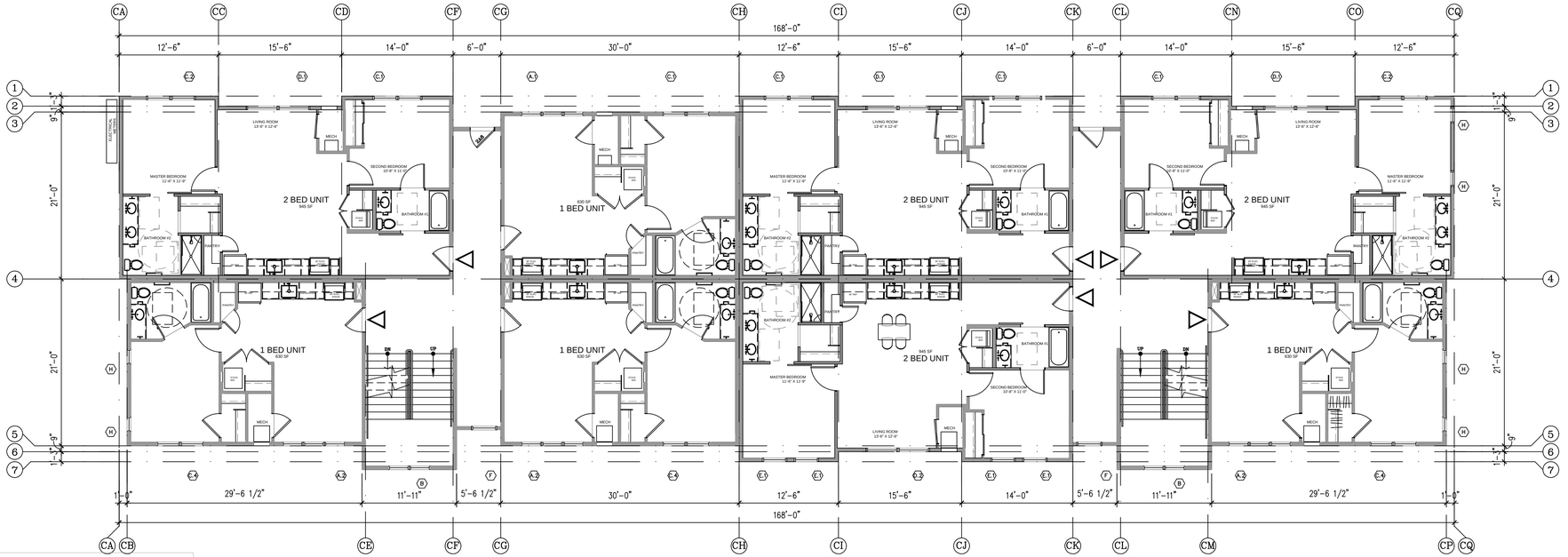
Checked by: MEF

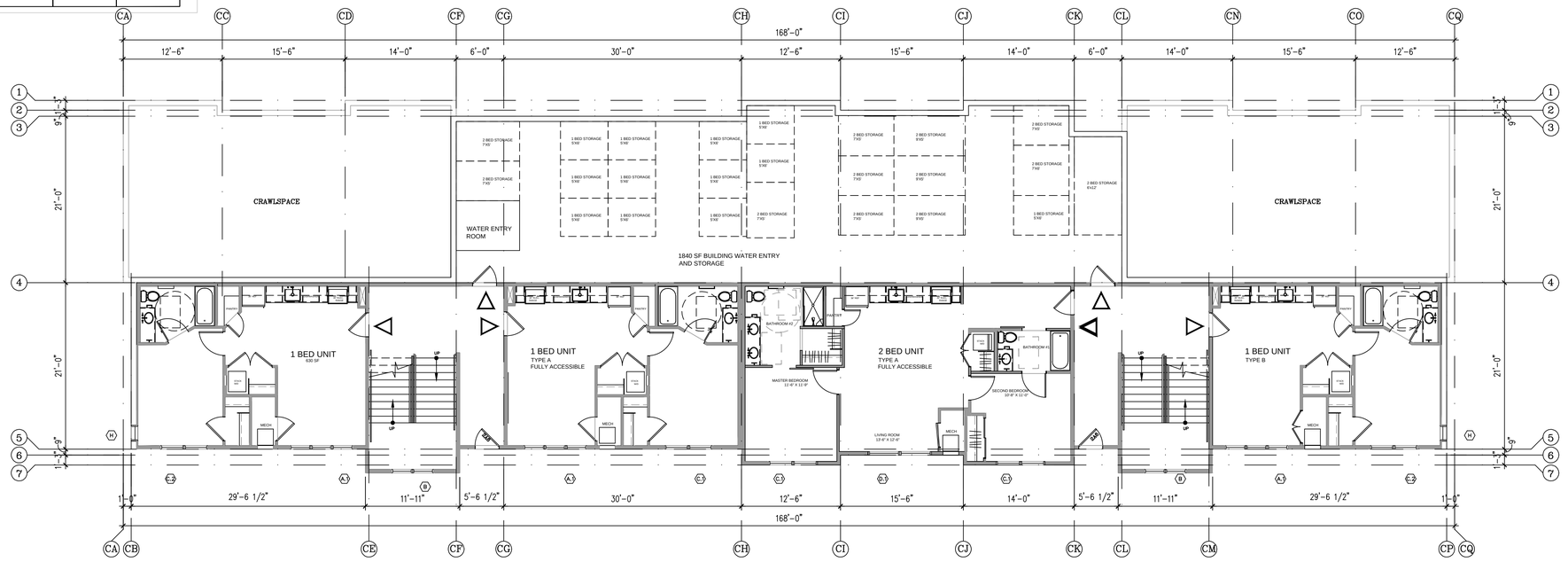
Sheet AA1.0

BELL RIPPY APARTMENTS

FLOOR	BUILDING COMMUNITY ROOM / LEASING	1 BEDROOM UNITS	2 BEDROOM UNITS	CIRCULATION	UTILITY / STORAGE	TOTAL SF (NOT INCLUDING STORAGE)
BUILDING A	630 SF	2 UNITS	9 UNITS	1,720 SF	1,750 SF	22,340 SF
BUILDING B		3 UNITS	7 UNITS	3,440 SF	940 SF	10,210 SF
BUILDING C		12 UNITS	12 UNITS	3,440 SF	1,540 SF	22,340 SF
BUILDING D	630 SF	11 UNITS	12 UNITS	3,440 SF	1,750 SF	22,340 SF
BUILDING E		6 UNITS	12 UNITS	3,440 SF	1,225 SF	18,560 SF
BUILDING F						
TOTALS EACH BUILDING	1,260 SF	37 UNITS	61 UNITS	15,480 SF	7,505 SF	95,790 SF +7,505 SF 103,295 SF



2 BUILDING A - FIRST LEVEL PLAN
1/8" = 1'-0"



1 BUILDING A - GARDEN LEVEL PLAN
1/8" = 1'-0"

APARTMENT BUILDINGS - SCHEMATIC PLANS

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Sheet title
SCHEMATIC BUILDING A PLANS

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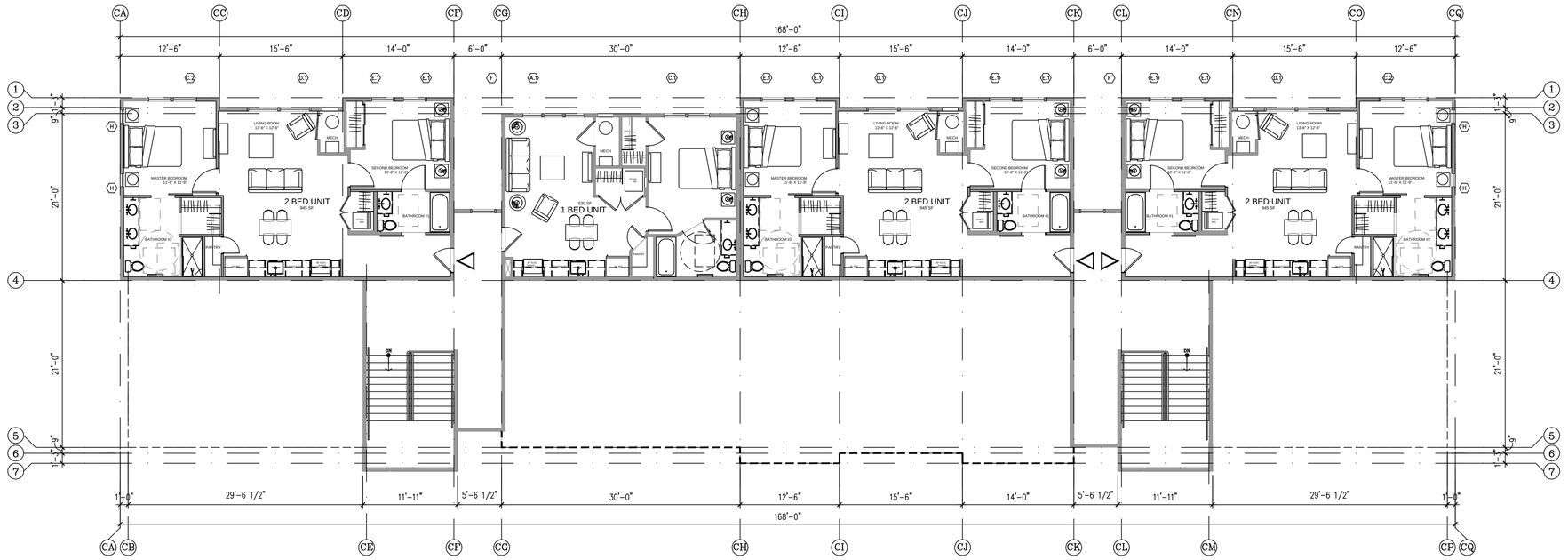
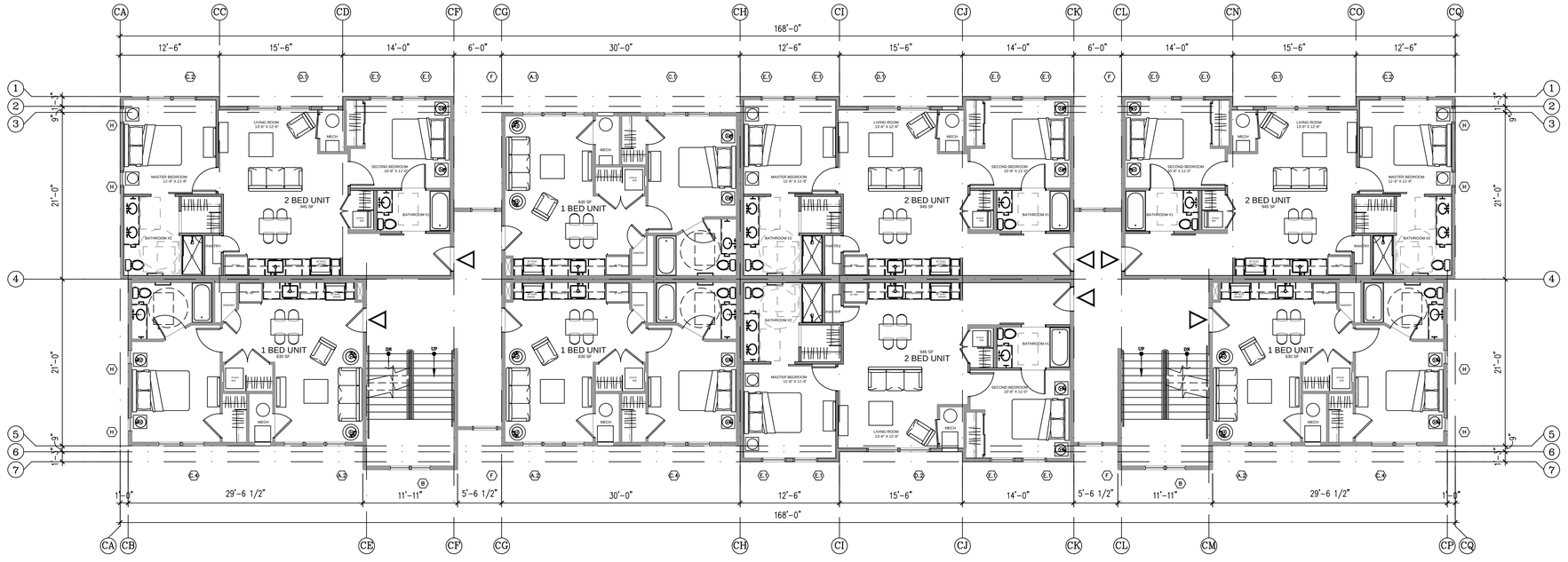


4 BUILDING A - THIRD LEVEL PLAN
1/8" = 1'-0"



3 BUILDING A - SECOND LEVEL PLAN
1/8" = 1'-0"

APARTMENT BUILDINGS - SCHEMATIC PLANS

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revised PLAN SUBMISSION 6-16-20

Sheet title
SCHEMATIC BUILDING A PLANS

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1 BUILDING A - WEST ELEVATION
1/8" = 1'-0"

BUILDING A - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	BLACK WALNUT
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 3" X 7 1/2" 6" EXPOSED - @ WINDOW / DOOR INFILL	LEEWOOD
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	HARBOR MIST
S2	STUCCO	2 COAT STUCCO SYSTEM W/ INTEGRAL COLOR	SW - BUCKHORN
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	SLATE GREY
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT 4/4 RUSTIC 3.5" RAILS 4/4 RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ ENTRY	FIBER CEMENT - 1/4 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 1/4 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
WO1	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

1. IN THE CASE OF ANY DISCREPANCIES BETWEEN THIS SCHEDULE AND OTHER CONTRACT DOCUMENTS, THE INFORMATION ON THIS SCHEDULE SHALL TAKE PRECEDENCE.
2. ALL FLASHING, VENTS, FLUES, ROOFTOP MECHANICAL EQUIPMENT, UTILITY BOXES, AND SIMILAR ITEMS SHALL BE PAINTED TO MATCH ADJACENT PORTIONS OF BUILDINGS UNLESS OTHERWISE NOTED.
3. TYPICAL SIDEWALL FLASHING ICE&WATER SHIELD 2'-0" VERT UP WALL, WRAP INTO OPENINGS, THEN APPLY TYVEK FLASHING TAPE AROUND PENETRATING PIPE. METAL FLASHING EXPOSED 6" UP WALL TYPICAL AT ALL SIDEWALL CONDITIONS.

4. THESE ELEVATIONS ARE CONCEPTUAL IN NATURE, INDIVIDUAL BUILDING ELEVATIONS MAY VARY BUT WILL BE EVALUATED FOR COMPLIANCE WITH DESIGN STANDARDS CONTAINED WITHIN TITLE 070 OF THE GLENWOOD SPRINGS MUNICIPAL CODE AT THE TIME OF SUBMITTING A BUILIDNG PERMIT APPLICATION.

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING A - ELEVATIONS

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Sheet title: BUILDING ELEVATIONS

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Date: 5/11/2020
Project No:
Drawn by: MEF
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Sheet AA4.0

BUILDING A - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	BLACK WALNUT
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - $\frac{5}{16}$" X 7 $\frac{1}{4}$" 6" EXPOSED - @ WINDOW / DOOR INFILL	LEEWOOD
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	HARBOR MIST
S2	STUCCO	2 COAT STUCCO SYSTEM W/ INTEGRAL COLOR	SW - BUCKHORN
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	SLATE GREY
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT $\frac{4}{4}$ RUSTIC 3.5" RAILS $\frac{6}{4}$ RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - $\frac{4}{4}$ RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ ENTRY	FIBER CEMENT - $\frac{4}{4}$ RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - $\frac{4}{4}$ RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - $\frac{4}{4}$ RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - $\frac{4}{4}$ RUSTIC 5.5"	FRENCH ROAST
WD1	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

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3. TYPICAL SIDEWALL FLASHING ICE&WATER SHIELD 2'-6" VERT UP WALL; WRAP INTO OPENINGS, THEN APPLY TYVEK FLASHING TAPE AROUND PENETRATING PIPE, METAL FLASHING EXPOSED 6" UP WALL TYPICAL AT ALL SIDEWALL CONDITIONS.

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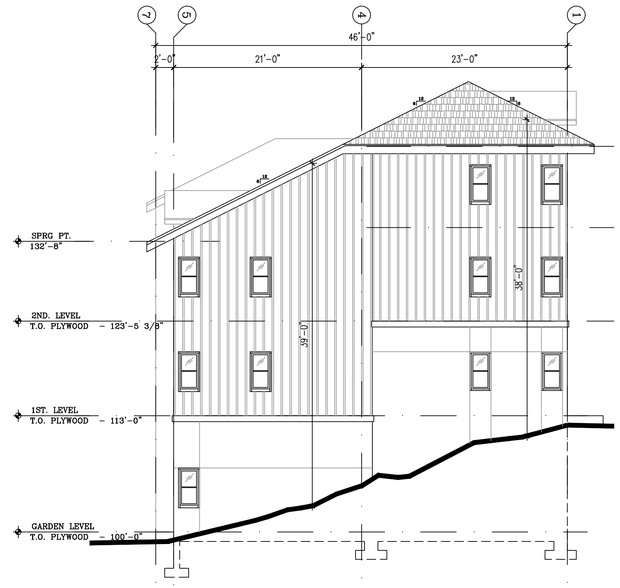
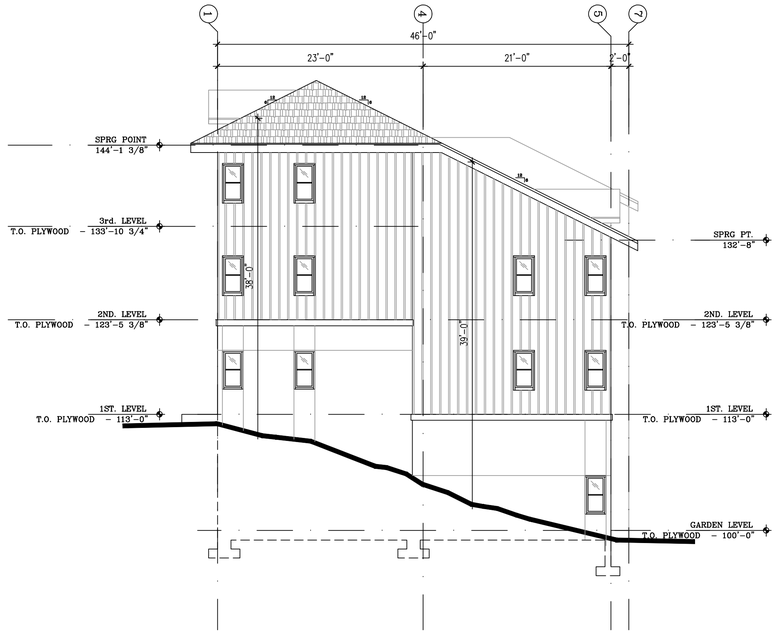


3 SOUTH ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

BUILDING A - ELEVATIONS

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Revisions:
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DD PRICING PACKAGE 5-11-20
MAJOR SITE ARCHITECTURAL PLAN re-SUBMISSION 6-16-20

Sheet title: BUILDING ELEVATIONS

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Date: 5/11/2020
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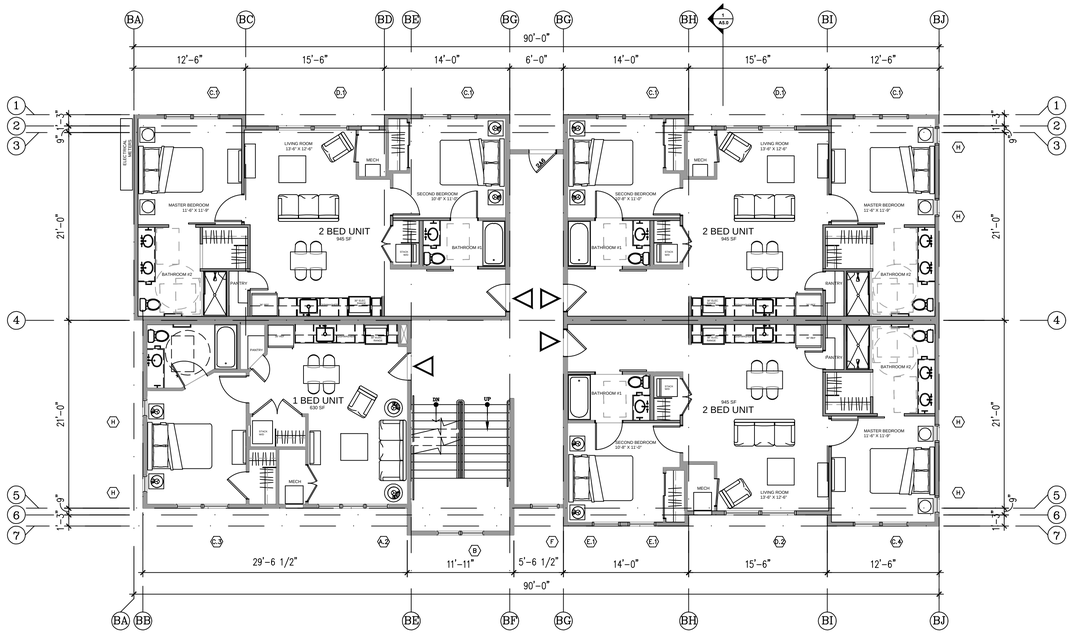
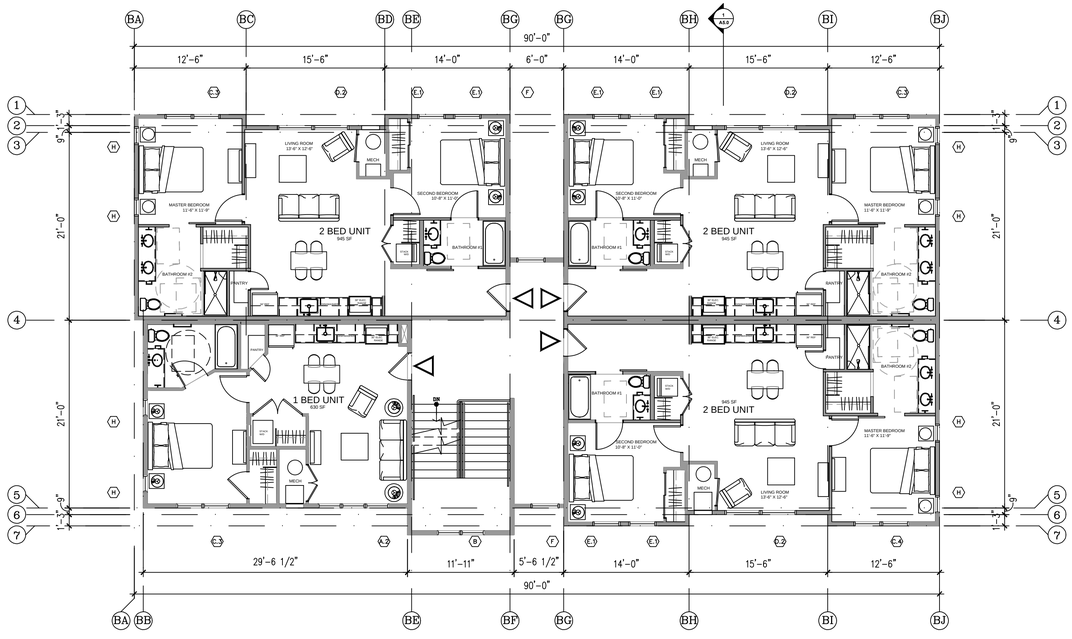
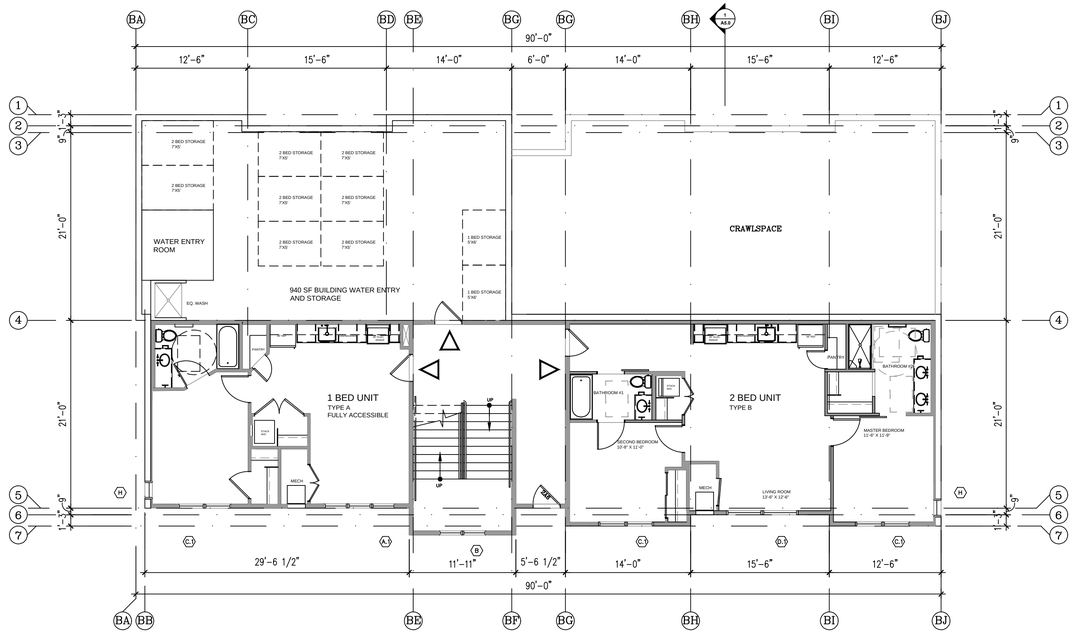


2 BUILDING B - FIRST LEVEL PLAN
1/8" = 1'-0"



3 BUILDING B - SECOND LEVEL PLAN
1/8" = 1'-0"



1 BUILDING B - GARDEN LEVEL PLAN
1/8" = 1'-0"

APARTMENT BUILDINGS - SCHEMATIC PLANS

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BUILDING B - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	RUSTIC SLATE
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 3/4" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	KHAKI BROWN
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	COBBLE BROWN
S2	STUCCO	2 COAT STUCCO SYSTEM W/ INTEGRAL COLOR	BENJAMIN MOORE "WISH" AF-680
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	BRONZE
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT 4/4 RUSTIC 3.5" RAILS 4/4 RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - 3/4 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ ENTRY	FIBER CEMENT - 3/4 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 3/4 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 3/4 RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - 3/4 RUSTIC 5.5"	FRENCH ROAST
WD1	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

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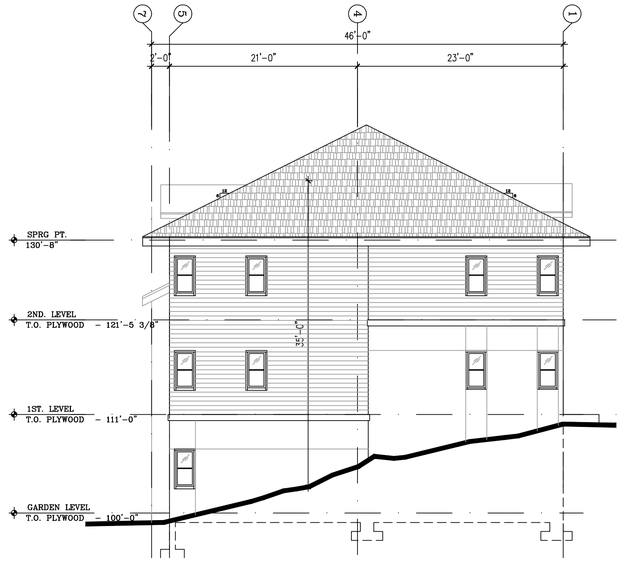
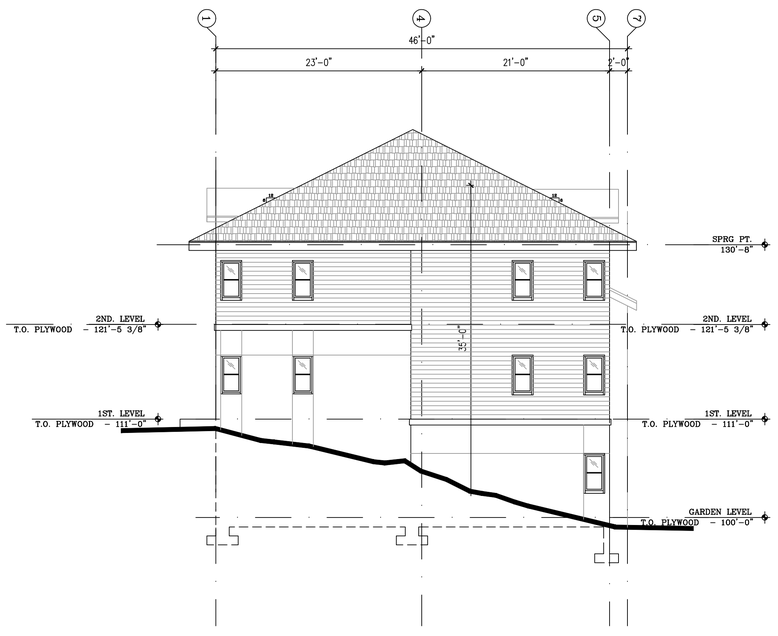
3. TYPICAL SIDEWALL FLASHING: ICE&WATER SHIELD 2'-6" VERT UP WALL; WRAP INTO OPENINGS, THEN APPLY TYVEK FLASHING TAPE AROUND PENETRATING PIPE. METAL FLASHING EXPOSED 6" UP WALL; TYPICAL AT ALL SIDEWALL CONDITIONS.

4. THESE ELEVATIONS ARE CONCEPTUAL IN NATURE, INDIVIDUAL BUILDING ELEVATIONS MAY VARY BUT WILL BE EVALUATED FOR COMPLIANCE WITH DESIGN STANDARDS CONTAINED WITHIN TITLE 070 OF THE GLENWOOD SPRINGS MUNICIPAL CODE AT THE TIME OF SUBMITTING A BUILIDNG PERMIT APPLICATION.



3 SOUTH ELEVATION
1/8" = 1'-0"

1 BUILDING - WEST ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING B - ELEVATIONS

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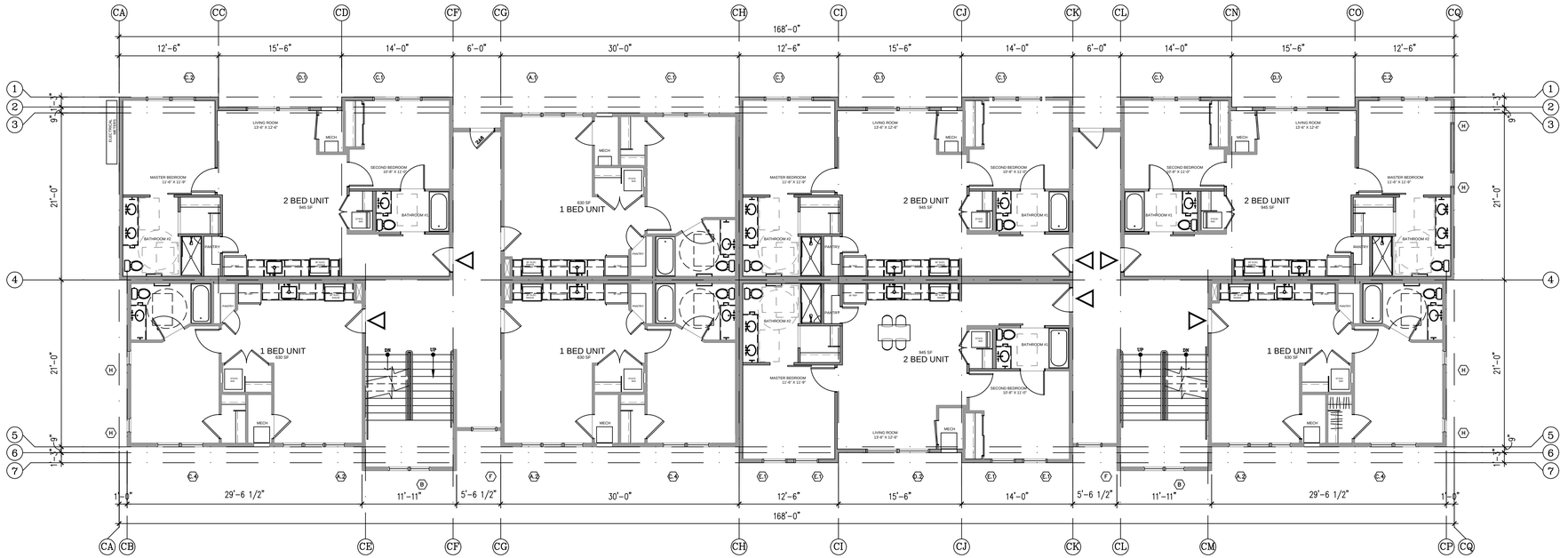
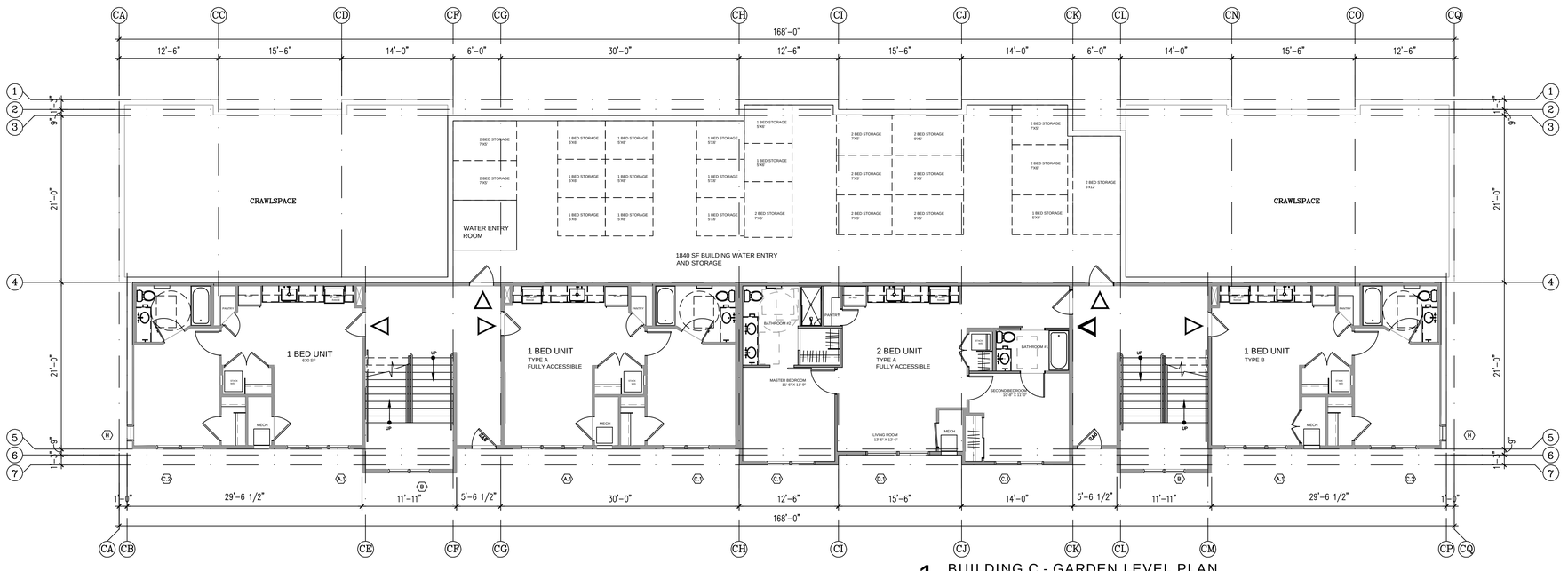


2 BUILDING C - FIRST LEVEL PLAN
1/8" = 1'-0"



1 BUILDING C - GARDEN LEVEL PLAN
1/8" = 1'-0"

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Sheet title
SCHEMATIC BUILDING C PLANS

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Checked by: MEF

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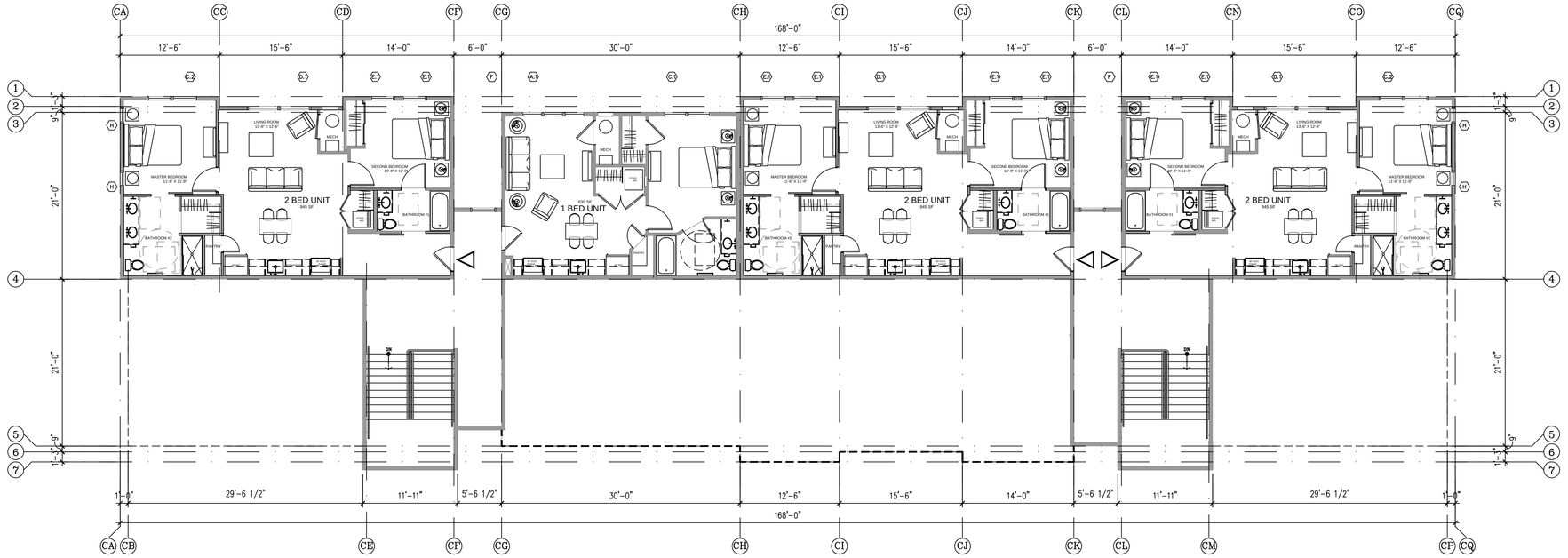
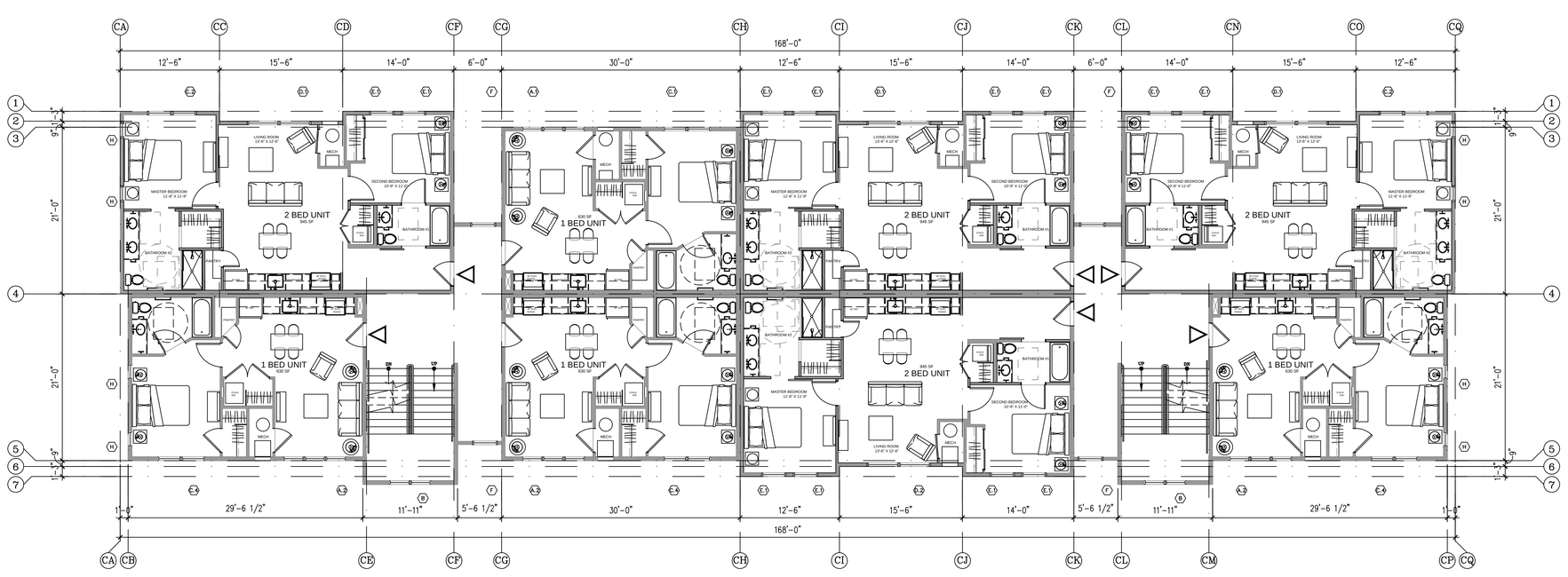


4 BUILDING C - THIRD LEVEL PLAN
1/8" = 1'-0"



3 BUILDING C - SECOND LEVEL PLAN
1/8" = 1'-0"

APARTMENT BUILDINGS - SCHEMATIC PLANS

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Sheet title
SCHEMATIC BUILDING C PLANS

Stamp

Date: 5/11/2020
Project No:
Drawn by: MEF
Checked by: MEF

Sheet AC2.1

BUILDING C - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	BLACK WALNUT
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 7/8" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	LEEWOOD
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	HARBOR MIST
S2	STUCCO	2 COAT STUCCO SYSTEM W/ INTEGRAL COLOR	SW - BUCKHORN
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	SLATE GREY
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT - 4/4 RUSTIC 3.5" RAILS 4/4 RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - 5/4 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ ENDS	FIBER CEMENT - 5/4 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 5/4 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 5/4 RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - 5/4 RUSTIC 5.5"	FRENCH ROAST
WD1	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

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3. TYPICAL SIDEWALL FLASHING: ICE&WATER SHIELD 2'-6" VERT UP WALL; WRAP INTO OPENINGS, THEN APPLY TYVEK FLASHING TAPE AROUND PENETRATING PIPE. METAL FLASHING EXPOSED 6" UP WALL: TYPICAL AT ALL SIDEWALL CONDITIONS.

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1 BUILDING - WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING C - ELEVATIONS

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BELL RIPPY NEIGHBORHOOD
GLENWOOD SPRINGS COLORADO

Revisions:
MAJOR SITE ARCHITECTURAL PLAN re-SUBMISSION 4-20-20
DD PRICING PACKAGE 5-11-20
MAJOR SITE ARCHITECTURAL PLAN re-SUBMISSION 6-16-20

Sheet title: BUILDING ELEVATIONS

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Checked by: MEF

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BUILDING C - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	BLACK WALNUT
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 5/16" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	LEEWOOD
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	HARBOR MIST
S2	STUCCO	2 COAT STUCCO SYSTEM W/ INTEGRAL COLOR	SW - BUCKHORN
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	SLATE GREY
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT 4/4 RUSTIC 3.5" RAILS 3/4 RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - 3/4 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ ENTRY	FIBER CEMENT - 3/4 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 3/4 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 3/4 RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - 3/4 RUSTIC 5.5"	FRENCH ROAST
W01	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

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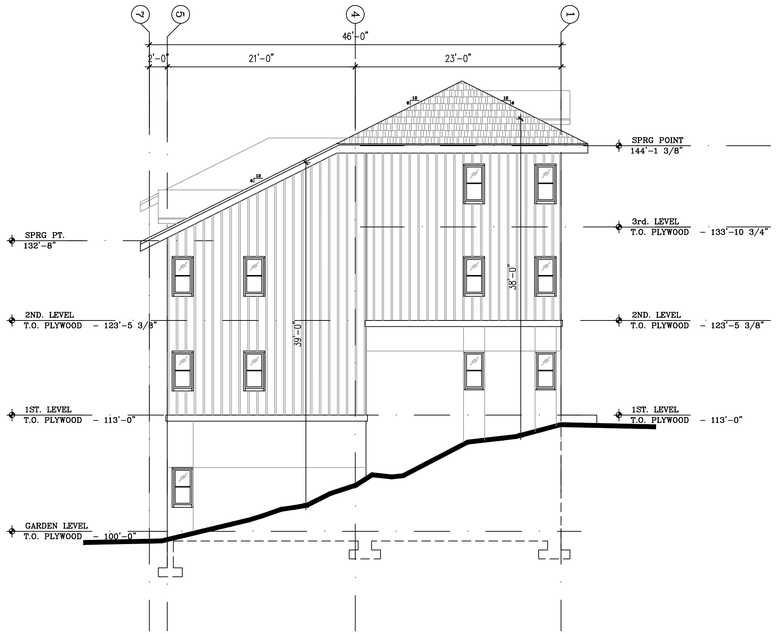
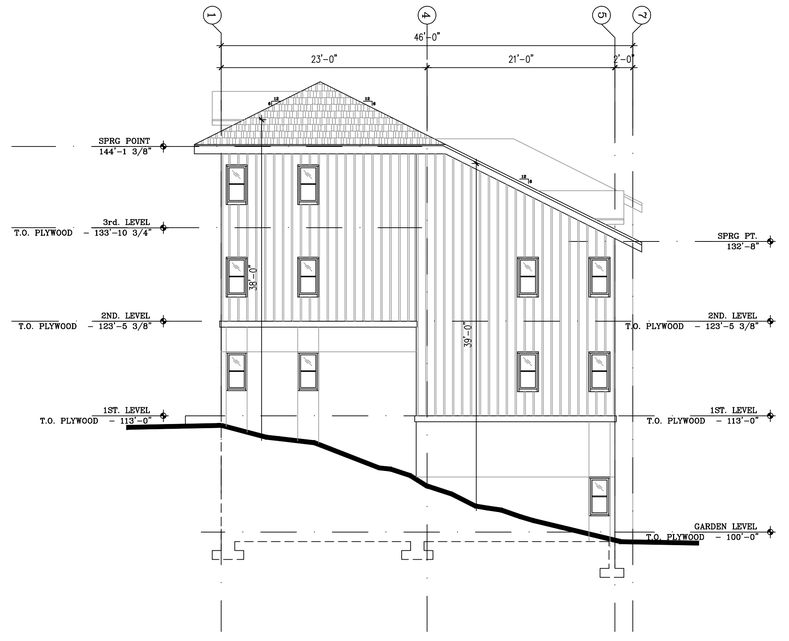


3 SOUTH ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

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Revisions:
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DD PRICING PACKAGE 5-11-20
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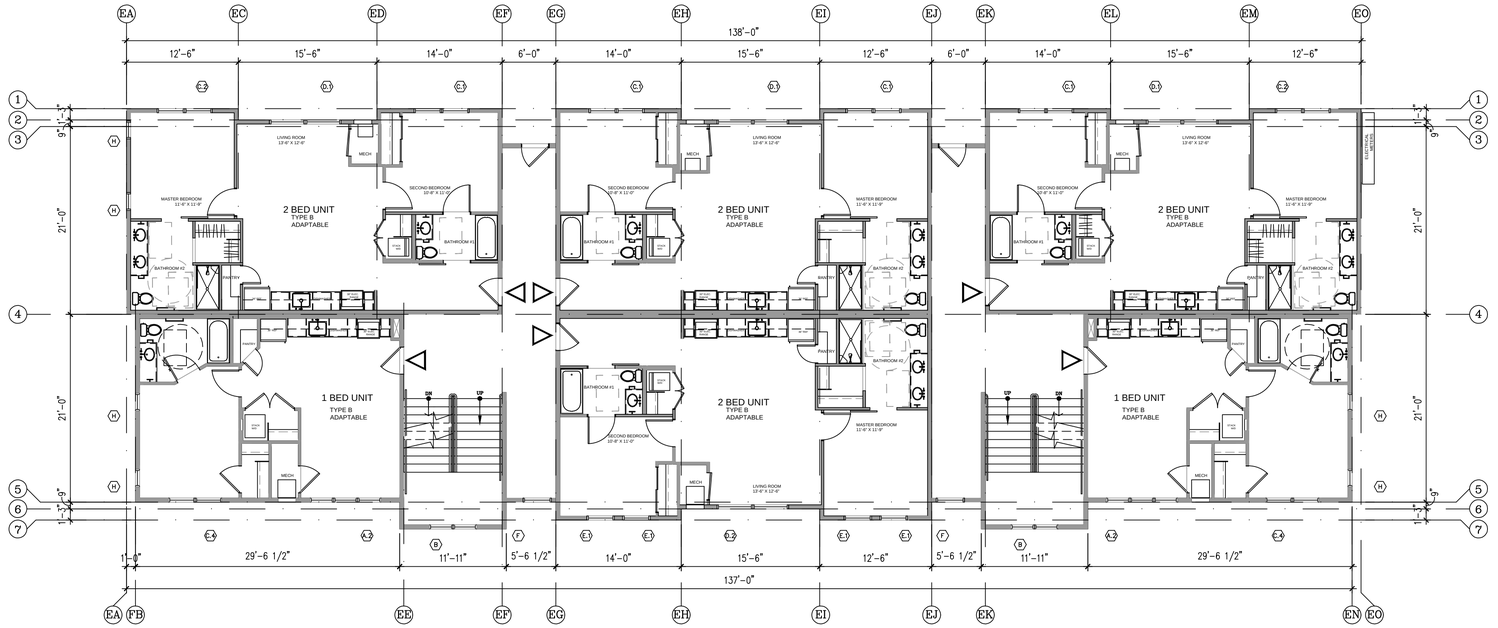
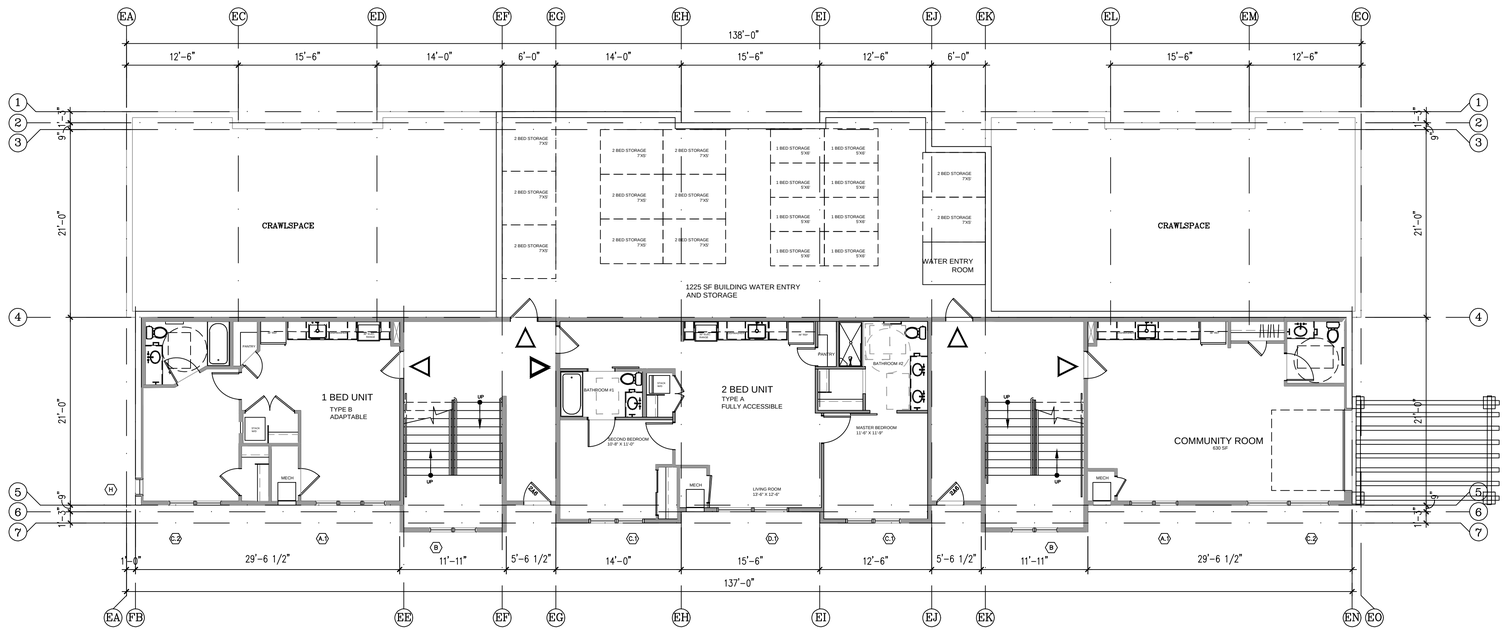


2 BUILDING D - FIRST LEVEL PLAN
1/8" = 1'-0"



1 BUILDING D - GARDEN LEVEL PLAN
1/8" = 1'-0"

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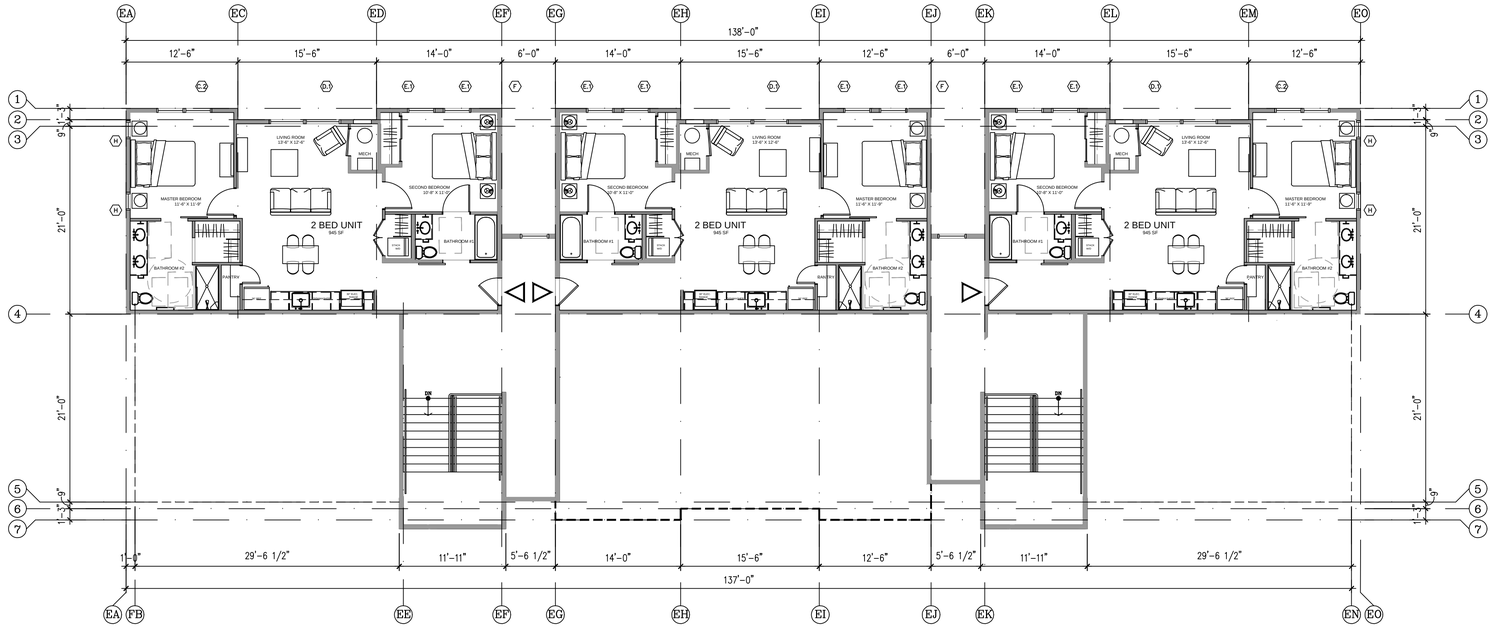
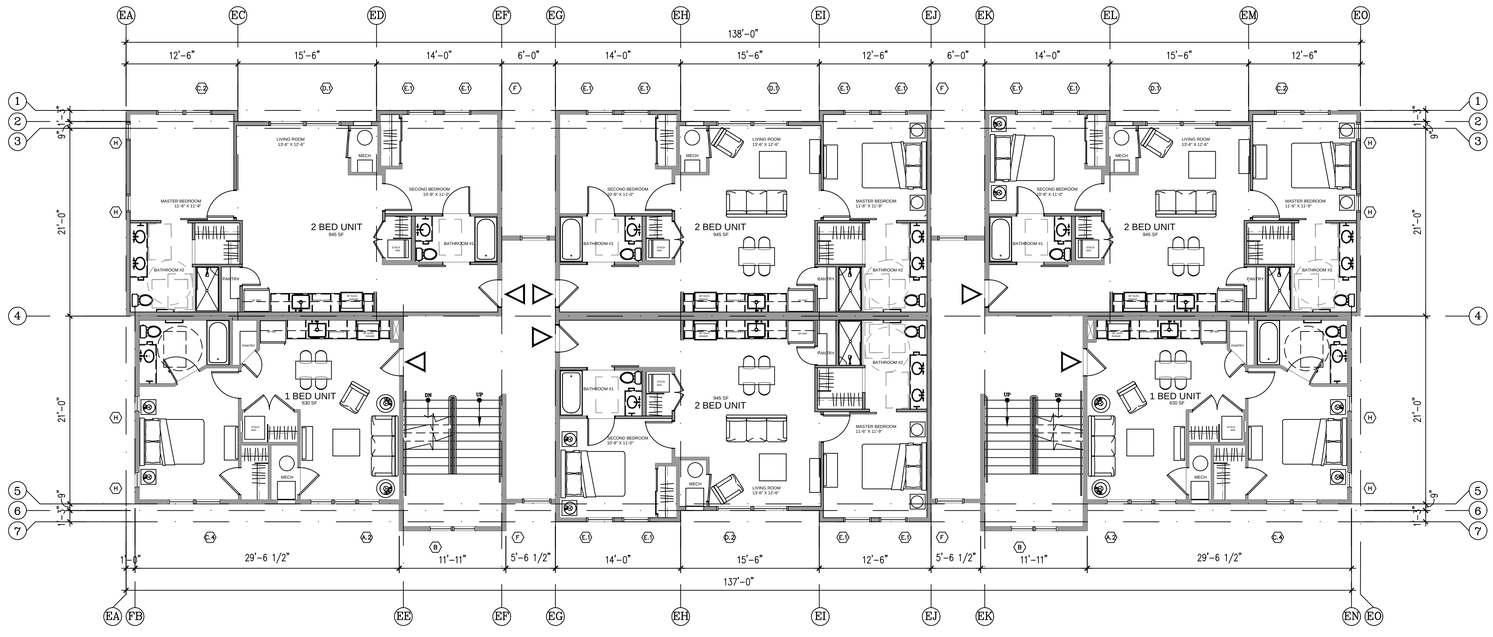


4 BUILDING D - THIRD LEVEL PLAN
1/8" = 1'-0"



3 BUILDING D - SECOND LEVEL PLAN
1/8" = 1'-0"

APARTMENT BUILDINGS - SCHEMATIC PLANS

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1 BUILDING - WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING D - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	RUSTIC SLATE
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 3/8" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	KHAKI BROWN
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	COBBLE BROWN
S2	STUCCO	2 COAT STUCCO SYSTEM W/ INTEGRAL COLOR	BENJAMIN MOORE "WISH" AF-680
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	BRONZE
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT - 4/4 RUSTIC 3.5" RAILS	FRENCH ROAST
T2	SIDING TRIM	4/4 RUSTIC 5.5" HEAD AND SILL FIBER CEMENT - 1/2 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ ENTRY	FIBER CEMENT - 1/2 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 1/2 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 1/2 RUSTIC 5.5"	FRENCH ROAST
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W01	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

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BUILDING D - ELEVATIONS

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BUILDING D - EXTERIOR FINISH SCHEDULE

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D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S3	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 5/16" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	KHAKI BROWN
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	COBBLE BROWN
S2	STUCCO	2 COAT STUCCO SYSTEM W/ INTEGRAL COLOR	BENJAMIN MOORE "WISH" AF-680
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	BRONZE
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT 4/4 RUSTIC 3.5" RAILS 4/4 RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - 5/4 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ ENDS	FIBER CEMENT - 5/4 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 5/4 RUSTIC 3.5"	FRENCH ROAST
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WD1	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

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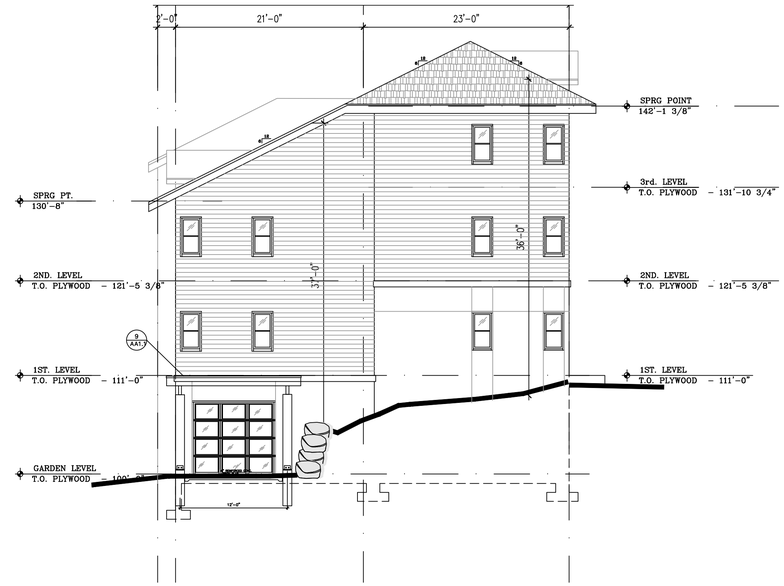
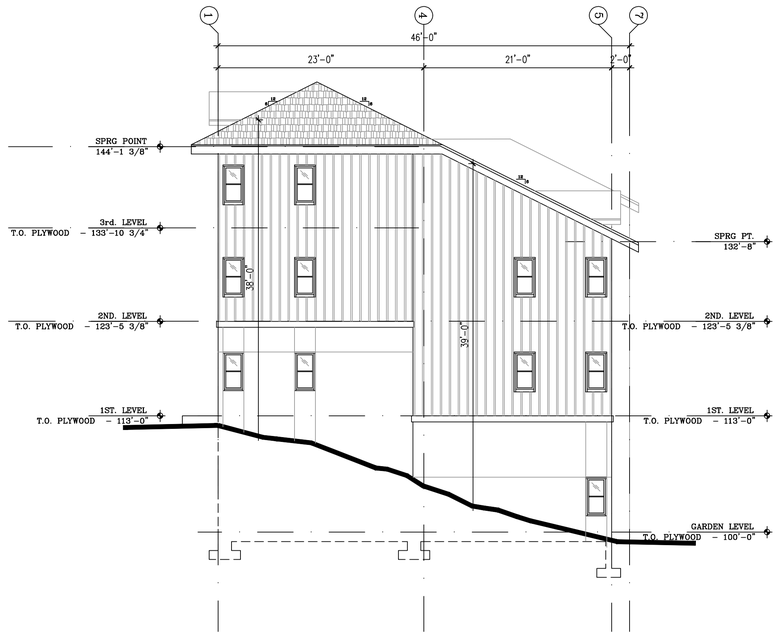


3 SOUTH ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

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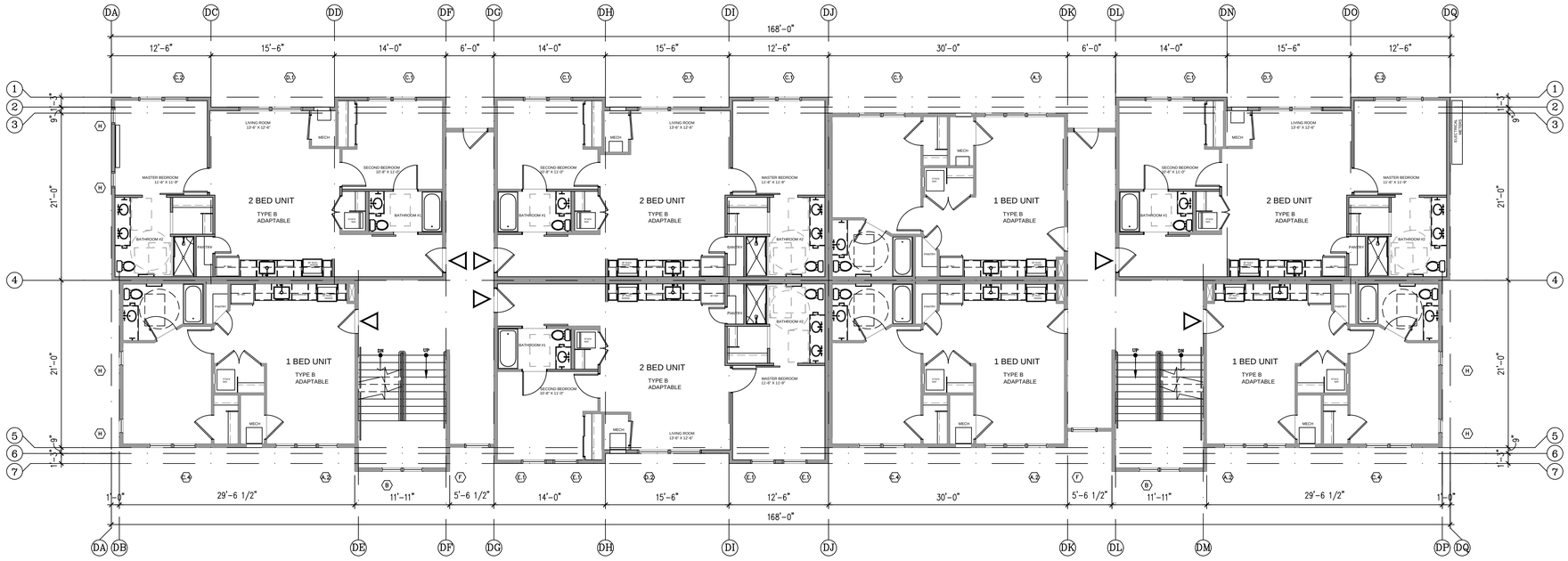
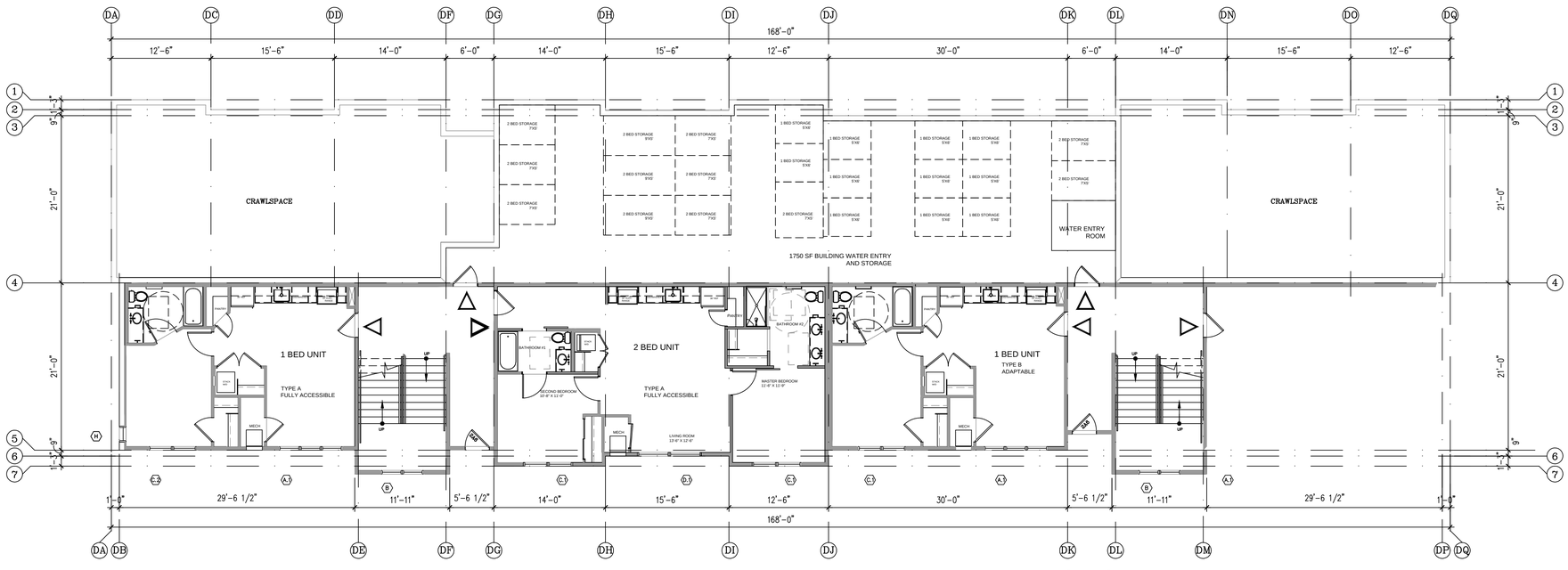


2 BUILDING E - FIRST LEVEL PLAN
1/8" = 1'-0"



1 BUILDING E - GARDEN LEVEL PLAN
1/8" = 1'-0"

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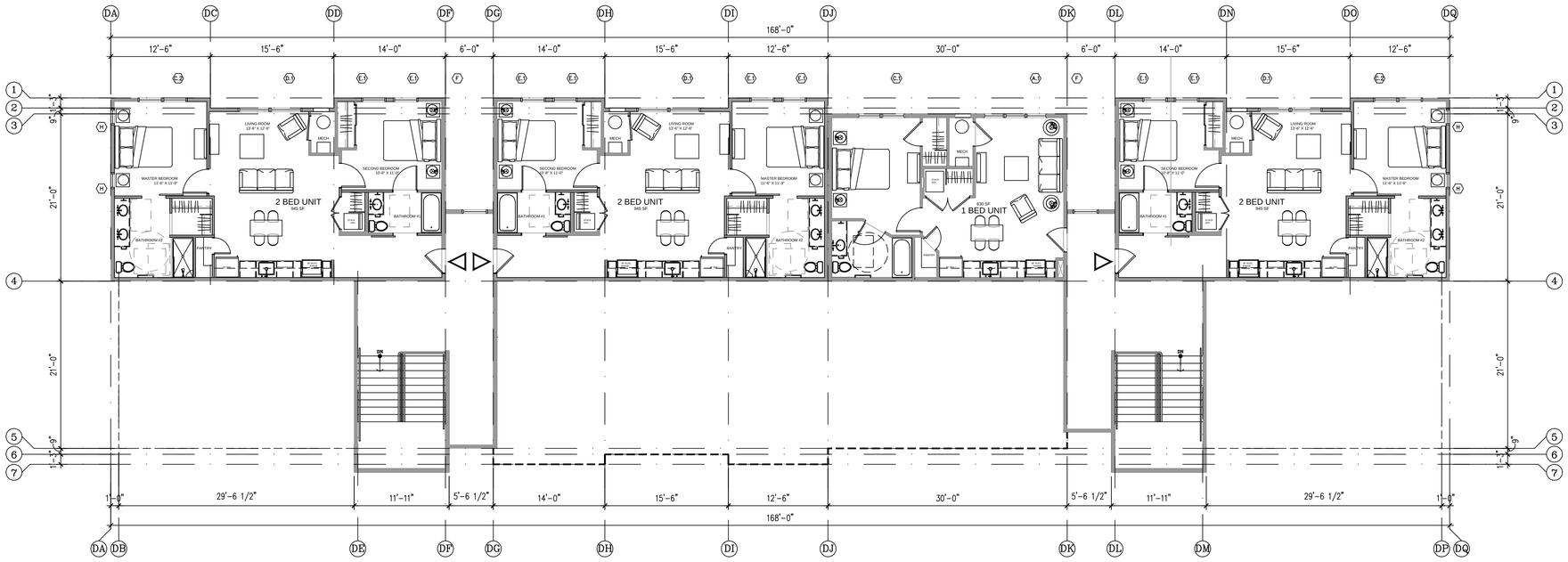

4 BUILDING E - THIRD LEVEL PLAN
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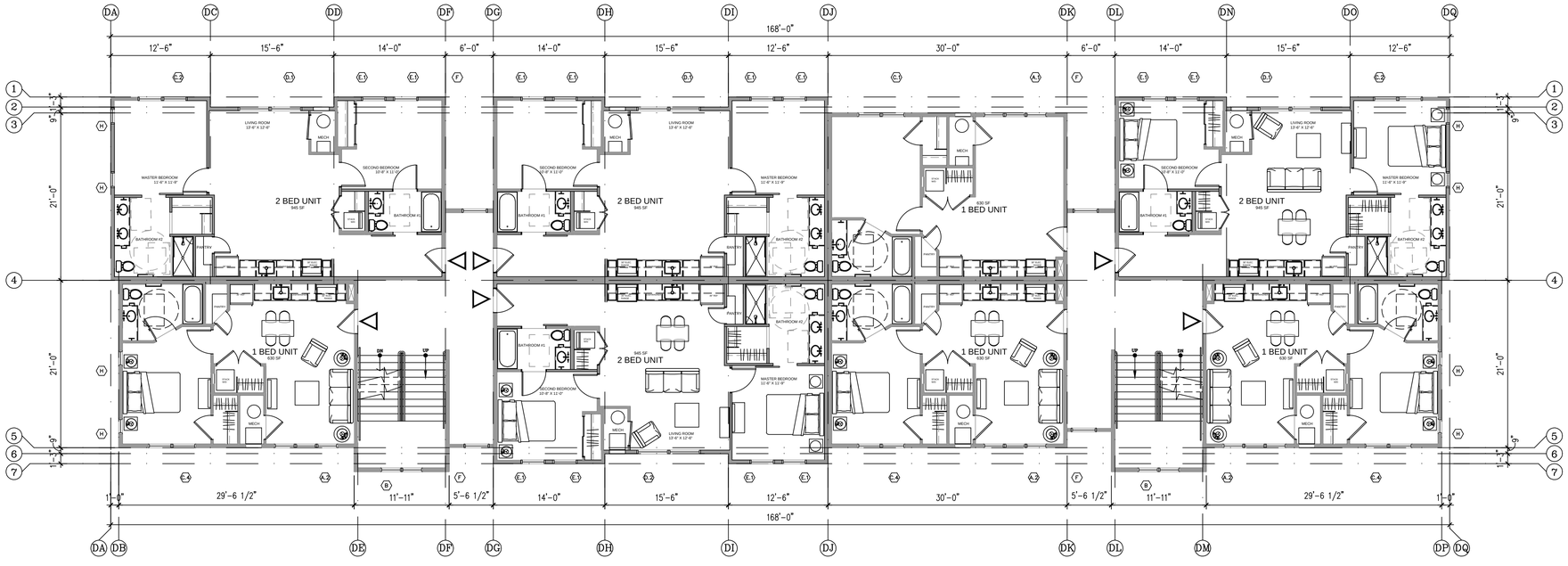

3 BUILDING E - SECOND LEVEL PLAN
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BUILDING E - EXTERIOR FINISH SCHEDULE

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S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	SLATE GREY
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4. THESE ELEVATIONS ARE CONCEPTUAL IN NATURE, INDIVIDUAL BUILDING ELEVATIONS MAY VARY BUT WILL BE EVALUATED FOR COMPLIANCE WITH DESIGN STANDARDS CONTAINED WITHIN TITLE 070 OF THE GLENWOOD SPRINGS MUNICIPAL CODE AT THE TIME OF SUBMITTING A BUILIDNG PERMIT APPLICATION.

1 BUILDING - WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING E - ELEVATIONS

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BELL RIPPY NEIGHBORHOOD
GLENWOOD SPRINGS COLORADO

Revisions:
MAJOR SITE ARCHITECTURAL PLAN re-SUBMISSION 4-20-20
DD PRICING PACKAGE 5-11-20
MAJOR SITE ARCHITECTURAL PLAN re-SUBMISSION 6-16-20

Sheet title: BUILDING ELEVATIONS

Stamp

Date: 5/11/2020
Project No:
Drawn by: MEF
Checked by: MEF

Sheet AE4.0

BUILDING E - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	BLACK WALNUT
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 1" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	LEEWOOD
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	HARBOR MIST
S2	STUCCO	2 COAT STUCCO SYSTEM W/ INTEGRAL COLOR	SW - BUCKHORN
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	SLATE GREY
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT 4/4 RUSTIC 3.5" RAILS 4/4 RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - 4/4 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ LEVEL	FIBER CEMENT - 4/4 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 4/4 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 4/4 RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - 4/4 RUSTIC 5.5"	FRENCH ROAST
WD1	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

1. IN THE CASE OF ANY DISCREPANCIES BETWEEN THIS SCHEDULE AND OTHER CONTRACT DOCUMENTS, THE INFORMATION ON THIS SCHEDULE SHALL TAKE PRECEDENCE.
2. ALL FLASHING, VENTS, FLUES, ROOFTOP MECHANICAL EQUIPMENT, UTILITY BOXES, AND SIMILAR ITEMS SHALL BE PAINTED TO MATCH ADJACENT PORTIONS OF BUILDINGS UNLESS OTHERWISE NOTED.
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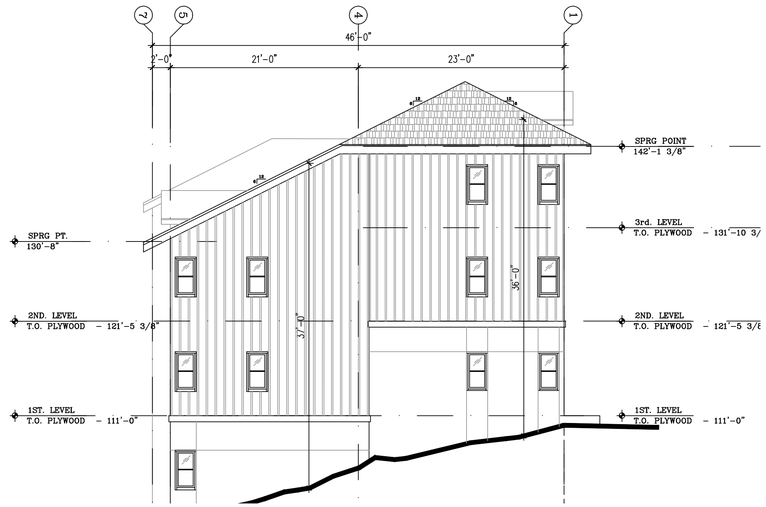
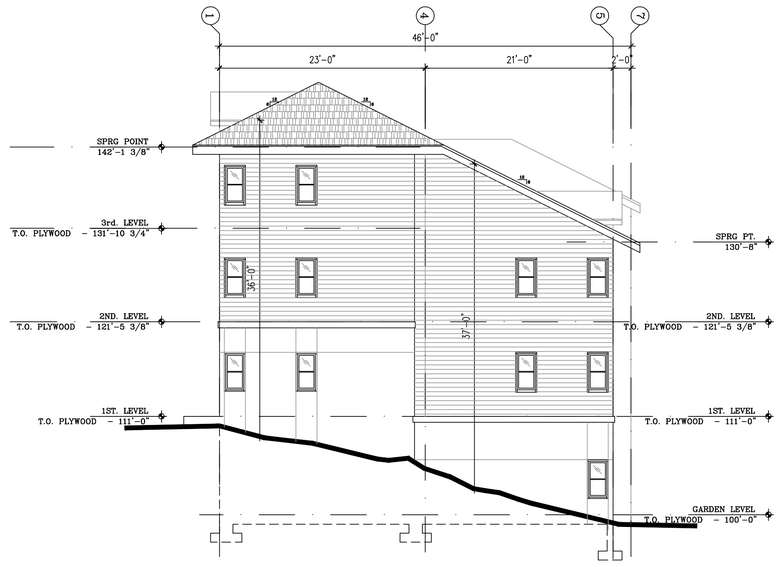


3 SOUTH ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

BUILDING E - ELEVATIONS

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Sheet title: BUILDING ELEVATIONS

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Date: 5/11/2020
Project No:
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Checked by: MEF

Sheet AE4.1

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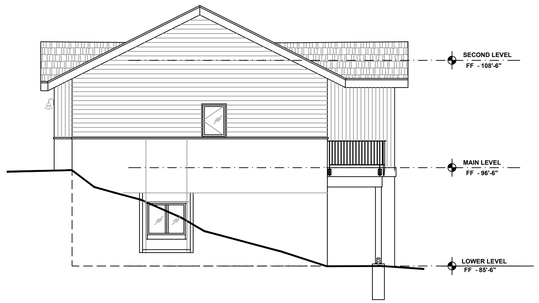
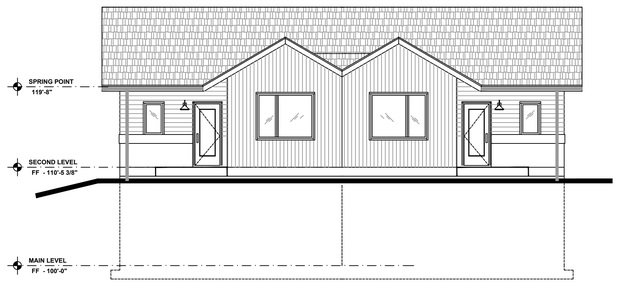
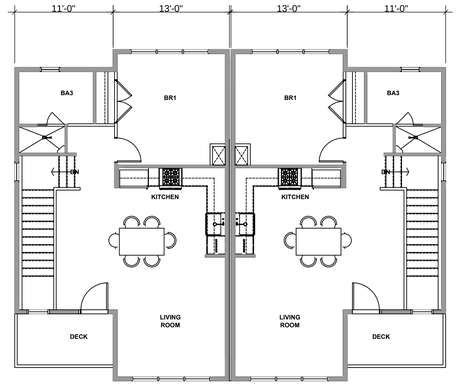


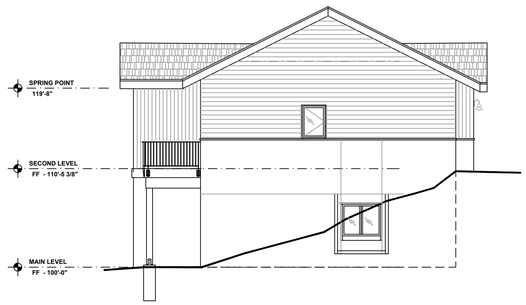
6 NORTH ELEVATION
1/8" = 1'-0"



4 EAST ELEVATION
1/8" = 1'-0"

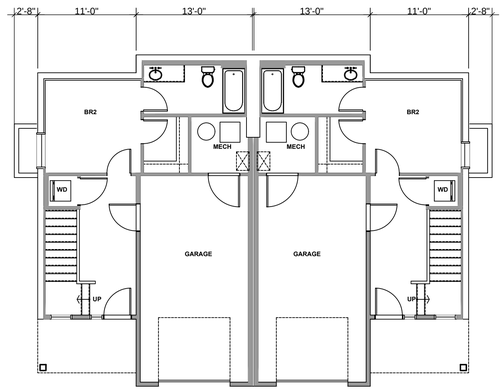


2 SECOND LEVEL PLAN
1/8" = 1'-0"



5 SOUTH ELEVATION
1/8" = 1'-0"

3 WEST ELEVATION
1/8" = 1'-0"



1 MAIN LEVEL PLAN
1/8" = 1'-0"

DUPLEX PLANS AND ELEVATIONS

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GLENWOOD SPRINGS COLORADO

Revisions:
MAJOR SITE
ARCHITECTURAL
PLAN SET SUBMISSION
6-16-20

Sheet title
DUPLEX
PLANS /
ELEVATIONS

Stamp

Date: 6/16/2020
Project No:
Drawn by: MEF
Checked by: MEF

Sheet AF1.0

LEGEND

- SHADE TREES
- EVERGREEN TREES
- ORNAMENTAL TREES
- SHRUBS
- ORNAMENTAL GRASSES
- PERENNIALS
- ROLL TOP PERFORATED STEEL EDGER
- TERRACE WALLS
- DROUGHT TOLERANT BLUEGRASS
- NATIVE SEED MIX

DEBRIS FLOW FENCE

UNDISTURED SLOPE AREA

UNDISTURBED SLOPE AREA

TERRACE WALLS

COMMUNITY GATHERING AREA - SEE ENLARGEMENT

EXISTING DRIVE WAY TO REMAIN

10' WIDE ASPHALT PATH W/ 5' GRAVEL SHOULDERS

FIRE TRUCK STAGING

PALMER AVE.

OFFSITE STORMWATER DEFLECTION BERM

BIKE RACKS

BUILDING E
24 UNITS

BUILDING D
17 UNITS
PLUS COMMUNITY ROOM

COMMUNITY ROOM

BUILDING C
24 UNITS

GARDENS AT ENTRY AREAS

PARKING LOT C
NEW : 26 SPACES

BIKE RACKS

TRASH

RES 1

RES 2

1/2 COURT BASKETBALL

SEATING AREA

TRASH

MAIN PARKING LOT
NEW : 67 SPACES
(2 in Garage)

NEW : 21 SPACES

BUILDING B
10 UNITS

PARKING LOT B
NEW : 23 SPACES

BUILDING A
23 UNITS PLUS LEASING OFFICE

LEASING OFFICE

ACCENT PARKING ENTRIES

BIKE RACKS

PROJECT SIGN

PARKING LOT A
NEW : 15 SPACES

STORMWATER DETENTION

BLAKE AVENUE

26TH. STREET

ZONE C

ZONE A

ZONE D

MIXED EVERGREEN, ORNAMENTAL TREES BUFFER

LARGE SHRUB BUFFER OVER UTILITY EASEMENTS

NOTES:

A COMPREHENSIVE AND CONSISTENT LANDSCAPE SOLUTION IS PROPOSED ACROSS THE ENTIRE PROPERTY WITH THE FOLLOWING POINTS:

- TREES AND SHRUBS ARE LOCATED AROUND THE BUILDINGS TO ACCENT THE STRUCTURES.
- RETAINING WALLS ARE SCREENED WITH TREES AND SHRUBS ON THE DOWNHILL SIDE.
- PARKING AREAS HAVE REQUIRED LANDSCAPE ISLANDS WITH TREES AND SHRUBS.
- ALL BUILDINGS ARE SURROUNDED WITH A MINIMUM 5' MULCH BED TO KEEP PLANNED GRASS AREAS AWAY FROM THE STRUCTURES TO AVOID ADDING IRRIGATION WATER TO THE SOILS UNDER THE BUILDINGS.
- ALL LANDSCAPE PLANTINGS ARE LOCATED A MINIMUM OF 5' AWAY FROM THE BUILDING TO AVOID ADDING IRRIGATION WATER TO THE SOILS UNDER THE BUILDINGS.
- ALL LANDSCAPE PLANTINGS ARE LOCATED TO ALLOW FOR SNOW STORAGE AREAS EQUALLING 20% OF THE ADJACENT PAVING AREAS.
- ALL REMAINING AREAS ON THE SITE NOT TO BE PAVED, BUILT UPON, OR MULCH BED WILL RECEIVE REVEGETATION WITH NATIVE GRASSES, TO INCLUDE TEMPORARY IRRIGATION UNTIL ADEQUATE REGROWTH.
- ALL LANDSCAPE PLANTINGS WILL HAVE ONE COMPREHENSIVE PERMANENT DRIP IRRIGATION SYSTEM INSTALLED AND MAINTAINED BY THE APARTMENT COMPLEX MANAGEMENT.
- ALL LANDSCAPE PLANTING WILL MEET THE MINIMUM SIZE AS REQUIRED BY GLENWOOD DEVELOPMENT CODE.

1 MASTER LANDSCAPE PLAN

1" = 30'-0"

0 30 60 FT

scale: 1"=30'-0"

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Revisions: DD SET

Sheet title: MASTER LANDSCAPE PLAN

Stamp

Date: 06/15/2020
Project No:
Drawn by: OSLA
Checked by: SG

Sheet L1.0

LEGEND

- SHADE TREES
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- NATIVE SEED MIX

1 DETAILED LANDSCAPE PLAN - NORTH

1" = 30'-0"

0 20 40 FT

scale: 1"=20'-0"

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Revisions: DD SET

Sheet title: DETAILED LANDSCAPE PLAN - NORTH

Stamp

Date: 06/15/2020
Project No:
Drawn by: OSLA
Checked by: SG

Sheet L1.1

LEGEND

- SHADE TREES
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- DROUGHT TOLERANT BLUEGRASS
- NATIVE SEED MIX

0 20 40 FT

scale: 1"=20'-0"

1 DETAILED LANDSCAPE PLAN - SOUTH

1" = 30'-0"

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Sheet L1.2

POTENTIAL PLANT LIST 6/15/20

QTY	KEY	COMMON NAME	SCIENTIFIC NAME	SIZE	o.c. SPACING
SHADE TREES:					
18	EPT	ExclamaSensation Box Elderion! Plane	Acer negundo 'Sensation'	2" clp.	as shown
17	HB	Hackberry	Celtis occidentalis	2" clp.	as shown
2	KC	Kentucky Coffeetree	Gymnocladus dioicus	2" clp.	as shown
13	RP	Prospector Elm	Ulmus wilsoniana 'prospector'	2" clp.	as shown
10	SHL	Skyline Honeylocust	Gleditsia triacanthos var. inermis 'Skyline'	2" clp.	as shown
60	**TOTAL**				
EVERGREEN TREES:					
8	AP	Austrian Pine	Pinus nigra	6' ht.	as shown
4	CBS	Colorado Blue Spruce	Picea pungens	6' ht.	as shown
7	DF	Douglas Fir	Pseudotsuga menziesii	6' ht.	as shown
6	SWP	Southwestern White Pine	Pinus strobiformus	6' ht.	as shown
25	**TOTAL**				
ORNAMENTAL TREES:					
9	ABP	Crabapple	Malus sp	1.5" clp.	as shown
3	ABS	Autumn Brilliance Serviceberry	Amelanchier x grandiflora'Autumn Brilliance'	1.5" clp.	as shown
11	FAM	Flame Amur Maple	Acer ginnala 'Flame'	1.5" clp.	as shown
23	**TOTAL**				
SHRUBS:					
4	AYJ	Andorra Youngstown Juniper	Juniperus horizontalis 'Youngstonwn'	5 gal.	3' o.c.
23	BJ	Buffalo Juniper	Juniperus sabina 'Buffalo'	5 gal.	5' o.c.
77	BMS	Dark Knight Bluemist Spirea	Caaryopteris x clandonensis 'Dark Knight'	5 gal.	4' o.c.
15	CL	Common Lilac	Syringa vulgaris	5 gal.	3' o.c.
101	CTLS	Creeping Three-Leaf Sumac	Rhus trilobata 'Autumn Amber'	5 gal.	4' o.c.
46	DBRB	Dwarf Blue Rabbitbrush	Chrysothamnus nausoesus nauseosus	5 gal.	4' o.c.
25	DN	Dwarf Ninebark	Physocarpus opulifolius 'Nanus'	5 gal.	4' o.c.
35	NFS	Neon Flash Spirea	Spiraea japonica 'Neon Flash'	5 gal.	3' o.c.
68	NWR	Nearly Wild Rose (Floribunda)	Rosa x 'Nearly Wild'	5 gal.	4' o.c.
49	RGD	Tall Blue Sagebrush	Artemisia trideneta 'Tall Blue'	5 gal.	6' o.c.
28	RTD	Isanti Redtwig Dogwood	Cornus sericea 'Isanti'	5 gal.	5' o.c.
471	**TOTAL**				
ORNAMENTAL GRASSES & PERENNIALS					
50	CMG	Arabesque Maiden Grass	Miscanthus sinensis 'Arabesque'	1 gal.	48" o.c.
124	FRG	Foerster Feather Reed Grass	Calamagrostis x acutiflora `Karl Foerster`	1 gal.	36" o.c.
185	L	Deep Blue Lavender	Lavendula aungustifolia 'Hidcote'	1 gal.	24" o.c.
133	SD	Becky Shasta Daisy	Leucanthemum x 'Becky'	1 gal.	18" o.c.
492	**TOTAL**				

LANDSCAPE AREA: 6/15/2020

SITE LANDSCAPE (not including parking lot landscape)

NORTH & SOUTH PARCELS		TREES: REQUIRED (1/400 sf)	TREES: PROVIDED	SHRUBS: REQUIRED (1/100 sf)	SHRUBS: PROVIDED	PERENNIALS & ORN. GRASSES REQUIRED (1/50 sf)	PERENNIALS & ORN. GRASSES PROVIDED
Disturbed Area Lot 1:	66,281						
Disturbed Area Lot 3:	106,010						
2710 Blake Street	10,018						
TOTAL DISTURBED:	182,309						
20% Landscape Area:	36,462	92	92.00	365	365	730	474
	total:	92	92	365	365	730	474
							sub 26 shrubs for deficit

STREET TREES	LINEAR FEET:	REQ. TREES - 1/75 LF	PROVIDED
PALMER AVE - EAST SIDE	240	3	3
PALMER AVE. - WEST SIDE	240	3	3
26TH ST. SOUTH SIDE	110	2	2
BLAKE AVE. EAST SIDE	444	6	6
total:		14	14

PARKING LOT ISLANDS:		1 TREE/ISLAND REQUIRED	1 TREE/ISLAND PROVIDED	5 SHRUBS/ISLAND REQUIRED	5 SHRUBS/ISLAND PROVIDED		
		16	16	80	80		
	total project:	108	108	445	471	730	474

PARKING LOT AREA	% required	REQUIRED SF	PROVIDED SF	percentage provided
50,068	20	10,014	10,014	20%

PLANT NOTES:

1. All plant material shall meet specifications of the American Association of Nurserymen (AAN) for number one grade. All trees shall be balled and burlapped or equivalent. All plant materials shall have all wire, twine or other containment materials, except for burlap, removed from trunk and root ball of the plant prior to planting. Any tree or shrub planted within sight triangles (access points to drives and roadways) should be limbed between 3.5' and 8' for clear views.

2. Trees shall not be planted closer 10 feet to any sewer or water line. Tree planting shall be coordinated with all dry utilities. Locations of all utilities shall be verified in the field prior to planting. Trees planted within sight triangles will be trimmed so no branches are below 8'.

3. Grades shall be set to allow for proper drainage away from structures. Grades shall maintain smooth profiles and be free of surface debris, bumps, and depressions.

4. Developers shall ensure that the landscape plan is coordinated with the plans done by other consultants so that the proposed grading, storm drainage, or other constructions does not conflict nor preclude installation and maintenance of landscape elements on this plan.

5. All shrub beds adjacent to turf areas shall be edged with roll top Perforated Steel Ryerson or approved equivalent steel edger.

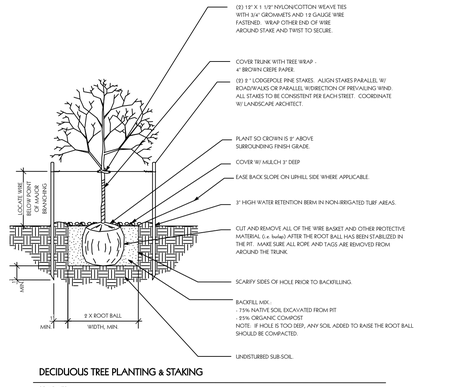
6. All shrub bed areas shall be mulched with wood bark mulch over weed barrier fabric to a depth of 4". Perennials and groundcover areas shall be mulched with a 3" layer of shredded bark mulch. No weed barrier in perennial/annual areas.

7. Prior to installation of plant materials, areas that have been compacted or disturbed by construction activity shall be thoroughly loosened; organic soil amendments shall be incorporated at the rate of at least five (5) cubic yards per 1000 square feet of landscape area.

8. All landscape (plant materials and grass) will be irrigated with an automatic system according to Town of Vail Design Specifications. Turf and seed areas will have a spray zone, shrubs will have a drip zone and perennials/groundcovers (part of the drip zone) will have micro-jet sprays where appropriate.

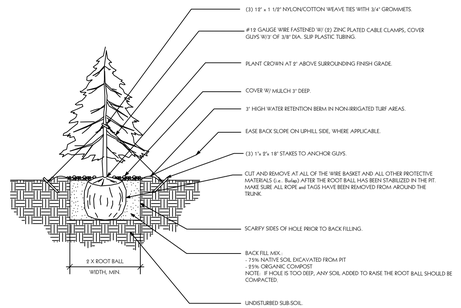
9. Contractor shall verify all material quantities prior to installation. Actual number of plant symbols shall have priority over the quantity designated.

10. All planting will comply with the Town of Glenwood Springs, Engineering Standards and specifications.



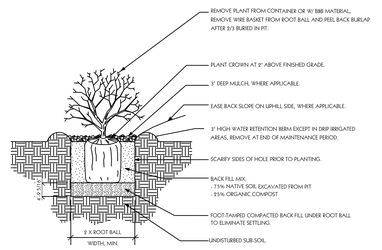
DECIDUOUS TREE PLANTING & STAKING

SCALE: NTS



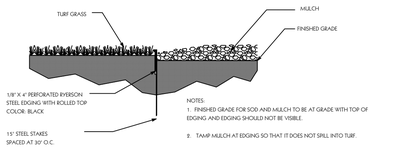
EVERGREEN TREE PLANTING & STAKING

SCALE: NTS



TYPICAL SHRUB PLANTING

SCALE: NTS



EDGING

SCALE: NTS

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Revisions: DD SET

Sheet title: LANDSCAPE NOTES & DETAILS

Stamp

Date: 06/15/2020
Project No:
Drawn by: OSLA
Checked by: SG

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Sheet **L2.0**

MINUTES
City of Glenwood Springs
Planning and Zoning Commission
Regular Meeting
May 26, 2020
Zoom
6:00PM

1. **Roll Call**

Present at roll call were Commissioners:	George Shaver, Marco Dehm, Kathryn Grosscup, Amber Wissing, Carolyn Cipperly, Ingrid Wussow, Sumner Schachter
Absent at roll call were Commissioners:	None
Also present were:	Jenn Ooton, Asst. City Manager, Terri Partch, City Engineer, Gretchen Ricehill, Asst. Economic/Community Development Director, Trent Hyatt, Senior Planner Anna S. Itenberg, City Attorney's Office Catherine Fletcher, City Clerk Jessica Bowser, Asst. City Engineer, Alissa Owsley, IT Director

2. **Receipt of Minutes- Receipt of April 28, 2020 and May 5, 2020 minutes.**

   Commissioner Wussow made a motion to receive the minutes, seconded by Commissioner Shaver. Motion passed unanimously.

3. **Public Comments**
   Comments from citizens appearing for items not on the agenda. No citizens were present.

4. **Continued Items –**
   a. *04-20 Consideration of a Major Site/Architectural Plan Review, Rezoning from RH Residential High-Density to RT Residential Transitional and Variance applications for the construction of 100 Multifamily apartment units in 6 buildings on approximately 5.8 acres (PIN 2185-153-04-001, 2185-153-02-008, and 2185-211-00-002)*

Commissioner Dehm reviewed the status of the hearing since May 5, 2020. Dehm noted that the public comment section was closed prior to losing internet connection and that the Planning Commission members had started deliberations prior to losing connection.

Commissioner Schachter asked for clarification of the status of the Blake gate and Blake Avenue improvements. City Engineer Terri Partch explained that these Blake Avenue items were conditions of a previous approval. Jenn Ooton clarified that the gate direction came from Council and was subsequent to Council's consideration of this application. Jenn Ooton indicated that it would be ideal to hold a neighborhood meeting following this application to address Blake gate and other neighborhood traffic issues. Terri Partch confirmed that the traffic study model was created with the assumption that the Blake gate was open.

Commissioner Schachter asked staff when the Blake gate would be opened and asked about the possibility of changing direction, if at all, on Blake. Terri Partch explained that the one-way direction for Blake was determined due to the condition of the asphalt on Blake Avenue.

Commissioner Wissing asked how long the on-site manager would be in place on site. Michael O'Connor from Triumph Development, LLC clarified that that on-site manager was to be a permanent fixture on the site. Commissioner Shaver also asked to confirm the ownership of the property and Trent Hyatt confirmed that the owner of the property, Triumph Development LLC, was also the applicant. Commissioner Shaver also asked about the status of off-site drainage improvements and the parking management plan.

Michael O'Connor explained that part of the parking management plan will rely on the on-site manager and that part of the parking management would be restricting the number of residents per unit and that parking spaces would be numbered and assigned per each tenant's lease. Stephanie Copeland from Triumph confirmed that there would be restrictions for number of residents per unit.

Jenn Ooton clarified the timing of the opening of Blake gate and that it would be open only to construction traffic during building construction and officially opened following issuance of Certificate of Occupancy for the final building on the property.

Commissioner Cipperly asked for clarification of other improvements related to the former project approval. Cipperly specifically asked about sidewalk size and the lack of sidewalk on both sides of the street. Trent Hyatt explained that the new engineering standards were adopted after approval of last application which results in the new application having a different sidewalk width than in the previous project. Trent Hyatt also explained that City Engineer Terri Partch has ability to waive certain construction standards based on topography. Cipperly also expressed concern over the planned 9-foot tall, 400' long retaining wall and expressed concern about wildlife movement. Michael O'Connor confirmed that wildlife would not be able to move through the fence and would need to move around it. Trent Hyatt confirmed that pedestrian access was not required to the privately owned land bordering the site. Cipperly also expressed concern over mitigation of trespassing issues and homeless encampments on the nearby hillside and asked how the site will deter trespassing. O'Connor explained that there will likely be cameras in the parking lots as well as retaining walls and fencing that would also deter trespassing on the site. Cipperly also asked if it was possible to require tenants to list all vehicles registered to a tenant and Stephanie Copeland confirmed that they would require tenants to provide list of all registered vehicle as part of the residency application.

Commissioner Dehm asked if the proposed traffic flow was acceptable to the Engineering Department. City Engineer Terri Partch confirmed that the two way directional flow through gate on Blake Avenue was acceptable. Commissioner Dehm also asked Trent Hyatt to confirm that what the applicant was proposing was a use by right for the zoning district, which was confirmed by Trent Hyatt. Commissioner Dehm also asked the applicant if they had conducted a community meeting. O'Connor summarized that the community meeting was well attended and that the sentiments of the public meeting were similar to the public comments that had been submitted during past Planning & Zoning Commission meetings. The public comments at the meeting addresses scale of project, road conditions, and traffic. application conditions of approval- can these be referenced in the current conditions of approval. Commissioner Dehm also asked if the conditions of approval from previous projects could be referenced with this application and both City Attorney Anna Itenberg and Trent Hyatt both confirmed that Planning & Zoning Commission could include conditions from previous approvals to pass on with this new application as it moves to City Council.

Commissioner Dehm then moved to consider the variances.

Action 1: 04-20 Variance from Section 070.040.080(d)(2)a.2 of the Glenwood Springs Municipal Code which requires internalized parking to be located away from street frontages.

Commissioner Schachter had a question if the variances were not approved if that would prohibit the application from proceeding. City Attorney Anna Itenberg explained that each variance would need to be examined individually and that the applicant could either proceed with denied variances which would require to amend the site plan or appeal the denial. Schachter also asked for confirmation as to how the criteria for approval for each variance related to approval of the whole project. Trent Hyatt explained that many of the variances are closely related and although they are reviewed individually that denying one could substantially alter the entire development.

Commissioner Wussow asked to confirm that since Planning & Zoning is a recommending body that any variance denied by Planning & Zoning could still be approved by City Council. Hyatt explained that Planning & Zoning Commission is the deciding body for variances and the Planning & Zoning could deny a variance and that an appeal would then have to be made by the applicant to City Council.

Commissioner Grosscup made a motion to approve Action #1 with the seven recommended findings on page 12 of staff report. Commissioner Wussow seconded the motion

Commissioner Dehm opened the motion for discussion.

Commissioner Schachter expressed reservations about proceeding with the application without understanding the circulation plan and felt that there were too many unknowns. Schachter explained that he would like to see a circulation plan that had approval of the neighborhood before even considering application approval. Commissioner Wussow stated that it seemed that the variance would not be needed if the owner kept the density as originally approved. Commissioner Shaver found no issue with this specific variance and that he would reserve comments about the general development to the final action item. Commissioner Grosscup expressed no issues with this variance request and felt that this proposed variance allows the project to utilize the topography of the hillside and that this variance resulted in an improved site plan. Commissioner Wissing asked for clarification that the applicant did not create the hardship by their own actions and that the hardship was not related to

convenience. Trent Hyatt confirmed that analysis on page 10 of the staff report identified that the hardship is created by the topography shape and geologic conditions of the property.

Further discussion among Commission members included a general discussion about how the variances relate to the entire development and discussed the need to develop a circulation plan prior to proceeding with all actions.

Jenn Ooton explained that the Planning Commission per Code would be allowed to remand an application back to the Director for further consider and would need to tie the request to remand the application to a specific variance. Ooton explained that if the Commission wanted to see a circulation plan that this request would need to be added as a condition to an applicable variance.

Commissioner Grosscup added that a circulation plan was critical and that ultimately, this area is difficult from a transportation perspective and would like to see more engagement by the City and that the new site plan was an improvement over previous plans for the site.

City Engineer Terri Partch explained that there is an existing circulation plan which was indicated in the traffic study which was modeled with Blake Avenue as a two-way street. Partch explained that the applicant has provided information on circulation and what could be done is request the developer to assist by working with residents to develop a mitigation plan. Commissioner Schachter asked if there were ways to develop a plan that would direct traffic away from the neighborhood. Commissioner Shaver asked for clarification as to what a mitigation plan would involve and Terri Partch explained that a mitigation plan would involve both public input and the creation of solutions based on that public input which could slow, reduce, or redirect traffic through the neighborhood. Ooton mentioned that any sort of street solution such as a cul-de-sac or additional gates could be added as conditions and would need additional consideration for things such as fire access and snow plowing. Commissioner Dehm also mentioned the possibility of moving the gate to 26th Street or a bollard. Commissioner Cipperly expressed concern that the City has not adequately heard from the neighborhoods due to social distancing due to COVID-19. Cipperly also asked if there was a master circulation plan or sidewalk plan for the neighborhood. Commissioner Wussow expressed that it seemed that had the owners kept the original density, construction on the project would have already started. Wussow also stated that if the Commission wished to discuss the development as whole, that should be addressed in Action 4 and that this discussion should focus on Action Item 1.

Commissioner Dehm called for the question.

Commissioners Grosscup, Shaver, Wissing, Cipperly, and Dehm approved, Commissioners Schachter and Wussow denied the Action.

Motion passed 5-2.

Action #2: Variance from Section 070.040.080(e)(3) of the Glenwood Springs Municipal Code requiring developments encompassing three acres to provide at least two housing types.

Commissioner Grosscup made a motion to approve Action #2. Motion was seconded by Commissioner Shaver.

Commissioner Dehm then started discussion on the item.

Commissioner Dehm expressed the opinion that this variance request did not meet the seven criteria. Commissioner Wussow agreed that the hardship was created by increase in density and that this proposed project did not fit with the feel and character of the surrounding area. Commissioner Schachter cited that the singular use of the property does not fit with the goal of trying to provide for a diversity of housing within the city. Commissioner Dehm asked for staff to clarify if the developer could have started construction per prior approval. Trent Hyatt confirmed that the applicant could still start construction based on plans which received previous approval. Commissioner Grosscup stated that this application is an improvement compared to the previously approved application.

Dehm then called for the question to approve Action Item #2.

Commissioners Shaver and Grosscup approved, Commissioners Schachter, Wissing, Dehm, Cipperly, and Wussow denied the motion.

Motion failed 5-2.

Action #3: Rezoning of 2710 Blake Avenue (PIN: 2185-211-002) from RH Residential High Density to RT Residential Transitional.

Commissioner Wussow made a motion to approve the motion, Commissioner Wissing seconded the motion.

Motion passed unanimously.

Action 4: Major Site/Architectural Plan Review to allow for the construction of 100 multi-family apartment units in six buildings.

Commissioner Schachter made a motion to continue the item with the objective to gather more information based on collaborative neighborhood circulation plans with city. Commissioner Wussow seconded the motion. Commissioner Grosscup asked about the motion to continue and if the applicant would be able to create said circulation plan. Jenn Ooton asked to clarify what specifically would be included in the plan and what type of timeline would the plan require. Commissioner Schachter explained that it would be necessary to hold public meetings involving the neighborhood to find a solution for the traffic and transportation concerns. Jenn Ooton explained there would be a need to set a deadline for this process and Commissioner Dehm suggested a period of 60 days. Commissioner Wussow stated that this development that has been a long-term project and that there have been significant community concerns at every juncture. Wussow stated that the current plan, while better than previous plans, still lacks some items and believes that not rushing the project and working with the neighborhood might be the most prudent way to proceed. Commissioner Shaver expressed concern about the project, specifically Building F, and suggested to remove it allowing for more open space and to enlarge Building E to compensate for unit loss. Shaver also questioned if the City would have the resources to improve the streets in the neighborhood given the current economic situation.

Commissioner Schachter made a motion to amend the continuance to 60 days and Commissioner Wussow seconded the amended motion. Commissioner Dehm cautioned that the discussion with the neighborhood would need to focus specifically on traffic circulation and mitigation and trying to develop solutions. Trent Hyatt asked if a date could be chosen for the continuance such as July 28, 2020. Both Commissioner Schachter and Wussow agreed with the date.

The motion passed unanimously.

Following the vote, Stephanie Copeland, Triumph Development, LLC, asked to clarify specifically which items would be required for a circulation plan and if July 28th was the earliest or the latest the application could be heard. Commissioner Schachter explained that what would be satisfy the requirement is a solution-based proposal that better involves the neighborhood to create a circulation and/or mitigation plan that will go to the City for approval. Copeland asked for clarification as to what would constitute satisfaction of the neighbors. Commissioner Schachter indicated that it would be likely best for the City to run the meetings while involving the application. Jenn Ooton also explained that July 28th would likely be the soonest that this issue could be discussed.

Commissioner Wussow also asked if it would be possible to have more information about the possible financial ramifications of the project to the City as to better understand how involved the City would be with this project. Jen Ooton questioned how that directly related to this application.

Commissioner Dehm called for a 5-minute recess at 8:34 PM.

Commissioner Dehm called the meeting back to order following a 5-minute recess.

b. *06-20 Consideration of a Special Use Permit for a Retail Marijuana establishment at 2114 Grand Avenue (PIN 2185-164-00-095)*

At the previous meeting on 5/5/2020, this item had been in the middle of public input when the internet connection was lost. Commissioner Dehm continued the public input portion. City staff had received the following written comments which were read into the record.

- Joel Dembinsky, on April 17th, 2020 sent an e-mail stating that this location is not an appropriate location for a dispensary and believes it incompatible with surrounding residential and commercial uses. Requested denial of the application.
- Garfield & Hecht Law Firm, representing Cedar Lodge, Inc, provided written comment stating that it was their opinion that the proposed marijuana store at 2114 Grand Avenue did not meet the criteria for approval as the location did not seem appropriate given the nearby proximity of a gun store and residential units sharing walls with the proposed store. The letter also expressed concerns over the small size of the parking lot as well as concerns that overflow parking from the proposed store would end up in the Cedar Lodge lot. The letter also mentioned concerns over Kind Castle's ability to adequately manage the odor. Requested denial of the application.
- Michelle Keplinger expressed the opinion that Planning & Zoning Commission should deny the application as there are multiple existing dispensaries in Glenwood Springs. Requested denial of the application.
- Suzanne Stewart requested denial of the application based on the fact there are already eight existing dispensaries and concerns that the proximity of the gas station to the proposed store could lead to increased driving under the influence. Requested denial of the application.
- Cindy Svatos, expressed the opinion that there were already enough dispensaries in Glenwood Springs and stated displeasure over the displacement of the existing frame store. Requested denial of the application.

- Barbara Koziol, provided comments on behalf of the Cedar Lodge, and expressed concerns regarding the location of the proposed store, the proximity to the Cedar Lodge, ability of Kind Castle to adequately manage the odor, and the possibility of an increase in traffic and the possibility of overflow parking from Kind Castle spilling over onto Cedar Lodge's lot. Requested denial of the application.
- Sue Sharpe, provided comments which expressed concerns that there are already a sufficient number of dispensaries in Glenwood Springs, possible negative effects on tourism, proximity of the store to Cedar Lodge and the gun store, and the displacement of the existing frame store. Requested denial of the application.
- Lynette Marie Lacerda, 285 Michaela Lane, New Castle provided comments which expressed concerns over possible increased traffic and congestion on site and a perceived lack of parking. Requested denial of the application.
- Linda Drake, April 29th, provided comments which expressed displeasure over the displacement of the frame store and expressed the opinion that there were already enough dispensaries in Glenwood Springs. Requested denial of the application.
- Dendy Heisel, provided comments which expressed the opinion that there are enough dispensaries in Glenwood Springs and expressed concern over possible increased traffic on site. Requested denial of the application.
- Debbie Roof provided comments that expressed the opinion that there are enough dispensaries in Glenwood Springs and expressed concern over possible increased traffic on site and its proximity to the high school. Requested denial of the application.
- Katie Laven, provided comments that expressed the opinion that there are enough dispensaries in Glenwood Springs and expressed concern over possible increased traffic on site and its proximity to the high school. Requested denial of the application.
- Kristine Del Rio, 1009 Colorado Avenue provided comments that expressed the opinion that there are already enough dispensaries in Glenwood Springs and expressed concern over the proximity of the site to the high school.

Commissioner Dehm opened the public comment to any individuals in the Zoom meeting that wished to speak on the item that had already not submitted comment. No members of the public had comments.

Commissioner Dehm closed the public comment portion of the meeting.

John Dyet, applicant and owner of Kind Castle, provided a summary to the Commission how odor would be managed on site with details of the systems used and how its effects on nearby properties would be managed. Dyet also stated that other dispensaries in town operate with proximity to other businesses and residential areas and felt that their proposed plan made adequate measures to control odor. Dyet also stated that previous amendments to the code ordinance regarding dispensaries were created due to concern over dispensaries effects on tourism which resulted in dispensaries not being allowed in the downtown area and that the proposed location would not negatively affect tourism given the distance from downtown. Dyet also explained that the possible overflow parking into Cedar Lodge is something that Kind Castle could control and manage. Dyet explained that Kind Castle would be a good neighbor to Cedar Lodge and other nearby businesses.

Mark Mayasich, Kind Castle addressed some of the comments expressed during public comment portion of the meeting. Mayasich questioned why it was an issue for a dispensary to share a wall with a gun store when it also shares a wall with a pawn shop and why that would be different. Mayasich also

stated that the location of Kind Castle met the distance requirements of the ordinance and due to its distance from downtown, would not have a negative effect on tourism. Mayasich explained that the barbershop had closed which would free up additional parking spaces and that overflow parking is likely to happen with any business. Mayasich also explained that pre-packaged flower will be sold on site and explained that odor management plan would be more than adequate. Mayasich described how the Kind Castle Parachute location resulted in increased revenue for nearby businesses and believed that the Kind Castle location in Glenwood Springs would have a similar effect. Mayasich also described security measures such as video cameras and window tint that would be used on site.

Discussion among commission members.

Commissioner George Shaver requested staff to provide summary of Police Department and Fire Department comments on the project. Trent Hyatt explained that Police Chief Joe Deras had expressed general concerns over the proposed location and its proximity to residential areas and the general traffic and congestion of the area. Fire Department comments expressed concern over access and ability to maneuver on site.

Commissioner Wissing asked how many complaints the City has received in connection with the marijuana industry in Glenwood Springs. Gretchen Ricehill explained that the City had not received complaints on the retail establishments and has received complaints on the grow facilities on Devereux Road. Commissioner Grosscup asked when the new ordinances for marijuana establishments were established. Trent Hyatt mentioned that City Council has discussed a possible cap on limiting number of dispensaries in town and that no action towards that beyond discussion had occurred.

Commissioner Schachter asked questions regarding the access control plan to the property and how redevelopment would affect the site. Trent Hyatt explained that CDOT had recommended combining the access in the future if the site was redeveloped. Commissioner Dehm asked to confirm that there were two residential units connected to the proposed project space and Trent Hyatt confirmed this.

Commissioner Cipperly had questions regarding the CDOT access permit and if the possible sidewalk realignment would result in a loss of parking. Trent Hyatt explained that there are existing substandard conditions on site and that was unable to comment on possible number of parking spaces lost based on that CDOT access plan. Commissioner Grosscup asked for confirmation for the total number of marijuana applications in town and Trent Hyatt confirmed that there are nine approved applications with seven operating, which does include two cultivation facilities with retail.

Commissioner Wussow made the motion to deny the application. Wussow cited the comprehensive plan and stated reason for denial was that this business pulls business away from downtown. The motion was seconded by Commissioner Cipperly.

Commissioner Schachter mentioned that the application meets the SUP criteria and that the application did not fit the general purpose of the Comprehensive Plan. Schachter also voiced support for City Council to consider a cap on marijuana establishments within the City. Commissioner Cipperly stated that while the use of this property was appropriate, there are concerns over increase in traffic to an already congested area. Commissioner Wussow further explained that the Comprehensive Plan is clear on the importance on consolidating businesses in the downtown. Commissioner Dehm stated that it is not Planning & Zoning Commission's job to determine the appropriate number of marijuana establishments in the City. Dehm explained that the purpose of a Special Use Permit is to evaluate if a

proposed use fits with surrounding uses and cited the fact that no other marijuana establishments in town are in a mixed-use building. Dehm explained that because it was a mixed-use building with residential units, that this site was not the best place for the proposed project.

Vote taken. Motion to deny the application passed unanimously.

5. New Items

a. *20-19 Consideration of a Code Amendment to Section 070.010.070 of the Glenwood Springs Municipal Code regarding the City's nonconforming use regulations.*

Commissioner Shaver recused himself and left the meeting.

Trent Hyatt summarized the intent of the proposed code amendment as it related to legal non-conforming structures in riparian areas.

No public comments were received.

Commissioner Wussow asked if the City would provide additional information to the public that resides along the river. Trent Hyatt explained that additional outreach would be provided for the proposed riparian setback code amendment and not this specific amendment.

Commissioner Cipperly made a motion to approve the item with the findings as stated in the staff report. The motion was seconded by Commissioner Schachter.

The motion to approve the item passed unanimously. Commissioner Shaver had already recused himself from the meeting.

6. Commissioner Comments

Commissioner Wussow stated that this meeting illustrated two potential problems with code in the variance requirements and the number of marijuana establishments and that the City could explore further discussion on those items. Commissioner Schachter expressed a desire to be able to restart the conversation and discussion on housing with the Housing Commission. Commissioner Grosscup mirrored Schachter's statement on housing and asked if Midland Avenue improvement were still planned. Jenn Ooton confirmed that these improvements were still on schedule. Commissioner Cipperly stated would like to see a reconsideration of code regarding the parking requirement reduction in code based on proximity to transit. Commissioner Dehm asked if City Hall would be reopening to the public and Jenn Ooton explained that a press release would be issued explaining that staff would be allowed back in the office and not the public. Dehm also asked if there was a possibility of an in-person meeting in June and Jen Ooton could not confirm that and explained that the City was looking at option for an in person meeting. Commissioner Schachter also congratulated City Clerk Catherine Fletcher for her recent feature in the Post Independent.

7. Adjournment

Meeting was adjourned at 10:06 PM.

Access and Circulation Discussion
Regarding Triumph-Bell Rippy Proposal

NEIGHBORHOOD MEETING
JUNE 8, 2020

ATTENDANCE

City Staff	Triumph
Jenn Ooton, Assistant City Manager/Community Development Director	Michael O'Conner
Trent Hyatt, Senior Planner	Stephanie Copeland
Terri Partch, City Engineer	Michael Foster
Matt Langhorst, Public Works Director	Derik Walter
Gretchen Ricehill, Asst. Community Development Dir.	

Trent Hyatt, Senior Planner, Glenwood Springs Community Development Department opened the meeting at 4:32PM.

He provided a summary of the purpose of the meeting to discuss traffic and mitigation associated specifically with Triumph's proposed development of the Bell Rippy property and introduced city staff and Triumph development team. He reviewed the existing development approvals and current traffic mitigation options from the development proposed approved in January 2018.

Stephanie Copeland, Triumph development team, stated that although disappointed in the development review delay, the extra time resulted in what she felt was a better overall site plan.

Michael O'Conner, Triumph development team, provided a PowerPoint summary that

- Reviewed existing approvals
- Reviewed traffic mitigation considerations based on current approvals
- Provided an image of a new proposed site plan
    - Focused on closure of the upper section of Palmer to traffic
    - Moving building F
    - Concentrating parking
    - Adding new park/open space at 26th & Palmer

Public Comments

Erin Lee- 2502 Palmer Ave
Thanked applicants for listening to the neighborhood. Option C felt like a blessing. 100 % voting for option C. Spoke with a number of other residents that felt the same.

Trish Kramer - 2501 Palmer
Thanked Trent for sharing the plan ahead of time. This is the concept that the neighborhood has asked the prior developers and the city to consider. See revised site plan as helping and stated that mitigation Option A or portions of it are still necessary. Blake gate opening is a powerful change. Gate opens the neighborhood to commuter and shopper traffic avoiding highway 82 – speed controlling option is

necessary. Urges city staff and developer to consider impacts on section of Palmer. Still need speed controlling options on Palmer.

Scott Kramer - 2501 Palmer
In favor of traffic mitigation option C. Moving building F was a good move for Oakhurst residents. Thanked developer for insight on developing Option C

Laura Speck
Pleased with improved option of plan C. Asked about need to drop the street 9 feet as originally proposed. Liked new site plan.

Matt – 2510 Blake Ave
Discussed traffic in his block of Blake Avenue and explained concerns about traffic even with option C. Still wanted Blake as a one way or as a one way couplet with Palmer Avenue. Suggested also moving the gate to Blake at 26th.

Jamie Raehal - 2413 Palmer Ave
Asked about the status of Blake as a one way. Liked option C. Not a fan of the one way. Felt that speed controls are still needed

Frank Martin - 805 Crestwood Drive
Agreed with the Kramer's. Liked the new site plan. Still concerned about traffic on Palmer. Speed mitigation is still needed. Concerned about one way on Palmer.

Brianna Milspaugh
Liked option C. Asked for the developers to consider a sign near Walmart to indicate no through traffic.

Shelly Lott
Concern with Option C – coupled with one way. Agreed that there needed to be a no through sign. Liked the park at 26th and Palmer. Asked whether debris flow mitigation to remain safe and in place to protect downstream properties.

Chat room question from Trish Kramer- name unknown
Does option C include one ways?

Trish Kramer – requested information about the following:

- Width of bike path and surface material
- Gates to discourage vehicles
- Height of retaining wall
- Access to uphill property
- Debris flow mitigation remain the same
- Park – able to be used by entire neighborhood or are there restrictions
- Speed dips instead of speed bumps – might help drainage
- Gate moved to 26th & Blake intersection – why can't it be moved.

Trent Hyatt turned meeting over to Michael O'Conner to address development-related questions.

Michael O'Conner
Bike path – size of retaining wall will be less. Not certain of final height yet. Might be reduced by 3-5 feet. Explained that option C will still be an emergency access – working width is 10 feet with shoulders. Need to maintain a wider access for EMS. Material will be asphalt or concrete. Details not finalized.
Debris flow – will not change.
Park will be private property, but public access will be allowed.
Speed dips – uncertain of the details.
Moving the gate deferred to Terri Partch
Configuration of Blake – will take current approvals and enhance those but Blake Avenue will remain one way.
Preventing circling traffic – staff and most of neighborhood do not prefer one way streets.

Terri Partch
Blake one way south option with a Palmer one way south will not work and is not supported by city staff
Blake one way south Palmer one way north creates a disadvantage for Palmer residents. Creates more potential traffic on Palmer Avenue.

Through traffic from Walmart
Moving gate – will send all traffic up to Palmer and make it difficult for Blake residents to use this street.

Is direction of Blake set – was a condition of the original approval. With new development the old conditions don't necessarily have to remain. Blake can be a two way.

Opening Blake gate – can still be negotiated. Yes, however traffic study created for this development assumed gate open. All traffic would have to go to 27th – creates issues for RFTA – would change traffic plan.

Speed bumps v dips – bumps or tables already used on Midland, bumps in South Park neighborhood. Latter are very steep; accelerate between the bumps. Hard to plow. Matt Langhorst – not big fan, prefer the bumps – hard to maintain in the winter. Changes drainage patterns.

No through traffic signs – it's possible but signs not generally observed.

Question from Trish, chat room: Distance between speed bumps – Matt Langhorst 2 bumps on Palmer.

Trent Hyatt notified everyone that the application will be re-noticed and will be heard at the June 23rd meeting. Send comments to Trent, Jenn and Gretchen as they will be entered into the record.

Question from Trish, chat room: drainage issues with speed bumps. Matt Langhorst indicated that there may be some but comparatively, bumps on Palmer are easier to maintain.

Final comments from Stephanie, Michael.

Meeting concluded at 5:35 PM

MINUTES
City of Glenwood Springs
Planning and Zoning Commission
Regular Meeting
May 5, 2020
Zoom
6:00PM

1. **Roll Call**

Present at roll call were Commissioners:	George Shaver, Marco Dehm, Kathryn Grosscup, Amber Wissing, Carolyn Cipperly, Ingrid Wussow, Sumner Schachter
Absent at roll call were Commissioners:	None
Also present were:	Jenn Ooton, Asst. City Manager, Terri Partch, City Engineer, Gretchen Ricehill, Asst. Economic/Community Development Director, Trent Hyatt, Senior Planner Anna S. Itenberg, City Attorney's Office Catherine Fletcher, City Clerk Jessica Bowser, Asst. City Engineer, Alissa Owsley, IT Director

2. **Receipt of Minutes- Receipt of February 25, 2020 minutes.**

   At previous meeting Commissioner Grosscup had requested a review of the minutes.

   Motion: Commissioner Dehm made a motion to receive the minutes, seconded by Commissioner Schachter. Motion passed with Shaver and Schachter abstaining.

3. **Public Comments**
   Comments from citizens appearing for items not on the agenda. No citizens were present.

DRAFT

4. New Items –

a. 11-20 Consideration of various amendments to Municipal Code Title 070 Sections 070.030, 070.040 and 070.070 regarding Use Regulations; Accessory Uses; Hillside Development; Landscaping, Screening and Fencing; Off-street Parking; Residential Site and Building Design Storage requirements; Signs; and Rules of Construction and Definitions

Assistant Community Development Director presented on the proposed changes to the municipal code. The following changes to the municipal code were proposed by Ricehill:

- Change to Code 070.030.020(e) Table of Allowed Uses. Proposal to create a new zoning use for "Craft Manufacturing" and propose to add it to all current commercial and industrial zoning categories. This use would include smaller manufacturing uses such as cabinetry, blacksmithing, and other small manufacturing uses.
- Change to Code 070.030.040 Accessory Uses and Structures. Proposal to allow backyard chickens as an allowed accessory use in Planned Unit Developments (PUD) unless specifically identified as a prohibited use in the PUD.
- Change to Code 070.040.050 Landscaping, Screening, Fencing. Proposal to reduce the amount of shrubs and perennials required in development proposals. Proposed to go back to previous code requirements for shrubs and perennials. Also proposed to reduce amount of required landscaping in I2 and I1 districts, as it is currently 20% which is greater than commercial zoning districts.
- Change to Code 070.040.050(f)(2)b Landscaping, Screening, and Fencing: Fence Standards and Fence materials. Proposal to amend code to allow chain link fencing in front and side yards in industrial zone districts if plants are added to base of fence when bordering public right-of-way.
- Change to Code 070.040.080(e) Residential Site and Building Design – Residential Building Design and Character. Proposal to correct formatting and change required storage for multifamily developments from 100 square feet per unit to a requirement of 1 cubic foot of storage per 3 square feet of gross floor area per unit.
- Change to Code 070.040.110 Signs. Proposal to add signs that are not visible from the public way to be added to list of signs not requiring a permit. Proposal to remove electronic message signs from the code per previous Council direction.
- Change to Code 070.040.060(h) Parking and Loading Area Use and Design. Proposal to require same number of trees per parking spaces and allow more flexibility with configuration of landscaping areas to be more flexible with installations of bioswales and rain gardens.

Commissioner Wussow asked how striking electronic messages from the code would affect existing electronic message board signs. Ricehill confirmed that those signs would be considered legal non-conforming signs going forward.

Commissioner Cipperly asked to clarify the required location of the landscaping screening for the chain link fencing in industrial area. Commissioner Dehm asked if landscape screening could be placed in public right of way.

DRAFT

Commissioner Grosscup asked if signs not visible from the public way would require a sign permit, and whether that would have any effect on sign lighting. Commissioner Wissing had questions regarding craft manufacturing and how it would relate to a mixed use or residential zone and home occupation uses and what scale of manufacturing was intended by the definition.

Commissioner Schachter asked to clarify the definition of bioswales. Commissioner Cipperly had a question about the tree islands and if those spaces could be permeable surfaces. The Commission requested clarification of the intent of shading a parking lot.

The Commission asked that 3-d printing be added to the craft manufacturing definition.

Chairman Dehm opened public comment. No public comments.

Commissioner Grosscup moved to approve item 11-20, motion with the noted modifications and clarifications, seconded by Commissioner Wussow. Commissioner Wussow asked if there was a need to modify any of the amendments, if that would be possible to do at a later meeting regarding these amendments.

Motion carried unanimously.

5. Continued Items from April 28, 2020

a. *07-20 Consideration of a request to Rezone a parcel from RH-Residential High Density to M2-Mixed Use Commercial Central Core zone district. The property is Lot 11B, Glenwood Meadows No. to a Minor Re-subdivision of Glenwood Meadows No 4 Lot Line Adjustment, County of Garfield, State of Colorado (PIN 2185-081-41-004)*

Assistant Director Ricehill indicated that since this issue was discussed at the previous meeting, there had been no submitted public comments.

Commissioner Dehm opened public comments. No public comments.

Commissioner Schachter made a motion to approve the request with the findings and conditions listed on page 8 of the staff report. Commissioner Shaver seconded the motion.

Motion carried unanimously.

b. *04-20 Consideration of a Major Site/Architectural Plan Review, Rezoning from RH Residential High-Density to RT Residential Transitional, and Variance applications for the construction of 100 Multifamily apartment units in 6 buildings on approximately 5.8 acres (PIN 2185-153-04-001, 2185-153-02-008, and 2185-211-00-002)*

Senior Planner Trent Hyatt provided an update as several items had been added to the application packet to address comments from the public and Planning Commission at the previous meeting. One question that was addressed by the applicant was the revision of a site plan showing parking options for electric vehicles. Additional drawings showing elevations between the existing Oakhurst Townhomes and proposed development were also added.

Public comments received between the previous meeting and 5/5/2020 were also added to the application packet. The following public comments were read into the record:

- David Turtle, no address given, expressed concerns over the effect of increased traffic on Blake and Palmer, especially given the current physical condition of the streets. Requested that Planning & Zoning deny the application.
- Lisa Menzano, 23rd & Palmer, expressed concern over scale of project and would prefer the space to remain open. Request Planning & Zoning to deny application
- Christine Smalley, no address given, expressed concerns over the amount of parking provided, increased traffic, and lack of sidewalks. Requested that Planning & Zoning deny the application.
- Janet & Richard O'Connell, 2409 Palmer Avenue, expressed concerns that current roads will not support future development and expressed concerns over parking, traffic, sidewalks. Requested that Planning & Zoning deny the application.
- Joan Troth, 3202 Cooper Court, expressed concerns over the scale of the project and size of the buildings, increased traffic, and decreased home values in the neighborhood. Requested that Planning & Zoning deny the application.
- Sara Simms, representing Mountain Valley Developmental Services, located at 2503 Palmer Avenue. Mountain Valley Developmental Services operates a home at this property for individuals with intellectual and development disabilities. Simms expressed concern that this project would increase traffic density in the neighborhood and expressed concern over the safety of the home's residents. Requested that the applicant extend street improvements through the neighborhood and increase safety measures for pedestrians in the neighborhood.
- Elaine Speck, 2506 Palmer Avenue, expressed concerns regarding density of the project and increased traffic in the neighborhood. Speck also suggested that the project application was tabled until after the COVID-19 crisis.
- Laura Speck, 2506 Palmer Avenue, requested Planning & Zoning Commission deny or postpone the decision on the application citing that many residents have been unable to follow the project or express their concerns adequately due to the online formats. Also expressed concerns over project density and proposed parking lot which would face the Speck residence. In addition, also expressed concern over possible change to their driveway configuration due to changes to Palmer. Speck also suggested that the project remove the north parking lot, reduce the number of units, and install adequate parking signage.
- Public comment received on behalf of multiple residents of the neighboring Oakhurst Townhomes including Laurie Nelson of Oakhurst #34, Dulce Ramirez of Oakhurst #33, Bianca Ramirez of Oakhurst #33, Bradley Rice of Oakhurst #10, Brandy Rice of Oakhurst #10, Unidentified of Oakhurst #10, Drake Timroth of Oakhurst #7, Kristen Levey #7, Unidentified #7, Steve [unknown last name]#28, Erica Crampton #28, Marie Dohm #4, George Dana #1, Shelly Lott #19, Joan Guilianelli #15, Brianna Millspaugh #18, Zachary Apke #18, Daisy Apke #18. This letter expressed concerns over increased traffic,

parking, physical condition of neighborhood roads, and project density.

- Annie Hoghuag, 678 Country Road 127, owner of 519 Easy Street. Annie expressed concerns over the amount of parking provided in the project. Requested that the City reconsider parking requirements.
- Dave Malehorn, 2407 Palmer Avenue, expressed concern over the project density, lack of sidewalks in the neighborhoods, neighborhood road conditions, parking, snow removal plan, and potential overall impact of the development on the neighborhood. This public comment had additional attachments that were unable to be read into record.
- A public comment from Allison Brett, 2201 Crestwood Drive, was submitted in the form of a Powerpoint. The presentation was shown by sharing a screen over Zoom. The slides were then read by the presentation author. Brett expressed concerns regarding traffic spillover and potential pollution from Highway 82 due to opening the Blake Gate, potential increased traffic, current road conditions, and pedestrian safety
- Joan Guilainelli, Oakhurst Townhomes, Unit #15 expressed concern over project density, physical proximity to Oakhurst and lack of fence, and decrease of open space in the neighborhood.
- Lynette Marie Lacerda, 285 Mikala Lane, New Castle, Colorado and former resident of 1814 Ouray Road, Glenwood Springs, Colorado. Lynette expressed concern over parking for the project.
- Ryan Roberts, 2419 Palmer Avenue, expressed concerns over the public involvement in the project especially concerning the capacity of residents of the neighborhood to communicate with one another and engage with the City given the current health crisis. Roberts suggested that the meeting and decision be postponed to a future date.
- A. David Cox & Cynthia Green, 2504 Palmer Avenue, submitted concerns regarding the public input process and expressed that the hearing should be delayed until an in person public hearing can be held. Concerns were also expressed regarding project density, parking, and rezoning of property at 2710 Blake as part of the project. Also questioned if these units were needed citing other multi-family developments in Glenwood Springs.
- Erin and William Lee, 2402 Palmer Avenue expressed concerns over the public input of the project and how COVID-19 limits communication regarding meaningful conversations about this project. Requested to postpone a decision until more personal forms of communication and meetings can occur.
- George Dana, Oakhurst Townhomes, expressed concerns over project size and density, parking, traffic, flood debris control, water flow, fencing, light pollution, pedestrian safety, snow removal, and open space. Requested Planning and Zoning to deny application.
- Lynn B Cary, 2405 Palmer expressed concerns regarding traffic, gating Palmer, increased density and inadequate parking.
- Scott Kramer, 2501 Palmer Avenue, expressed concerns regarding current road conditions, pedestrian safety, traffic overflow from Highway 82, opening of Blake Gate, and concern over public input process and use of Zoom platform during COVID-19.

Commissioner Dehm then opened the public comment to any meeting attendees.

- Frank Martin, 805 Crestwood Drive. Prior to comments Martin disclosed that he is the spouse of City Council member Paula Stepp and that his comments reflect his own

opinions. Expressed concerns over current conditions of Palmer Avenue and possible increase in traffic.

- Jamie Raehal, 2314 Palmer Avenue, expressed concerns that the City of Glenwood Springs Transportation Commission was not involved in these discussions as traffic, parking, and other transportation concerns have been a focal point of public input.

- Shelly Lott, Oakhurst Townhomes #19, expressed concern over the roads in the neighborhood and the access to the development. Suggested making the development a cul-de-sac pushing traffic through the Blake gate rather than connecting to Palmer.
- Elaine Speck, 2506 Palmer, expressed concern over public input process and requested that the decision be postponed.
- Annie Hoghaug, 678 County Road 127 and owner of a property at 519 Easy Street expressed concerns regarding project density, traffic, local road conditions, and possible effect of the development on the neighborhood.
- Dave Malehorn, 2407 Palmer, expressed concern regarding public input process and suggested that any decision with the project be postponed.
- Cody Lyden, 2415 Palmer, expressed that he was in agreement with the general sentiment of the neighborhood such as concerns regarding traffic, project density, and local road conditions.

Commissioner Dehm closed the public comment period.

Michael O'Connor, Triumph Development West, addressed the following questions from the public and Planning & Zoning Commission from the previous meeting.

- Restricted Public Access to Uphill Open Space: O'Conner explained that the uphill open space would be separated from the development by a 420' debris flow fence and multiple retaining walls which would provide physical separation.
- Neighborhood Traffic Impacts: Greg Schroeder, McDowell Engineering spoke on the possible traffic impact on the neighborhood from this project. Stated that they had received a CDOT access permit and that estimated increase in traffic as a direct result of this development would be 4 to 13 vehicles per hour based on studies. Schroeder also stated that the traffic studies were also peer-reviewed by engineers at CDOT. O'Connor stated that traffic calming measures have been considered for Palmer including one-way designation, signage, and speed bumps.
- Parking Counts and Management: O'Connor stated that their parking plan meets City Code and is not requesting a variance for parking. Also explained that leases for the unit will require tenant to specify number of cars and residents to each unit as managed by an onsite manager and that assigned numbered parking will be used.
- Site Sections and Landscape Buffers at Oakhurst Townhomes: Mike Foster, the landscape architect for the project, further described the landscape plan along with elevations showing the development and its spatial relation to the existing Oakhurst Townhomes. Foster also explained that the light poles for this project would be placed as far as possible away from the Oakhurst Townhomes.
- Controlling Trespassing through Neighbor Properties: O'Connor mentioned that the planned landscaping would provide a physical deterrent to cutting through the Oakhurst property.
- Pedestrian Circulation and Palmer Avenue Typical Section: Foster explained that there

would be a continuous sidewalk on both sides of Palmer as part of the site plan. There would also be additional sidewalk added on Blake as part of the project as well. Foster explained more about the Palmer street design showing sidewalks and landscaping.

- Green Building Elements: Foster explained that they would be pursuing National Green Building Certification as a component of HUD Loan process.
- EV Charging Parking Spaces: Plan will include infrastructure for future EV parking spaces.
- Material Samples and Colors: Foster provided visual examples to demonstrate the colors and materials that would be used for the project.
- Palmer Avenue Construction: O'Connor also addressed the reconstruction of the driveway on the Speck property showing pictures of the current site. The reconstruction of Palmer Avenue to meet City standards would require to create a new driveway on the property with an easement.
- Compliance with Zoning: O'Conner provided further clarification and information as to how the project complies with the current zoning requirements. O'Connor also explained specifically what the variances are for this project.

O'Connor explained that applicant would be willing to include the following items to the plan as condition of approval: privacy fencing on west side of parking area, traffic calming techniques along Palmer Avenue, and working with adjacent landowner on construction of a new driveway.

O'Connor concluded comments and discussion moved to questions from the Planning & Zoning Commission.

Commissioner Dehm proposed a brief recess before continuing the meeting.

Commissioner Dehm reconvened the meeting for questions for the applicant and staff.

Commissioner Shaver asked the applicant about the ratio of compact to standard size parking. Applicant explained that according to the plan that there were 20 compact parking spaces. Shaver also asked staff how any variances previously approved on the property would apply to the current project. Trent Hyatt explained that variances are granted in connection with a specific site plan and since this development has a different site plan that the previous project variances do not apply to this project.

Commissioner Schachter asked applicant regarding the summary of traffic volumes as compiled by McDowell Engineering. Schachter asked how traffic would move if there was only one access route to the site from the south and not connect Palmer through the site. Greg Schroeder, McDowell Engineering, explained that typical best practice road design encourages more access points for traffic flow and emergency response. Schachter expressed concern about the traffic flow in the area with the project. Schachter also had questions about open space requirements, especially the active space requirement. Mike Foster explained that the community room for the site, including outdoor space helped meet that requirement as well as space between Buildings D & E.

Schachter also about the potential for debris flow damages to Palmer or surrounding neighborhoods. Jessica Bower, Assistant City Engineer, explained that there will be a maintenance agreement between the development and the City which includes debris flow inspections and standards to be met. Bowser also explained that the proposed design of the project mitigates risk by installing a debris flow fence.

Commissioner Grosscup asked the applicant regarding the number of spaces in the north parking lot that face the Oakhurst Townhomes. Mike Foster explained that there were 24 total spaces in the north parking lot with 14 spaces facing west. Grosscup also asked how development would manage tenants parking additional vehicles in the neighborhood after exceeding their allotted spaces. Grosscup had questions for staff regarding traffic speed, which Terri Partch confirmed would be 25 MPH. Grosscup also asked if any street improvements are planned in the neighborhood. Terri Partch explained that improvements to Blake between 23rd and 26th has been planned for the near future.

At approximately 9:45 PM, there was a disruption as many meeting participants lost access to the Zoom meeting space. There was an internet outage which caused many participants lost access to the Zoom meeting space.

City Attorney Anna Itenberg clarified that without a quorum of commissioners, that the meeting could not legally proceed and advised to wait to see if any other members of the commission could join.

Commissioner Wussow asked if it would be possible to use e-mail to decide to continue the meeting. Anna Itenberg clarified that e-mail was not mentioned in Code.

A quorum of Commissioners returned to the Zoom meeting.
Commissioner Schachter, Dehm, Wussow, and Cipperly were able to rejoin the Zoom meeting. Anna Copeland, Triumph Development West, asked if public comment would be reopened if the meeting was set to continue at a future date. Dehm confirmed that public comment portion had already been closed.

Commissioner Schachter made a motion to continue item 04-20 to the next Planning & Zoning Commission meeting on Tuesday, May 26th. The motion was seconded by Commissioner Cipperly.

Motion passed by Schachter, Dehm, Wussow, and Cipperly. Commissioners Shaver, Grosscup, and Wissing were not present to vote due to internet outage.

Commissioner Schachter made a motion to continue item 06-20 to the next Planning & Zoning Commission meeting on Tuesday, May 26th. The motion was seconded by Commissioner Wussow.

Motion passed by Schachter, Dehm, Wussow, and Cipperly. Commissioners Shaver, Grosscup, and Wissing were not present to vote due to internet outage.

6. Director Comments

Director was not available for comments as was not able to connect to the meeting.

7. Adjournment

Meeting was adjourned at 10:13 PM.

From:	Carol Turtle
To:	Trent Hyatt
Subject:	Fwd: 100 apartment application proposed for Blake Avenue
Date:	Tuesday, April 28, 2020 7:17:43 AM

Begin forwarded message:

From: Carol Turtle <c.turtle@icloud.com>
Date: April 23, 2020 at 11:10:00 AM MDT
To: letters@postindependent.com
Subject: 100 apartment application proposed for Blake Avenue

On April 28, 2020, Glenwood Springs Planning and Zoning Commission will consider an application for a proposed major development of 100 apartments in 6 buildings located South of Oakhurst Townhomes and North of Walmart on Blake Avenue. The hillside location sits above the Bus Rapid Transit Station in South Glenwood. If they have not already done so, I suggest the P&Z Commission and City Council members visit the proposed site, and more importantly, visit the surrounding neighborhoods of Blake and Palmer Avenues. These 2 streets will serve as major access roads into the development from South Glenwood. Blake and Palmer Avenues are both substandard streets with improper drainage and no sidewalks. Both streets are totally inadequate to handle the traffic they have now, let alone taking on the increase of traffic generated by 100 apartments while providing no safe passage for children to access schools and parks.

I hope our P&Z Commission will deny approval of this major development application until our city can address the inadequate roads with its lack of sidewalks in the Blake and Palmer neighborhoods.

David J. Turtle
Glenwood Springs, CO

Dear Planning + Zoning

April 16, 2020

My name is Lisa Manzano

I have lived in Glenwood Springs since 1976. My current residence for the past 16 years is 23rd + Palmer, The stop sign sits on my property. During construction on the Grand Ave. Bridge with the increase of traffic 90% of the cars did not stop, Dangerous maybe a lawsuit next time.

My neighborhood has change with many young families lots of

small children, playing outside kickball, walking, riding bikes—
The proposed Bell Ripley Development in the past was single family homes, and now it has turned into multi family condo's - The project is simply to BIG to ~~many~~ many people to many cars.
Please reconsider a smaller scale of a project. In a perfect world we would love open space - Thankyou for your time

Lisa M Morgan

From: Gretchen E Ricehill
To: Trent Hyatt
Subject: FW: Concern over Bell Rippy Development
Date: Monday, April 27, 2020 8:07:07 AM

Hello Trent
I hope you had a pleasant weekend.
I received this message yesterday. According to the plan, on May 5th P & Z meeting you'll need to read it into the record. If we receive a lot of written comments, I'll help you do that.
Best,
Gretchen

From: Christine Smalley <csmalley@rfschools.com>
Sent: Sunday, April 26, 2020 10:45 AM
To: Gretchen E Ricehill <gretchen.ricehill@cogs.us>
Subject: Concern over Bell Rippy Development

Dear Miss Ricehill,

My name is Chrisitne Smalley, a high school social studies teacher, mother of two, and resident of Palmer Ave. I write to you today to express my concern over the Bell Rippy Development by Walmart.

They plan to have two bedroom apartments with only 1.5 spots available per apartment. This is unrealistic as almost every family that needs two bedrooms has two cars. With high costs of housing people will certainly be having roommates, again a situation that would have two cars. The neighborhood does not have the space or the road conditions to allow for overflow parking. Additionally, there are many children in the neighborhood riding bikes and families walking. Without sidewalks, they are in the street and already in an unsafe condition; additional traffic through this area is scary for all residents and our children.

I'm not opposed to the development, but it needs to come with sidewalks and safety precautions for those in the neighborhood around it. Successful city planning requires thoughtful consideration for impacts of developments beyond the confines of the parking lot. City council must consider the overall effects that a development will have on the area as a whole.

If you have not walked through these areas, you need to, and please do so with your fellow council members, consider discussing these concerns with Paula Steep who walks the neighborhood regularly. You need to see people pushing their strollers and kids trying to navigate the already pot-holed streets on their training wheels; you too would feel the concern that our neighborhood has. Thank you for your time.

--
Christine Smalley
Glenwood Springs High School Social Studies Teacher

From: Gretchen E Ricehill
To: Trent Hyatt
Subject: FW: Bell Rippy Development Comments
Date: Monday, April 27, 2020 12:32:25 PM
Attachments: ~$mmunity Development DepartmentRichard.docx

Here's another one.
Gretchen

From: Richard OConnell <r.oconnell@sbcglobal.net>
Sent: Monday, April 27, 2020 12:18 PM
To: Gretchen E Ricehill <gretchen.ricehill@cogs.us>; jandjraehal@gmail.com; Jan OConnell <tenacity71@gmail.com>; Christine Smalley <csmalley@rfsd.k12.co.us>; Ralph Smalley <rsmalley@rfsd.k12.co.us>
Subject: Bell Rippy Development Comments

Community Development Department
Richard & Janet O'Connell

101 W. 8th Street 2409
Palmer Ave

Glenwood Springs, Co 81601
Glenwood Springs, Co 81601

Attn: Planning and Zoning Commission

Gretchen Ricehill

We own a multi- generational home at 2409 Palmer Ave. We are concerned that the existing roads do not support the existing Oakhearst Townhomes and the new Bell Rippy Development will make a bad situation worse. We are also concerned that the Bell Rippy Development will end up with non-residential parking and increased traffic on the developed portion of Plamer Ave.

Blake Street has no sidewalks and always has cars and trucks parked on the East side of the street. 26th Street is worse, with a high grade, poor condition, no sidewalks and cars always parked on the north side of the street. The opening of the Blake Ave gate by Walmart will also increase the traffic load on Blake Ave. The existing foot traffic is already high with the RFTA bus stop at 27th Street and will be considerably higher with the Bell Rippy Development. Parking is limited at the RFTA bus stop, which also adds pressure to parking in the area.

At their February 4, 2020 meeting, the new developers reviewed their proposed plans

for the property. It is our understanding that they are proposing 100 apartments located in 6, three and a half story buildings, based on taking advantage of the relatively steep grade of the site. This is an increase of 30 apartments from the previous developer. They were able to increase the number of apartments by eliminating parking under the buildings proposed by the previous developer. There will be a mix of 1 and 2 bedroom rental apartments. They are not planning on any elevators so there will be no handicap access for the upper floors. Per the Glenwood Springs development code Table 0.30.1, they are required to have 1.5 parking spaces per each dwelling and a quest parking space for every five dwellings. Based on 100 apartments they would need to have 170 parking spaces at a minimum. The developers noted they plan to ask for a variance in the parking space requirements which we believe should not be allowed due to the overloaded parking in the area.

Sincerely

Richard and Janet O'Connell

From: Gretchen E Ricehill
To: Trent Hyatt
Subject: FW: P & Z discussion-public comment
Date: Tuesday, April 28, 2020 12:27:59 PM

-----Original Message-----
From: Joan Troth <jktroth@comcast.net>
Sent: Tuesday, April 28, 2020 12:24 PM
To: Gretchen E Ricehill <gretchen.ricehill@cogs.us>
Subject: P & Z discussion

I request that Planning & Zoning deny the request to approve 100 apartments in six buildings between Blake and Palmer for these reasons:

The city's mission statement includes maintaining the small town character of Glenwood Springs

Massive buildings do not comply with this statement

Adding the huge number of new residents on the south edge of town will impact the surrounding neighborhood negatively regarding home values and traffic

Adding more cars to Grand Avenue will result in congestion becoming the norm

Adding the large number of apartments will impact the city's water supply and sewage capacity

The city of Glenwood Springs has no responsibility to provide housing for up-valley workers

Joan Troth, 3202 Cooper Ct.
945-0668

From:	Sara Sims
To:	Trent Hyatt
Cc:	Sara Sims
Subject:	FW: statement for the record
Date:	Tuesday, April 28, 2020 2:51:46 PM

Good afternoon, Trent.

Please accept this communication as Mountain Valley Developmental Services' official public comment regarding the Bell Rippy development of the Oakhurst subdivision:

Mountain Valley Developmental Services is a Community Centered Board and Program Approved Service Provider, supporting people who have intellectual and developmental disabilities. We own a home at 2503 Palmer Avenue, which is adjacent to said development. This home supports 7 adults of varying levels of need, but nearly all require a little extra time and space to physically maneuver through their environments. This includes getting into and out of vehicles on Palmer Avenue and 26th Street.

I am aware of the current issues regarding the on-street parking to accommodate for the overflow of Oakhurst Townhomes and the lack of sidewalks in the area. After attending the neighborhood meeting on February 4th, it is clear that the new development will exacerbate these concerns.

Additionally, the increase in traffic produced by the property's future inhabitants will inevitably render Palmer Ave a higher density traffic area which is not equipped to handle this volume of vehicles.

I am worried about the safety of the people living not only in our home, but in the neighborhood, and their ability to navigate these hazards. Our current space is adequate to accommodate for staff vehicles and specially equipped vehicles (which are larger than typical) on which the residents rely. However, with more vehicles and increased traffic flow, I fear that we won't be able to safely or easily find parking, load/unload residents, or maneuver our vehicles onto and off Palmer Avenue and 26th Street.

Here are a few considerations to mitigate our concerns:

- Request the developers commit to subdivision improvements to address these issues (mentioned above);
- Extend these improvements past the development's property lines to 23rd and Palmer, along 26th Street, and from 27th to 23rd and Blake; and
- Dedicate City resources to creating better parking and traffic plans that includes safety measures for pedestrians along the streets mentioned above.

Thank you for your consideration.

Sara Sims

From:	Elaine Speck
To:	Gretchen E Ricehill; Trent Hyatt; michael@triumphdev.com
Subject:	Triumph Development West Application for Apartment Community
Date:	Thursday, April 30, 2020 4:59:55 PM

This is a follow-up to our Zoom meeting held on April 28. In 2017 the P&Z held numerous meetings for a development similar to the current proposal. We had dozens of concerned citizens attending the meetings and speaking of their concerns, i.e. increased traffic flow, to open or not open the gate on Blake, one way on Blake, one way on Palmer, density of the proposal, grade of the road, P&Z will hopefully look back to see concerns at that time.
The proposal, although finally approved, went silent.
Several months ago notices were sent to residents about a new proposal. The meeting was held in a small room at the Community Center with standing room only (6 chairs were provided). Nothing pertinent came of this gathering - preliminary architectural plans were shown. It is perplexing that this new developer can just pick up where the previous developer failed and move forward. Are they not required to start as a new entity? The proposal has significant differences. The next meeting of P&Z will be held on Tuesday, May 4th, one week after the Zoom Meeting.
The impact to the residents of the Oakhurst Condominiums is truly horrid. The traffic will be a nightmare.
I have lived at 2506 Palmer since the 70's. Now I find that I might have to move my driveway to accommodate the new construction. Really?
Please consider tabling this matter and resume when we are on the other side of the current health crisis. Most of us are still in some kind of "social distancing" and "safer at home" mode.
Thank you for your consideration.
Elaine Speck

From:	The Silver Bead Colorado
To:	Gretchen E Ricehill; Trent Hyatt; Michael O"Connor
Subject:	Planning and Zoning
Date:	Thursday, April 30, 2020 8:11:05 PM

I am requesting that you deny/postpone ANY decisions that could possibly be made in regards to the development proposed by Triumph LLC during this time of Pandemic in our world. Most of our lives have been turned upside down and I feel that it is incredibly irresponsible to make any crucial decisions on a project of this scale, that greatly effects so many citizens.

I know that many other concerned residents were unable to communicate their questions due to the Zoom/You Tube platform on Tuesday night. It is only fair that you have heard from every citizen before rendering any decisions.

This presentation was the first that many of us have seen the illustrations and information of the proposed plans and it was also the first time we got to "see" who the members of Triumph Development LLC are. During this lengthy presentation many disturbing topics were brought up that NEED to be discussed before we continue any further. Please allow me to present a few of my families concerns;

#1. This project is still TOO MUCH for this land parcel. They have proposed to basically tear up most of the property to construct buildings, concrete, asphalt and fences. They have not taken into consideration any neutral/open space to allow for significant privacy or environmental impact.

#2. Why is it that when new developers (mainly who reside in other towns or states) that see a "potential" to develop areas in OUR town, seem to have more rights and allowances than the current residents who have been investing into our community and paying taxes for years??? As I mentioned on the video conference the other night, my father built our house 48 years ago on this land. The whole area was then zoned for single family house developments. Unfortunately, zones have been changed over the years and the Bell/Rippy multi-family land owners seem hell bent on only allowing LARGE developers to decimate the land and turn the whole area into high density housing units.
The reason why there is such push back and frustrations over these proposals is because it is just TOO MUCH and needs to be scaled down to a more measurable and responsible size. I would like the newer members on this commission to know that this is at least the FOURTH time in the past 12 years that "we", as the neighbors have had to deal with these proposals. Yet, we are never informed as to what happened when the previous plans fell through or failed. We are left questioning and hoping that perhaps the land owners have finally realized it is time for ANOTHER type of development option to be explored (example...open space or a park).

#3. Just because Planning and Zoning and the City Council approved the last development in 2017, that does NOT just "grandfather" in this new proposed development. There are

significant changes that have been made in this plan and well as a whole new set of questions that need to be answered. One of the biggest concerns, that impacts our family's property is this NEW Northside parking lot that would be directly in front of our house. This was NOT in the previous plan!!! I am sure that any one of you reading this can appreciate how difficult that is for us to even comprehend this type of change. I ask that you have compassion and try to imagine if this was YOUR house. The street lights/ noise would penetrate our beautiful dark skies at night, headlights would be facing directly towards our front windows, as well as the Oakhurst condominiums. Not to mention the exhaust that would be contaminating our entire neighborhood with the substantial increase of vehicles not only driving into the proposed parking lots, but also idling in the cooler winter months. It is kind of unbelievable that an entire plot of land needs to be developed for a parking lot that only accommodates some 25 cars!!! How greedy and unnecessary and dare I say...cruel .

Mike O'Conner casually mentioned that "we" (the house at 2506 Palmer) would need to re-configure OUR driveway to accommodate for this new plan. WHAT???? As you know by my comments on the video chat, that was completely shocking news to us and absolutely unacceptable. There should be more concern for NOT impacting the current residents in ANY sort of way. Again, let me state, WHY would you allow a project to progress that causes so much disruption to such a large area of citizens??? The people from 23rd street, the entire block of Palmer Avenue, down to the Oakhurst Condominiums, 26th Street and Blake street are all being impacted. Not to mention RAFTA, Highway 6 & 82, 25th street and more. Doesn't that seem a bit much to you???

What I would like to propose is a compromise. I understand that change is inevitable, but no positive changes can ever occur without compassion and flexibility. What I propose is to eliminate the North side parking lot completely and leave that area as a neutral open space. That would alleviate our major concerns as well as for some of the residents at Oakhurst. It would also greatly decrease the potential traffic volume on Palmer Avenue and 25th Street. I would also like to see this project scaled down from 100 units to 80 or less. I think buildings E & F could be removed from this plan to assist in the direct impact on Oakhurst. I propose NO sidewalks be developed on the side of Palmer Avenue (as one commissioner mentioned, it is a sidewalk that goes "no where", because there are no other sidewalks constructed for it to attach to until the other side of 23rd street). The entryway to the parking lot would be removed completely as well and there would only be ONE entry point into the main internal parking lot and that would be located further down on Palmer. This would allow for this area to remain peaceful and clam and make good strides to be kind neighbors to each other. It would also not impact our family's house in any way and allow for us to breath easy again.

I would also like to see the proposed debris flow fence be moved significantly further away from our property line to allow for spatial distance and privacy. In addition, I would like the developer to post signage of no parking areas so that Palmer Avenue road is not filled up with additional vehicles/trailers/campers, etc. because they do not fit into the "allocated spaces". No one can really believe that 1.5 parking spots will accommodate the accurate number of

what people will actually be driving. They are going to need to strongly limit and monitor the amount of vehicles their tenants own and not just charge them an extra "fee" if, and when, they show up with more. The main source of impact that this development needs to focus it's energy on is the wide open space at the corner of Palmer and Blake where it is not effecting the current residents as much.

I would also like to see these property owners address the trash and homeless encampments that have taken over the entire area up here. Initially I wanted to bring this topic up on the video chat the other night...but then so many other more pertinent issues arose that I forgot to mention it again. I am in the process of creating a task force to finally clean up these horrific camps once, and for all in this area (from Palmer down to the south side of Walmart). ECOS will have to be hired to help us clean up these toxic and incredibly dangerous sites. I would like this developer (as well as the members of Bell/Rippy) to consider contributing significantly to this cause. It is partially the fault of these current land owners that have allowed this situation to have gotten to this point, as well as BLM and the state. I would hope that Triumph Developers LLC would also like to help and make contributions that would benefit our entire neighborhood. That would show us some good faith that you are really trying to be a positive part of our neighborhood and perhaps, we can really all come together in hopes of a development that benefits us all.

I appreciate you taking the time to read my lengthy email and I look forward to hearing back from you soon.

Sincerely,
Laura Speck
2506 Palmer Avenue
Glenwood Springs, Colorado 81601
970-945-5663 (work)

4/30/2020

We the people living in the Oakhurst townhomes oppose the building of the proposed Apartments Because:

(1) the increased traffic will make the neighborhood hazardous to walk or ride bikes in

(2) An increase of vehicles will make an already bad road worse - especially in winter

(3) There is not enough places to park for the current residents And their guests/family to park

(4) DO you think there will be only one car per Apartment And no one will ever have any visitors? At least 200 + parking spaces are needed - where will they be?

(5) Low income housing will make this section of Glenwood A slum part of the city faster. IN Slums there is always an increase of Crime, violence And drug Dealing (Gangs). Can the police Department handle this? We DO not want the Apartment people coming into our Neighborhood Destroying our Property

(6) How are the homeless people and their Dogs

That chase people going to be addressed?

1) Lori Nelson Oakhurst #34
2) Dulce Ramirez Oakhurst #33
3) Blanca Ramirez #33
4) BRADLEY Rice #10
5 Brandy Rice #10
6 Cathy Cassand #10
7. Drake Timroth #7
8. Kristen Levey #7
9. [illegible] #7
10. Steve Pierce #28
11. Erickxa Crampton #28
12. Marie Dohm #4
13. George Dana #1
14. Shelly Lo ~~##~~ 19 Oakhurst
15. Joan Guilianelli #15
16. Breanna Millspaugh #18
17. Zachary Apke #18
18. Daisy Apke #18

May 1, 2020

To: Glenwood Springs City Hall – Community Development Department

Regarding: The Application from Triumph Development West LLC on behalf of property owner, Bell Rippy Glenwood LLC

Public Comment from: Ann E "Annie" Hoghaug

Address: 678 County Rd 127, Glenwood Spgs CO 81601

Owner: 519 Easy Street, Glenwood Spgs CO 81601

Firstly, thank you for the comprehensive informational session with the P&Z Commission and the Developer and related parties on April 28, 2020. I attended the meeting via the Zoom protocol. I was also in attendance at the February 4, 2020 Community Information Session at the Glenwood Springs Community Center.

My concerns with this project are primarily related to PARKING. Looking at the number of bedrooms in the project and doing the math at the average number of people per bedroom, as estimated by Michael O'Connor during the 4/28/2020 meeting, I get 204 people (163 bedrooms x's 1.25 people/bdrm). Note that this estimate seems low to me due to the likelihood that the per unit rental costs will be high at approximately $2,000 + per unit as of initial leasing upon project completion. In my experience, high rental rates equate to high occupancy per unit in tenant efforts to manage affordability. Note also that the $2,000 + per/month amount was suggested by Michael O'Connor at the February community meeting about the project.

But, back to the parking… perhaps a portion of the 204 people are either children or the unusual adult who does not own a motor vehicle. With a non-vehicle estimate at 15% of the total 204 people, the number of car owners drops to 174. The proposal includes a total of 148 parking spots. At one car per person this is an immediate parking spot deficit of 26 spaces OR an average of .85 parking spots per vehicle owning tenant. I would speculate that the EXTRA vehicles related to tenants of this project will be parking anywhere they can – along Blake Ave, Palmer Ave and 26th Street; as well as in the Wal Mart parking lot and RFTA Park & Ride parking lot! As pointed out by Trish Kramer during the Public Comments portion of the 4/28/20 meeting, "reduced vehicle usage" does not necessarily equate to "reduced vehicle ownership". In other words, yes, this project may result in more people taking the bus and biking, BUT they will likely still own a vehicle or two (i.e. work vehicle; car for recreating on the weekends; etc.).

I understand that Triumph is simply taking advantage of the parking spot requirements as dictated by the City of Glenwood Spgs. I, therefore, respectfully request that P&Z as well as City Planning Dept and City Council reconsider required parking allotments for developments of this type; and subsequently, deny approval of this project. Ironically, I ran across an article in the *Glenwood Springs Post Independent dated April 20, 2016 and titled "Developers: Proposed Fee Schedule Still Falls Short"*. The article includes a few interesting tidbits. One I find interesting is seeing that P&Z recommended denial of the 116-unit Oasis Creek Apartments due to building height ***and parking code*** variances:

> "One project that would benefit from whatever fee reductions come about is the proposed 116-unit Oasis Creek Apartments, which is also before council on Thursday. That project has its own hurdles to clear, including a recommendation for denial by the city's Planning and Zoning Commission, primarily due to the developer's requested building height and parking code variances."

First, it is interesting to me that 1.5 (or less) parking spots per unit ***used to be*** considered a variance. Now it appears to be the status quo for projects of this type. Secondly, I wonder who benefits from such minimal parking requirements? I would guess the developers are OK with it. Seems like nothing but trouble for prospective tenants AND rental management agents.

Other interesting tidbits from this article:

> From Chad Lee, Local Land-Use Attorney --"The comprehensive plan, updated in 2011, was the product of hundreds of hours of citizen comment and participation. The comprehensive plan acknowledges a dearth of housing in Glenwood. It also acknowledges the market's inability to deliver both affordable and attainable housing. Part of the problem, he said, is Glenwood Springs' affordable housing mandate, which requires developers of free-market, for-purchase housing to build a certain number of below-market, deed restricted units as well. The comprehensive plan explicitly says the city will use incentives and regulations to encourage attainable housing, he said."

This, to me, explains, in part, why there are so many rental complexes springing up all over town. The developers are incentivized to build this type of housing in Glenwood Springs since deed restricted units are a drag on their profits. Additionally, at the 2/4/20 meeting, Michael O'Connor, stated that the Bell Rippy project is NOT considered "affordable" housing. I would agree that $2,000/month and just one parking spot for my family's 2 cars would NOT make me feel as if I had found anything close to ***affordable*** housing. Finally, the "attainable" piece – "attainable" seems to be subject to considerable interpretation. Perhaps Bell Rippy units will be attainable for middle income earners… but, I must wonder, will they be ***desirable***?

Finally, IF the Bell Rippy project continues down the path of approval, I respectfully propose that a City of Glenwood Springs CONDITION OF APPROVAL become part of the permanent record to the effect that: Leasing Agent/s, in perpetuity, are required to explicitly specify number of parking spots per each unit AND assign spots per a spot numbering system that correlates to an assigned number physically attached to the actual space, as well as on the lease agreement. I believe the existing neighborhood and greater Glenwood Springs community deserve recourse that such a condition could afford in the event of the parking situation becoming a free for all at some point in the future. This CONDITION OF APPROVAL could also enact NO PARKING ZONES along the portions of Palmer Ave and Blake Ave that abut the Bell Rippy property, along with ENFORCEMENT of the No Parking Zones.

I am also compelled to comment on the opening of the Blake Gate and the city plan to make Blake Ave between 24th Street and 26th Street a one-way going south. Multiple times last night the one-way portion was referred to as being between 23rd Street and 26th Street so I would appreciate clarification on that. My understanding is that it would be between only 24th and 26th streets and I am supportive of this plan in order to prevent "cheater" traffic at times of high volume north bound travel on Hwy 82. Easy Street intersects Blake Avenue in the proposed one-way section, and, I believe, Easy

Street residents would accept the inconvenience of a lifetime of left hand turns off of Easy Street over the likelihood of this section of Blake Avenue seeing increased traffic in BOTH directions. Note also that this section of Blake Avenue is VERY narrow. A one-way section here could potentially pave the way (no pun intended) for improvements to Blake Avenue that could include gutter and sidewalk. I strongly encourage all city personnel, P&Z commissioners and city council members to walk this stretch of Blake Avenue prior to making any binding decisions regarding its fate.

Finally, I wish to emphasize the public comment from Trish Kramer during the 4/28/20 meeting regarding her concerns about Coronavirus and its effects on the city's ability to support and improve infrastructure peripheral to the Bell Rippy proposed project, i.e. Blake Avenue, Palmer Avenue, 26th Street and 23rd Street and supporting infrastructure therein, such as sewer and water systems, gutters and sidewalks. In other words, does this project put undue burden on the City of Glenwood Springs (as well as neighbors of the project) during this time when the City has already had to slash their budget??

In closing, I wholeheartedly support "infill" and public transportation for Glenwood Springs and the Roaring Fork Valley. I also support SMART growth. In my opinion, the Bell Rippy Project, as proposed, just does not deliver on the smart growth piece of what Glenwood Springs deserves.

Respectfully Submitted,

~ Ann E "Annie" Hoghaug
970-945-5649
Annieh49@comcast.net

05/04/2020

Bell Rippy Development

I am writing on behalf of myself, Dave Malehorn and my family living at 2407 Palmer Avenue. Family members include my wife, Polly; my 80-year-old mother, Linda, my daughter Shelby; and my Granddaughter, Eliza, 9 months as well as our three dogs.

First, I would like to start with **The City of Glenwood Spring's Mission** statement that states" *To meet the health, safety, and welfare needs of it citizens, and contribute to their quality of life, the City of Glenwood Springs* and *its employees believe the following"* bullet point number 7 states" *We advance the interest of the community openly and transparently"* In 2018, the City of Glenwood Springs voted to open the Blake Street gate and make Blake Street one way without any notification to it's citizens. I implore you to re-think that decision.

Second, the **City of Glenwood Springs 2020-2025 Strategic Vision** bullet point 3 "*protect and preserve our quality of life"* states, *"…. There are challenges to our quality of life including traffic congestion, rising housing costs, increased impacts from growth etc…."*

With these two statements, I have many concerns about the new Bell Rippy development as outlined below:

- **Walkability to retail and downtown**
  - Currently, there are no sidewalks on South Blake
  - Currently, there are no sidewalks on 26th Street
  - Currently, there are no sidewalks on Palmer Ave.

  How does the city reconcile the walkability of the neighborhoods if there is nowhere to walk other than on the streets?

- **Conditions of adjoining streets**
  - South Blake Street is in very poor condition
  - 26th Street is in very poor condition
  - Palmer Street has no sidewalks and is used as a major walking route for the Palmer and adjacent neighborhoods
  - 23th street in poor condition

  Does the city currently have the means to fix these streets before this development is completed?

- **Develop affordable housing**
    - What is the definition of affordable per the city?
    - What is the proposed rent for the Bell Rippy property?
    - How much free market housing is already approved and/or being developed. (The Lofts, Six Canyons, the old Buffalo Valley property, the old Lutheran Church property in West Glenwood)

  Does the city really need 100 more units of free market housing?

- **Parking**
    - The 27th Street Park and Ride parking already overflows onto South Blake, 26th Street and upper Palmer
    - Oakhurst Condominiums has 34 units and 80 parking spots and their residents overflow park on South Blake and 26th Street
    - RFTA buses are currently parking by the Blake Street Gate as the can no longer park at the old American Furniture parking lot. Where will they go?
    - Bell Rippy's snow removal program currently is to plow the snow into parking spaces, where will those cars go?

  Does the city have a plan to deal with the parking issue that will be exasperated with Bell Rippy?

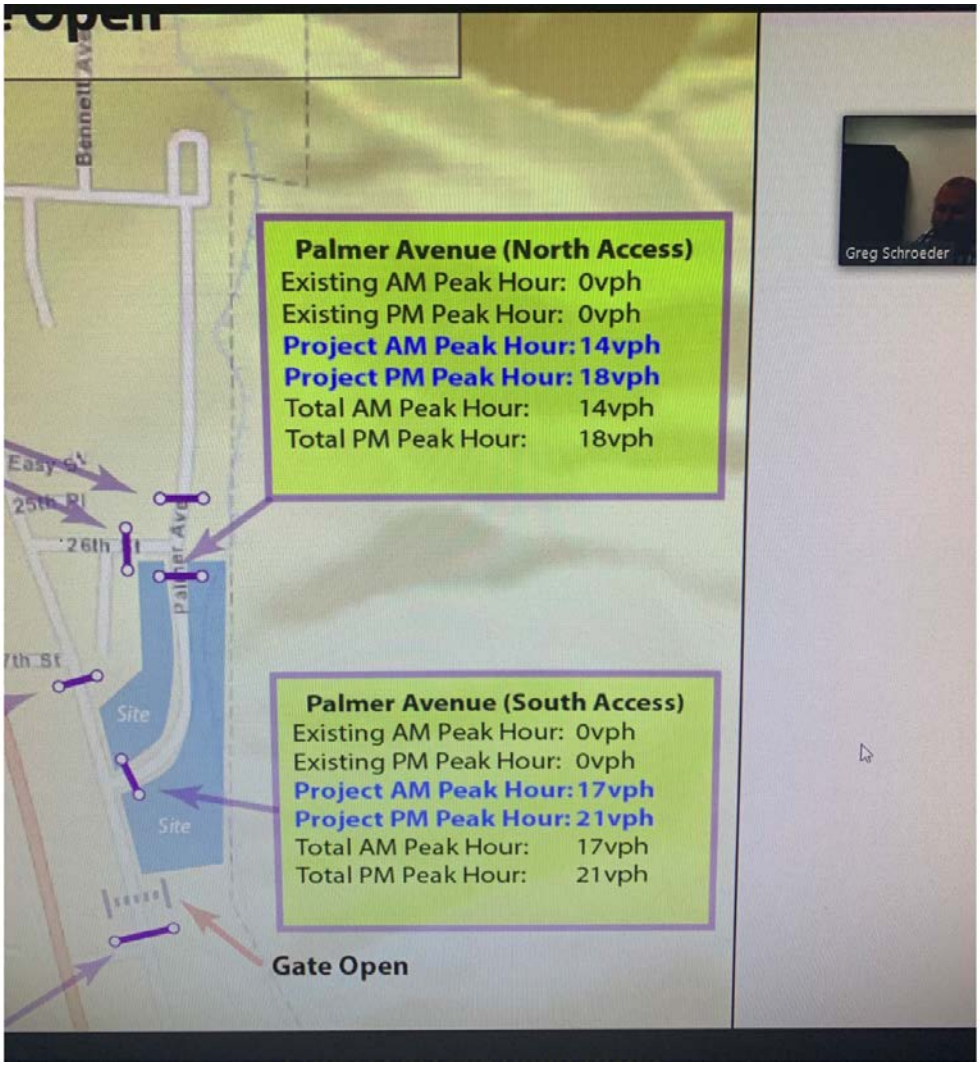
- **Traffic in the adjacent neighborhoods**

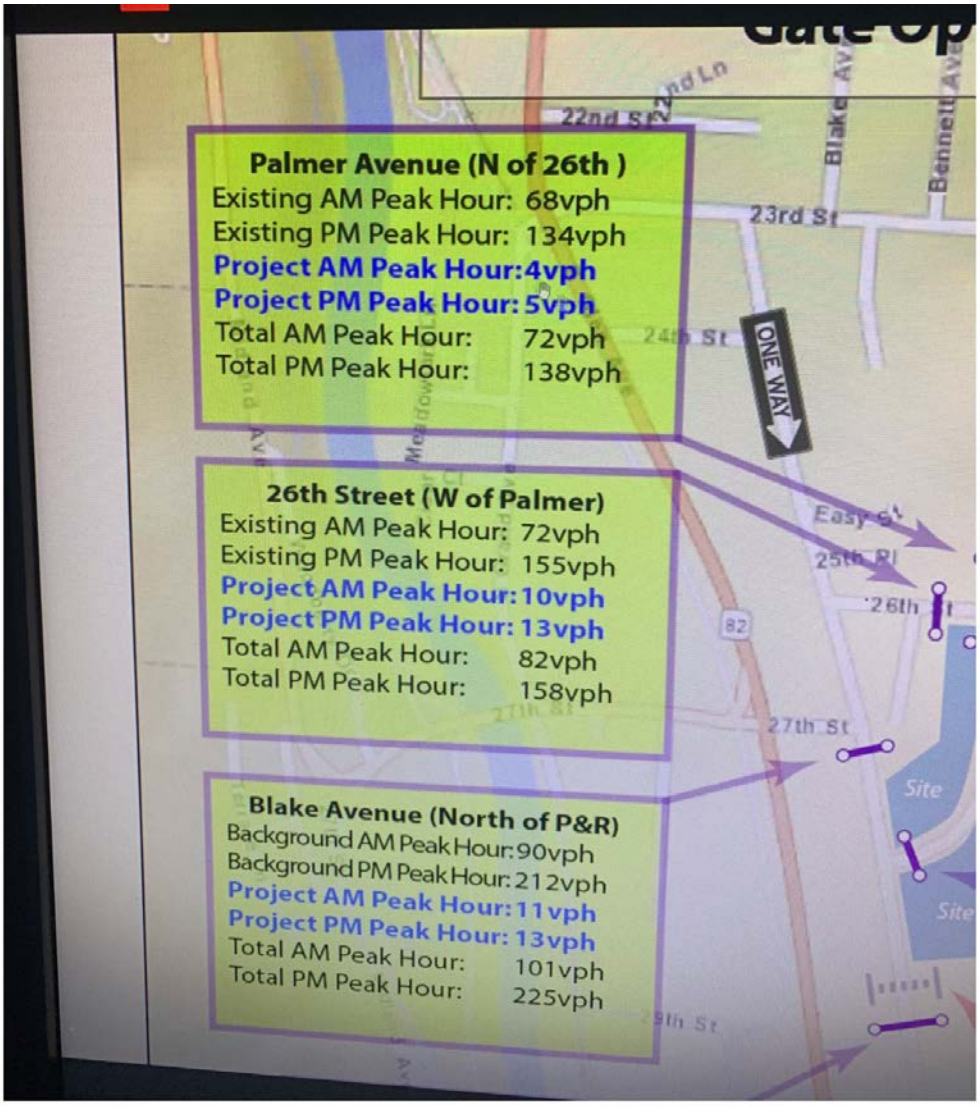
  In a letter to the City of Glenwood Springs dated November 21, 2017 from McDowell Engineering LLC (attached) several points were made about the traffic impacts from the Bell Rippy development

    - Blake Street one way would route northbound traffic onto Palmer Ave
    - Traffic calming measures would include curb extensions but there currently are no curbs nor sidewalk on Palmer
    - A graph on this document shows and 86.5% increase in traffic with Blake Street one way and the Blake Street Gate opened. How does that kind of impact not need a CDOT Access Permit?
    - In a revised traffic study by McDowell Engineering, (attached) the projected traffic impact on North Palmer was estimated at a 4VPH am peak traffic and 5 VPH pm peak traffic, *those numbers are not realistic, they are almost fanciful.*

    - We have seen the impact of traffic through Palmer Ave during the GAP (see attach photo) when Palmer was not connected to Blake and the Blake Street Gate was closed. The neighborhood is very concerned with our quiet community being overrun with traffic.
- **Bell Rippy P&Z meeting April 28th, 2020**
    - The statement "we will figure that out later" was used frequently. That is not an acceptable statement. The time to resolve issues is before they are created, not vise versa
    - The developer noted a "10 year involvement", what does that mean? They will no longer manage this new development and any issues it creates?

I look forward to working with P&Z as well as a receptive city council to resolve these issues. Until these are solved, it is irresponsible to approve this development.


Palmer Avenue (North Access)
Existing AM Peak Hour: 0vph
Existing PM Peak Hour: 0vph
Project AM Peak Hour: 14vph
Project PM Peak Hour: 18vph
Total AM Peak Hour: 14vph
Total PM Peak Hour: 18vph
Palmer Avenue (South Access)
Existing AM Peak Hour: 0vph
Existing PM Peak Hour: 0vph
Project AM Peak Hour: 17vph
Project PM Peak Hour: 21vph
Total AM Peak Hour: 17vph
Total PM Peak Hour: 21vph
Gate Open
Site
Site
Greg Schroeder


Palmer Avenue (N of 26th)
Existing AM Peak Hour: 68vph
Existing PM Peak Hour: 134vph
Project AM Peak Hour: 4vph
Project PM Peak Hour: 5vph
Total AM Peak Hour: 72vph
Total PM Peak Hour: 138vph
26th Street (W of Palmer)
Existing AM Peak Hour: 72vph
Existing PM Peak Hour: 155vph
Project AM Peak Hour: 10vph
Project PM Peak Hour: 13vph
Total AM Peak Hour: 82vph
Total PM Peak Hour: 158vph
Blake Avenue (North of P&R)
Background AM Peak Hour: 90vph
Background PM Peak Hour: 212vph
Project AM Peak Hour: 11vph
Project PM Peak Hour: 13vph
Total AM Peak Hour: 101vph
Total PM Peak Hour: 225vph
22nd St
23rd St
24th St
ONE WAY
Easy St
25th Pl
26th
27th St
Site
Site
82

November 21, 2017

City of Glenwood Springs
Attn: Terri Partch, City Engineer
101 West 8th Street
Glenwood Springs, CO 81601

RE: Glenwood Multifamily
Traffic Impacts of One-Way Blake Avenue from 23rd Street to 26th Street
Glenwood Springs, Colorado

Dear Terri:

In response to your inquiry regarding developing a comprehensive traffic solution for the neighborhood near Blake and Palmer Avenues between 23rd and 26th Streets, McDowell Engineering has prepared this letter to provide you with additional information on revised options and strategies.

Blake Avenue One-Way Configuration

Blake Avenue between 23rd and 26th Street is proposed to be reconfigured as southbound one way from 23rd to 26th Street. Traffic that previously used Blake Avenue northbound would now be routed to either Palmer Avenue to the east or SH 82 to the west to continue northbound. This configuration would also keep the majority of northbound commercial traffic off of Blake Avenue, and would primarily use SH 82, and to a lesser extent, Palmer Avenue. Based upon the circuitous re-routing to Palmer Avenue and the current traffic distribution, it was assumed that seventy percent of the re-directed traffic will utilize the SH 82 route.

RFTA Park and Ride Effects

The RFTA Park and Ride is adding a significant amount of the current traffic volume on Blake Avenue. This traffic is anticipated to be re-routed via SH 82 and Palmer Avenue in a similar distribution to the overall area traffic, as described above.

Gate Closure Options

Option A –Gate Closed (Existing Condition)

This option would keep the existing gate closed, replicating existing conditions. This option will not allow any of the commercial traffic to access Blake Street and will keep the distribution of this commercial traffic at its present locations, mainly at the Blake Avenue/SH 82 signal near the McDonald's entrance and 29th Street/SH 82.

Option B –Gate Open

This option would open the existing gate and would reconnect Blake Street to the south SH 82 connection near the McDonald's entrance. This option would support parallel routes through the south side of Glenwood Springs and would provide additional traffic flow and emergency access for the community. Local residential neighborhoods can better access the commercial areas without accessing SH 82. Opening the Blake Avenue gate will provide another parallel option for traffic, allowing for the completion of the gridded street network and dispersing traffic access to SH 82.

The gate configuration (open or closed) is not significantly impacted by the Glenwood Multifamily project traffic. The site generated traffic addition ranges from 2% to 14% of the anticipated Year 2040 total traffic on the adjacent street network.

Currently no curbs nor sidewalks

Traffic Calming Options

A number of traffic calming options can be proposed to help manage traffic, speeds, and driver route choices. Curb extensions can be installed on 26th Street and/or Palmer Avenue to create a narrowing effect and visually differentiate smaller neighborhood streets. In addition, improved pedestrian crossings can create awareness of the multimodal nature of the neighborhood.

Speed bumps or humps are not recommended as they can impact emergency response times, cause street maintenance concerns, and cause driver aggravation. A series of speed humps or bumps is typically required to make a significant impact and for the installation to perform successfully.

The creation of these traffic calming options will create slower speeds and increase travel time throughout the area, which will deter drivers from cutting through the neighborhood and will promote using the SH 82 corridor.

Traffic Impacts

The anticipated traffic volumes on Blake Avenue, Palmer Avenue, 26th Street, and 23rd Street are depicted in the attached Figure 11A and Figure 12A and summarized in the table below.

Year 2040 Traffic Volumes (vph)	Blake Avenue One-Way Southbound from 23rd Street to 26th Street (Blake Avenue Gate CLOSED)			
	Blake Avenue SB One-Way (South of 23rd Street)	Palmer Avenue (South of 23rd Street)	26th Street (East of Blake Ave.)	23rd Street (East of SH 82)
Background Traffic	74	105	122	668
Site Traffic	2	7	20	12
Total Traffic	76	112	142	680
Year 2040 Traffic Volumes (vph)	Blake Avenue One-Way Southbound from 23rd Street to 26th Street (Blake Avenue Gate OPEN)			
	Blake Avenue SB One-Way (South of 23rd Street)	Palmer Avenue (South of 23rd Street)	26th Street (East of Blake Ave.)	23rd Street (East of SH 82)
Background Traffic	154	118	135	661
Site Traffic	2	7	20	12
Total Traffic	156	125	155	673

The above table shows that the site generated traffic adds a very small percentage of the overall traffic. With the southbound one-way configuration of Blake Avenue, opening the gate is anticipated to have little impact upon the neighborhood traffic volumes. Blake Avenue currently has 191 vph south of 23rd Street in its presently configured two-way street. Both proposed scenarios listed above result in less traffic on Blake Avenue.

State Highway Access Permit

With the proposed configurations (one-way Blake Street and opening the Blake Street gate), a new State Highway Access Permit will be required at the intersection of SH 82 and 27th Street. The anticipated total traffic volumes on the east leg of 27th Street exceed a twenty percent increase in the current State Highway Access Permit volume of 163dhv. With the gate closed, the site-generated traffic is anticipated to be 19.8% of the total Year 2040 traffic volume on the east leg of this intersection. With the gate open, the site-generated traffic is 10.5%.

The following table summarizes the percent increase of traffic from the current access permit volumes, the gate configuration, Blake Avenue lane configuration, and development impacts:

Condition	Gate	Development Traffic (dhv)	Total Year 2040 Traffic at SH 82 and 27th Street (dhv)	% Increase from Access Permit
Baseline Traffic (Two-way Blake), No Development Impacts	Closed	N/A	191	17.2%
One-way Blake, No Development Impacts	Closed	N/A	195	19.6%
One-way Blake, No Development Impacts	Open	N/A	272	66.8%
One-way Blake w/ Development	Closed	48	243	49.1%
One-way Blake w/ Development	Open	32	304	86.5%

Conclusions

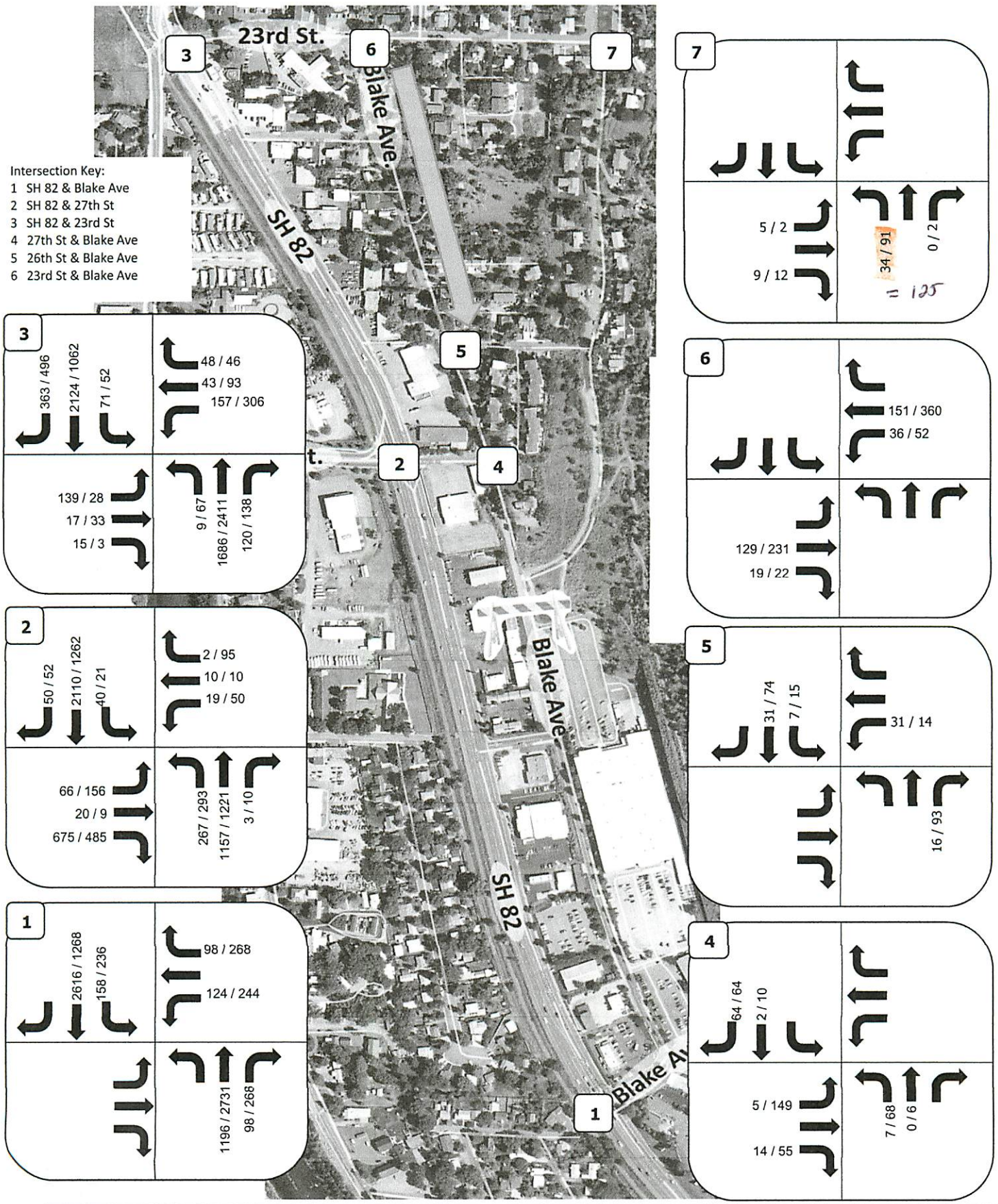
The proposed traffic volumes from the Glenwood Multifamily are not substantial compared to the background traffic volumes that presently exist. The creation of the one-way Blake Avenue configuration is not significantly impacted by the site traffic. Opening the Blake Avenue gate will provide another parallel option for traffic, allowing for the completion of the gridded street network and dispersing traffic access to SH 82.

Sincerely,
McDowell Engineering

Kari McDowell Schroeder, PE, PTOE
Traffic/Transportation Engineer

Encl: Figure 4A – Year 2040 Background Traffic – Blake Ave. Gate is Closed and Blake is One-Way SB Street from 23rd to 26th.
Figure 5A – Year 2040 Background Traffic – Blake Ave. Gate is Open and Blake is One-Way SB Street from 23rd to 26th.
Figure 7 – Project-Generated Traffic Assignment – Bake Ave. Gate Remains Closed
Figure 8 – Project-Generated Traffic Assignment – Bake Ave. Gate is Open
Figure 11 – Year 2040 Total Traffic – Blake Ave. Gate Remains Closed, Blake is Two-Way
Figure 11A - Year 2040 Total Traffic – Blake Ave. Gate is Closed and Blake is One-Way SB Street from 23rd to 26th.
Figure 12A – Year 2040 Total Traffic – Blake Ave. Gate is Open and Blake is One-Way SB Street from 23rd to 26th.

Figure 4A: Year 2040 Background Traffic - Blake Ave. Gate is Closed and Blake is One-Way Southbound Street from 23rd to 26th



Project Number: 1247
Prepared By: KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX vph

October 30, 2017

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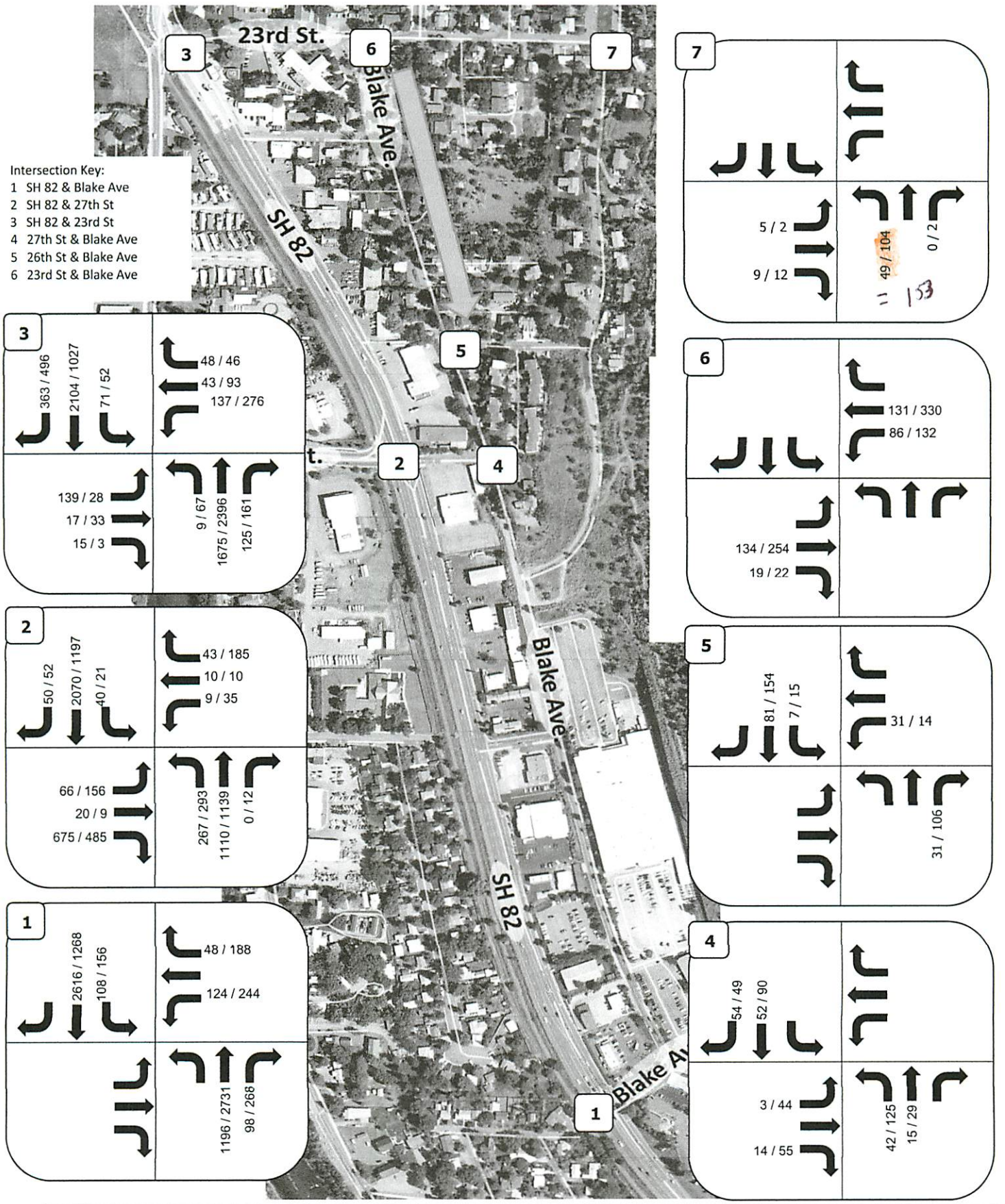
Figure 5A: Year 2040 Background Traffic - Blake Ave. Gate is Open and Blake is One-Way Southbound Street from 23rd to 26th



Project Number: 1247
Prepared By: KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

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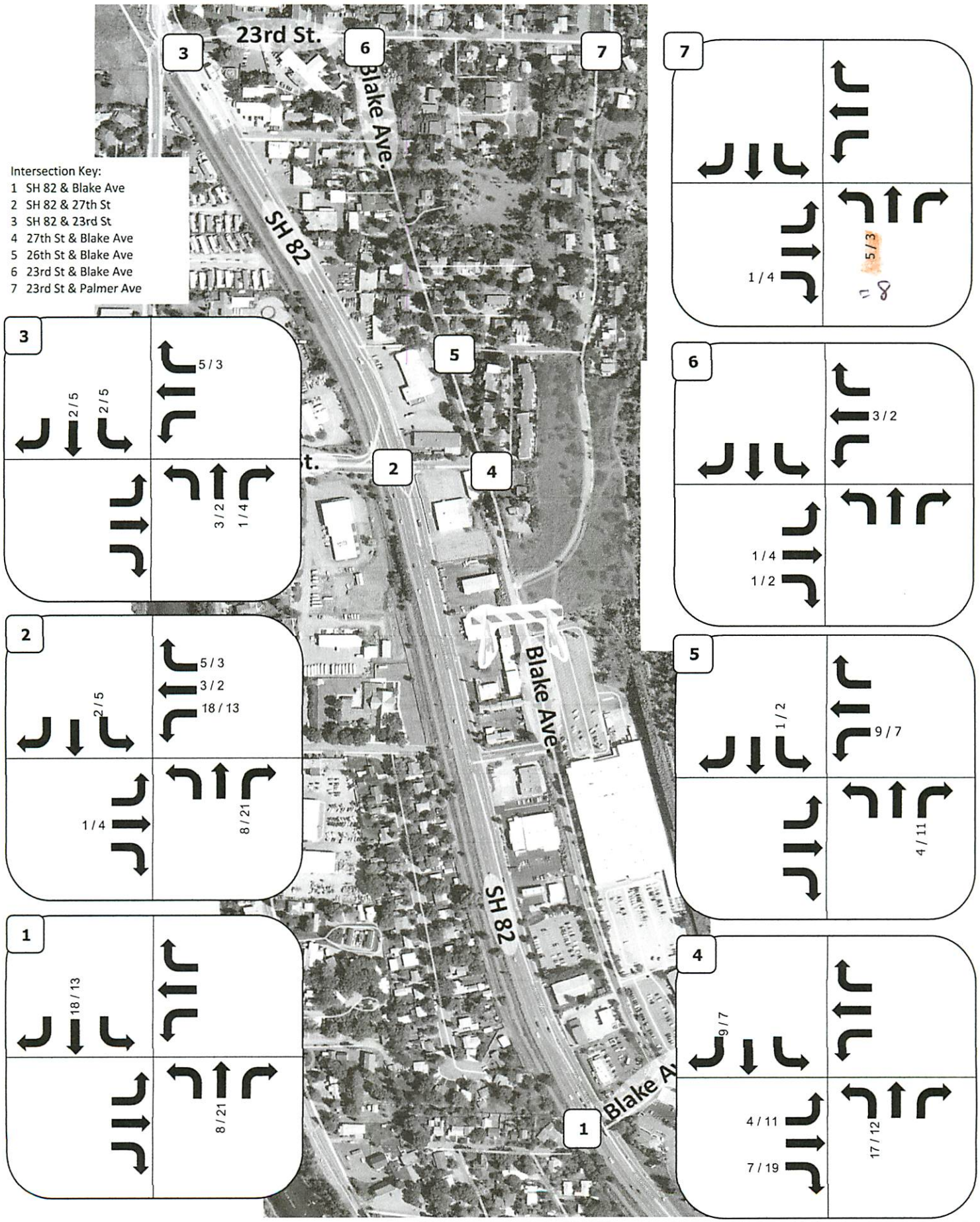
AM/PM Volumes = XX / XX vph

October 30, 2017

Figure 7: Project-Generated Traffic Assignment - Blake Ave. Gate Remains Closed



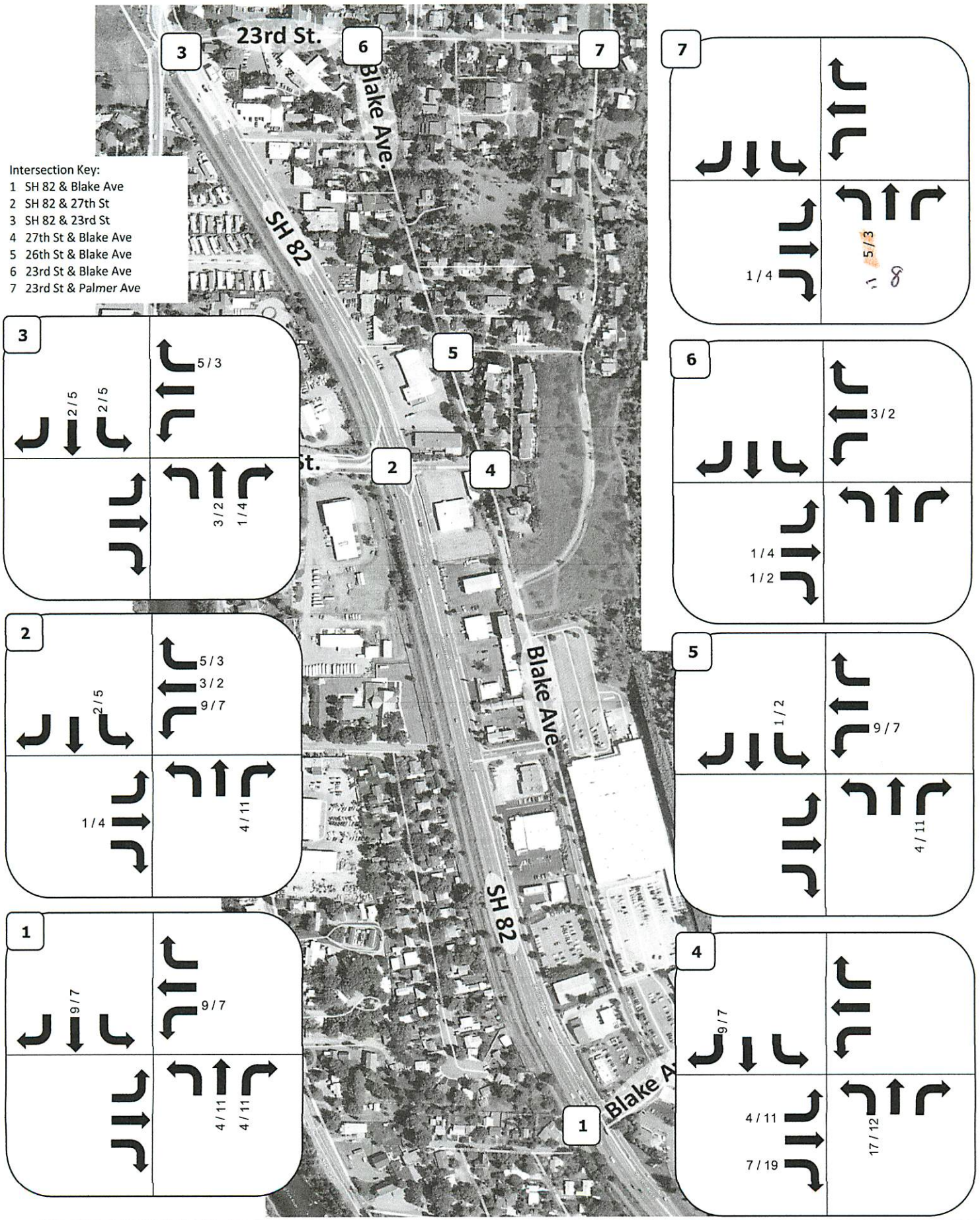
Project Number: 1247
Prepared By: BBG
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX vph

March 9, 2017

Figure 8: Project-Generated Traffic Assignment - Blake Ave. Gate is Opened



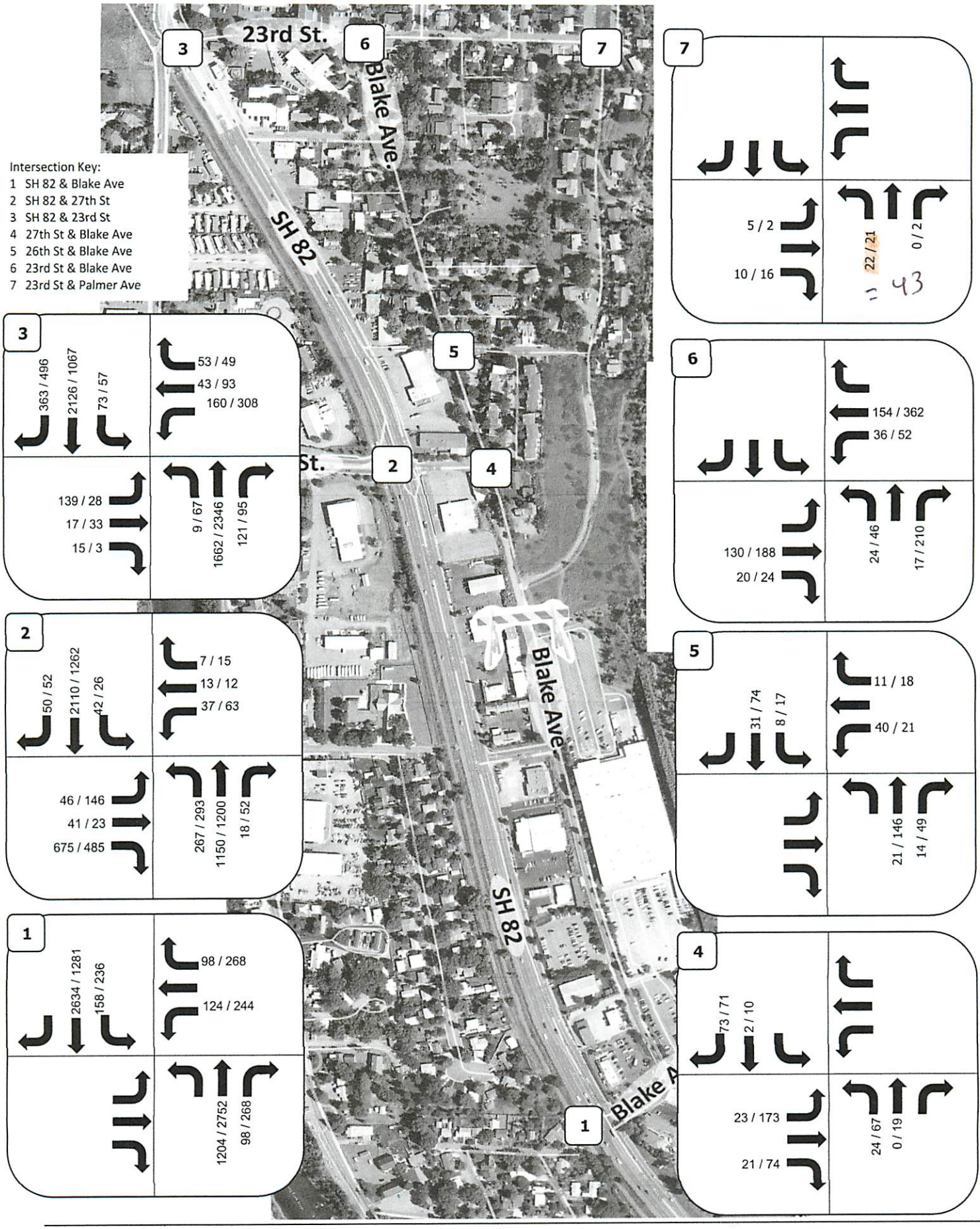
Project Number: 1247
Prepared By: BBG
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX vph

March 9, 2017

Figure 11: Year 2040 Total Traffic - Blake Ave. Gate Remains Closed, Blake is Two-Way



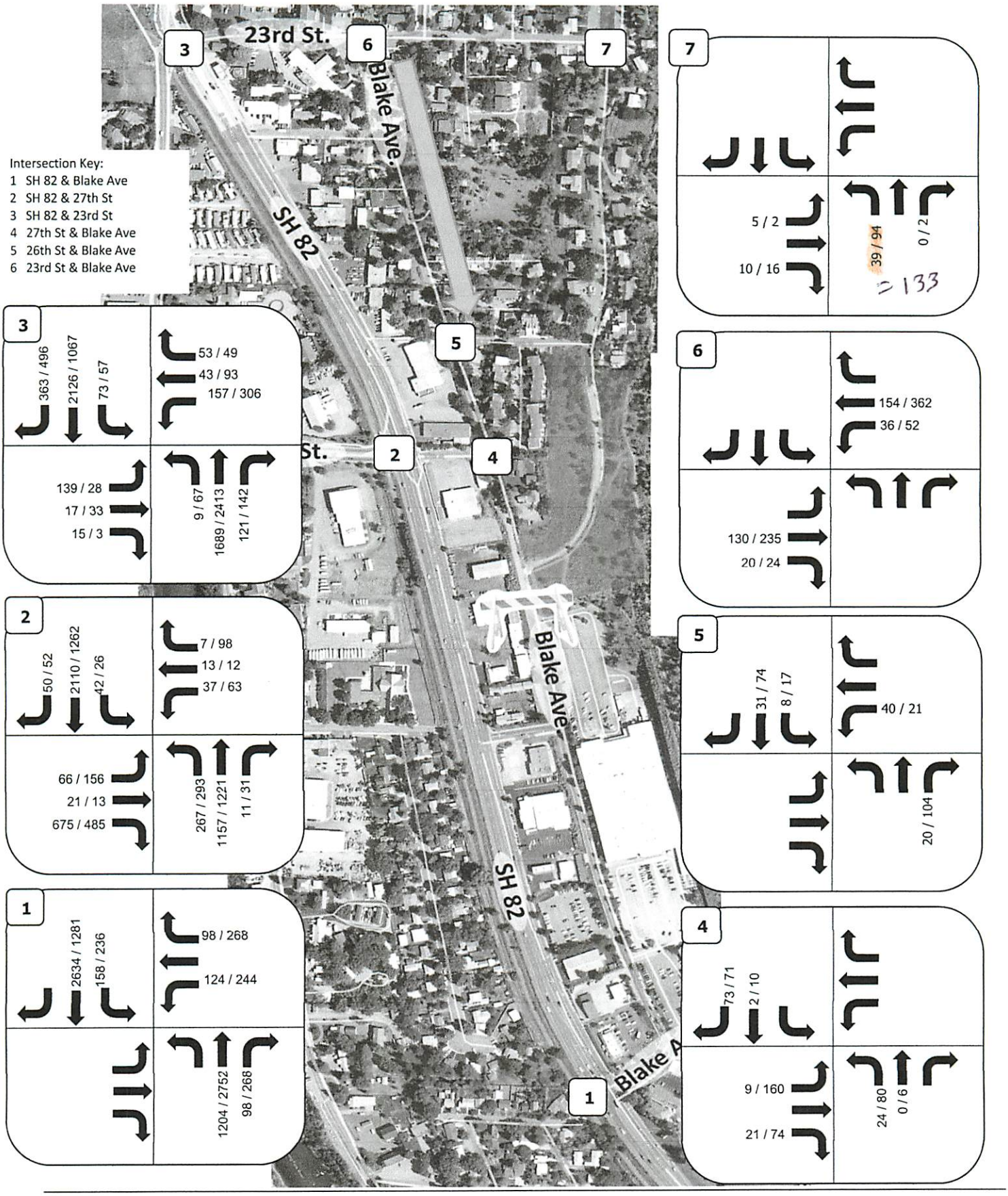
Project Number: 1247
Prepared By: BBG
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX vph

March 9, 2017

Figure 11A: Year 2040 Total Traffic - Blake Ave. Gate Remains Closed and Blake is One-Way Southbound Street from 23rd to 26th



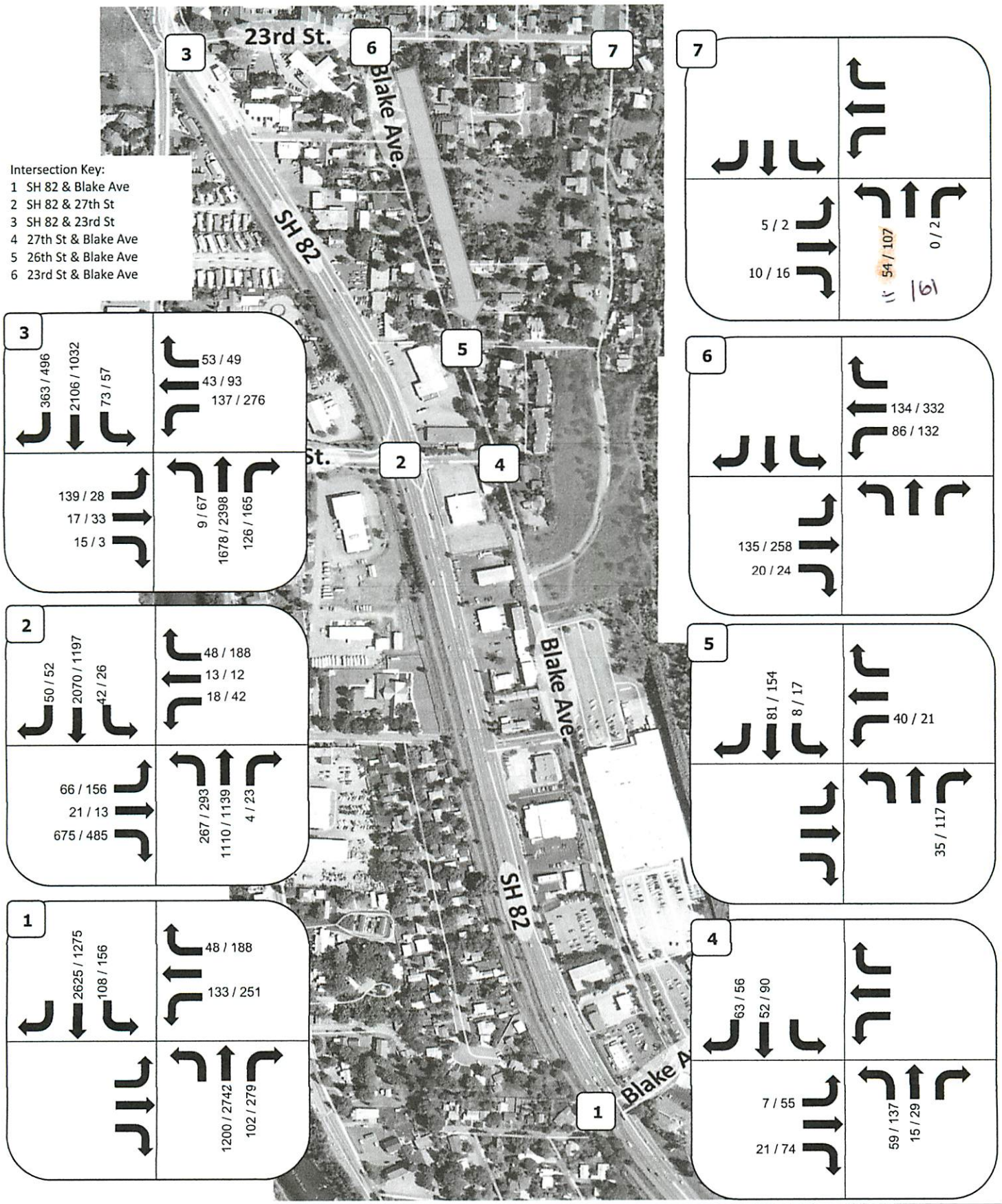
Project Number: 1247
Prepared By: KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX vph

October 30, 2017

Figure 12A: Year 2040 Total Traffic - Blake Ave. Gate is Opened and Blake is One-Way Southbound Street from 23rd to 26th



Project Number: 1247
Prepared By: McDowell Engineering, KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX vph

October 30, 2017

Questions to Planning and Zoning Commissioners – Triumph/Rippy Application

Alison Brett, 2201 Crestwood Drive

- Commissioners have conflated the building of the new development with the opening of Blake Gate and development of Palmer as a through road.

- Traffic studies presented on April 28, 2020 were misleading and inadequate. They present the impact of additional traffic as though the new development is to be created in a bubble.

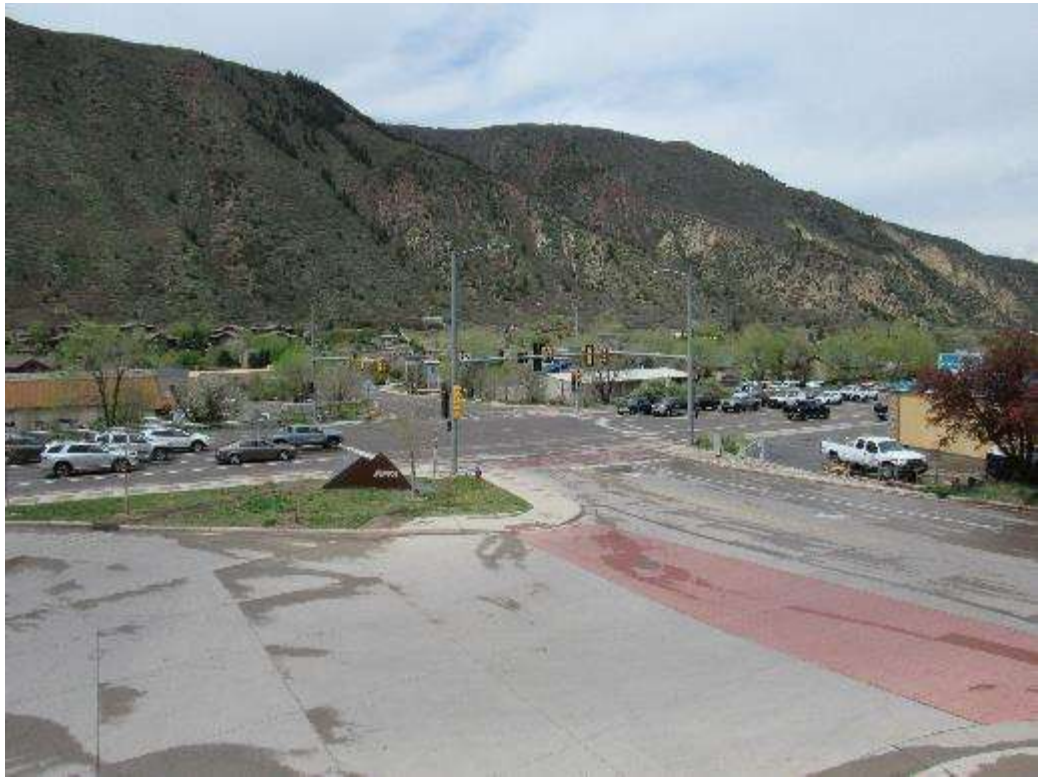
Consequently…

Commuter and commercial traffic infiltration into residential areas is inevitable.

- **What data is available to indicate the number of vehicles currently using Highway 82 during recent peak seasons and hours?**
- **From that, what data is available to estimate the percentage of those vehicles that will divert through the new routes once the development is complete?**

The opening of Blake Gate and continuation of Palmer encourages unnecessary commuter and commercial traffic off Highway 82 into residential areas.
Residents in both existing and the new residential areas will be negatively affected.
What is being done to avoid substantial change and significant adverse impacts upon current residents' experience of living there?

Commuter traffic from Highway 82



Walmart traffic

How can additional traffic be justified when there are no safe crossings or sidewalks?

27th Street is already steep and dangerous.

The steep hill up 27th Street makes the junction onto Blake at the top difficult to see and negotiate. The sidewalk stops there.

Blake has no facilities for increased traffic volume. Residents and other road users will suffer from crowding, noise and pollution.
Residences and play areas are too close to the physical dangers of additional traffic.
What are commissioners' plans for overcoming these problems?

Oakhurst families need protection from vehicles.

Blake has no sidewalks nor protection from the effects of vehicles.

Currently, neither of these signs along Blake are effective against speeding motorists. How will commissioners protect busy residential areas from the dangers of additional commuter and commercial traffic?

Another truck jumping the stop sign at this dangerous junction of 27th Street and Blake.

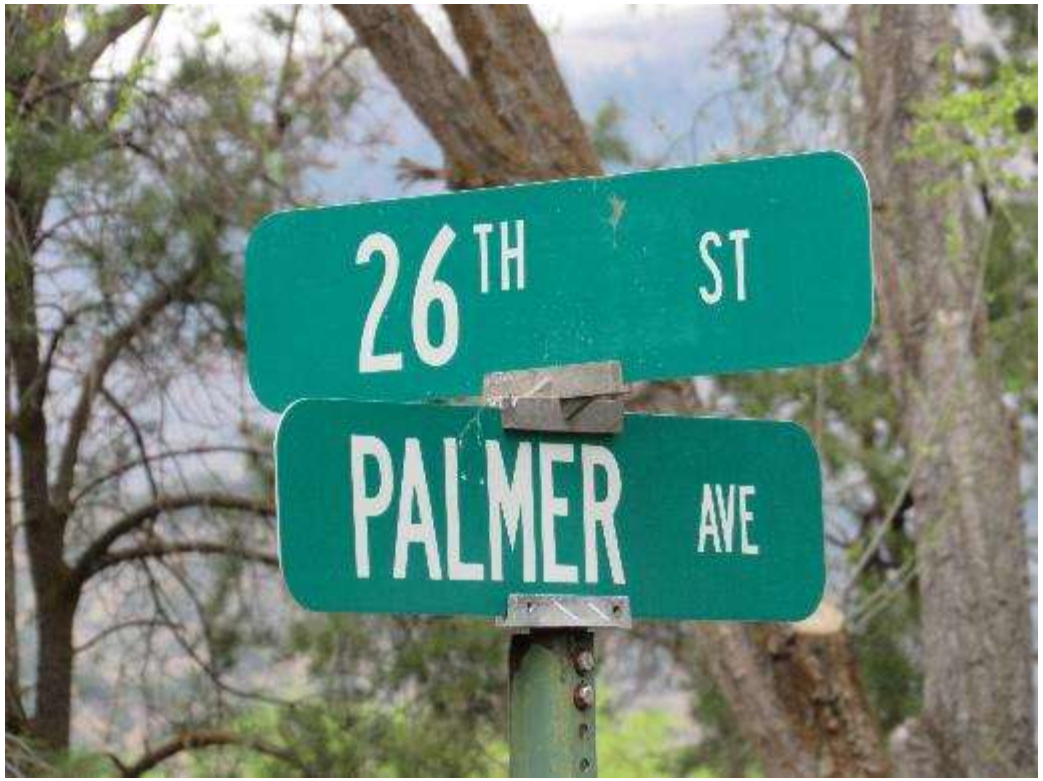
Oakhurst Road descends awkwardly towards 26th Street. This whole areas is extremely slippery in winter.

26th Street, Palmer and surrounding areas are very popular walking and cycling routes.
How will such users be protected from the traffic?
What will be done to provide for cyclists and pedestrians along the existing Palmer Avenue and beyond?

Oakhurst Townhomes – single entrance and exit onto 26th Street, which is destined to become a busy road.

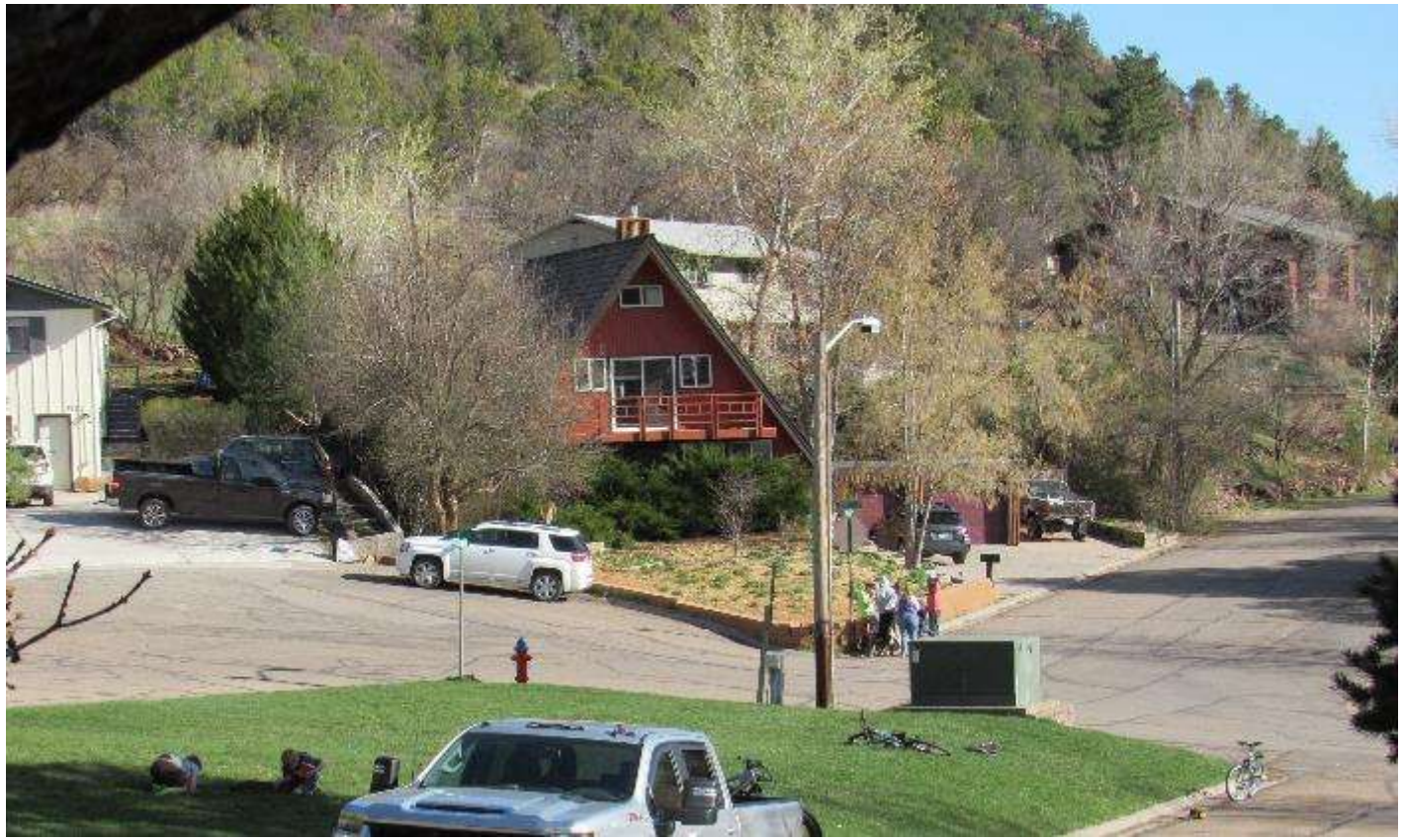
Looking from south to north up Palmer Avenue. The sidewalk for the new development stops at this 26th Street junction.

How will commissioners preserve the multi-modal use of existing routes and prevent travelers resorting to using their cars because walking and cycling become dangerous and unhealthy? If Blake is to be ‘one way south’ to protect residents in that area, why can’t the existing Palmer Avenue also be one way south for a similar reason?



Air quality in the entire area will deteriorate because additional traffic will travel along Bennett past Valley View Hospital in the same way that commuter traffic does now.
Why has there been no mention of effects upon air quality?
Why is the City's air quality data so meagre?
How do commissioners justify allowing increased pollution in residential areas and detrimental effects upon residents' health?

CHILDREN BREATHING
NIÑOS RESPIRANDO
NO IDLE ZONE
Turn your engine off
¡Apague su motor!



TO THE Glenwood City Council members:

I live in the Oakhurst townhomes in front of where the proposed low income apartments are to be built. I think building those apartments is a very bad idea.

IN Oakhurst there are a number of renters. The units of the renters have trash around them, lots of visitors, and they tend not to follow the Rules. They come and go at all hours and often are very noisy. They all drive cars and there are not enough parking spaces now. Increasing the number of renters will only make the problem worse.

There is no fence between Oakhurst and the proposed apartments. That means people living in those apartments can break into the yards and Oakhurst units. One hundred apartments will increase the crime, violence and illegal activity in the area the police force in Glenwood do not have enough personal to handle the increase crime that happens with low income housing.

Another reason the apartments are a bad idea is the wildlife on that hillside. There are deer, bear, mountain lions and coyotes that roam there. Where will they go? They already have a limited area in Glenwood. The only wildlife that wouldn't be missed are the homeless people and their dogs. However I'm sure they would stay and continue to be a fire hazard and

wander Through the apartment Complex as they do the neighborhood now.

These are only a few of my Concerns.
I would ask the people on the Council (especially if you live in Glenwood) to consider the effect adding more rental units to this neighborhood would cost Glenwood in increased crime (Slum neighborhood) and decreased tourists visits. People don't want to vacation in areas with A high crime rate. Would you? It's A short walk to downtown And tourists From this neighborhood. It's in your hands to make this decision. I hope the decision you make is for Glenwood And not financial reasons.

Thank You For your time

Dan Giulianelli
Unit #15

From: Gretchen E Ricehill
To: Trent Hyatt
Subject: FW: Bell Rippy Development Comments
Date: Tuesday, May 5, 2020 8:35:51 AM

Another, different comment from Richard O'Connell

From: Richard OConnell <r.oconnell@sbcglobal.net>
Sent: Monday, May 4, 2020 8:58 PM
To: Gretchen E Ricehill <gretchen.ricehill@cogs.us>; jandjraehal@gmail.com; Jan OConnell <tenacity71@gmail.com>; Christine Smalley <csmalley@rfsd.k12.co.us>; Ralph Smalley <rsmalley@rfsd.k12.co.us>
Subject: Re: Bell Rippy Development Comments

Community Development Department
Richard & Janet O'Connell

101 W. 8th Street 2409
Palmer Ave

Glenwood Springs, Co 81601
Glenwood Springs, Co 81601

Attn: Planning and Zoning Commission

Gretchen Ricehill

We own a multi- generational home at 2409 Palmer Ave. We are concerned that the Bell Rippy Development will end up with non-residential parking and unsafe traffic on the developed portion of Palmer Ave. The existing roads do not support the Oakhearst Townhomes and RAFTA parking and the new Bell Rippy Development will make a bad situation worse. We are also concerned that the proposed schedule does not provide time to evaluate the many considerations for a development of this size.

The city development code calls for the creation of the best environment for the city by promoting an orderly efficient and integrated development of Glenwood Spings. It is clear from the April 26 meeting that the new developers are relying on previous development plans and decisions that are not necessary in the current best interest of the existing neighborhood. It is important that all ideas from the existing neighborhood be discussed and evaluated. To do this we suggest a continuance of the review process with a open public meeting. The Zoom meetings are simple but many of the existing neighbors do not have the computer skills to participate in the meeting.

Ideas which the city development commission should consider and discuss to integrate the Bell Rippy Development, with the existing neighborhood. include the

creation of a culdisac for the development, adding speed bumps to the developed portion of Palmer Ave, making Palmer one way South, adding sidewalks to the developed portion of Palmer Ave, improving the intersection of 23rd Street and Grand to handle the increased traffic.

Sincerely

Richard and Janet O’Connell

From:	Gretchen E Ricehill
To:	Trent Hyatt
Subject:	FW: Comment-4-20 MultiFamily project
Date:	Tuesday, May 5, 2020 8:36:55 AM

From: Lynette Marie <stete78@hotmail.com>
Sent: Monday, May 4, 2020 10:22 PM
To: Gretchen E Ricehill <gretchen.ricehill@cogs.us>
Subject: 4-20 MultiFamily project

Dear Ms. Ricehill,

My name is Lynette-Marie Lacerda and I live at 285 Mikala Lane in New Castle. My dwelling place was at 1814 Ouray Road in GWS just a few weeks ago until I realized it was contaminated with black mold and I was forced to relocate temporarily.

As someone that attends multiple Homeowners Association meetings a year, there is a common thread of lack of parking. The proposed 1.5 spaces per unit is an unrealistic number to accommodate the number of vehicles that will require a parking spot. Renters and owners have multiple cars. Glenwood Springs is the bedroom community for Aspen and even if someone took the bus to work, they own vehicles. Some get work trucks as part of their job packages. Sure the TDW allows for 136 spaces, however, this is not enough parking for the size of this residential project. It is an all to common theme at Cardiff Glen, not enough parking for the families that own 2 and 3 cars. I could go on...

In closing, please don't reduce the parking spots to less than 170. When all is said and done the parking burden/headache will be left on the surrounding neighborhood, the residence of this project and property management company.

Best,
Lynette Marie Lacerda

From: Gretchen E Ricehill
To: Trent Hyatt
Subject: FW: Comments - Bell Rippy
Date: Tuesday, May 5, 2020 8:35:00 AM

From: Ryan Roberts <ryaninyanga@me.com>
Sent: Monday, May 4, 2020 6:41 PM
To: Gretchen E Ricehill <gretchen.ricehill@cogs.us>
Subject: Continuance

To the City of Glenwood Springs Council .
I think it is vital that the vote on the amended plans for the proposed new development on Palmer avenue be delayed until the residents have the capacity to speak about it face to face with each other. The Zoom meetings are a barrier to some residents. In addition , the restrictions on being able to assemble in groups in a public debate are a substantial barrier to the process. The developer changed plans unilaterally and must allow time for the new plans to be reconsidered. Our capacity as residents to assemble freely has been severely impeded. We must have time to reconnect, reconsider and offer coherent input. The Council Zoom meetings are restrictive in a way that traditional debate and regular council meetings are not.
Please reschedule the decision process until we are in a position to meet up.
Sincerely,
Ryan Roberts
2419 Palmer Avenue
Glenwood Springs
Colorado
970 274 8161

Sent from my iPhone

Sent from my iPhone

May 4, 2020

A. David Cox
Cynthia Green
2504 Palmer Ave.
Glenwood Springs, CO 81601

Ms. Gretchen Ricehill
Assistant Economic/Community Development Director
Glenwood Springs Planning Department
Via email: Gretchen.Ricehill@cogs.us

Dear Ms. Ricehill:

We are owners and residents of 2504 Palmer Avenue in the Oakhurst Subdivision neighborhood in Glenwood Springs. We respectfully submit the following comments and concerns regarding the Bell Rippy Neighborhood (Applicant) proposed development that has been submitted to you for review:

Concern 1: Community Meeting with Neighborhood

We understand the challenges with public meetings in light of COVID-19. However, a development of the intensity proposed in Applicant's plan, especially with variances requested, demands that effective public meetings be held. The Oakhurst neighborhood has not been accommodated with such an effective forum. As was demonstrated at the P&Z meeting last week, Zoom meetings are an insufficient substitute and do not provide adequate means for meaningful public comment and participation. At a minimum, proceeding with the development application should be delayed until the residents of the neighborhood are afforded an appropriate public hearing on the development.

Concern 2: Development Proposal Differs from Predecessor's

Applicant's narrative makes several references to the Glenwood Multi Family LLC project that was granted a development permit in 2018. The current development proposed by Applicant differs from that of its predecessor in several material ways:

1. Number of units increased from 79 to 100;
2. Number of parking spaces decreased from 163 to 148; and
3. Acquisition of an additional parcel in March 2020 at 2710 Blake requested to be rezoned and included in Applicant's development.

Because of the significance of each of these changes, Applicant's development and related variance requests should be evaluated independently of those granted to its predecessor.

Concern 3: Variance for Variety of Housing Types

Applicant is requesting relief from the municipal requirement of housing variety on a 3-acre development due to "unique site constraints." The "site constraints" of this parcel are self-evident and should have been known by the Developer prior to the purchase of the property with proper due

diligence. Requesting a variance from a known site limitation is an unreasonable request of the City and places unreasonable demands on both the City and its citizenry.

Applicant further states "multifamily rental units are so badly needed in Glenwood Springs" as rationale for approving its request. This claim is inconsistent with fact that the Six Canyon Apartment complex in West Glenwood is largely vacant. There are also hundreds of new, partially completed units to be completed in the near term within the City limits proper. At the southern edge of the City, Applicant's development is also inconsistent with the stated City goals of directing development upward rather than outward and to redevelopment locations, preserving natural resources and minimizing human/wildlife interactions, and directing development to cost-effective locations to serve.

Concern 4: Design Variance – Sidewalks on Both Sides of the Street

Again, Applicant is requesting relief due to "unique site constraints." The "site constraints" of this parcel are self-evident and should have been known by the Developer prior to the purchase of the property. Requesting a variance from a known site limitation is an unreasonable request of the City. Because the development is high-density in nature and the Applicant is promoting it as "transit oriented," Section 070.040.070(f)(1)(a)(2) of the Municipal Code is clear and vitally important to accomplish the goals of residential-transition zone development to promote foot traffic over vehicular traffic to the adjacent stores, RFTA Park and Ride, and neighborhood facilities.

Concern 5: Design Variance – Grades at Driveway, Parking Lot and Intersection Approach

In the past, several other developments requesting similar grading variances due to "unique site constraints" were declined by the City. This project should not be allowed variances of this type when others were routinely declined in the past. Further, the high-density nature of this development and attendant vehicle traffic, necessitate safe ingress and egress of both vehicles and pedestrians. Again, the topography of this particular lot should not be used as justification to abandon established municipal code principles.

Concern 6: Re-zoning Newly-Acquired Parcel Included in Development

Applicant is requesting re-zoning of an RH-zoned parcel at 2710 Blake Avenue to include in its development. Applicant recently acquired this parcel in March 2020 to eliminate the existing triplex structure and is proposing construction of an 18-unit building, Building C on Applicant's schematic.

Applicant is requesting re-zoning this parcel to allow construction of 100 units between it and the adjacent parcel, along with redirecting traffic on Blake Avenue to a south-bound, one-way and opening what has come to be known as the 'WalMart gate.' What this density and revision to current traffic flow, will be to increase north-bound traffic onto Palmer Avenue. The currently developed area of Palmer Avenue is all zoned RM1 with a current density of 11 single-family homes with a total of 41 bedrooms. Applicant's development will increase the density on Palmer Avenue nearly four-fold in number of bedrooms and ten-fold in number of households. Pushing all of this increased density north-bound into the downtown core of Glenwood Springs via Palmer Avenue does not comply with the Comprehensive Plan goals of sustainability, maintaining small town character, directing development to locations and building forms that are cost-effective to serve in compact forms and in infill and/or redevelopment. This development is directing growth outward rather than the stated goal of directing growth inward. Further, the increased traffic load onto Palmer Avenue from Applicant's requests for the

WalMart gate opening and south-bound only on Blake Avenue forces a medium-density neighborhood's infrastructure on Palmer Avenue to support the traffic demands of high-density/transitional density/commercial density from WalMart through Applicant's development.

We appreciate your thoughtful consideration of our concerns for both our neighborhood and the vibrancy and sustainability of development in the City of Glenwood Springs.

A. David Cox
Cynthia Green

From: Gretchen E Ricehill
To: Trent Hyatt
Subject: FW: message about the Bell Rippy Property
Date: Tuesday, May 5, 2020 3:35:46 PM

From: Erin & William Lee <threeolee@gmail.com>
Sent: Tuesday, May 5, 2020 3:09 PM
To: Gretchen E Ricehill <gretchen.ricehill@cogs.us>
Subject: message about the Bell Rippy Property

Respectfully to everyone whom it may concern,

My name is Erin Lee and I live at 2502 Palmer Avenue, GWS, CO. I thank you for taking the time to read my letter. I would like to first and foremost let you all know that I am absolutely not opposed to development and growth, in fact I like it! Truthfully, I personally am one that loves change when the change creates a better situation or environment rather it be inside my own home, my neighborhood or my community. I have tried to embrace the new Bell Rippy Development that is being proposed with an open mind, and have went as far as reaching out to the developer myself to ask questions, inquire with what I think could be thoughtful ideas that would possibly become good solutions. All though Mr O'Connor was very polite and listened to what I had to say, he ultimately was telling me that the things I had to say, needed to be directed to and addressed by the city.

I was present on the zoom meeting on April 28th, and listened to everything that was said. One of the main things said at least twice that night, was that the city was wanting to have a community meeting with the residents that currently live in this neighborhood. Which was extremely comforting and welcoming to hear several times over, because we all know that a development will inevitably become part of our neighborhood and hopefully if done right, will fit right in nicely and enhance our community.

In the present situation of COVID-19 that we are all now in social isolation, the whole world seems to be “trying” to communicate through the zoom platform, which I am hearing that most school age children, let alone adults, are finding this form of communication to be very difficult to embrace. When it comes to having meaningful conversations with all parties involved and making a decision this large, that will impact this neighborhood and our entire community to the north of us, FOREVER, I am asking you to please postpone this major decision until we have the ability to have proper and personal communication between the city and the residents of this neighborhood and definitely not through an online zoom meeting.

Also, not to be whining, but in the previous meeting the developer said many, many, many, times that this was a project that was already approved by the city. Considering that the developer is truthfully asking for more units, with more vehicles, creating more traffic does not make this the same previously approved project in the minds of the citizens effected by this development. Developments should enhance a neighborhood, and our neighboring neighborhoods, not hurt them. That alone, I am hoping speaks volumes to you, and hopefully you will postpone this matter until we can have the opportunity to have an in-person meeting with our neighborhood members to try to come up with solutions to bring to a proper in-person community meeting with the city (without technical difficulties) that would help this development fit nicely into all the neighborhoods of Glenwood Springs.

Thank you for your time,

Erin Lee

To: Glenwood Springs Planning and Zoning Commission and the Glenwood Springs City Council

Topic: Triumph Development West, LLC Project at Blake and Palmer

The City of Glenwood should deny the Triumph Development West apartment proposal and project. We have no responsibility or commitment to provide housing for people to live here and then get in their cars or on a bus to go to their jobs in Carbondale, El Jebel, Basalt, and Aspen. The majority of the occupants would travel out of town for employment.

This project should be denied for the following concerns:

1. **The project is too large**. Six buildings, one hundred units, 150-200 people. Simply overwhelming for 5 acres of steep land.
2. **Not enough parking.** 148 parking spots is not enough. For example, Oakhurst Townhomes has 2 spots for each of the 36 units and that is not *nearly* enough. Blake and 26th street are always full of people's excess vehicles.
3. **Inaccurate traffic flow situations**. Almost every afternoon, traffic on Hwy 82 slows and backs up from Walmart into Glenwood. Many vehicles turn right on 27th to Blake north or east on 26th to Palmer then north. These trips all lead to Blake north at the same time all of the Valley View employees are getting off of work. Add to these all the vehicles turning right onto 23rd to go north on Blake and more vehicles from this new development to determined realistic traffic numbers in these neighborhoods.
4. **Inadequate flood debris control**. The last high flood decades ago saw boulders as big as cars come down and damage Oakhurst Townhomes. No flood control fence could stop this.
5. **Water flow problems from parking lots and sidewalks.** No control plan is in place whatsoever. Where will this water go? It will go onto private properties on Palmer and down 26th to Blake. There is already a 6-inch deep gulley on the south side of 26th the top 1/3 of the street where inadequate repair of the street happened after a new electric line was replaced years ago. The water goes down to 26th and Blake where it forms a huge (almost impassable) debris-filled puddle.
6. **No fencing planned.** There should be fencing completely around the development to prevent trespassing to and from Oakhurst and to keep people from the homeless camp out.
7. **Light pollution from parking lots and buildings coming into right into Oakhurst homes.** No amount of landscaping could stop this. Fencing *might* help where cars park.
8. **There was no landscaping plan provided.**
9. **Noise pollution from 150 to 200 people is a huge concern.**
10. **Homeless people problems for the people living in the development.** We have had problems with the noise, dogs, fires, drugs, theft, trespassing and soliciting in the past. The results would be a big increase in police, fire and ambulance calls from people in the development.
11. **No sidewalks on Blake, 26th or Palmer.** Pedestrians and bicycle riders coming out of complex would have to walk or ride in the already too-narrow streets, causing an already dangerous situation to escalate.

12. **Snow removal problems.** The city makes 1 or 2 snowplow passes on the above mentioned streets and on 23rd. This results in snow buildup on the sides of the streets, making them even more narrow and dangerous.
13. **Steepness of 26th Street.** After snowstorms, snow and ice buildup (especially in the early morning hours and after dark). This steepness makes it impossible for many cars to make it up to Palmer. They have to back down or turn around to go back down. Very dangerous!
14. **Not enough parking for the 27th Street Bus Station**. Many riders already park on Blake, 26th, Palmer, Walmart, the Rivers Restaurant, etc… More people from the development… more problems.
15. **Engineering/building problems**. Just like Ironbridge, The Terraces, The Meadows and Lofts, Red Mtn., Oakhurst and the recently abandoned/ sold City MOC Building, this site will have stability problems that engineers may not be able to alleviate.
16. **This area has always been a "wildlife sanctuary zone"**, providing an area of protection for many, many species of mammals, birds, reptiles, insects, etc… also there are a wide variety of trees and plants there.
17. **Who will live in this development?** If Triumph Development could rent units only to people who have jobs in Glenwood like hospital/medical employees, first responders and other city employees, school district employees, county employees, restaurant/bar workers, business employees recreation related employment, etc… "Anything in Glenwood" then maybe we could support this development. But this would not be legal. So we should not support this project. Remember that a majority of the people living there would work in other towns.

In conclusion, please remember that these out of town developers from the Eagle-Vail area have purchased this land at the lowest cost available to them. They will develop it with the incentives to keep costs as low as possible for their investors. This may include not correctly addressing all the problems and issues that exist with this development. In addition, their rental rates will be as high as possible. Keep in mind their job is to maximize profits for their company and investors.

Please protect the citizens of Glenwood Springs from unnecessary development that would result in higher costs to our already constrained budgets.

Please vote to not approve this development from Triumph Development West, LLC.

George Dana
Resident, Oakhurst Townhomes

From:	lcrfnd@rof.net
To:	Gretchen E Ricehill
Subject:	FW: RE: development variances
Date:	Tuesday, May 5, 2020 9:59:28 AM

Hello Gretchen,
I had sent this email for the 1st P & Z meeting on April 28 which Trent said was included in the packets for the P & Z members. My comments were never mentioned at the meeting.
I have a couple of more items for tonight's meeting: The developers are from out of town and have never seen normal traffic on Hwy 82 (Grand Ave) at 5pm. No one from this development will take the hwy to get to City Market, they will take Palmer to 23rd to Blake.
Also one of the developers said maybe they would have a "dog wash". Are they going to allow pets?
Thank you for your time,
Lynn Cary
2405 Palmer Ave

-----Original Message-----
From: "Trent Hyatt" <trent.hyatt@cogs.us>
Sent: Friday, April 24, 2020 8:22am
To: "lcrfnd@rof.net" <lcrfnd@rof.net>
Cc: "Debra Figueroa" <debra.figueroa@cogs.us>, "Paula Stepp" <paula.stepp@cogs.us>, "jandjraehal@gmail.com" <jandjraehal@gmail.com>
Subject: RE: development variances

Lynn,
Thanks for your comments. I have included them in the packet we will provide to the Planning and Zoning Commission later today.

Regards,

Trent L. Hyatt
970.384.6427 (p)
trent.hyatt@cogs.us

From: lcrfnd@rof.net <lcrfnd@rof.net>
Sent: Wednesday, April 22, 2020 2:40 PM
To: Trent Hyatt <trent.hyatt@cogs.us>
Cc: Debra Figueroa <debra.figueroa@cogs.us>; Paula Stepp <paula.stepp@cogs.us>; jandjraehal@gmail.com
Subject: development variances

Trent Hyatt, Planning and Zoning Commission,

I have seen the posts concerning the request for variances by Triumph Development on Palmer Ave: Public Notice in Post Independent on April 14 and 21, 2020 and sign erected at 26th and Palmer on April 17 for public hearing on April 28.

The entire country including GLENWOOD SPRINGS is under a Stay-at-Home order. I don't think that people are aware of your posts with a very short time frame.

I feel that this request for variances should be postponed until the Stay-at-Home order is lifted so that the neighbors who are affected by this development can visit in person.

I have lived at 2405 Palmer Ave longer than any other person in this area and certainly understand the neighborhood.

I have read the request for the variances and nowhere is the traffic pattern addressed. How do all the vehicles access the development? Where is the map and where is the site view of buildings, park, parking lots, dumpster locations, lights, etc?

Directing traffic up 23rd st and down existing Palmer Ave is not acceptable. There are more than 10 grade school or younger children who live on Palmer Ave/ Crestwood Dr.

After the original development was approved the developer was to meet with the city to arrange to install a gate at his expense on Palmer to the south of the Speck property. It would be able to be opened by First Responders only.

We were told that these apartments would be rented at " market rates" with no restrictions on how many people could occupy each unit so it will not be cheaper than over-priced existing units.

Increasing the density and not having adequate parking will certainly cause many future problems. Just because it is close to the bus station is certainly no guarantee that people will not have at least two vehicles per unit (even a one bedroom) or even ride the bus.

I hope you will answer my questions and address the concerns of the neighborhood.

Thank you,
Lynn B Cary
2405 Palmer Ave
Glenwood Spgs, Co 81601
970-945-7215
lcrfnd@rof.net

Scott B. Kramer
2501 Palmer Avenue, Glenwood Springs CO 81601
Kramers85@comcast.net 970-618-5235

To: Planning and Zoning Commissioners, City of Glenwood Springs

RE: Triumph-Bell Rippy Development

First of all, I'd like to convey thoughts brought forward from the last proposal. All of the residents of Palmer Avenue have been adamant that our street's infrastructure is completely inadequate NOW, never mind to handle more traffic as there are no sidewalks, curbs/gutter, etc. All foot and bike traffic travels on the Palmer Avenue driving lane. When the Blake Gate is opened and the section of Blake Avenue made one-way, Hwy 82 commuters will (and always have) get around rush-hour gridlock by using Palmer Avenue at 27th and 29th street access points. Palmer Ave already experiences speeding commuters for years now. This dangerous problem will be vastly worsened due to the city's decisions on Blake Gate/one-way Blake Avenue. Commuter/shopper traffic is unacknowledged by city and traffic experts. Their "expert" traffic manuals and numbers notwithstanding, we see this dangerous, speeding commuter traffic every day.

During the previous application process, the city's traffic flow people met with a group of Palmer Avenue residents. We were basically told that the city was more interested in moving commuters through our neighborhood and to their destination than in our unsafe infrastructure and increased traffic concerns. (Connectivity?) Our impression from city staff member comments at the 4/28 zoom meeting this week is that this policy remains intact. This sure doesn't jive with the city's stated goal of preserving small town quality of life. All north-south oriented neighborhoods/streets are evidently exempt from deserving of quality small town living? We are promised solutions to this but our trust in that happening is beyond low. We proposed a fire gate at north end of new Palmer to give the new neighborhood a quiet, safe neighborhood for their kids free from speeding commuters as well as preserving our own. It seems such a simple solution that still keeps everyone safe. This was denied. One current resident south of that gate was opposed, as well. Vague promises of traffic calming "efforts" ring hollow.

We invite you to pull up a lawn chair and join us to watch commuters and shoppers speed through our neighborhood every afternoon and evening. Once new Palmer Avenue is improved and paved, Blake Gate is open and sections of Blake are one-way,

Scott B. Kramer
2501 Palmer Avenue, Glenwood Springs CO 81601
Kramers85@comcast.net 970-618-5235

this dangerous behavior will only worsen on an unsafe street full of little kids on bikes, owners walking their dogs or walking to and from work/school.

Secondly, I wish to comment on the new development proposal itself. Generally, I consider it well-thought out in many important aspects and an improvement over the original proposal. Additional housing provision is an important regional goal. My one serious concern is about Building F and its extremely close proximity to the existing Oakhurst condos. The separation is very minimal. All three floors of Building F will look directly over the fence and right into those home's tiny yard and windows. These condos only have their small backyards for privacy as front views are driveway/street only.

In addition, the 1.38 parking spaces (variance based on proximity to RFTA) per unit is woefully inadequate. Use of vehicles to get to work/retail is a different matter than OWNERSHIP of vehicles. Proximity to RFTA may encourage/solve getting to work/some shopping without use of a car, but does not eliminate car/truck ownership needs for many other aspects of life. 2 Bedroom units will have roommates as often or more often than one family (two working parents?) due to rent cost. There WILL BE two vehicles OWNED per unit even if they are not used daily to get to jobs! Where will they park? Along old and new Palmer Avenue? If leases limit #vehicles, where are additional already-owned vehicles going to park? Would applicant consider eliminating Building F (12 units) to allow additional parking and eliminate crowding onto Oakhurst condos privacy? Could one of the other buildings expand in design to capture some of eliminated Building F units? (eg. Building A) 88 units is still a big addition to the city housing pool. Provide new housing but help preserve "small town quality of life" for existing and future home owners?

Thank you for your consideration. P&Z commissioners have asked and addressed many of our concerns earnestly and we appreciate that. Sadly, it seems city council and city staff are happy to ignore those concerns and even denigrate our public comments as a waste of their valuable time, to quote Councilman Godes during the original application approval process. Out of that apparent disdain came a sudden vote to open Blake Gate at end of construction of the original development proposal. We were totally blindsided by this unexpected and unannounced but likely previously planned decision. It was a disheartening at best and very angering experience for all of us who attended that public meeting and had worked to open discussion with staff and council up to that point.

4-29-20
8:10 PM

PLANNING DEPT
P & Z
CITY COUNCIL

I'M NOT SURE WHO TO ADRESS THIS QUESTION TO BUT AFTER LAST NITES ZOOM MEETING (4-28) AND TODAY VISITING WITH MANY MEMBERS OF THE PALMER AVE. CONCERNED CITIZENS

① HOW COME THIS PROPOSAL IS BEING RAMRODED THRU IN TWO MEETINGS OVER SEVEN DAYS? IN THE PAST IT WAS ALWAY A MONTH TO MONTH SCHEDULE.

② MANY PEOPLE TRIED TO GET THRU TO MAKE COMMENTS LAST NIGHT BUT WERE EITHER UNSUCCESSFUL OR DIDN'T UNDERSTAND HOW TO ACCESS THE ZOOM PLATFORM.

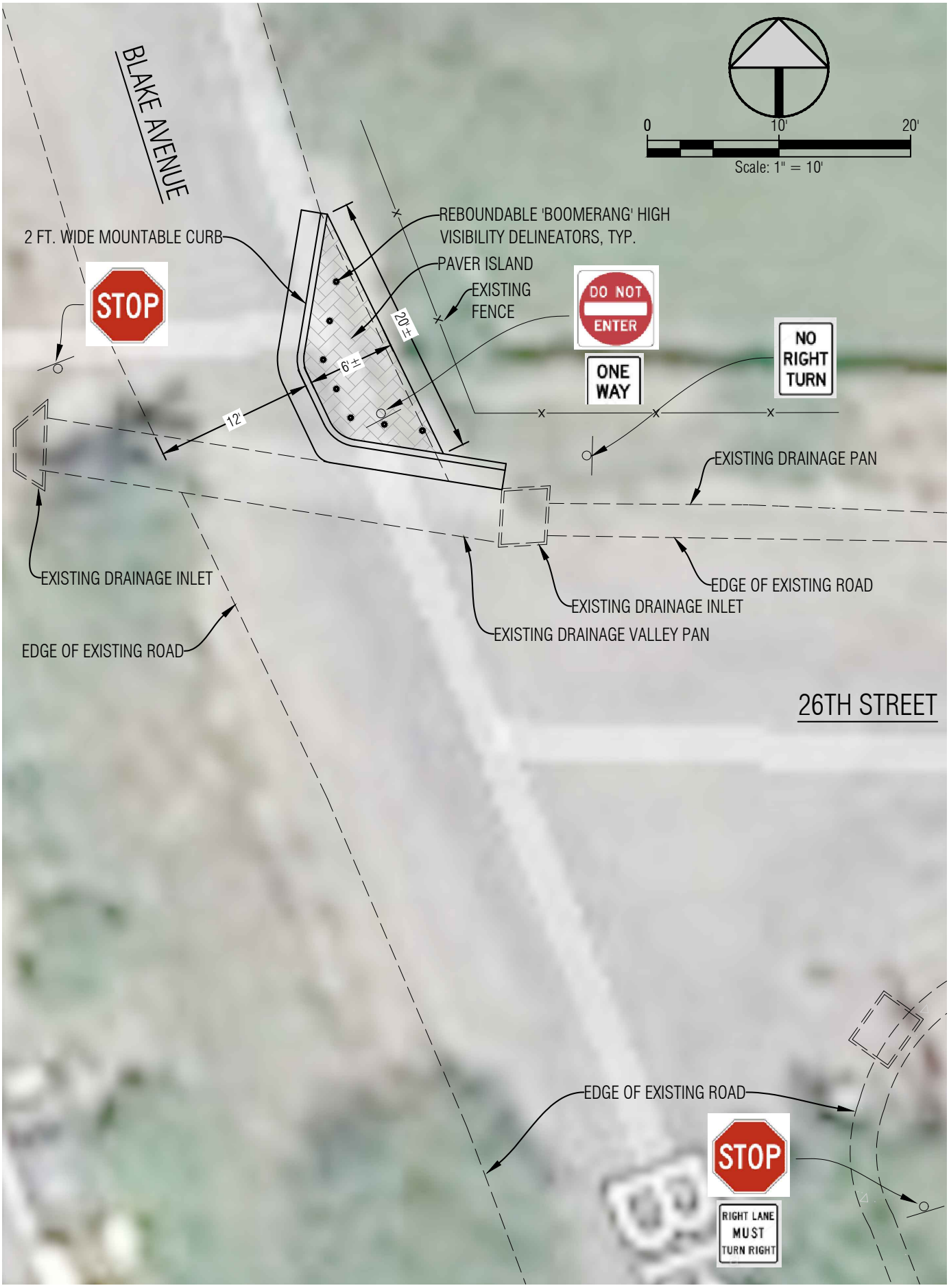
③ A FEW OF THE FOLKS I TALKED TO HEARD COMMENTS TO THE FACT THAT THERE IS VERY LITTLE OPPOSITION THIS TIME. * THIS COULDN'T BE FURTHER FROM THE TRUTH *
I ENCOURAGED THEM TO PUT THERE THOUGHTS IN WRITING AND GET THOSE THOUGHTS TO CITY HALL

④ THE DEVELOPER HAS A HUGE ADVANTAGE BY THE PALMER - BLAKE - CRESTWOOD NEIGHBOR HOODS CONFUSION AND LACK OF CORRESPONDANCE WITH EACH OTHER DURING THIS COVID CRISIS AND VERY VERY SHORT TIMEFRAME IN WHICH TO RESPOND AFTER THE INITIAL 4-28 MEETING. THEY MUST BE VERY HAPPY WITH THIS FORMAT.

VERY FRUSTRATED

SCOTT KRAMER
2501 PALMER AVE

970 618 5235


BLAKE AVENUE
0
10'
20'
Scale: 1" = 10'
2 FT. WIDE MOUNTABLE CURB
REBOUNDABLE 'BOOMERANG' HIGH VISIBILITY DELINEATORS, TYP.
PAVER ISLAND
EXISTING FENCE
STOP
DO NOT ENTER
ONE WAY
NO RIGHT TURN
20'±
6'±
12'
EXISTING DRAINAGE PAN
EXISTING DRAINAGE INLET
EDGE OF EXISTING ROAD
EXISTING DRAINAGE INLET
EXISTING DRAINAGE VALLEY PAN
EDGE OF EXISTING ROAD
26TH STREET
EDGE OF EXISTING ROAD
STOP
RIGHT LANE MUST TURN RIGHT

To the City of Glenwood Springs regarding the traffic impacts and circulation surrounding the proposed Triumph Bell Rippy project and the opening of the 'Blake Gate':

At the Glenwood Springs Community Development meeting regarding traffic mitigation options for the area nearby the proposed development, the developer stated "the neighborhood's safety should not be significantly compromised [by the development]".

Blake Avenue between 24th and 26th Streets is a neighborhood road with a posted speed limit of 15 MPH. The road is in dire condition; it is very narrow (only 16 feet wide in one section) and has no sidewalks. It is not a safe corridor for pedestrians as is, and especially our local children and animals and those of us walking our pets. Adding significantly higher two-way traffic volume will preclude any semblance of safe pedestrian and bicycle usage. The ROW width is not standard and is not physically wide enough to support a full road reconstruction with standard drive lanes, curb and gutter, sidewalks and drainage improvements.

The written stated GOAL of the City Street Design Standards is to encourage walking and biking and a safe balance for all street users. The first FIVE written OBJECTIVES of the City street standards are to optimize safer routes and create intermodal connections with enhanced pedestrian safety and encourage non-motorized modes of travel.

Two-way traffic on this section of Blake Avenue with an open Blake Gate will only increase traffic through the neighborhood and severely compromise alternate modes of transportation (i.e. walking & biking) and be devastating to the sense of neighborhood as well as the safety of our children. An open Blake Gate and two-way traffic along this section of Blake Ave will be an open invitation to bypass northbound Highway 82 traffic and to hop onto Blake Ave at McDonalds and just stay on it all the way through town!

Increasing traffic and allowing this portion of Blake to become even more of a Highway 82 bypass than it currently is, defeats the goals and all of the objectives of the City's policies by sacrificing the neighborhood for additional traffic circulation. Traffic should be concentrated on Highway 82 where it was intended and not invited to the back streets of a 15 MPH neighborhood.

The prior approval of the multi-family project two years ago came with the condition that this section of Blake Avenue be designated as one-way south. We urge P&Z and Council to maintain this condition when they approve of the Triumph Bell Rippy project.

Assuming one day the road may be upgraded, the future design should be for a single lane with a bicycle lane and a sidewalk that will be wide enough for emergency access and will support all the goals and objectives of the City and keep the neighborhood residents safe.

Petition to designate Blake Avenue as One-way south between 24th and 26th Streets when the Blake Gate at Walmart is opened.

Petition summary and background	Approvals for the Triumph Bell Rippy multi-family project will also result in the Walmart Blake Gate being opened, thereby increasing traffic and increasing safety issues within a 15 MPH road and neighborhood.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now to mitigate the increased traffic and safety issues by designating Blake Avenue as One-way south between 24th and 26th Streets when the Blake Gate is opened.

Printed Name	Signature	Address	Comment	Date
DAVID J. TURTLE		2429 BLAKE AVE 501 EASY ST.	ONE WAY TRAFFIC WITH SIDEWALKS AND BIKE PATH	6/17/20
Carol Turtle		501 Easy St.	Need Bike Path + Sidewalks to reduce car traffic + Conform to City's intermodal Connectivity Plan	6-17-20
Mary R Rose	Mary R. Rose	2615 Blake # 8	I AM 93 YEARS OLD AND NEED A SIDEWALK TO SAFELY WALK TO WALMART	6/18/20
Irene Cuevas	I. Cuevas	2430 Blake		6/17/20
Lowell HAAG	Lowell Haag	2430 Blake Ave B		6-18-20
JOSE GARCIA	JOSE GARCIA	2430 BLAKE AVE A		6/17/20
Holly & Caleb	Holly & Caleb	2430 Blake A	Fix the Road	6/17/20
Jeffrey Jensen		2517 Blake A	I Need you to fix My Car - Potholes bad	6/18/20
Tara Elliott	Tara Elliott	2510 Blake av.	our yard is torn up because of the road	6/18/20
WILLIAM M SAPPINGTON	William M. Sappington	2421 Blake ave	Pedestrian safety is big issue. Speeding also issue	6/18/20
Ken Klatt		2429 Blake Ave	one way only!	6/20/20
Ryan Newberry		2426 Blake	Fix the Road!	6/21/20
AARON Skaar		2424 Blake Ave	Fix the Road!	

Petition to designate Blake Avenue as One-way south between 24th and 26th Streets when the Blake Gate at Walmart is opened.

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Printed Name	Signature	Address	Comment	Date
Carol Hostettler	Carol Hostettler	2102 Grand Ave X114	no sidewalk or shoulder in winter — many children playing	6-20-20
Matthew Sheddan	[illegible]	2401 Blake Ave	we need a side walk	6-20-20
defiance church	defiance leadership	2306 Blake ave	-so many kids w/ school @ church-?SDA	6-20-20
Lois Wilmoth	Lois Wilmoth	2413 Blake Ave	keep the neighborhood safe	6-20-20
Eleanor Baker	Eleanor Baker	2509 Blake Ave	Kids and dogs bikes wheel chairs ect	6-20-20
David Moya	David Moya	2509 Blak Ave	dogs wheel chairs	6-20-20
Joy White	[illegible]	509 25th Pl. Glenwood Springs	the road is not sufficient for a two way	6-20-2020
Hugo Romero	[illegible]	506 23th place	To much Traffi and Kids like to play on the road	
W. Matthew Elliott	Matthew Elliott	2510 Blake Av.	to much traffic already	6-20-2020
Stephanie Kuehn	[illegible]	2402 Blake Ave	too much traffic, poor road condition	6/20/20
Josefa Jimenez	[illegible]	2409 Blake ave	~~Tottom~~ I HAVE KIDS AND DOGS	

Petition to designate Blake Avenue as One-way south between 24th and 26th Streets when the Blake Gate at Walmart is opened.

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Printed Name	Signature	Address	Comment	Date
MARY ANN E Taylor	Mary Anne Taylor	2418 Blake Ave	Totally against 2 way traffic	6/14/20
PAUL G. TAYLOR	Paul G. Taylor	2418 BLAKE AVE.	" "	6-14-2020
Martha Harris	Martha Harris	2501 Blake Ave	2 way traffic will ruin our neighborhood - unsafe for children, bikes, ways etc. This will significantly compromise our neighborhood ~~development of Bell~~ Rippy!	6-19-2020
PHIL HARRIS	Phil Harris	2501 BLAKE AVE	24 YEAR OWNER - MAKE THIS ONE WAY & NOT SACRIFICE THE NEIGHBORHOOD (15 MPH) FOR HIGHWAY 82 BYPASS CONNECTIVITY!	6/20/20

Petition to designate Blake Avenue as One-way south between 24th and 26th Streets when the Blake Gate at Walmart is opened.

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Printed Name	Signature	Address	Comment	Date
Robert Monte		521 EASY St.		6-20-20
Julie hartman	Julie Hartman	521 easy St.		6.20.20

Petition to designate Blake Avenue as One-way south between 24th and 26th Streets when the Blake Gate at Walmart is opened.

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Printed Name	Signature	Address	Comment	Date
NEIL GOLUBA		ASPENWOOD APARTMENTS 417 E. 23RD STREET GWS, CO	AS MANAGER OF ASPENWOOD APARTMENTS	6/18/20

26th Streets when the Blake Gate at Walmart is opened.

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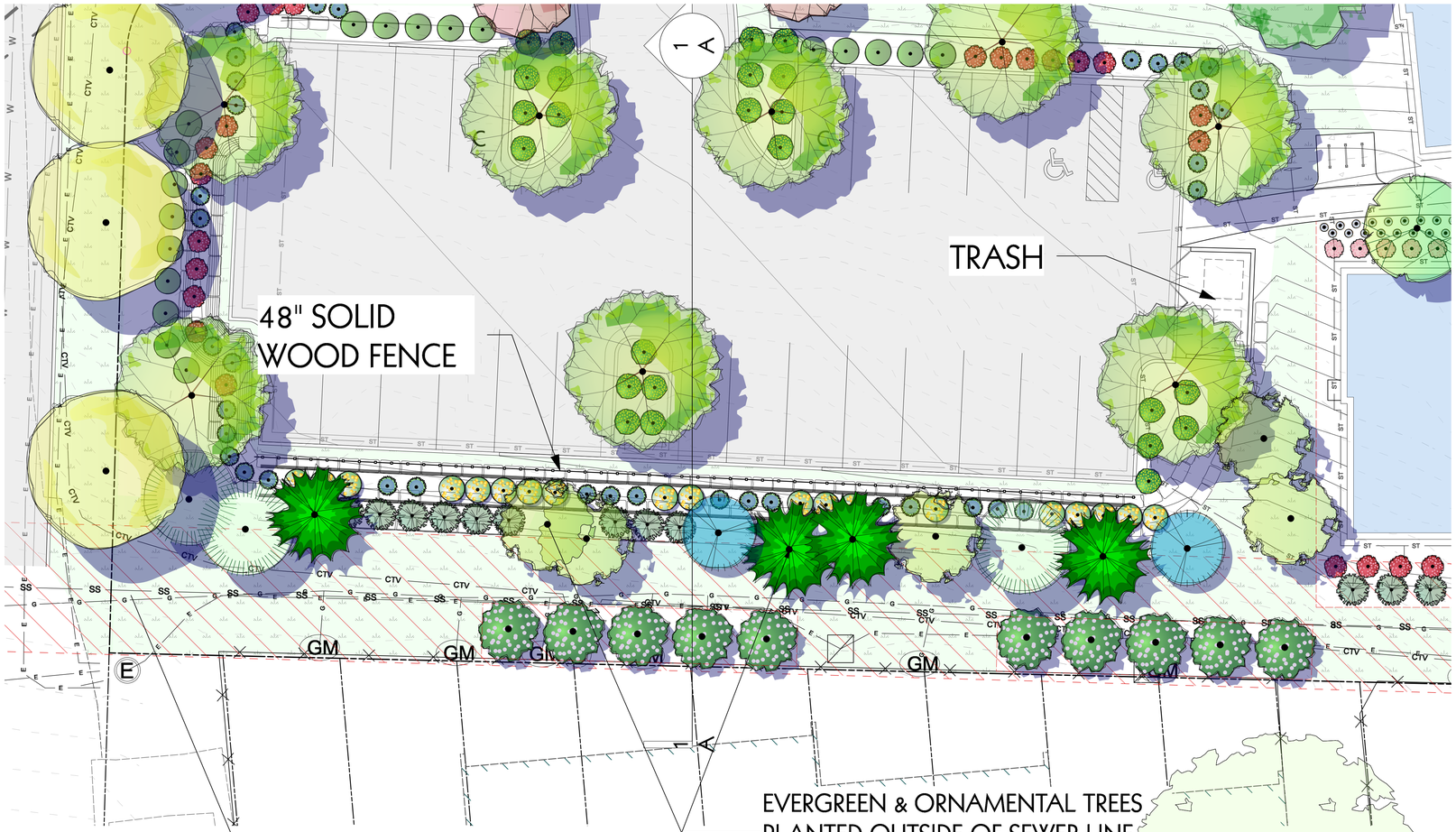
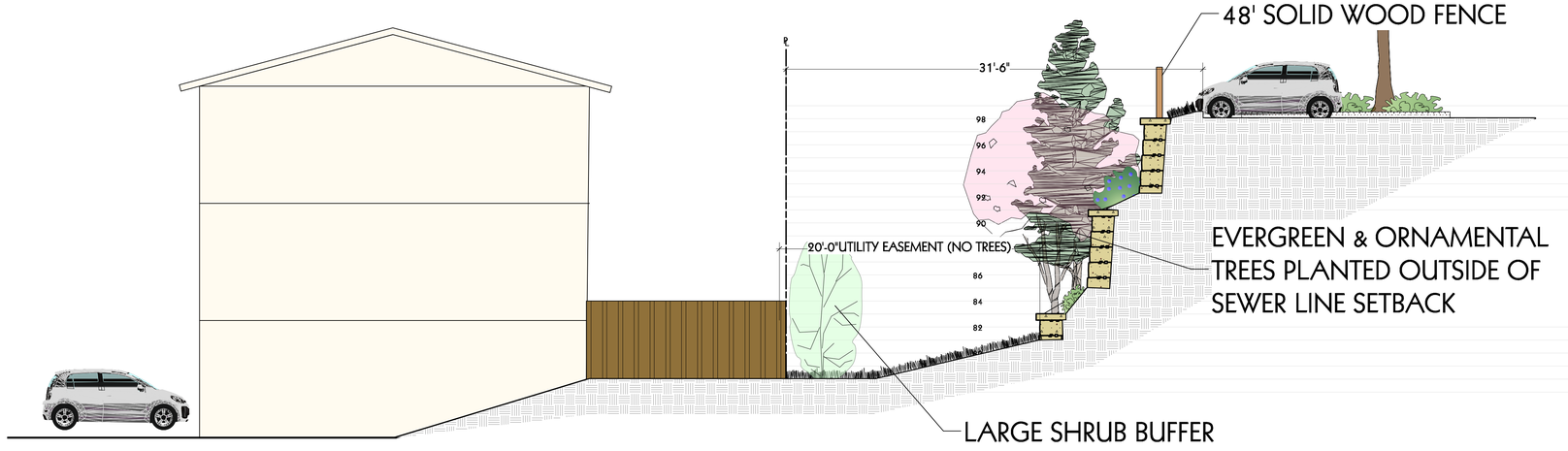
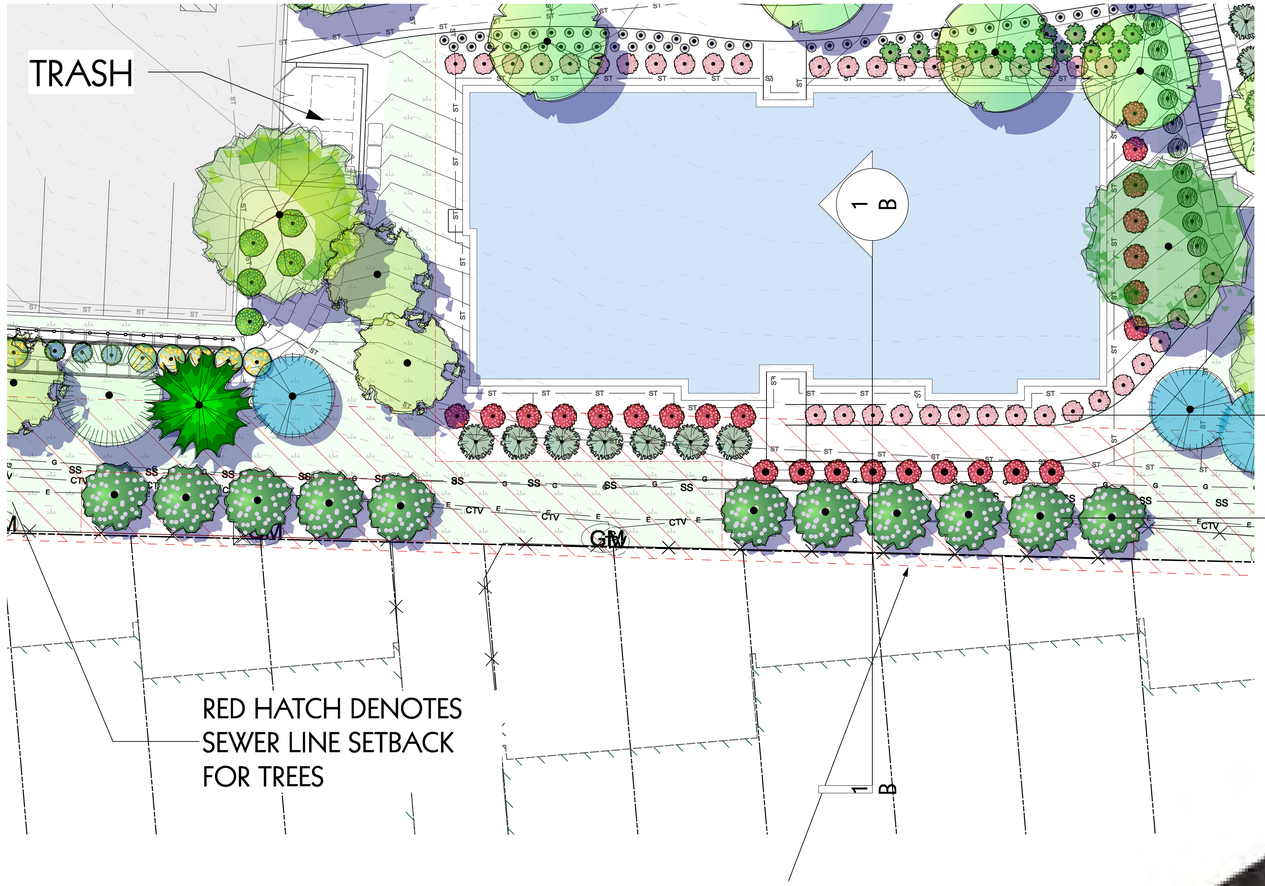
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now to mitigate the increased traffic and safety issues by designating Blake Avenue as One-way south between 24th and 26th Streets when the Blake Gate is opened.

Printed Name	Signature	Address	Comment	Date
Thomas Brennan	[signature]	513 EASY ST. GWS - owner		6/19/20
Kristina Clary	[signature]	108 Colorado Ave GWS - owner of 513 EASY ST GWS		6/19/20

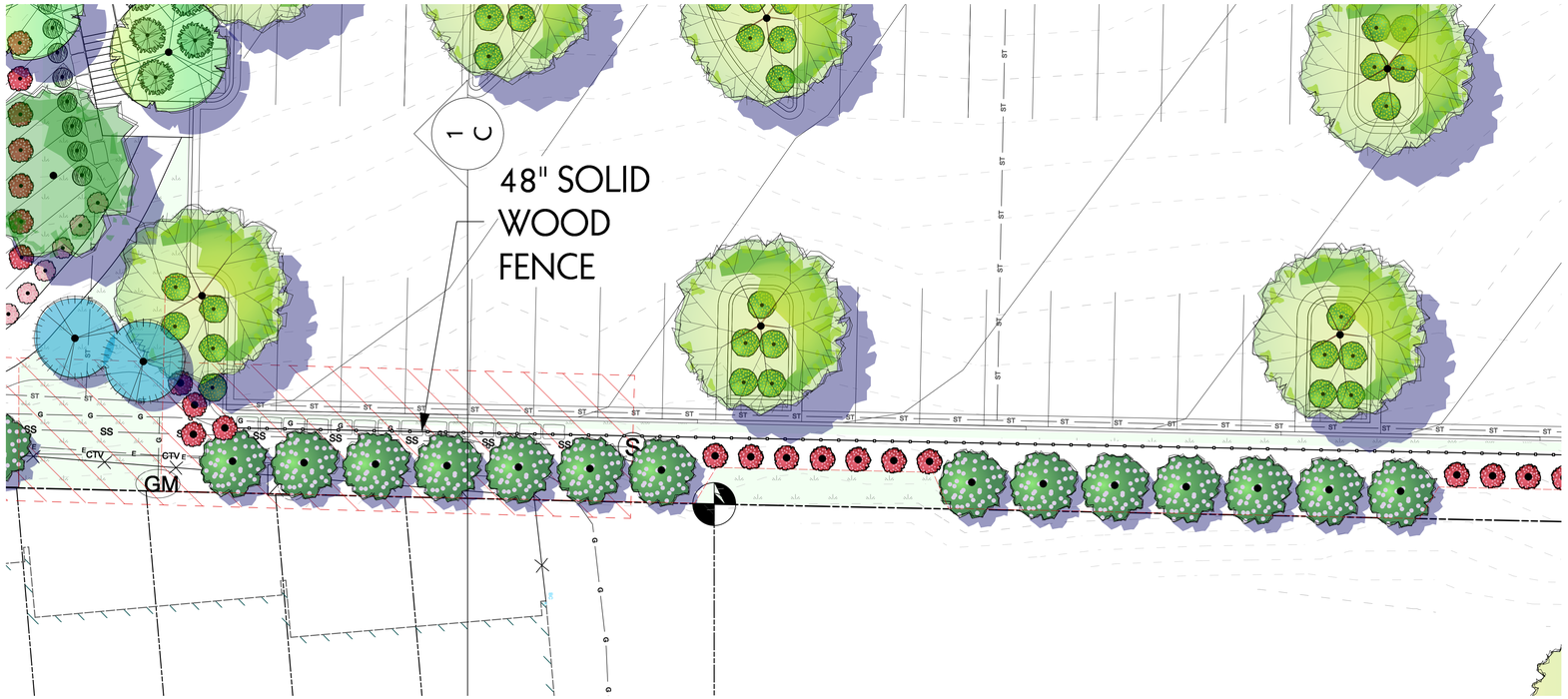


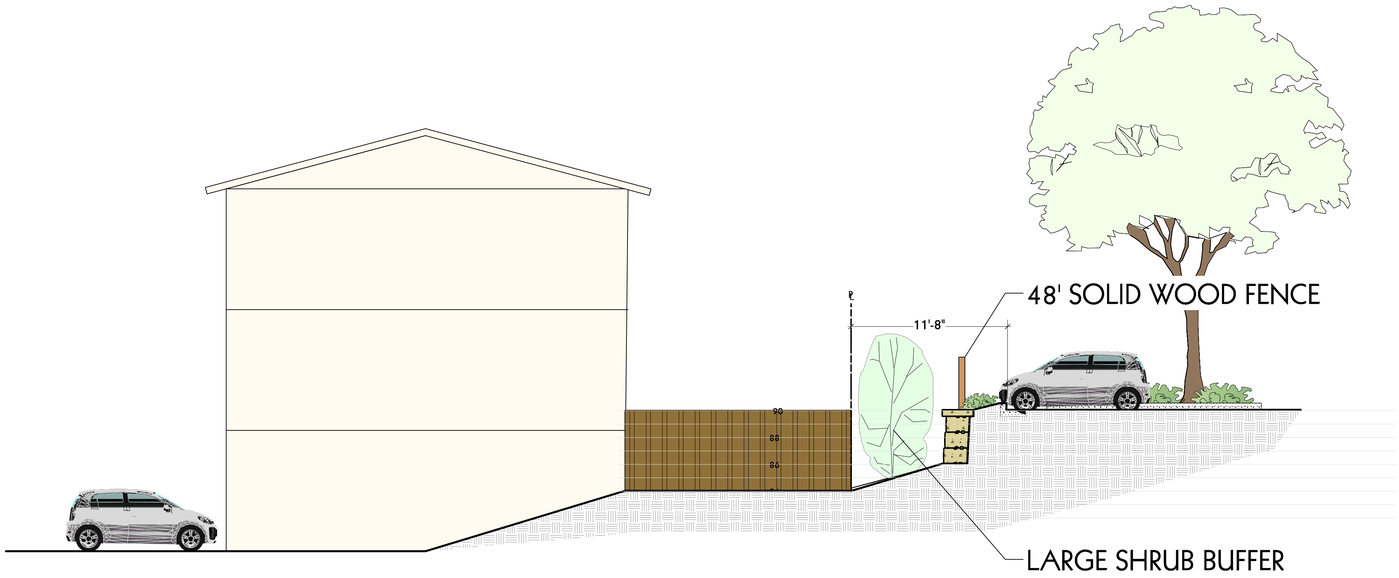


A-A NORTH LOT SECTION



B-B MAIN LOT SECTION





C-C MAIN LOT SECTION

BELL RIPPY NEIGHBORHOOD

OVERALL SITE PLAN

Civil Engineering
Surveying
& Beyond
Boundaries Unlimited Inc.
923 Cooper Ave., Ste. 201
Glenwood Springs, CO 81601
(T) 970.945.5252
www.bu-inc.com

N/A

N/A
N/A
N/A

Engineer or Surveyor Seal

NOT FOR CONSTRUCTION
Review

Client Information:

TRIUMPH
12 VAIL ROAD, SUITE 700
VAIL, COLORADO 81657
970 479-9990

NORTH

0 40' 80'
Scale: 1" = 40'

811
Know what's below.
Call before you dig.

GLENWOOD SPRINGS, COLORADO

Bell Rippy Neighborhood

Overall Site Plan

30% Review Set - Major Site Plan Submission

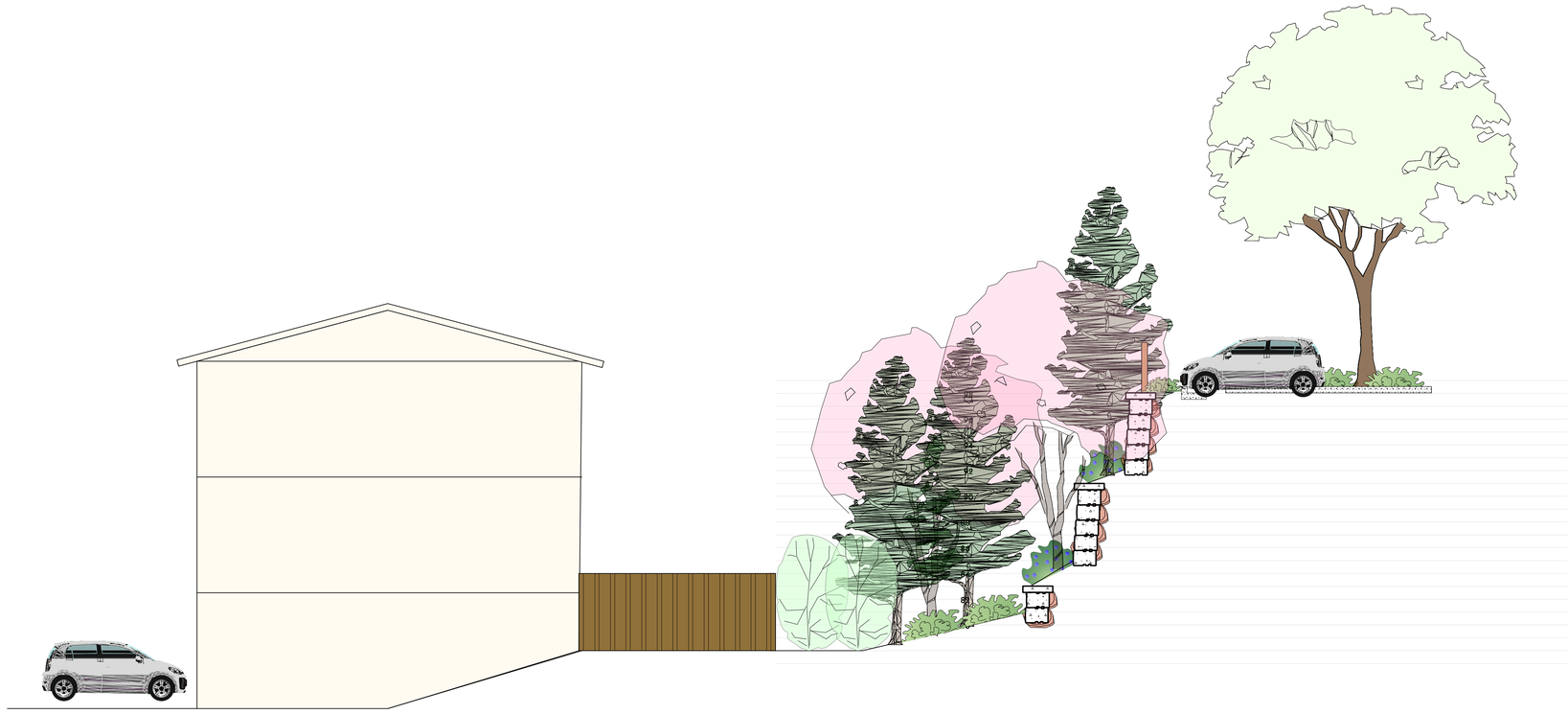
No.	Date	Revision	By
1.	4.20.20	CITY COMMENTS TO 30% SUBMITTAL	PH
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

PROJECT NO.
20002
Designer:
DJW
Drafter:
RUI
Date:
5/01/20

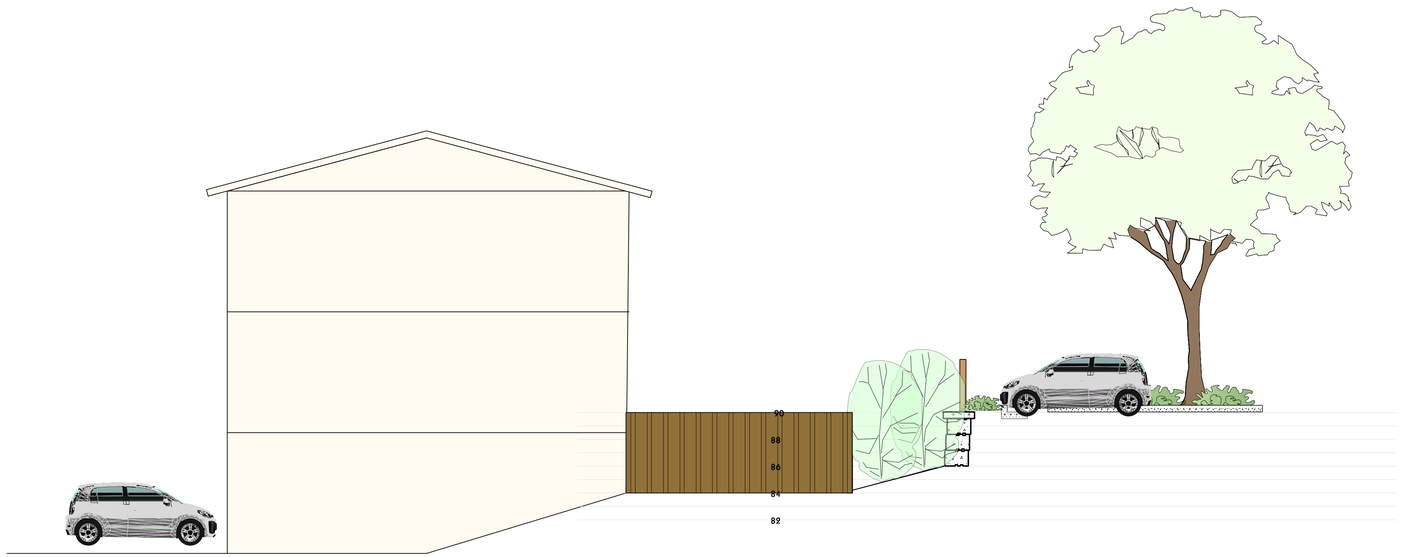
Sheet
C.1

File Name: 20002-c-cover.dwg

N:\PROJECTS\2020\20002-Bell Rippy Townhouses\dwg\20002-C-Cover.dwg 5/1/2020 9:23 AM



NORTH LOT SECTION



MAIN LOT SECTION

Triumph-Bell Rippy

Major Site/Architectural Plan Review, Rezoning, and Variances Planning File #04-20

Planning and Zoning Commission

April 28, 2020

CITY OF GLENWOOD SPRINGS COLORADO

Process

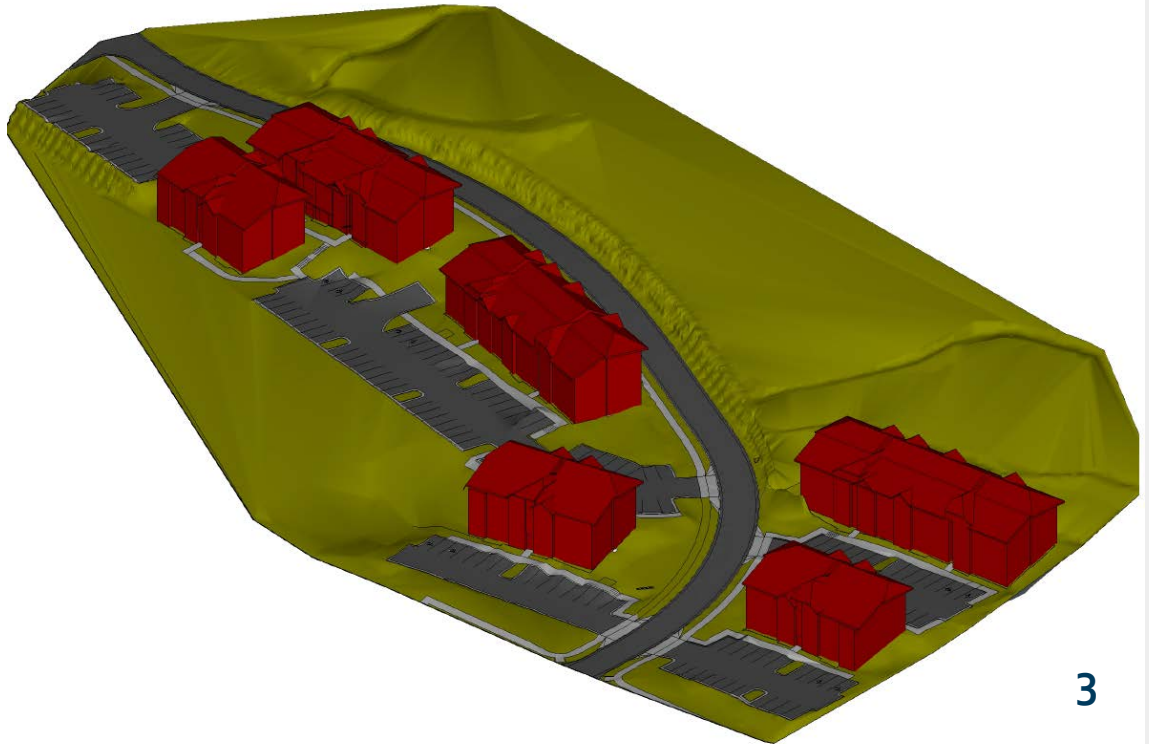
- 070.060.020/Table 060.1
  - Planning and Zoning Commission
    - Recommending body
      - Major Site/Architectural Plan Review
        - 25 or more new dwelling units and/or
        - 30,000 or more gross sf of nonresidential space
      - Rezoning
    - Decision making body
      - Variances
  - City Council
    - Decision making body
      - Major Site/Architectural Plan Review
      - Rezoning
  - City Staff
    - Construction Plans prior to building permit application

CITY OF GLENWOOD SPRINGS COLORADO

Background/Proposal

- 2018
  - Council approved similar yet separate proposal
    - 79 multi-family units
    - 10 buildings
- Current proposal- Triumph Development West
  - 100 multi-family units
  - 6 buildings
  - Rezoning of newly added parcel at 2710 Blake Avenue RH to RT
  - Extension of Palmer Avenue
  - Common open space improvements/landscaping
  - 5.74 acres

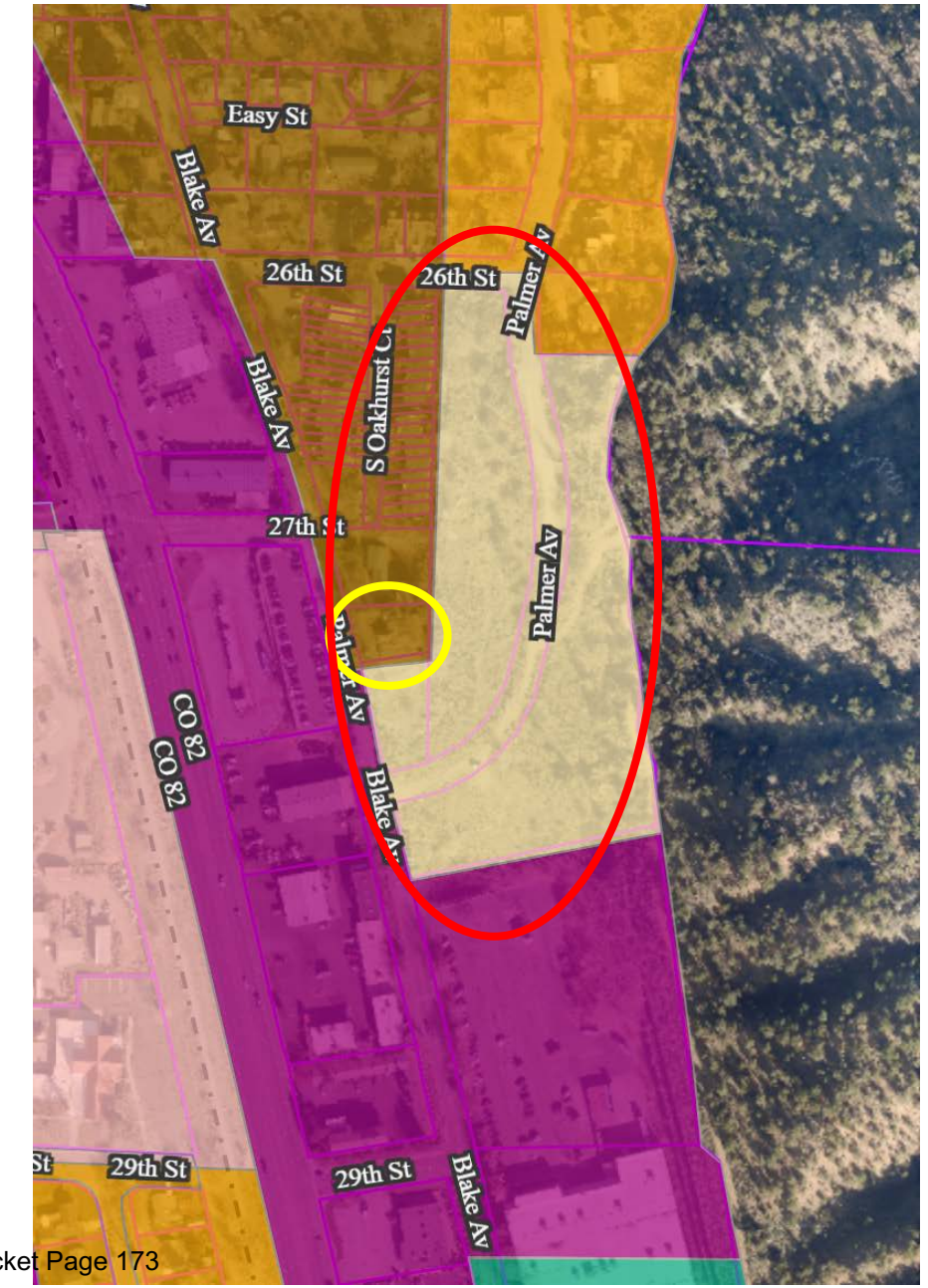
Existing northeast view (photo credit: Google Maps) and related perspective view



CITY OF GLENWOOD SPRINGS COLORADO

Zoning and Adjacent Land Uses

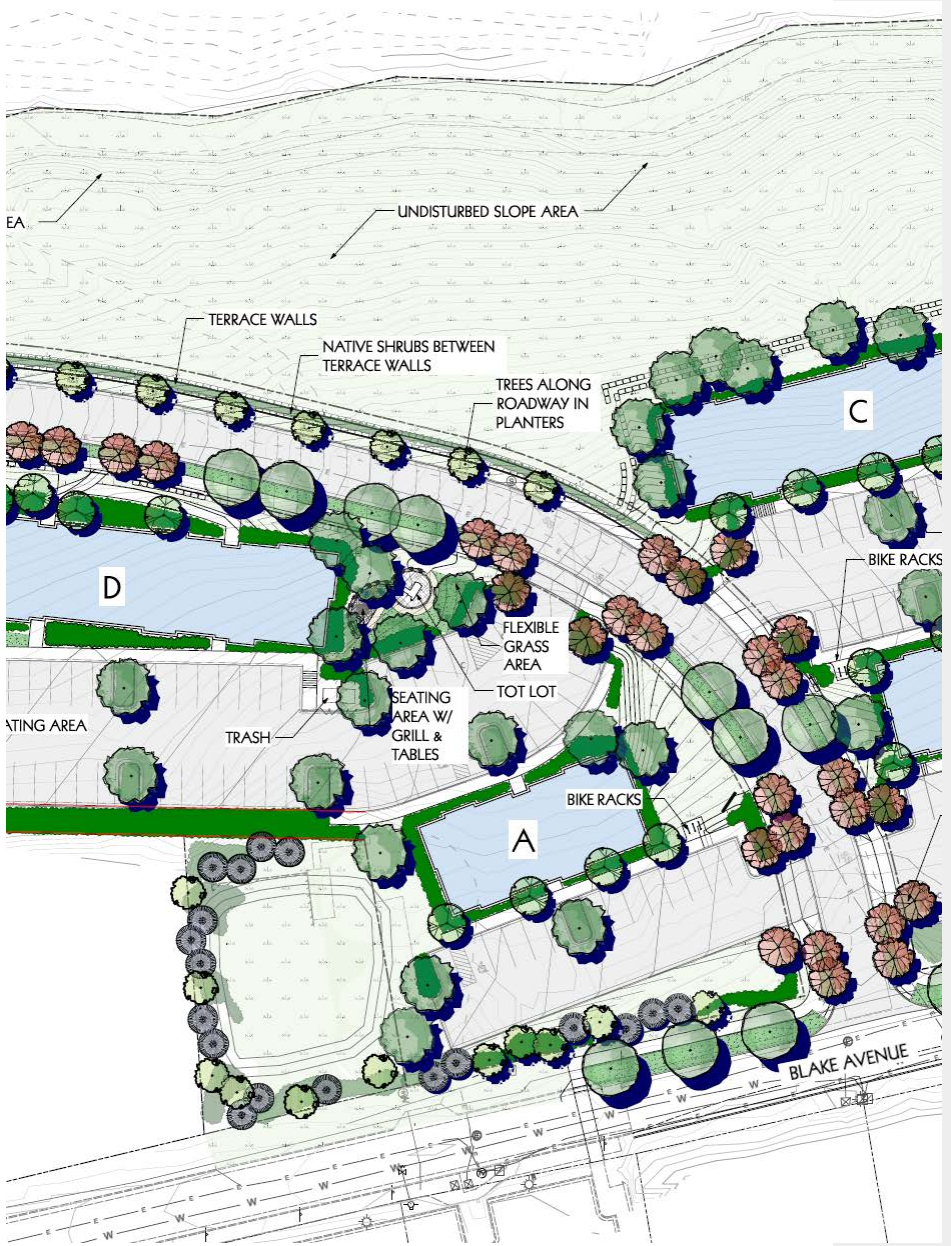
- 5.74 acre
  - RT Residential Transitional (tan)
  - RH Residential High-Density (brown)
  - Borders city boundary to the east



CITY OF GLENWOOD SPRINGS COLORADO

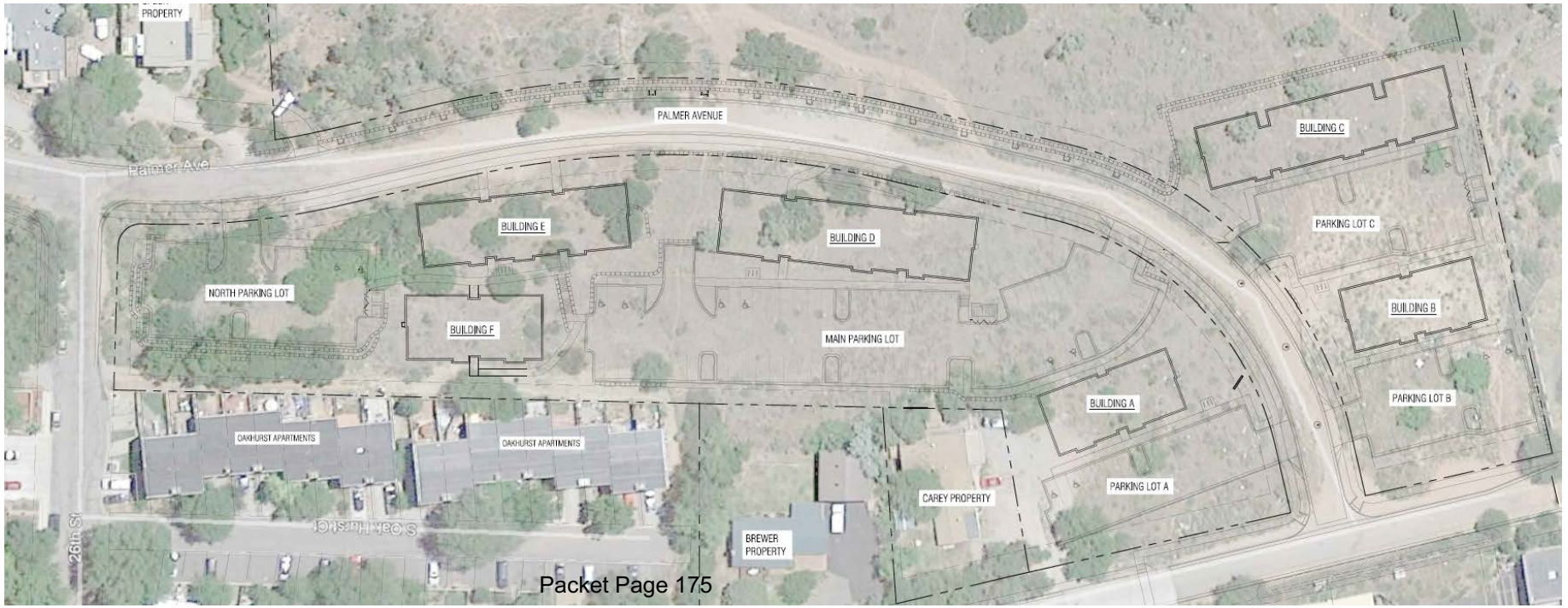
070.040 Development Standards

- Open Space (070.040.040) and Landscaping (070.040.050)
  - Min. 20 percent of development site as landscaping/common open space
    - 37,631 square feet total required
    - 1,360 square feet required as interior parking lot landscaping
    - Street trees adjacent to site
    - Active and passive recreation
  - Proposed
    - 72,026 square feet/38 percent
    - Tot plays area, outdoor gathering spaces, an indoor community room, geologic hazard debris flow area, stormwater retention area, and undeveloped portions of the property



Off Street Parking and Loading (070.030.020(e)/Table 030.1)

- 1.5 spaces per multi-family dwelling unit required and 1 guest space per five dwelling units
- 170 total spaces
- 20 percent reduction requested by TDW per 070.040.060(e)
- 136 required
- 148 proposed



Site Layout and Building Design (070.040.080)

- 070.040.080(d)(2)a.2
  - Requires MF developments to internalize parking lots
  - Buildings A and B are located behind parking lots
- 70.040.080(e)(3)
  - Requires developments of three acres to incorporate min. two housing types.
  - Only MF apartments proposed

CITY OF GLENWOOD SPRINGS COLORADO

Site Layout and Building Design (070.040.080)

- Architectural variety and four-sided design
  - Numerous element articulate the buildings
    - variations in color, materials, texture, roof forms,
    - changes in in wall planes,
    - prominent entries, and
    - windows on all sides

East elevation-Building C
(facades facing Palmer Avenue)

WEST ELEVATION - BUILDING E

Traffic Impacts

- Updated analysis by McDowell Engineering, LLC
  - Forecasts/analyzes project impacts on surrounding streets and intersections
  - 489 vehicle trips per day on an average weekday
    - 30 vehicle trips AM peak hour traffic
    - 38 vehicle trips PM peak hour traffic
  - Majority of impacts at the intersections of
    - 27th Street and Highway 82 and
    - Blake Street and Highway 82
  - CDOT access permits granted but will need revising
    - Intersection improvements not required by CDOT nor City Council prior
    - Blake one way south 23rd to 29th median improvements
  - City wishes to further discuss circulation options with neighborhood, following any approval

CITY OF GLENWOOD SPRINGS COLORADO

Debris Flow

- Analysis by Golder Associates
  - Debris flow flexible fencing
  - Berms

CITY OF GLENWOOD SPRINGS COLORADO

Variance Approval Criteria (070.060.070(a)(3)e.2)

- i. The subject property has an exceptional shape, topography, building configuration or other exceptional site condition that is not a general condition throughout the zone district;
  - Exceptionally long, narrow shape
  - Significant topography (15.5 percent within development site)
  - Debris flow, rockfall, and hydrocompactive soils
  - Curvilinear ROW
- ii. The strict application of the Code standards for which a variance is sought would produce undue hardship;
  - Exceptional conditions create difficulty in developing the site
  - Limits ability to utilize the topography in the building design and develop adjacent to exiting ROW

CITY OF GLENWOOD SPRINGS COLORADO

Variance Approval Criteria (070.060.070(a)(3)e.2)

- iii. The applicant did not create the hardship by his/her own actions;
  - Hardships not created by the applicant

- iv. The variance requested does not harm the public and does not impair the intent or purposes of this Code, goals, and policies, including the specific regulation for which the variance is sought;
  - Consistent with the general purpose and intent of the Code
    - natural hazards,
    - efficient development,
    - compatible design, and
    - addressing impacts

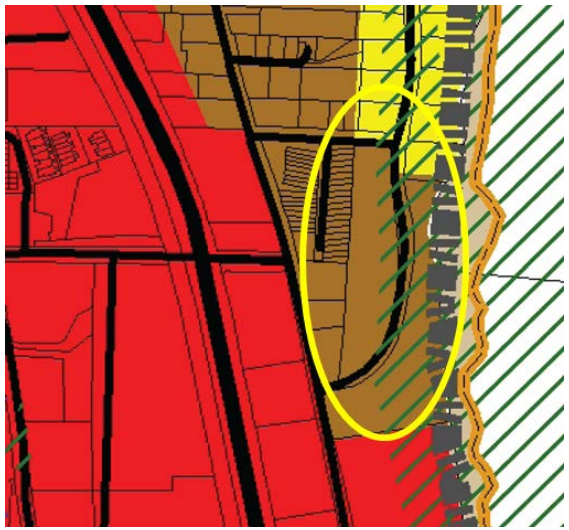
CITY OF GLENWOOD SPRINGS COLORADO

Variance Approval Criteria (070.060.070(a)(3)e.2)

- v. The variance request demonstrates exceptional hardship not related to purposes of convenience or financial burden;
  - Allow development of the site in manner intended by the RT district
- vi. The variance request will not violate building or fire code requirements; and
  - Does not
- vii. The variance is the minimum variance that will afford relief of the subject standards of the Code.
  - Minimum necessary for development of the site

Rezoning Approval Criteria (070.060.040(a)(3)f.3)

- i. The rezoning is consistent with the City's comprehensive plan and the purpose of this Code;
  - Designated "Multi-family Residential" "Hillside Preservation" with green hatching
  - Numerous community goals and related objectives and strategies supported
    - Encourage economic development,
    - Preserve small town character
    - Convenient transportation,
    - Infill development,
    - Housing opportunities, and
    - Social diversity



- ii. The rezoning is consistent with the proposed purpose statement of the proposed zoning district;
  - Consistent with transition between residential and commercial uses which exist in the area per RT purpose statement

Rezoning Approval Criteria (070.060.040(a)(3)f.3)

- iii. Substantial changes in the subject area warrant a zoning change; and/or
  - Development proposal is a substantial change/consideration and prevents a split zoning
- iv. The intensity of development in the new zoning district is not expected to create significantly adverse impacts to surrounding properties or the neighborhood.
  - Intensity of development expected to decrease with the current proposal
    - Replaces an existing triplex with a stormwater detention area
    - RH is a more intense zone district than the RT

CITY OF GLENWOOD SPRINGS COLORADO

Site/Architectural Plan Review Approval Criteria 070.060.050(6)

- a. The site/architectural plan is consistent with the general purpose and intent of this Code;
  - Consistent with the general purpose and intent of the Code as outlined above

- b. The site/architectural plan is consistent with the dimensional, design, development, and all other standards of this Code;
  - Consistent with the dimensional, design, development, and other standards excluding variance requests

- c. The site/architectural plan is consistent with any previously approved plat, PUD, or any other precedent land use approval; and
  - Consistent with the dimensional, design, development, and other standards excluding variance requests

CITY OF GLENWOOD SPRINGS COLORADO

Site/Architectural Plan Review Approval Criteria 070.060.050(6)

- d. The site/architectural plan is consistent with the Comprehensive Plan and other adopted City policies and plans.
  - Consistent with the general purpose and intent of the Code as outlined above

CITY OF GLENWOOD SPRINGS COLORADO

Referral Agency/Adjacent Property Comments

- Agencies
  - Fire Department – Comments discuss fire apparatus road longer than 150 feet without a turnaround
  - Engineering - Comments received outline procedures for exceptions related to the proposed Palmer Avenue extension, request to increase the width of the single sidewalk along said extension, clarification from CDOT regarding applicable traffic mitigation, site acreage, soil type outlined in the drainage report, proposed contours, and necessary revisions to debris flow analysis and other plans needed prior to development
  - Parks and Recreation – Comments received outline the need for the applicant to submit a full landscaping and irrigation plan.
  - Public Works - Comments received outline numerous revisions/clarifications required for the civil plan set related to the fire hydrant location and specifications, storm sewer connections, water/sewer line locations/sizes/specifications, debris flow mitigation, and personnel contact information.

CITY OF GLENWOOD SPRINGS COLORADO

Referral Agency/Adjacent Property Comments

- Adjacent property owners
  - In opposition
    - Jamie Raehal
    - Joan Troth
    - David J. Turtle
    - Richard and Janet O'Connell
    - Christine Smalley

Action Items 1-4 and Staff Recommendation

- Section 070.060.030(g)(1)d
  - Approve,
  - Approve with conditions
  - Deny
  - Continue

- Staff recommends
  - Approval of Action Items 1 and 2 (Variances)
    - Findings on pages 12 and 13
  - Recommending approval with conditions to City Council of Action Item 3 (Rezoning) and 4 (Major Site/Arch Plan Review)
    - Findings and conditions on pages 13-14

CITY OF GLENWOOD SPRINGS COLORADO

MINUTES
City of Glenwood Springs
Planning and Zoning Commission
Regular Meeting
April 28, 2020
Zoom
6:00PM

1. Roll Call

Present at roll call were Commissioners:	Amber Wissing, Marco Dehm, Kathryn Grosscup, Carolyn Cipperly, Ingrid Wussow, George Shaver, and Sumner Schachter
Absent:	None.
Also present were:	Jenn Ooton, Asst. City Manager, Director Gretchen Ricehill, Asst. Director Trent Hyatt, Senior Planner Anna S. Itenberg, City Attorney's Office Catherine Fletcher, City Clerk Jessica Bowser, Asst. City Engineer Alissa Owsley, IT Director

2. Receipt of Minutes from the Feb. 25, 2020 meeting
Commissioner Grosscup pointed out on page 3 of the minutes, that Dr. Salmen's comments were not provided in their entirety and asked that staff review the tape.

Motion: Commissioner Grosscup made a motion to continue the minutes to the next meeting, seconded by Commissioner Wissing. Motion carried unanimously.

3. Comments from citizens appearing for items not on the agenda.

Laura Speck asked whether the topic of homeless was going to come up during the course of the meeting, and said that she would recommend no further development be approved until the situation is addressed. Chairman Dehm suggested that Ms. Speck make that comment during Planning Item 04-20 later in the agenda.

Lynette-Marie (no last name given) – Asked if the Framing Expressions/marijuana application was on the agenda. Commissioner Dehm said that is item 5B.

4. Continued Items –

a. 07-20 Consideration of a request to Rezone a parcel from RH-Residential High Density to M2-mixed use commercial central core zone district. The property is Lot 11B, Glenwood Meadows No. to a Minor Resubdivision of Glenwood Meadows No 4 Lot Line Adjustment, County of Garfield, State of Colorado (PIN 2185-081-41-004)

Asst. Director Ricehill provided an overview of the project for rezoning Lot 11B, which is a 0.4 acre parcel of land located on the southeast corner of Wulfsohn Road and Flat Tops View Drive, from RH-residential high density (formerly R/3) to M2-mixed use downtown core (formerly C/2). She pointed out that this item requires hearings before Planning Commission and City Council, said that staff believes that the application meets the criteria for rezoning and recommended approval of the application.

Commissioner Grosscup asked what the height difference is between the two zoning districts. Ms. Ricehill said that is 40 feet for both zoning districts.

Commissioner Shaver asked about the evolution of the lot configuration. Ms. Ricehill explained that there were lot boundary adjustments on the adjacent Lofts properties and the configuration of Flat Tops View Drive that resulted in the specific configuration of lot 11B.

Chairman Dehm asked about a building design and future plans for the project and whether those details would be part of a future application. Ms. Ricehill said that would be submitted sometime in the future, and the review procedure for a site/architectural review would be determined by the size of the building proposal in the future.

Chris Hawkins, Alpine Planning LLC, 523 Clinton St., Suite 2, Ridgeway, presented his request for the rezoning, explaining that the western sliver of the parcel already has a split zoning, and that his clients would determine a future proposal for the parcel after the rezoning.

Commissioner Dehm asked if the applicants would be developing the lot, and Mr. Hawkins said that the proposal was moving forward with the approval of the land owner, and if the contract didn't close that the current property owner supports the new zoning and would move forward from there.

Commissioner Dehm then opened the public hearing.

Trish (no last name given) said that she didn't have a question, but was checking the raise-hand function.

Breanna Millspaugh, 2600 S. Oakhurst, Unit 18 questioned why it is being encouraged not to deny the application.

Chairman Dehm then closed the public hearing, and reminded the public that the hearing would be kept open for people to provide additional time to comment.

Commissioner Schachter moved to continue the item to May 5. The motion was seconded by Commissioner Wussow. The motioned passed unanimously.

5. New Items

a. 04-20 Consideration of a Major Site/Architectural Plan Review, Rezoning from RH Residential High-Density to RT Residential Transitional, and Variance applications for the construction of 100 Multifamily apartment units in 6 buildings on approximately 5.8 acres (PIN 2185-153-04-001, 2185-153-02-008, and 2185-211-00-002)

Senior Planner Trent Hyatt presented the item, stating that the applicant, Triumph Development West, LLC, proposes to construct 100 multi-family apartment units in six separate buildings on approximately 5.74 acres. He also provided information about the procedure for the action items before the Commission including two variances, the rezoning of 2710 Blake Avenue from RH Residential High-Density to RT Residential Transitional, and the proposal for the Major Site/Architectural Plan. Mr. Hyatt pointed out that this Action Items 1-2 would be decided at the Planning Commission level and that Action Items 3-4 require hearings before Planning Commission and City Council.

Questions to staff from commissioners addressed circulation, the previous approval's condition related to the one-way configuration of Blake, the code's allowable parking reduction due to the site's proximity to transit, how the parking lot relates to the adjacent Oakhurst Townhomes, the details of snow removal, if the drainage facility could only be used for retention, what number of architectural features are required to provide four-sided architecture/achieve sufficient variation, what off-site improvements can be required of the applicant and whether there was a full landscaping plan within the application.

Commissioner Schachter asked about what off-site improvements could be required of the applicant. Mr. Hyatt said that anything that is considered a potential impact of the development can be recommended to City Council, and Assistant City Attorney Anna Itenberg agreed.

Commissioner Grosscup then asked if the Blake Gate was assumed to be opened, and Mr. Hyatt said, yes, that the traffic analysis assumes that the gate would be opened.

Assistant City Engineer Jessica Bowser answered the question about the sizing of the detention – noting that due to expense that the drainage would not be oversized. She confirmed that the city requested that the traffic analysis was modeled with the gate open.

Michael O'Connor, Triumph Development West provided a presentation on the proposed project and introduced all members of the development team. Mr. O'Connor briefly described opportunity zones and how it applies to the property and project in addition to the development team's history of completing similar projects. O'Connor also summarized the previously approved projects on the site and how they compare to their proposed plan, mentioning the proposed project did not have any buildings in the flood zone.

Architect, Mike Foster, Triumph Development, 12 Vail Road Suite 700, Vail, CO further discussed the proposed project and site plan. Mr. Foster discussed the layout of the site, fire truck access, architectural features, and grade changes on the site. In addition, Foster also highlighted that 50% of the units were adaptable for ADA access. He also described the visual screening of the site's border with Oakhurst Townhomes as well as in front of the main parking area.

Greg Schroeder, representing McDowell Engineering, 241 Broadway Street, Eagle, CO presented on traffic design on the site. Schroeder mentioned that much direction was taken from a February 2018 Council meeting which promoted opening the Blake Avenue gate and making Blake Avenue a one-way street to reduce through traffic. Schroeder also referenced that the previous traffic design and plan was approved by CDOT and that the proposed development has a lower traffic impact compared to previously approved plans.

Michael O'Connor provided a short summary of the proposed project application and addressed the parking counts and feedback from the February community meeting. O'Conner described how the proposed parking complies with code.

Commissioner Schachter had multiple questions on how the traffic was measured and potential impacts on the neighborhood, especially along Palmer Avenue. Commissioner Schachter also asked about the possibility of the City abandoning Palmer to be a private road. O'Connor indicated that the option to take over Palmer had been considered but the process did not fit well with the project's timeline.

Commissioner Grosscup had questions about the site plan regarding walkability, parking access, and amenities offered including if on-site management would be offered. O'Connor explained that the size of this development would likely result in an on-site property manager. Stephanie Copeland, from Four Points Funding, the equity partner in the project and owner of the property, also added that an on-site manager was important to the operation of the project.

Commissioner Shaver had several questions about the elevation of the site and how it relates to the nearby Oakhurst Townhomes. Architect Mike Foster explained the difference between elevations and the entries into buildings on the site plan. Commissioner Shaver also asked if there would be more detailed landscaping plans in the future.

Commissioner Wussow asked if there were any 'green' initiatives for the project such as sustainable building materials or community garden space. Mike Foster mentioned that they were in the process of researching solar panels on the roof and EV parking. Foster also explained that they were in the process of pursuing HUD certification, which has its own sustainability requirements. Commissioner Wussow also requested a sample of building materials for the next meeting.

Commissioner Wissing asked about potential sidewalks along Blake Avenue.
Mike Foster explained that the updated site plan will continue sidewalk for the entire length of the property to the north. Commissioner Cipperly also had questions about sidewalks along Palmer as well as questions about potential pedestrian traffic through the site.

Chairman Dehm opened the public hearing.

Breanna Millspaugh, 2600 S. Oakhurst, Unit 18, said that she is very concerned about the project. She said that at the neighborhood meeting that a fence between the two properties was discussed, and that the project as presented does not have a fence. People will still be able to come through the Oakhurst property. There are serious parking problems at Oakhurst and that the 1.5 parking spaces for this project is not adequate. She also asked what is affordable housing and said that affordable housing does not exist in this Valley.

Tom Doogan, said that the project is not affordable housing, it is additional housing. We have huge growth that needs to be accepted, and we are in dire need of additional housing. He said he was supportive of one more thought for traffic flow to do a one-way street that would exit on the southside by Wal-Mart, and make the traffic flow to the south.

Jerry Raehal, 2314 Palmer Ave, wanted to state that he is not opposed to growth and has real concern about the plan. Believes that there are variances not mentioned, including that the increase in the traffic will require the reclassification of Palmer to a collector. He expressed concern that the project will create walkability to nowhere without sidewalks other than within the development. He said that the assigned parking would make parking overflow into the neighborhood and said that when traffic is backed up on 82, that the traffic will flow onto Palmer.

Jamie Raehal, 2314 Palmer Ave., said that she disagrees with the traffic study and expressed concern for the safety of her neighborhood, noting that the Blake Street Gate opening would create flow through traffic to Palmer. It will have a negative impact on the goals within the long-range transportation plan, other than traffic onto the highway. She said that the development will create single-use streets, instead of multi-modal streets. She applauded the city for the traffic calming program, but that it is not a reason to rush the decision here.

Laura Speck, representing her family's home at 2506 Palmer Avenue, which she described as the last house on the road. She stated that this is the first time that she had heard that the driveway would be affected by the plan and would require compensation and privacy amenities. She said that they would be potentially be looking out onto a parking lot, fencing or retaining wall. There are too many questions that need to be addressed before this project should be allowed.

Trish Kramer, 2501 Palmer Avenue, said that her overall impression of the project that it is an improvement over the previous proposal, however, her concerns remain unaddressed regarding parking and traffic. She brought up a question about the width of the road and whether parking would be allowed on the extension of Palmer Avenue. She said that she thought there needed to be a plan for snow removal that did not include taking up parking. She stated that reduced vehicle use is different from reduced vehicle ownership, and she thought the parking reduction was unrealistic. She said that the traffic study didn't take into account the increased crowding on 82 resulting in increased crowding onto side streets in Glenwood Springs. She said that we're facing a 10-year period of economic stressors, and said that she doesn't see the city being able to address street maintenance.

Ralph Scmalley, 2409 Palmer Ave., said that he doesn't have a concern with adding housing in the area, but thought the added traffic on Palmer Avenue. Traffic summary was not precise, but it brought up a good point that the traffic in the p.m. is caused by the backup on 82. People use Palmer already, and that would increase if Blake were made one-way. He said he has concerns about the traffic at the 23rd intersection with 82.

Shelly Lott, 2600 S. Oakhurst, #19, President for the Oakhurst Townhomes. She asked what is retaining the earth above the north parking lot and the lot next to it. She said the developers moved the buildings toward Wal-Mart and left the flood zones open for the homeowners below. She noted that the Oakhurst Townhomes are family homes, and that this development is being built right above. She said that they are not able to assure us that the townhomes will be protected. She said that she wanted more research.

Mike Foster addressed the questions regarding the fencing between Oakhurst and the site. Foster explained that the project was still open to fencing but that further discussion with Oakhurst and additional residential neighboring area. Foster also addressed snow storage on the property that these issues would be addressed in a snow removal and storage plan as part of the building permit. Foster also explained that there will be debris fencing above the site. Assistant City Engineer Jessica Bowser provided comments on the debris fencing and explained that the applicant would be required as part of site review to prove that any development does exacerbate any existing drainage issues.

Commissioner Grosscup made a motion to continue Planning Item 04-20 to the May 5, 2020, agenda. Commissioner Shaver seconded the motion, which passed unanimously.

b. 06-20 Consideration of a Special Use Permit for a Retail Marijuana establishment at 2114 Grand Avenue (PIN: 2185-164-00-095)

Mr. Hyatt explained that the applicant, John Dyet, doing business as Kind Castle, proposes the interior remodel of an existing approximately 738 square foot unit (currently occupied by a framing business) in the commercial strip located at 2114 Grand to accommodate the retail sale of cannabis and related products. He said that as a special use review, Planning Commission is a recommending body to City Council.

Mark Maysich, 2005 East Ballard Avenue, Silt, CO 81652. Deferred to John Dyet.

John Dyet, East 4th Street, Parachute, CO, 81635. Dyet elaborated on the application summary provided by Trent Hyatt. Dyet explained that their flagship location is in Parachute and they are looking to expand to six other stores based on current success of Parachute location. Dyet explained their security practices and that they have never had any issues with odor or other compliance issues.

Brian Cole 1723 Riverbend Way noted that he is a cannabis user and this he believes that Glenwood Springs has a plethora of choices for marijuana and that it has had a negative impact on visitors and travelers, and the mentality that we are a pot town. He said that the traffic area near the Starbucks and gas station is very overwhelming. He said that he didn't support the application.

Lynette-Marie Lacerda, 285 Mikala Ln, New Castle, said she is in opposition to the application and said that there is not enough parking. She expressed concern that there will be increased traffic, and that Glenwood Springs has one framing shop, and that she didn't think we need another marijuana store.

Haley Carmer, Garfield and Hecht, noted that her firm represents the Cedar Lodge Motel, which is adjacent to property. She brought up concerns related to parking, traffic and odor. The existing commercial in the building already has some overflow parking going onto the Cedar Lodge's property when there isn't enough space. She said that the parking is inadequate in number and configuration. She raised issues related to being able to see due to the location of the sign, the lack of a landscape buffer, wafting smells back and forth, and the state of the building potentially being a cause for odor to come from the building.

Virginia Gera, 122 Tanager Drive, part owner of Framing Expressions, said that she does not feel that there is a need for another marijuana shop given the number in Glenwood, noted that they are the only frame shop, doesn't believe this project is infill because the space is currently being used, raised the issue of odor reaching other parts of the building, raised the issue of parking, and pointed out people stayed 4.5 hours in a meeting to express how strongly they are opposed.

Corey Gera, 122 Tanager Drive, said the proposal makes it seem as if the business isn't active, brought up that parking is a big issue, and said that the proposal is pushing out an active business. She urged Planning Commission to deny the permit.

Barbara Koziol Speaking on behalf of the owners of the Cedar Lodge, 2102 Grand Avenue, brought up concerns about health and safety of the neighborhood, brought up odor, said that there is a common wall between the retail and residential with small children, and that everyone would have the potential to smell the marijuana. This would carry over into the parking lot of the lodge and that there isn't a reason for another marijuana shop. She brought up the proximity to two air conditioning units for the lodge and that guests checking in would potentially smell things and that there is a potential impact to 22 guest rooms. Parking space is a big concern because just the employees would take up the parking. Requested the Planning Commission deny.

Chelsea Sullivan, 1699 Riverbend, don't need another marijuana store in our city, we are established and have a very good community, and another marijuana store is not what we want especially in the middle of town. It is a bad decision on Glenwood Springs; part to encourage another marijuana store to be here.

Todd Leahy, 1028 Blake Avenue, said that he heard a common theme tonight that Glenwood Springs doesn't need another marijuana store. He said that he had done a lot of research on John before he decided to put him as a tenant in one of his properties, had visited Parachute and felt that store was like a high-end jewelry store. He said he had taken a lot of phone calls from interested marijuana operators wanting this site, so he checked John out thoroughly. He said that the free market should decide what stores make it and which ones won't. He said that there isn't any reason within the staff report for a denial.

Applicant John Dyet responded to comments and concerns that they would be very respectful

of potential new neighbors, especially addressing odor issues. Mr. Dyet explained that very few locations in Glenwood Springs meet the ordinance requirements for this use. Mr. Dyet also explained that he would be willing to help the framing store to find a new location.

Mark Maysich also responded to several comments. Maysich explained that the parking would be adequate and used the example of their Parachute store, which has less than 8 spaces. Maysich also spoke about security measures including cameras on site as well as a potential easement that would alleviate traffic flow on the property.

Commissioner Grosscup had several questions regarding how many dispensaries had been permitted in Glenwood and how many stores were currently operating. Commissioner Cipperly mentioned that there were some Fire Department comments on emergency access behind the building and that this was a concern.

Commissioner Grosscup made a motion to continue Planning Item 06-20 to May 5, 2020, that was seconded by Commissioner Schachter. The motion passed unanimously

c. 11-20 Consideration of various amendments to Municipal Code Title 070 Sections 070.030, 070.040 and 070.070 regarding Use Regulations; Accessory Uses; Hillside Development; Landscaping, Screening and Fencing; Off-street Parking; Residential Site and Building Design Storage requirements; Signs; and Rules of Construction and Definitions.

Commissioner Grosscup made a motion to continue the item to the May 5, 2020 meeting. The motion was seconded by Commissioner Shaver. The motion passed unanimously.

6. Adjournment 10:59 PM

DRAFT

Bell Rippy Apartment Homes

Major Site/Architectural Plan Review with Variances

& Rezoning of 2710 Blake Ave

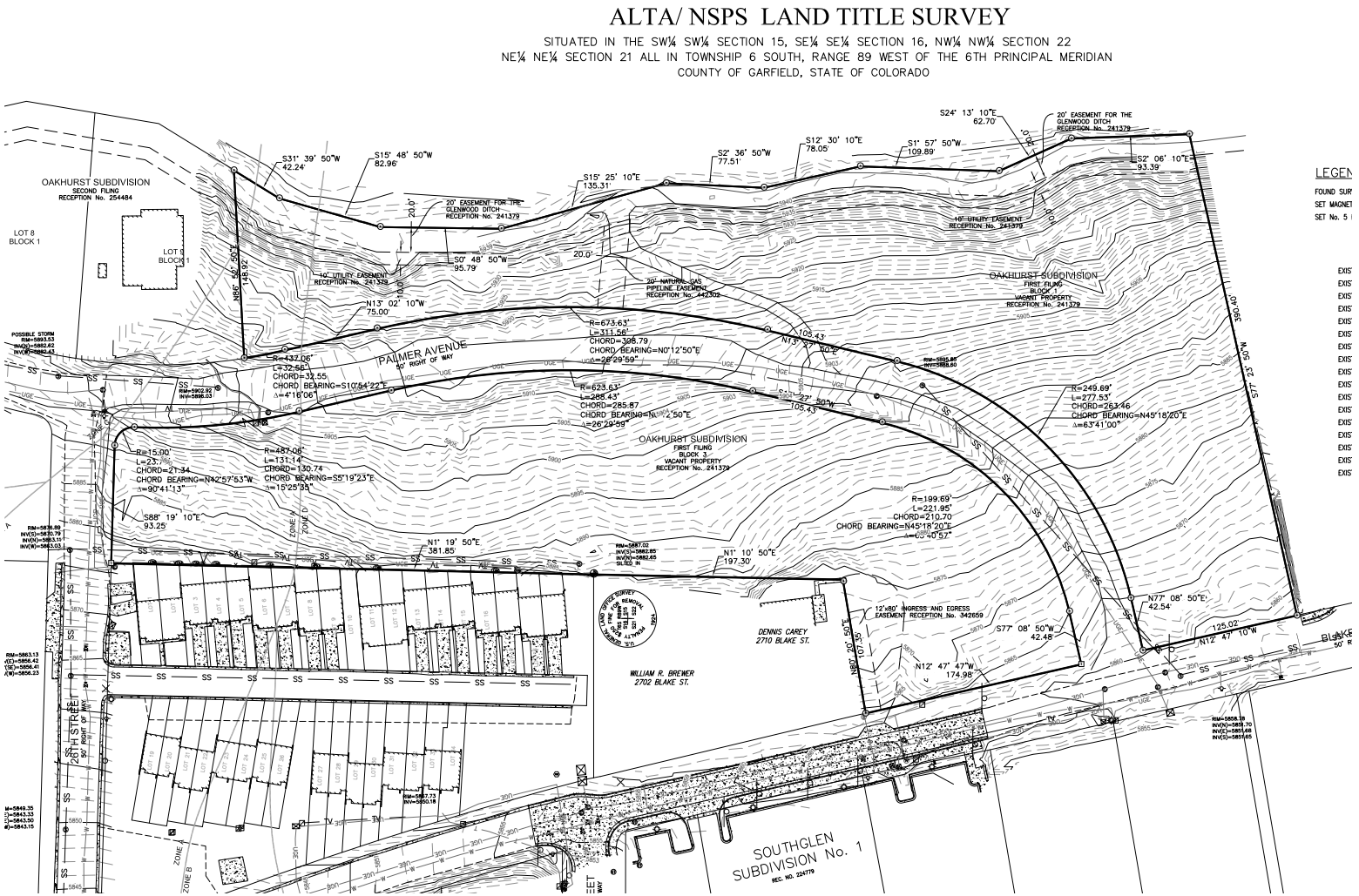
Planning & Zoning Commission Meeting - 4.28.20

Development Team

- Owner: Bell Rippy Glenwood, LLC - c/o Four Points Funding - Stephanie Copeland
- Owners Rep & Co-Sponsor: Triumph Development West - Michael O'Connor
- Architect: Triumph West Architecture - Mike Foster
- Civil Design: Boundaries Unlimited - Deric Walter
- Landscape Design: Outside LA – Sandi Gibson
- Traffic Engineering: McDowell Engineering - Greg Schroeder

Bell Rippy Aerial

Survey and Flood Zone A Location



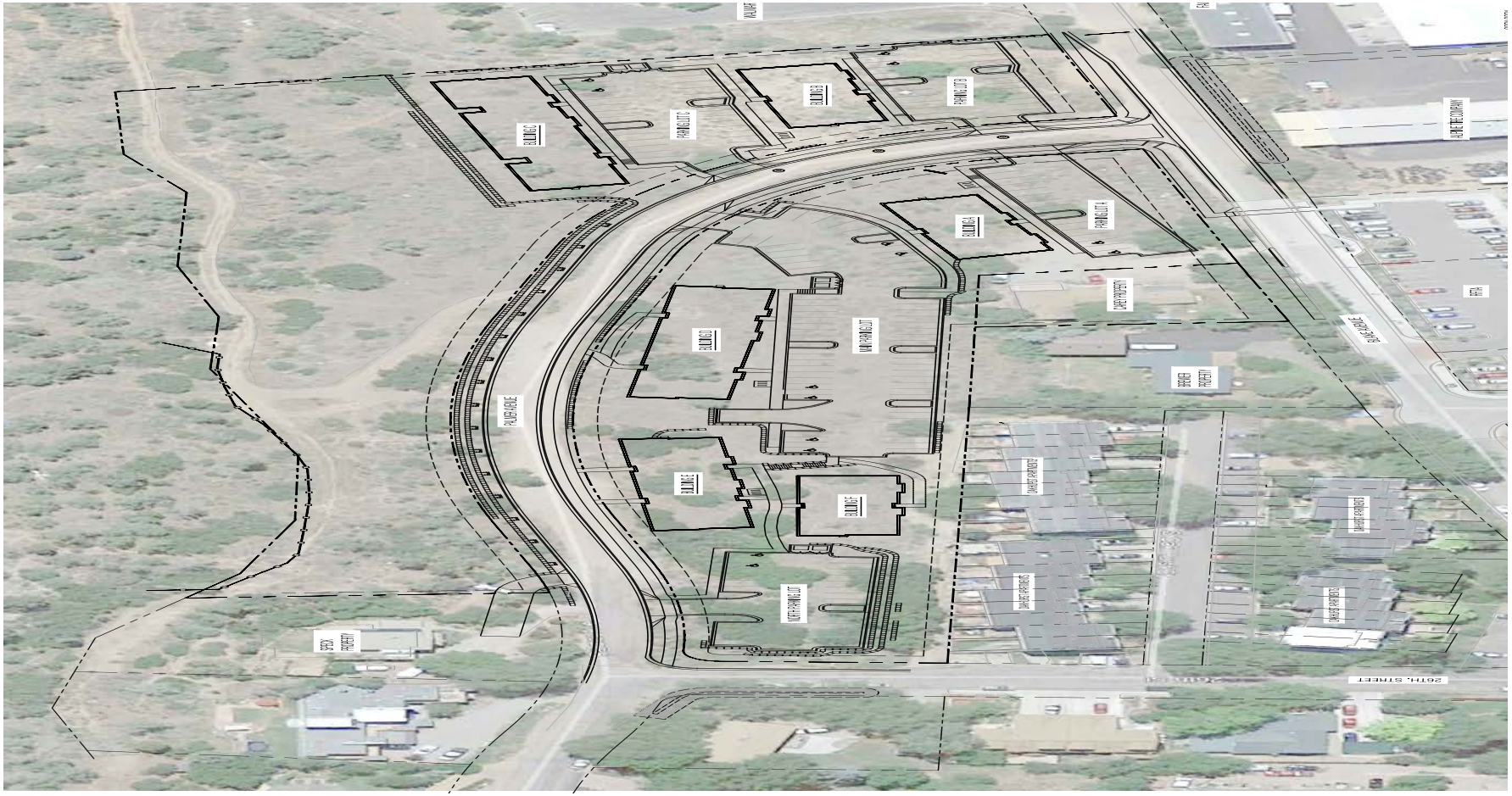
Current Development Approvals

- 10 three-story buildings buildings with 79 homes and 156 bedrooms. Mostly 2BR
- Construction of the Palmer Avenue ROW to the COGS design standards, along with debris flow mitigation
- CDOT Access Permit received for the proposed traffic pattern

Overview of Proposed Development

- Added 2710 Blake to the Development Application.
- 6 three-story buildings buildings with 100 homes and 162 bedrooms. Mix of 2BR and 1BR homes.
- Construction of the Palmer Avenue ROW to COGS standards, along with debris flow mitigation for the neighborhood.

Development Plan Over Site Aerial

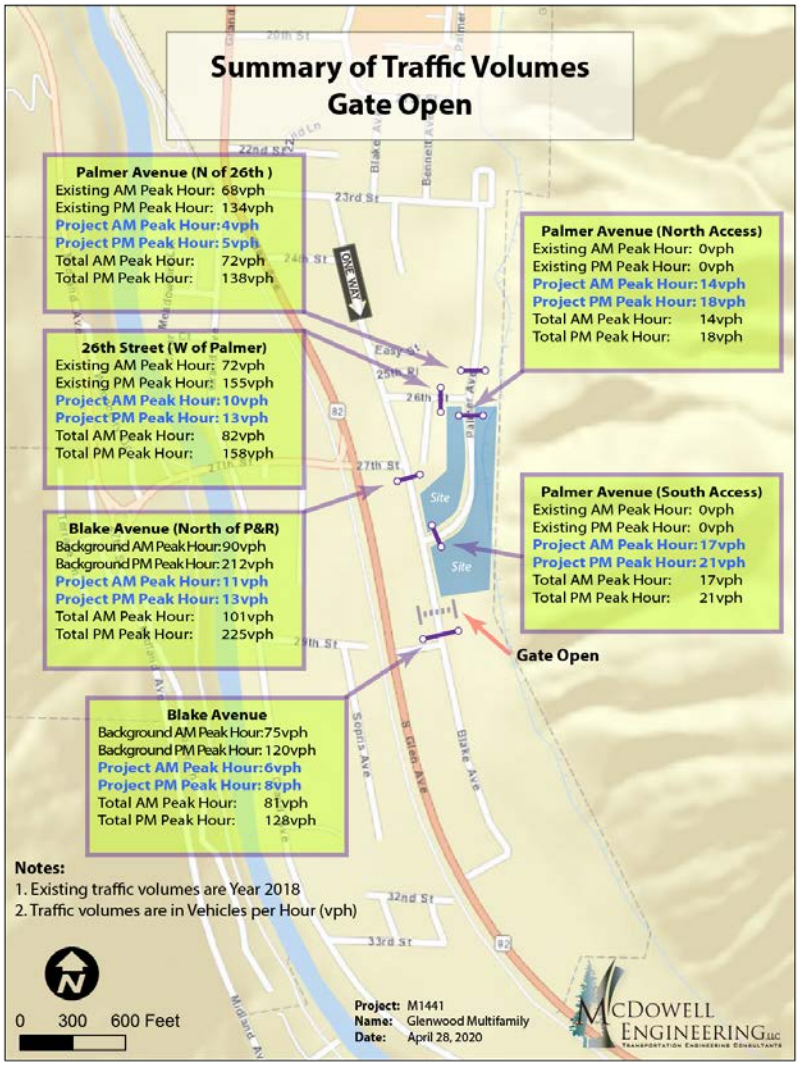

BUILDING 1
BUILDING 2
BUILDING 3
BUILDING 4
BUILDING 5
BUILDING 6
PARKING LOT 1
PARKING LOT 2
PARKING LOT 3
PARKING LOT 4
PARKING LOT 5
MAIN PARKING LOT
NORTH PARKING LOT
PALMER DRIVE
PALMER AVENUE
20TH. STREET
GRAVEL PARKING
GRAVEL PARKING
GRAVEL PARKING

Site and Architectural Design Presentation
Mike Foster, Triumph West Architecture

Traffic Impact Study Presentation
Greg Shroeder, McDowell Engineering

Traffic Impact Conclusions

- Applicant's proposed traffic pattern is the same configuration approved in Current Plan.
- CDOT Access Permit has been received for current plan.
- Traffic volumes of this plan are lower than Current Approvals
- Decision to open Blake Gate was made by City Council in the Current Plan with strong support from Glenwood Springs Transportation Commission.
- Traffic impacts from this Project on the surrounding neighborhood are minor - only 4 to 13 vph on existing neighborhood streets.



Summary of the Proposed Parking Plan

- Parking Plan exceed the requirements of the GSMC which recognizes the benefit of access to public transit.
- Access to public transit does not get better than this site.
- Community targets residents whose lives are conducive to public transit and will attract households that only need 1 car.
- Managed community where parking will be controlled via leases:
  - Onsite manager to control parking
  - Leases to specify number of cars and residents for each unit
  - Assigned parking spaces
  - Management tools such as charge for parking in excess of 1 space per unit

Number of Units		100
Resident Parking (Per Unit)	1.50	150
Guest Parking (Per Unit)	0.20	20
Transit Proximity Discount	20%	(34)
Total Parking Required		136
Total Parking Proposed		148
Extra Parking Spaces to Code		12

Overview of Major Site/Architectural Plan Improvements to the Currently Approved Plan

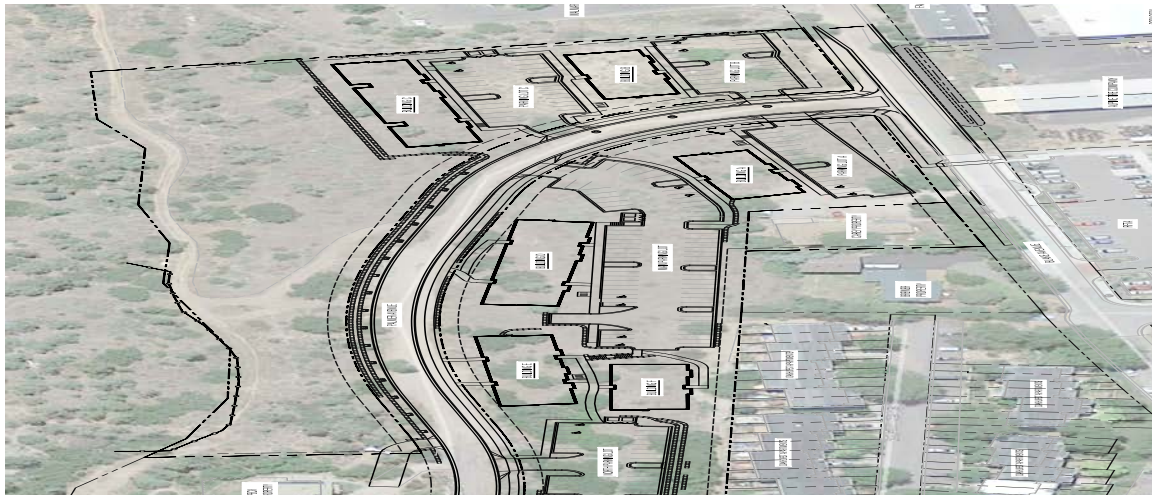
- Proposed construction of Palmer to COGS standards – drops grade as much as 9 feet
- Retaining walls vs. significant uphill site excavation to preserve highly visible native landscape
- Construction of 400’ debris flow fence for the benefit of the entire neighborhood
- Site plan that discourages access to uphill open lands and improves the safety of the neighborhood
- Fewer, attractive buildings than Current Approvals that compliment and complete the neighborhood and comply with all the main zoning standards
- Plan that avoid Flood Zone A with all buildings
- Units that are more affordable, yet livable, by design with surface parking.
- Mix of 2BR and 1BR with separate basement storage to cater to a mix of households.
- Transit oriented development that encourages the use of public transit andis walkable to essential retail.
- Honors the prior commitments and approvals of the currently approved plan for offsite traffic improvements and debris flow mitigation.

Zoning Compliance & Comparison of Current vs. Proposed Plan

Zoning Criteria		Code		Current Approved Plan		Proposed Plan	
Lot Size		5.74	acres	5.51	acres	5.74	acres
Density	Lot SF/Unit	2,500					
	Total Permitted Units	100	units	79	units	100	units
Unit Mix	1BR	n/a		77	2BR	63	2BR
	2BR	n/a		2	1BR	37	1BR
Total Bedrooms				156	bedrooms	163	bedrooms
Setbacks	Front (Non-Arterial)	10	feet	10+	feet	10+	feet
	Side	5	feet	5+	feet	5+	feet
	Rear	10	feet	10+	feet	10+	feet
Height		40	feet	3	stories	40	feet
Lot Coverage	Allowed	50%					
	Square Feet	120,008	sf	49,635	sf	32,406	sf
						27%	of permitted
Landscape Area	Minimum Required	20%					
	Square Feet	48,003	sf	134,209	sf	125,103	sf
						261%	of required
Proposed Parking		136.00		179	spaces	148	spaces
Zoning Variances				5	variances	2	variances

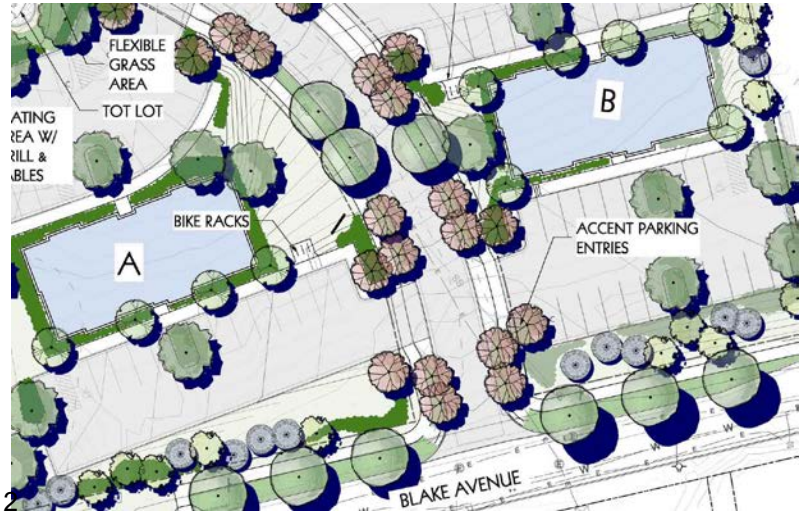
Zoning Variance #1 – Multiple Housing Types

- Section 70.040.080(e)(3) the *GSMC* requiring developments with three acres to provide at least two housing types.
- Site grade and engineering requirements for the Palmer Avenue engineering standards drive a development plan with a condensed footprint that minimizes uphill development disturbances
- Current Approved Plan requested and received this same variance.
- See Staff Memo for compliance with 7 Variance Criteria

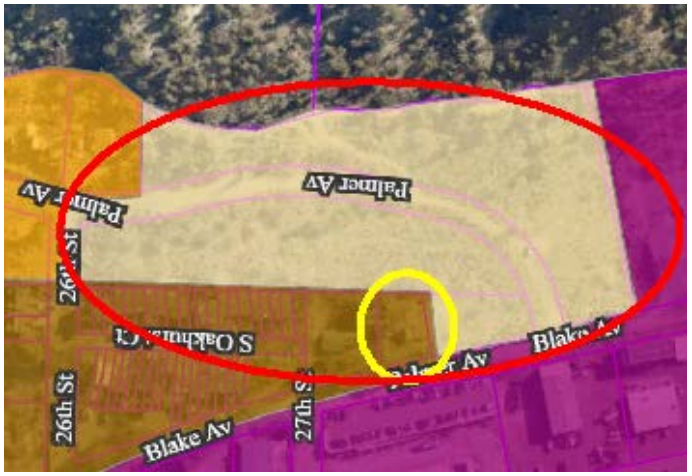


Zoning Variance #2 – Parking Internal to Site

- Section 070.040.080(d)(3)a.2 of the *GSMC* requires internalized parking located away from street frontages.
- Site grade and ROW and parking engineering standards dictate site plan with tiered parking. Plan proposes to use foundations for site retaining rather than tall retaining walls.
- Current Plan and Proposed Plan have similar site layout condition.
- See Staff Memo for compliance with the 7 Variance Criteria



Rezoning of 2710 Blake



- Rezoning this 0.25-acre parcel to be consistent with the larger 5.5-acre parcel.
- Rezoning of 2710 Blake is consistent with Comp Plan
- Rezoning represents a slight downzoning in the allowable number of units that can be developed. All other development standards remain the same.
- See Staff Memo for compliance with Variance Criteria.

Questions?

GLENWOOD MULTIFAMILY DEVELOPMENT

Planning & Zoning Meeting

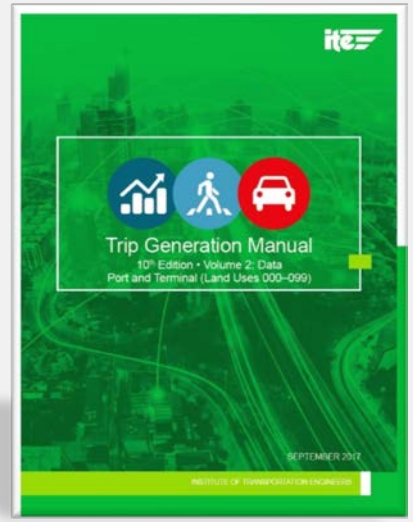
April 28, 2020

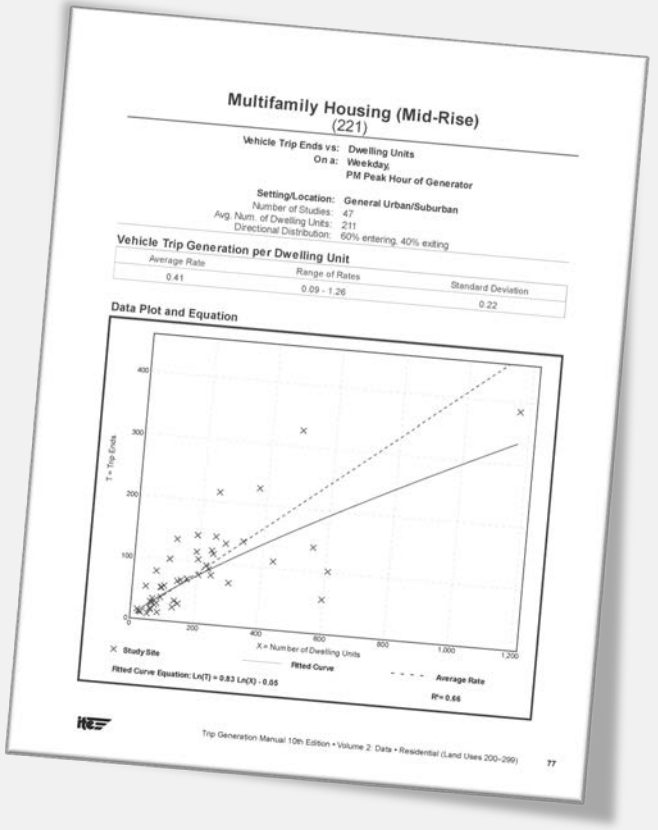
TRAFFIC UPDATE

- Direction from February 2018 City Council Hearing
  - Approved by Engineering Department and Council
  - Opening the gate at Blake Avenue was agreed at Town Council direction. Improvement to the traffic circulation pattern in the neighborhood is desirable.
  - One Way on Blake Avenue to control cut through traffic
    - Southbound from 23rd to 26th
- CDOT Approval
  - State Highway Access Permits are approved for the currently approved plan with higher projected traffic volume
- Proposed volumes are less than previous development
  - March 2020 Memorandum to City

ESTIMATE GLENWOOD MULTIFAMILY DEVELOPMENT SPECIFIC TRAFFIC

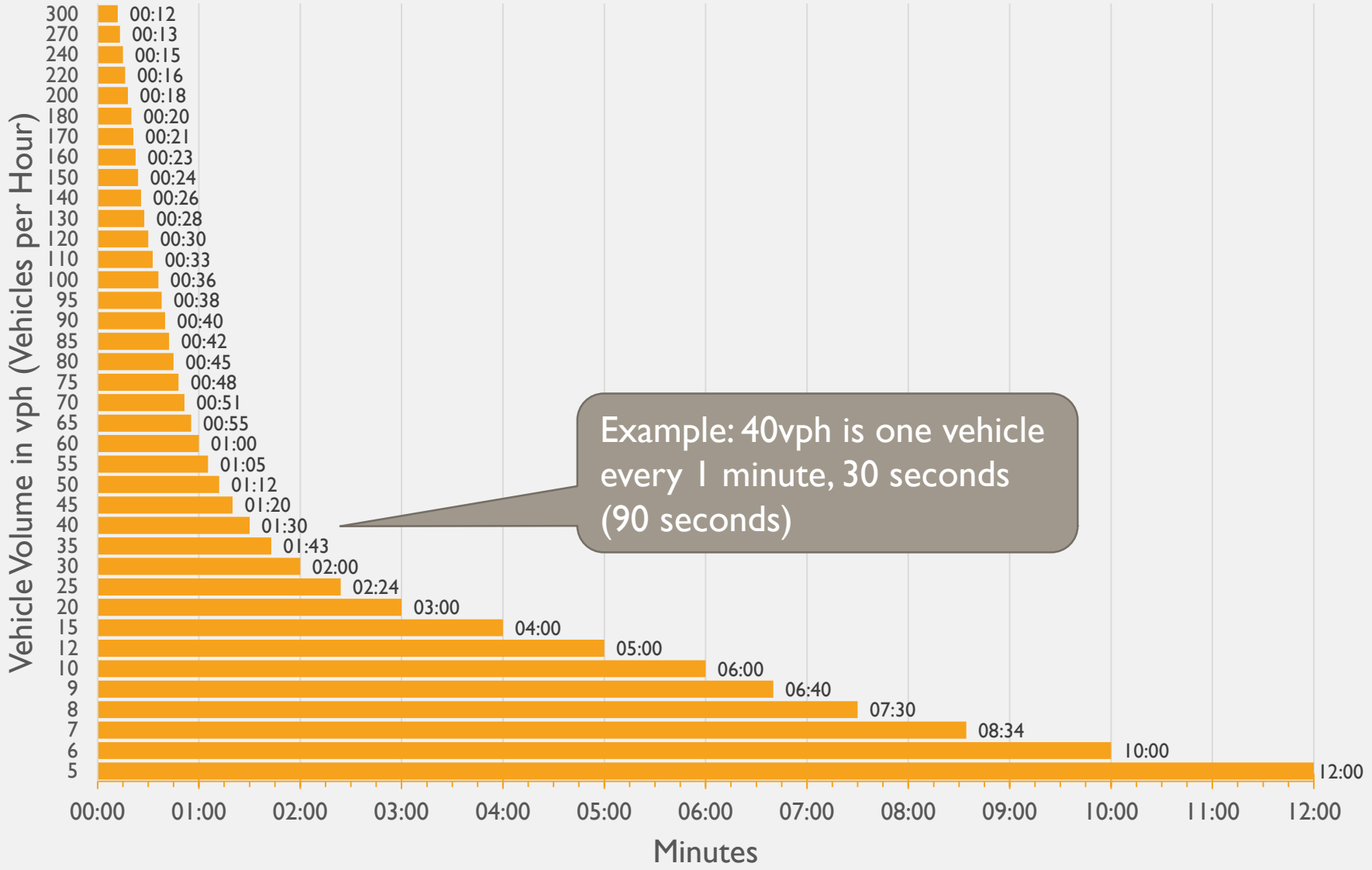
- ITE Trip Generation Manual, 10th Edition
- 3000+ pages of traffic trip generation studies





Vehicle Volumes

Average Number of Minutes Between Vehicles



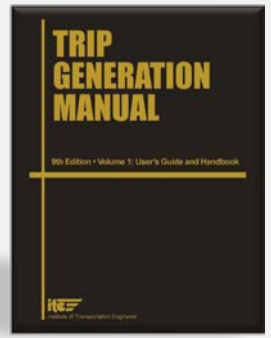
TRAFFIC VOLUME / TRIP GENERATION COMPARISON

- Previous Development Proposal
- Trip Generation
  - 79 Dwelling Units.
  - 10% Multimodal Trip Reduction (due to proximity to transit)
  - 543vpd Average Weekday Trips, 43vph AM Peak Hour, and 57vph PM Peak Hour

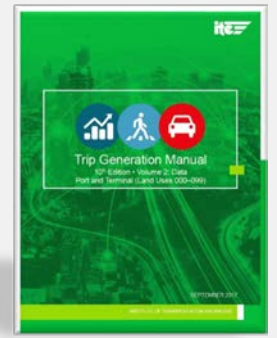
- This Development Proposal
- Trip Generation
  - 100 Dwelling Units.
  - 10% Multimodal Trip Reduction (due to proximity to transit)
  - 489vpd Average Weekday Trips, 30vph AM Peak Hour, and 38vph PM Peak Hour

WHY DID THE TRAFFIC VOLUMES GO DOWN WHEN THE # OF UNITS INCREASED?

- Previous Proposal
  - Project began in 2016/2017
  - First Submittal in early 2017
  - Used ITE Trip Generation 9th Edition
    - Published in 2012
    - Land Use #220 – Apartment
    - Land Use #223 – Mid Rise Apartment did not have enough data
      - Manual did not allow use

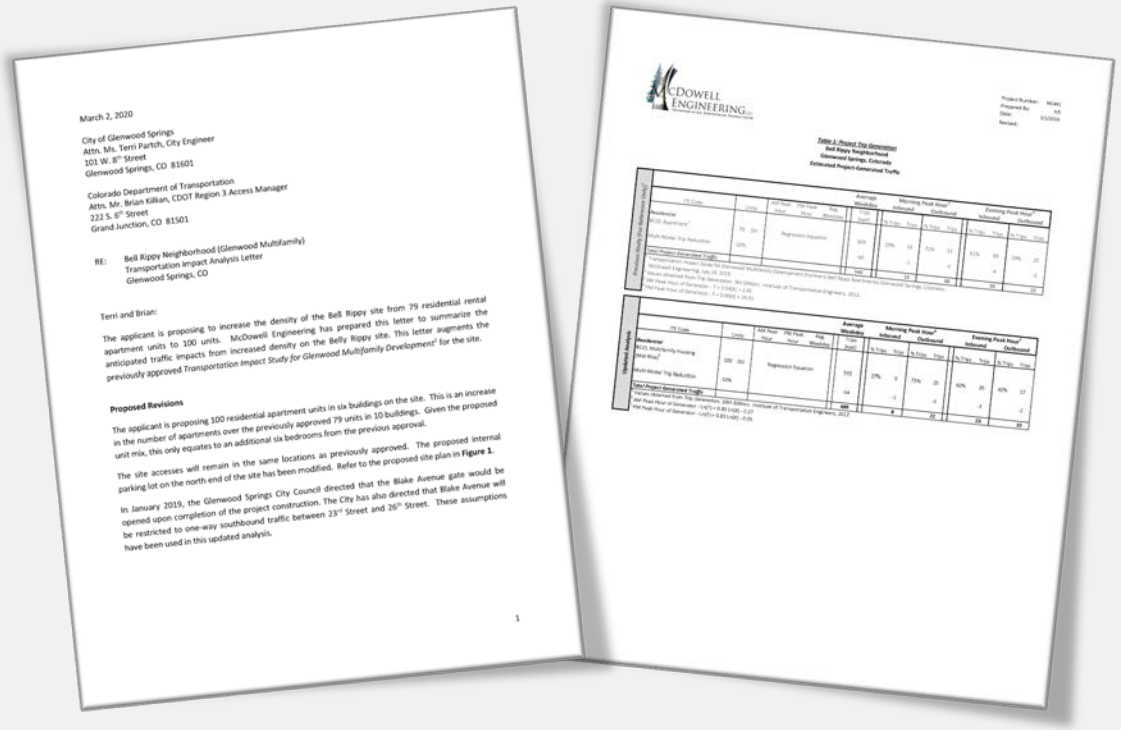


- This Proposal
  - Revised Application submitted 2019/2020
  - Used ITE Trip Generation 10th Edition
    - More Data Points
    - Better Land Use Distinctions
    - Published in September 2017
    - Land Use #221, Multifamily Housing (Mid-Rise)
  - Memorandum to City, March 2020



MARCH 2020 MEMORANDUM

- Discussed the change of traffic volumes due to the ITE Trip Generation 9th vs10th data updates
- Use most current and reliable data
- 10th Edition gathered more data for the mid-rise multifamily category
- Lower projected traffic volumes than current approvals.
- No changes for infrastructure improvements from previously submitted studies.
- Very little traffic impact on neighborhood streets from the project. Most traffic from the project will use Blake Avenue.



March 2, 2020

City of Glenwood Springs
Attn, Ms. Terri Partch, City Engineer
101 W. 8th Street
Glenwood Springs, CO 81601

Colorado Department of Transportation
Attn. Mr. Brian Killian, CDOT Region 3 Access Manager
222 S. 6th Street
Grand Junction, CO 81501

RE: Bell Rippy Neighborhood (Glenwood Multifamily)
Transportation Impact Analysis Letter
Glenwood Springs, CO

Terri and Brian:

The applicant is proposing to increase the density of the Bell Rippy site from 79 residential rental apartment units to 100 units. McDowell Engineering has prepared this letter to summarize the anticipated traffic impacts from increased density on the Belly Rippy site. This letter augments the previously approved *Transportation Impact Study for Glenwood Multifamily Development*[1] for the site.

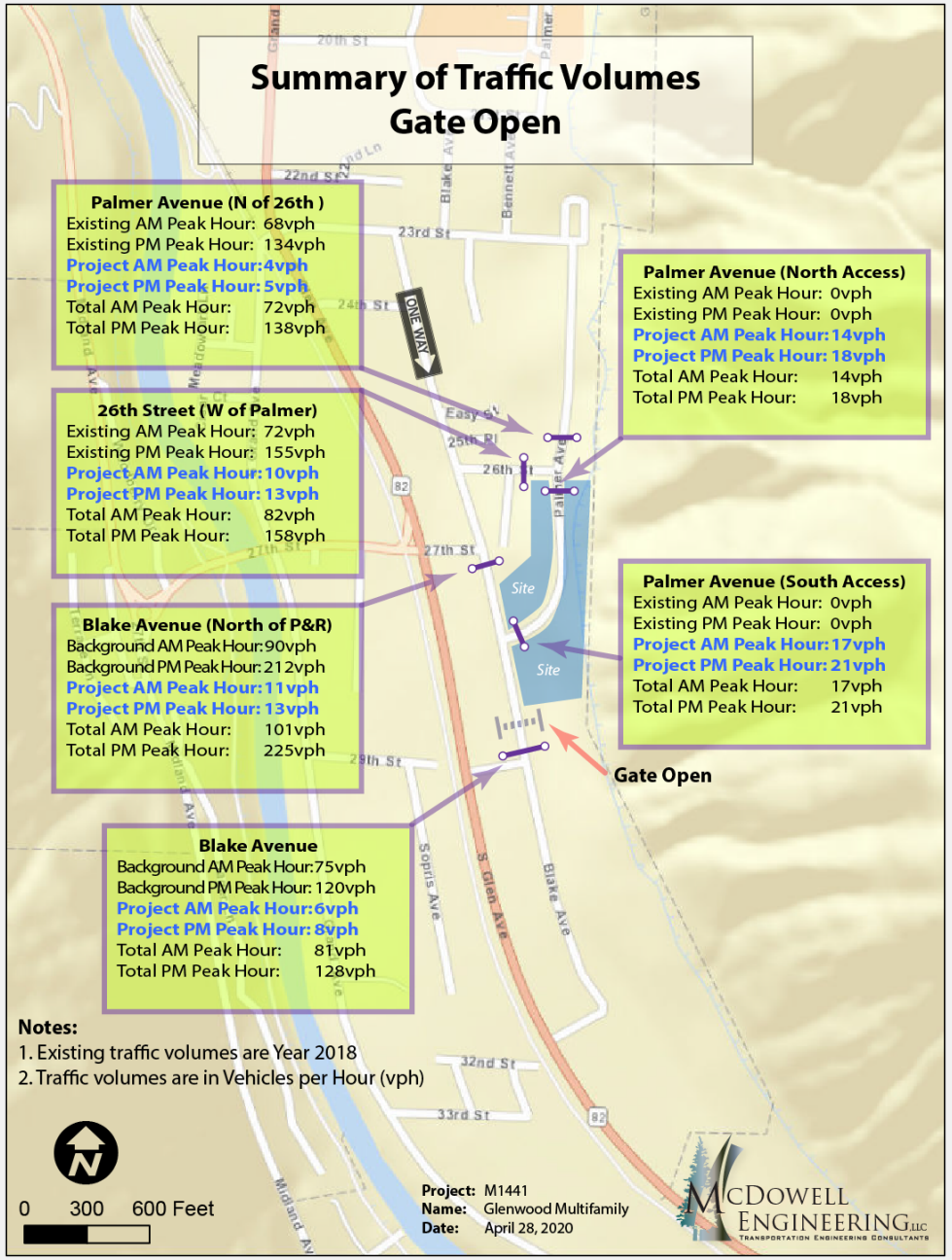
Proposed Revisions

The applicant is proposing 100 residential apartment units in six buildings on the site. This is an increase in the number of apartments over the previously approved 79 units in 10 buildings. Given the proposed unit mix, this only equates to an additional six bedrooms from the previous approval.

The site accesses will remain in the same locations as previously approved. The proposed internal parking lot on the north end of the site has been modified. Refer to the proposed site plan in **Figure 1**.

In January 2019, the Glenwood Springs City Council directed that the Blake Avenue gate would be opened upon completion of the project construction. The City has also directed that Blake Avenue will be restricted to one-way southbound traffic between 23rd Street and 26th Street. These assumptions have been used in this updated analysis.

1


Summary of Traffic Volumes
Gate Open
Palmer Avenue (N of 26th)
Existing AM Peak Hour: 68vph
Existing PM Peak Hour: 134vph
Project AM Peak Hour: 4vph
Project PM Peak Hour: 5vph
Total AM Peak Hour: 72vph
Total PM Peak Hour: 138vph
26th Street (W of Palmer)
Existing AM Peak Hour: 72vph
Existing PM Peak Hour: 155vph
Project AM Peak Hour: 10vph
Project PM Peak Hour: 13vph
Total AM Peak Hour: 82vph
Total PM Peak Hour: 158vph
Blake Avenue (North of P&R)
Background AM Peak Hour: 90vph
Background PM Peak Hour: 212vph
Project AM Peak Hour: 11vph
Project PM Peak Hour: 13vph
Total AM Peak Hour: 101vph
Total PM Peak Hour: 225vph
Blake Avenue
Background AM Peak Hour: 75vph
Background PM Peak Hour: 120vph
Project AM Peak Hour: 6vph
Project PM Peak Hour: 8vph
Total AM Peak Hour: 81vph
Total PM Peak Hour: 128vph
Palmer Avenue (North Access)
Existing AM Peak Hour: 0vph
Existing PM Peak Hour: 0vph
Project AM Peak Hour: 14vph
Project PM Peak Hour: 18vph
Total AM Peak Hour: 14vph
Total PM Peak Hour: 18vph
Palmer Avenue (South Access)
Existing AM Peak Hour: 0vph
Existing PM Peak Hour: 0vph
Project AM Peak Hour: 17vph
Project PM Peak Hour: 21vph
Total AM Peak Hour: 17vph
Total PM Peak Hour: 21vph
Gate Open
Site
Site
ONE WAY
Notes:
1. Existing traffic volumes are Year 2018
2. Traffic volumes are in Vehicles per Hour (vph)
0 300 600 Feet
Project: M1441
Name: Glenwood Multifamily
Date: April 28, 2020
McDowell Engineering, LLC
Transportation Engineering Consultants

Planning and Zoning Commission Report

Date: April 28, 2020
To: Planning and Zoning Commission
From: Trent L. Hyatt, Senior Planner
Subject: #04-20– Triumph-Bell Rippy

REQUEST	Major Site/Architectural Plan Review, Rezoning, and Variances related to a 100-unit multi-family apartment development
APPLICANT	Triumph Development West, LLC
OWNER	Bell Rippy Glenwood LLC
LOCATION	Adjacent to Palmer Avenue between 26th Street and Blake Avenue (PIN: 2185-153-04-001, 2185-153-02-008, and 2185-211-00-002)
ZONE	RH Residential High-Density and RT Residential Transitional
SURROUNDING LAND USES	North: Mixed residential South: Retail East: Vacant, Bureau of Land Management West: Multi-family residential, mixed commercial
LOT SIZE	Approximately 250,034 square feet (5.74 acres)

ACTION ITEM

Per Section 070.060.020/Table 060.1 of the *Glenwood Springs Municipal Code* (Code), the Planning and Zoning Commission (Commission) reviews and provides a recommendation to City Council for all Major Site/Architectural Plan Review applications which include 25 or more new dwelling units and/or more than 30,000 gross square feet of nonresidential space as well as all Rezoning applications. Additionally, the Commission reviews and decides all Variance requests. Following any approval (with or without conditions) of the related applications, the applicant must still submit and receive approval of a Construction Plans application from City staff prior to submitting a building permit application.

Action 1 – Variance – from Section 070.040.080(d)(3)a.2 of the *Glenwood Springs Municipal Code* requiring internalized parking located away from street frontages.

Staff recommendation: *Staff recommends **approval** of the Variance with the findings and conditions on page 12.*

Action 2 – Variance – from Section 70.040.080(e)(3) the *Glenwood Springs Municipal Code* requiring developments encompassing three acres to provide at least two housing types.

Staff recommendation: *Staff recommends **approval** of the Variance with the findings and conditions on pages 12-13.*

Action 3 – <u>Rezoning</u> – of 2710 Blake Avenue (PIN: 2185-211-00-002) from RH Residential High-Density to RT Residential Transitional.

<u>Staff recommendation</u>: *Staff recommends **approval (with conditions)** of the Rezoning with the findings page 13.*

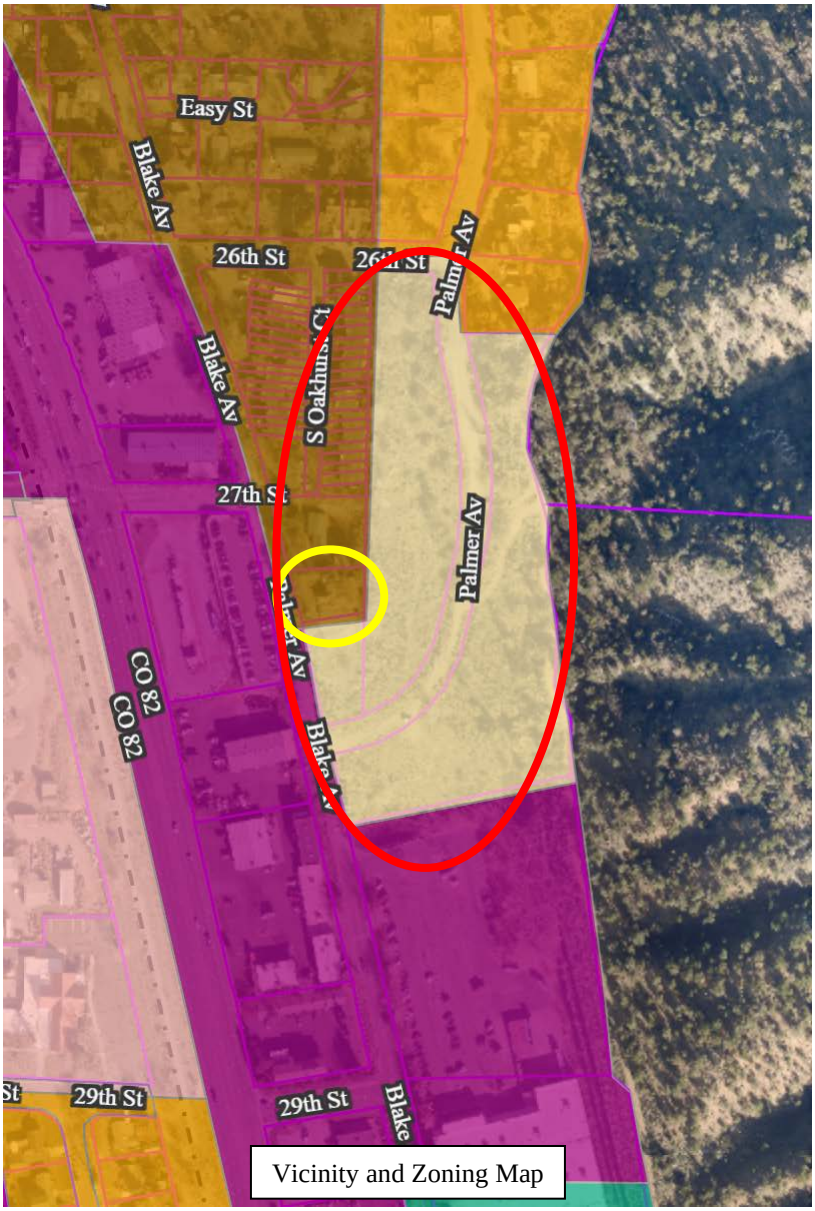
Action 4 – <u>Major Site/Architectural Plan Review</u> – to allow for the construction of 100-~~unit~~ multi-family apartment units in six buildings.

<u>Staff recommendation</u>: *Staff recommends **approval (with conditions)** of the Major Site/Architectural Plan Review with the findings and conditions on pages 13-14.*

BACKGROUND/ANALYSIS

Proposal

Triumph Development West, LLC (TDW) proposes the construction of 100 multi-family apartment units in six separate buildings on the approximately 5.74 acre subject property (circled in red at right) lying adjacent to the undeveloped right-of-way of Palmer Avenue between 26th Street and intersection of Blake Avenue. The site is primarily vacant and zoned RT Residential Transitional (excluding the portion zoned RH Residential High- Density circled in yellow) and is nestled between established residential neighborhoods and commercial developments.



Vicinity and Zoning Map

A similar, yet different development proposal including 79 multi-family units in 10 buildings as outlined in Planning Item 08-17 was approved by City Council on February 1, 2018. The total increase in the number of bedrooms is six with 38 units being one bedroom and 62 offered as two-bedroom units. Site layout related to building locations and

parking between the two proposals is different due to the reduced number of buildings (10 to six). The new proposal relies on the City's new parking standards/reductions resulting in less surface parking yet exceeds the amount required by 12 spaces. Related traffic impacts between the two proposals are similar as are the proposed offsite traffic mitigation measures/improvements. Application materials include a site plan, floor plans, elevations, landscaping plan, grading plan, and related reports which are attached for your review.

Existing southeast view (photo credit: Google Maps)

Existing southwest view (photo credit: Google Maps)

Development Standards

Section 070.020.080 outlines the RH zone district dimensional standards (height, setbacks, lot area) for the site and project. Development details related to site layout, building design, parking, landscaping, and other specifics within much of the City are subject to Section 070.040 of the Code. Staff provides an overview of the various applicable standards below.

Landscaping and Open Space

Section 070.020.080 requires multi-family developments provide a minimum of 20 percent of the

area of the limits of disturbance as landscaping (requiring 37,631 square feet), whereas Sections 070.040.050(c) and 070.040.060(h)(6) provides details as the required amount of various plant types and their locations (screening, interior to parking lots (requiring 1,360 square feet), adjacent to access streets, etc.). Staff has determined that the required number of shrubs and perennials outlined in Table 040.5 of the Code is quite excessive. Therefore, a Code text amendment is recommended by staff separate from and unrelated to the current proposals.

Additionally, Section 070.040.040(c) of the Code requires residential developments provide 20 percent of the development site as common open space. The proposal provides 72,026 square feet, or 38 percent, of the site as common open space including both passive (outdoor gathering spaces, an indoor community room, geologic hazard debris flow area, stormwater retention area, undeveloped portions of the property, landscaping discussed above) and active recreational areas (tot lot play area).

Off Street Parking and Loading

Section 070.030.020(e)/Table 030.1 Table of Allowed Uses outlines 1.5 spaces per multi-family dwelling unit (regardless of size) and one guest space per five dwelling units requiring 170 total spaces for the current proposal, or 1.7 per unit. TDW is requesting a 20 percent reduction in the number of required spaces per Section 070.040.060(e) (which allows for a cumulative maximum 30 percent reduction by the Community Development Director per various factors) based on the site's proximity to transit (27th Street Station park and ride owned/operated by the Roaring Fork Transportation Authority) which reduces said minimum to 136 spaces parking spaces/1.36 per unit. The Code also allows for compact spaces to account for 20 percent of the required number of spaces.

Site Layout and Building Design

Section 070.040.080 of the Code outlines design specifics related to lot coverage, site building/parking orientation, architectural design and elements provided, and façade articulation. Section 070.040.080(d)(2)a.2 requires multi-family developments to internalize parking lots placing them away from street frontages. As depicted on the overall site plan at left, Buildings A and B are located behind parking lots located at the intersection of Blake and Palmer Avenues.

Section 70.040.080(e)(3) requires developments encompassing three acres or more to incorporate at least two housing types (i.e. single-family homes, townhomes, apartment, etc.), however, the proposal only includes multi-family apartments. Adherence to these regulations is constrained by the varying topography at the site. Therefore, TDW is requesting variances related thereto as outlined below.

East elevation-Building C
(representative of facades facing Palmer Avenue for Buildings D and E)

Architectural variety and four-sided design are required for all multi-family development in the City. As depicted in the elevations below, the applicant provides numerous elements which help articulate the buildings such as variations in color, materials, texture, roof forms. Additionally, the design provides changes in in wall planes, prominent entries, and windows on all sides.

North and South elevations -Building C

West elevation-Building C

Traffic Study

TDW updated the traffic impact analysis, completed by McDowell Engineering, LLC for the former development proposal in order to forecast and analyze the impacts of traffic volumes associated with the project on surrounding streets and intersections. The project is anticipated to add 489 vehicle trips per day on an average weekday. Weekday AM peak hour traffic is expected to generate 30 vehicle trips as PM peak hour traffic is expected to generate 38 vehicle trips.

The vast majority of impacts are expected at the intersections of 27th Street and Highway 82 and Blake Street and Highway 82. Access permits with the Colorado Department of Transportation were required for the former proposal (due to an increase in traffic volume of twenty percent or more), and an update will be required for the new, current proposal. However, significant intersection improvements were not required by CDOT nor City Council previously, and none are expected with the current proposal. Following approval of the development proposal, if applicable, the City wishes to further discuss circulation options with citizens in the greater neighborhood to determine various implementation options.

Geological/Debris Flow Hazards

The project is subject to several geologic hazards such as debris flow, rockfall, and hydrocompactive soils. The debris flow hazard is associated with a special flood hazard zone and has been reviewed extensively by reports provided by the applicant and reviewed by the Engineering Department. The site layout and drainage infrastructure provide/accommodate for the hazard. Other hazards, such as hydrocompactive soils and rockfall were also taking into consideration.

Rezoning and Related Approval Criteria

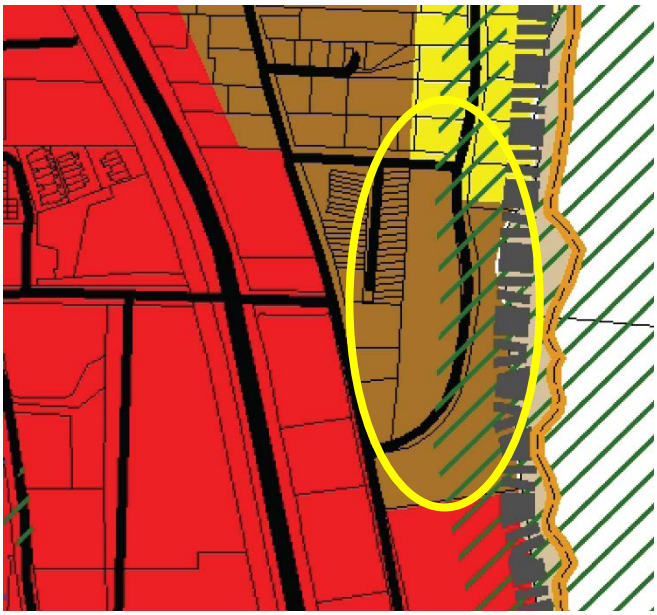
As mentioned above, the vast majority of the site is zoned RT -Residential Transitional. However, the parcel located at 2710 Blake Avenue (PIN: 2185-211-00-002), which is the location of an existing triplex, is currently zoned RH-Residential High Density. To maintain consistency, the applicant proposed to rezone the parcel to RT.

Section 070.060.040(a)(3)f.3 outlines the criteria for the review and approval of a Rezoning

application. Said criteria are provided in ***bold italics*** below. Other language is provided by staff.

In reviewing a proposed rezoning, the Planning Commission and City Council shall consider whether:

i. The rezoning is consistent with the City's comprehensive plan and the purpose of this Code;



As shown at right, *Map 2.2 Future Land Use – Central Portion of the City of the Glenwood Springs* of the Comprehensive Plan (Comp Plan) identifies the area as "Multi-family Residential" in brown and "Hillside Preservation" with green hatching. According to the Comp Plan, the "Multi-family Residential" designation "… *accommodates multifamily structures of 3 units or greater. Home occupations, assisted living facilities, institutional uses such as churches, schools, public building, parks and trails are allowed uses."* "Hillside Preservation" are areas of "…*defined by prominent ridge lines, steep slopes, varied unstable geologic conditions, rock outcroppings, and extensive vegetation*". This includes slopes which are equal to or greater than 20 percent where development requires special care or is discouraged. It is important to note that the Comprehensive Plan's map is an inexact measurement of slope. The new Development Code requires identification of the Limits of Disturbance (LOD) and an exact measurement of the average slope within the LOD. With that, TDW verified that the average slopes within the limits of disturbance of this development are less than 20 percent.

Numerous community goals and related objectives and strategies are outlined in the Executive Summary and subsequent chapters of the Comp Plan which are summarized in the following table.

Comprehensive Plan Goal Supported	**Objective and Strategies**
Promote long-term, sustainable, diverse, economic development	-Direct development into a compact form: infill and redevelopment (Chapter 3, Page 34)
Staff Comment: The objective/strategy outlined above are supported by the current application as it includes infill development/redevelopment.	
Preserve small town character while maintaining the livability of Glenwood Springs and increasing the vibrancy and commercial success of the downtown	-Develop according to the vision (Chapter 4, Page 34) -Direct development into a compact form: infill and redevelopment (Chapter 3, Page

	34) -Enhance pedestrian–friendliness while facilitating traffic (Chapter 3, Page 36) -Direct growth inward (Chapter 9, Page 102)
Staff Comment: Infill, as proposed, makes improvements more cost effective. The design of the project is in character with surrounding the site area and aligns with zone district purpose.	
Address transportation and provide multiple convenient travel choices	-Direct development into a compact form: infill and redevelopment (Chapter 3, Page 34) -Encourage reduction of single occupant vehicles and encourage alternate travel modes through land use planning and community design (Chapter 5, Page 66)
Staff Comment: Dense infill, as proposed, is a land use strategy used to address transportation issues per the Comp Plan which also encourages the use of public transportation to reduce single occupancy vehicle use.	
Direct development to locations and building forms that are cost effective to serve	-Direct development into a compact form: infill and redevelopment (Chapter 3, Page 34) -Direct growth to areas where utilities and services can be provided efficiently (Chapter 7, Page 82) -Direct growth inward (Chapter 9, Page 102)
Staff Comment: Infill/redevelopment, as proposed, makes improvements more cost effective. Therefore, the objectives/strategies associated with the project support the Comp Plan goal.	
Provide housing opportunities for the entire community	-Direct development into a compact form: infill and redevelopment (Chapter 3, Page 34) -Require good design for mixed-use and higher density project (Chapter 6, Page 78)
Staff Comment: Infill/redevelopment, as proposed, makes improvements more cost effective while providing a nice aesthetic. Therefore, the objectives/strategies associated with the project support the Comp Plan goal.	
Support social diversity	-Direct development into a compact form: infill and redevelopment (Chapter 3, Page 34) -Require good design for mixed-use and higher density projects (Chapter 6, Page 78) -Direct growth inward (Chapter 9, Page 102)
Staff Comment: Dense infill, as proposed, is a land use strategy to address transportation issues per the Comp Plan which encourage the use of public transportation and reduce single occupancy vehicle use. Infill/development allows for easier access to goods/services for the entire community.	

ii. The rezoning is consistent with the proposed purpose statement of the proposed zoning district;

The rezoning is consistent with the transition between residential and commercial uses which exist in the area as described in the purpose statement for the RT zone district located in Section 070.020.080(a) of the Code.

iii. Substantial changes in the subject area warrant a zoning change; and/or

The current development proposal is a substantial change/consideration which warrants the rezoning of the parcel and prevents the existence of a split zoning classification of the development site.

iv. The intensity of development in the new zoning district is not expected to create significantly adverse impacts to surrounding properties or the neighborhood.

Intensity of development in the area proposed for rezoning is expected to decrease with the current proposal as it replaces an existing triplex with a stormwater detention area for the larger site. Comparatively, the RH is a more intense zone district than the RT in terms of residential minimum and per unit area requirements as outlined in Table 020.2 and highlighted below. That being said, while not associated with the current proposal, the RT zone district does allow for some uses, , not permitted in the RH zone such as a club or lounge (by special use), community centered board facility, hospital or medical clinic, bar (by special use), restaurant (by special use), hotel (by special use), printing establish (by special use), personal services (some by special use), retail (some by special use) parking (by special use),and a geothermal heat exchange.

Table 020.2: Summary of Residential Dimensional Standards

	RR	RL	RM1	RM2	RH	RT
Lot Standards, Minimum						
Lot area	40,000 sf	20,000 sf	6,000 sf	--	--	--
Lot area, lots created prior to March 1, 1965			5,000 sf			
Lot area, single-family detached	--	--	--	5,000 sf	4,500 sf	5,000 sf
Lot area, attached dwellings sharing common wall	--	--	7,500 sf	2,500 sf/unit	2,250 sf/unit	2,500 sf/unit
Landscaped area (for multifamily dwellings)	--	--	--	20 percent	20 percent	20 percent
Setbacks, Minimum						
Front (from arterial streets)	50 feet	50 feet	30 feet	30 feet	15 feet	15 feet
Front (from other streets)	25 feet	25 feet	20 feet	20 feet	10 feet	10 feet
Side	10 feet	10 feet[1]	5 feet	5 feet[2]	5 feet[2]	5 feet[2]
Rear	25 feet	25 feet	15 feet	10 feet	10 feet	10 feet
Building Standards, Maximum						
Building height	27 feet	27 feet	27 feet	27 feet	40 feet	40 feet

Variance Approval Criteria

As addressed above, TDW is requesting two variances related to site layout standards: parking lot location relative to intersections and providing numerous housing types.. Variance requests must adhere to the approval criteria outlined in Section 070.060.070(a)(3)e.2 of the Code and as included in ***bold italics*** below. Other language is provided by staff.

i. The subject property has an exceptional shape, topography, building configuration or other exceptional site condition that is not a general condition throughout the zone district;

The varying topography (15.5 percent within the limits of disturbance), elongated shape, debris flow and curvilinear right-of-way bisecting the subject property are exceptional site conditions. However, it is not possible to compare these conditions throughout the zone district as the site makes up the entirety. That being said, these conditions are not a general condition in the surrounding area.

ii. The strict application of the Code standards for which a variance is sought would produce undue hardship;

The exceptional conditions outlined above create difficulty in developing the site in manner intended by the RT zone district. Strictly adhering to the Code standards (parking lot location and multiple housing types) creates undue hardship not allowing the applicant to utilize the topography in the building design nor develop the site along the exiting right-of-way.

iii. The applicant did not create the hardship by his/her own actions;

The existing topography, shape, and debris flow/flood zone are not hardships created by the applicant.

iv. The variance requested does not harm the public and does not impair the intent or purposes of this Code, goals, and policies, including the specific regulation for which the variance is sought;

The proposal is consistent with the general purpose and intent of the Code regarding guarding against natural hazards, efficient development, compatible design, and addressing impacts.

v. The variance request demonstrates exceptional hardship not related to purposes of convenience or financial burden;

As outlined above the exceptional hardship is not related to convenience nor financial burden and is required to allow development of the site in the manner intended by the RT zone district.

vi. The variance request will not violate building or fire code requirements; and

The request does not create a building nor fire code violation.

vii. The variance is the minimum variance that will afford relief of the subject standards of the Code.

This variance request is the minimum required to allow for construction on the subject parcel as intended by the RT zone district.

Site/Architectural Plan Review Approval Criteria

A Major Site/Architectural Plan Review application must adhere to the approval criteria outlined in Section 070.060.050(6) of the Code and as included in ***bold italics*** below. Other language is provided by staff.

a. The site/architectural plan is consistent with the general purpose and intent of this Code;

As mentioned above, the proposal is consistent with the general purpose and intent of the Code regarding guarding against natural hazards, efficient development, compatible design, and addressing impacts.

b. The site/architectural plan is consistent with the dimensional, design, development, and all other standards of this Code;

As outlined above, staff found that the proposal is consistent with the dimensional, design, development, and all other standards of the Code exclusive of the variance requests discussed herein.

c. The site/architectural plan is consistent with any previously approved plat, PUD, or any other precedent land use approval; and

As outlined above, staff found that the proposal is consistent with the dimensional, design, development, and all other standards of the Code exclusive of the variance requests discussed herein.

d. The site/architectural plan is consistent with the Comprehensive Plan and other adopted City policies and plans.

As addressed in detail above, the current proposal is in compliance with the *Future Land Use* map designations and descriptions and goals and objectives of the Comp Plan.

Reviewing Agency Comments

An overview of comments received from referral agencies is provided below. Said comments are also attached.

Fire Department - Comments received discuss the need to eliminate the construction of a fire apparatus road longer than 150 feet without a turnaround.

Engineering - Comments received outline procedures for exceptions related to the proposed Palmer Avenue extension, request to increase the width of the single sidewalk along said extension, clarification from CDOT regarding applicable traffic mitigation, site acreage, soil type outlined in the drainage report, proposed contours, and necessary revisions to debris flow analysis and other plans needed prior to development.

Parks and Recreation – Comments received outline the need for the applicant to submit a full landscaping and irrigation plan.

Public Works - Comments received outline numerous revisions/clarifications required for the civil plan set related to the fire hydrant location and specifications, storm sewer connections, water/sewer line locations/sizes/specifications, debris flow mitigation, and personnel contact information.

ACTION ALTERNATIVES AND STAFF RECOMMENDATION:

Section 070.060.030(g)(1)d outlines the review and decision procedures for applications being considered by the Commission and/or City Council stating, "[T]he applicable review body shall **approve, approve with conditions, or deny** the application **based on the applicable approval criteria** listed in the application-specific procedures. The body may also **continue** the hearing…"

Action 1 – Variance – from Section 070.040.080(d)(3)a.2 of the *Glenwood Springs Municipal Code* requiring internalized parking located away from street frontages.

Staff Recommendation/Suggested Motion
Staff recommends **approval** of the Variance with the following findings:

Recommended Findings:
1. The subject property has an exceptional shape, topography, and soil conditions that are not general conditions throughout the RT-residential transitional zone district or vicinity;
2. The strict application of the Code standards for which the variance is sought produce undue hardship;
3. The applicant did not create the hardship by his/her own actions;
4. The variance requested does not harm the public and does not impair the intent or purposes of this Code, goals, and policies, including the specific regulation for which the variance is sought;
5. The variance request demonstrates exceptional hardship not related to purposes of convenience or financial burden;
6. The variance request does not violate building or fire code requirements; and
7. The variance is the minimum variance that will afford relief of the subject standards of the Code.

Action 2 – Variance – from Section 70.040.080(e)(3) the *Glenwood Springs Municipal Code* requiring developments encompassing three acres to provide at least two housing types.

Staff Recommendation/Suggested Motion
Staff recommends **approval** of the Variance with the following findings:

Recommended Findings:
1. The subject property has an exceptional shape, topography, and soil conditions that are not general conditions throughout the RT-residential transitional zone district or vicinity;
2. The strict application of the Code standards for which the variance is sought produce undue hardship;
3. The applicant did not create the hardship by his/her own actions;

4. The variance requested does not harm the public and does not impair the intent or purposes of this Code, goals, and policies, including the specific regulation for which the variance is sought;
5. The variance request demonstrates exceptional hardship not related to purposes of convenience or financial burden;
6. The variance request does not violate building or fire code requirements; and
7. The variance is the minimum variance that will afford relief of the subject standards of the Code.

Action 3 – Rezoning – of 2710 Blake Avenue (PIN: 2185-211-00-002) from RH Residential High-Density to RT Residential Transitional.

Staff Recommendation/Suggested Motion
Staff recommends **approval (with conditions)** of the Rezoning request with the following **findings** and **conditions**:

Recommended Findings:
1. The rezoning is consistent with the City's comprehensive plan and the purpose of this Code;
2. The rezoning is consistent with the proposed purpose statement of the RT- Residential Transitional zone district;
3. Substantial changes in the subject area warrant a zoning change; and/or
4. The intensity of development in the new zoning district is not expected to create significantly adverse impacts to surrounding properties or the neighborhood.

Action 4 – Major Site/Architectural Plan Review – to allow for the construction of a 89-unit multi-family apartment building.

Staff Recommendation/Suggested Motion
Staff recommends **approval (with conditions)** of the Major Site/Architectural Plan Review with the following **findings** and **conditions**:

Recommended Findings:
1. The site/architectural plan is consistent with the general purpose and intent of the Code;
2. The site/architectural plan is consistent with the dimensional, design, development, and all other standards of this Code;
3. The site/architectural plan is not in conflict with precedent land use approvals; and
4. The site/architectural plan is substantially consistent with the Comprehensive Plan and other adopted City policies and plans.

Recommended Conditions:
1. The applicant shall comply with/address all City staff comments related to specific Code requirements prior to approval of a Construction Plans application.
2. The development shall comply with the requirements of the Code except where specific variances have been granted. Any future physical changes or improvements to the property or buildings on the parcel are subject to the review and approval of the Community Development Director for compliance with applicable requirements of the Glenwood Springs Municipal

Code.

3. The applicant shall comply with all verbal representations made in the public hearings, as outlined in all application materials, and/or as revised per conditions herein and approved by the Community Development Director.
4. Prior to submitting a building or grading permit application, the applicant shall
   a. Submit a Construction Plans application in accordance with Municipal Code section 070.060.050(c).
   b. Enter into a development agreement with the City which shall be recorded with the Garfield County Clerk and Recorder.
   c. Submit an engineer's estimate of all public improvement and submit a financial security for any required improvement not yet completed.
   d. Schedule a pre-construction meeting with applicable City departments.
   e. Submit combination of lots plat for the three subject parcels
   f. Submit a landscaping plan in compliance with applicable regulations at that time.
5. Prior to approval of a Construction Plans application, the applicant shall amend and obtain approval of CDOT access permits, as required.

TRIUMPH

Triumph Development
www.triumphdev.com

March 3, 2020
(Revised April 16, 2020)

Bell Rippy Apartments - Project Narrative
Major Site/Architectural Plan Review with Variances & Rezoning

Development Team

Owner:
Bell Rippy Glenwood, LLC
c/o Stephanie Copeland, Four Points Funding
stephanie@fourpointsfunding.com
303.522.6655

Owners Representative:
Triumph Development West, LLC
Michael O'Connor
michael@triumphdev.com
970.688.5057

Architect:
Triumph Development West, LLC
Michael Foster
mikef@triumphdev.com
303.475.4413

Civil Design:
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The Property

The subject property is located at the south end of the Oakhurst Subdivision, just to the north of Walmart and east of the RFTA bus station at 27th Street. The property is bounded by Blake Street to the west and 26th Street the north. The unimproved portion of the Palmer Avenue right-of-way runs through the middle of the site. The subject property consists of three total parcels – the remaining un-subdivided portion of the Block 1 of the Oakhurst Subdivision First Filing, Block 3 of the Oakhurst Subdivision First Filing, and the parcel with the address 2710 Blake Avenue.

Block 1 and Block 3 include 5.51 acres that are currently undeveloped and zoned Residential Transitional District (RT). 2710 Blake is 0.23 acres currently improved with a triplex and zoned Residential High-Density District (RH).

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The Development

With close-proximity to the RFTA bus station and nearby commercial amenities, the new development will be a transit-oriented rental community targeted towards housing for the local workforce as allowed by the current zoning on all three properties. The plan proposes to remove the existing triplex which is the only vertical improvement to the property, and construct 100 new garden apartments in six total buildings. The development will include an onsite management office, indoor community room, outdoor community space, as well as the surface parking required by the City's Municipal Code. The development will also complete the construction of Palmer Avenue through the site, and will also include uphill debris flow fencing and drainage channels for protection of this new community as well as the Oakhurst Townhomes to the west of the site. The proposed mix of units includes 38 one-bedroom units and 62 two-bedroom units. The one-bedroom units are approximately 630 square feet. The two-bedroom units are approximately 945 square feet. All of the apartments will be owned by a single ownership entity, rented on monthly basis, and managed via an onsite management office.

The applicant believes the proposed plan represents a meaningful improvement to the currently approved development plan for the site. While the unit count has increased from 79 to 100 units, the plan has added another parcel to development site with the addition of 2710 Blake. The new plan has also added many more one-bedroom units into the unit mix to better serve a range of households (the prior plan was almost entirely two bedrooms). The plan has only added 6 more bedrooms to the development (from 162 bedrooms vs 156 bedrooms in the prior plan). In additional the development has been consolidated from ten buildings into just six buildings.

Palmer Avenue and Building Access

One of the primary drivers of the overall site plan is the location and grades of the existing Palmer Avenue right-of-way. This new road will be constructed in the existing 50-foot right-of-way that bisects the property. Due to the maximum grades allowed by the City's Engineering Standards, improving the Palmer Avenue right-of-way requires that grade be dropped as much as 10 feet in areas. The significance of this cut, along with the applicant's desire to minimize impacts on surrounding uphill open space, has led to many of the applicant's proposed layout and each of the zoning variances discussed below. All buildings will be accessed from the new extension of Palmer Avenue, and are located on the lower portion of the site. Palmer Avenue will be built to the requirements of the Engineering Standards, but will maximize the allowable grades. On the uphill side of Palmer Avenue, the applicant plans to build landscaped retaining walls, that will minimize the amount of uphill disturbance and preserve as much native vegetation as possible. Sidewalks will be located in convenient locations for the residents and provide easy pedestrian access through the neighborhood and down to the RFTA bus station. The proposed plan does not include sidewalks on the uphill, east

side of the new Palmer Avenue as this would further increase the size of the retaining walls and uphill disturbance.

Overview of Building Design

The buildings are designed and located to work with the natural grade of the site, with a garden level apartment on the downhill side of each building, and a ground-floor unit walking out to grade on the uphill side of the building. There is storage for residents in the basement behind the garden level apartments. The buildings are each three stories on the downhill side of the building, and three stories on the uphill side of the building, with all units accessed from a central stair tower. The orientation of the buildings and parking lots has been carefully laid out to work with existing grade as much as possible, and the buildings help serves as natural retaining of the site. The buildings are oriented toward the street and parking lots.

The buildings are planned to be constructed as wood-framed structures. The site's varying soil conditions will be evaluated at each building location prior to construction, with the anticipation that there will be some need for foundation systems that deal with expansive or settling soils as recommended by the geotechnical engineer. There are three different building types spread across the six total buildings. The exterior of the buildings will be a combination of cementitious siding with stucco accents and base. The cementitious siding will be a combination of horizontal and vertical to differentiate and provide visual interest to the design. The pitched roof will be constructed with asphalt shingles and will include gabled sections that provide further visual interest. The color pallet will consist of two different, but complimentary, schemes with natural colors that are spread through the neighborhood to create a variation in the outward appearance of the six buildings.

Amenities

The proposed plan includes the following onsite amenities: an onsite management office, and indoor community room, conveniently located dumpsters and two outdoor gathering spaces and kids park.

Landscape

All landscape planting will meet the minimum size as required by Municipal Code. A comprehensive and consistent landscape solution is proposed across the entire property with the following highlights: Trees and shrubs are located around the buildings to accent the structures. Parking lots are screened with trees and shrubs to neighboring homes. Parking areas have required landscape islands with trees and shrubs. All buildings are surrounded with a mulch bed to keep planned grass areas away from the

structures to avoid adding irrigation water to the soils under the buildings. All remaining areas on the site not to be paved, built upon, or mulched will receive revegetation with native grasses which will include temporary irrigation until adequate regrowth. All landscape plantings will have one comprehensive permanent drip irrigation system installed and maintained by the apartment complex management.

Site Lighting

To maintain the residential character of the proposed development, we are proposing a consistent lighting package across the property that is in context with the surrounding neighborhood. Exterior lights will be a combination of wall-mounted, timer-controlled sconces at each ground floor building entrance; as well as a limited number of street lights and bollards strategically located in parking lots and internal paths without close proximity to a building. All lights will be Dark Sky Compliant.

Rezoning of 2710 Blake Avenue

The applicant is the owner of all parcels that are the subject of this application. In order to create one cohesive development plan with one consistent set of zoning requirements, the applicant proposes to rezone the smaller 0.23-acre 2710 Blake parcel to be consistent with the larger 5.5-acre site. This parcel will eventually be combined with the adjacent Block 3 parcel through a Minor Subdivision.

From a zoning standpoint, this rezoning will result in very few changes to the site's zoning characteristics. Setbacks, building height, lot coverage, landscape area and parking requirements will all remain the same with the new RT District zoning. The one change to the rezoning will be a small decrease in the number of units permitted for the rezoned lot – 1 unit per 2,250 square feet of site area under the RH District would be changed to 1 unit per 2500 square feet of site area in the RT District.

There are several review criteria for consideration for this rezoning by the Planning & Zoning Commission and City Council that are each discussed below.

1. *The rezoning is consistent with the City's comprehensive plan and the purpose of this Code;*

The 2011 Glenwood Springs Comprehensive Plan calls for Multifamily Residential at this location. The proposed new RT District zoning for 2710 Blake Avenue is consistent with this Comprehensive Plan

2. *The rezoning is consistent with the proposed purpose statement of the proposed zoning district;*

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This proposed development is consistent with both the current RH District Zoning and the proposed RT District Zoning. The rezoning will clean up difference in zoning for a lot with common ownership that will be developed as one community.

3. *Substantial changes in the subject area warrant a zoning change; and/or*

All the properties subject to this application are adjacent and have just recently come into common ownership.

4. *The intensity of development in the new zoning district is not expected to create significantly adverse impacts to surrounding properties or the neighborhood*

There is no increase in the intensity of development that results from this rezoning. Rezoning 2710 Blake to the RT District represents a slight decrease in the permitted number of units with no changes to the other major zoning standards.

Overview of Zoning Criteria

The goal for the proposed housing development is to meet each of the requirements for development in the RT District. A summary of each of the development requirements is outlined below:

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Bell Rippy Apartments - Zoning Summary for Residential Transitional (RT) District						
Lot Area	2700 Palmer	5.51	acres			
	2710 Blake	0.23	acres			
	Total	5.74	acres			
Zoning Criteria		**Code**			**Proposed Plan**	
Use		Permitted Use			Dwelling, multifamily	
Density	Lot SF/Unit	2,500				
	Total Permitted Units	100	units		100	units
Setbacks	Front (Non-Arterial)	10	feet		10+	feet
	Side	5	feet		5+	feet
	Rear	10	feet		10+	feet
Height		40	feet		40	feet
Lot Coverage	Allowed	50%				
	Square Feet	120,008	sf		31,630	sf
Landscape Area	Minimum Required	20%				
	Square Feet	48,003	sf		122,540	sf
Parking	Resident Parking (per DU)	1.5	150			
	Guest Parking (per DU)	0.2	20			
	Subtotal		170			
	Transit Proximity Discount	20%	(34)			
	Total		136		148	spaces

Parking

The proposed parking plan for the development meets each of the requirements of the Town Code for parking. With the goal of keeping development costs and corresponding rents lower, the plan includes several surface parking lots for the neighborhood. With immediate proximity to the RFTA station, and apartments that are targeted to residents who use public transit, the development plan looks to take

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advantage of the 20% parking discount for proximity to transit as allowed in the City's Development Standards for properties within 750 feet of public transit. The development will provide 148 parking spaces, exceeding the amount required by code by 12 spaces. All resident parking spaces will be numbered and assigned via a lease. Guest parking will be monitored by management to ensure that it is not improperly used by residents.

Traffic and Transportation

The applicant is proposing to replicate the traffic management solutions approved in the prior plan – including the one-way configuration of Blake Avenue, the offsite improvements required in the prior application, and opening the Blake Street gate. As the project is only introducing 6 more bedrooms, and decreasing the number of parking spaces in the plan by 25 spaces, the change to the traffic impacts from this new version of the apartment community will be very minor when compared to the currently approved plan and CDOT Access Permit. An updated letter from our traffic engineer, McDowell Engineering, is included as part of this application.

Construction Phasing

The applicant intends to construct the development in one continuous construction that begins with the necessary relocation of the existing utilities in Palmer Avenue, followed by the sequential construction of Palmer Avenue and the apartment community over approximately 18 months. The applicant anticipates receiving a certificate of occupancy and occupying some buildings that are completed first, while the remaining buildings on the site may still be under construction.

Variances from Municipal Code

Despite meeting most of the development criteria required by the zone, the application is seeking four variances from the Municipal Code and Engineering Standards – each having to do with the steepness of the natural grade of the site, the location of a flood zone impacting the site, and requirement to construct Palmer Ave. This represents a substantial reduction from the six variances approved in the current approvals for the site. Variance #1 "Variety of Housing Types" is a planning variance for consideration by Planning & Zoning Commission. Variance #2 "Sidewalks on Both Sides of the Street" and Variance #3 "Grades at Driveway, Parking Lot and Intersection Approach" are technical variances for review by the City's Public Works Department. The final Variance #4 relates to locating buildings in proximity to city streets.

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Design Variance #1 – Variety of Housing Types

Section 070.040.080(e)(3) of the Municipal Code states:

"Variety of Housing Types. Development parcels encompassing more than three (3) acres shall incorporate a minimum of two (2) housing types…The following housing types may be used to satisfy these standards:

a. *Detached single-family dwellings;*
b. *Accessory dwelling units;*
c. *Two family dwelling units;*
d. *Single-family townhouse dwellings;*
e. *Multi-family dwellings other than two-family or townhouse dwellings"*

The applicant is requesting a variance from this section of the Code due the unique site constraints of the 5.7-acre parcel as outlined below. Each of the seven criteria for a variance are discussed in detail. Please note that this same variance was requested and approved as part of the currently approved development plan for the site.

1. *The subject property has an exceptional shape, topography, building configuration or other exceptional site condition that is not a general condition throughout the zone district;*

The site's steep topography, the designated flood zone on the north side of the site, and the applicant's desire to concentrate development and minimize the uphill limits of disturbance are all factors leading to the proposed development with only multifamily rental units that are so badly needed in Glenwood Springs. In addition, the requirement to construct Palmer Avenue to meet City's Engineering Standards requires a significant drop in grade, which makes spreading out development around the site difficult and would require design solutions that run counter to many of the goals of the town for transit-oriented development and development that works with existing site conditions rather than building large retaining walls.

A development plan that minimizes the areas of disturbance and concentrates development into a smaller footprint will create housing that is needed and will leave a larger portion of the uphill, visible hillside intact.

In an attempt to meet the intensions of the code, the applicant has varied the size of buildings throughout the development with three different building sizes, and provided a greater variety of unit types than are currently approved for the site in order to serve different households of different sizes.

2. *The strict application of the Code standards for which a variance is sought would produce undue hardship;*

A strict application of the code would create undue hardship. In order to introduce other, less-dense housing types, the development plan would need to have a larger development footprint and locate units on the much steeper portions of the site, either on the uphill side of Palmer Avenue or in the designate flood area at the north side of the site. Both of these factors make development in these areas impractical and would require substantial and unattractive retaining walls and flood protection structures.

3. *The applicant did not create the hardship by his/her own actions;*

Neither of the site constraints discussed above, the location of the Palmer Avenue right-of-way, nor the Engineering Standards that dictate the construction of Palmer Avenue were caused by the applicant.

4. *The variance requested does not harm the public and does not impair the intent or purposes of this Code, goals, and policies, including the specific regulation for which the variance is sought;*

There is no harm to the public good resulting from this variance. The surrounding neighborhood already contains a mix of complimentary uses including townhomes to the development's west and single-family homes to the north. Instead, the proposed plan meets the intent of the Residential "Transitional" zone and creates a complimentary and more affordable housing type at an infill location close to transit.

5. *The variance request demonstrates exceptional hardship not related to purposes of convenience or financial burden;*

The exceptional hardship discussed above is not a matter of convenience or financial burden to the applicant. Instead, it is a factor of creating a development plan that meets the requirements of the Engineering Standards and minimizes the area of disturbance to the more visible, uphill areas of the site. In addition, it will minimize the need for even more substantial retaining walls along Palmer Avenue and other areas around the site that would be required to create more buildable areas for other housing types.

6. *The variance request will not violate building or fire code requirements;*

There is no impact on the building or fire code related to this variance request.

7. *The variance is the minimum variance that will afford relief of the subject standards of the Code.*

This variance request is asking for a deviation from the two housing types required by the Code to only one type of housing. This is the minimum deviation.

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Engineering Variance # 2 – Sidewalks on Both Sides of the Street

Section 070.040.070(f)(1)(a)(2) of the Municipal Code states:

"Sidewalks shall be installed on both sides of all arterials, collector streets, and local streets (including loop streets and cul-de-sac), and within and along the frontage of all new development and redevelopment."

The applicant is requesting a variance from this section of the code due to the unique site constraints as outlined below. Each of the seven criteria for a variance are discussed in detail. Please note that this same variance was requested and approved as part of the currently approved development plan for the site.

1. *The subject property has an exceptional shape, topography, building configuration or other exceptional site condition that is not a general condition throughout the zone district;*

This request is a direct result of the steep slopes of this site and the need to drop the grade of Palmer Avenue in the existing right-of-way.

2. *The strict application of the Code standards for which a variance is sought would produce undue hardship;*

The above discussed site conditions make installing a sidewalk on both sides of the street an undue hardship and unnecessary. Sidewalks are proposed in proximity to all buildings and will provide safe and convenient pedestrian access throughout the neighborhood and down to the RFTA station. The ten-foot total dimensions for a sidewalk and planting strip along the section of Palmer Avenue above and to the north of Building C would require an even more substantial retaining wall and much more site disturbance for a sidewalk that does not provide any meaningful pedestrian connectivity.

3. *The applicant did not create the hardship by his/her own actions;*

Neither of the site constraints discussed above, the location of the Palmer Avenue right-of-way, nor the Engineering Standards that dictate the construction of Palmer Avenue were caused by the applicant.

4. *The variance requested does not harm the public and does not impair the intent or purposes of this Code, goals, and policies, including the specific regulation for which the variance is sought;*

There is no harm to the public good by this request. The applicant will still construct new, safe pedestrian circulation via public sidewalks in the right-of-way and internal paths that provide convenient pedestrian circulation in all areas that will be traveled by the residents and neighbors.

5. *The variance request demonstrates exceptional hardship not related to purposes of convenience or financial burden;*

The exceptional hardship discussed above is not a matter of convenience or financial burden to the applicant. Instead, it is a factor of creating a development plan that meets the requirements of the Engineering Standards for a neighborhood street and minimizes the area of disturbance to the more visible, uphill areas of the site. In addition, it will minimize the need for more substantial retaining walls along Palmer Avenue that are discourage by the Municipal Code.

6. *The variance request will not violate building or fire code requirements;*

There is no impact on the building or fire code related to this variance request.

7. *The variance is the minimum variance that will afford relief of the subject standards of the Code.*

The proposed road grades have been optimized to Engineering Standards. The applicant is only asking for a variance in the areas where sidewalks would not be used by the residents and the neighboring public.

Engineering Variance #3 – Grades at Driveway, Parking Lot and Intersection Approach

Sections 5.2.4.E and 5.2.10.J Glenwood Springs Engineering Design Standards deal with grades for local roads, driveways and parking lots. These Engineering Standards allow local streets to be up to 10% grade, but require driveway and intersections approaches to by 4% within 50’ of an intersection or driveway access. Access grades for parking lots have a maximum of 6% allowed. The applicant is requesting a variance from this section of the Standards due to the unique site constraints as discussed below. Please note that this same variance was requested and approved as part of the currently approved development plan for the site.

1. *The subject property has an exceptional shape, topography, building configuration or other exceptional site condition that is not a general condition throughout the zone district;*

This request is a direct result of the steep slope of this site and the need to drop the grade of Palmer Avenue in the existing right-of-way to meet the requirements of the City’s Engineering Standards.

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2. *The strict application of the Code standards for which a variance is sought would produce undue hardship;*

Due to the steepness of the site and these engineering standards, the grade of the existing Palmer Avenue right-of-way needs to be dropped as much as 10 feet in places to meet the maximum 10% grade allowed by the City. The applicant's development plan is however seeking a variance in a few select areas for the grade of the approaches to intersections and parking lot driveways. The applicant is proposing to maintain a 4% grade within 29 feet of the new intersection at Palmer and Blake, but not the full 50 feet of approach. Likewise, the application is looking to maintain the steeper grade of Palmer Avenue throughout the site, including at the parking lot access drives, but transitioning to the 6% driveway grades quickly. These variances are sought with the intention of meeting the grade requirements for a local street, and providing for a safe condition at the intersection, but not unnecessarily creating further hardship by requiring an even more excessive cut at Palmer Avenue. Without this variance the plan would require approximately another three more feet of cut and retaining.

3. *The applicant did not create the hardship by his/her own actions;*

Neither the steepness of the slope, the location of the Palmer Avenue right-of-way, nor the municipal building requirements that dictate the construction of Palmer Avenue were caused by the applicant.

4. *The variance requested does not harm the public and does not impair the intent or purposes of this Code, goals, and policies, including the specific regulation for which the variance is sought;*

There is no harm to the public good by this request. The applicant will still provide adequate and safe vehicular circulation via a local street that meets the grades allowed by the code.

5. *The variance request demonstrates exceptional hardship not related to purposes of convenience or financial burden;*

The exceptional hardship discussed above is not a matter of convenience or financial burden to the applicant. Instead, it is a factor of creating a development plan that meets the requirements of the Engineering Standards and minimizes the amount of excavation need to build on an unimproved right-of-way that was not constructed at the time it was dedicated. The variance will minimize the area of disturbance and size of retaining walls on the more visible uphill side of the new Palmer Avenue.

6. *The variance request will not violate building or fire code requirements;*

There is no impact on the building or fire code plans for the development related to this variance request. These variances are for Engineering Standards that can be reviewed by the Public Works department.

7. The variance is the minimum variance that will afford relief of the subject standards of the Code.

The proposed road grades have been optimized to the Engineering Standards. The applicant is only asking for a variance at the driveway access and intersections. And at these intersections, a 4% grade is still being provided for safety at the bottom of Palmer Avenue, albeit for 29 feet.

Design Variance #4 – Orienting Building Toward the Street

Section 070.040.080(e)(2)(b) of the Municipal Code states:

"To the maximum extent feasible, the primary entrance and façade of individual buildings within a multi-family development shall be oriented towards:(i) Primary, internal or perimeter streets; or (ii) Common open space, such as interior courtyards, parks, or on-site natural areas or features with a clearly defined and easily accessible pedestrian circulation system."

The applicant believes that it has satisfied the requirements of this section of the code "*to the maximum extend feasible*" – however is requesting a variance from this section of the Code for Buildings A, B and F due the unique site constraints of the 5.7-acre parcel as outlined below. Each of the seven criteria for a variance are discussed in detail. Please note that the proposed site layout is largely consistent with the design of the currently approved plan for the site.

1. The subject property has an exceptional shape, topography, building configuration or other exceptional site condition that is not a general condition throughout the zone district;

The site's relatively steep topography is the primary factors leading to the proposed site plan with Building A and B located away from the street behind the proposed surface parking. Rather than building large retaining walls to construct vehicular circulation and parking areas that need to be flat, the site plan for the community utilizes each buildings' foundation as efficient and attractive site retaining. In the case of Building A and B, this requires placing a parking lot at the front of the site which is slightly more level, and placing buildings behind the parking to work with natural grade and retain the earth for the next tier of parking and buildings. These buildings still face our internal street in the parking lot. And allows for tiered parking as the buildings and parking work up the site.

In the case of Building F, the building cannot be shifted to the north and orient toward 26th Street due to the location of the designated Flood Zone A area in this vicinity that is shown on the civil plans and survey. Instead, the applicant has located this building to the south of this flood zone area to minimize

the risk of flooding. The primary entrance to the building has been located off of an internal courtyard in a location that works well with existing and proposed grade.

2. *The strict application of the Code standards for which a variance is sought would produce undue hardship;*

A strict application of the code would create undue hardship. In order to locate Buildings A, B and F in locations with immediate proximity to the street it would require more substantial retaining walls and as well as a building that is located in a Flood Zone A. Both of these factors make development in these areas impractical and would require substantial and sizeable retaining walls and/or flood protection structures that are discouraged by the municipal code.

3. *The applicant did not create the hardship by his/her own actions;*

Neither of the site constraints discussed above, the location of the Flood Zone or steepness of the site were caused by the applicant. The proposed plan is a thoughtful and efficient layout that addresses these issues.

4. *The variance requested does not harm the public and does not impair the intent or purposes of this Code, goals, and policies, including the specific regulation for which the variance is sought;*

There is no harm to the public good resulting from this variance and the proposed site plan supports many of the other goals of the code that encourages the site plan that is responsive to the site and minimizes negative impacts of development and encourages housing and efficient public transit.

5. *The variance request demonstrates exceptional hardship not related to purposes of convenience or financial burden;*

The exceptional hardship discussed above is not a matter of convenience or financial burden to the applicant. Instead, it is a factor of creating a development plan that minimizes the area of disturbance to the more visible, uphill areas of the site and using attractive buildings for site retaining rather than retaining walls that are 6 feet or more at internal locations to the site.

6. *The variance request will not violate building or fire code requirements;*

There is no impact on the building or fire code related to this variance request.

7. *The variance is the minimum variance that will afford relief of the subject standards of the Code.*

This variance request is only for the two buildings along Blake Ave at the lower, more level part of the site that best facilitates surface parking, and for Building F that needs to avoid the debris flow area.

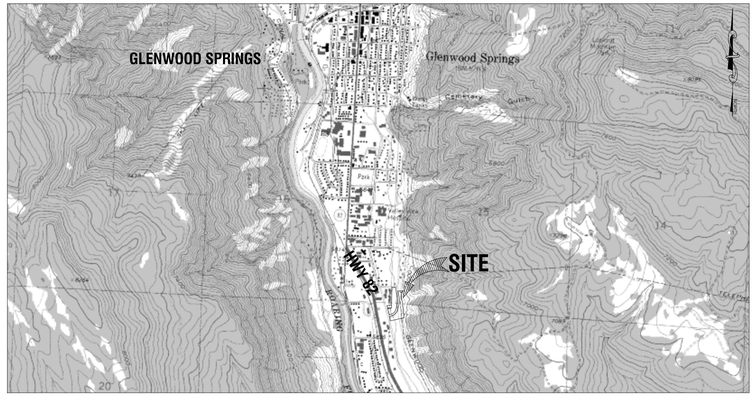
ABBREVIATIONS

APROX	*APPROXIMATE*	GA	*GAUGE*	QTY	*QUANTITY*		
ARCH	*ARCHITECT*	GAL	*GALLON*				
AVG	*AVERAGE*	GALV	*GALVANIZED*	R	*RADIUS*		
		GB	*GRADE BREAK*	RE	*REFERENCE*		
B&B	*BALLED AND BURLAPPED*	GC	*GENERAL CONTRACT(OR)*	REINF	*REINFORCE(D), (ING)*		
BLDG	*BUILDING*	GPM	*GALLON PER MINUTE*	REQ'D	*REQUIRED*		
BM	*BENCHMARK*			REV	*REVISION(S), REVISED*		
BOC	*BACK OF CURB*	HORIZ	*HORIZONTAL*	RIM	*RIM ELEVATION*		
BOV	*BLOW OFF VALVE*	HP	*HIGH POINT*	ROW	*RIGHT-OF-WAY*		
BR	*BOTTOM OF RAMP*	HT	*HEIGHT*	RP	*RADIUS POINT*		
BS	*BOTTOM OF STEP*						
BW	*BOTTOM OF WALL*	ID	*INSIDE DIAMETER*	SAN	*SANITARY*		
		INV	*INVERT ELEVATION*	SCH	*SCHEDULE*		
CAL	*CALIPER*	IN	*INCHES*	SD	*STORM DRAIN*		
CF	*CUBIC FEET*	INCL	*INCLUDE(D)*	SEC	*SECTION*		
CIP	*CAST-IN-PLACE*	IRR	*IRRIGATION*	SF	*SQUARE FOOT (FEET)*		
CJ	*CONTROL JOINT*			SHT	*SHEET*		
CL	*CENTERLINE*	JT	*JOINT(S)*	SIM	*SIMILAR*		
CLR	*CLEAR(ANCE)*			SPECS	*SPECIFICATIONS*		
C/O	*CLEANOUT*	LIN	*LINEAR*	SQ	*SQUARE*		
COMP	*COMPACTED*	LP	*LOW POINT*	STA	*STATION*		
CONC	*CONCRETE*	LT	*LIGHT*	STD	*STANDARD*		
CONT	*CONTINUOUS*			STL	*STEEL*		
CONTR	*CONTRACTOR*	MATL	*MATERIAL*	STRUCT	*STRUCTURAL*		
CU	*CUBIC*	MAX	*MAXIMUM*	SYM	*SYMMETRICAL*		
		MECH	*MECHANICAL*				
DBL	*DOUBLE*	MH	*MANHOLE*	TBC	*TOP OF BACK OF CURB*		
DEG	*DEGREE*	MIN	*MINIMUM*	TC	*TOP OF CURB*		
DEMO	*DEMOLISH, DEMOLITION*	MISC	*MISCELLANEOUS*	THK	*THICK*		
DIA	*DIAMETER*			T LF	*TOP OF LIGHT FOOTING*		
DIM	*DIMENSION*	NIC	*NOT IN CONTRACT*	TO	*TOP OF*		
DN	*DOWN*	NOM	*NOMINAL*	TOPO	*TOPOGRAPHY*		
DTL	*DETAIL*	NTS	*NOT TO SCALE*	TR	*TOP OF RAMP*		
DWG	*DRAWING*			TRANS	*TRANSFORMER*		
		OC	*ON CENTER(S)*	TS	*TOP OF STEP*		
EA	*EACH*	OD	*OUTSIDE DIAMETER*	TW	*TOP OF WALL*		
EF	*EACH FACE*	OPP	*OPPOSITE*	TYP	*TYPICAL*		
EJ	*EXPANSION JOINT*						
ELEV	*ELEVATION*	PA	*PLANTING AREA*	UNFIN	*UNFINISHED*		
ELECT	*ELECTRICAL*	PC	*POINT OF CURVATURE*				
ENG	*ENGINEER*	PERF	*PERFORATE(D)*	VAR	*VARIES*		
EOP	*CURB LIP*	PED	*PEDESTRIAN*	VERT	*VERTICAL*		
EQ	*EQUAL*	PERM	*PERIMETER*	VEH	*VEHICLE*		
EST	*ESTIMATE*	PI	*POINT OF INTERSECTION*	VOL	*VOLUME*		
EW	*EACH WAY*	PL	*PROPERTY LINE*				
EXIST	*EXISTING*	POB	*POINT OF BEGINNING*	W/	*WITH*		
		PSF	*POUNDS PER SQUARE FOOT*	W/O	*WITHOUT*		
FG	*FINISHED GRADE*	PSI	*POUNDS PER SQUARE INCH*	WT	*WEIGHT*		
FIN	*FINISH*	PT	*POINT, POINT OF TANGENCY*	WWF	*WELDED WIRE FABRIC*		
FL	*FLOW LINE*	PVC	*POLYVINYL CHLORIDE*				
FOB	*FACE OF BUILDING*	PVMT	*PAVEMENT*	YD	*YARD*		
FOW	*FACE OF WALL*	PVR	*PAVER(S)*				
FS	*FINISH SURFACE*						
FT	*FOOT (FEET)*						
FTG	*FOOTING*						

MAJOR SITE/ARCHITECTURAL PLAN SUBMISSION

BELL RIPPY NEIGHBORHOOD

GLENWOOD SPRINGS, COLORADO

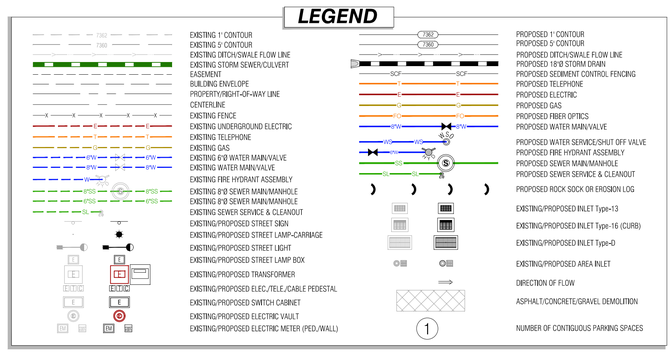


VICINITY MAP
Scale: 1"=2000'

NOTES:

THIS PLAN SET IS INTENDED TO BE PLOTTED IN COLOR. FAILURE TO DO SO MAY RESULT IN MISSING DATA & INFORMATION CRITICAL TO THE PROJECT.

LEGEND



A PORTION OF THE SITE IS LOCATED WITHIN ZONE A OF THE FIRM (FLOOD INSURANCE RATE MAP) FOR THE CITY OF GLENWOOD SPRINGS, COMMUNITY PANEL NUMBER 080071 1434C, MAP REVISED OCTOBER 15, 1985.

THIS PROPERTY IS SUBJECT TO GEOLOGIC HAZARDS PER THE ADOPTED MAPPING BY THE CITY OF GLENWOOD SPRINGS. HAZARDS TO NOTE ARE DEBRIS FLOWS. A FINAL GEOLOGIC HAZARD REPORT WILL BE SUBMITTED UPON APPLICATION OF A BUILDING PERMIT.

PROPOSED PUBLIC FACILITIES (ROAD, SIDEWALKS, UTILITIES, ETC.) REQUIRED FOR THE PROJECT, AND THE RESPONSIBILITY FOR PAYMENT THEREOF IS BY THE DEVELOPER.

GENERAL NOTES

1. THE WARRANTY PERIOD SHALL BE TWO (2) YEARS FROM THE DATE OF ACCEPTANCE.
2. CONSTRUCTION WORK, ANY NOISE CREATED BY OPERATING OR CAUSING TO BE OPERATED ANY EQUIPMENT (MECHANICAL OR NON-MECHANICAL, SELF-PROPELLED OR MANUALLY MANIPULATED) USED IN CONSTRUCTION, REPAIR, ALTERATION OR DEMOLITION WORK ON BUILDINGS, STRUCTURES, STREETS, ALLEYS OR APPURTENANCES AT ANY TIME OTHER THAN BETWEEN THE HOURS OF 7:00 A.M. AND 8:00 P.M. ON MONDAY THROUGH FRIDAY, AND 8:00 A.M. AND 6:00 P.M. ON SATURDAY AND SUNDAY. THE CITY MANAGER IS HEREBY AUTHORIZED TO ISSUE A CONSTRUCTION WORK NOISE PERMIT ALLOWING CONSTRUCTION WORK NOISE TO OCCUR AT A TIME OTHER THAN THE TIME SET FORTH HEREIN BASED ON CIRCUMSTANCES WHICH NECESSITATE SUCH CONSTRUCTION WORK, IN THE EVENT THE CITY MANAGER ISSUES SUCH A PERMIT, THE CITY COUNCIL SHALL BE ADVISED OF SUCH ISSUANCE AT THE NEXT REGULAR CITY COUNCIL MEETING.
3. IN ORDER OF PRECEDENCE, ALL CONSTRUCTION SHALL MEET OR EXCEED THE PROJECT PLANS AND TECHNICAL SPECIFICATIONS; STANDARDS ESTABLISHED IN THE LATEST EDITIONS OF THE CITY PUBLIC WORKS MANUAL AND/OR ENGINEERING STANDARDS; AND CDOT SPECIFICATIONS, AS REFERENCED HEREIN, AND BE SUBJECT TO OBSERVATION BY THE PROJECT ENGINEER, TOWN/CITY AND CDOT, AS APPLICABLE.
4. IN CASE OF A CONFLICT BETWEEN VARYING SPECIFICATIONS, THE MOST STRINGENT SHALL APPLY.
5. THE CONTRACTOR SHALL OBTAIN A COPY OF THE LATEST STANDARD SPECIFICATIONS AND DETAILS OF ALL AGENCIES EXERCISING JURISDICTION OVER THIS PROJECT. A COPY OF THESE SPECIFICATIONS AND DETAILS SHALL BE MAINTAINED ON THE JOBSITE AT ALL TIMES.
6. THE CONTRACTOR SHALL HAVE IN HIS POSSESSION AT ALL TIMES TWO (2) SIGNED COPIES OF THE LATEST PLANS, STANDARDS, AND SPECIFICATIONS AS APPROVED BY THE APPROPRIATE GOVERNING AGENCY AND PROJECT ENGINEER. THE CONTRACTOR SHALL NOT CHANGE OR DEVIATE FROM THESE PLANS WITHOUT FIRST OBTAINING WRITTEN APPROVAL FROM THE OWNER, PROJECT ENGINEER, AND GOVERNING AGENCY.
7. ALL WORK SHALL CONFORM TO ALL LOCAL, STATE, AND FEDERAL APPLICABLE LAWS AND REGULATIONS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL JOB SITE SAFETY ON THE PROJECT. THIS SHALL INCLUDE THE SAFETY OF HIS OWN PERSONNEL, SUBCONTRACTORS, ALL VISITORS TO THE SITE, AND THE GENERAL PUBLIC. ALL JOB SITE SAFETY SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS AND CODES, AND ENSURE COMPLIANCE INCLUDING, BUT NOT LIMITED TO, THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REQUIREMENTS.
9. THE CONTRACTOR SHALL CONTACT ONE CALL OF COLORADO AT #811 (1-800-922-1987), FOR THE MARKING OF MEMBER UNDERGROUND UTILITIES. (www.uncc2.org) A MINIMUM OF SEVENTY TWO (72) HOURS (EXCLUDING WEEKENDS AND HOLIDAYS) IN ADVANCE OF ANY EXCAVATION.
10. ALL MATERIALS SHALL BE NEW UNLESS OTHERWISE INDICATED IN THE PLANS, AND SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE OWNER, PROJECT ENGINEER, TOWN/CITY AND CDOT, AS APPLICABLE.
11. LOCATIONS AND ELEVATIONS OF EXISTING IMPROVEMENTS TO BE MET (OR AVOIDED) BY THE PROPOSED WORK SHALL BE CONFIRMED BY THE CONTRACTOR THROUGH FIELD EXPLORATIONS PRIOR TO CONSTRUCTION. CONTRACTOR SHALL REPORT TO THE PROJECT ENGINEER ANY DISCREPANCIES BETWEEN HIS MEASUREMENTS AND THESE PLANS.
12. THE CONTRACTOR SHALL CONTACT THE PROJECT ENGINEER IMMEDIATELY UPON DISCOVERY OF ANY ERRORS OR INCONSISTENCIES SHOWN IN THE PLANS AND/OR SPECIFICATIONS. THE CONTRACTOR SHALL NOT SCALE DRAWINGS FOR CONSTRUCTION PURPOSES. ANY MISSING DIMENSIONS OR DISCREPANCIES IN PLANS, FIELD STAKING, OR PHYSICAL FEATURES SHALL BE BROUGHT TO THE ATTENTION OF THE PROJECT ENGINEER. IF THE CONTRACTOR PROCEEDS WITH THE WORK WITHOUT NOTIFYING THE PROJECT ENGINEER, HE DOES SO AT HIS OWN RISK.
13. ALL ESTIMATES OF QUANTITIES ARE FOR INFORMATIONAL PURPOSES ONLY. CONTRACTOR AND SUBCONTRACTORS SHALL BE RESPONSIBLE FOR DETERMINING ACTUAL QUANTITIES, AND SHALL PROVIDE ALL WORK AND MATERIALS NECESSARY TO CONSTRUCT THE PROJECT IN ITS ENTIRETY.
14. THE CONTRACTOR SHALL PROTECT ALL EXISTING IMPROVEMENTS NOT DESIGNATED FOR REMOVAL AND THOSE IMPROVEMENTS THAT ARE OUTSIDE THE LIMITS OF THE PROPOSED CONSTRUCTION. CONTRACTOR SHALL TAKE CARE TO AVOID DAMAGE THERETO AND SHALL PROVIDE TEMPORARY FENCING, BARRICADES, SUPPORTS, RESTRAINTS, AND/OR BRACING WHERE REQUIRED TO PROTECT EXISTING IMPROVEMENTS. DAMAGE TO EXISTING IMPROVEMENTS SHALL BE REPAIRED AND/OR REPLACED TO EQUAL OR BETTER CONDITION AT THE CONTRACTOR'S EXPENSE.
15. ALL GRADING AND CONSTRUCTION ACTIVITIES SHALL BE CONFINED TO THE OWNERS PROPERTY, PUBLIC RIGHT-OF-WAY, PERMANENT EASEMENTS, AND TEMPORARY CONSTRUCTION EASEMENTS. THE CONTRACTOR SHALL NOT OPERATE OUTSIDE THIS AREA WITHOUT THE PRIOR CONSENT OF THE PROPERTY OWNER INVOLVED. ANY DAMAGE TO PRIVATE PROPERTY BY THE CONTRACTOR OUTSIDE THESE LIMITS WITHOUT THE PERMISSION OF THE PRIVATE PROPERTY OWNER WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS NOT OBTAINED BY THE OWNER OR OWNERS REPRESENTATIVES, AND PAY ALL FEES AS REQUIRED BY THE CONSTRUCTION COVERED IN THESE PLANS.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE APPROPRIATE GOVERNING AGENCIES AND LOCAL FIRE DEPARTMENT OF ALL STREET CLOSURES AND EXISTING FIRE HYDRANTS/FIRE SUPPRESSION TAKEN OUT OF SERVICE AT LEAST SEVENTY TWO (72) HOURS PRIOR TO CONSTRUCTION.
18. THE CONTRACTOR IS RESPONSIBLE FOR ALL SITE SECURITY AND SHALL PROPERLY PROTECT AND BARRICADE THE CONSTRUCTION SITE UNTIL CONSTRUCTION IS COMPLETE. STORAGE, LOSS DUE TO THEFT, OR VANDALISM OF MATERIALS AND EQUIPMENT (SECURED OR UNSECURED) WILL BE SOLELY AT THE CONTRACTOR'S EXPENSE.
19. PRIOR TO BEGINNING THE WORK, THE CONTRACTOR SHALL OBTAIN ANY WRITTEN AGREEMENTS FOR INGRESS AND EGRESS TO THE WORK FROM ADJACENT PRIVATE PROPERTY OWNERS. ACCESS TO ANY ADJACENT PRIVATE PROPERTY SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD, DURING ALL HOURS OF OPERATION FOR THE BUSINESS LOCATED ON THOSE PARCELS.
20. FOR ANY CHANGES OR DEVIATIONS FROM THESE PLANS PROPOSED BY THE CONTRACTOR, SHOP DRAWINGS AND MATERIAL SPECIFICATIONS SHALL BE SUBMITTED TO THE PROJECT ENGINEER FOR REVIEW AND APPROVAL PRIOR TO PLACEMENT OF MATERIAL.
21. CONTRACTOR MUST COORDINATE ALL CONSTRUCTION WITH THE OWNERS DEDICATED CONSTRUCTION PROJECT MANAGER OR THE PROJECT ENGINEER.
22. CONTRACTOR SHALL PROTECT AND PRESERVE ALL SURVEY CONTROL AND PROPERTY MONUMENTATION. ANY DAMAGED MONUMENTS SHALL BE RESET BY A PROFESSIONAL LAND SURVEYOR LICENSED IN THE PROJECT'S STATE AT THE CONTRACTOR'S EXPENSE.
23. PRIOR TO MOVING OFF THE JOB SITE THE CONTRACTOR SHALL NOTIFY THE ENGINEER OR THE OWNER'S CONSTRUCTION PROJECT MANAGER TO PERFORM THE FINAL WALK-THROUGH OF THE CONSTRUCTION SITE.
24. TEMPORARY POWER, TELEPHONE, WATER, SANITARY SEWER AND WASTE DISPOSAL SERVICE FOR THE SITE IS THE CONTRACTOR'S RESPONSIBILITY UNLESS OTHERWISE SPECIFIED.
25. NO BELOW GRADE WORK SHALL BE BACKFILLED (INCLUDING BEDDING MATERIAL ABOVE THE SPRING LINE OF THE PIPE) UNTIL THE CONSTRUCTION HAS BEEN INSPECTED AND APPROVED FOR BACKFILLING BY THE APPROPRIATE GOVERNING AGENCY, PROJECT ENGINEER AND/OR OWNER'S CONSTRUCTION PROJECT MANAGER. INSPECTIONS SHALL BE SCHEDULED AT LEAST FORTY EIGHT (48) HOURS PRIOR.
26. THE CONTRACTOR SHALL PROVIDE ALL TRAFFIC CONTROL NECESSARY TO COMPLETE THE WORK. ALL TRAFFIC CONTROL DEVICES AND METHODS OF CONTROLLING TRAFFIC THROUGH CONSTRUCTION ZONES SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, AND ALL REVISIONS THERETO INCLUDING LOCAL AND STATE SUPPLEMENTS. ADDITIONAL WORK IN THE RIGHT-OF-WAY OR TRAFFIC CONTROL PERMITS MAY BE NECESSARY AND SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
27. FOR ANY CONSTRUCTION ACTIVITY WITHIN A ROAD RIGHT-OF-WAY, CONTRACTOR SHALL PROVIDE ALL WARNING LIGHTS, SIGNS, BARRICADES, FLAG MEN OR OTHER DEVICES NECESSARY TO PROVIDE FOR PUBLIC SAFETY IN ACCORDANCE WITH THE LASTED EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL CONSTRUCTION ZONE TRAFFIC CONTROL. A CONSTRUCTION TRAFFIC CONTROL PLAN MUST BE SUBMITTED FOR REVIEW AND APPROVAL TO THE TOWN/CITY AND PROJECT ENGINEER, 7 DAYS PRIOR TO COMMENCING CONSTRUCTION WITHIN A PUBLIC RIGHT-OF-WAY.
28. CONTRACTOR SHALL DESIGNATE A CERTIFIED TRAFFIC CONTROL SUPERVISOR (TCS) TO MANAGE CONSTRUCTION SIGNAGE AND SAFETY OF OPERATIONS DURING ACTIVITIES WITHIN THE RIGHT OF WAY. A TRAFFIC CONTROL SUPERVISOR SHALL BE AVAILABLE WHENEVER WORK IS IN PROGRESS.
29. IF UNANTICIPATED HAZARDOUS MATERIALS OF ANY KIND ARE ENCOUNTERED IN THE WORK, THE CONTRACTOR SHALL IMMEDIATELY CEASE ALL CONSTRUCTION OPERATIONS AND NOTIFY THE PROJECT ENGINEER AND/OR OWNER'S CONSTRUCTION PROJECT MANAGER FOR FURTHER DIRECTION.
30. ALL DEBRIS RESULTING FROM CONSTRUCTION AND DEMOLITION SHALL BE HAULED OFF SITE AND DISPOSED OF PROPERLY AND LEGALLY AND SHALL BE CONSIDERED PART OF THE WORK.
31. THE CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE AWAY FROM ALL STRUCTURES IN ALL DIRECTIONS. DRAINAGE FACILITIES MAY NEED TO BE CONSTRUCTED & MAINTAINED AS NECESSARY TO PROTECT PUBLIC & PRIVATE PROPERTY.
32. ALL CONSTRUCTION SHALL BE SUBJECT TO OBSERVATION AND REVIEW BY THE TOWN/CITY AND THE PROJECT ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF OBSERVATIONS AND REVIEW OF ALL INSTALLATIONS. OBSERVATIONS AND REVIEW OF CONSTRUCTION WORK IN PROGRESS ARE NOT TO BE CONSTRUED AS A GUARANTEE OR WARRANTY BY THE OBSERVER OF THE COMPLETED WORK. ALL GUARANTEES OR WARRANTIES REMAIN WITH THE CONTRACTOR.
33. ALL DISTURBED AREAS MUST BE RECLAIMED WITH VEGETATION AS DIRECTED BY CITY AND/OR THE ENGINEER OF RECORD. THE CONTRACTOR SHALL REPAIR OR REPLACE ALL AFFECTED OR DAMAGED LANDSCAPING, INCLUDING IRRIGATION, WITH SIMILAR MATERIALS AND SIZE. SOD SHALL BE USED TO REPLACE LAWN.
34. THE CONTRACTOR SHALL TAKE APPROPRIATE PRECAUTIONS TO SIGNIFICANTLY REDUCE POTENTIAL POLLUTION FROM CONSTRUCTION ACTIVITIES, INCLUDING VEHICLE FUELING & MAINTENANCE, AND STORAGE AND USE OF CHEMICALS & FERTILIZERS. THE CONTRACTOR SHALL IDENTIFY BEST MANAGEMENT PROCEDURES FOR HANDLING POTENTIAL POLLUTANTS AND SUBMIT SPILL PREVENTION AND RESPONSE PROCEDURES TO THE TOWN/CITY AND PROJECT ENGINEER PRIOR TO ANY ACTIVITY AT THE PROJECT SITE.
35. THE CONTRACTOR SHALL VERIFY EXISTING PIPE OR MANHOLE INVERTS/DEPTHS PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER.
36. THE CITY WILL PROVIDE THE CONTRACTOR WITH A TAX EXEMPT FORM FOR USE IN PURCHASING OF MATERIALS AND SUPPLIES.
37. ALL PRODUCT INFORMATION SHOWN IS AS PROVIDED BY THE MANUFACTURER. THE CONTRACTOR IS RESPONSIBLE FOR REVIEWING AND COMPLYING WITH THE MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS FOR THE INSTALLATION OF ALL MATERIALS WITH SPECIAL ATTENTION TO PROPER SEALING OF MATING SURFACES. THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE ENGINEER IF ANY DISCREPANCIES ARE FOUND BETWEEN THE DELIVERED PRODUCTS AND THOSE SHOWN ON THIS PLAN.
38. ALL SIGNS REMOVED FROM THE RIGHT-OF-WAY WILL BE RETURNED TO THE CITY OR STORED ONSITE. CONTRACTOR TO RECORD PHOTOS OF THE AREA AND REINSTALL SIGNS THAT ARE REMOVED DURING CONSTRUCTION.
39. ANY MUD OR OTHER MATERIAL TRACKED OR OTHERWISE DEPOSITED ON THE ROADWAY SHALL BE REMOVED DAILY OR AS ORDERED BY THE DEPARTMENT INSPECTOR.
40. THE CONTRACTOR SHALL PROVIDE ON-SITE SANITARY FACILITIES UNLESS FACILITIES ARE ALREADY PROVIDED THAT ARE REASONABLY CLOSE TO THE CONSTRUCTION SITE.
41. THE CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS TO AFFECTED PROPERTY OWNERS AT ALL TIMES DURING CONSTRUCTION AT NO ADDITIONAL COST.
42. THE CONTRACTOR SHALL COMPLY WITH ALL AGREEMENTS BETWEEN THE CITY AND PRIVATE PROPERTY OWNERS.
43. ADDITIONAL NOTES ARE LOCATED THROUGHOUT THE CONSTRUCTION DOCUMENTS.

STORMWATER MANAGEMENT AND EROSION/SEDIMENT CONTROL NOTES

1. THE PREPARATION OF STORMWATER MANAGEMENT PLANS, PERMITTING AND COMPLIANCE ARE THE RESPONSIBILITY OF THE CONTRACTOR. THIS PROJECT MAY ALSO REQUIRE A PERMIT FOR STORMWATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITY FROM THE STATE OF COLORADO. THE CONTRACTOR IS TO COMMENCE WORK ON THIS SITE ONLY AFTER AN ACTIVE PERMIT NUMBER HAS BEEN OBTAINED FROM THE STATE OF COLORADO. THE STORMWATER MANAGEMENT PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO APPLYING FOR THE PERMIT. THE CONTRACTOR IS TO PROVIDE EROSION CONTROL IN ACCORDANCE WITH STATE OF COLORADO GUIDELINES.
2. THE CONTRACTOR SHALL CONTINUOUSLY PROVIDE ADEQUATE STORMWATER MANAGEMENT IN ACCORDANCE WITH AN APPROVED STORMWATER MANAGEMENT PLAN (SWMP) FROM THE STATE OF COLORADO.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING THE PUBLIC STREETS, ACCESS ROUTES, AND WATERWAYS IN THE VICINITY OF THE JOB SITE CLEAN AND FREE OF ROCKS, SOIL AND DEBRIS.
4. THE CONTRACTOR SHALL INSTALL EROSION AND SEDIMENTATION CONTROL "BEST MANAGEMENT PRACTICES" (BMPS) PRIOR TO ANY SITE PREPARATION WORK (E.G., CLEARING, GRUBBING, DEMOLITION, OR EXCAVATION).
5. A GROUNDWATER DISCHARGE PERMIT MAY BE REQUIRED FROM THE STATE GOVERNING AUTHORITY PRIOR TO DISCHARGE. GROUNDWATER SHALL BE SAMPLED AND SENT TO AN APPROVED LABORATORY FOR TESTING PRIOR TO BEING DISCHARGED. TESTING SHALL BE IN ACCORDANCE WITH THE PERMIT FOR STORMWATER DISCHARGE.
6. A WATER SOURCE MUST BE AVAILABLE ON SITE DURING EARTHWORK OPERATIONS AND UTILIZED AS REQUIRED TO MINIMIZE DUST FROM EARTHWORK EQUIPMENT AND WIND.
7. ALL DITCHES & EROSION CONTROL SHOULD BE COMPLETED TO THE RECEIVING STREAM.
8. THE PLACEMENT OF EROSION AND SEDIMENT BMPS SHALL BE IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL PLAN IF IT WAS PREPARED FOR THE PROJECT. CONTRACTOR TO ADJUST QUANTITY, LOCATION, AND TYPE OF EROSION AND SEDIMENT CONTROL BMPS AS NECESSARY FOR THE VARIOUS PHASES OF THE WORK AND AS ACTUAL CONDITIONS WARRANT. CONTRACTOR SHALL CONTINUOUSLY MODIFY THE EROSION AND SEDIMENT CONTROL PLAN WITH CURRENT BMPS IN ACCORDANCE WITH THE CONSTRUCTION STORMWATER PERMIT REQUIREMENTS. ADDITIONAL EROSION AND SEDIMENT CONTROL BMPS EMPLOYED BY THE CONTRACTOR AT HIS DISCRETION WILL NOT BE MEASURED OR PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
9. APPROVED EROSION AND SEDIMENT CONTROL BMPS SHALL BE MAINTAINED AND KEPT IN GOOD REPAIR FOR THE DURATION OF THIS PROJECT, UNLESS OTHERWISE REQUIRED BY THE STATE'S CONSTRUCTION STORMWATER PERMIT, AT A MINIMUM THE CONTRACTOR SHALL INSPECT ALL BMPS EVERY 14 DAYS, AND AFTER ALL SIGNIFICANT PRECIPITATION EVENTS I.E. RAINFALL, SNOWMELT. ALL NECESSARY MAINTENANCE AND REPAIR ACTIVITIES SHALL BE COMPLETED WITHIN TWENTY-FOUR (24) HOURS AFTER DIRECTION BY THE INSPECTOR. ACCUMULATED SEDIMENT AND CONSTRUCTION DEBRIS SHALL BE REMOVED WEEKLY FROM ALL BMPS, OR AT ANY TIME THAT SEDIMENT OR CONSTRUCTION DEBRIS ADVERSELY IMPACTS THE FUNCTIONING OF THE BMPS.
10. TOPSOIL AND SUITABLE EARTHEN MATERIALS SHALL BE SEGREGATED AND STOCKPILED WITHIN THE LIMITS OF CONSTRUCTION FOR USE ON AREAS TO BE FILLED AND RE-VEGETATED. ANY AND ALL STOCKPILES SHALL BE PLACED IN AN APPROVED LOCATION AND PROTECTED FROM EROSIVE ELEMENTS USING MEASURES SPECIFIED IN THE EROSION/SEDIMENT CONTROL PLAN AND APPROVED STORMWATER MANAGEMENT PLAN (SWMP) FROM THE STATE OF COLORADO.
11. SOILS THAT WILL BE STOCKPILED FOR MORE THAN THIRTY (30) DAYS SHALL BE MULCHED AND SEEDED WITH A TEMPORARY OR PERMANENT GRASS COVER WITHIN FOURTEEN (14) DAYS OF STOCKPILE CONSTRUCTION.
12. ANY SETTLEMENT OR SOIL ACCUMULATIONS BEYOND THE LIMITS OF CONSTRUCTION DUE TO GRADING OR EROSION SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR REMEDIATION OF ANY ADVERSE IMPACTS TO ADJACENT WATERWAYS, WETLANDS, PROPERTIES, ETC. RESULTING FROM WORK DONE AS PART OF THIS PROJECT.
13. THE CONTRACTOR MUST KEEP ALL POLLUTANTS, INCLUDING SEDIMENT, CONSTRUCTION DEBRIS, AND TRENCH BACKFILL MATERIALS FROM ENTERING THE STORM SEWER SYSTEM.
14. ALL SPILLS, INCLUDING, BUT NOT LIMITED TO, PETROLEUM PRODUCTS, SOLVENTS, AND CEMENT SHALL BE CLEANED UP IMMEDIATELY. THE LOCAL TOWN/CITY/COUNTY AND STATE'S GOVERNING AUTHORITY SHALL BE NOTIFIED IMMEDIATELY.
15. THE CONTRACTOR SHALL ENSURE THAT ALL LOADS OF CUT AND FILL MATERIAL IMPORTED TO OR EXPORTED FROM THE SITE SHALL BE PROPERLY COVERED TO PREVENT LOSS OF THE MATERIAL DURING TRANSPORT ON PUBLIC RIGHT-OF-WAY. ALL MATERIAL EXPORTED FROM THE SITE SHALL BE DISPOSED OF AT A SITE PERMITTED TO ACCEPT SUCH MATERIAL.
16. THE USE OF REBAR, STEEL STAKES OR STEEL FENCE POSTS FOR STAKING DOWN STRAW OR HAY BALES, OR TO SUPPORT SILT FENCING USED AS AN EROSION CONTROL MEASURE, IS PROHIBITED.
17. THE CLEANING OF CONCRETE DELIVERY TRUCK CHUTES IS RESTRICTED TO APPROVED LOCATIONS ON THE JOB SITE. THE DISCHARGE OF WASHOUT WATER CONTAINING WASTE CEMENT TO THE STORM SEWER SYSTEM IS PROHIBITED. ALL CONCRETE WASTE SHALL BE PROPERLY CLEANED UP AND DISPOSED OF AT AN APPROPRIATE LOCATION.
18. CONTRACTOR SHALL PROVIDE A COMPLETED "NOTICE OF TERMINATION" TO OWNER, FOR OWNERS SUBMITTAL TO THE STATE'S GOVERNING AUTHORITY ONCE THE PROJECT IS COMPLETE, ALL DISTURBED AREAS HAVE BEEN STABILIZED AND TEMPORARY BMPS HAVE BEEN REMOVED.
19. THE CONTRACTOR SHALL CLEAN OUT ALL EXISTING AND PROPOSED INLETS, PIPES AND MANHOLES OF DEBRIS AND SEDIMENTATION AT COMPLETION OF SITEWORK. THIS WORK SHALL BE DONE TO THE SATISFACTION OF THE OWNER AND LOCAL AUTHORITIES. ANY CONSTRUCTION DEBRIS OR MUD DROPPED INTO MANHOLES, INLETS, PIPES OR TRACKED ONTO EXISTING ROADWAYS SHALL BE REMOVED IMMEDIATELY BY THE CONTRACTOR. THE CONTRACTOR SHALL REPAIR ANY EXCAVATIONS OR PAVEMENT FAILURES CAUSED BY HIS CONSTRUCTION.
20. THE CONTRACTOR SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO SIGNIFICANTLY REDUCE ANY POTENTIAL POLLUTION CAUSED BY HIS ACTIVITIES, INCLUDING VEHICLE FUELING, STORAGE OF FERTILIZERS OR CHEMICALS, ETC. THE CONTRACTOR SHALL HAVE IDENTIFIED PROCEDURES FOR HANDLING POTENTIAL POLLUTANTS AND HAVE IDENTIFIED SPILL PREVENTION AND RESPONSE PROCEDURES PRIOR TO ANY ACTIVITIES AT THE PROJECT SITE.
21. ALL EROSION CONTROL FABRIC SHALL BE NORTH AMERICAN GREEN SC250 OR ENGINEER APPROVED EQUAL UNLESS SPECIFIED DIRECTLY

BELL RIPPY NEIGHBORHOOD

OVERALL SITE PLAN

Boundaries Unlimited Inc.
Civil Engineering
Surveying
& Beyond
923 Cooper Ave., Ste. 201
Glenwood Springs, CO 81601
(T) 970.945.5252
www.bu-inc.com

N/A

N/A
N/A
N/A

Engineer or Surveyor Seal

NOT FOR CONSTRUCTION
Review

Client Information:

TRIUMPH
12 VAIL ROAD, SUITE 700
VAIL, COLORADO 81657
970 479-9990

NORTH

0 40' 80'
Scale: 1" = 40'

811
Know what's below.
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GLENWOOD SPRINGS, COLORADO

Bell Rippy Neighborhood

Overall Site Plan

30% Review Set - Major Site Plan Submission

No.	Date	Revision	By
1.	4.20.20	CITY COMMENTS TO 30% SUBMITTAL	PH
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PROJECT NO.
20002
Designer:
DJW
Drafter:
RUI
Date:
3/03/20

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C.1

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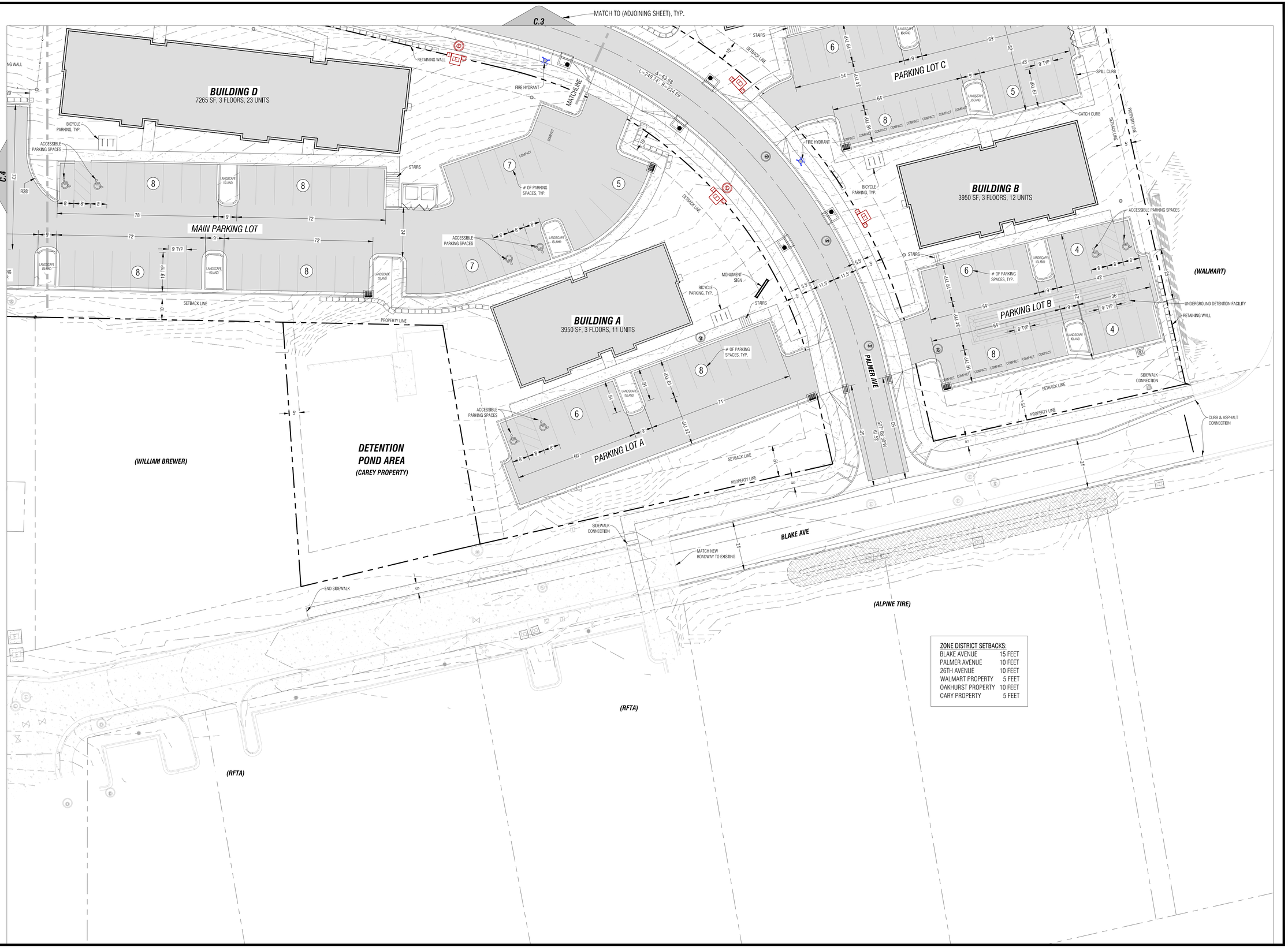

ZONE DISTRICT SETBACKS:	
BLAKE AVENUE	15 FEET
PALMER AVENUE	10 FEET
26TH AVENUE	10 FEET
WALMART PROPERTY	5 FEET
OAKHURST PROPERTY	10 FEET
CARY PROPERTY	5 FEET

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NORTH
0 20' 40'
Scale: 1" = 20'

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PROJECT NO. 20002
Designer: DJW
Drafter: BUI
Date: 3/02/20

Sheet C.2

File Name: 20002 c-site.dwg

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ZONE DISTRICT SETBACKS:	
BLAKE AVENUE	15 FEET
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26TH AVENUE	10 FEET
WALMART PROPERTY	5 FEET
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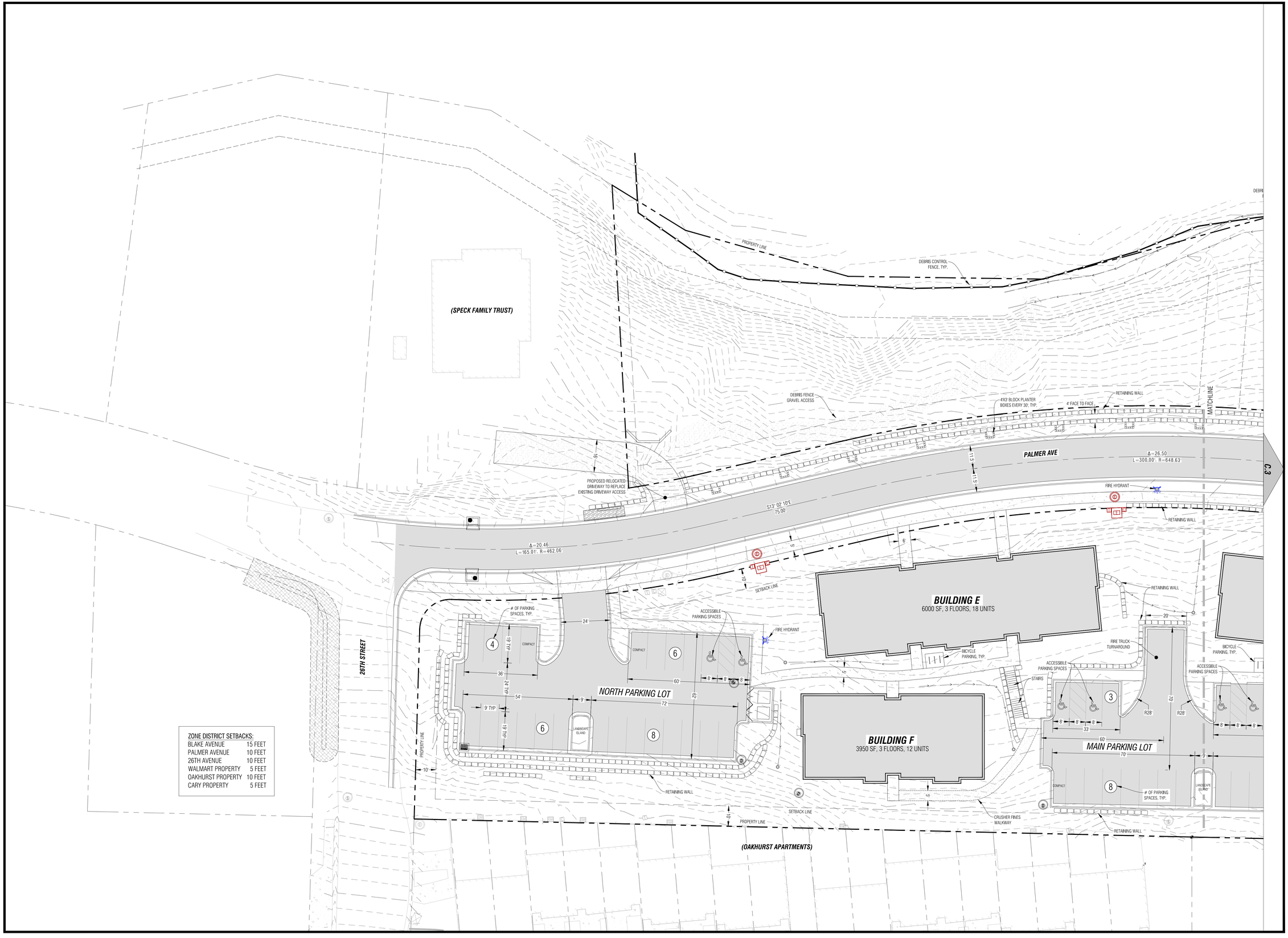
PROJECT NO.
20002
Designer:
DJH
Drafter:
BUI
Date:
3/03/20

Sheet
C.3

File Name: 20002 c-site.dwg



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NOT FOR CONSTRUCTION
Review

Client Information:

TRIUMPH
12 VAIL ROAD, SUITE 700
VAIL, COLORADO 81657
970 479-9990

NORTH

0 20' 40'
Scale: 1" = 20'

811
Know what's below.
Call before you dig.

GLENWOOD SPRINGS, COLORADO

Bell Rippy Neighborhood

Site Plan

30% Review Set - Major Site Plan Submission

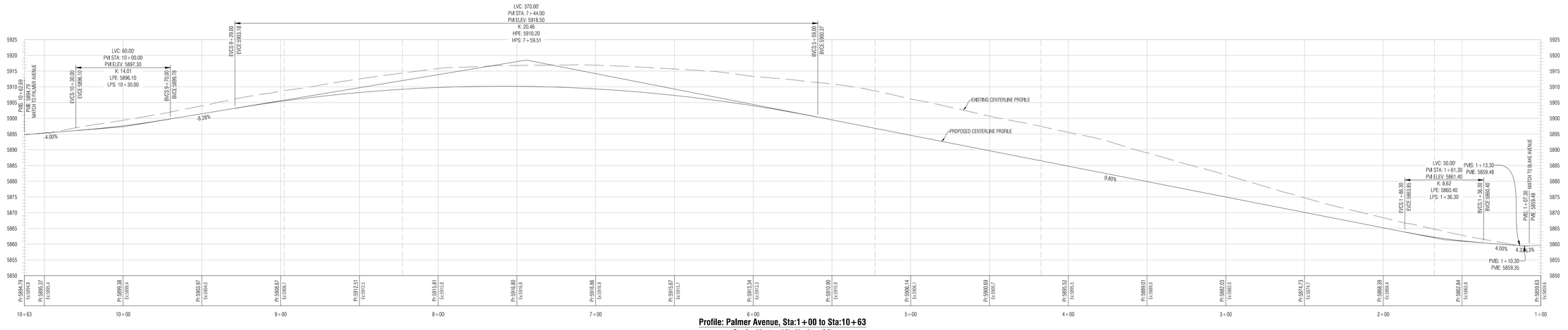
No.	Date	Revision	By
1.	4.20.20	CITY COMMENTS TO 30% SUBMITTAL	PH
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

PROJECT NO.
20002
Designer:
DJW
Drafter:
BUI
Date:
3/03/20

Sheet
C.4

File Name: 20002 c-site.dwg

N:\PROJECTS\2020\20002-Bell Rippy Townhouses\dwg\20002 C-Site.dwg 4/20/2020 8:55 AM



Profile: Palmer Avenue, Sta:1+00 to Sta:10+63
Scale: Vert.=15', Horiz.=30'

N:\PROJECTS\20202-20002-Bell Rippy Townhouses\dwg\20002 C-Base.dwg 4/20/2020 8:58 AM

Boundaries Unlimited Inc.
Civil Engineering
Surveying
& Beyond
923 Cooper Ave., Ste. 201
Glenwood Springs, CO 81601
(T) 970.945.5252
www.bu-inc.com

N/A

N/A
N/A
N/A

Engineer or Surveyor Seal

NOT FOR CONSTRUCTION
Review

Client Information:
TRIUMPH
12 VAIL ROAD, SUITE 700
VAIL, COLORADO 81657
970 479-9990

NORTH
0 30' 60'
Scale: 1" = 30'

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GLENWOOD SPRINGS, COLORADO

Bell Rippy Neighborhood

Palmer Avenue Plan & Profile

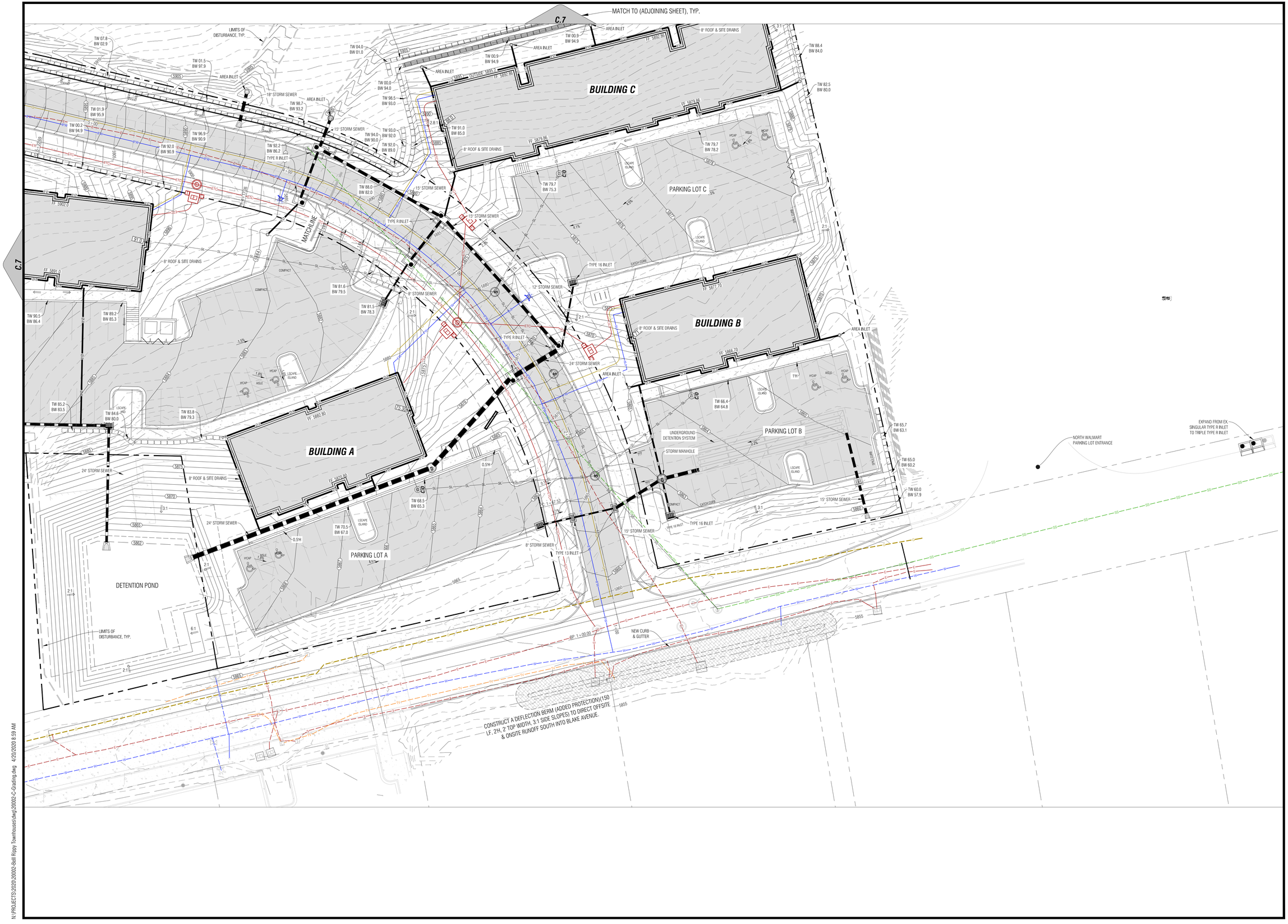
30% Review Set - Major Site Plan Submission

No.	Date	Revision	By
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

PROJECT NO.
20002
Designer:
DJW
Drafter:
BUI
Date:
3/03/20

Sheet
C.5

File Name: 20002 c-base.dwg



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VAIL, COLORADO 81657
970 479-9990

NORTH

0 20' 40'
Scale: 1" = 20'

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Know what's below.
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GLENWOOD SPRINGS, COLORADO

Bell Rippy Neighborhood

Grading & Drainage Plan

30% Review Set - Major Site Plan Submission

No.	Date	Revision	By
1.	4.20.20	CITY COMMENTS TO 30% SUBMITTAL	PH
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

PROJECT NO.
20002
Designer:
DJW
Drafter:
BUI
Date:
3/03/20

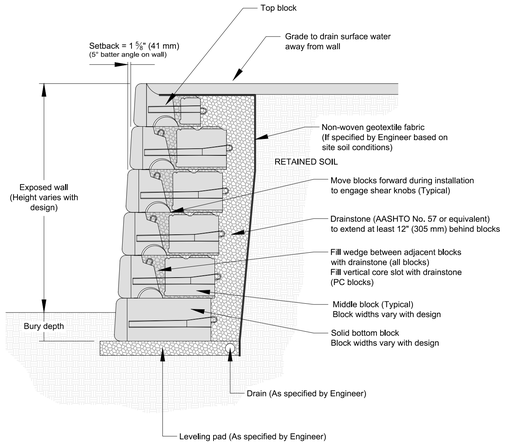
Sheet
C.6

File Name: 20002-c-grading.dwg

N:\PROJECTS\2020\20002-Bell Rippy Townhouses\dwg\20002-C-Grading.dwg 4/20/2020 8:59 AM

Typical Gravity Wall Section above Palmer Avenue.

(Actual wall to be determined)



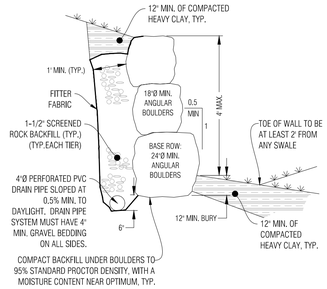
This drawing is for reference only. Determination of the suitability and/or manner of use of any details contained in this document is the sole responsibility of the design engineer of record. Final project designs, including all construction details, shall be prepared by a licensed professional engineer using the actual conditions of the proposed site.

DRAWN BY:	JRJ
APPROVED BY:	JRJ
DATE:	17MAR2016
SHEET:	1 of 1

TITLE: Typical Gravity Wall Detail

FILE: 1 Typical Gravity Wall Detail 031716.dwg

RED ROCK
05481 US 31 SOUTH, CHARLEVOIX, MI 49720
(866) 222-8400 ext 3010 • engineering@redrock.com
www.redrocks.com



BOULDER LANDSCAPE WALL NOTES:

1. THIS DETAIL IS TO BE USED ONLY FOR RETAINING LANDSCAPED AREAS WITH A MAXIMUM WALL HEIGHT OF 4-FEET. THIS DETAIL SHALL NOT BE USED TO RETAIN STRUCTURES/VEHICLE LOADED AREAS OR AREAS REQUIRING GREATER RETENTION.
2. FREE DRAINING WALL BACKFILL SHOULD BE CAPPED WITH AT LEAST 12 INCHES OF COMPACTED HEAVY CLAYS TO REDUCE SURFACE WATER INFILTRATION.
3. BOULDERS SHALL BE ANGULAR AND SQAURE/RECTANGULAR IN SHAPE. ROUND RIVER BOULDERS ARE NOT ACCEPTABLE.
4. INSTALL MIRAFI 140N FILTER FABRIC BETWEEN THE NATIVE EXCAVATION AND THE SCREENED ROCK BACKFILL.
5. SET BASE ROWS ON BENCHES WHERE THE TOPSOIL HAS BEEN REMOVED AND THE SUBBASE HAS BEEN SCARIFIED TO 9" MINIMUM DEPTH & RECOMPACTED TO 95% STANDARD PROCTOR.
6. CARE SHOULD BE TAKEN NOT TO OVER COMPACT THE BACKFILL OR USE LARGE EQUIPMENT NEAR THE WALL.
7. SELECT AND PLACE BOULDERS IN A MANNER WHICH PERMITS AT LEAST 30% CONTACT AREA WITH ADJACENT BOULDERS.
8. PLACE LARGER BOULDERS AT BOTTOM AND TRANSITION TO SMALLER BOULDERS AT TOP OF WALL. UNDER NO CIRCUMSTANCES SHOULD ANY BOULDER BE PLACED ON TOP OF ANOTHER BOULDER WHICH IS SMALLER THAN ITSELF.

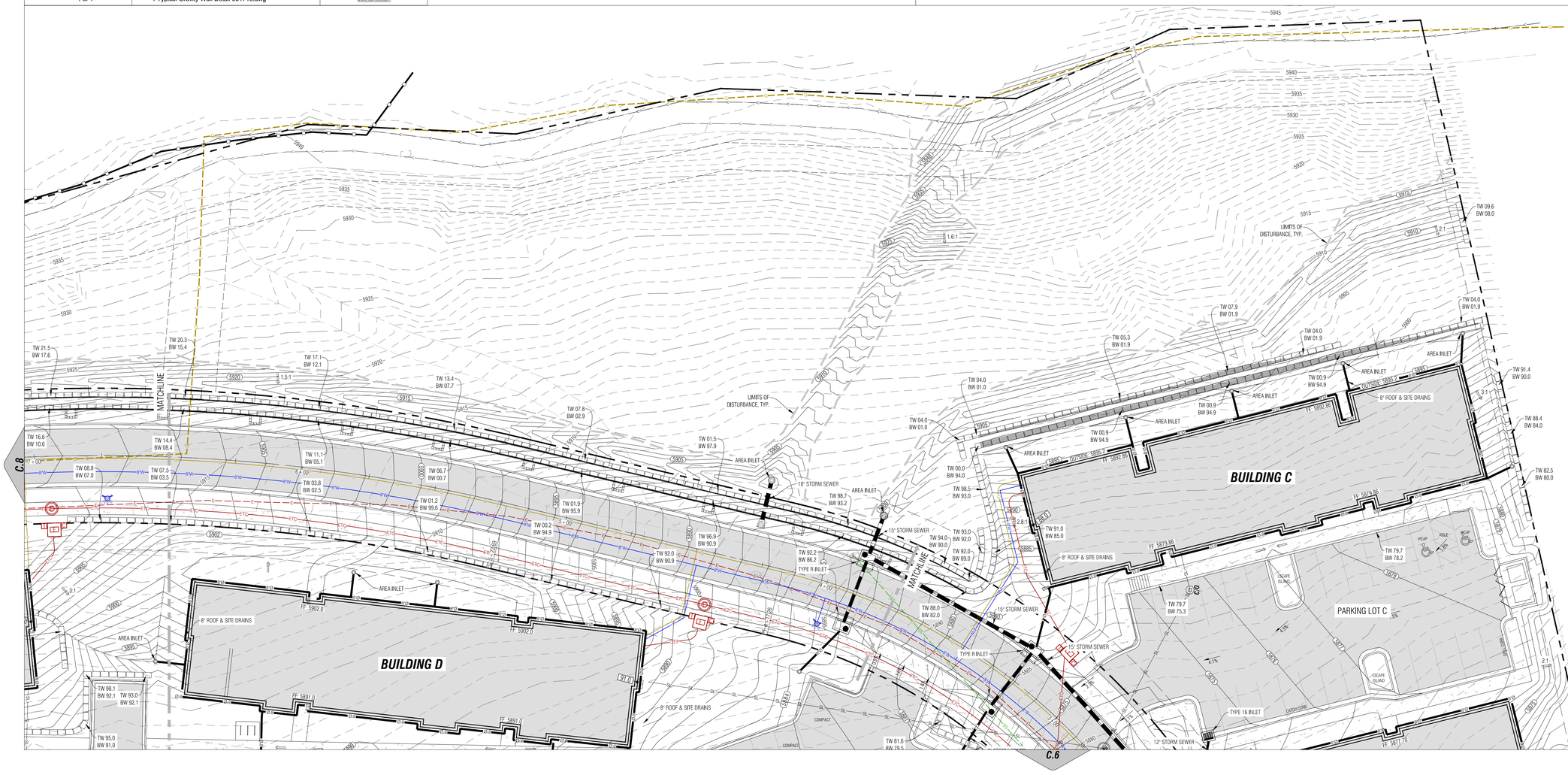
(Actual wall to be determined)

BOULDER WALL DETAIL, LANDSCAPED AREA

N.T.S.

TO BE VERIFIED BY PROJECT SOILS ENGINEER

REFER & COORDINATE WITH THE GEOTECHNICAL REPORT



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N/A
N/A

Engineer or Surveyor Seal

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Review

Client Information:

TRIUMPH
12 VAIL ROAD, SUITE 700
VAIL, COLORADO 81657
970 479-9990

NORTH

0 20' 40'

Scale: 1" = 20'

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Know what's below.
Call before you dig.

GLENWOOD SPRINGS, COLORADO

Bell Rippy Neighborhood

Grading & Drainage Plan

30% Review Set - Major Site Plan Submission

No.	Date	Revision	By
1.	4.20.20	CITY COMMENTS TO 30% SUBMITTAL	PH
2.			
3.			
4.			
5.			
6.			
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8.			
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PROJECT NO.: 20002
Designer: DJW
Drafter: BUI
Date: 3/03/20

Sheet: C.7

File Name: 20002-c-grading.dwg

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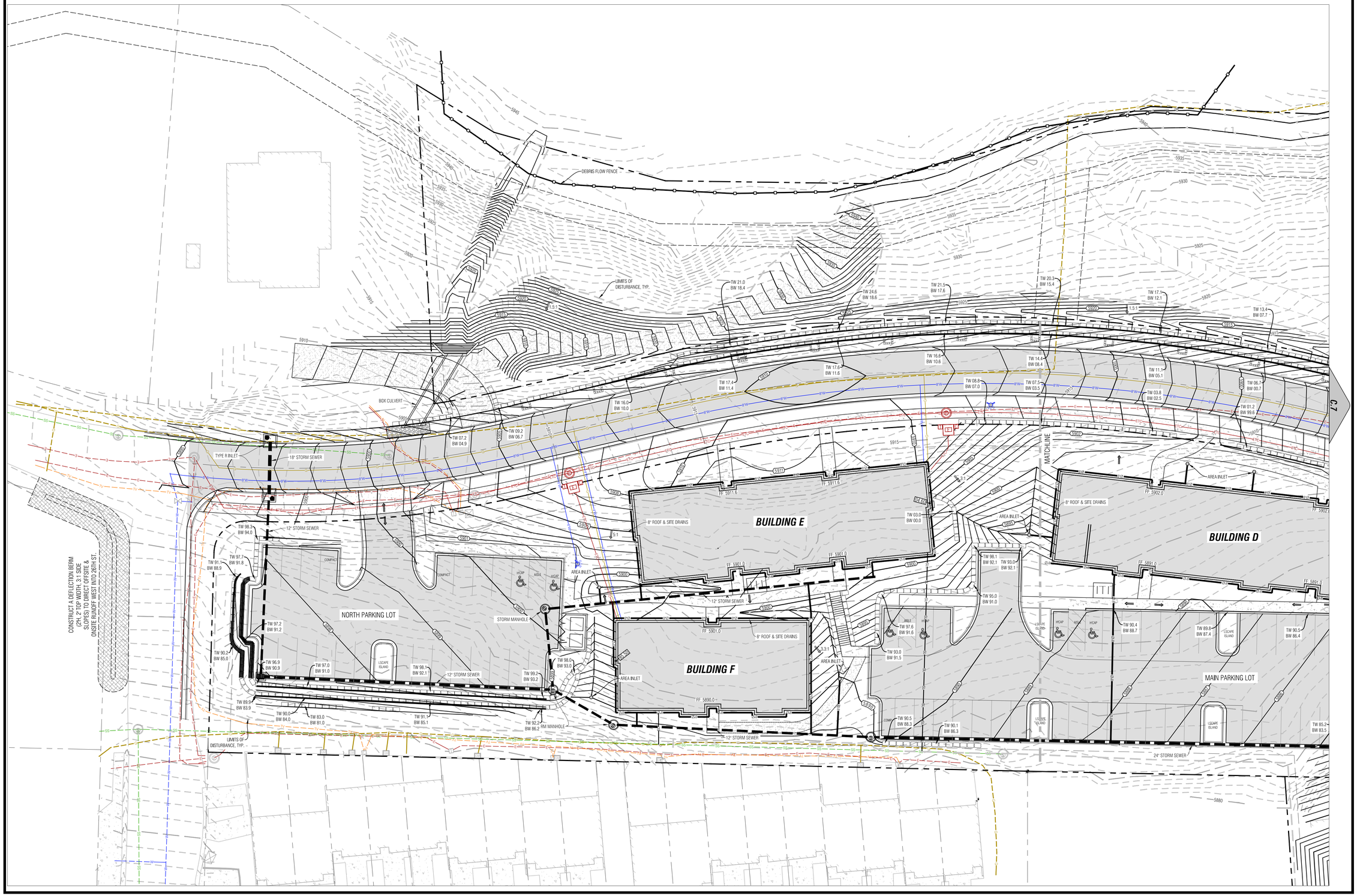

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N/A
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Engineer or Surveyor Seal

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Client Information:

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12 VAIL ROAD, SUITE 700
VAIL, COLORADO 81657
970 479-9990

NORTH

0 20' 40'
Scale: 1" = 20'

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GLENWOOD SPRINGS, COLORADO

Bell Rippy Neighborhood

Grading & Drainage Plan

30% Review Set - Major Site Plan Submission

No.	Date	Revision	By
1.	4.20.20	CITY COMMENTS TO 30% SUBMITTAL	PH
2.			
3.			
4.			
5.			
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9.			

PROJECT NO.
20002
Designer:
DJW
Drafter:
BUI
Date:
3/03/20

Sheet
C.8

File Name: 20002-c-grading.dwg

LEGEND

EXISTING 1' CONTOUR
EXISTING 5' CONTOUR
EXISTING DITCH/SWALE FLOW LINE
EXISTING STORM SEWER/CULVERT
EASEMENT
BUILDING ENVELOPE
PROPERTY/RIGHT-OF-WAY LINE
CENTERLINE
EXISTING FENCE
EXISTING UNDERGROUND ELECTRIC
EXISTING TELEPHONE
EXISTING GAS
EXISTING 6"Ø WATER MAIN/VALVE
EXISTING WATER MAIN/VALVE
EXISTING FIRE HYDRANT ASSEMBLY
EXISTING 8"Ø SEWER MAIN/MANHOLE
EXISTING 8"Ø SEWER MAIN/MANHOLE
EXISTING SEWER SERVICE & CLEANOUT
EXISTING/PROPOSED STREET SIGN
EXISTING/PROPOSED STREET LAMP-CARRIAGE
EXISTING/PROPOSED STREET LIGHT
EXISTING/PROPOSED STREET LAMP BOX
EXISTING/PROPOSED TRANSFORMER
EXISTING/PROPOSED ELEC./TELE./CABLE PEDESTAL
EXISTING/PROPOSED SWITCH CABINET
EXISTING/PROPOSED ELECTRIC VAULT
EXISTING/PROPOSED ELECTRIC METER (PED./WALL)

PROPOSED 1' CONTOUR
PROPOSED 5' CONTOUR
PROPOSED DITCH/SWALE FLOW LINE
PROPOSED 18"Ø STORM DRAIN
PROPOSED SEDIMENT CONTROL FENCING
PROPOSED TELEPHONE
PROPOSED ELECTRIC
PROPOSED GAS
PROPOSED FIBER OPTICS
PROPOSED WATER MAIN/VALVE
PROPOSED WATER SERVICE/SHUT OFF VALVE
PROPOSED FIRE HYDRANT ASSEMBLY
PROPOSED SEWER MAIN/MANHOLE
PROPOSED SEWER SERVICE & CLEANOUT
PROPOSED ROCK SOCK OR EROSION LOG
EXISTING/PROPOSED INLET Type-13
EXISTING/PROPOSED INLET Type-16 (CURB)
EXISTING/PROPOSED INLET Type-D
EXISTING/PROPOSED AREA INLET
DIRECTION OF FLOW
ASPHALT/CONCRETE/GRAVEL DEMOLITION

ZONE C
ZONE A
ZONE A
ZONE D
ELECTRIC & CABLE SERVICE LINES TO BE RELOCATED
GAS LINE TO BE RELOCATED
EX. ELECTRIC VAULT, BEGIN NEW ELECTRIC LINE CONSTRUCTION
BEGIN NEW 8" WATER LINE CONSTRUCTION
EX. FIRE HYDRANT TO BE RELOCATED IN FRONT OF NEW SIDEWALK
NEW GAS LINE LOCATION
ZONE C
ZONE B
ZONE A
EX. MANHOLE
INSTALL FIRE HYDRANT
WATER SERVICE, FIRE SPRINKLER SERVICE, ELECTRIC, GAS & COMMUNICATION SERVICES
BUILDING F
SEWER SERVICE LOCATION
EX. MANHOLE
GAS LINE TO BE RELOCATED
NEW 8" WATER LINE
ELECTRIC LINE TO BE RELOCATED
EX. MANHOLE & SEWER LINE TO BE REMOVED
WATER SERVICE, FIRE SPRINKLER SERVICE, ELECTRIC, GAS & COMMUNICATION SERVICES
INSTALL FIRE HYDRANT
BUILDING E
BUILDING D
WATER SERVICE, FIRE SPRINKLER SERVICE, ELECTRIC, GAS & COMMUNICATION SERVICES
SEWER SERVICE LOCATION
BUILDING C
WATER SERVICE, FIRE SPRINKLER SERVICE, ELECTRIC, GAS & COMMUNICATION SERVICES
SEWER SERVICE LOCATION
INSTALL FIRE HYDRANT
SEWER SERVICE LOCATION
INSTALL FIRE HYDRANT
BUILDING B
WATER SERVICE, FIRE SPRINKLER SERVICE, ELECTRIC, GAS & COMMUNICATION SERVICES
NEW MANHOLE
NEW 8" SEWER MAIN
SEWER SERVICE LOCATION
PARKING LOT B
WATER SERVICE, FIRE SPRINKLER SERVICE, ELECTRIC, GAS & COMMUNICATION SERVICES
BUILDING A
SEWER SERVICE LOCATION
NEW MANHOLE
EX. FIRE HYDRANT
INSTALL NEW SEWER LINE INTO EX. MANHOLE
END NEW 8" WATER LINE CONSTRUCTION
EX. ELECTRIC VAULT END NEW ELECTRIC LINE CONSTRUCTION
ZONE A
ZONE B
ZONE D
ZONE D
ZONE A

N:\PROJECTS\2020\20002-Bell Rippy Townhouses\dwg\20002 C-Utility.dwg 4/20/2020 9:01 AM

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N/A
N/A
N/A

Engineer or Surveyor Seal

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Review

Client Information:
TRIUMPH
12 VAIL ROAD, SUITE 700
VAIL, COLORADO 81657
970 479-9990

NORTH
0 40' 80'
Scale: 1" = 40'

811
Know what's below.
Call before you dig.

GLENWOOD SPRINGS, COLORADO

Bell Rippy Neighborhood

Overall Utility Plan

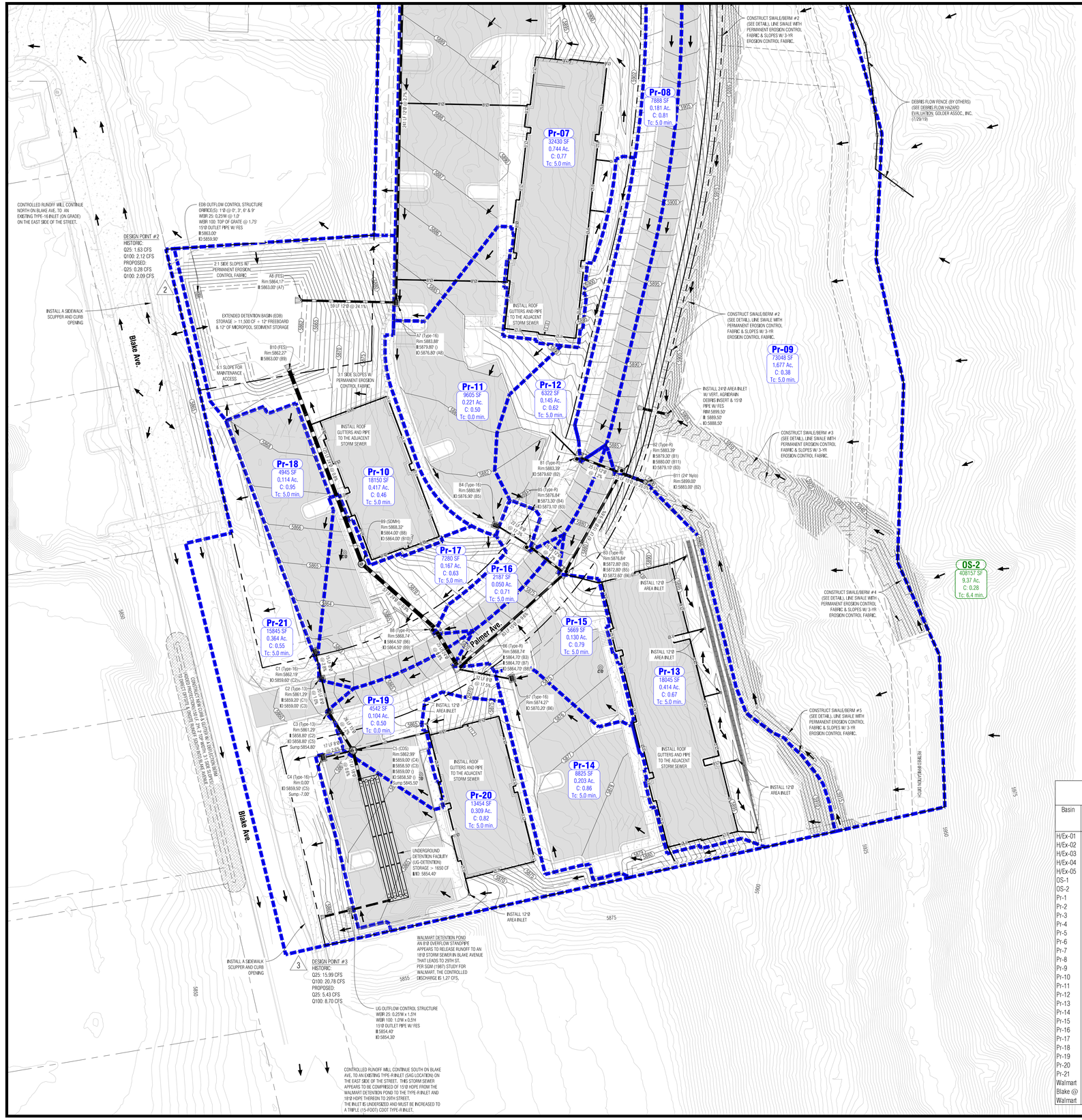
30% Review Set - Major Site Plan Submission

No.	Date	Revision	By
1.	4.20.20	CITY COMMENTS TO 30% SUBMITTAL	PH
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

PROJECT NO. 20002
Designer: DJW
Drafter: BUI
Date: 3/03/20

Sheet C.9

File Name: 20002 c-utility.dwg


Pr-07
32430 SF
0.744 Ac.
C: 0.77
Tc: 5.0 min.
Pr-08
7888 SF
0.181 Ac.
C: 0.81
Tc: 5.0 min.
Pr-09
73048 SF
1.677 Ac.
C: 0.38
Tc: 5.0 min.
Pr-10
18150 SF
0.417 Ac.
C: 0.46
Tc: 5.0 min.
Pr-11
9605 SF
0.221 Ac.
C: 0.50
Tc: 0.0 min.
Pr-12
6322 SF
0.145 Ac.
C: 0.62
Tc: 5.0 min.
Pr-13
18045 SF
0.414 Ac.
C: 0.67
Tc: 5.0 min.
Pr-14
8825 SF
0.203 Ac.
C: 0.86
Tc: 5.0 min.
Pr-15
5660 SF
0.130 Ac.
C: 0.79
Tc: 5.0 min.
Pr-16
2187 SF
0.050 Ac.
C: 0.71
Tc: 5.0 min.
Pr-17
7280 SF
0.167 Ac.
C: 0.63
Tc: 5.0 min.
Pr-18
4945 SF
0.114 Ac.
C: 0.95
Tc: 5.0 min.
Pr-19
4542 SF
0.104 Ac.
C: 0.50
Tc: 0.0 min.
Pr-20
13454 SF
0.309 Ac.
C: 0.82
Tc: 5.0 min.
Pr-21
15845 SF
0.364 Ac.
C: 0.55
Tc: 5.0 min.
OS-2
408157 SF
9.37 Ac.
C: 0.28
Tc: 6.4 min.
Blake Ave.
Palmer Ave
DESIGN POINT #2
HISTORIC
Q25: 1.63 CFS
Q100: 2.12 CFS
PROPOSED:
Q25: 0.28 CFS
Q100: 2.09 CFS
DESIGN POINT #3
HISTORIC
Q25: 15.99 CFS
Q100: 20.78 CFS
PROPOSED:
Q25: 5.43 CFS
Q100: 8.70 CFS
CONTROLLED RUNOFF WILL CONTINUE NORTH ON BLAKE AVE. TO AN EXISTING TYPE-16 INLET (ON GRADE) ON THE EAST SIDE OF THE STREET.
EDB OUTFLOW CONTROL STRUCTURE ORIFICE(S): 1'@ 0', 2', 5' & 9'
WEIR 25: 0.25'W @ 1.0'
WEIR 100: TOP OF GRATE @ 1.75'
15"Ø OUTLET PIPE W/ FES
INVERT=5863.00'
INVERT=5859.90'
2:1 SIDE SLOPES W/ PERMANENT EROSION CONTROL FABRIC
A8 (FES)
Rim:5864.17'
INVERT=5863.00' (A1)
59 LF 12"Ø @ 24.1%
EXTENDED DETENTION BASIN (EDB)
STORAGE = 11,500 CF + 12" FREEBOARD
& 12" OF MICROPOOL SEDIMENT STORAGE
B10 (FES)
Rim:5862.27'
INVERT=5863.00' (B9)
6:1 SLOPE FOR MAINTENANCE ACCESS
3:1 SIDE SLOPES W/ PERMANENT EROSION CONTROL FABRIC
INSTALL A SIDEWALK SCUPPER AND CURB OPENING
A7 (Type-16)
Rim:5883.88'
INVERT=5879.80' ()
INVERT=5876.80' (A8)
INSTALL ROOF GUTTERS AND PIPE TO THE ADJACENT STORM SEWER
B4 (Type-16)
Rim:5880.96'
INVERT=5876.90' (B5)
B9 (SDMH)
Rim:5868.32'
INVERT=5864.00' (B8)
INVERT=5864.00' (B10)
B8 (Type-R)
Rim:5868.74'
INVERT=5864.50' (B6)
INVERT=5864.50' (B9)
C1 (Type-16)
Rim:5862.19'
INVERT=5859.60' (C2)
C2 (Type-13)
Rim:5861.29'
INVERT=5859.20' (C1)
INVERT=5859.00' (C3)
C3 (Type-13)
Rim:5861.29'
INVERT=5858.80' (C2)
INVERT=5858.80' (C4)
Sump:5854.80'
C4 (Type-16)
Rim:0.00'
INVERT=5859.50' (C5)
Sump=7.00'
C5 (CDS)
Rim:5862.99'
INVERT=5859.00' (C4)
INVERT=5858.50' (C3)
INVERT=5859.00' ()
INVERT=5858.50' ()
Sump:5845.50'
INSTALL ROOF GUTTERS AND PIPE TO THE ADJACENT STORM SEWER
B1 (Type-R)
Rim:5883.39'
INVERT=5879.60' (B2)
B2 (Type-R)
Rim:5883.29'
INVERT=5879.30' (B1)
INVERT=5880.00' (B11)
INVERT=5879.10' (B3)
B11 (24" Nylo)
Rim:5899.00'
INVERT=5883.00' (B2)
B3 (Type-R)
Rim:5876.84'
INVERT=5872.80' (B2)
INVERT=5872.80' (B5)
INVERT=5872.60' (B6)
B6 (Type-R)
Rim:5868.74'
INVERT=5864.70' (B5)
INVERT=5864.70' (B8)
B7 (Type-16)
Rim:5874.27'
INVERT=5870.20' (B6)
INSTALL 12"Ø AREA INLET
INSTALL 24"Ø AREA INLET W/ VERT. AGRERVAN DEBRIS INSERT & 15"Ø PIPE W/ FES
RIM:5899.50'
INVERT=5889.50'
INVERT=5888.50'
UNDERGROUND DETENTION FACILITY (UG-DETENTION) STORAGE = 1650 CF
INVERT=5854.40'
WALMART DETENTION POND
AN 8'Ø OVERFLOW STANDPIPE APPEARS TO RELEASE RUNOFF TO AN 18"Ø STORM SEWER IN BLAKE AVENUE THAT LEADS TO 29TH ST.. PER SGM (1987) STUDY FOR WALMART, THE CONTROLLED DISCHARGE IS 1.27 CFS.
UG OUTFLOW CONTROL STRUCTURE
WIER 25: 0.25'W x 1.5'H
WIER 100: 1.0'W x 0.5'H
15"Ø OUTLET PIPE W/ FES
INVERT=5854.40
INVERT=5854.20
CONTROLLED RUNOFF WILL CONTINUE SOUTH ON BLAKE AVE. TO AN EXISTING TYPE-R INLET (SAG LOCATION) ON THE EAST SIDE OF THE STREET. THIS STORM SEWER APPEARS TO BE COMPRISED OF 15"Ø HDPE FROM THE WALMART DETENTION POND TO THE TYPE-R INLET AND 18"Ø HDPE THEREON TO 29TH STREET. THE INLET IS UNDERSIZED AND MUST BE INCREASED TO A TRIPLE (15-FOOT) CDOT TYPE-R INLET.
CONSTRUCT SWALE/BERM #2 (SEE DETAIL). LINE SWALE WITH PERMANENT EROSION CONTROL FABRIC & SLOPES W/ 3-YR EROSION CONTROL FABRIC.
DEBRIS FLOW FENCE (BY OTHERS) (SEE DEBRIS FLOW HAZARD EVALUATION, GOLDER ASSOC., INC. (7/29/19)
CONSTRUCT SWALE/BERM #3 (SEE DETAIL). LINE SWALE WITH PERMANENT EROSION CONTROL FABRIC & SLOPES W/ 3-YR EROSION CONTROL FABRIC.
CONSTRUCT SWALE/BERM #4 (SEE DETAIL). LINE SWALE WITH PERMANENT EROSION CONTROL FABRIC & SLOPES W/ 3-YR EROSION CONTROL FABRIC.
CONSTRUCT SWALE/BERM #5 (SEE DETAIL). LINE SWALE WITH PERMANENT EROSION CONTROL FABRIC & SLOPES W/ 3-YR EROSION CONTROL FABRIC.
INSTALL 12"Ø AREA INLET
INSTALL ROOF GUTTERS AND PIPE TO THE ADJACENT STORM SEWER
INSTALL 12"Ø AREA INLET
INSTALL 12"Ø AREA INLET
INSTALL 12"Ø AREA INLET
RESERVED PARKING LOT
5960
5965
5970
5975
5980
5985
5990
5995
6000
6005
6010
6015
6020
6025
6030
6035
6040
6045
6050
6055
6060
6065
6070
6075
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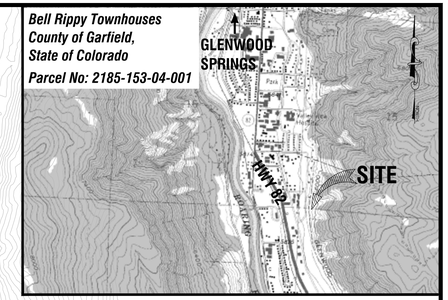
6085
6090
6095
6100
6105
6110
6115
6120
6125
6130
6135
6140
6145
6150
6155

Bell Rippy Townhouses
County of Garfield,
State of Colorado
Parcel No: 2185-153-04-001



VICINITY MAP
Scale: 1" = 4000'

ZONE A
ZONE B
ZONE C
ZONE D

RUNOFF (OFFSITE PASS-THRU) MINUS A MINOR AMOUNT CAPTURED BY INLETS A1/A2/) WILL CONTINUE NORTH ON 26TH ST., TO EXISTING AREA INLETS ON BLAKE AVE.

DESIGN POINT #1
HISTORIC:
Q25: 102.44 CFS
Q100: 131.82 CFS
PROPOSED:
Q25: 102.12 CFS
Q100: 131.44 CFS

CONSTRUCT A DEFLECTION BERM (2H, 2' TOP WIDTH, 3:1 SIDE SLOPES) TO DIRECT OFFSITE & ONSITE RUNOFF WEST INTO 26TH ST.

A3 (Type-16)
Rim:5896.76
I: 5891.20' (A2)
IO:5891.00' (A4)

A2 (Type-R)
Rim:5896.57
I: 5892.20' (A1)
IO:5892.00' (A3)

81 LF 12"Ø @ 1.2%

25 LF 12"Ø @ 1.2%

A1 (Type-R)
Rim:5896.57
IO:5892.50' (A2)

RUNOFF CAPTURE HEAD/STEM WALL W/ CONCRETE APRON & A 24'x2' CONCRETE BOX CULVERT @ 1% MIN.
TOW: 5910.00'
I: 5902.50' IO:5902.00'
INSTALL GROUTED RIPRAP (5'x20') FROM THE OUTLET TO THE CURB.

Pr-04
14401 SF
0.331 Ac.
C: 0.33
Tc: 5.0 min.

RUNOFF FROM PR-04 WILL SHEET FLOW WEST ONTO ADJACENT PROPERTIES AT A PEAK FLOW RATE AND QUANTITY LESS THAN HISTORIC

Pr-03
12339 SF
0.283 Ac.
C: 0.79
Tc: 5.0 min.

13 LF 12"Ø @ 10%

CONSTRUCT SWALE/BERM #1 (SEE DETAIL, LINE SWALE WITH PERMANENT EROSION CONTROL FABRIC & SLOPES W/ 3-YR EROSION CONTROL FABRIC.

CONSTRUCT 16'W DRIVE (8% MAX.)

CONSTRUCT 10'W ACCESS TRAIL (8% MAX.)

1.5:1 SLOPES W/ 3-YR EROSION CONTROL FABRIC

DEBRIS FLOW FENCE (BY OTHERS) (SEE DEBRIS FLOW HAZARD EVALUATION, GOLDER ASSOC., INC. (7/29/19)

ZONE C
ZONE A

ZONE A
ZONE D

A9 (SDMH)
Rim:5900.15'
I: 5894.40' (A10)
IO:5894.20' (A4)

34 LF 12"Ø @ 1.1%

A4 (SDMH)
Rim:5899.80
I: 5889.70' (A3)
I: 5893.80' (A9)
IO:5889.50' (A5)

A5 (SDMH)
Rim:5893.85'
I: 5889.10' (A4)
IO:5888.90' (A6)

117 LF 12"Ø @ 2.1%

Pr-01
24815 SF
0.570 Ac.
C: 0.48
Tc: 5.0 min.

Pr-02
5326 SF
0.122 Ac.
C: 0.83
Tc: 5.0 min.

Pr-05
6391 SF
0.147 Ac.
C: 0.77
Tc: 5.0 min.

Pr-06
12701 SF
0.292 Ac.
C: 0.78
Tc: 5.0 min.

OS-1
5423220 SF
124.5 Ac.
C: 0.36
Tc: 22.5 min.

REVEGETATION MITIGATION

CUT IN SWALE BEHIND THE FENCE TO DIRECT RUNOFF TO SWALE/BERM #1

A6 (SDMH)
Rim:5890.77'
I: 5886.50' (A5)

A10 (12" NyloI)
Rim:5899.00'
IO:5896.00' (A9)

CONSTRUCT SWALE/BERM #2 (SEE DETAIL, LINE SWALE WITH PERMANENT EROSION CONTROL FABRIC & SLOPES W/ 3-YR EROSION CONTROL FABRIC.

241 LF 12"Ø @ 2.1%

Pr-08
7888 SF
0.181 Ac.
C: 0.81
Tc: 5.0 min.

Pr-07
32430 SF
0.744 Ac.

5850 5875 5900 5925 5950 5975 6000

N:\PROJECTS\2020\20002-Bell Rippy Townhouses\dwg\20002-C-Drainage.dwg 4/20/2020 9:05 AM

Boundaries Unlimited Inc.
Civil Engineering
Surveying
& Beyond
923 Cooper Ave., Ste. 201
Glenwood Springs, CO 81601
(T) 970.945.5252
www.bu-inc.com

Subsurface Utility Engineering (SUE)
Required Project: ***N/A***

If "Yes", SUE Certification by:
Firm: ***N/A***
Job #: ***N/A***
Date: ***N/A***

Engineer or Surveyor Seal

Client Information:
TRIUMPH
12 VAIL ROAD, SUITE 700
VAIL, COLORADO 81657
970 479-9990

NORTH
0 10' 20'
Scale: 1" = 10'

811 Know what's below. Call before you dig.

GLENWOOD SPRINGS, COLORADO

Bell Rippy Neighborhood

Drainage Site Plan

30% Review Set - Major Site Plan Submission

No.	Date	Revision	By
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

PROJECT NO.
20002
Designer:
DJW
Drafter:
BUI
Date:
3/03/20

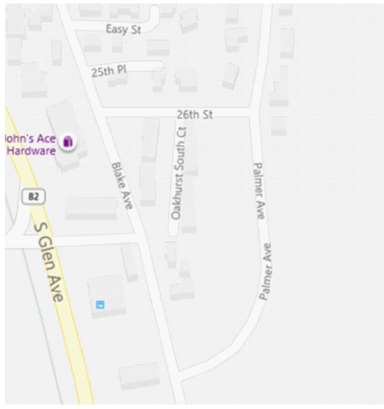
Sheet
SD-2

File Name: ***20002-c-drainage.dwg***

BELL RIPPY APARTMENTS

RENTAL RESIDENTIAL UNITS
- 6 BUILDINGS
- 100 UNITS

GLENWOOD SPRINGS
GARFIELD COUNTY, COLORADO



VACINITY MAP

LANDSCAPE AREA: 4/21/2020

SITE LANDSCAPE (not including parking lot landscape)

		TREES		SHRUBS		PERENNIALS	
NORTH PARCEL		REQUIRED	PROVIDED	REQUIRED	PROVIDED	REQUIRED	PROVIDED
lot	121,154						
Bldgs	51,594						
parking lot	37,585						
landscape	56,475	141	86	565	678	1,129	substitute 113 shrubs
walk	5,892						
SOUTH PARCEL		TREES		SHRUBS		PERENNIALS	
		REQUIRED	PROVIDED	REQUIRED	PROVIDED	REQUIRED	PROVIDED
lot	43,121						
BLDg	19,000						
parking lot	14,777						
landscape	15,554	39	65	156	188	311	substitute 32 shrubs
walk	2,669						
	total	180	131	720	866	1,441	sub for 144 shrubs

STREET TREES	LINEAR FEET	REQ. TREES - 1/25 LF	PROVIDED	
PALMER AVE - EAST SIDE	924	13	58	
PALMER AVE - WEST SIDE	924	13	32	
26TH ST. SOUTH SIDE	110	5	5	
BLAKE AVE. EAST SIDE	444	5	5	
	total	36	60	

PARKING LOT ISLANDS:		1 TREE/ISLAND		5 SHRUBS/ISLAND		
		REQUIRED	PROVIDED	REQUIRED	PROVIDED	
		19	18	93	93	
	total project	233	217	815	961	1,441 sub for shrubs
			(16)		146	10 per/shrub

PARKING LOT AREA	% required	REQUIRED SF	PROVIDED SF	percentage provided
NORTH:	10	7,517	23,57	31%
SOUTH:	10	5,955	5,955	20%

LANDSCAPE TOTALS

Bell Rippy Apartments - Zoning Summary for Residential Transitional (RT) District

Lot Area	2700 Palmer	5.51	acres		
	2710 Blake	0.23	acres		
	Total	5.74	acres		
Zoning Criteria		**Code**		**Proposed Plan**	
Use		Permitted Use		Dwelling, multifamily	
Density	Lot SF/Unit	2,500			
	Total Permitted Units	100	units	100	units
Setbacks	Front (Non-Arterial)	10	feet	10+	feet
	Side	5	feet	5+	feet
	Rear	10	feet	10+	feet
Height		40	feet	40	feet
Lot Coverage	Allowed	50%			
	Square Feet	120,008	sf	31,630	sf
Landscape Area	Minimum Required	20%			
	Square Feet	48,003	sf	122,540	sf
Parking	Resident Parking (per DU)	1.5	150		
	Guest Parking (per DU)	0.2	20		
	Subtotal		170		
	Transit Proximity Discount	20%	(34)		
	Total		136	148	spaces

ZONING TABLE

LIST OF SHEETS

ARCHITECTURAL

A0	COVER SHEET, LIST OF SHEETS, PROJECT DATA
A1	SITE PLAN
A1.1	SITE ACCESSORIES
A1.2	SITE LIGHTING PLAN
AA2.0	BUILDING A FLOOR PLANS
AA3.0	BUILDING A ELEVATIONS
AA3.1	BUILDING A ELEVATIONS MATERIAL CALCS
AA5.0	BUILDING SECTIONS
AA8.0	TYPICAL UNIT PLANS
AB2.0	BUILDING B FLOOR PLANS
AB3.0	BUILDING B ELEVATIONS
AB3.1	BUILDING B ELEVATIONS MATERIAL CALCS
AC2.0	BUILDING C FLOOR PLANS
AC2.1	BUILDING C FLOOR PLANS
AC3.0	BUILDING C ELEVATIONS
AC3.1	BUILDING C ELEVATIONS
AC3.2	BUILDING C ELEVATIONS MATERIAL CALCS
AC3.3	BUILDING C ELEVATIONS MATERIAL CALCS
AD2.0	BUILDING D FLOOR PLANS
AD2.1	BUILDING D FLOOR PLANS
AD3.0	BUILDING D ELEVATIONS
AD3.1	BUILDING D ELEVATIONS
AD3.2	BUILDING D ELEVATIONS MATERIAL CALCS
AD3.3	BUILDING D ELEVATIONS MATERIAL CALCS
AE2.0	BUILDING E FLOOR PLANS
AE2.1	BUILDING E FLOOR PLANS
AE3.0	BUILDING E ELEVATIONS
AE3.1	BUILDING E ELEVATIONS
AE3.2	BUILDING E ELEVATIONS MATERIAL CALCS
AE3.3	BUILDING E ELEVATIONS MATERIAL CALCS
AF2.0	BUILDING F FLOOR PLANS
AF3.0	BUILDING F ELEVATIONS
AF3.1	BUILDING F ELEVATIONS MATERIAL CALCS

CIVIL

T1	COVER SHEET - SPEC
C1	OVERALL SITE PLAN
C2	SOUTH SITE PLAN
C3	SOUTH EAST SITE PLAN
C4	NORTH SITE PLAN
C5	PROFILES
C6	SOUTH GRADING / DRAINAGE
C7	SOUTH EAST GRADING / DRAINAGE
C8	NORTH GRADING / DRAINAGE
C9	OVERALL UTILITY PLAN
SD1	SOUTH DRAINAGE PLAN
SD2	NORTH DRAINAGE PLAN

LANDSCAPE:

L1	LANDSCAPE PLAN AND MATERIAL SCHEDULE

STRUCTURAL

MECHANICAL, ELECTRICAL, PLUMBING (MEP)

PROJECT DATA

OWNER: BELL RIPPY GLENWOOD, LLC

OWNER REPRESENTATIVE: TRIUMPH DEVELOPMENT WEST, LLC
MICHAEL O'CONNOR (970) 688-5057

ARCHITECT: TRIUMPH CUSTOM HOMES
MIKE FOSTER (303-475-4413)

STRUCTURAL ENGINEERING: MONROE NEWELL STRUCTURAL ENGINEERS
GRAIG CARROLL (303) 807-8403

MEP ENGINEERING: BURGGRAAF AND ASSOCIATES
MARK BURGGRAAF (970) 240-5990

CONTRACTOR: TBD

PROPERTY INFORMATIN
PARCEL #: 218515304001, 218515302008, 218521100002

ADDRESS: 2700 PALMER AVE & 2710 BLAKE AVE
GLENWOOD SPRINGS, CO 81601
LEGAL: BLOCK 1 (SOUTH OF LOT 9) AND BLOCK 3,

ZONING: RT DISTRICT AND RH DISTRICT

BLDG. HT: 42'-0" AT HIGHEST RIDGE ELEVATION

DESCRIPTION: RESIDENTIAL
TOTAL SF: 99,540 + 7,635 (STORAGE)
TOTAL OF SIX BUILDINGS / 100 UNITS

NOTES:

1. BUILDING CODES:
ALL WORK SHALL COMPLY WITH THE CURRENT CODES, THE INTERNATIONAL BUILDING CODE 2015. INCLUDING THE INTERNATIONAL ENERGY CODE 2009, THE INTERNATIONAL PLUMBING AND MECHANICAL CODES, THE CURRENT NEC AND ALL LOCAL CODES HAVING JURISDICTION.

2. PROPOSED BUILDING TYPE:
TYPE V-A, NFPA 13R SPRINKLED BUILDING
OCCUPANT GROUP:
R-2 - 200 SF / OCCUPANT
BUSINESS - 100 SF / OCCUPANT
MINIMUM FIRE RESISTIVE REQUIREMENTS:
STRUCTURAL FRAME 1 HR
BEARING WALLS 1 HR
FLOOR CONSTRUCTION 1 HR
ROOF CONSTRUCTION 1 HR

OCCUPANCY SEPARATION:
R-2 / B = 1 HR.

FIRE PROTECTION SYSTEM SUBMITTED SEPRATELY (SECTION 903.3)

SMOKE DETECTION SHALL BE PROVIDED THROUGHOUT.

FIRE ALARM SYSTEM (SECTION 907) PROVIDED THROUGHOUT

3. PROPOSED ENERGY COMPLIANCE:
WINDOW AND DOORS, U-0.35 OR LESS.
MINIMUM R-VALUES,
CEILINGS AND ROOFS, R-38
WALLS, R-23
FLOORS, R-30
SLAB PERIMETER AND DEPTH, R10/24-IN
CRAWL SPACE, R-10/13

4. AREA CALCULATIONS:

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12 Vail Road,
suite 700
Vail, CO 81657
Tel: 970.479.9990
www.triumphdev.com

BELL RIPPY
NEIGHBORHOOD
GLENWOOD SPRINGS COLORADO

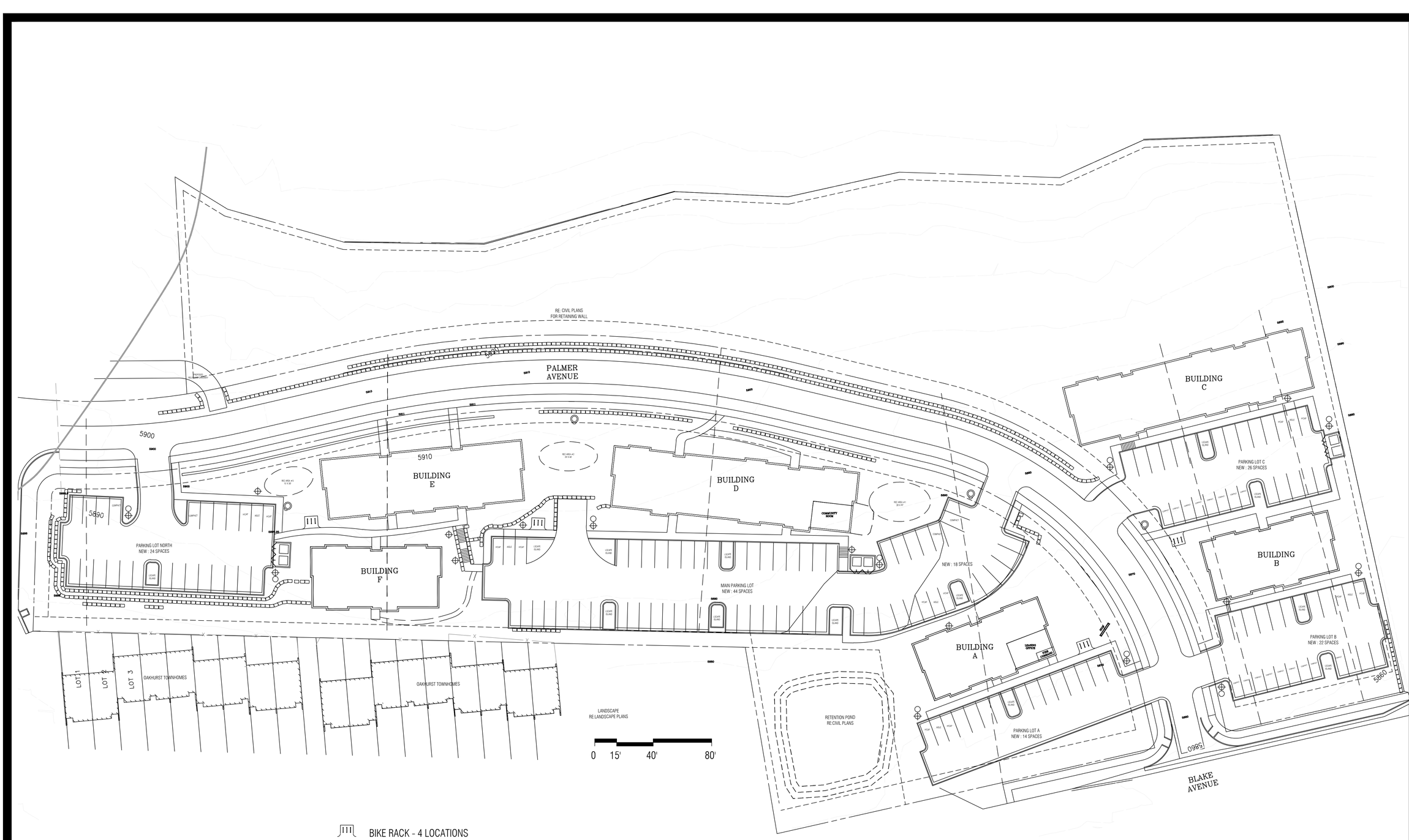
Revision:
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 3-3-20
MAJOR SITE ARCHITECTURAL PLAN RE-SUBMISSION 4-21-20

Sheet title: COVER SHEET

Stamp

Date: 4/21/2020
Project No:
Drawn by: MEF
Checked by: MEF

Sheet AA0.0



BIKE RACK - 4 LOCATIONS

TRASH ENCLOSURE - 3 LOCATIONS

BOLLARD - 10 LOCATIONS

LIGHT POLE - 11 LOCATIONS

SITE SIGNAGE

FIRE HYDRANTS - 4 LOCATIONS

1 SITE PLAN
1" = 30'-0"

NORTH

SITE PLAN

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2700 PALMER AVE
GLENWOOD SPRINGS COLORADO

Revisions:
MAJOR SITE
ARCHITECTURAL
PLAN SUBMISSION
3-3-20

Sheet title
SCHEMATIC
SITE
PLAN

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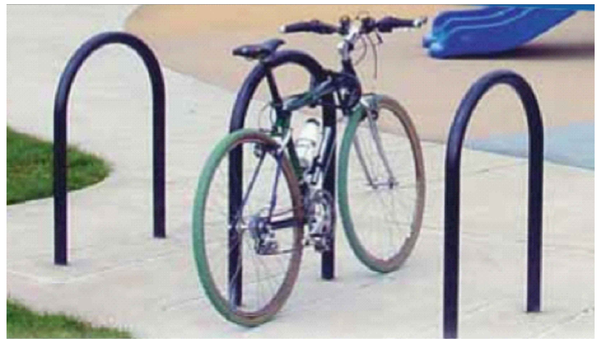
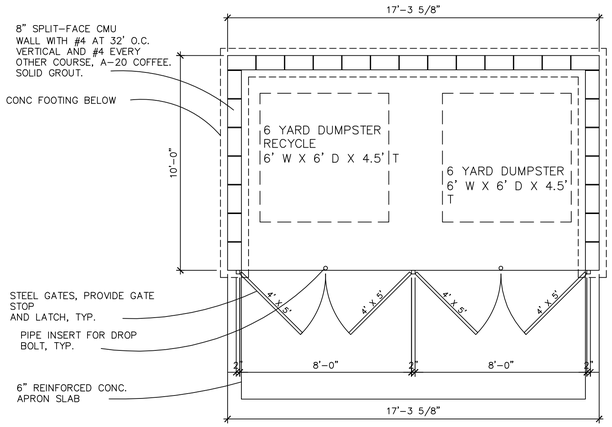
Date: 2/26/2020
Project No:
Drawn by: MEF
Checked by: MEF

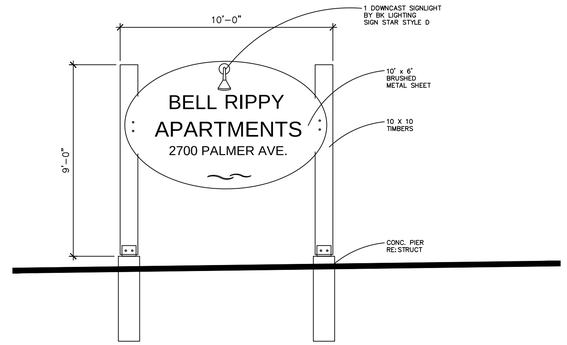
Sheet AA1.0



7 BIKE RACKS
N.T.S.

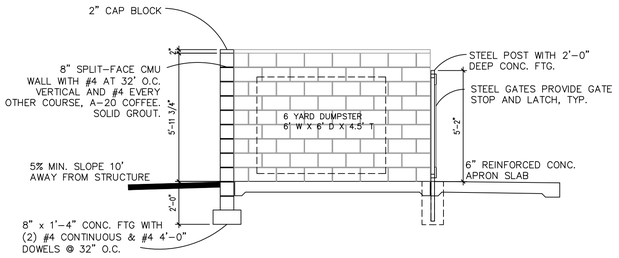


4 TRASH ENCLOSURE PLAN
N.T.S.



1 MONUMENT SIGN
N.T.S.

8 TRASH ENCLOSURE
N.T.S.



5 TRASH ENCLOSURE SECTION
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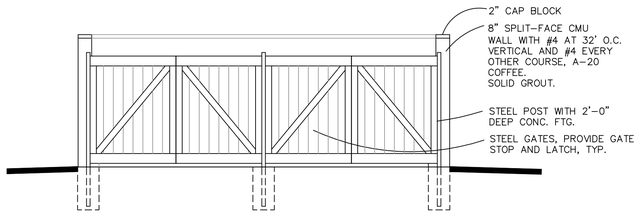
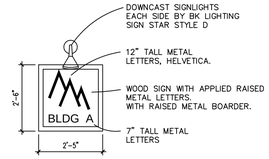


6 TRASH ENCLOSURE ELEVATION
N.T.S.



2 BUILDING SIGNAGE
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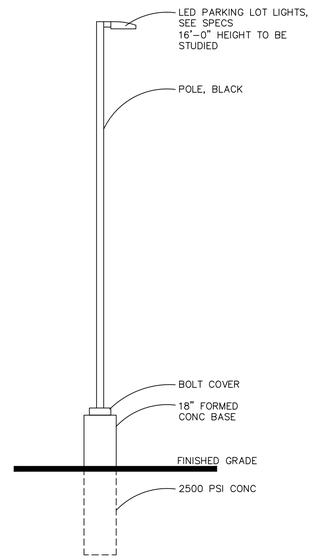

3 PARKING LOT LIGHTING
N.T.S.

SITE - ACCESSORIES

TRIUMPH
Vail Office
12 Vail Road,
suite 7000
Vail, CO 81657
Tel: 970.479.9990
www.triumphdev.com

BELL RIPPY
NEIGHBORHOOD
GLENWOOD SPRINGS COLORADO

Revisions:
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 3-3-20
MAJOR SITE ARCHITECTURAL PLAN RE-SUBMISSION 4-21-20

Sheet title
SITE PLAN ACCESSORIES

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Date: 4/21/2020
Project No:
Drawn by: MEF
Checked by: MEF

Sheet AA1.1

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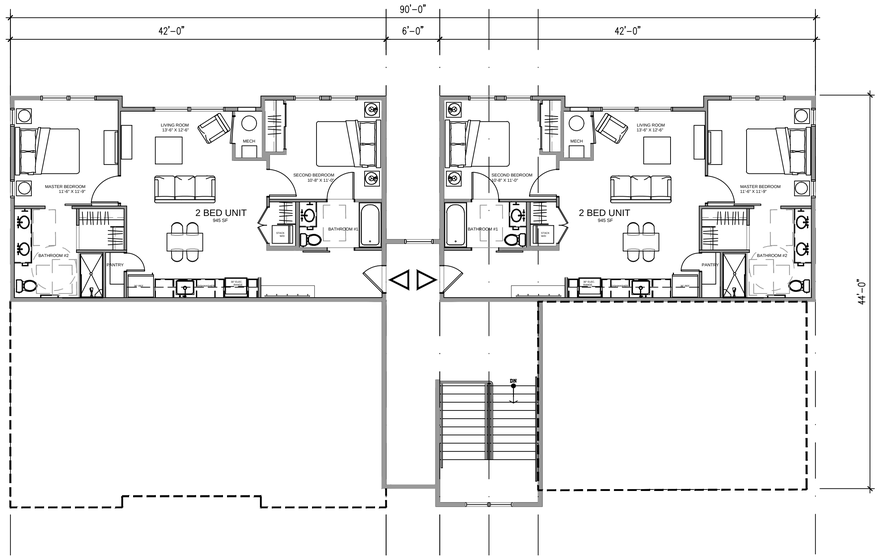
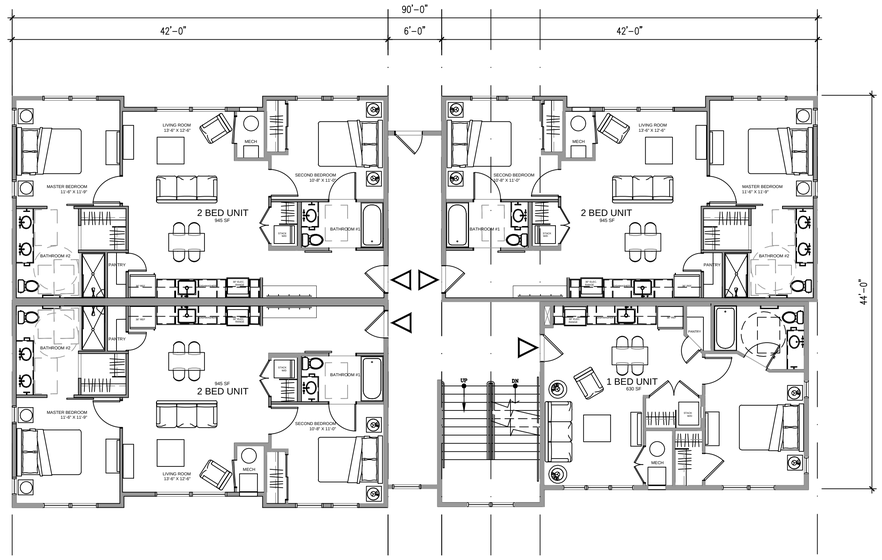


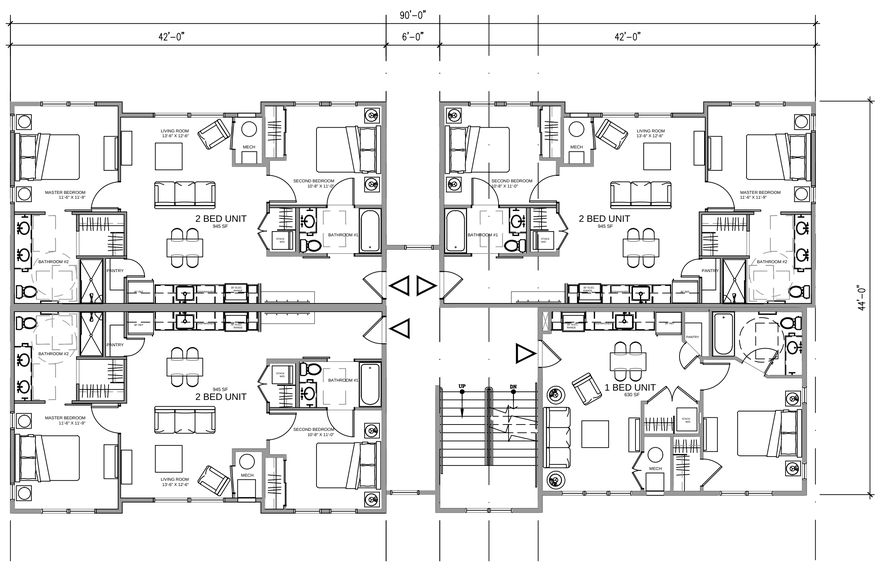
4 BUILDING A - THIRD LEVEL PLAN
1/8" = 1'-0"



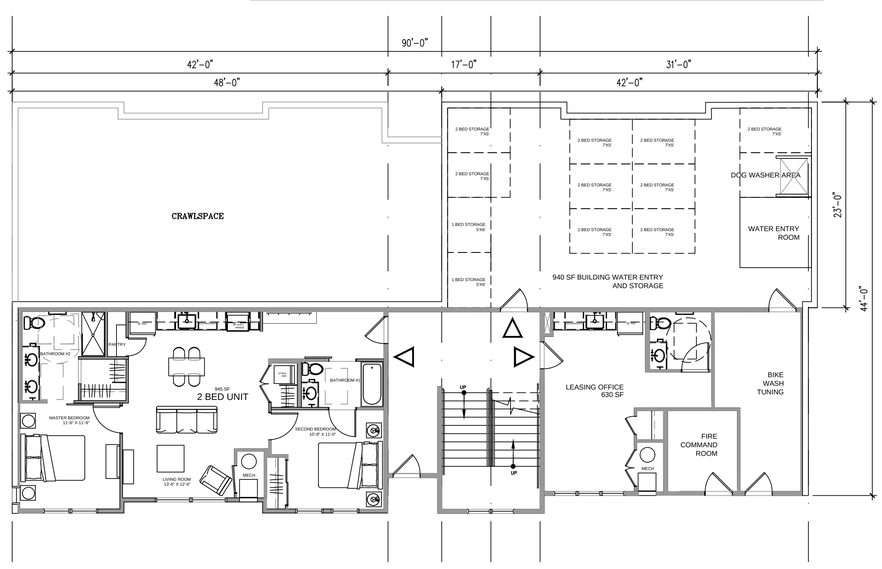
2 BUILDING A - FIRST LEVEL PLAN
1/8" = 1'-0"

BELL RIPPY APARTMENTS

FLOOR	BUILDING COMMUNITY ROOM / LEASING	1 BEDROOM UNITS	2 BEDROOM UNITS	CIRCULATION	UTILITY / STORAGE	TOTAL SF (NOT INCLUDING STORAGE)
BUILDING A	630 SF	2 UNITS	9 UNITS	1,720 SF	940 SF	12,100 SF
BUILDING B		3 UNITS	9 UNITS	1,720 SF	940 SF	12,100 SF
BUILDING C		12 UNITS	12 UNITS	3,440 SF	1,840 SF	22,340 SF
BUILDING D	630 SF	11 UNITS	12 UNITS	3,440 SF	1,750 SF	22,340 SF
BUILDING E		6 UNITS	12 UNITS	3,440 SF	1,225 SF	18,580 SF
BUILDING F		3 UNITS	9 UNITS	1,720 SF	940 SF	12,100 SF
TOTALS EACH BUILDING	1,260 SF	37 UNITS	63 UNITS	15,480 SF	7,635 SF	99,540 SF +7,635 SF 107,175 SF



3 BUILDING A - SECOND LEVEL PLAN
1/8" = 1'-0"



1 BUILDING A - GARDEN LEVEL PLAN
1/8" = 1'-0"

APARTMENT BUILDINGS - SCHEMATIC PLANS

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GLENWOOD SPRINGS COLORADO

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MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 3-3-20
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION revised 4-20-20

Sheet title
SCHEMATIC BUIDLING A PLANS

Stamp

Date: 4/16/2020
Project No:
Drawn by: MEF
Checked by: MEF

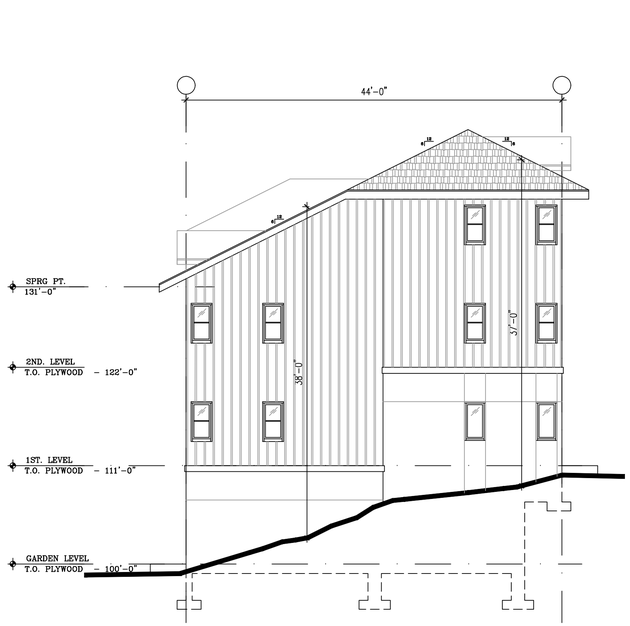
Sheet AA2.0

BUILDING A - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	RUSTIC SLATE
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 7" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	KHAKI BROWN
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	COBBLE BROWN
S2	STUCCO	SYNTHETIC STUCCO SYSTEM	BENJAMIN MOORE "WISH" AF-680
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	BRONZE
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT 4/4 RUSTIC 3.5" RAILS 4/4 RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ ENTRY	FIBER CEMENT - 1/4 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 1/4 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
WD1	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

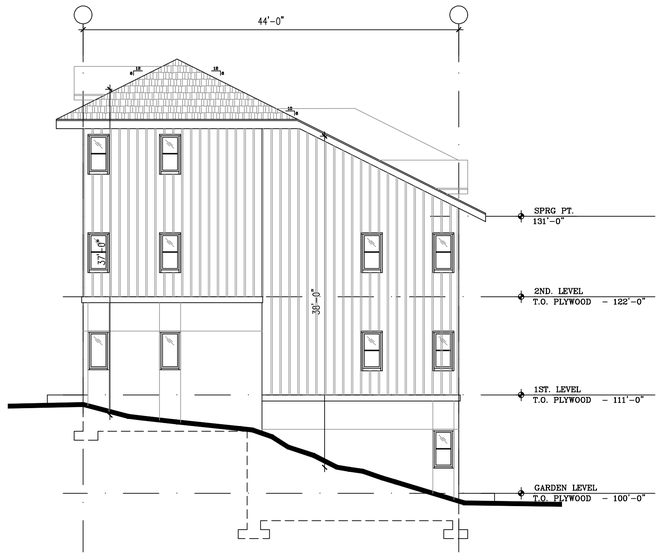
1. IN THE CASE OF ANY DISCREPANCIES BETWEEN THIS SCHEDULE AND OTHER CONTRACT DOCUMENTS, THE INFORMATION ON THIS SCHEDULE SHALL TAKE PRECEDENCE.
2. ALL FLASHING, VENTS, FLUES, ROOFTOP MECHANICAL EQUIPMENT, UTILITY BOXES, AND SIMILAR ITEMS SHALL BE PAINTED TO MATCH ADJACENT PORTIONS OF BUILDINGS UNLESS OTHERWISE NOTED.
3. TYPICAL SIDEWALL FLASHING: ICE&WATER SHIELD 2'-6" VERT UP WALL; WRAP INTO OPENINGS, THEN APPLY TYVEK FLASHING TAPE AROUND PENETRATING PIPE. METAL FLASHING EXPOSED 6" UP WALL: TYPICAL AT ALL SIDEWALL CONDITIONS.

4. THESE ELEVATIONS ARE CONCEPTUAL IN NATURE, INDIVIDUAL BUILDING ELEVATIONS MAY VARY BUT WILL BE EVALUATED FOR COMPLIANCE WITH DESIGN STANDARDS CONTAINED WITHIN TITLE 070 OF THE GLENWOOD SPRINGS MUNICIPAL CODE AT THE TIME OF SUBMITTING A BUILIDNG PERMIT APPLICATION.



3 SOUTH ELEVATION
1/8" = 1'-0"

1 BUILDING A - WEST ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING A - ELEVATIONS

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Revisions:
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 3-3-20
MAJOR SITE ARCHITECTURAL PLAN 2ND SUBMISSION 4-20-20

Sheet title: BUILDING ELEVATIONS

Stamp

Date: 4/17/2020
Project No:
Drawn by: MEF
Checked by: MEF

Sheet AA3.0

NET GLAZING

METAL PANEL

STUCCO

SIGNAGE

CEMENTITIOUS BOARDS

BUILDING A - EXTERIOR FINISH PERCENTAGE

WEST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	2830 SF	NA
NET GLAZING	738 SF	26.1%
NET STUCCO	666 SF	23.5%
NET CEMENTITIOUS BOARDS	1181 SF	41.7%
NET METAL PANEL	245 SF	8.6%

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING A - EXTERIOR FINISH PERCENTAGE

EAST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	2770 SF	NA
NET GLAZING	727 SF	26.2%
NET STUCCO	752 SF	27.1%
NET CEMENTITIOUS BOARDS	815 SF	29.4%
NET METAL PANEL	476 SF	17.2%

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING A - EXTERIOR FINISH PERCENTAGE

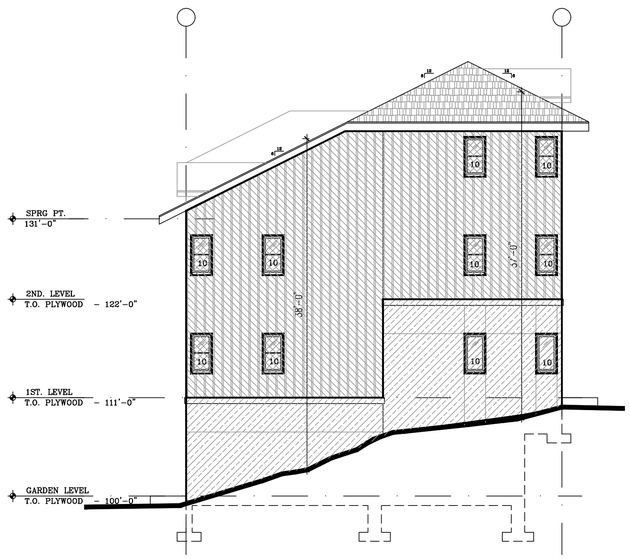
SOUTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	1410 SF	NA
NET GLAZING	100 SF	7.1%
NET STUCCO	438 SF	31.1%
NET CEMENTITIOUS BOARDS	872 SF	61.8%
NET METAL PANEL	N/A	N/A

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING A - EXTERIOR FINISH PERCENTAGE

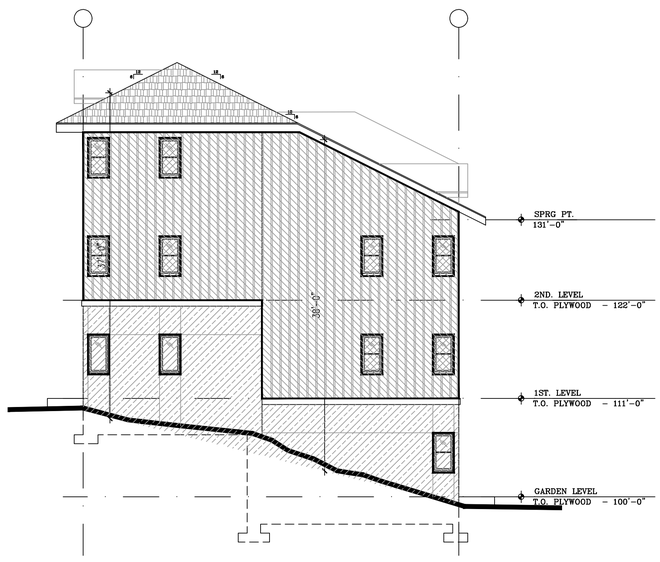
NORTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	1410 SF	NA
NET GLAZING	110 SF	7.8%
NET STUCCO	428 SF	30.4%
NET CEMENTITIOUS BOARDS	872 SF	61.8%
NET METAL PANEL	N/A	N/A

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS



3 SOUTH ELEVATION
1/8" = 1'-0"

1 BUILDING A - WEST ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING A - ELEVATIONS

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MAJOR SITE ARCHITECTURAL PLAN RESUBMISSION 4-20-20

Sheet title
BUILDING ELEVATIONS
MATERIAL CALCS

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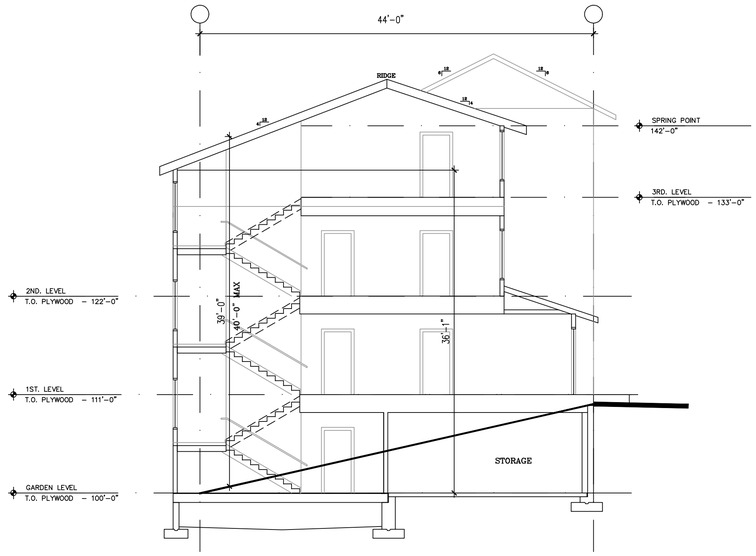
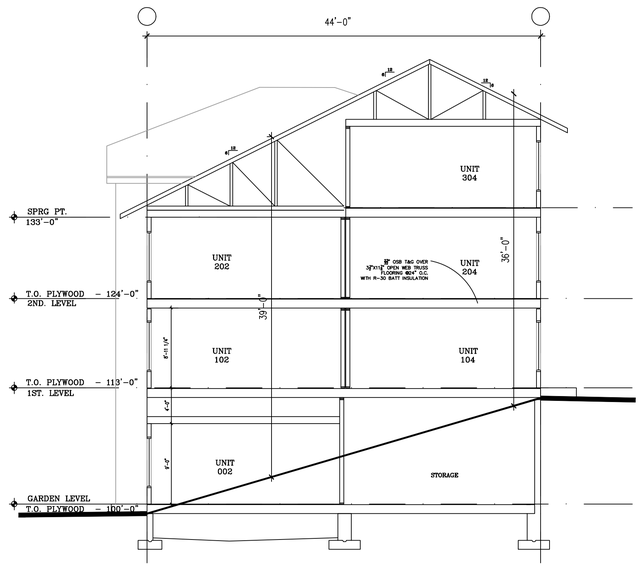


1 BUILDING SECTION - STAIR
1/8" = 1'-0"



2 TYPICAL BUILDING SECTOIN
1/8" = 1'-0"

BUILDING SECTIONS

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MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 4-20-20

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BUILDING SECTIONS

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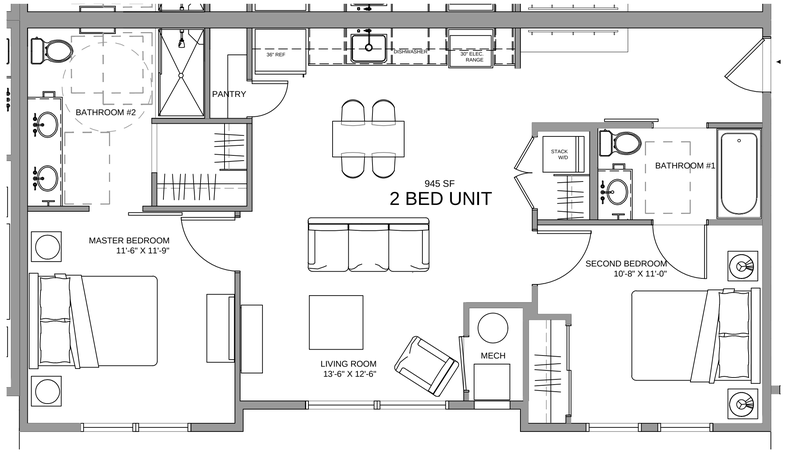
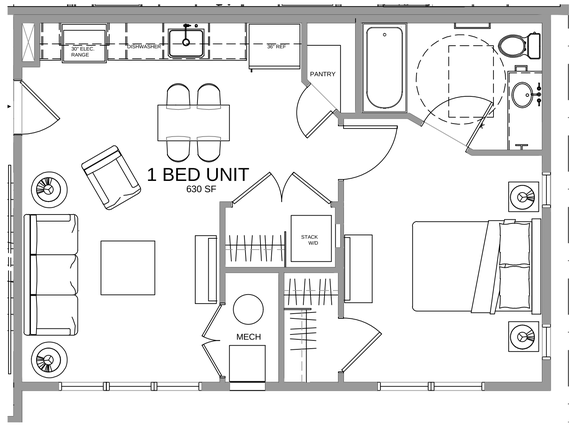
Sheet AA5.0



1 TYPICAL TWO BEDROOM UNIT
1/4" = 1'-0"



2 TYPICAL ONE BEDROOM UNIT
1/4" = 1'-0"

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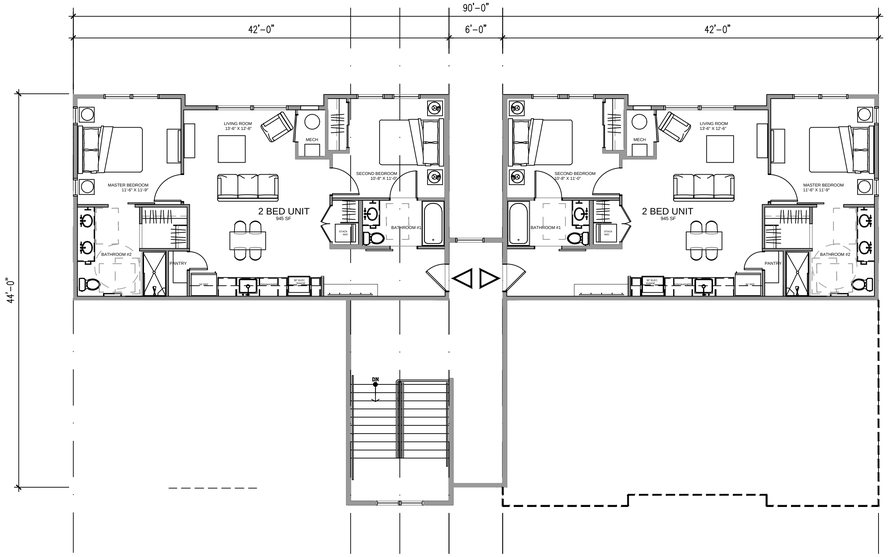
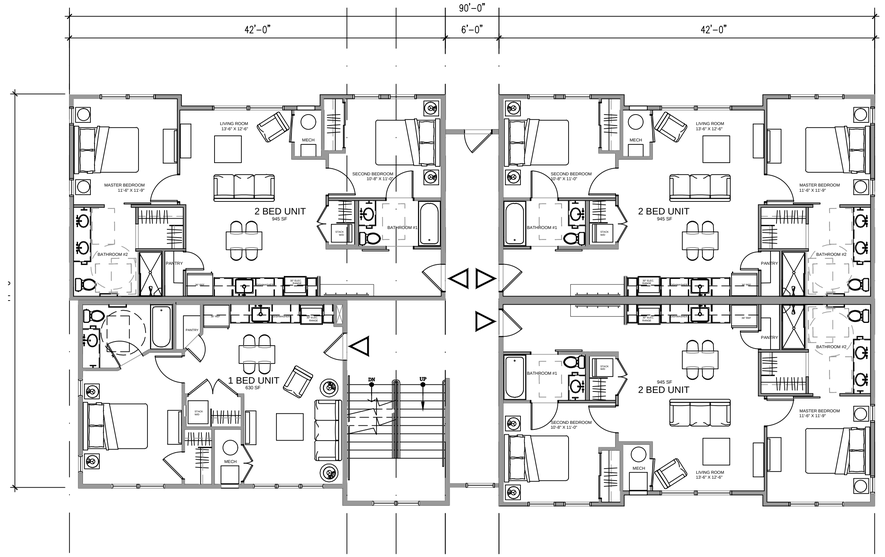
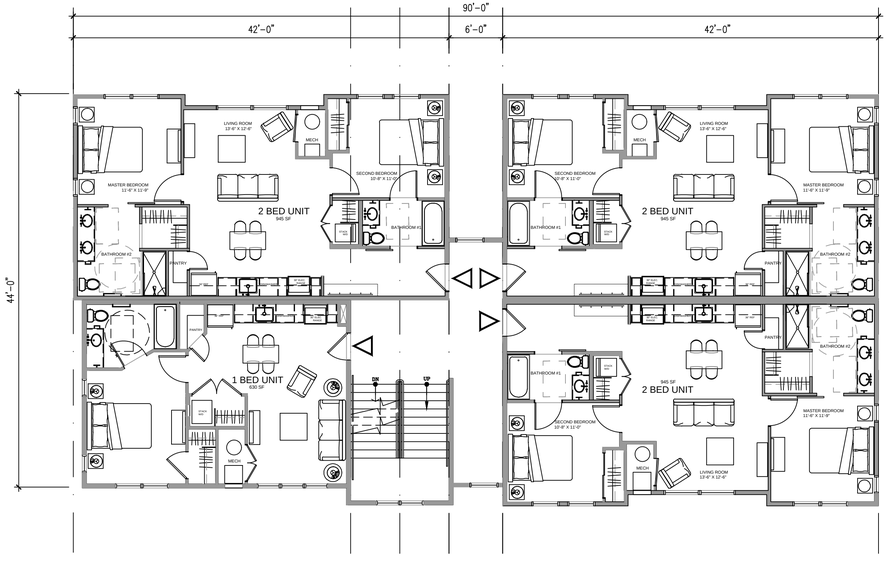
Sheet AA8.0



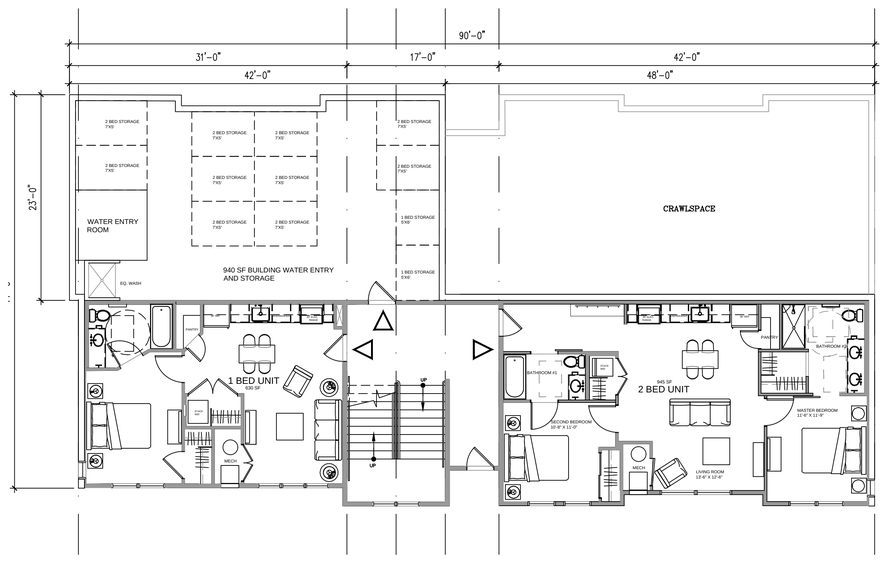
4 BUILDING B - THIRD LEVEL PLAN
1/8" = 1'-0"



2 BUILDING B - FIRST LEVEL PLAN
1/8" = 1'-0"



3 BUILDING B - SECOND LEVEL PLAN
1/8" = 1'-0"



1 BUILDING B - GARDEN LEVEL PLAN
1/8" = 1'-0"

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MAJOR SITE ARCHITECTURAL PLAN SUBMISSION revised 4-20-20

Sheet title
SCHEMATIC BUILDING B PLANS

Stamp

Date: 4/16/2020	Project No:	Drawn by: MEF	Checked by: MEF

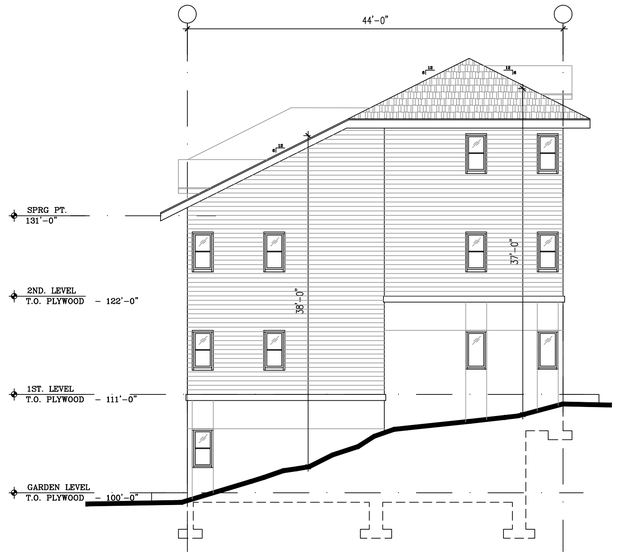
Sheet AB2.0

BUILDING B - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	RUSTIC SLATE
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 7/16" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	KHAKI BROWN
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	COBBLE BROWN
S2	STUCCO	SYNTHETIC STUCCO SYSTEM	BENJAMIN MOORE "WISH" AF-680
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	BRONZE
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT 4/4 RUSTIC 3.5" RAILS & RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ ENDS	FIBER CEMENT - 1/4 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 1/4 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
WD1	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

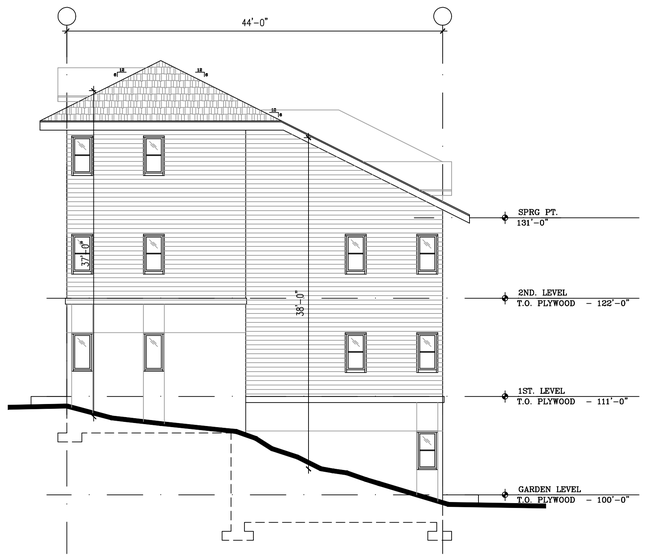
1. IN THE CASE OF ANY DISCREPANCIES BETWEEN THIS SCHEDULE AND OTHER CONTRACT DOCUMENTS, THE INFORMATION ON THIS SCHEDULE SHALL TAKE PRECEDENCE.
2. ALL FLASHING, VENTS, FLUES, ROOFTOP MECHANICAL EQUIPMENT, UTILITY BOXES, AND SIMILAR ITEMS SHALL BE PAINTED TO MATCH ADJACENT PORTIONS OF BUILDINGS UNLESS OTHERWISE NOTED.
3. TYPICAL SIDEWALL FLASHING: ICE&WATER SHIELD 2'-6" VERT UP WALL; WRAP INTO OPENINGS, THEN APPLY TYVEK FLASHING TAPE AROUND PENETRATING PIPE. METAL FLASHING EXPOSED 6" UP WALL; TYPICAL AT ALL SIDEWALL CONDITIONS.

4. THESE ELEVATIONS ARE CONCEPTUAL IN NATURE, INDIVIDUAL BUILDING ELEVATIONS MAY VARY BUT WILL BE EVALUATED FOR COMPLIANCE WITH DESIGN STANDARDS CONTAINED WITHIN TITLE 070 OF THE GLENWOOD SPRINGS MUNICIPAL CODE AT THE TIME OF SUBMITTING A BUILDING PERMIT APPLICATION.



3 SOUTH ELEVATION
1/8" = 1'-0"

1 BUILDING - WEST ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING B - ELEVATIONS

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Revisions:
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 3-3-20
MAJOR SITE ARCHITECTURAL PLAN 2nd SUBMISSION 4-20-20

Sheet title: BUILDING ELEVATIONS

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Date: 4/17/2020
Project No:
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Sheet AB3.0

NET GLAZING

METAL PANEL

STUCCO

SIGNAGE

CEMENTITIOUS BOARDS

BUILDING B - EXTERIOR FINISH PERCENTAGE

WEST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	2830 SF	NA
NET GLAZING	738 SF	26.1%
NET STUCCO	666 SF	23.5%
NET CEMENTITIOUS BOARDS	1181 SF	41.7%
NET METAL PANEL	245 SF	8.6%

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING B - EXTERIOR FINISH PERCENTAGE

EAST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	2770 SF	NA
NET GLAZING	727 SF	26.2%
NET STUCCO	752 SF	27.1%
NET CEMENTITIOUS BOARDS	815 SF	29.4%
NET METAL PANEL	476 SF	17.2%

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING B - EXTERIOR FINISH PERCENTAGE

SOUTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	1410 SF	NA
NET GLAZING	110 SF	7.8%
NET STUCCO	428 SF	30.4%
NET CEMENTITIOUS BOARDS	872 SF	61.8%
NET METAL PANEL	N/A	N/A

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

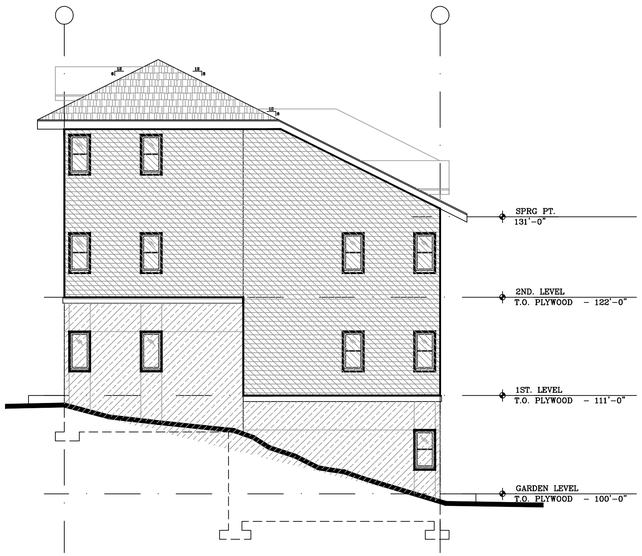
BUILDING B - EXTERIOR FINISH PERCENTAGE

NORTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	1410 SF	NA
NET GLAZING	110 SF	7.8%
NET STUCCO	428 SF	30.4%
NET CEMENTITIOUS BOARDS	872 SF	61.8%
NET METAL PANEL	N/A	N/A

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

3 SOUTH ELEVATION
1/8" = 1'-0"

1 BUILDING - WEST ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING B - ELEVATIONS

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Revisions:
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MAJOR SITE ARCHITECTURAL PLAN re-SUBMISSION 4-20-20

Sheet title
BUILDING ELEVATIONS MATERIAL CALCS

Stamp

Date: 4/20/2020
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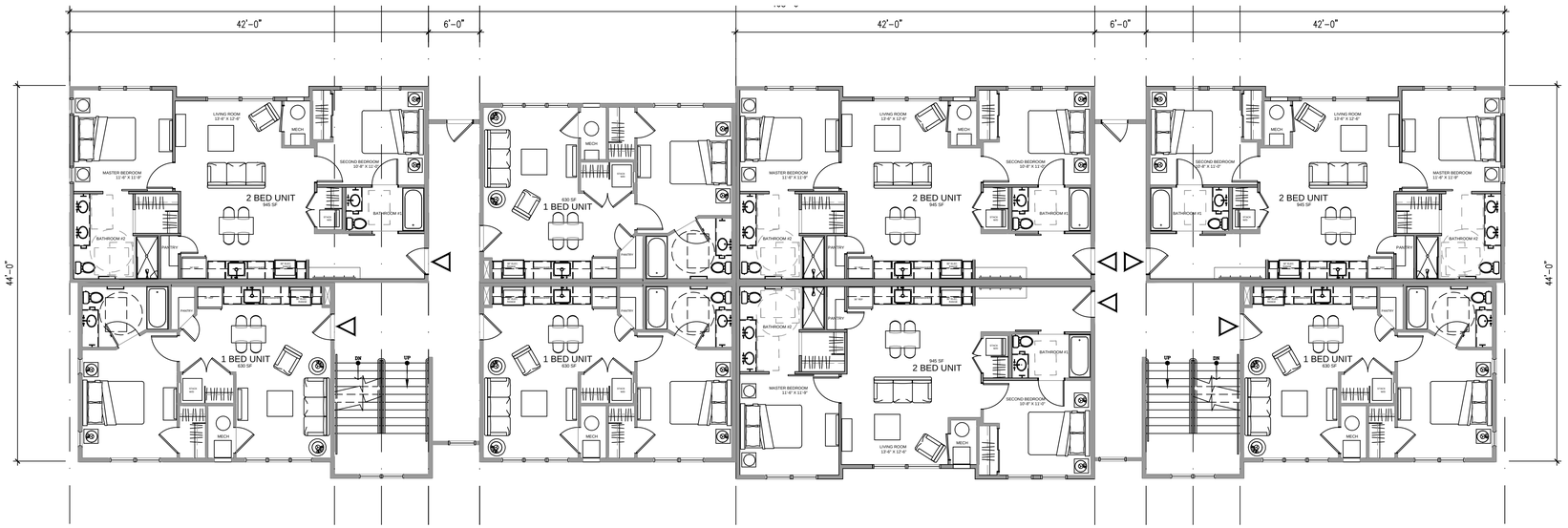

2 BUILDING C - FIRST LEVEL PLAN

1/8" = 1'-0"

1 BUILDING C - GARDEN LEVEL PLAN

1/8" = 1'-0"

APARTMENT BUILDINGS - SCHEMATIC PLANS

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MAJOR SITE ARCHITECTURAL PLAN SUBMISSION revised 4-20-20

Sheet title
SCHEMATIC BUILDING C PLANS

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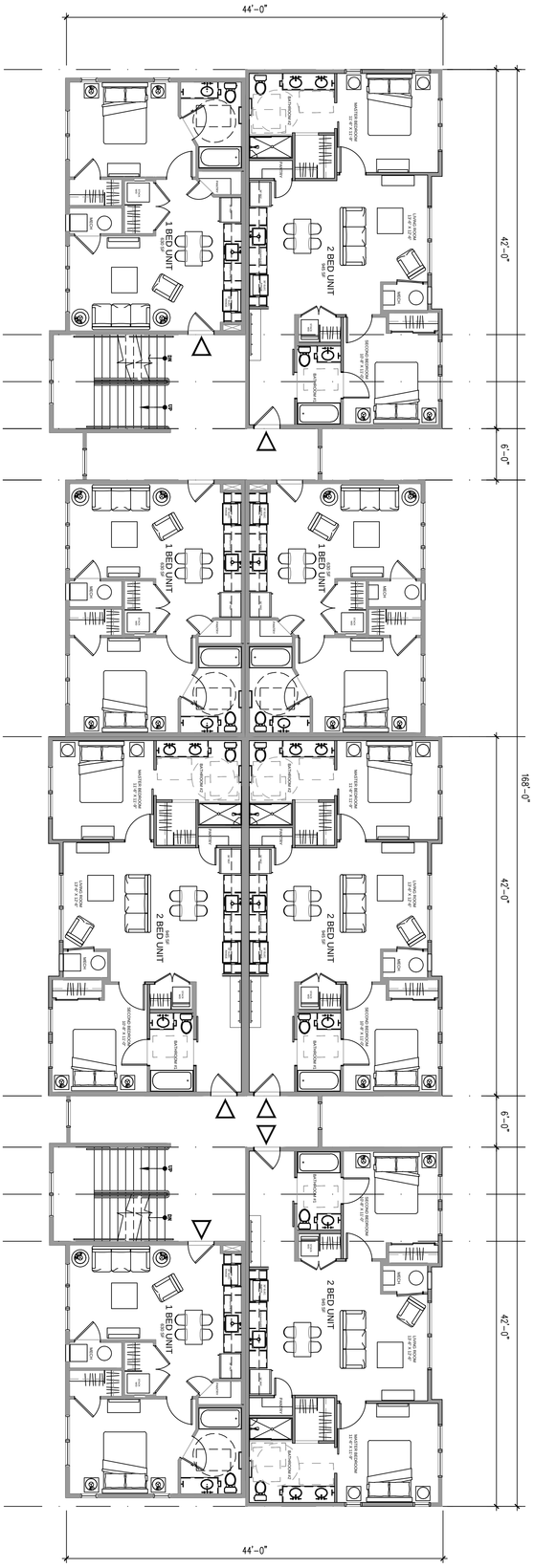
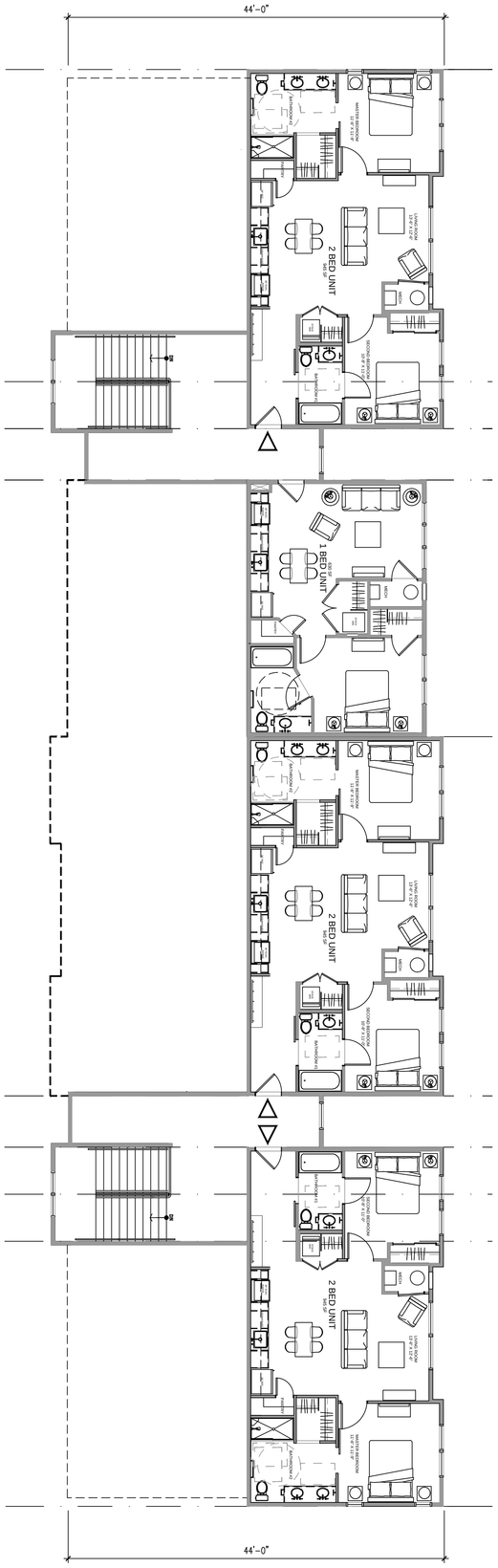


3 BUILDING C - SECOND LEVEL PLAN
1/8" = 1'-0"



4 BUILDING C - THIRD LEVEL PLAN
1/8" = 1'-0"

APARTMENT BUILDINGS - SCHEMATIC PLANS

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SCHEMATIC BUILDING C PLANS

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MAJOR SITE ARCHITECTURAL revised PLAN SUBMISSION 4-20-20

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BUILDING C - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	BLACK WALNUT
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 5/16" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	LEEWOOD
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	HARBOR MIST
S2	STUCCO	SYNTHETIC STUCCO SYSTEM	SW - BUCKHORN
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	SLATE GREY
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT - 1/4" RUSTIC 3.5" RAILS 1/4 RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ GABLES	FIBER CEMENT - 1/4 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 1/4 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
WD1	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

1. IN THE CASE OF ANY DISCREPANCIES BETWEEN THIS SCHEDULE AND OTHER CONTRACT DOCUMENTS, THE INFORMATION ON THIS SCHEDULE SHALL TAKE PRECEDENCE.
2. ALL FLASHING, VENTS, FLUES, ROOFTOP MECHANICAL EQUIPMENT, UTILITY BOXES, AND SIMILAR ITEMS SHALL BE PAINTED TO MATCH ADJACENT PORTIONS OF BUILDINGS UNLESS OTHERWISE NOTED.
3. TYPICAL SIDEWALL FLASHING: ICE&WATER SHIELD 2'-6" VERT UP WALL; WRAP INTO OPENINGS, THEN APPLY TYVEK FLASHING TAPE AROUND PENETRATING PIPE. METAL FLASHING EXPOSED 6" UP WALL: TYPICAL AT ALL SIDEWALL CONDITIONS.

4. THESE ELEVATIONS ARE CONCEPTUAL IN NATURE, INDIVIDUAL BUILDING ELEVATIONS MAY VARY BUT WILL BE EVALUATED FOR COMPLIANCE WITH DESIGN STANDARDS CONTAINED WITHIN TITLE 070 OF THE GLENWOOD SPRINGS MUNICIPAL CODE AT THE TIME OF SUBMITTING A BUILIDNG PERMIT APPLICATION.

1 BUILDING - WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING C - ELEVATIONS

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GLENWOOD SPRINGS COLORADO

Revisions:
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 3-3-20
MAJOR SITE ARCHITECTURAL PLAN RESUBMISSION 4-20-20

Sheet title: BUILDING ELEVATIONS

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Date: 4/17/2020
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Sheet AC3.0

BUILDING C - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	BLACK WALNUT
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - $\frac{3}{8}$" X 7 $\frac{1}{4}$" 6" EXPOSED - @ WINDOW / DOOR INFILL	LEEWOOD
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	HARBOR MIST
S2	STUCCO	SYNTHETIC STUCCO SYSTEM	SW - BUCKHORN
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	SLATE GREY
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT $\frac{4}{4}$ RUSTIC 3.5" RAILS $\frac{4}{4}$ RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - $\frac{3}{4}$ RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ GABLE	FIBER CEMENT - $\frac{3}{4}$ RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - $\frac{3}{4}$ RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - $\frac{3}{4}$ RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - $\frac{3}{4}$ RUSTIC 5.5"	FRENCH ROAST
WD1	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

1. IN THE CASE OF ANY DISCREPANCIES BETWEEN THIS SCHEDULE AND OTHER CONTRACT DOCUMENTS, THE INFORMATION ON THIS SCHEDULE SHALL TAKE PRECEDENCE.
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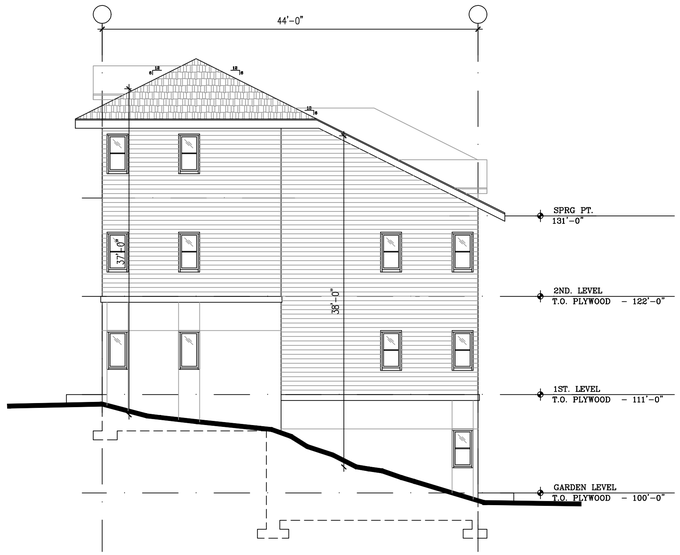
4. THESE ELEVATIONS ARE CONCEPTUAL IN NATURE. INDIVIDUAL BUILDING ELEVATIONS MAY VARY BUT WILL BE EVALUATED FOR COMPLIANCE WITH DESIGN STANDARDS CONTAINED WITHIN TITLE 070 OF THE GLENWOOD SPRINGS MUNICIPAL CODE AT THE TIME OF SUBMITTING A BUILIDNG PERMIT APPLICATION.

3 SOUTH ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

BUILDING C - ELEVATIONS

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Revisions:
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MAJOR SITE ARCHITECTURAL PLAN RESUBMISSION 4-20-20

Sheet title
BUILDING ELEVATIONS

Stamp

Date: 4/17/2020
Project No:
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Checked by: MEF

Sheet AC3.1

NET GLAZING

METAL PANEL

STUCCO

SIGNAGE

CEMENTITIOUS BOARDS

BUILDING C - EXTERIOR FINISH PERCENTAGE

WEST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	5300 SF	NA
NET GLAZING	1353 SF	25.5%
NET STUCCO	1400 SF	26.4%
NET CEMENTITIOUS BOARDS	2250 SF	42.4%
NET METAL PANEL	486 SF	9.7%

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING C - EXTERIOR FINISH PERCENTAGE

EAST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	5175 SF	NA
NET GLAZING	1361 SF	26.3%
NET STUCCO	1314 SF	25.4%
NET CEMENTITIOUS BOARDS	1528 SF	29.5%
NET METAL PANEL	972 SF	18.8%

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING C - EXTERIOR FINISH PERCENTAGE

SOUTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	1410 SF	NA
NET GLAZING	110 SF	7.8%
NET STUCCO	428 SF	30.4%
NET CEMENTITIOUS BOARDS	872 SF	61.8%
NET METAL PANEL	N/A	N/A

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING C - EXTERIOR FINISH PERCENTAGE

NORTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	1410 SF	NA
NET GLAZING	110 SF	7.8%
NET STUCCO	428 SF	30.4%
NET CEMENTITIOUS BOARDS	872 SF	61.8%
NET METAL PANEL	N/A	N/A

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

1 BUILDING - WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING C - ELEVATIONS

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Revisions:
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MAJOR SITE ARCHITECTURAL PLAN re-SUBMISSION 4-20-20

Sheet title
BUILDING ELEVATIONS MATERIAL CALCS

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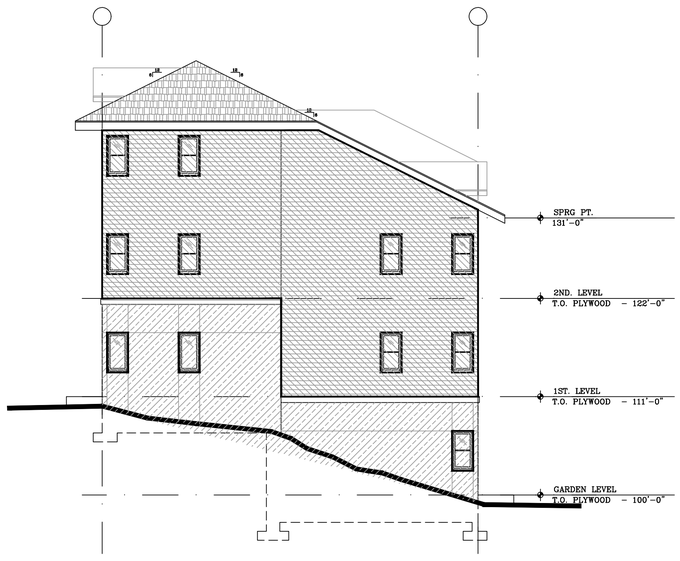
Sheet AC3.2

3 SOUTH ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

BUILDING C - ELEVATIONS

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BUILDING ELEVATIONS
MATERIAL CALCS

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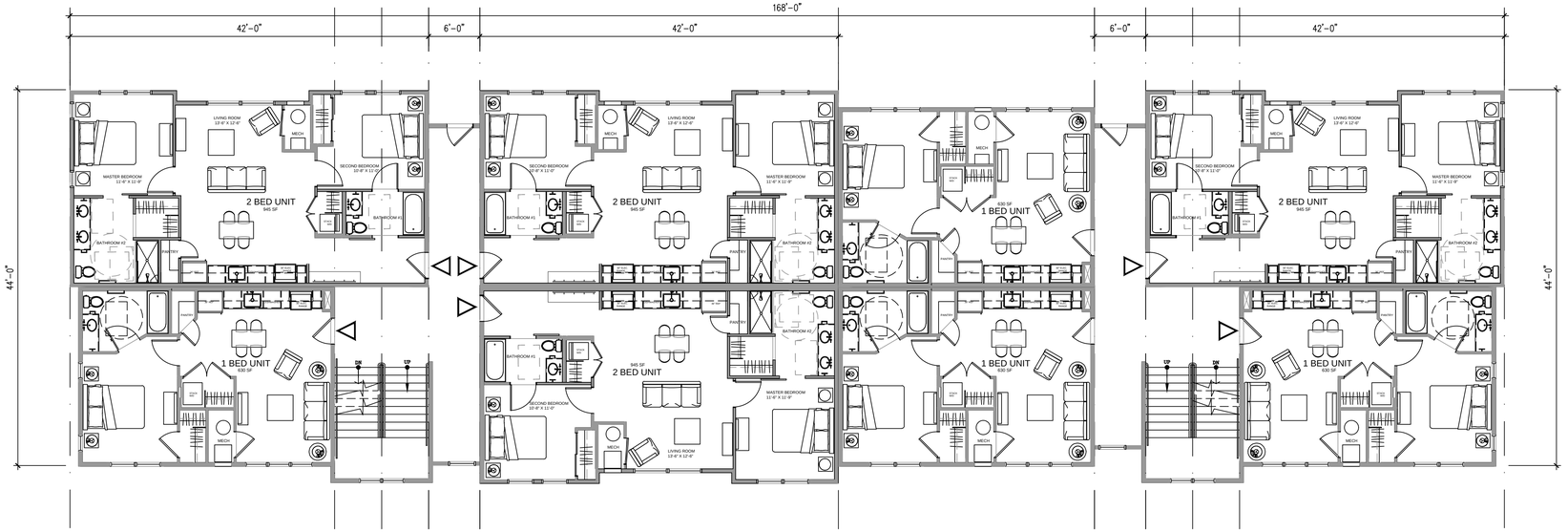
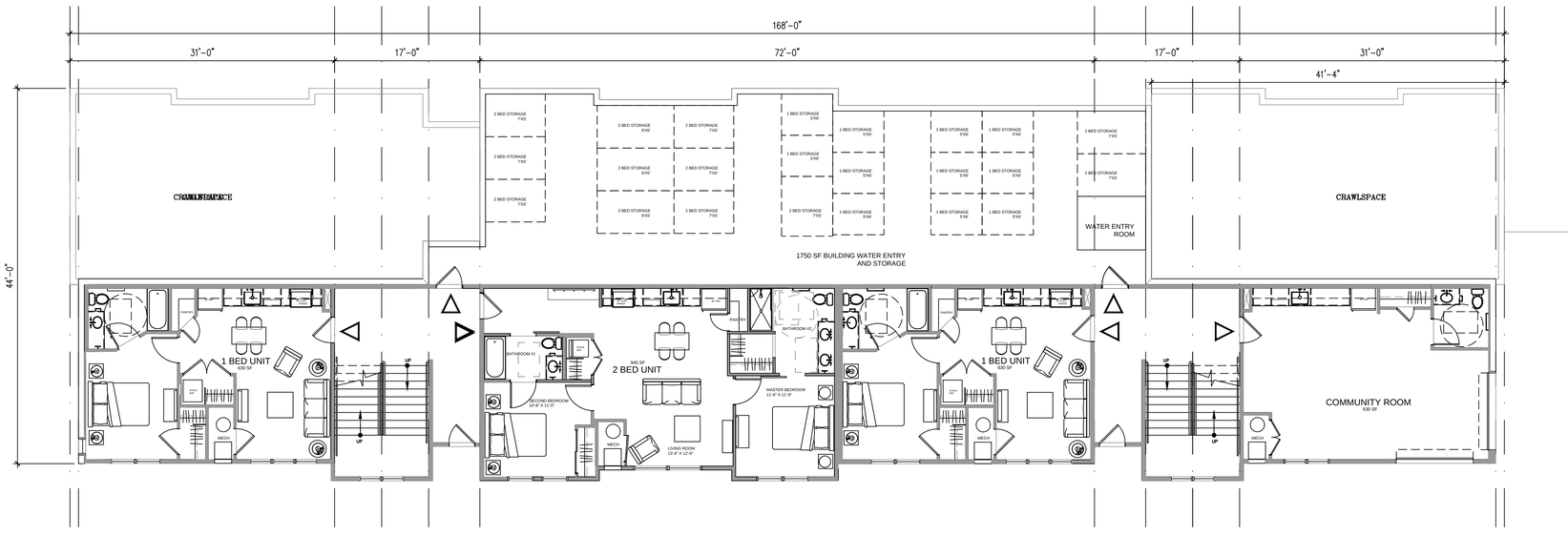


2 BUILDING D - FIRST LEVEL PLAN

1/8" = 1'-0"



1 BUILDING D - GARDEN LEVEL PLAN

1/8" = 1'-0"

APARTMENT BUILDINGS - SCHEMATIC PLANS

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MAJOR SITE ARCHITECTURAL revised PLAN SUBMISSION 4-20-20

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SCHEMATIC BUILDING D PLANS

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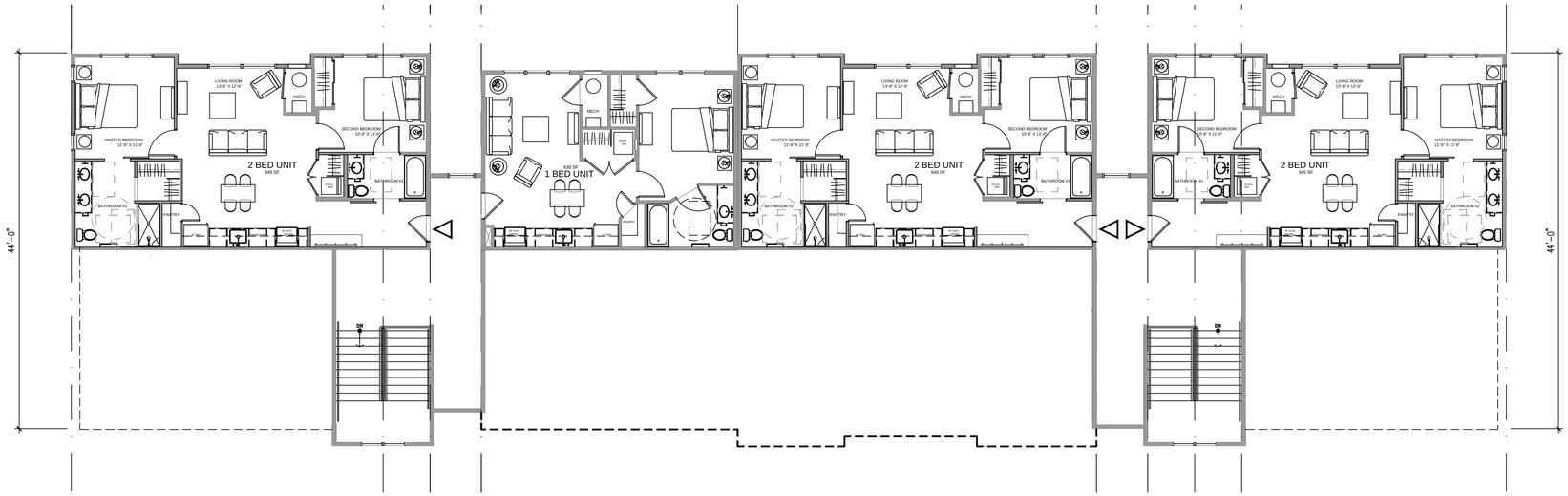
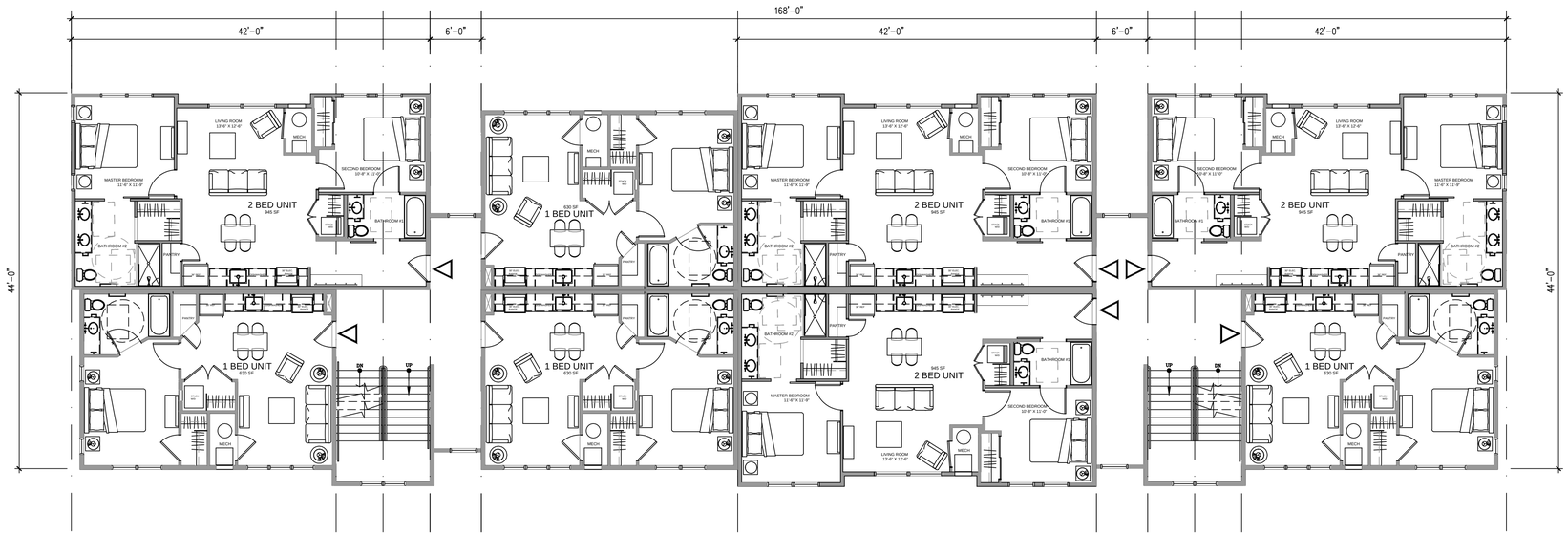


4 BUILDING D - THIRD LEVEL PLAN

1/8" = 1'-0"



3 BUILDING D - SECOND LEVEL PLAN

1/8" = 1'-0"

APARTMENT BUILDINGS - SCHEMATIC PLANS

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Sheet title
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Project No:
Drawn by: MEF
Checked by: MEF

Sheet AD2.1

BUILDING D - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	BLACK WALNUT
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 7" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	LEEWOOD
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	HARBOR MIST
S2	STUCCO	SYNTHETIC STUCCO SYSTEM	SW - BUCKHORN
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	SLATE GREY
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT 4/4 RUSTIC 2.5" RAILS 4/4 RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - 1/2 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ GABLE	FIBER CEMENT - 1/2 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 1/2 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 1/2 RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - 1/2 RUSTIC 5.5"	FRENCH ROAST
W01	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

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4. THESE ELEVATIONS ARE CONCEPTUAL IN NATURE. INDIVIDUAL BUILDING ELEVATIONS MAY VARY BUT WILL BE EVALUATED FOR COMPLIANCE WITH DESIGN STANDARDS CONTAINED WITHIN TITLE 070 OF THE GLENWOOD SPRINGS MUNICIPAL CODE AT THE TIME OF SUBMITTING A BUILDNG PERMIT APPLICATION.

1 BUILDING - WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING D - ELEVATIONS

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Sheet title
BUILDING ELEVATIONS

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Checked by: MEF

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BUILDING D - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	BLACK WALNUT
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 7/16" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	LEEWOOD
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	HARBOR MIST
S2	STUCCO	SYNTHETIC STUCCO SYSTEM	SW - BUCKHORN
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	SLATE GREY
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT 4/4 RUSTIC 3.5" RAILS 4/4 RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - 3/4 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ ENTRY	FIBER CEMENT - 3/4 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 3/4 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 3/4 RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - 3/4 RUSTIC 5.5"	FRENCH ROAST
WD1	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

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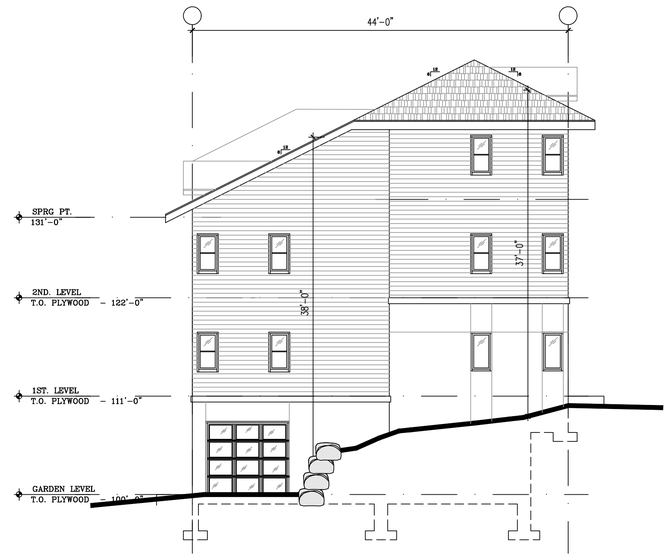
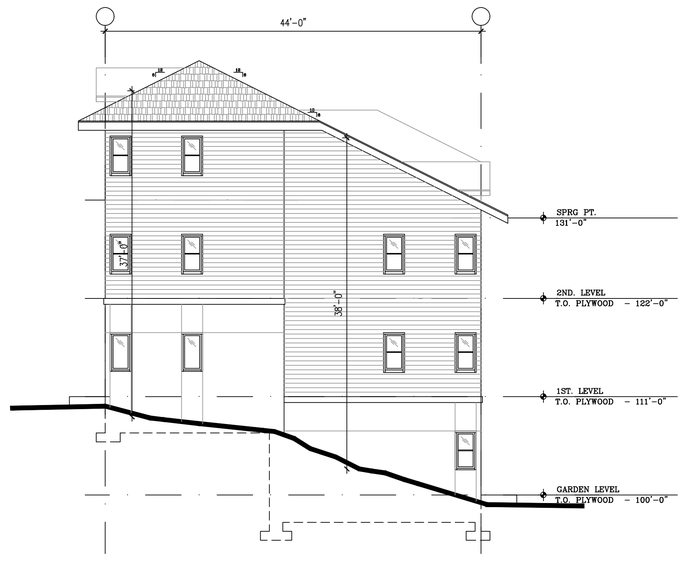


3 SOUTH ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

BUILDING D - ELEVATIONS

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Revisions:
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MAJOR SITE ARCHITECTURAL PLAN RESUBMISSION 4-20-20

Sheet title
BUILDING ELEVATIONS

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Date: 4/17/2020
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Checked by: MEF

Sheet AD3.1

NET GLAZING

METAL PANEL

STUCCO

SIGNAGE

CEMENTITIOUS BOARDS

BUILDING D - EXTERIOR FINISH PERCENTAGE

WEST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	5300 SF	NA
NET GLAZING	1398 SF	26.4%
NET STUCCO	1355 SF	25.6%
NET CEMENTITIOUS BOARDS	2250 SF	42.4%
NET METAL PANEL	486 SF	9.7%

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING D - EXTERIOR FINISH PERCENTAGE

EAST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	5175 SF	NA
NET GLAZING	1361 SF	26.3%
NET STUCCO	1314 SF	25.4%
NET CEMENTITIOUS BOARDS	1528 SF	29.5%
NET METAL PANEL	972 SF	18.8%

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING D - EXTERIOR FINISH PERCENTAGE

SOUTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	1410 SF	NA
NET GLAZING	135 SF	9.6%
NET STUCCO	400 SF	28.4%
NET CEMENTITIOUS BOARDS	872 SF	61.8%
NET METAL PANEL	N/A	N/A

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING D - EXTERIOR FINISH PERCENTAGE

NORTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	1410 SF	NA
NET GLAZING	110 SF	7.8%
NET STUCCO	428 SF	30.4%
NET CEMENTITIOUS BOARDS	872 SF	61.8%
NET METAL PANEL	N/A	N/A

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

1 BUILDING - WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING D - ELEVATIONS

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Revisions:
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 3-3-20
MAJOR SITE ARCHITECTURAL PLAN re-SUBMISSION 4-20-20

Sheet title
BUILDING ELEVATIONS MATERIAL CALCS

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Sheet AD3.2

3 SOUTH ELEVATION
1/8" = 1'-0"

4 WEST ELEVATION
1/8" = 1'-0"

BUILDING D - ELEVATIONS

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BUILDING ELEVATIONS
MATERIAL CALCS

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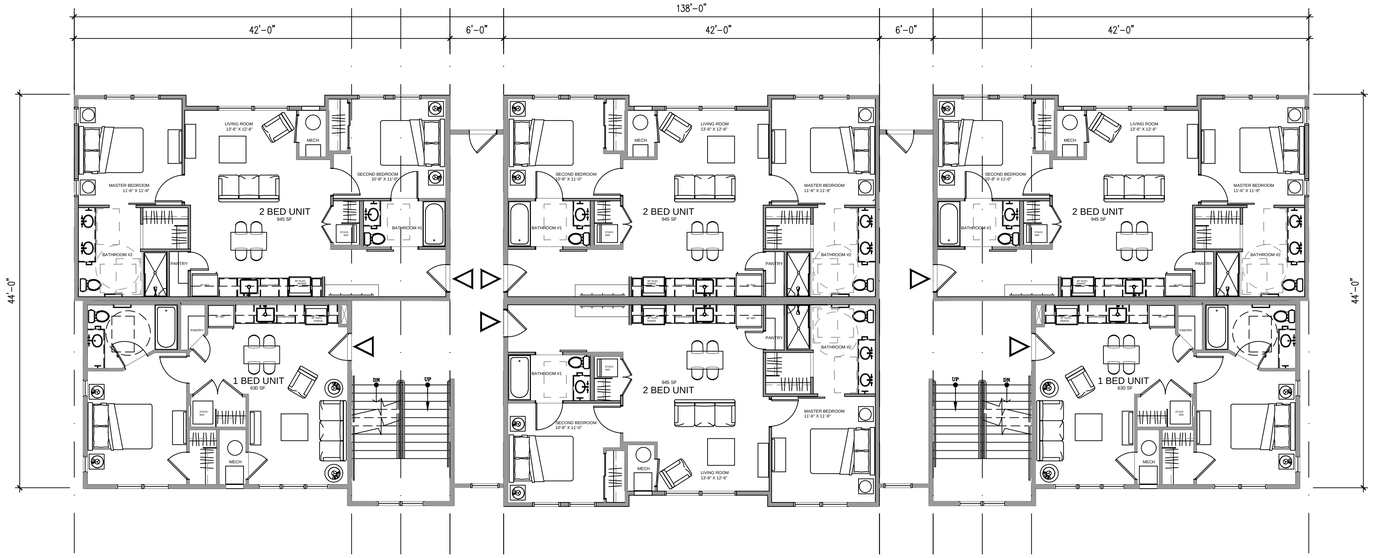

2 BUILDING E - FIRST LEVEL PLAN

1/8" = 1'-0"

1 BUILDING E - GARDEN LEVEL PLAN

1/8" = 1'-0"

APARTMENT BUILDINGS - SCHEMATIC PLANS

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BELL RIPPY NEIGHBORHOOD
2700 PALMER AVE
GLENWOOD SPRINGS COLORADO

Revisions:
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 5-15-20
MAJOR SITE ARCHITECTURAL revised PLAN SUBMISSION 4-20-20

Sheet title
SCHEMATIC BUILDING E PLANS

Stamp

Date: 4/16/2020
Project No:
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Checked by: MEF

Sheet AE2.0

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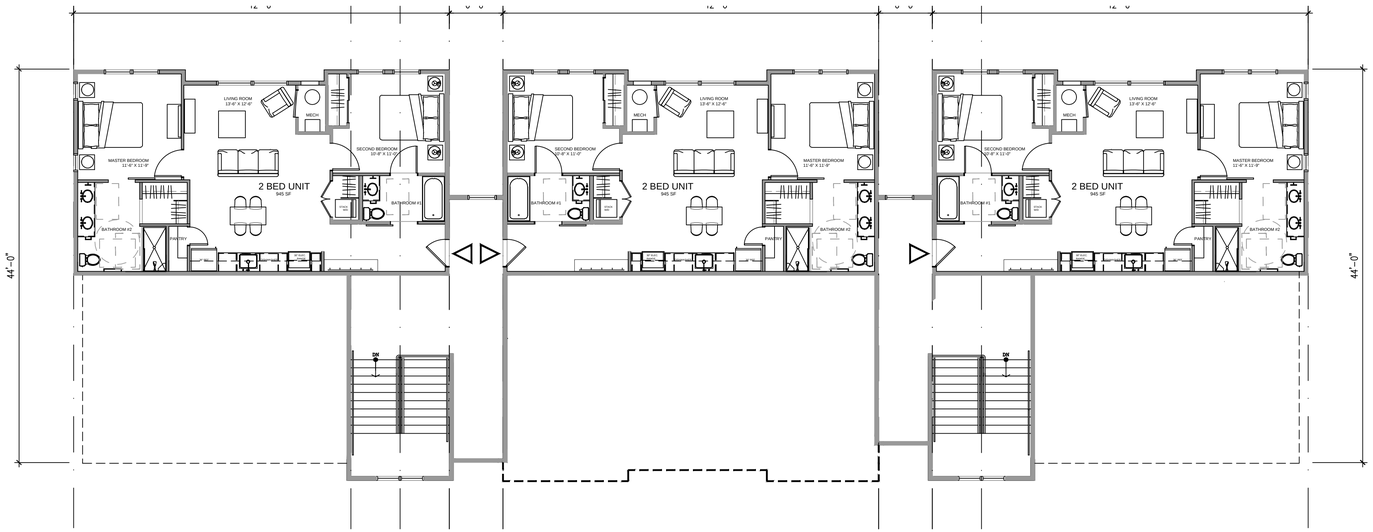
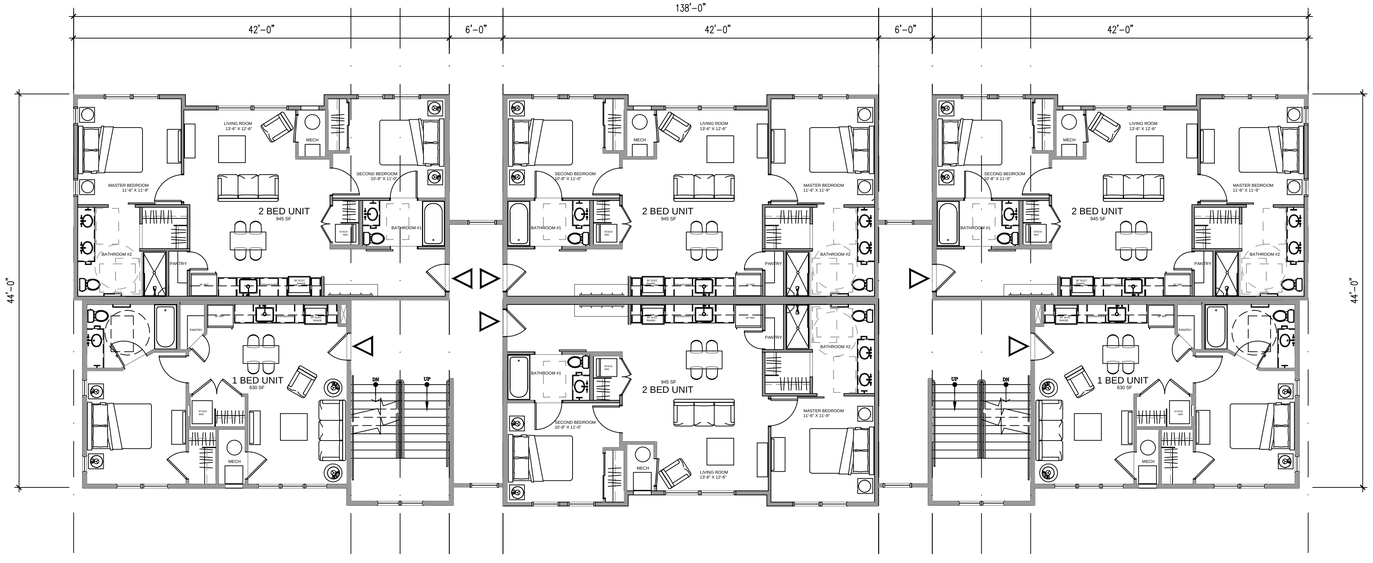


4 BUILDING E - THIRD LEVEL PLAN
1/8" = 1'-0"



3 BUILDING E - SECOND LEVEL PLAN
1/8" = 1'-0"

APARTMENT BUILDINGS - SCHEMATIC PLANS

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MAJOR SITE ARCHITECTURAL PLAN SUBMISSION revised 4-20-20

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BUILDING E - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	BLACK WALNUT
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 7/16" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	LEEWOOD
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	HARBOR MIST
S2	STUCCO	SYNTHETIC STUCCO SYSTEM	SW - BUCKHORN
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	SLATE GREY
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT 4/4 RUSTIC 3.5" RAILS 4/4 RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - 5/4 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ ENDS	FIBER CEMENT - 5/4 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 5/4 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 5/4 RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - 5/4 RUSTIC 5.5"	FRENCH ROAST
WD1	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

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2. ALL FLASHING, VENTS, FLUES, ROOFTOP MECHANICAL EQUIPMENT, UTILITY BOXES, AND SIMILAR ITEMS SHALL BE PAINTED TO MATCH ADJACENT PORTIONS OF BUILDINGS UNLESS OTHERWISE NOTED.
3. TYPICAL SIDEWALL FLASHING: ICE&WATER SHIELD 2'-6" VERT UP WALL; WRAP INTO OPENINGS, THEN APPLY TYVEK FLASHING TAPE AROUND PENETRATING PIPE. METAL FLASHING EXPOSED 6" UP WALL: TYPICAL AT ALL SIDEWALL CONDITIONS.

4. THESE ELEVATIONS ARE CONCEPTUAL IN NATURE, INDIVIDUAL BUILDING ELEVATIONS MAY VARY BUT WILL BE EVALUATED FOR COMPLIANCE WITH DESIGN STANDARDS CONTAINED WITHIN TITLE 070 OF THE GLENWOOD SPRINGS MUNICIPAL CODE AT THE TIME OF SUBMITTING A BUILIDNG PERMIT APPLICATION.

1 BUILDING - WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING E - ELEVATIONS

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Revisions:
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 3-3-20
MAJOR SITE ARCHITECTURAL PLAN RESUBMISSION 4-20-20

Sheet title
BUILDING ELEVATIONS

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Date: 4/17/2020
Project No:
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Checked by: MEF

Sheet AE3.0

BUILDING E - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	BLACK WALNUT
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 7/16" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	LEEWOOD
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	HARBOR MIST
S2	STUCCO	SYNTHETIC STUCCO SYSTEM	SW - BUCKHORN
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	SLATE GREY
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT 4/4 RUSTIC 3.5" RAILS 4/4 RUSTIC 5.5" HEAD AND SILL	FRENCH ROAST
T2	SIDING TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ GABLE	FIBER CEMENT - 1/4 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 1/4 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
WD1	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

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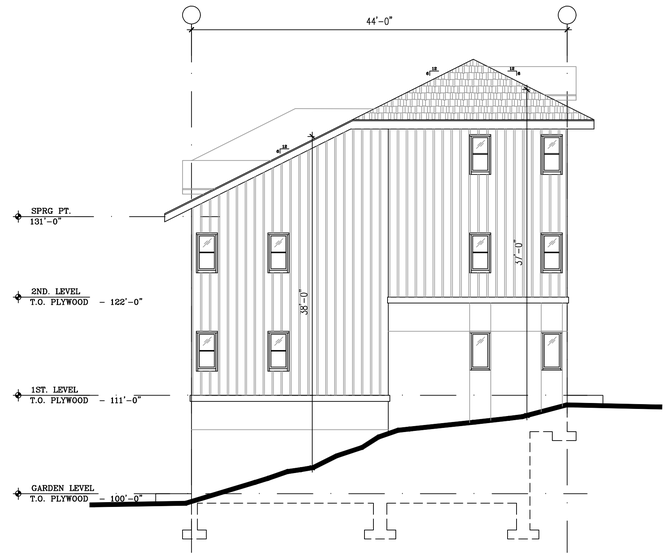
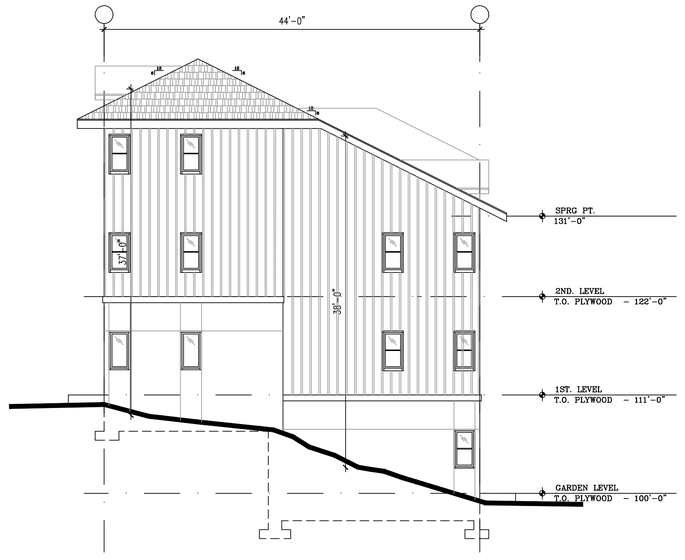


3 SOUTH ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

BUILDING E - ELEVATIONS

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Revisions:
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 3-3-20
MAJOR SITE ARCHITECTURAL PLAN re-SUBMISSION 4-20-20

Sheet title
BUILDING ELEVATIONS

Stamp

Date: 4/17/2020
Project No:
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Sheet AE3.1

NET GLAZING

METAL PANEL

STUCCO

SIGNAGE

CEMENTITIOUS BOARDS

BUILDING E - EXTERIOR FINISH PERCENTAGE

WEST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	4355 SF	NA
NET GLAZING	1007 SF	23.1%
NET STUCCO	1034 SF	23.7%
NET CEMENTITIOUS BOARDS	2071 SF	47.5%
NET METAL PANEL	243 SF	5.6%

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING E - EXTERIOR FINISH PERCENTAGE

EAST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	4235 SF	NA
NET GLAZING	1114 SF	26.3%
NET STUCCO	1086 SF	25.6%
NET CEMENTITIOUS BOARDS	1306 SF	30.8%
NET METAL PANEL	729 SF	17.2%

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING E - EXTERIOR FINISH PERCENTAGE

SOUTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	1410 SF	NA
NET GLAZING	110 SF	7.8%
NET STUCCO	428 SF	30.6%
NET CEMENTITIOUS BOARDS	872 SF	61.8%
NET METAL PANEL	N/A	N/A

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING E - EXTERIOR FINISH PERCENTAGE

NORTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	1410 SF	NA
NET GLAZING	110 SF	7.8%
NET STUCCO	428 SF	30.4%
NET CEMENTITIOUS BOARDS	872 SF	61.8%
NET METAL PANEL	N/A	N/A

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

1 BUILDING - WEST ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING E - ELEVATIONS

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Revisions:
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 3-3-20
MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 4-20-20

Sheet title
BUILDING ELEVATIONS
MATERIAL CALCS

Stamp

Date: 4/20/2020
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3 SOUTH ELEVATION
1/8" = 1'-0"

4 WEST ELEVATION
1/8" = 1'-0"

BUILDING E - ELEVATIONS

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MAJOR SITE ARCHITECTURAL PLAN RESUBMISSION 4-20-20

Sheet title
BUILDING ELEVATIONS
MATERIAL CALCS

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Date: 4/20/2020
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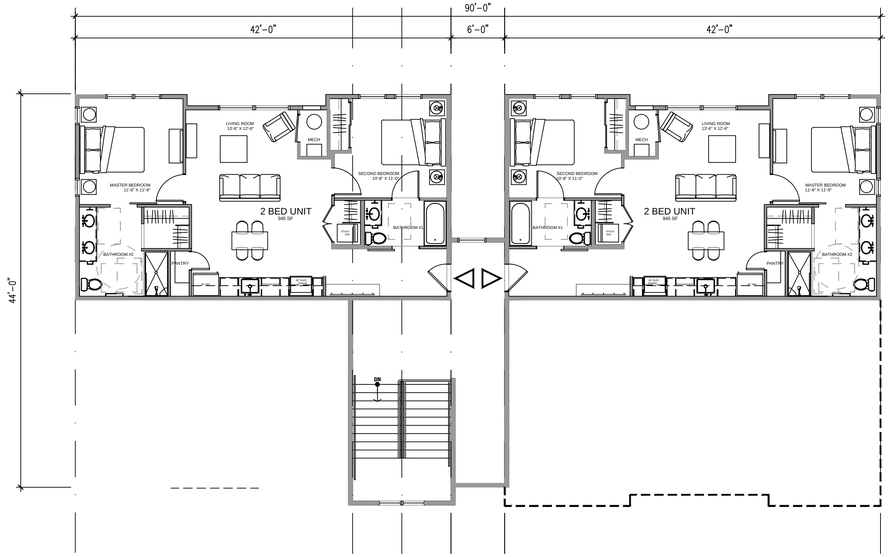
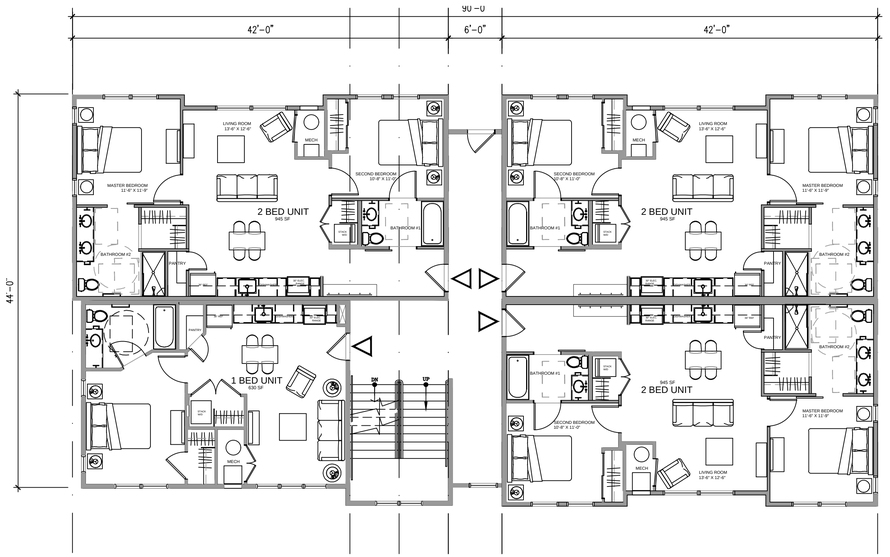


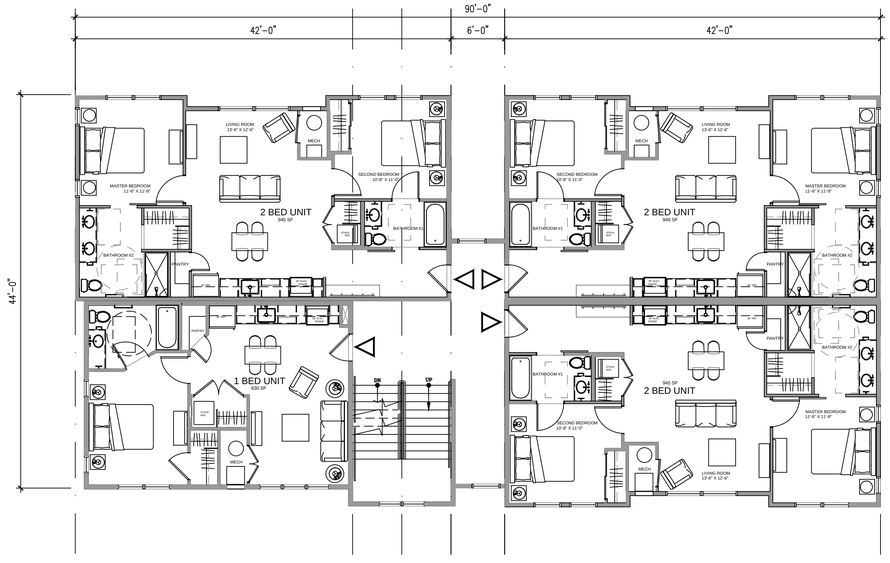
4 BUILDING F - THIRD LEVEL PLAN

1/8" = 1'-0"



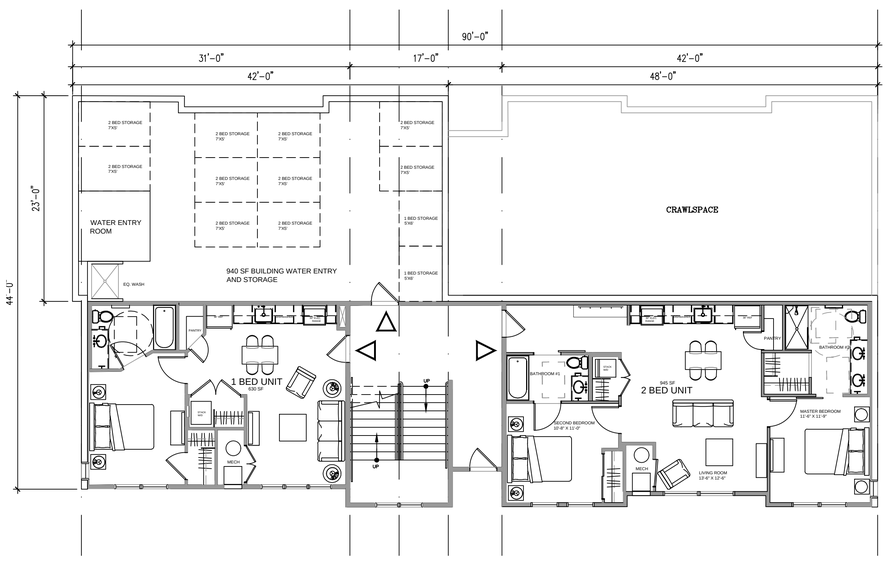
2 BUILDING F - FIRST LEVEL PLAN

1/8" = 1'-0"



3 BUILDING F - SECOND LEVEL PLAN

1/8" = 1'-0"



1 BUILDING F - GARDEN LEVEL PLAN

1/8" = 1'-0"

APARTMENT BUILDINGS - SCHEMATIC PLANS

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MAJOR SITE ARCHITECTURAL PLAN SUBMISSION revised 4-20-20

Sheet title
SCHEMATIC BUILDING F PLANS

Stamp

Date: 4/16/2020
Project No:
Drawn by: MEF
Checked by: MEF

Sheet AF2.0

BUILDING F - EXTERIOR FINISH SCHEDULE

TAG	ITEM	MATERIAL	COLOR
R1	PRIMARY ROOF	TAMKO 30 YR - HERITAGE (CLASS A REQUIRED)	RUSTIC SLATE
D1	DRIP EDGE	ALUMINUM (PREFINISHED)	MATCH ADJACENT ROOF
F1	FASCIA @ R1	FIBER CEMENT BOARDS - 5/4 RUSTIC x 9.25"	FRENCH ROAST
F3	SOFFIT	FIBER CEMENT SOFFIT PANELS - VENTED CEDARMILL	FRENCH ROAST
S1	HORIZONTAL LAP SIDING	FIBER CEMENT LAP SIDING - 3/4" X 7 1/4" 6" EXPOSED - @ WINDOW / DOOR INFILL	KHAKI BROWN
S3	BOARD AND BATTEN	FIBER CEMENT VERT SIDING 3.5" OVER FIBER CEMENT PLANKS - CEDAR MILL	COBBLE BROWN
S2	STUCCO	SYNTHETIC STUCCO SYSTEM	BENJAMIN MOORE "WISH" AF-680
S4	METAL SIDING PANELS	METAL WALL SYSTEM - PBC	BRONZE
W1	DOORS AND WINDOWS	PREMIUM VINYL	BRONZE
T1	DOORS AND WINDOWS TRIM	FIBER CEMENT 4/4 RUSTIC 3.5" RAILS 3/4 RUSTIC 5.5" HEAD AND SILL FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
T2	SIDING TRIM		FRENCH ROAST
T3	HORIZONTAL SIDING TRIM @ ENTRY	FIBER CEMENT - 1/4 RUSTIC 9.25" / 11.25"	FRENCH ROAST
T4	INSIDE CORNER TRIM	FIBER CEMENT - 1/4 RUSTIC 3.5"	FRENCH ROAST
T5	OUTSIDE CORNER TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
T6	FRIEZE TRIM	FIBER CEMENT - 1/4 RUSTIC 5.5"	FRENCH ROAST
W01	TRUSSES	HEAVY TIMBER	SW - 3524 CHESTNUT

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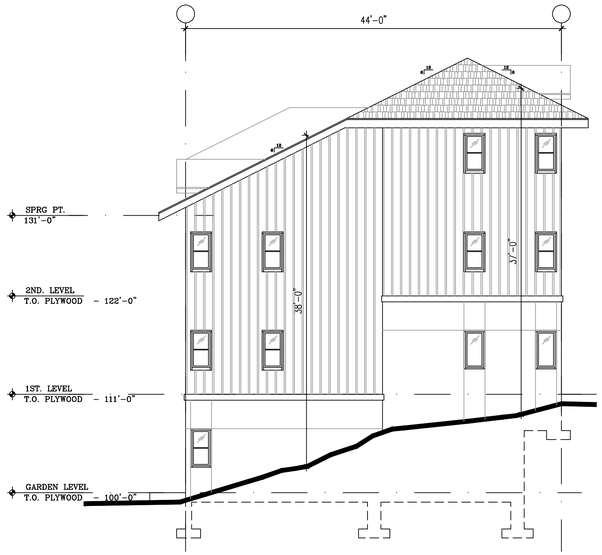
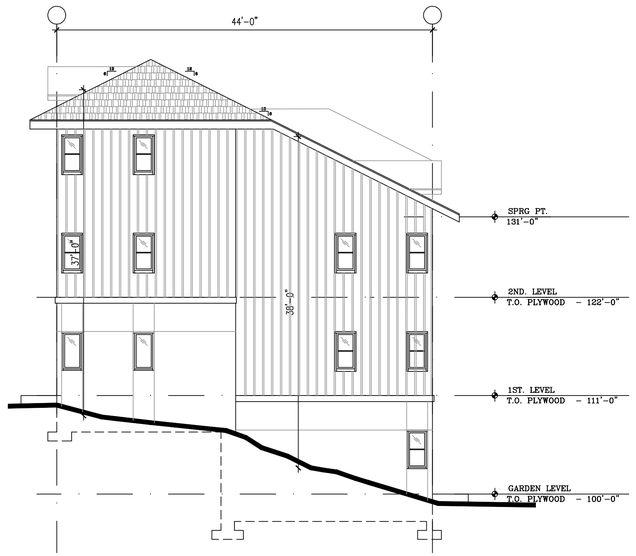


3 SOUTH ELEVATION
1/8" = 1'-0"

1 BUILDING - WEST ELEVATION
1/8" = 1'-0"



4 NORTH ELEVATION
1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING F - ELEVATIONS

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MAJOR SITE ARCHITECTURAL PLAN SUBMISSION 3-3-20
MAJOR SITE ARCHITECTURAL PLAN 2nd SUBMISSION 4-20-20

Sheet title: BUILDING ELEVATIONS

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Date: 4/17/2020
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Drawn by: MEF
Checked by: MEF

Sheet AF3.0

NET GLAZING

METAL PANEL

STUCCO

SIGNAGE

CEMENTITIOUS BOARDS

BUILDING F - EXTERIOR FINISH PERCENTAGE

WEST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	2830 SF	NA
NET GLAZING	736 SF	26.1%
NET STUCCO	666 SF	23.5%
NET CEMENTITIOUS BOARDS	1181 SF	41.7%
NET METAL PANEL	245 SF	8.6%

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING F - EXTERIOR FINISH PERCENTAGE

EAST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	2770 SF	NA
NET GLAZING	727 SF	26.2%
NET STUCCO	752 SF	27.1%
NET CEMENTITIOUS BOARDS	815 SF	29.4%
NET METAL PANEL	476 SF	17.2%

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
2. INCLUDES GLAZED WINDOWS AND DOORS

BUILDING F - EXTERIOR FINISH PERCENTAGE

SOUTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS OF WALL	1410 SF	NA
NET GLAZING	110 SF	7.8%
NET STUCCO	428 SF	30.6%
NET CEMENTITIOUS BOARDS	872 SF	61.8%
NET METAL PANEL	N/A	N/A

1. EXCLUDES ROOF FORMS, FASCIA AND SIMILAR FEATURES.
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BUILDING F - EXTERIOR FINISH PERCENTAGE

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NET METAL PANEL	N/A	N/A

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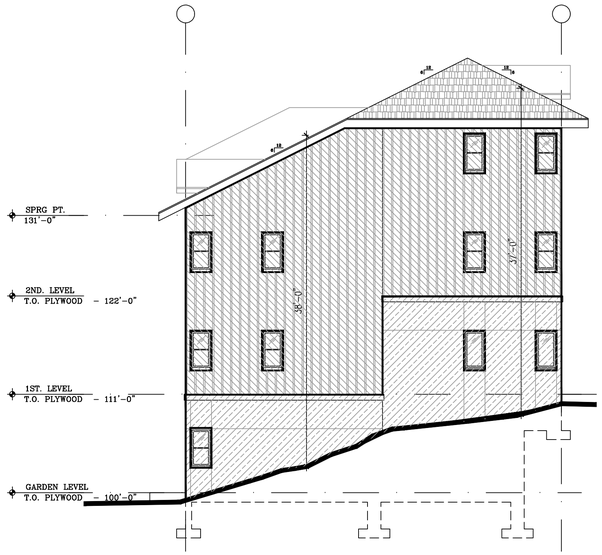
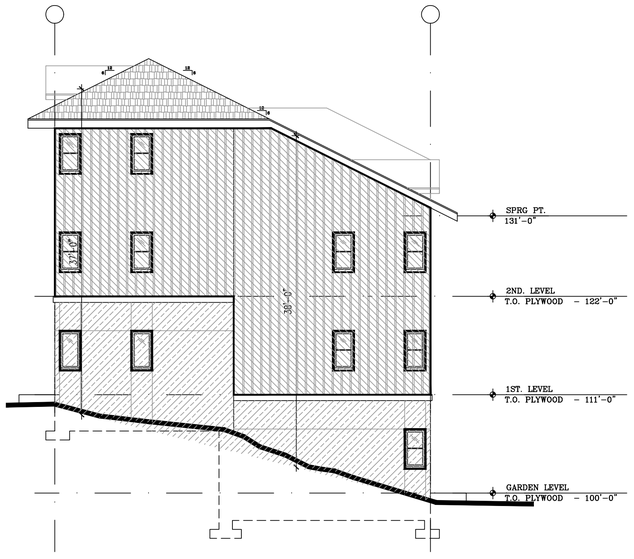


3 SOUTH ELEVATION
1/8" = 1'-0"

1 BUILDING - WEST ELEVATION
1/8" = 1'-0"



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1/8" = 1'-0"

2 EAST ELEVATION
1/8" = 1'-0"

BUILDING F - ELEVATIONS

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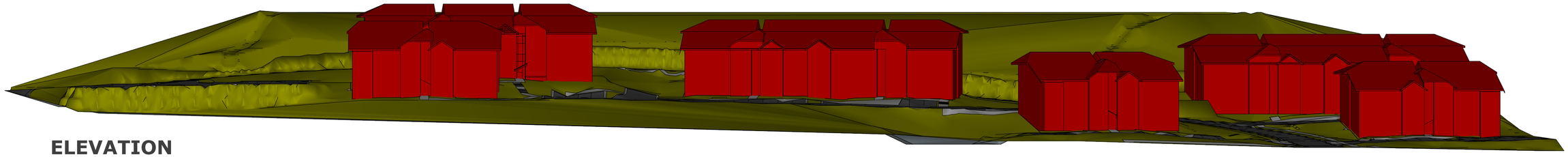
Checked by: MEF

Sheet AF3.1



ELEVATION

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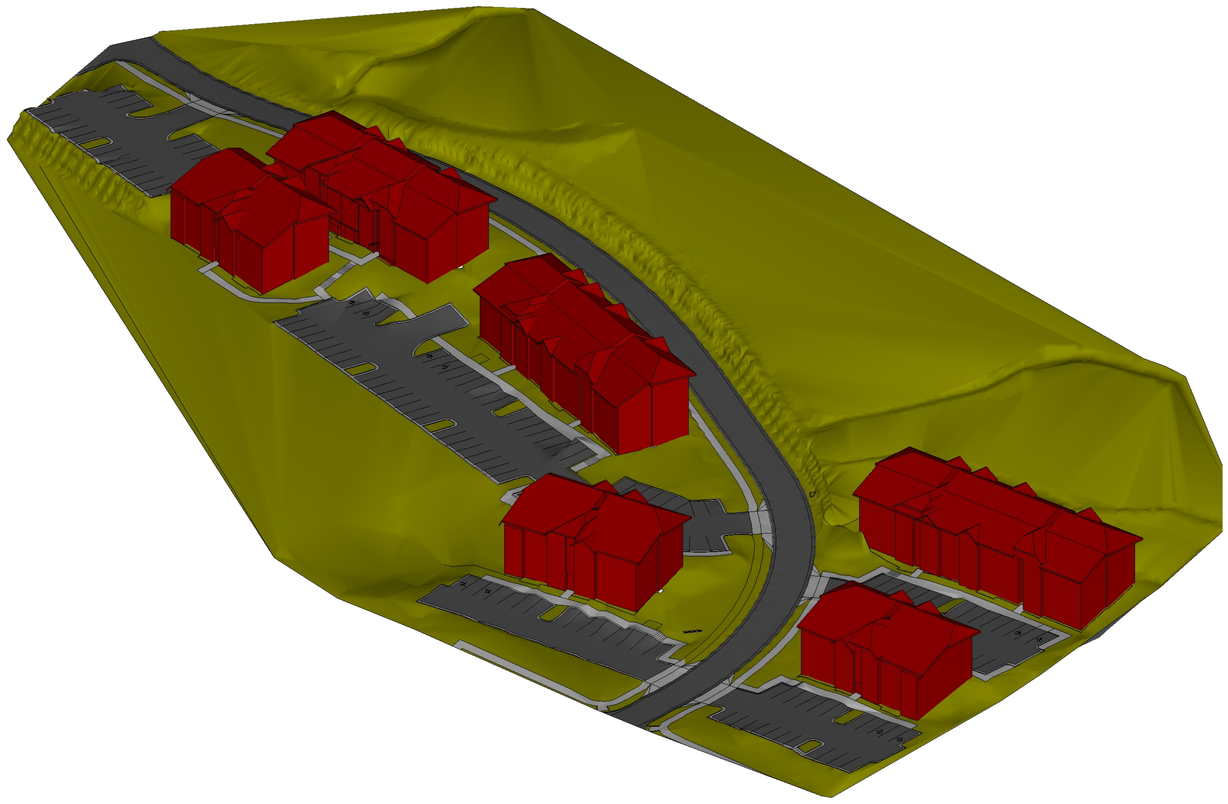

PERSPECTIVE 1

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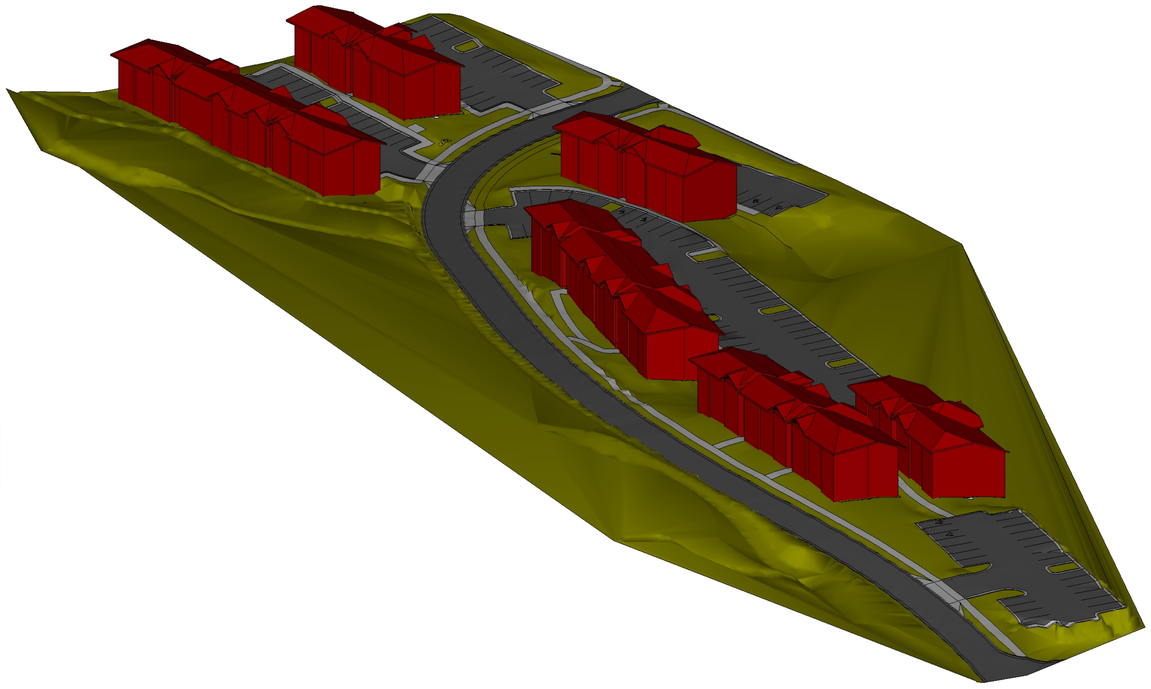

PERSPECTIVE 2

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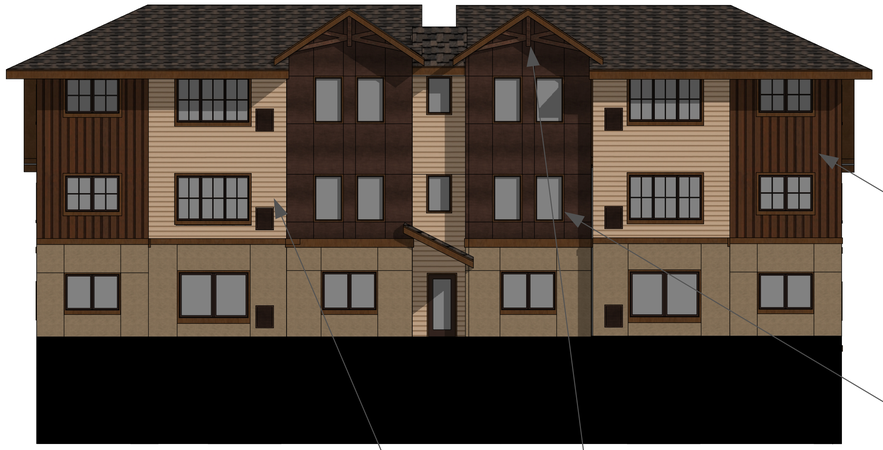


NORTH ELEVATION - BUILDING A

Scale: 1/8"=1'-0"

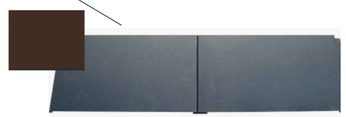
DARK SKY COMPLIANT LIGHTING

TAMKO ASPHALT SHINGLES, RUSTIC SLATE

HARDIE T&G HORIZONTAL SIDING, SW - GINGER ROOT

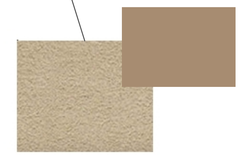
TIMBER TRUSSES, DARK BROWN

VYNIL WINDOWS AND DOORS, BRONZE COLOR

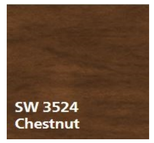


FLAT METAL PANEL, DARK BROWN

HARDIE BOARD (1X12) AND BATTEN (1X4) SW-FRENCH ROAST



STUCCO WITH EXPANSIONS: LIGHT SAND FINISH, SW - DOUBLE LATTE



TRIMS AND FASCIA

WEST ELEVATION - BUILDING A

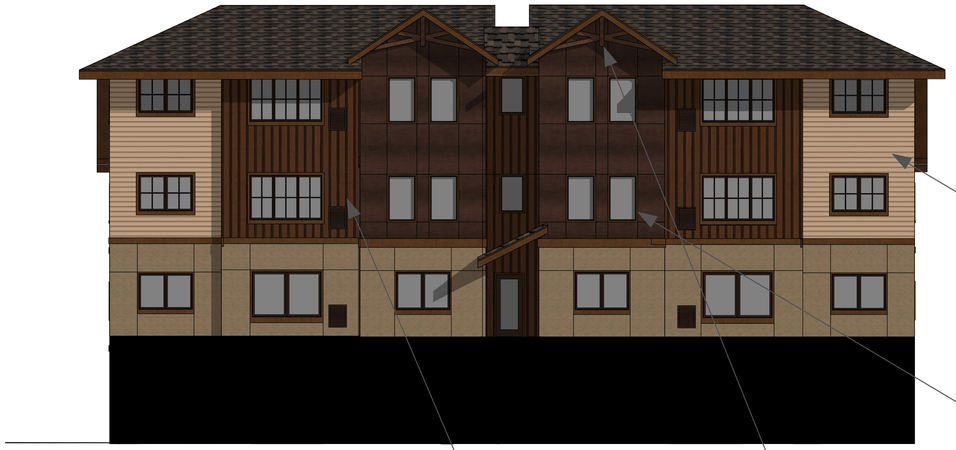
Scale: 1/8"=1'-0"

SOUTH ELEVATION - BUILDING A

Scale: 1/8"=1'-0"

EAST ELEVATION - BUILDING A

Scale: 1/8"=1'-0"



NORTH ELEVATION - BUILDING B

Scale: 1/8"=1'-0"

DARK SKY COMPLIANT LIGHTING

TAMKO ASPHALT SHINGLES, RUSTIC SLATE

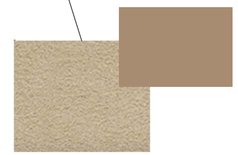
HARDIE T&G HORIZONTAL SIDING, SW - GINGER ROOT

TIMBER TRUSSES, DARK BROWN

VYNIL WINDOWS AND DOORS, BRONZE COLOR

FLAT METAL PANEL, DARK BROWN

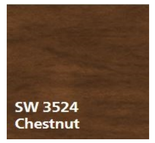
HARDIE BOARD (1X12) AND BATTEN (1X4) SW-FRENCH ROAST



STUCCO WITH EXPANSIONS: LIGHT SAND FINISH, SW - DOUBLE LATTE

WEST ELEVATION - BUILDING B

Scale: 1/8"=1'-0"



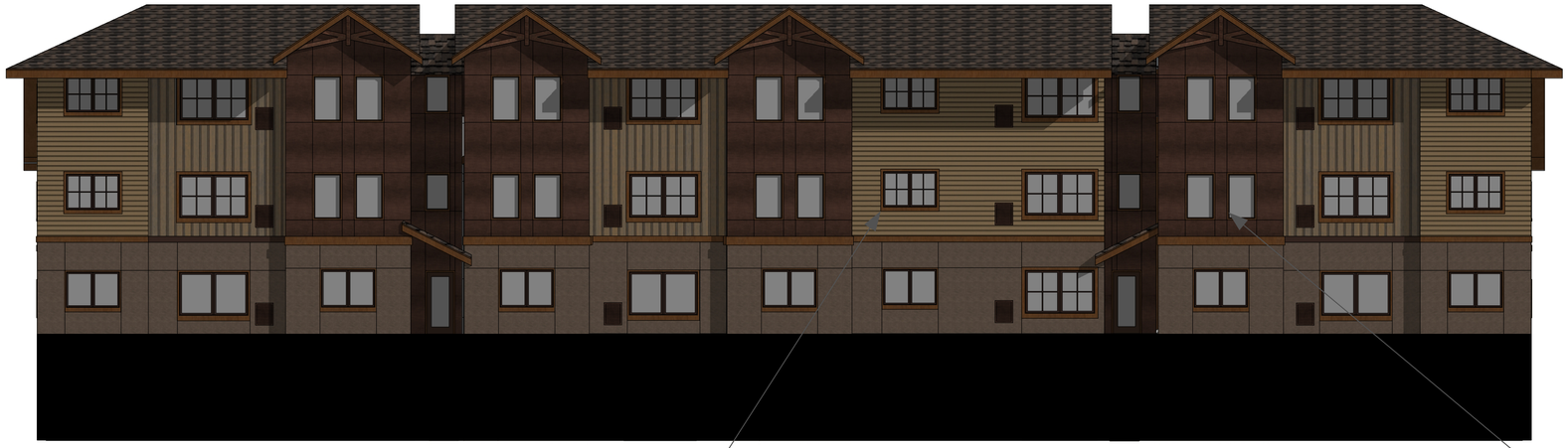
TRIMS AND FASCIA

SOUTH ELEVATION - BUILDING B

Scale: 1/8"=1'-0"

EAST ELEVATION - BUILDING B

Scale: 1/8"=1'-0"

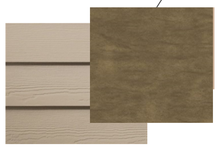


NORTH ELEVATION - BUILDING C

Scale: 1/8"=1'-0"

DARK SKY COMPLIANT LIGHTING

TAMKO ASPHALT SHINGLES, BLACK WALNUT



HARDIE T&G HORIZONTAL SIDING, SW LEEWARD

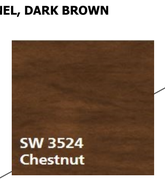
TIMBER TRUSSES, DARK BROWN

VYNIL WINDOWS AND DOORS, BRONZE COLOR

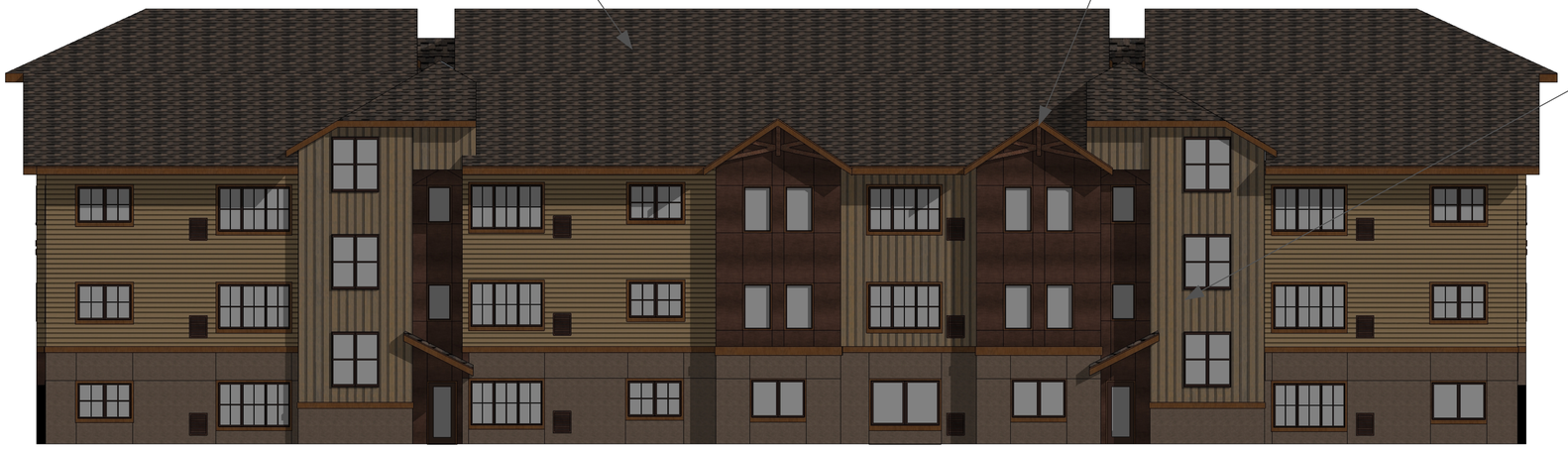
FLAT METAL PANEL, DARK BROWN

HARDIE BOARD (1X12) AND BATTEN (1X4) SW-RIVERWOOD

SYNTHETIC STUCCO SYSTEM: BUCKHORN



TRIMS AND FASCIA



SOUTH ELEVATION - BUILDINGS C

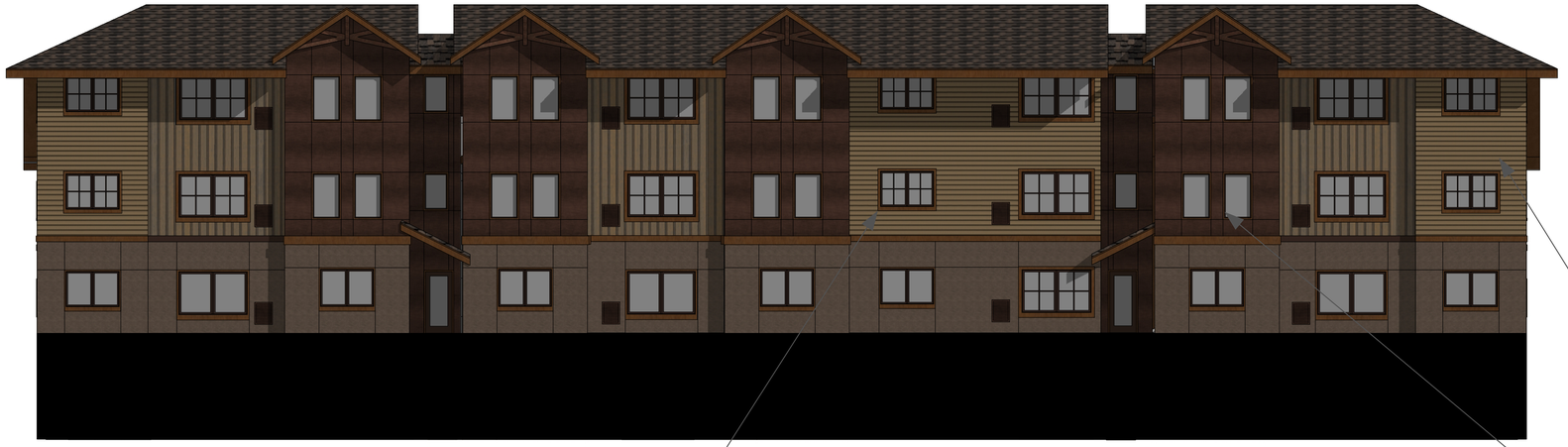
Scale: 1/8"=1'-0"

WEST ELEVATION - BUILDING C

Scale: 1/8"=1'-0"

EAST ELEVATION - BUILDING C

Scale: 1/8"=1'-0"

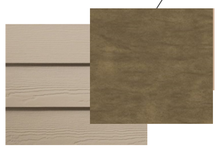


NORTH ELEVATION - BUILDING D

Scale: 1/8"=1'-0"

DARK SKY COMPLIANT LIGHTING

TAMKO ASPHALT SHINGLES, BLACK WALNUT



HARDIE T&G HORIZONTAL SIDING, SW LEEWARD

TIMBER TRUSSES, DARK BROWN

VYNIL WINDOWS AND DOORS, BRONZE COLOR

FLAT METAL PANEL, DARK BROWN

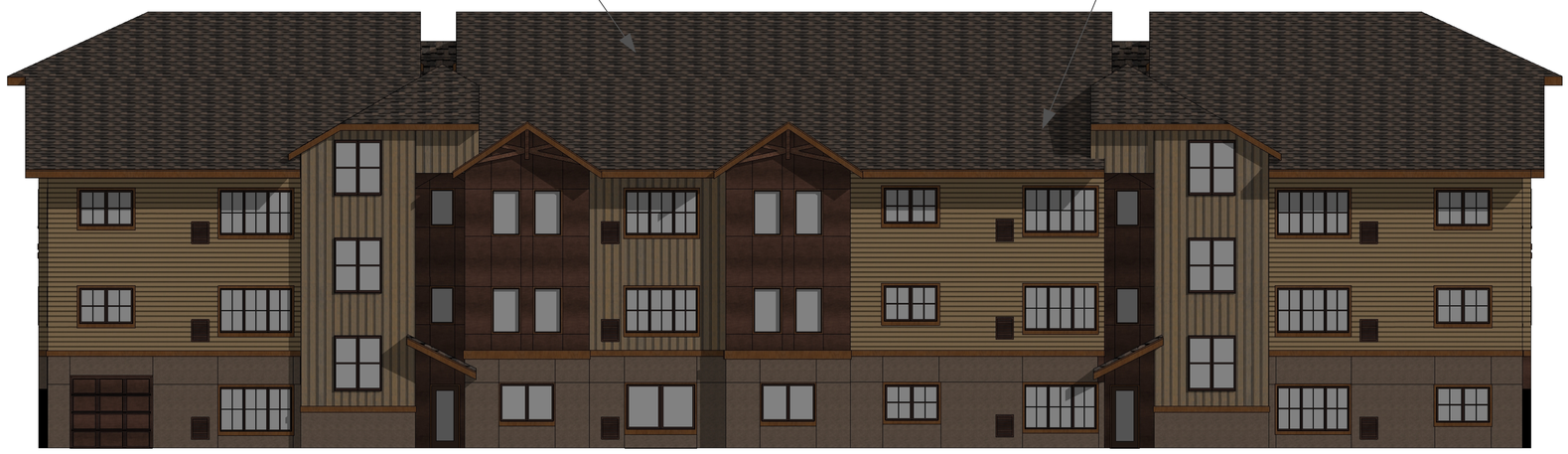
TRIMS AND FASCIA

HARDIE BOARD (1X12) AND BATTEN (1X4) SW-RIVERWOOD

SYNTHETIC STUCCO SYSTEM: BUCKHORN

WEST ELEVATION - BUILDING D

Scale: 1/8"=1'-0"

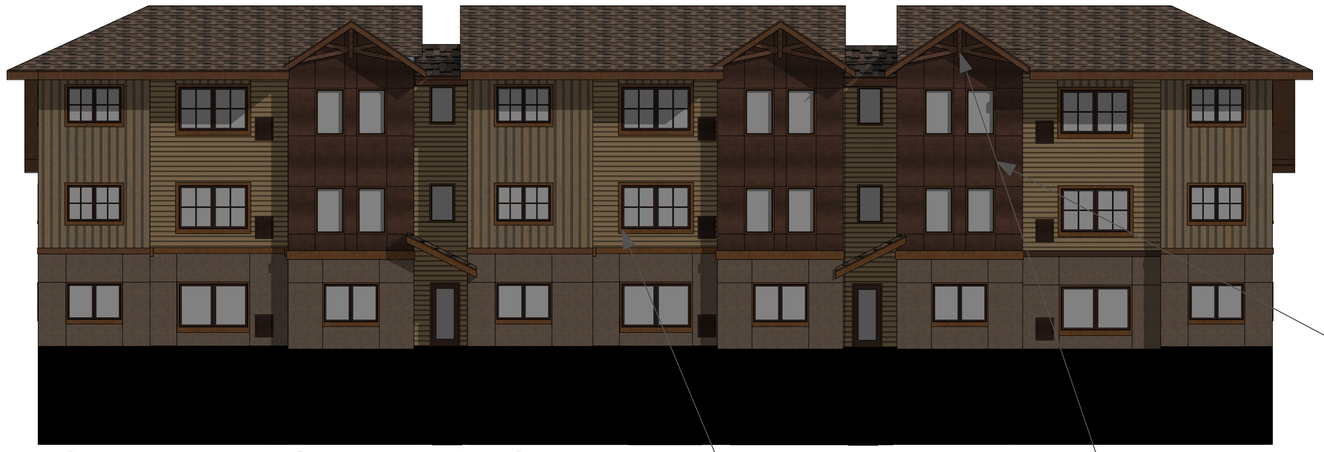


SOUTH ELEVATION - BUILDINGS D

Scale: 1/8"=1'-0"

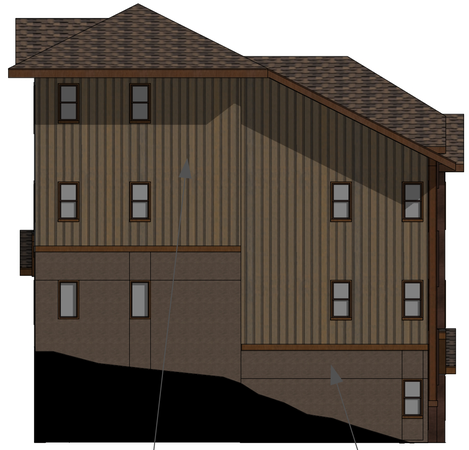
EAST ELEVATION - BUILDING D

Scale: 1/8"=1'-0"



NORTH ELEVATION - BUILDING E

Scale: 1/8"=1'-0"

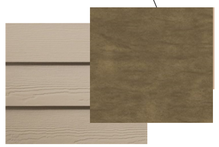


WEST ELEVATION - BUILDING E

Scale: 1/8"=1'-0"

DARK SKY COMPLIANT LIGHTING

TAMKO ASPHALT SHINGLES, BLACK WALNUT



HARDIE T&G HORIZONTAL SIDING, SW LEEWARD

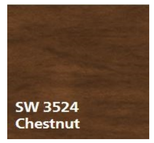
TIMBER TRUSSES, DARK BROWN

VYNIL WINDOWS AND DOORS, BRONZE COLOR

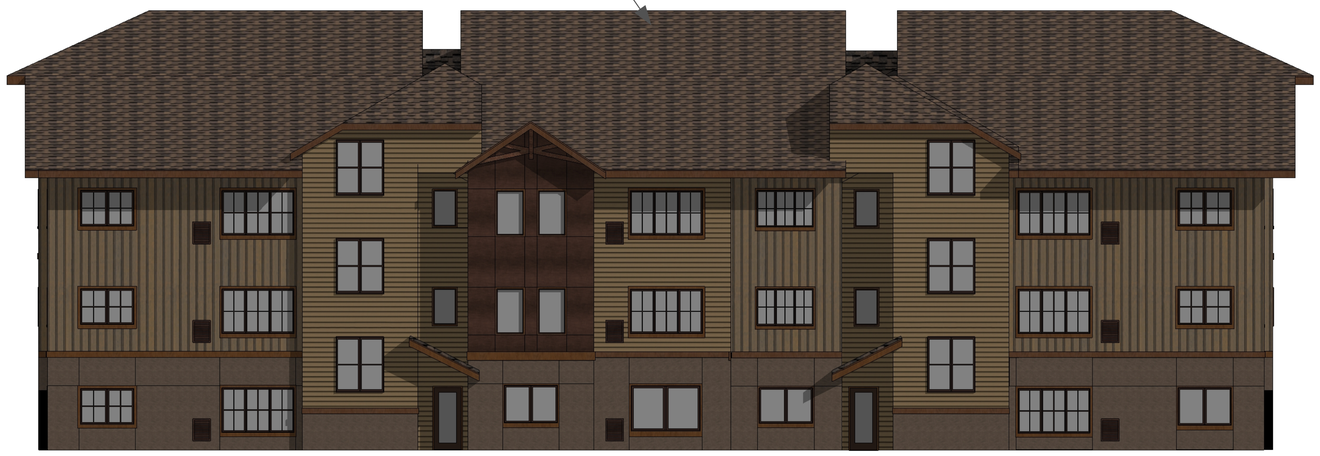
FLAT METAL PANEL, DARK BROWN

HARDIE BOARD (1X12) AND BATTEN (1X4) SW-RIVERWOOD

SYNTHETIC STUCCO SYSTEM: BUCKHORN



TRIMS AND FASCIA

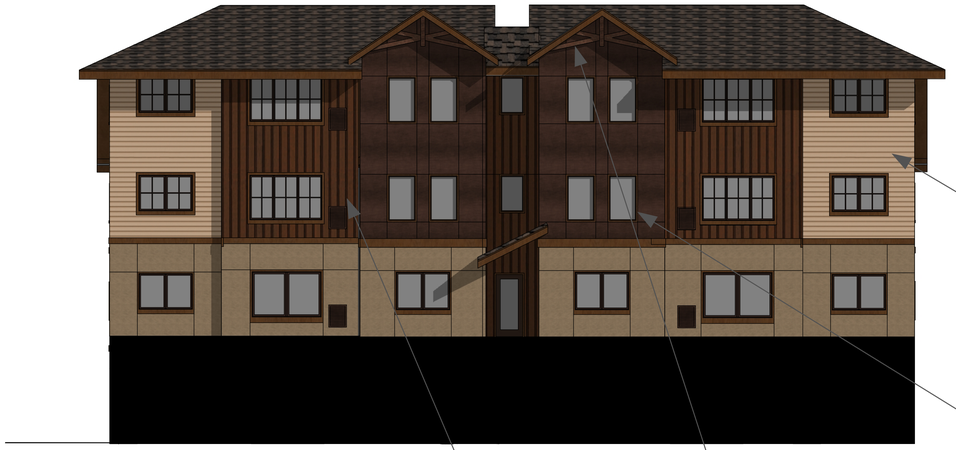


SOUTH ELEVATION - BUILDING E

Scale: 1/8"=1'-0"

EAST ELEVATION - BUILDING E

Scale: 1/8"=1'-0"



NORTH ELEVATION - BUILDING F

Scale: 1/8"=1'-0"

DARK SKY COMPLIANT LIGHTING

TAMKO ASPHALT SHINGLES, RUSTIC SLATE

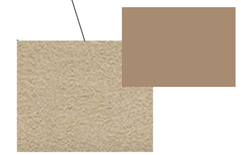
HARDIE T&G HORIZONTAL SIDING, SW - GINGER ROOT

TIMBER TRUSSES, DARK BROWN

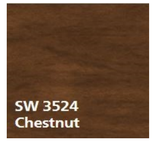
VYNIL WINDOWS AND DOORS, BRONZE COLOR

FLAT METAL PANEL, DARK BROWN

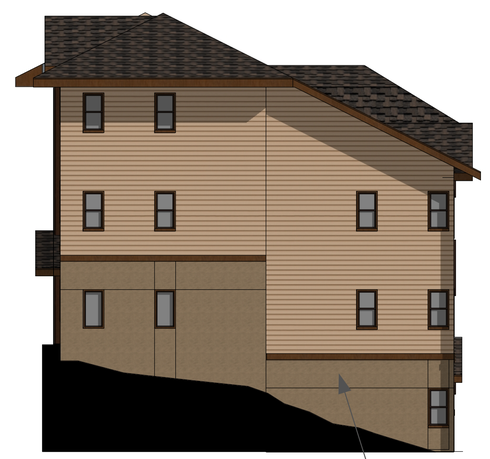
HARDIE BOARD (1X12) AND BATTEN (1X4) SW-FRENCH ROAST



STUCCO WITH EXPANSIONS: LIGHT SAND FINISH, SW - DOUBLE LATTE



TRIMS AND FASCIA



WEST ELEVATION - BUILDING F

Scale: 1/8"=1'-0"

SOUTH ELEVATION - BUILDING F

Scale: 1/8"=1'-0"

EAST ELEVATION - BUILDING F

Scale: 1/8"=1'-0"

CITY OF GLENWOOD SPRINGS

Engineering Department

Engineering Department **Jessica Bowser,** **Asst. City Engineer** **&** **Terri Partch, City Engineer**	**Date:** April 2, 2020 **To:** Community Development **Re:** Bell Rippy Glenwood LLC Apartments Major Development Permit

Please see the following engineering comments for the Bell Rippy Glenwood LLC Apartments Major Development Permit**.**

Miscellaneous Comments on the submitted Development Permit:

1. The variances that apply to the engineering standards to not need to be presented to the Planning Commission as they are the City Engineer's sign off. It would be advisable to tell the Commission we are approving these variances from the engineering standards because they make valid arguments for the variance and there is not negative impact for the allowancing of them.

2. The Transportation Commission has made a request that the developer to widen the sidewalk on the north side of Palmer Avenue to 8' and continue along the east side of Blake avenue to a mid-block crossing that ties into the RFTA BRT Station. This would help facilitate bike/pedestrian sidewalk and use of multimodal facilities.

Traffic Study Comments to be addressed prior to Development Permit Approval:

1. The Developer should submit a letter to CDOT from the Traffic Engineer stating that the recommendations of the first study will not change with the revision of traffic along with the traffic engineering update letter. CDOT should verify that no further action from the developer is necessary.

Geotechnical Report Comments to be addressed prior to Development Permit Approval:

1. The new HB Report states a different Acreage amount than in the application. The application states 5.74 Acres. The Report states that the site is 6.4 Acres under the first paragraph of section 1.3.

Drainage Report Comments to be addressed prior to Development Permit Approval:

1. The accurate soil classification to be used in the drainage calculations. Per the geotechnical report, the soil classification in site is type C.

    a. WSS information from the NRCS is not always the most accurate. While utilizing this information is acceptable for off-site flows, the on-site soils observed should be considered. If the engineer would like to have a more conservative approach, the less impervious soil type could be used, but should be justified in the report.

101 West 8th Street, Glenwood Springs, CO 81601 (970) 384-6434 FAX (970) 945-8582
jessica.bowser@cogs.us

2. P13 – Proposed contours should be shown on the proposed drainage mapping.

3. There are some small grammatical/formatting errors throughout the report. Please proofread prior to final submittal. Otherwise, the report is comprehensive and addresses the concerns the City had previously.

Preliminary Debris Analysis Comments to be addressed prior to Development Permit Approval:

1. Goulder should revise their report to include the revised drainage report information and site plan.

    a. The reports still included site features that were supposed to be removed prior to revision. These diversion walls/berms were not and are not planned on this site. This should be updated to show the intent to use debris fencing and how this changes the debris potential in a developed condition.

2. Goulder should adjust their modeling or describe why the southern debris fan disappears and reappears to the west on Blake avenue.

Miscellaneous Comments to on the Submitted Plans:

1. Cover Sheet:

    a. Please Provide a Sheet Index.

2. Overall Site Plan:

    a. Property Lines should be identified with basis of bearings and distance. The lots should also be identified. General dimensions should be provided for orientation of the plan set. See the attached checklist for further direction.

    b. It would be helpful to remove the contour lines from the site plan sheets.

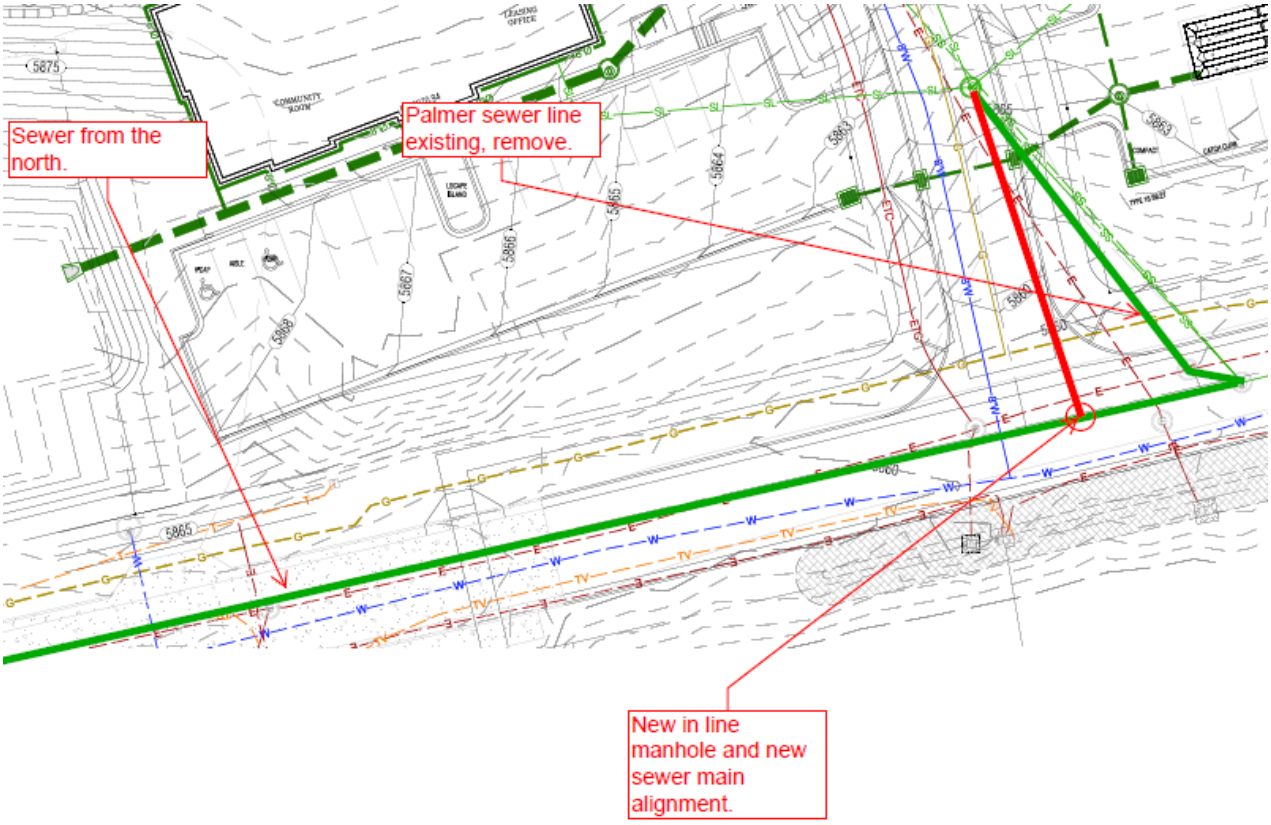
3. Site Plan:

    a. It would be helpful to remove the contour lines from the site plan sheets.

    b. ADA ramps should be directional and not point into intersections.

4. Utility Plan:

    a. The Sanitary Sewer main should be extended in Blake with a new manhole with the main remaining within the City ROW. Work for the installation/replacement of utilities within ROW should meet the engineering standards.



b. Service lines should not tie into manholes unless they are of equal size to the main; otherwise, they should enter perpendicular to the main with a WYE and a backwater valve placed at the property line.

c. Utility sizes should be identified.

5. Grading and Drainage Plan:

a. Include limits of disturbance (LOD) delineation on the grading plan. This LOD should include all off-site improvements as well.

b. The deflection berm proposed at 26th and Palmer appears to encroach on the adjacent property. Please provide documentation that the homeowner will allow this construction and is prepared to take responsibility for the maintenance, or that the Bell Rippy Property Owner will accept maintenance responsibility and it is included with their planning.

Comments to be addressed prior to Grading/Building Permit Approval:

1. Provide an Existing Conditions Plan.

2. Provide a Demolition Plan.

a. Please refer to the City Code regarding street cuts, asphalt installation, and patching.

3. Utility Plan:

a. There should be a minimum of at least 2’ from the edge of dry utility and the city ROW. Please provide a dry utility trench detail. Additionally, the utilities should have appropriate separation the is in compliance with the Engineering Standards.

b. Plan and Profiles are required for all Utilities in City ROW. This project will require Provide Subsurface Utility Engineering (SUE) or stamped letter stating why this project is exempt from a SUE.

c. Provide Utility Details.

4. Provide retaining wall details.

    a. All structural retaining walls over 4’ from bottom of footer to top of wall **and/or** expect to bear traffic loading, shall have a structural engineered design submitted for review

5. Drainage Plan:

    a. Drainage Details should be included.

    b. Foundation design and underdrains should be provided per the recommendation of the Geotechnical Report.

    c. Check dams may need to be installed within the drainage channels to reduce velocity and erosion. Please have the geotechnical engineer comment on the slopes and treatments allowed for slope stability.

6. Include a Signage and Striping Plan.

    a. No parking signs should be provided along Palmer Avenue.

7. A CDPHE Construction Stormwater Discharges Permit will be required. The Developer should submit a copy of the completed (and approved) SWMP to the City.

8. No work for this project will be allowed to commence until **all** easements (temporary or permanent), on or off site, are in place for the development of property.

9. A maintenance plan and agreement will need to be completed for all debris berms, fencing, and swales.

10. Update the drainage report with the final detail information for the proposed underground detention system prior to final drainage report submittal.

Comments to be addressed prior to Certificate of Occupancy:

1. The City will require a maintenance plan and agreement with the development for the detention and debris system/s. If the system/s are not being maintained property and having a negative effect on downstream facilities, the City will need access to perform the maintenance and back charge the facility owner.

2. All drainage and site improvements will require a certification letter from the design engineer that verifies that all improvements were constructed per plan.

3. Record drawings will be required to be submitted to the City along with electronic drawings (CAD).

Miscellaneous Comments (no need to be addressed, for tracking purposes only):

1. Palmer Avenue and the storm system is being constructed to support the development of this parcel and it is not likely to be a publicly used road. The drainage across this property and Palmer Avenue will be the responsibility of the property owner to treat and detain as it has multiple connections into the private development and will have a direct impact to the maintenance frequency of the facilities in the ROW.

    a. The City will only maintain the inlets within City ROW. The City will not be responsible for the maintenance for any drainage or water quality facilities crossing/entering private property. Maintenance frequency will be monitored and in the event the City sees excessive debris in these facilities that impact the maintenance schedule of these inlets the City will require the submission of maintenance logs from the property owner for the facilities that tie into the public ROW. If it is found that there is undue impacts to the public system, the City will require the owner to maintain or repair the public facilities until such time that they can provide documentation that their on site facilities have been repaired/maintained to prevent excess debris from entering the public system.

Matthew Langhorst DPW
(970) 384-6438 (o)

CITY OF GLENWOOD SPRINGS PUBLIC WORKS

101 West 8th Street
Glenwood Springs, CO 81601

April 6th, 2020

RE: Bell Rippy Plan Comments

The following are comments regarding the proposed project plans:

1. The fire hydrant located along Palmer between buildings A and C is too close to the Type R inlet to maintain, please adjust its location.
2. Private storm sewer system is hook directly to the roadway storm sewer system, a storm water maintenance agreement will need to be competed with the City, all infrastructure will be maintained by the development.
3. No main line water valve locations have been shown, please add valves per the city engineering standards and general practice.
4. What is the purpose of the two water services to each building location? Fire and domestic? Fire and domestic lines can be run to each building as one service and separated internally to the building.
5. Several fire hydrants do not have lead lines shown to them.
6. Please add fire hydrant valves to the plans.
7. Please add service line valves to the plans attached to the main line tee.
8. What size sewer line is being proposed? Any main lines located on the property will be the responsibility of the property owner. The City will not take ownership or maintain ace of these lines. The three manholes and main within Palmer Avenue will become the property and maintenance responsibility of the City.
9. Services lines are not allowed to enter a City manhole directly unless it is of equal size to the sewer main. All other service connections should be completed with a wye connection to the sewer main itself. What size services are being proposed?
10. Debris flow/Storm mitigation structures and piping will be maintained by the property owner or HOA. A maintenance agreement will need to be completed with the City for these items also.
11. The construction work hours are noted incorrectly in the general notes on page one of the plans set.
12. Note 15 within the utility notes seems to contradict the plan set design pertaining to sewer services and manhole connections.
13. The City would prefer note 23 under utilities call out C900 versus DIP.
14. Utility providers contact updates:
    a. Broadband: Michael Gardner 384-4807.
    b. Water/Sewer: Mike Hoffman 384-6343
    c. Public Works Director: Matthew Langhorst 384-6438
15. The city will assign a PM for the project, which may not be PW. Please just not a city representative for this position.
16. Testing should be noted as it is currently, or per City Engineering Standards.

17. Reviewing the Golder Debris Flow Report 29Jul19 it appears that the development has not been shown with the new site planning included, this will change the model and design.
18. Reviewing the Golder Debris Flow Report 29Jul19 it appears that the development significantly changes the location of the debris flow entering the Oak Hurst Townhome development and appears to add flow to the western side of the townhomes that was not there in the existing conditions. Please explain the change in historic flows noted if these still occur in with the updated plan.
19. Reviewing the Golder Debris Flow Report 29Jul19 it appears that the development changes the location of the debris flow on the southern portion of the property and it relocates the flow from the back-side of 2830 Glen Avenue to more in line with 2772 Glen Avenue. Please explain if either the existing condition or proposed condition overtops in a minor way to the properties noted if this still occurs with the updated plan.
20. Upon approval of the PUD the developer will be required to follow the **Glenwood Springs Line Extension Policy.** (attached)
21. A pre-construction meeting must be held with the developer's contractor and the electric department superintendent to clarify all responsibilities of the rules and regulations pertaining to the installation of electric infrastructure. Landscaping cannot interfere with required clearances around transformers and metering equipment.
    The electric department will need more information on the proposed transformer location in respect to grades and retaining walls and more information on metering equipment locations. Residential units will be metered separately.
22. Municipal Code 070.030.130 Underground Utilities. Utility easements and right-of-ways shall be provided in the subdivision or development meeting the requirements of the City of Glenwood Springs Electric System for the installation and maintenance of energy distribution and telecommunication facilities.

Additional Water line comments

23. The water line on Blake Ave is believed to be thin wall steel pipe. We will not allow a tap into the existing thin wall. A large portion of the main will need to be replaced. Recommended that potholing be done to verify material and size.
24. There is a stub out at the top of palmer. If this stub out is not utilized it will need to be abandoned to City standards. W/WW Department may require the replacement of the existing valve if it is determined to be in unacceptable condition. We recommend potholing to verify material and size of pipe.
25. It was noted on previous reviews that this is a geologically active area and that bell restraints will may be required on all wet pipe
26. The plans show 2 service lines for each building 1 for fire and 1 for domestic water. 1 combined service line for fire and domestic will be required. The line shall be designed and constructed to NFPA 24 standards The lead valve will be the demarcation point for the private water service for each building.
27. No fire hydrant leads, or valves are shown
28. No water service lead valves are shown or mainline valves.
29. There is no profile for the water or sewer lines. All water/sewer crossings must meet CDPHE requirements for separation.
30. How is metering for each building proposed sizes?

31. For fire hydrants located on private property, The W/WW department will operate, maintain and repair the hydrants and all hydrant leads. Each hydrant requires a minimum 15' square easement around the hydrant and access easement up to the hydrants for maintenance and repair.

Additional Sewer line comments

32. Service lines are not allowed to connect directly into Manholes unless 8" or greater. All service lines shall be connected with a factory wye. As noted in Utility notes line 15
33. Ensure the development meets the Wastewater Discharge Ordinance for sanitary sewer discharges.
34. The sewer service for building F and E shows a tie in to an existing sewer line. It is believed to be truss pipe. Recommend that potholing be done to verify material and size.
35. Will need a detail of new sewer line tie-in to existing manhole on Blake Ave.

Thank you,

Matthew Langhorst
City of Glenwood Springs, Director of Public Works

YCCD Response: Landscape islands were not previously coordinated with civil. The plans have been updated to reflect the islands.

50. The pavement hatch is not shown in the legend on C1.0.
    YCCD Response: Pavement hatch has been added to the legend.
51. Please include striping along Palmer Avenue.
    YCCD Response: Per discussions with Jessica Bowser, none of the residential streets in this neighborhood are striped.
52. Please add a stop sign to the north side of the Palmer Avenue and 26th Street intersection.
    YCCD Response: A "stop" sign has been added to the north side of the intersection.

Water / Wastewater Department

1. For all main extensions (water and sewer), contractor must warranty workmanship of City-accepted infrastructure for a minimum of two years.
   YCCD Response: Refer to General Note 25 on Sheet C1.1. ok
2. City main extension must be installed per City specifications.
   YCCD Response: There are several notes throughout the drawings which state this. ok
3. Tapping sleeve and ancillary hardware must be stainless steel.
   YCCD Response: This is not appropriate for drawings but instead for project specifications. Note 24 has been added to Sheet C7.2 to satisfy the comment. ok
4. City requires restraints for all fittings. Additionally, the city recommends restraints for all joints on wet pipe in this geologically-challenging area.
   YCCD Response: Refer to Water Note 3 on Sheet C7.2 and Sanitary Sewer Note 2 on Sheet C9.1. Restraint will be provided for all joints. ok
5. Rather than re-tapping the main for the new hydrant, can the existing tap be re-used and just extend the lead?
   YCCD Response: The existing lateral will be extended to the new fire hydrant location.

   ok for this submittal but need to see detail at some point showing coupling, restraints, thrust restraint, etc.
6. Our records indicate there may be an existing valve with stub-out, which would eliminate the need for a new tap. Suggest field-verification of the stub-out. City may require replacement of the existing valve if it is determined to be in unacceptable condition.
   YCCD Response: Note 21 on Sheet C7.2 has been added accordingly. ok
7. City recommends contractor pothole ASAP to verify existing water pipe type and material (in 26th Street and Palmer Avenue intersection).
   YCCD Response: A contractor for this project has not been selected. This comment is better suited for a Building Permit submittal. The work will be coordinated at a future date.

   ok for this submittal, but potholing recommendation should be included in future submittal
8. The isolation valve for each service line is the demarcation point for city / private responsibilities. Customer responsibility begins downstream of the service valve. (This is a general statement that applies to all service valves in the project.)
   YCCD Response: This is not appropriate for drawings but instead for City Municipal Code. Note 23 on Sheet C7.2 has been added, however, to satisfy the comment. ok
9. What size meters will be installed for each building?
   YCCD Response: This information is unknown as we are applying for a Development Permit not a Building Permit. No plumbing design has been completed. Meter sizes will not be known until the Building Permit submittal.

   ok for this submittal, but comment should be included in future submittal that indicates a City-approved meter must be installed in accordance with City specs.
10. For fire hydrants located on private property, the City Water Department will operate, maintain, and repair the hydrants and all hydrant lead piping located downstream of the hydrant lead isolation valve. Maintenance / repairs of the hydrant lead isolation valve and all piping upstream of the valve is the responsibility of the property owner. Each hydrant requires a minimum 15' square easement around the hydrant and access easement up to the hydrants for City repairs.

YCCD Response: No fire hydrants will be connected to private services. All fire hydrants will be fed from public water mains.

REQUIRED: Fire hydrant location needs to be approved by Fire Department so that we know if any hydrants are on private property.

11. Provide centralizer detail for all encasements.
    YCCD Response: No encasements are proposed for the project. There will be sleeves beneath the retaining wall along Palmer Avenue. Per discussion with Brad, there is no requirement to keep the pipe centralized in a sleeve. YCCD will consider this for a future Building Permit submittal.

ok for this submittal because the lines in question would be considered private. If plan changes, encasement w/ pipe centralizers may be required.

12. Fire Department expressed concern about fire hydrants on east side of development versus west side along the access road.
    YCCD Response: The fire hydrant layout is in conformance with the International Fire Code and further conforms to the original direction given by the fire department. The design team has received no written comments from the fire department but has made a substantial effort to seek their guidance on this issue. No direction has been received. If revisions are needed, we need firm direction from the fire department. Any changes will be incorporated into the Building Permit submittal.

see note 10

13. Will the addition of two new fire hydrants for the project be acceptable to the fire department?
    YCCD Response: The fire hydrant layout is in conformance with the International Fire Code and further conforms to the original direction given by the fire department. The design team has received no written comments from the fire department but has made a substantial effort to seek their guidance on this issue. No direction has been received. If revisions are needed, we need firm direction from the fire department. Any changes will be incorporated into the Building Permit submittal.

see note 10

14. Construction water must be metered and equipped with a City-approved cross-connection control device. Contact the W/WW Department prior to using any water for construction purposes (Please see attached construction water usage policy).
    YCCD Response: This is not appropriate for drawings but instead for documentation associated with a Building Permit. I assume you will provide the City's Water / Wastewater specifications to the contractor when they apply for a Building Permit.

ok for this submittal but please add this comment to future drawings.

15. Any existing water or sewer service stubs originally installed for these lots that are not utilized in the development of the lot shall be abandoned by the developer at the originating main line.
    YCCD Response: There are no known service stubs to this property.

ok, but if a stub out is encountered, it will need to be abandoned per City policy.

16. All wet utility lines shall be restrained joint pipe.
    YCCD Response: Refer to Water Note 3 on Sheet C7.2 and Sanitary Sewer Note 2 on Sheet C9.1. Restraint will be provided for all joints.
17. Contact 811 to schedule the appropriate utility locations prior to construction.
    YCCD Response: This note continues to be included on every single civil plan. ok
18. The City's standard minimum depth-of-bury requirement for water and sewer mains is 5.5 feet (top of finished surface to top of pipe). The City recommends that private service lines meet the same standard.
    YCCD Response: This continues to be labeled not only on the utility profiles but also Water Note 10. ok
19. The City shall inspect and approve pressure testing, disinfection, and bacteria sampling of the completed water and sewer line extensions.
    YCCD Response: Refer to Note 13 on Sheet C7.2 and Note 23 on Sheet C9.2. ok
20. All modifications to City infrastructure must conform to City standards (see attached W/WW Department).
    YCCD Response: There are several notes throughout the drawings which state this. ok
21. Please contact the City's W/WW Department prior to construction to discuss additional installation and material requirements for taps and hydrant installation.
    YCCD Response: Refer to Note 25 on Sheet C7.2. ok

22. The City's W/WW Department staff must be onsite to observe, inspect, and approve ANY work that may affect water or sewer mains.
    YCCD Response: This is not appropriate for drawings but instead for documentation associated with a Building Permit. Refer to Note 26 on Sheet C7.2. ok
23. Only City W/WW Department staff may perform a tap into the City's water or sewer mains. In certain circumstances --and only with pre-authorization --the City may approve a qualified contractor to install the tap while under the City's direct supervision.
    YCCD Response: This is not appropriate for drawings but instead for documentation associated with a Building Permit. Refer to Note 27 on Sheet C7.2. ok
24. The customer is responsible for all costs incurred by the City for the installation of tap(s).
    YCCD Response: This is not appropriate for drawings but instead for documentation associated with a Building Permit. Refer to Note 28 on Sheet C7.2. ok
25. All tap materials must conform to City standards (see attached W/WW Department Standards).
    YCCD Response: There are several notes throughout the drawings which state to conform to City standards for all aspects of construction. ok
26. As built utility drawings shall be provided to the City.
    YCCD Response: Refer to General Note 24 on Sheet C1.1. ok. Engineer-certification is also req'd
27. Ensure the development meets the Wastewater Discharge Ordinance for sanitary sewer discharges. (see attached ordinance).
    YCCD Response: Construction will be in accordance with the City's standards. ok
28. Please provide a detail of service connection inside mechanical rooms for all buildings.
    YCCD Response: This information is unknown as we are applying for a Development Permit not a Building Permit. No plumbing design has been completed.

ok, but comment shall be made in future subittals that meter and backflow devices need to be installed per City requirements.

29. City accepts Mueller or Kennedy brand fire hydrants.
    YCCD Response: This is not appropriate for drawings but instead for project specifications to be prepared for the Building Permit submittal. ok, but ensure this is noted in future submittals
30. City field staff recalls that the existing 8" main that runs along Blake may transition from DI to thin-walled steel approx. 75-100 feet to the north of this proposed tie-in point. City recommends contractor pothole ASAP to verify existing water pipe type and material at the proposed tie-in point. City will not allow tap into the thin walled steel pipe. If existing pipe is thin-walled steel, City will require new DI pipe to be installed up to the existing DI-steel transition.
    YCCD Response: A contractor for this project has not been selected. Note 22 on Sheet C7.2 has been added accordingly. The work will be coordinated at a future date.

REQUIRED - This is an important consideration that could have significant design and cost implications. Additional consideration is needed at this phase of the project. Note #22 on Sheet C7.2 should be modified to indicate that potholing is not a "City suggestion" but rather a requirement of the project.

31. Provide detail for connection to main. Assume hot tap w/ valve? Hot tap sleeve and ancillary hardware must be stainless steel.
    YCCD Response: A label has been added for this connection. ok
32. Ensure that all water/sewer crossings meet CDPHE requirements for separation distance. City requests additional detail for all water/sewer crossings (this is a general comment applicable to all crossings).
    YCCD Response: Encasement of the sanitary sewer pipe will be provided when it crosses the water main. A detail will be provided in a future Building Permit submittal.

REQUIRED - We are concerned that water/ sewer separation and crossing requirements have not been appropriately addressed. The crossings need to be identified in the drawing set and a general detail needs to be provided for the crossings. Also, explain why two types of gravity sewer pipe are specified (SDR35 and C900). One type of pipe for the project is preferred.

33. Fire Department expressed concern about fire hydrants on east side of development vs. west side along the access road. Consider relocating?
    YCCD Response: The fire hydrant layout is in conformance with the International Fire Code and further conforms to the original direction given by the fire department. The design team has received no written comments from the fire department but has made a substantial effort to seek their guidance on this issue. No direction has been received. If revisions are needed, we need firm direction from the fire department. Any changes will be incorporated into the Building Permit submittal.

see note 10

34. If existing manhole will be re-used, it appears the existing ladder rungs will interfere with the new core hole. Ladder rungs will need to be removed and relocated to a different location in the manhole. An additional rung is needed. The ring will need to be replaced.
    YCCD Response: It is desired to adjust the incoming pipe elevation to avoid removing and relocating the ladder rungs. Direction will be discussed and agreed upon during field reconnaissance with the contractor and City prior to construction.
    ok, but comment shall be made in future submittal that rungs need to be relocated, as necessary.
35. Provide detail on how the existing stub-out pipe will be abandoned.
    YCCD Response: Per a conversation with Brad, the City is going to further investigate the presence of a stub-out. ok. The City's original comment was incorrect.
36. What will be the pressure testing requirements for C900 (sewer) pipe? Please provide specification.
    YCCD Response: This information will be included in project specifications prepared for a Building Permit submittal. This submittal is only for a Development Permit.
    ok, but comment shall be made in future subittals tregarding testing procedure
37. What will be the pressure testing requirement for SDR35 sewer pipe? Please provide specification.
    YCCD Response: This information will be included in project specifications prepared for a Building Permit submittal. This submittal is only for a Development Permit.
    ok, but comment shall be made in future subittals tregarding testing procedure
38. Is SDR35 sewer pipe adequate for this application given the challenging soils in this area?
    YCCD Response: Certa-Lok joint restraints can be added to SDR-35 pipe; therefore, yes, this pipe is adequate for the application. ok
39. Field staff wanted to emphasize that proper bedding of the pipe in this geographically-challenging area is critical.
    YCCD Response: Noted. ok
40. We understand that C900 pipe is spec'd as alternative approach to meeting the minimum separation distance requirements between water and sewer pipe. Please provide documentation that this is approach is acceptable to CDPHE.
    YCCD Response: Information from CDPHE has been forwarded for review. Any revisions will be incorporated into the Building Permit submittal.
    See note 32. City's current interpretation of CDPHE policy is that C900 does not eliminate the need for sleeving at crossings.
41. City requires CCTV of the new sewer mains after they are completed. A copy of the video must be submitted to the City.
    YCCD Response: This is not appropriate for drawings but instead for documentation associated with a Building Permit. Requirement is noted.
    ok, but requirement will be included in development agreement.
42. Verify this manhole will be brought to grade?
    YCCD Response: As indicated by the notes on this drawing, the existing structure (be it a manhole or a clean-out) is proposed to be replaced with a new manhole. ok
43. This is a cleanout, not a manhole.
    YCCD Response: There is a manhole cover at-grade. Whatever the structure, it will be replaced with a manhole. ok
44. Provide connection detail.
    YCCD Response: Per discussion with Brad, the existing pipe in Palmer Avenue is truss pipe – a product readily produced and sold by Contech Engineered Solutions. An appropriate coupler will be required between the truss pipe and C900 PVC. ok

City of Glenwood Springs Line Extension Policy

1. AVAILABILITY AND APPLICABILITY.

This Line Extension Policy is available in all territories served by the City of Glenwood Springs Electric System and is applicable to all classes of electric service.

2. GENERAL PROVISIONS.

The provisions of this policy are subject to the following rules for all customers served outside and within the City limits:

A. Construction Policies of the Glenwood Springs Electric Department.
B. Rules and Regulations of the City of Glenwood Springs.
C. Line Extension Policy as filed with the Public Utilities Commission of the State of Colorado.
   (i) Customers within City limits: Courtesy Filing
   (ii) Customers outside City limits: Filing per PUC of Colorado

3. POLICY.

The rules and regulations of the City of Glenwood Springs Electric System, as outlined above under the General Provisions, require that the customer, owner or developer pay the full estimated cost for the requested new line extension.

The cost for the new requested facilities shall be paid for by the customer in full in advance of construction with no provisions for rebates or refunds.

Line extensions and new electrical facilities needed to serve new customers shall be classified into two categories of construction: On-site Facilities and Off-site Facilities. The new consumer, owner or developer shall pay the full amount for the new on-site and off-site facilities needed to provide electric service to the new customer.

4. DEFINITIONS.

On-site facilities are comprised of those electrical facilities on the premises of the project needed to provide electric service to the new load. These new facilities include but are not limited to the following items: poles and line appurtenances, primary underground cables, trenching and backfilling, transformers, meters, sectionalizing equipment, vaults, equipment pads, secondary pedestals, and secondary services.

Off-site facilities are comprised of electrical facilities not located on the premises of the project, but are associated with the backbone system comprised of substation equipment and main primary feeder lines which may or may not need to be upgraded to serve the new load.

5. FEE CALCULATION.

The Glenwood Springs Electric Department will estimate the investment required for on-site facilities and off-site facilities needed to provide electric service to the new customer. The cost estimate for each new project will be provided by the City Electric Department and will be based on historical cost records. In the case of large, phased projects, the City may permit estimates and construction advances for individual phases of the project. No construction shall proceed until the required construction advance is received by the City. If, during the course of construction, it is apparent that actual construction costs are or will exceed, by more than ten percent (10%) the original estimate, construction shall cease until a sufficient additional construction advance is received by the City to cover additional estimated costs.

A. The investment estimate shall include all costs necessary for the extension for appropriate new on-site and off-site equipment and facilities.
B. The investment estimate shall include all incidental costs such as engineering fees, fees for legal counsel, and all other overhead costs incurred in conjunction with the extension.
C. The investment estimate shall not include any additional costs for capacity, size or strength in excess of that necessary to meet the requirements of the customer or customers requesting the extension.

If the actual costs for the extension is less than the cost estimate submitted by the City, this overcharge will be refunded to the owner upon completion of all work for the line extension. If the actual cost for the extension is more than the cost estimate submitted by the City, this underpayment amount shall be paid by the owner to the City prior to energization of the project.

From: Lisa DiNardo
To: Trent Hyatt
Subject: Re: April 6 Department Review Meeting
Date: Sunday, April 5, 2020 5:16:15 PM
Attachments: image001.png

Hi Trent,

I hope all is going well with you.

I'm looking forward to seeing how the Raymond property plant material that were planted last fall have overwintered. I'll let you know what I find.

Here are my comments for the three land use proposals.

I. Bell Rippy

1. The landscape plan for the Bell Rippy development of Block 1 and Block 3 in the Oakhurst Subdivision are recommending a drip system throughout the proposed landscape. While drip irrigation may be suitable for perennials; shrubs and trees require larger volumes of water hence an irrigation system with pop-up spray heads is more appropriate for shrubs and trees with maturing, spreading root systems. A pop-up spray head irrigation system, if properly maintained, will ensure the long term health and vitality of the landscape.
2. Please have the applicant submit a detailed irrigation plan.
3. Please have the applicant submit a detailed landscape plan calling out the plants and their locations.

II. Zayo Group – Special Use Permit

1. I did not see any construction impacts to the landscaping. If it arises please let me know.

III. Kind Castle - Special Use Permit

1. There are mature trees on the east side of this building. It was not noted in the document that these will be impacted by any improvements. If something changes, please let me know.

Please let me know if you have any questions.

:)

Lisa

From: Greg Bak
To: Trent Hyatt
Subject: Re: Bell Rippy
Date: Friday, April 10, 2020 8:57:07 AM
Attachments: image001.png

I apologize, I had that meeting marked on my calendar and still missed it.

I met with the architect a couple weeks ago regarding water supply and access.

The chief concern is the length of the parking lot on the east side of the project. 150' without a turnaround for fire apparatus is the limit allowed: this lot is considerably longer than that. My first preference would be to have a continuous emergency access road across the south side of the complex, emptying out onto 26th. He was going to check into the feasibility of that.

Did this get mentioned at the meeting?

Thanks,

Greg

From: Trent Hyatt <trent.hyatt@cogs.us>
Sent: Thursday, April 9, 2020 5:30 PM
To: Greg Bak <greg.bak@cogs.us>
Subject: Bell Rippy

Greg,
I think I may have accidentally removed you from the department review meeting on Monday. I apologize if so and want to follow up with you to see if you had any comments on the proposal.

Thanks,

Trent L. Hyatt
Senior Planner
City of Glenwood Springs
101 W. Eighth Street
Glenwood Springs, CO 81601
970.384.6427 (p) 970.945.8582 (f)
trent.hyatt@cogs.us

From:	lcrfnd@rof.net
To:	Trent Hyatt
Cc:	Debra Figueroa; Paula Stepp; jandjraehal@gmail.com
Subject:	development variances
Date:	Wednesday, April 22, 2020 2:40:18 PM

Trent Hyatt, Planning and Zoning Commission,

I have seen the posts concerning the request for variances by Triumph Development on Palmer Ave: Public Notice in Post Independent on April 14 and 21, 2020 and sign erected at 26th and Palmer on April 17 for public hearing on April 28.

The entire country including GLENWOOD SPRINGS is under a Stay-at-Home order. I don't think that people are aware of your posts with a very short time frame.

I feel that this request for variances should be postponed until the Stay-at-Home order is lifted so that the neighbors who are affected by this development can visit in person.

I have lived at 2405 Palmer Ave longer than any other person in this area and certainly understand the neighborhood.

I have read the request for the variances and nowhere is the traffic pattern addressed. How do all the vehicles access the development? Where is the map and where is the site view of buildings, park, parking lots, dumpster locations, lights, etc?

Directing traffic up 23rd st and down existing Palmer Ave is not acceptable. There are more than 10 grade school or younger children who live on Palmer Ave/ Crestwood Dr.

After the original development was approved the developer was to meet with the city to arrange to install a gate at his expense on Palmer to the south of the Speck property. It would be able to be opened by First Responders only.

We were told that these apartments would be rented at " market rates" with no restrictions on how many people could occupy each unit so it will not be cheaper than over-priced existing units.

Increasing the density and not having adequate parking will certainly cause many future problems. Just because it is close to the bus station is certainly no guarantee that people will not have at least two vehicles per unit (even a one bedroom) or even ride the bus.

I hope you will answer my questions and address the concerns of the neighborhood.

Thank you,
Lynn B Cary
2405 Palmer Ave
Glenwood Spgs, Co 81601
970-945-7215
lcrfnd@rof.net

Dear Planning and Zoning Commision in regards to the Bell Rippy Development:

I have spoken to Trent Hyatt, Terri Partch, and Linda DuPriest about this issue. I have done extensive research into various street and traffic issues. I cannot endorse this development in the current state of application. This is not smart growth.

To start, the development is trying to squeeze too many people and not enough parking spaces into too small of a space. The lack of parking will spill out into a neighborhood that already has parking issues. The development plan is focused more with money making rather than quality of life.

The developer is asking for several variances from City code. The code is there to keep people safe. Varying as much from the code as they are asking is questionable.

The most unsafe part of all of this is the street and traffic issues surrounding the development. The neighborhood streets infrastructure is far below what is necessary for the creation of through streets and the opening of Blake Street gate.

Very few of the streets in this neighborhood have sidewalks. There is copious amounts of research done saying sidewalks are the best way to keep pedestrians and kids safe, including City of Glenwood Springs own documents. There are so many kids in this neighborhood, why endanger lives by adding traffic to streets that don't have basic safety infrastructure? A few minutes of convenience should never come before safety. The traffic is frustrating, but my children's lives, my neighbor's lives and our pet's lives mean more than an added 5-10 minutes travel time.

I applaud Linda DuPriest and Terri Partch in efforts to use new and innovative ideas to help find a solution, but the solution needs to be fully planned out before the plan for the development is accepted. We need solutions to the problems before there is a safety issue.

I applaud the City with its traffic calming initiative, but here is a chance to make it right before needing the traffic calming funds that could certainly be used in other areas of the City. The traffic calming program is not an excuse for improper planning.

I don't make my kids wear a bike helmet only after they sustain a serious injury, they put on their helmets before getting on the bike every time. The streets and traffic safety should be done in the same manner.

Safety is this mother's top priority, and when looking at the City of Glenwood's goals for Long Range Transportation this development in the current form hinders 7 of the 8 goals rather than supporting them. That is not smart growth.

Sincerely,
Jamie Raehal

From: Gretchen E Ricehill
To: Trent Hyatt
Subject: FW: Bell Rippy Development Comments
Date: Monday, April 27, 2020 12:32:25 PM
Attachments: ~$mmunity Development DepartmentRichard.docx

Here's another one.
Gretchen

From: Richard OConnell <r.oconnell@sbcglobal.net>
Sent: Monday, April 27, 2020 12:18 PM
To: Gretchen E Ricehill <gretchen.ricehill@cogs.us>; jandjraehal@gmail.com; Jan OConnell <tenacity71@gmail.com>; Christine Smalley <csmalley@rfsd.k12.co.us>; Ralph Smalley <rsmalley@rfsd.k12.co.us>
Subject: Bell Rippy Development Comments

Community Development Department
Richard & Janet O'Connell

101 W. 8th Street 2409
Palmer Ave

Glenwood Springs, Co 81601
Glenwood Springs, Co 81601

Attn: Planning and Zoning Commission

Gretchen Ricehill

We own a multi- generational home at 2409 Palmer Ave. We are concerned that the existing roads do not support the existing Oakhearst Townhomes and the new Bell Rippy Development will make a bad situation worse. We are also concerned that the Bell Rippy Development will end up with non-residential parking and increased traffic on the developed portion of Plamer Ave.

Blake Street has no sidewalks and always has cars and trucks parked on the East side of the street. 26th Street is worse, with a high grade, poor condition, no sidewalks and cars always parked on the north side of the street. The opening of the Blake Ave gate by Walmart will also increase the traffic load on Blake Ave. The existing foot traffic is already high with the RFTA bus stop at 27th Street and will be considerably higher with the Bell Rippy Development. Parking is limited at the RFTA bus stop, which also adds pressure to parking in the area.

At their February 4, 2020 meeting, the new developers reviewed their proposed plans

for the property. It is our understanding that they are proposing 100 apartments located in 6, three and a half story buildings, based on taking advantage of the relatively steep grade of the site. This is an increase of 30 apartments from the previous developer. They were able to increase the number of apartments by eliminating parking under the buildings proposed by the previous developer. There will be a mix of 1 and 2 bedroom rental apartments. They are not planning on any elevators so there will be no handicap access for the upper floors. Per the Glenwood Springs development code Table 0.30.1, they are required to have 1.5 parking spaces per each dwelling and a quest parking space for every five dwellings. Based on 100 apartments they would need to have 170 parking spaces at a minimum. The developers noted they plan to ask for a variance in the parking space requirements which we believe should not be allowed due to the overloaded parking in the area.

Sincerely

Richard and Janet O'Connell

From: Gretchen E Ricehill
To: Trent Hyatt
Subject: FW: Concern over Bell Rippy Development
Date: Monday, April 27, 2020 8:07:07 AM

Hello Trent
I hope you had a pleasant weekend.
I received this message yesterday. According to the plan, on May 5th P & Z meeting you'll need to read it into the record. If we receive a lot of written comments, I'll help you do that.
Best,
Gretchen

From: Christine Smalley <csmalley@rfschools.com>
Sent: Sunday, April 26, 2020 10:45 AM
To: Gretchen E Ricehill <gretchen.ricehill@cogs.us>
Subject: Concern over Bell Rippy Development

Dear Miss Ricehill,

My name is Chrisitne Smalley, a high school social studies teacher, mother of two, and resident of Palmer Ave. I write to you today to express my concern over the Bell Rippy Development by Walmart.

They plan to have two bedroom apartments with only 1.5 spots available per apartment. This is unrealistic as almost every family that needs two bedrooms has two cars. With high costs of housing people will certainly be having roommates, again a situation that would have two cars. The neighborhood does not have the space or the road conditions to allow for overflow parking. Additionally, there are many children in the neighborhood riding bikes and families walking. Without sidewalks, they are in the street and already in an unsafe condition; additional traffic through this area is scary for all residents and our children.

I'm not opposed to the development, but it needs to come with sidewalks and safety precautions for those in the neighborhood around it. Successful city planning requires thoughtful consideration for impacts of developments beyond the confines of the parking lot. City council must consider the overall effects that a development will have on the area as a whole.

If you have not walked through these areas, you need to, and please do so with your fellow council members, consider discussing these concerns with Paula Steep who walks the neighborhood regularly. You need to see people pushing their strollers and kids trying to navigate the already pot-holed streets on their training wheels; you too would feel the concern that our neighborhood has. Thank you for your time.

--
Christine Smalley
Glenwood Springs High School Social Studies Teacher

From: Gretchen E Ricehill
To: Trent Hyatt
Subject: FW: P & Z discussion-public comment
Date: Tuesday, April 28, 2020 12:27:59 PM

-----Original Message-----
From: Joan Troth <jktroth@comcast.net>
Sent: Tuesday, April 28, 2020 12:24 PM
To: Gretchen E Ricehill <gretchen.ricehill@cogs.us>
Subject: P & Z discussion

I request that Planning & Zoning deny the request to approve 100 apartments in six buildings between Blake and Palmer for these reasons:

The city's mission statement includes maintaining the small town character of Glenwood Springs

Massive buildings do not comply with this statement

Adding the huge number of new residents on the south edge of town will impact the surrounding neighborhood negatively regarding home values and traffic

Adding more cars to Grand Avenue will result in congestion becoming the norm

Adding the large number of apartments will impact the city's water supply and sewage capacity

The city of Glenwood Springs has no responsibility to provide housing for up-valley workers

Joan Troth, 3202 Cooper Ct.
945-0668

From:	Sara Sims
To:	Trent Hyatt
Cc:	Sara Sims
Subject:	FW: statement for the record
Date:	Tuesday, April 28, 2020 2:51:46 PM

Good afternoon, Trent.

Please accept this communication as Mountain Valley Developmental Services' official public comment regarding the Bell Rippy development of the Oakhurst subdivision:

Mountain Valley Developmental Services is a Community Centered Board and Program Approved Service Provider, supporting people who have intellectual and developmental disabilities. We own a home at 2503 Palmer Avenue, which is adjacent to said development. This home supports 7 adults of varying levels of need, but nearly all require a little extra time and space to physically maneuver through their environments. This includes getting into and out of vehicles on Palmer Avenue and 26th Street.

I am aware of the current issues regarding the on-street parking to accommodate for the overflow of Oakhurst Townhomes and the lack of sidewalks in the area. After attending the neighborhood meeting on February 4th, it is clear that the new development will exacerbate these concerns.

Additionally, the increase in traffic produced by the property's future inhabitants will inevitably render Palmer Ave a higher density traffic area which is not equipped to handle this volume of vehicles.

I am worried about the safety of the people living not only in our home, but in the neighborhood, and their ability to navigate these hazards. Our current space is adequate to accommodate for staff vehicles and specially equipped vehicles (which are larger than typical) on which the residents rely. However, with more vehicles and increased traffic flow, I fear that we won't be able to safely or easily find parking, load/unload residents, or maneuver our vehicles onto and off Palmer Avenue and 26th Street.

Here are a few considerations to mitigate our concerns:

- Request the developers commit to subdivision improvements to address these issues (mentioned above);
- Extend these improvements past the development's property lines to 23rd and Palmer, along 26th Street, and from 27th to 23rd and Blake; and
- Dedicate City resources to creating better parking and traffic plans that includes safety measures for pedestrians along the streets mentioned above.

Thank you for your consideration.

Sara Sims

Executive Director
Mountain Valley Developmental Services
P.O. Box 338
Glenwood Springs, Colorado 81602
970-230-9831 office phone
970-404-0089 cell phone
970-945-6469 fax
www.mtnvalley.org
Ssims@mtnvalley.org

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From:	Carol Turtle
To:	Trent Hyatt
Subject:	Fwd: 100 apartment application proposed for Blake Avenue
Date:	Tuesday, April 28, 2020 7:17:43 AM

Begin forwarded message:

From: Carol Turtle <c.turtle@icloud.com>
Date: April 23, 2020 at 11:10:00 AM MDT
To: letters@postindependent.com
Subject: 100 apartment application proposed for Blake Avenue

On April 28, 2020, Glenwood Springs Planning and Zoning Commission will consider an application for a proposed major development of 100 apartments in 6 buildings located South of Oakhurst Townhomes and North of Walmart on Blake Avenue. The hillside location sits above the Bus Rapid Transit Station in South Glenwood. If they have not already done so, I suggest the P&Z Commission and City Council members visit the proposed site, and more importantly, visit the surrounding neighborhoods of Blake and Palmer Avenues. These 2 streets will serve as major access roads into the development from South Glenwood. Blake and Palmer Avenues are both substandard streets with improper drainage and no sidewalks. Both streets are totally inadequate to handle the traffic they have now, let alone taking on the increase of traffic generated by 100 apartments while providing no safe passage for children to access schools and parks.

I hope our P&Z Commission will deny approval of this major development application until our city can address the inadequate roads with its lack of sidewalks in the Blake and Palmer neighborhoods.

David J. Turtle
Glenwood Springs, CO

ALTA/ NSPS LAND TITLE SURVEY

SITUATED IN THE SW¼ SW¼ SECTION 15, SE¼ SE¼ SECTION 16, NW¼ NW¼ SECTION 22
NE¼ NE¼ SECTION 21 ALL IN TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE 6TH PRINCIPAL MERIDIAN
COUNTY OF GARFIELD, STATE OF COLORADO

TABLE A

OPTIONAL SURVEY RESPONSIBILITIES AND SPECIFICATIONS

1. Monuments placed (or a reference monument or witness to the corner) at all major corners of the boundary of the property, unless already marked or referenced by existing monuments or witnesses in close proximity to the corner.
- shown hereon

2. Address(es) of the surveyed property if disclosed in documents provided to or obtained by the surveyor, or observed while conducting the fieldwork.
- No address Blake and Palmer Avenue, Glenwood Springs, CO 81601

3. Flood zone classification (with proper annotation based on federal Flood Insurance Rate Maps or the state or local equivalent) depicted by scaled map location and graphic plotting only.
The Property described on this Survey does lie within a Special Flood Hazard Area ("SFHA") as defined by the Federal Emergency Management Agency; the Property lies within Zone(s) A,B,C and D of the Flood Insurance Rate Map identified as Community Panel No 0802051434 Suffix B, bearing an effective date of January 3, 1986 and within Zone(s) A,B,C, and D of the Flood Insurance Rate Map identified as Community Panel No 0802051434 Suffix C, bearing an effective date of October 15, 1985.

Zone A - Areas of 100-year flood; base flood elevations and flood hazard factors not determined.

Zone B - Areas between limits of the 100-year flood and the 500-year flood; or certain areas subject to 100-year flooding with depths less than one foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood.

Zone C - Areas of minimal flooding.

Zone D - Areas of undetermined, but possible flood hazards.

4. Gross land area.
- 5.508 acres

5. Vertical relief with the source of information (e.g., ground survey, aerial map), contour interval, datum and originating benchmark identified.
- Contours were devised by a ground survey conducted during December, 2019, Vertical Datum 6.04 feet below NAVD88.

7. (a) Exterior dimensions of all buildings at ground level.
- vacant property

(B) Square footage of:
(1) exterior footprint of all buildings at ground level.
- vacant property

8. Substantial features observed in the process of conducting the fieldwork (in addition to the improvements and features required pursuant to Section 5 above) (e.g., parking lots, billboards, signs, swimming pools, landscaped areas, substantial areas of refuse).
- shown hereon

10. (a) As designated by the client, a determination of the relationship and location of certain division or party walls with respect to adjoining properties (client to obtain necessary permission)
- none found
11. Location of utilities existing on or serving the surveyed property as determined by:
- shown hereon
-observed evidence collected pursuant to Section 5.E.iv.
-evidence from plans requested by the surveyor and obtained from utility companies, or provided by client (with reference as to the sources of information), and
-markings requested by the surveyor pursuant to an 811 utility locate or similar request

Representative examples of such utilities include, but are not limited to:
-Manholes, catch basins, valve vaults and other surface indications of subterranean uses;
-Wires and cables (including their function, if readily identifiable) crossing the surveyed property, and all poles on or within ten feet of the surveyed property. Without expressing a legal opinion as to the ownership or nature of the potential encroachment, the dimensions of all encroaching utility pole crossmembers or overhangs; and
-Utility company installations on the surveyed property.
Note to the client, insurer, and lender – With regard to Table A, item 11, source information from plans and markings will be combined with observed evidence of utilities pursuant to Section 5.E.iv. to develop a view of the underground utilities. However, lacking excavation, the exact location of underground features cannot be accurately, completely, and reliably depicted. In addition, in some jurisdictions, 811 or other similar utility locate requests from surveyors may be ignored or result in an incomplete response, in which case the surveyor shall note on the plat or map how this affected the surveyor's assessment of the location of the utilities. Where additional or more detailed information is required, the client is advised that excavation and/or a private utility locate request may be necessary.

14. As specified by the client, distance to the nearest intersecting street.
non specified property falls at intersection of Blake and Palmer Avenue.

16. Evidence of recent earth moving work, building construction, or building additions observed in the process of conducting the fieldwork.
- none observed

17. Proposed changes in street right of way lines, if such information is made available to the surveyor by the controlling jurisdiction. Evidence of recent street or sidewalk construction or repairs observed in the process of conducting the fieldwork.
- none observed

18. If there has been a field delineation of wetlands conducted by a qualified specialist hired by the client, the surveyor shall locate any delineation markers observed in the process of conducting the fieldwork and show them on the face of the plat or map. If no markers were observed, the surveyor shall so state.

- none observed

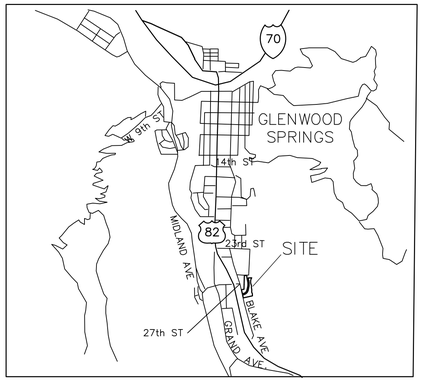
19. Include any plottable offsite (i.e., appurtenant) easements or servitudes disclosed in documents provided to or obtained by the surveyor as a part of the survey pursuant to Sections 5 and 6 (and applicable selected Table A items) (client to obtain necessary permissions).
- shown hereon

General Notes:

1. OWNERSHIP, RECORDED RIGHTS–OF–WAY, AND EASEMENT INFORMATION WAS DONE USING A CURRENT TITLE COMMITMENT BY LAND TITLE GUARANTEE COMPANY. ORDER NUMBER GPR63014324.

2. BEARINGS ARE BASED ON THE SOUTH LINE OF OAKHURST SUBDIVISION FIRST FILING ACCORDING TO THE PLAT FILED AT RECEPTION NO. 241379 IN THE OFFICE OF THE GARFIELD COUNTY CLERK AND RECORDER. THE VALUE USED, S77°23'50"W AS SHOWN THEREON WAS DETERMINED FROM A FOUND PLASTIC CAP STAMPED LS 37935 AT THE WEST AND EAST ENDS OF SAID LINE.

3. ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVERED SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN HEREON.



VICINITY MAP

LEGAL DESCRIPTION:

OAKHURST SUBDIVISION (FIRST FILING) ACCORDING TO THE PLAT THEREOF FILED AT RECEPTION NO. 241379 IN THE OFFICE OF THE GARFIELD COUNTY CLERK AND RECORDER.

EXCEPT: (1) LOTS 1, 2, AND 3 IN BLOCK I, ACCORDING TO SAID PLAT;
(2) LOTS 1, 2 AND 3 IN BLOCK 2, ACCORDING TO SAID PLAT; AND(3) LOTS 4, 5, 6, 7, 8, AND 9 IN BLOCK 1 AND LOTS 4, S. 6, 7, 8 AND 9 IN BLOCK 2, ACCORDING TO THE MAP OF OAKHURST SUBDIVISION, SECOND FILING FILED AT RECEPTION NO. 254484 IN SAID OFFICE.

COUNTY OF GARFIELD
STATE OF COLORADO

SURVEYORS CERTIFICATION:

To Land Title Guarantee Company, Glenwood Multi Family, LLC, A Colorado Limited Liability Company, and Four Points Funding.

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2016 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 2, 3, 4, 5, 7(a), 8, 10, 11, 14, 16, 17, and 18 of Table A thereof. The fieldwork was completed on December 11, 2019.

Date of Plat or Map: December 11, 2019
Patrick W. Click

Dated: December 16, 2019 Registration No. 37904

SCHEDULE B, PART II
EXCEPTIONS

1. Any facts, rights, interests, or claims thereof, not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
– SHOWN HEREON
2. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
– NOT A SURVEY MATTER
3. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
– SHOWN HEREON
4. Any lien, or right to a lien, for services, labor or material heretofore or hereafter furnished, imposed by law and not shown by the Public Records.
– NOT A SURVEY MATTER
5. Defects, liens, encumbrances, adverse claims or other matters, if any, created, first appearing in the public records or attaching subsequent to the effective date hereof but prior to the date of the proposed insured acquires of record for value the estate or interest or mortgage thereon covered by this Commitment.
– NOT A SURVEY MATTER
6. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
– NOT A SURVEY MATTER
7. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water.
– NOT A SURVEY MATTER
8. RIGHT OF THE PROPRIETOR OF A VEIN OR LODE TO EXTRACT AND REMOVE HIS ORE THEREFROM, SHOULD THE SAME BE FOUND TO PENETRATE OR INTERSECT THE PREMISES HEREBY GRANTED, AND A RIGHT OF WAY FOR DITCHES OR CANALS CONSTRUCTED BY THE AUTHORITY OF THE UNITED STATES, AS RESERVED IN UNITED STATES PATENT RECORDED DECEMBER 07 1891 IN BOOK 12 AT PAGE 342 AND RECORDED MARCH 14, 1891 IN BOOK 12 AT PAGE 72.
– BLANKET EASEMENT
9. EASEMENTS AND RIGHT OF WAY FOR TELEPHONE/TELEGRAPH PURPOSES AS CONTAINED IN INSTRUMENT RECORDED JUNE 25, 1936 IN BOOK 183 AT PAGE 422.
– NONE FOUND

10. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN INSTRUMENT RECORDED JUNE 06, 1983 UNDER RECEPTION NO. 342659.
– SHOWN HEREON
11. TERMS, CONDITIONS AND PROVISIONS OF MAINTENANCE AGREEMENT RECORDED APRIL 16, 1986 AT RECEPTION NO. 370323.
– DOES NOT AFFECT PROPERTY SURVEYED HEREON
12. TERMS, CONDITIONS AND PROVISIONS OF AGREEMENT RECORDED MAY 08, 1970 AT RECEPTION NO. 246299.
– ACCESS AGREEMENT FOR PALMER AVENUE TO THE NORTH OF THE PROPERTY SURVEYED HEREON
13. TERMS, CONDITIONS AND PROVISIONS OF ORDINANCE NO. 62 RECORDED JANUARY 13, 1988 AT RECEPTION NO. 388990.
– NOT A SURVEY MATTER (REZONE OF PROPERTY)
14. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN RIGHT OF WAY EASEMENT RECORDED DECEMBER 18, 1992 UNDER RECEPTION NO. 442302.
– SHOWN HEREON
15. EASEMENTS, CONDITIONS, COVENANTS, RESTRICTIONS, RESERVATIONS AND NOTES ON THE PLAT OF OAKHURST SUBDIVISION RECORDED JULY 25, 1968 UNDER RECEPTION NO. 241379 AND THE FILING NO. 2 PLAT RECORDED FEBRUARY 2, 1972 AT RECEPTION NO. 254484.
– SHOWN HEREON

EASEMENTS AND RIGHT OF WAY FOR THE GLENWOOD DITCH.

ALTA/NSPS LAND TITLE SURVEY
SITUATED IN SECTION 15, 16, 22 AND 21
TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE 6TH PRINCIPAL MERIDIAN
COUNTY OF GARFIELD, STATE OF COLORADO

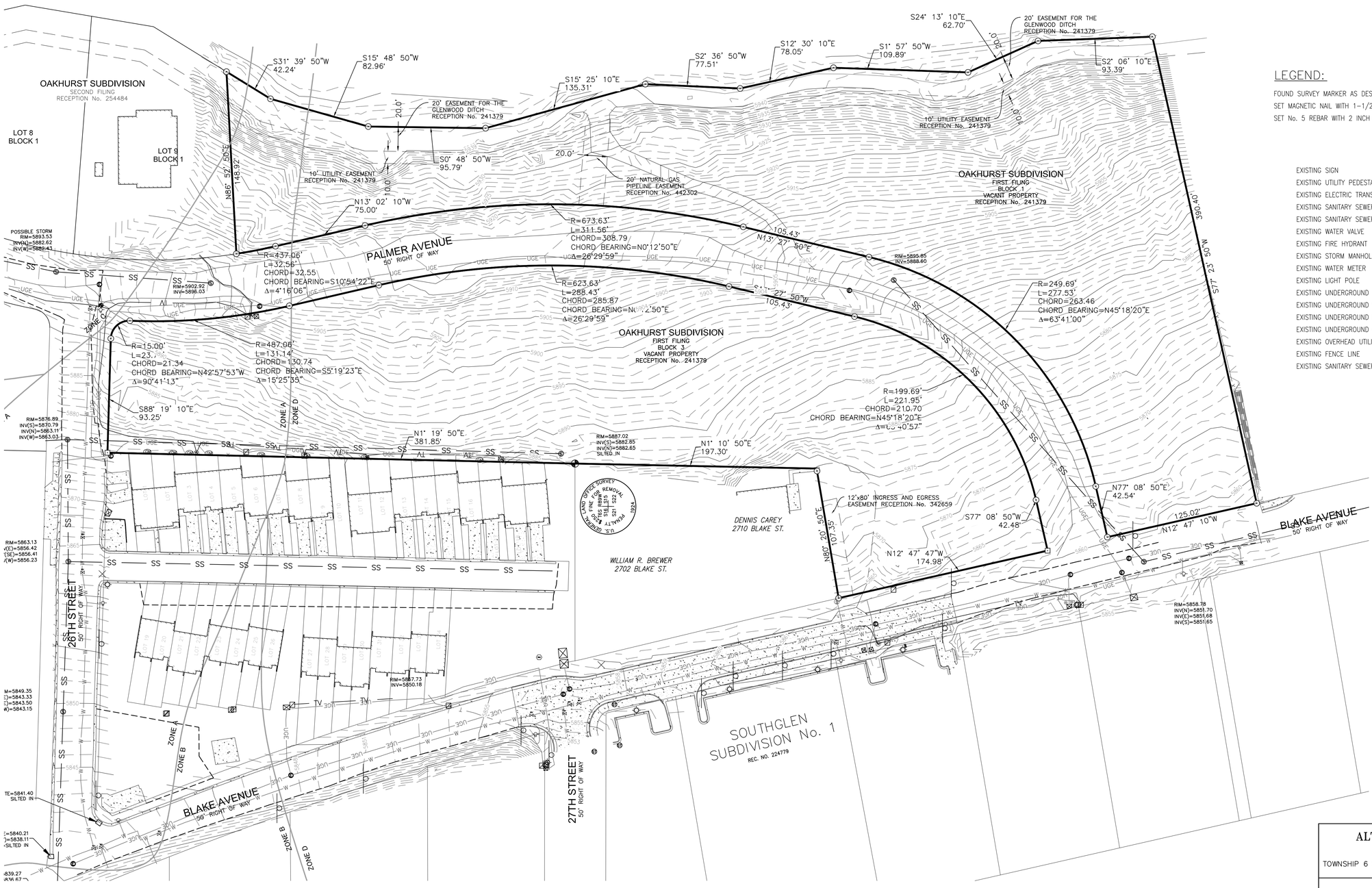
JOB #: 2019159 FIELD WORK: PC
DATE: 12/16/19 DRAWING NAME: ALTA DRAWN BY: PC

POLARIS SURVEYING
PATRICK W. CLICK P.L.S.
3194 MESA AVE. #B
GRAND JUNCTION, CO 81504
PHONE/FAX (970)434–7038

SH: 1 OF 2

ALTA/ NSPS LAND TITLE SURVEY

SITUATED IN THE SW¼ SW¼ SECTION 15, SE¼ SE¼ SECTION 16, NW¼ NW¼ SECTION 22
NE¼ NE¼ SECTION 21 ALL IN TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE 6TH PRINCIPAL MERIDIAN
COUNTY OF GARFIELD, STATE OF COLORADO



GRAPHIC SCALE:
1"=40'
40 0 40 80
LINEAR UNITS ARE U.S. SURVEY FEET

LEGEND:

FOUND SURVEY MARKER AS DESCRIBED	◔
SET MAGNETIC NAIL WITH 1-1/2 INCH BRASS DISC PLS 37904	⊙
SET No. 5 REBAR WITH 2 INCH ALUMINUM CAP PLS 37904	⊡
EXISTING SIGN	○
EXISTING UTILITY PEDESTAL	▨
EXISTING ELECTRIC TRANSFORMER	⊠
EXISTING SANITARY SEWER MANHOLE	Ⓢ
EXISTING SANITARY SEWER CLEANOUT	⊛
EXISTING WATER VALVE	⋈
EXISTING FIRE HYDRANT	⊕
EXISTING STORM MANHOLE	Ⓢ
EXISTING WATER METER	Ⓦ
EXISTING LIGHT POLE	☼
EXISTING UNDERGROUND TELEPHONE LINE	— T — T — T —
EXISTING UNDERGROUND WATER LINE	— W — W — W —
EXISTING UNDERGROUND ELECTRIC LINE	— UGE — UGE — UGE —
EXISTING UNDERGROUND GAS LINE	— GAS — GAS —
EXISTING OVERHEAD UTILITY LINE	— OH — OH —
EXISTING FENCE LINE	— X —
EXISTING SANITARY SEWER LINE	— SS — SS —

COLORADO LICENSED
PATRICK W. CLICK
12-16-19
37904
PROFESSIONAL LAND SURVEYOR

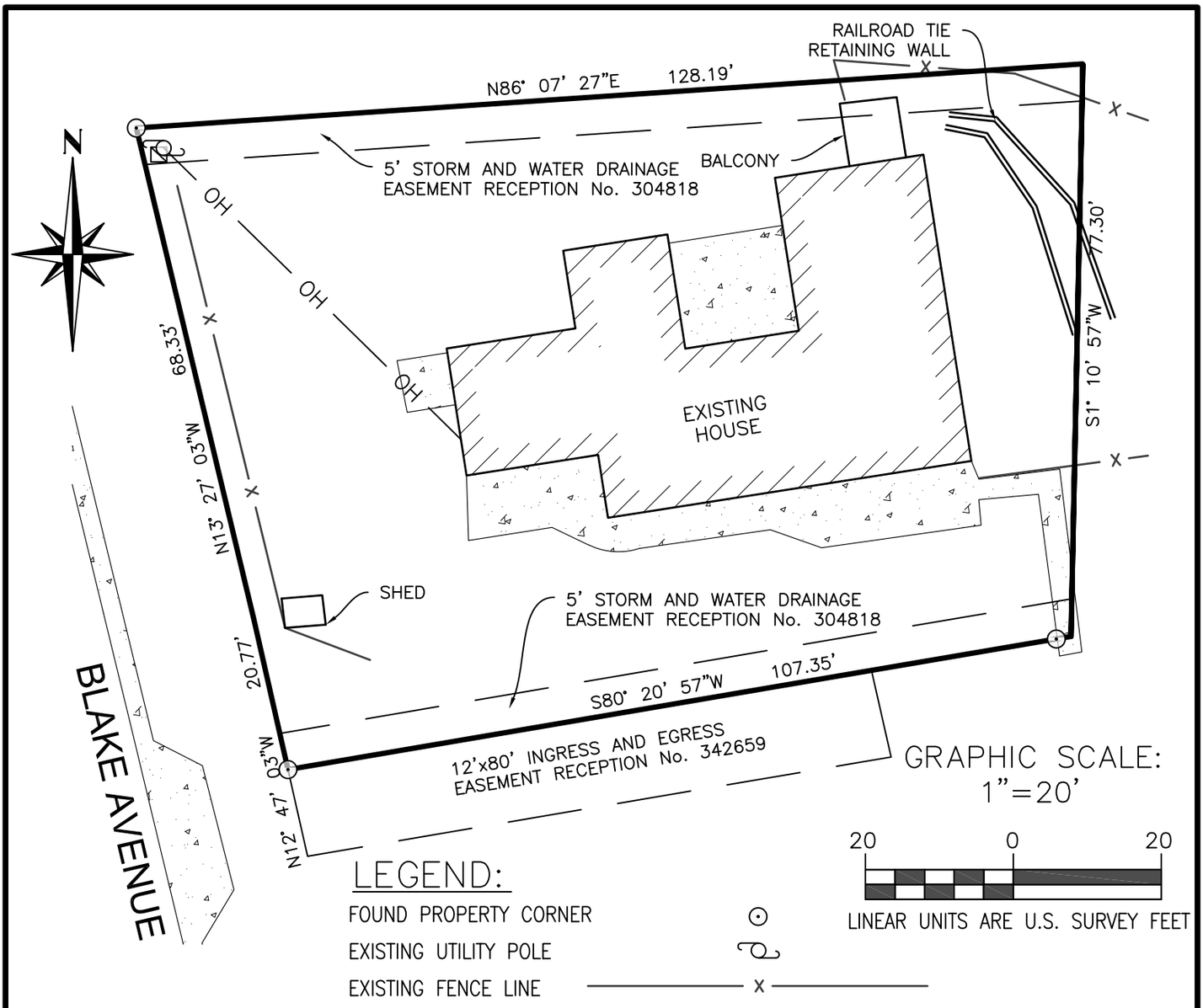
ALTA/NSPS LAND TITLE SURVEY

SITUATED IN SECTION 15, 16, 22 AND 21
TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE 6TH PRINCIPAL MERIDIAN
COUNTY OF GARFIELD, STATE OF COLORADO

JOB #: 2019159 FIELD WORK: PC
DATE: 12/16/19 DRAWING NAME: ALTA DRAWN BY: PC

POLARIS SURVEYING
PATRICK W. CLICK P.L.S.
3194 MESA AVE. #B
GRAND JUNCTION, CO 81504
PHONE/FAX (970)434-7038

SH: 1 OF 2



LEGAL DESCRIPTION:

A tract or parcel of land being all that part of the NE1/4NE1/4 of Section 21, Township 6 South, Range 89 West of the 6th P.M., lying westerly of the easterly line of said Section 21 and easterly of the proposed Blake Street extension in the City of Glenwood Springs, described as follows:

Beginning at a point on the easterly line of said Section 21, whence the Northeast corner of said Section 21 bears North 1°11' East 120.00 feet;

thence South 1°11' West 77.30 feet along the easterly line of said Section 21; thence South 80°21' West 107.35 feet to a point on the easterly line of said Blake Street extension; thence North 12°47'West 20.77 feet along the easterly line of said Blake Street extension;

thence North 13°27'West 68.33 feet along the easterly line of said Blake Street extension; thence North 86°07'30" East 128.19 feet to a point on the easterly line of said Section 21, the Point of Beginning.

Together with a non-exclusive easement for ingress and egress situate in the NE1/4 of the NE1/4 of Section 21, Township 6 South, Range 89 West of the 6th P.M., being more particularly described as follows: Beginning at the Northeast corner of said Section 21;

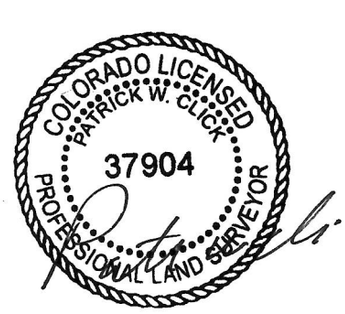
thence South 01°11' West 197.30 feet along the East line of said Section 21, thence South 80°21'West 107.35 feet to the True Point of Beginning; thence North 80°21'East 80.00 feet; thence South 12°47'East 12.00 feet; thence South 80°21'West 80.00 feet to the easterly line of Blake Street extension; thence North 12°47'West 12.00 feet along said easterly line to the True Point of Beginning.

IMPROVEMENT LOCATION CERTIFICATE

I hereby certify that this improvement location certificate was prepared for COMMONWEALTH LAND TITLE INSURANCE COMPANY, that it is not a land survey plat or improvement survey plat, and that it is not to be relied upon for the establishment of fence, building, or other future improvement lines. I further certify that the improvements on the above described parcel on this date, FEBRUARY 19, 2020, except utility connections, are entirely within the boundaries of the parcel, except as shown, that there are no encroachments upon the described premises by improvements on any adjoining premises, except as indicated, and that there is no apparent evidence or sign of any easement crossing or burdening any part of said parcel, except as noted.

Stamp By: PATRICK W CLICK

DATE: February 21, 2020



POLARIS SURVEYING
PATRICK W. CLICK P.L.S.
3194 MESA AVE
GRAND JUNCTION, CO 81504
PHONE (970)434-7038

2710 Blake Avenue

LEGEND

- SHADE TREES
- EVERGREEN TREES
- ORNAMENTAL TREES
- SHRUB MASSES
- PEREMNNIALS
- TERRACE WALLS
- DROUGHT TOLERANT BLUEGRASS
- NATIVE SEED MIX

NOTES:

A COMPREHENSIVE AND CONSISTENT LANDSCAPE SOLUTION IS PROPOSED ACROSS THE ENTIRE PROPERTY WITH THE FOLLOWING POINTS:

- TREES AND SHRUBS ARE LOCATED AROUND THE BUILDINGS TO ACCENT THE STRUCTURES.
- RETAINING WALLS ARE SCREENED WITH TREES AND SHRUBS ON THE DOWNHILL SIDE.
- PARKING AREAS HAVE REQUIRED LANDSCAPE ISLANDS WITH TREES AND SHRUBS.
- ALL BUILDINGS ARE SURROUNDED WITH A MINIMUM 5' MULCH BED TO KEEP PLANNED GRASS AREAS AWAY FROM THE STRUCTURES TO AVOID ADDING IRRIGATION WATER TO THE SOILS UNDER THE BUILDINGS.
- ALL LANDSCAPE PLANTINGS ARE LOCATED A MINIMUM OF 5' AWAY FROM THE BUILDING TO AVOID ADDING IRRIGATION WATER TO THE SOILS UNDER THE BUILDINGS.
- ALL LANDSCAPE PLANTINGS ARE LOCATED TO ALLOW FOR SNOW STORAGE AREAS EQUALLING 20% OF THE ADJACENT PAVING AREAS.
- ALL REMAINING AREAS ON THE SITE NOT TO BE PAVED, BUILT UPON, OR MULCH BED WILL RECEIVE REVEGETATION WITH NATIVE GRASSES, TO INCLUDE TEMPORARY IRRIGATION UNTIL ADEQUATE REGROWTH.
- ALL LANDSCAPE PLANTINGS WILL HAVE ONE COMPREHENSIVE PERMANENT DRIP IRRIGATION SYSTEM INSTALLED AND MAINTAINED BY THE APARTMENT COMPLEX MANAGEMENT.
- ALL LANDSCAPE PLANTING WILL MEET THE MINIMUM SIZE AS REQUIRED BY GLENWOOD DEVELOPMENT CODE.

1 ILLUSTRATIVE SITE PLAN

1" = 30'-0"

0 30 60 FT

scale: 1"=30'-0"

TRIUMPH
Vail Office
12 Vail Road,
suite 700
Vail, CO 81657
Tel: 970.479.9890
www.triumphdev.com

BELL RIPPY NEIGHBORHOOD

GLENWOOD SPRINGS COLORADO

Revisions: GS PLANNING MEETING 11.20.19

Sheet title: ILLUSTRATIVE SITE PLAN

Stamp

Date: 2/28/2020
Project No:
Drawn by: MEF
Checked by: MEF

© 2020 TRIUMPH

Sheet L1.0

March 2, 2020

City of Glenwood Springs
Attn. Ms. Terri Partch, City Engineer
101 W. 8th Street
Glenwood Springs, CO 81601

Colorado Department of Transportation
Attn. Mr. Brian Killian, CDOT Region 3 Access Manager
222 S. 6th Street
Grand Junction, CO 81501

RE: Bell Rippy Neighborhood (Glenwood Multifamily)
Transportation Impact Analysis Letter
Glenwood Springs, CO

Terri and Brian:

The applicant is proposing to increase the density of the Bell Rippy site from 79 residential rental apartment units to 100 units. McDowell Engineering has prepared this letter to summarize the anticipated traffic impacts from increased density on the Belly Rippy site. This letter augments the previously approved *Transportation Impact Study for Glenwood Multifamily Development*[1] for the site.

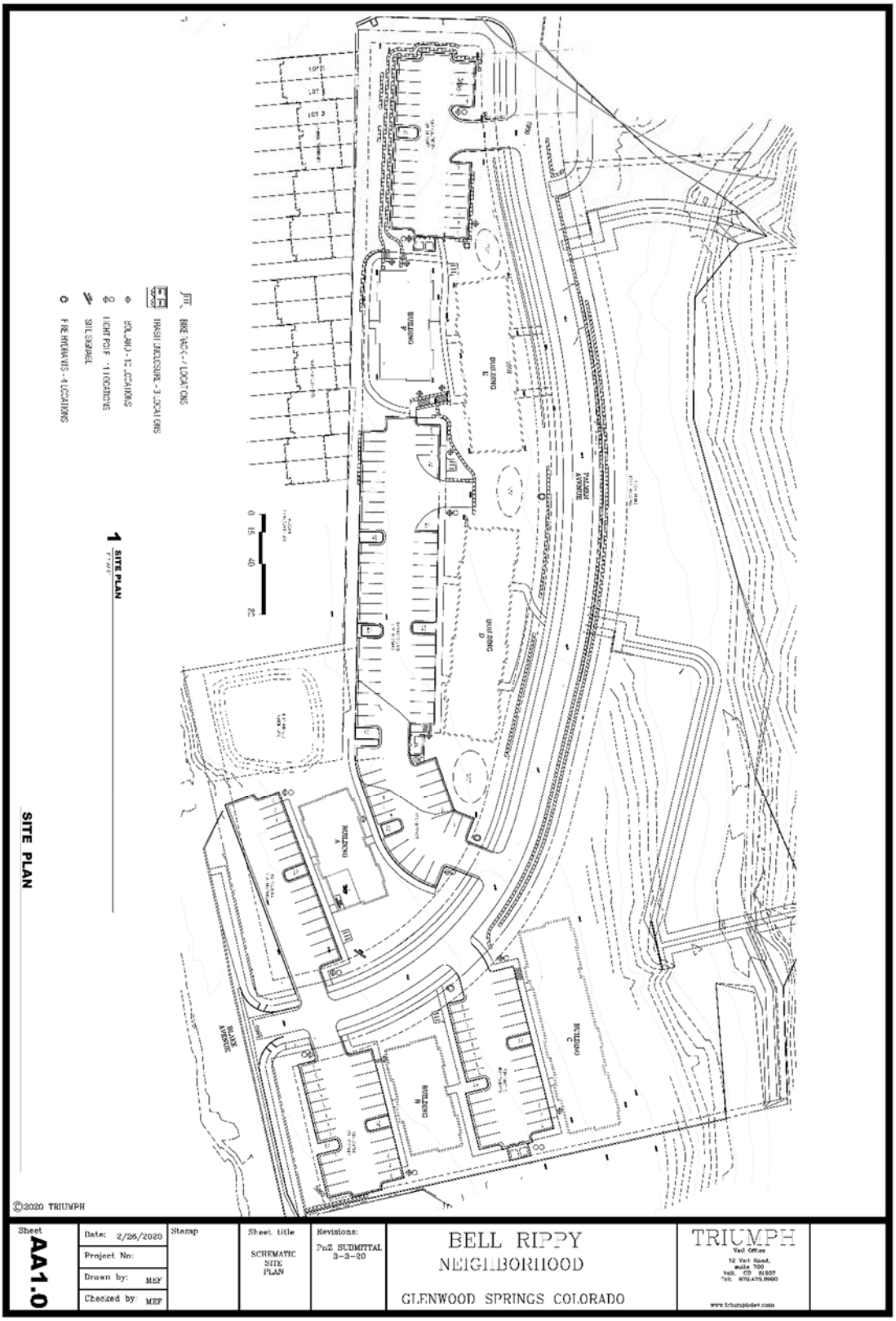
Proposed Revisions

The applicant is proposing 100 residential apartment units in six buildings on the site. This is an increase in the number of apartments over the previously approved 79 units in 10 buildings. Given the proposed unit mix, this only equates to an additional six bedrooms from the previous approval.

The site accesses will remain in the same locations as previously approved. The proposed internal parking lot on the north end of the site has been modified. Refer to the proposed site plan in **Figure 1**.

In January 2019, the Glenwood Springs City Council directed that the Blake Avenue gate would be opened upon completion of the project construction. The City has also directed that Blake Avenue will be restricted to one-way southbound traffic between 23rd Street and 26th Street. These assumptions have been used in this updated analysis.

Figure 1: Site Plan



Trip Generation

This development is anticipated to consist of six separate four-story buildings of rental apartments. Per the Institute of Transportation Engineers' *Trip Generation Manual*[2], this proposed use is classified as Land Use #221 Multifamily Housing (Mid-Rise). The analysis includes the same 10 percent multimodal reduction as the previous analysis due to the direct access to a RFTA Park 'n Ride facility and connectivity to local bicycle and pedestrian facilities.

The previous trip generation calculations used the 9th Edition of the *Trip Generation Manual*[2]. Land Use #223 Mid-Rise Apartment did not have enough data points for use in the previous analysis, so Land Use #220 Apartment was used. Since the previous traffic analysis, the 10th Edition of the *Trip Generation Manual*[2] has been released. The 10th Edition of the *Trip Generation Manual*[2] defines the new Land Use #221 Multifamily Housing (Mid-Rise) as apartments having between three and ten floors and at least three other dwelling units within the same building. There are 27 to 48 data points available, allowing accurate comparisons using this data.

Table 1 calculates the anticipated trip generation of this development along with a comparison to the previous study performed for this parcel. The proposed apartment complex is anticipated to generate a total of 489 trips over the course of an average weekday, including a total of 30 trips during the morning peak hour and 38 trips during the evening peak hour.

With the new available methodology, the new trip generation estimate represents a decrease of 54 trips during an average weekday. During the morning peak hour, the reduction is 13 trips and during the evening peak hour the expected reduction is 19 trips when compared to the previous study.

Total Traffic

The total traffic is anticipated to be less than the previous *Transportation Impact Study for Glenwood Multifamily Development*[1] analysis, given the updated methodology and data sets available by the 10th Edition of the Institute of Transportation Engineering's *Trip Generation Manual*[2] for mid-rise multifamily housing. Therefore, no modifications to the infrastructure recommendations are anticipated for the proposed land use revision.

Project Number: M1441
Prepared By: KJS
Date: 3/1/2020
Revised:

Table 1: Project Trip Generation
Bell Rippy Neighborhood
Glenwood Springs, Colorado
Estimated Project-Generated Traffic

Previous Study (For Reference Only)[1]

ITE Code	Units	AM Peak Hour	PM Peak Hour	Avg. Weekday	Average Weekday Trips (vpd)	Morning Peak Hour[3] Inbound % Trips	Morning Peak Hour[3] Inbound Trips	Morning Peak Hour[3] Outbound % Trips	Morning Peak Hour[3] Outbound Trips	Evening Peak Hour[4] Inbound % Trips	Evening Peak Hour[4] Inbound Trips	Evening Peak Hour[4] Outbound % Trips	Evening Peak Hour[4] Outbound Trips
Residential													
#220, Apartment[2]	79 DU	Regression Equation			603	29%	14	71%	33	61%	39	39%	25
Multi-Modal Trip Reduction	-10%				-60		-1		-3		-4		-3
Total Project Generated Traffic					**543**		**13**		**30**		**35**		**22**

[1] Transportation Impact Study for Glenwood Multifamily Development (Formerly Bell Rippy Apartments) Glenwood Springs, Colorado. McDowell Engineering, July 24, 2019.
[2] Values obtained from *Trip Generation, 9th Edition,* Institute of Transportation Engineers, 2012.
[3] AM Peak Hour of Generator - T = 0.54(X) + 2.45
[4] PM Peak Hour of Generator - T = 0.60(X) + 14.91

Updated Analysis

ITE Code	Units	AM Peak Hour	PM Peak Hour	Avg. Weekday	Average Weekday Trips (vpd)	Morning Peak Hour[6] Inbound % Trips	Morning Peak Hour[6] Inbound Trips	Morning Peak Hour[6] Outbound % Trips	Morning Peak Hour[6] Outbound Trips	Evening Peak Hour[7] Inbound % Trips	Evening Peak Hour[7] Inbound Trips	Evening Peak Hour[7] Outbound % Trips	Evening Peak Hour[7] Outbound Trips
Residential													
#221, Multifamily Housing (Mid-Rise)[5]	100 DU	Regression Equation			543	27%	9	73%	25	60%	26	40%	17
Multi-Modal Trip Reduction	-10%				-54		-1		-3		-3		-2
Total Project Generated Traffic					**489**		**8**		**22**		**23**		**15**

[5] Values obtained from *Trip Generation, 10th Edition,* Institute of Transportation Engineers, 2017.
[6] AM Peak Hour of Generator - Ln(T) = 0.83 Ln(X) - 0.27
[7] PM Peak Hour of Generator - Ln(T) = 0.83 Ln(X) - 0.05

Infrastructure Recommendations

The previous *Transportation Impact Study for Glenwood Multifamily Development*[1] recommendations included the following:

SH 82 & 27th Street: With site-generated traffic the length of the southbound queue at this intersection can be anticipated to increase by two cars or fifty feet. The City and/or CDOT may consider re-striping the southbound left turn lane to the north to address this existing operational concern.

SH 82 & 23rd Street: Year 2019 background traffic conditions require the construction of a longer westbound left turn lane and a northbound right turn lane.

27th Street & Blake Avenue: Year 2019 background traffic conditions require the construction of an eastbound left turn lane and northbound left turn lane.

Refer to **Table 5** in the original *Transportation Impact Study for Glenwood Multifamily Development*[1] for geometric requirements for these turn lanes. All of these improvements are needed with or without the construction of the proposed development.

As is typical with all side streets accessing SH 82, 27th Street currently has excessive delays with or without the addition of project traffic. Delay is anticipated to increase through Year 2040 background traffic conditions. This is largely due to the 120 seconds of the 160 second cycle length being allocated to SH 82 movements. Per June 2019 correspondence, CDOT will not adjust signal timing to clear the queuing on the side streets. Given the current site constraints, widening of 27th Street is not feasible.

The applicant is promoting multimodal travel by locating this project in close proximity to a transit center, constructing sidewalks for increased mobility, and providing bicycle facilities for its residents.

State Highway Access Permits

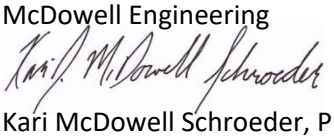
CDOT issued Access Permits to the City of Glenwood Springs on August 22, 2019 for the intersections of State Highway 82 and 27th Street (Permit #319104) and the intersection of State Highway 82 and Blake Avenue (Permit #319105). These permits included the previous (higher) volume of traffic anticipated for the Bell Rippy site. Therefore, the existing permits are adequate to cover the anticipated traffic from the new development application. Both permits are included with this letter.

Conclusions

The applicant is proposing to increase the density of the Bell Rippy site from 79 residential rental apartment units to 100 units. Since the preparation of the previous *Transportation Impact Study for Glenwood Multifamily Development*[1] was analyzed, the Institute of Transportation Engineer's *Trip Generation Manual*[2] has revised their land use definitions with numerous new data points for multifamily mid-rise apartments. With the updated Institute of Transportation Engineers' *Trip Generation Manual*[2], the number of project trips is anticipated to decrease from the previous analysis.

Therefore, no modifications to the infrastructure recommendations are anticipated for the proposed land use revision.

Sincerely,
McDowell Engineering



Kari McDowell Schroeder, PE, PTOE
Traffic/Transportation Engineer

References:

[1]*Transportation Impact Study for Glenwood Multifamily Development (Formerly Bell Rippy Apartments) Glenwood Springs, Colorado*. McDowell Engineering, July 24, 2019.

[2]*Trip Generation Manual, 10th Edition*. Institute of Transportation Engineers, September 2017.

Enclosed:

State Highway Access Permit for the intersection of State Highway 82 and 27th Street (Permit #319104)

State Highway Access Permit for the intersection of State Highway 82 and Blake Avenue (Permit #319105)

COLORADO
Department of Transportation
Region 3

R3 Traffic Section, Access Unit
222 S 6th St, Rm 100
Grand Junction, CO 81501
PH (970) 683-6284 FAX (970) 683-6290

<<<<< e-mailed >>>>>

August 22, 2019 **Permit No. 319104**

City of Glenwood Springs
101 W 8th St
Glenwood Springs, Colorado 81601

Dear Permittee:

1. Please review the attached State Highway Access Permit (Form #101) and all enclosed attachments.
2. If you choose NOT to act on the permit, please return the permit unsigned.
3. If you ACCEPT the Permit and its Terms and Conditions (and are authorized to sign as legal owner of the property, or as an authorized representative), please sign and date the Access Permit form on the line marked "**PERMITTEE**" within 60 days of the transmittal date on the permit. Your signature confirms your agreement to all the listed Terms and Conditions.
4. If you fail to sign and return the attached Access Permit within 60 days of the permit transmittal date, the Colorado Department of Transportation (CDOT) will consider this permit withdrawn.
5. You must return the signed Access Permit hard copies with original signature(s), including all pages of terms and conditions and all attachments, with your payment to the Colorado Department of Transportation (CDOT) at the address noted below. The Department will return an executed copy of this permit. You may retain this cover letter for your records.
6. Provide a check or money order made payable to "CDOT" for the total amount due of $100.00.
7. If you wish to APPEAL the Terms and Conditions of the permit, please refer to the attached Form 101, Pages 2 and 3 for an explanation of the appeal procedures.
8. As described in the additional attached Terms and Conditions, you must make a written request to obtain a Notice to Proceed. DO NOT begin any work within the State Highway Right-of-Way without a validated Access Permit and Notice to Proceed. Use of this permit without the Colorado Department of Transportation's validation shall be considered a violation of State Law.

If you have any questions please call Kandis Aggen, Access Coordinator, at (970) 683-6270 or Dan Roussin, Region 3 Permit Manager, at the number above.

Please return Access Permit and attachments to: Region 3 Access Unit
Attn: Kandis Aggen, Access Coordinator
222 S 6th St, Rm 100
Grand Junction, CO 81501

COLORADO DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ACCESS PERMIT

CDOT Permit No.	
319104	
State Highway No / Mp / Side	
082A / 1.715 / Left	

Permit Fee	Date of Transmittal	Region / Section / Patrol / Name	Local Jurisdiction
$100.00	08/22/2019	3 / 02 / 2K12 Alan Hayes	Glenwood Springs

The Permittee(s):

City of Glenwood Springs
101 W 8th St
Glenwood Springs, Colorado 81601
(970) 384-6388

The Applicant(s):

is hereby granted permission to have an access to the state highway at the location noted below. The access shall be constructed, maintained and used in accordance with this permit, including the State Highway Access Code and any attachments, terms, conditions and exhibits. This permit may be revoked by the Issuing Authority if at any time the permitted access and its use violate any parts of this permit. The issuing authority, the Department and their duly appointed agents and employees shall be held harmless against any action for personal injury or property damage sustained by reason of the exercise of the permit.

Location: Located on the north (east) side of Hwy 082A at 27th St. and approximately 4725 feet east of MP 1

Access to Provide Service to:	(Land Use Code)	(Size)	(Units)
	999 - City Street 27th Street (North Side)	**348**	**DHV**

Additional Information:

No Construction needed

MUNICIPALITY OR COUNTY APPROVAL
Required only when the appropriate local authority retains issuing authority.

Signature	Print Name	Date	Title

Upon the signing of this permit the permittee agrees to the terms and conditions and referenced attachments contained herein. All construction shall be completed in an expeditious and safe manner and shall be finished within 45 days from Initiation. The permitted access shall be completed in accordance with the terms and conditions of the permit prior to being used.

The permittee shall notify Les Stanton 2K2 with the Colorado Department of Transportation, at (970) 384-3357 at least 48 hours prior to commencing construction within the State Highway right-of-way.

The person signing as the permittee must be the owner or legal representative of the property served by the permitted access and have full authority to accept the permit and its terms and conditions.

Permittee Signature:	Print Name	Date
Co-Permittee Signature: (if applicable)	Print Name	Date

This permit is not valid until signed by a duly authorized representative of the Department.
COLORADO DEPARTMENT OF TRANSPORTATION

Signature	Print Name	Title	Date (of issue)

Copy Distribution: Required: 1.Region 2.Applicant 3.Staff Access Section 4.Central Files
Make copies as necessary for: Local Authority Inspector MTCE Patrol Traffic Engineer

Previous editions are obsolete and may not be used

State Highway Access Permit
Form 101, Page 2

The following paragraphs are excerpts of the State Highway Access Code. These are provided for your convenience but do not alleviate compliance with all sections of the Access Code. A copy of the State Highway Access Code is available from your local issuing authority (local government) or the Colorado Department of Transportation (Department). When this permit was issued, the issuing authority made its decision based in part on information submitted by the applicant, on the access category which is assigned to the highway, what alternative access to other public roads and streets is available, and safety and design standards. Changes in use or design not approved by the permit or the issuing authority may cause the revocation or suspension of the permit.

APPEALS

1. Should the permittee or applicant object to the denial of a permit application by the Department or object to any of the terms or conditions of a permit placed there by the Department, the applicant and permittee (appellant) have a right to appeal the decision to the [Transportation] Commission [of Colorado]. To appeal a decision, submit a request for administrative hearing to the Transportation Commission of Colorado within 60 days of transmittal of notice of denial or transmittal of the permit for signature. Submit the request to the Transportation Commission of Colorado, 4201 East Arkansas Avenue, Denver, Colorado 80222-3400. The request shall include reasons for the appeal and may include changes, revisions, or conditions that would be acceptable to the permittee or applicant.

2. Any appeal by the applicant or permittee of action by a local issuing authority shall be filed with the local authority and be consistent with the appeal procedures of the local authority.

3. In submitting the request for administrative hearing, the appellant has the option of including within the appeal a request for a review by the Department's internal administrative review committee pursuant to [Code] subsection 2.10. When such committee review is requested, processing of the appeal for formal administrative hearing, 2.9(5) and (6), shall be suspended until the appellant notifies the Commission to proceed with the administrative hearing, or the appellant submits a request to the Commission or the administrative law judge to withdraw the appeal. The two administrative processes, the internal administrative review committee, and the administrative hearing, may not run concurrently.

4. Regardless of any communications, meetings, administrative reviews or negotiations with the Department or the internal administrative review Committee regarding revisions or objections to the permit or a denial, if the permittee or applicant wishes to appeal the Department's decision to the Commission for a hearing, the appeal must be brought to the Commission within 60 days of transmittal of notice of denial or transmittal of the permit.

PERMIT EXPIRATION

1. A permit shall be considered expired if the access is not under construction within one year of the permit issue date or before the expiration of any authorized extension. When the permittee is unable to commence construction within one year after the permit issue date, the permittee may request a one year extension from the issuing authority. No more than two one-year extensions may be granted under any circumstances. If the access is not under construction within three years from date of issue the permit will be considered expired. Any request for an extension must be in writing and submitted to the issuing authority before the permit expires. The request should state the reasons why the extension is necessary, when construction is anticipated, and include a copy of page 1 (face of permit) of the access permit. Extension approvals shall be in writing. The local issuing authority shall obtain the concurrence of the Department prior to the approval of an extension, and shall notify the Department of all denied extensions within ten days. Any person wishing to reestablish an access permit that has expired may begin again with the application procedures. An approved Notice to Proceed, automatically renews the access permit for the period of the Notice to Proceed.

CONSTRUCTION

1. Construction may not begin until a Notice to Proceed is approved. (Code subsection 2.4]

2. The construction of the access and its appurtenances as required by the terms and conditions of the permit shall be completed at the expense of the permittee except as provided in subsection 2.14. All materials used in the construction of the access within the highway right-of-way or on permanent easements, become public property. Any materials removed from the highway right-of-way will be disposed of only as directed by the Department. All fencing, guard rail, traffic control devices and other equipment and materials removed in the course of access construction shall be given to the Department unless otherwise instructed by the permit or the Department inspector.

3. The permittee shall notify the individual or the office specified on the permit or Notice to Proceed at least two working days prior to any construction within state highway right-of-way. Construction of the access shall not proceed until both the access permit and the Notice to Proceed are issued. The access shall be completed in an expeditious and safe manner and shall be finished within 45 days from initiation of construction within the highway right-of-way. A construction time extension not to exceed 30 working days may be requested from the individual or office specified on the permit.

4. The issuing authority and the Department may inspect the access during construction and upon completion of the access to ensure that all terms and conditions of the permit are met. Inspectors are authorized to enforce the conditions of the permit during construction and to halt any activities within state right-of-way that do not comply with the provisions of the permit, that conflict with concurrent highway construction or maintenance work, that endanger highway property, natural or cultural resources protected by law, or the health and safety of workers or the public.

5. Prior to using the access, the permittee is required to complete the construction according to the terms and conditions of the permit. Failure by the permittee to abide by all permit terms and conditions shall be sufficient cause for the Department or issuing authority to initiate action to suspend or revoke the permit and close the access. If in the determination of the Department or issuing authority the failure to comply with or complete the construction requirements of the permit create a highway safety hazard, such shall be sufficient cause for the summary suspension of the permit. If the permittee wishes to use the access prior to completion, arrangements must be approved by the issuing authority and Department and included in the permit. The Department or issuing authority may order a halt to any unauthorized use of the access pursuant to statutory and regulatory powers. Reconstruction or improvement of the access may be required when the permittee has failed to meet required specifications of design or materials. If any construction element fails within two years due to improper construction or material specifications, the permittee shall be responsible for all repairs. Failure to make such repairs may result in suspension of the permit and closure of the access.

6. The permittee shall provide construction traffic control devices at all times during access construction, in conformance with the M.U.T.C.D. as required by section 42-4-104, C.R.S., as amended.

7. A utility permit shall be obtained for any utility work within highway right-of-way. Where necessary to remove, relocate, or repair a traffic control device or public or private utilities for the construction of a permitted access, the relocation, removal or repair shall be accomplished by the permittee without cost to the Department or issuing authority, and at the direction of the Department or utility company. Any damage to the state highway or other public right-of-way beyond that which is allowed in the permit shall be repaired immediately. The permittee is responsible for the repair of any utility damaged in the course of access construction, reconstruction or repair.

8. In the event it becomes necessary to remove any right-of-way fence, the posts on either side of the access shall be securely braced with an approved end post before the fence is cut to prevent any slacking of the remaining fence. All posts and wire removed are Department property and shall be turned over to a representative of the Department.

9. The permittee shall ensure that a copy of the permit is available for review at the construction site at all times. The permit may require the contractor to notify the individual or office specified on the permit at any specified phases in construction to allow the field inspector to inspect various aspects of construction such as concrete forms, subbase, base course compaction, and materials specifications. Minor changes and additions may be ordered by the Department or local authority field inspector to meet unanticipated site conditions.

10. Each access shall be constructed in a manner that shall not cause water to enter onto the roadway or shoulder, and shall not interfere with the existing drainage system on the right-of-way or any adopted municipal system and drainage plan.

11. By accepting the permit, permittee agrees to save, indemnify, and hold harmless to the extent allowed by law, the issuing authority, the Department, its officers, and employees from suits, actions, claims of any type or character brought because of injuries or damage sustained by any person resulting from the permittee's use of the access permit during the construction of the access.

CHANGES IN ACCESS USE AND PERMIT VIOLATIONS

1. It is the responsibility of the property owner and permittee to ensure that the use of the access to the property is not in violation of the Code, permit terms and conditions or the Act. The terms and conditions of any permit are binding upon all assigns, successors-in-interest, heirs and occupants. If any significant changes are made or will be made in the use of the property which will affect access operation, traffic volume and or vehicle type, the permittee or property owner shall contact the local issuing authority or the Department to determine if a new access permit and modifications to the access are required.

2. When an access is constructed or used in violation of the Code, section 43-2-147(5)(c), C.R.S., of the Act applies. The Department or issuing authority may summarily suspend an access permit and immediately order closure of the access when its continued use presents an immediate threat to public health, welfare or safety. Summary suspension shall comply with article 4 of title 24, C.R.S.

MAINTENANCE

1. The permittee, his or her heirs, successors-in-interest, assigns, and occupants of the property serviced by the access shall be responsible for meeting the terms and conditions of the permit, the repair and maintenance of the access beyond the edge of the roadway including any cattle guard and gate, and the removal or clearance of snow or ice upon the access even though deposited on the access in the course of Department snow removal operations. Within unincorporated areas the Department will keep access culverts clean as part of maintenance of the highway drainage system. However, the permittee is responsible for the repair and replacement of any access-related culverts within the right-of-way. Within incorporated areas, drainage responsibilities for municipalities are determined by statute and local ordinance. The Department will maintain the roadway including auxiliary lanes and shoulders, except in those cases where the access installation has failed due to improper access construction and/or failure to follow permit requirements and specifications in which case the permittee shall be responsible for such repair. Any significant repairs such as culvert replacement, resurfacing, or changes in design or specifications, requires authorization from the Department.

STATE of COLORADO HIGHWAY ACCESS PERMIT
ADDITIONAL TERMS and CONDITIONS

August 22, 2019 **PERMIT No. 319104**
Permittee(s): City of Glenwood Springs
Location: Garfield County on CO Highway 082A, near Mile Ref. Pt. 1.715 Left

1. This permitted access is only for the use and purpose stated in the Application and Permit. This Permit is issued in accordance with the State Highway Access Code (2 CCR 601-1), also referred to as the Access Code (Code), and is based in part upon the information submitted by the Permittee.
2. Any subsequent relocation, reconstruction, or modifications to the access (or changes in the traffic volume or traffic nature using the access) shall be requested from CDOT by the means of a new application. Any changes to the access that causes non-compliance with the Access Code may render this permit void, and shall require a new application for a new permit.
3. This permit replaces any and all additional access permits that may be in existence for this access.
4. This permit is for an as-constructed access with a change in use for 27th Street (north side).
5. The total traffic volume shall be 348 DHV (1 vehicle in the peak hour-- passenger vehicle equivalents).
6. This access shall have a full-turning movement signalized intersection.
7. The Permittee is responsible for obtaining any necessary additional Federal, State and/or City/County permits or clearances required for construction of the access. Approval of this access permit does not constitute verification of this action by the Permittee. Permittee is also responsible for obtaining all necessary utility permits in addition to this access permit.
8. The permittee, his or her heirs, successors-in-interest, assigns, and occupants of the property serviced by the access shall be responsible for meeting the terms and conditions of the permit, the repair and maintenance of the access beyond the edge of the roadway including any cattle guard and gate, and the removal or clearance of snow or ice upon the access driveway, even if the deposited material is on the access in the course of the Department's snow-removal operations. Within unincorporated areas, the Department will keep access culverts clean as part of maintenance of the highway drainage system. However, the permittee is responsible for the repair and replacement of any access-related culverts within the right-of-way. Within incorporated areas, drainage responsibilities for municipalities are determined by statute and local ordinance. The Department will maintain the roadway including auxiliary lanes and shoulders, except in those cases where the access construction has failed due to improper access installation and/or failure to follow permit requirements and specifications in which case the permittee shall be responsible for such repair. Any significant repair such as culvert replacement, resurfacing, or changes in design or specifications, requires authorization from the Department.

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like roads and sidewalks prevent stormwater from naturally soaking into the ground

Why is stormwater runoff a problem?

Stormwater can pick up debris, chemicals, dirt and other pollutants and flow into CDOT's storm drain system or directly into a stream, river, lake, wetland or reservoir. Anything that enters CDOT's storm drain system is discharged untreated into the waterways we use for fishing, swimming, and providing drinking water.

Dredged spoil, dirt, slurry, solid waste, incinerator residue, sewage, sewage sludge, garbage, trash, chemical waste, biological nutrient, biological material, radioactive material, heat, pH, wrecked or discarded equipment, rock, sand, any industrial, municipal, or agricultural waste.

Tips for Reporting an Illicit Discharge

Call the illicit discharge hotline at **(303) 512-4426**
From a safe distance try to estimate the amount of the discharge.
Identify characteristics of the discharge (color, odor, algae, etc.).
Obtain information on the vehicle dumping the waste (if applicable).
Do not approach!
Call *CSP for illicit dumping.
If possible, take a photo, record a license plate.

REMEMBER:
Never get too close to the illicit discharge, it may be dangerous!!!

For more information on CDOT Utility Permits:

https://www.codot.gov/business/permits/utilitiesspecialuse

For more information on CDOT Access Permits:

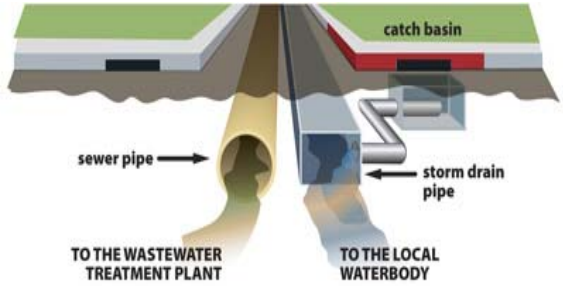
https://www.codot.gov/business/permits/accesspermits

For more information on CDOT Water Quality Program:

Water Quality Program Manager
4201 E. Arkansas Ave.
Shumate Building
Denver, Colorado 80222
303-757-9343

Water Quality Program Industrial Facilities Program

CDOT has a Municipal Separate Storm Sewer System permit, otherwise known as (MS4) from the Colorado Department of Public Health and Environment. The permit states that only stormwater can be discharged from CDOT's storm drain system

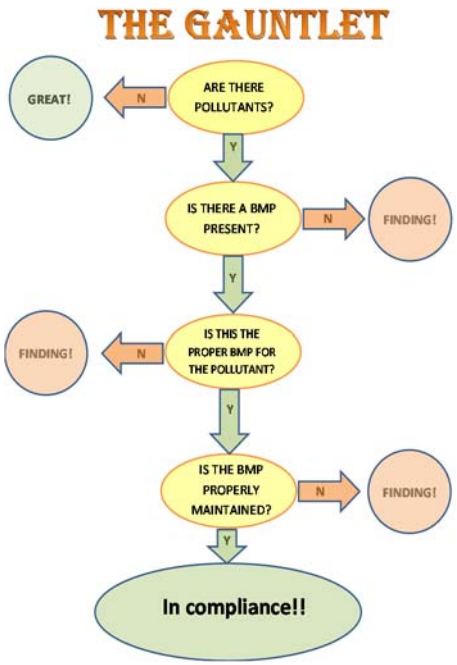


As part of the permit, CDOT has several different programs to prevent pollutants from entering into the storm drain system:

- Construction Site Program
- New Development Redevelopment Program
- Illicit Discharge Program
- Industrial Facilities Program
- Public Education and Outreach Program
- Pollution Prevention and Good Housekeeping Program
- Wet Weather Monitoring Program

Control Measures for Industrial Facilities

Industrial facilities can use control measures (CM) otherwise known as Best Management Practices (BMP) during the construction of a facility and when operating the facility. Control measures are schedules of activities, maintenance procedures, and other management practices to prevent and reduce pollution entering into CDOT's storm drain system. Control Measures also include treatment, operating procedures, and practices to control site run off which can include structural and non-structural controls.



CDOT defines a utility, or utility facility as any privately, publicly, or cooperatively owned line, facility, or system producing, transmitting or distributing the following:

- ✓ Communications
- ✓ Cable television
- ✓ Power
- ✓ Electricity
- ✓ Light
- ✓ Heat Gas
- ✓ Oil
- ✓ Crude Products
- ✓ Water
- ✓ Stream
- ✓ Waste
- ✓ Stormwater not connected with highway drainage
- ✓ Similar Commodity

Industrial Facilities Program Elements:

1. **Educate and outreach to owners or operators that have potential to contribute substantial pollutant to water.**
2. **Report and include information on discharge and water quality concerns. Provide written notification within 15 days of discovery to CDPHE.**
3. **Submit an annual report to CDPHE containing the number of informational brochures distributed; name and title of each individual trained.**

Education

There are instances when a utility company or other entity doing work in the state highway right-of-way will require some type of environmental permit or clearance for that work. CDOT has put together an Environmental Clearances Information Summary for those applying for a CDOT Utility and Special Use Permit or Access Permit to obtain all required clearances. This fact sheet is given to each permittee and is available at: http://www.coloradodot.info/programs/environmental/resources/guidance-standards/Environmental%20Clearances%20Info%20Summary.pdf

COLORADO DEPARTMENT OF TRANSPORTATION
Environmental Clearances Information Summary

PURPOSE - This summary is intended to inform entities external to CDOT that may be entering the state highway right-of-way to perform work related to their own facilities (such as Utility, Special Use or Access Permittees), about some of the more commonly encountered environmental permits/clearances that may apply to their activities. This listing is not all-inclusive - additional environmental or cultural resource permits/clearances may be required in certain instances. Appropriate local, state and federal agencies should be contacted for additional information if there is any uncertainty about what permits/clearances are required for a specific activity. **IMPORTANT – Please Review The Following Information Carefully – Failure to Comply With Regulatory Requirements May Result In Suspension or Revocation of Your CDOT Permit, Or Enforcement Actions By Other Agencies**

CLEARANCE CONTACTS - As indicated in the permit/clearance descriptions listed below, the following individuals or agencies may be contacted for additional information:

- Colorado Department of Public Health and Environment (CDPHE): General Information – (303) 692-2035
  Water Quality Control Division (WQCD): (303) 692-3500
  Environmental Permitting Website https://www.colorado.gov/pacific/cdphe/all-permits
- CDOT Water Quality Program Manager: (303) 757-9343 https://www.codot.gov/programs/environmental/water-quality
- CDOT Asbestos Project Manager: Phil Kangas, (303) 512-5519
- Colorado Office of Archaeology and Historic Preservation: (303) 866-3395
- U.S. Army Corps of Engineers, District Regulatory Offices:
  Omaha District (NE CO), Denver Office (303) 979-4120
  http://www.nwo.usace.army.mil/Missions/RegulatoryProgram/Colorado.aspx
  Sacramento Dist. (Western CO), Grand Junction Office (970) 243-1199
  http://www.spk.usace.army.mil/Missions/Regulatory.aspx
  Albuquerque District (SE CO), Pueblo Office (719)-543-9459
  http://www.spa.usace.army.mil/Missions/RegulatoryProgramandPermits.aspx
- CDOT Utilities, Special Use and Access Permitting: (303) 757-9654 https://www.codot.gov/business/permits

Wildlife Resources - Disturbance of wildlife shall be avoided to the maximum extent practicable. Entry into areas of known or suspected threatened or endangered species habitat will require special authorization from the CDOT permitting office. If any threatened or endangered species are encountered during the progress of the permitted work, work in the subject area shall be halted and the CDOT Regional Permitting Office and Region Planning and Environmental Manager shall be contacted immediately. Authorization must be provided by CDOT prior to the continuation of work. Information about threatened or endangered species may be obtained from the CDOT website, http://www.codot.gov/programs/environmental/wildlife/guidelines, or the Colorado Parks and Wildlife (CPW) website, http://www.cpw.state.co.us/learn/Pages/SOC-ThreatenedEndangeredList.aspx. Additional guidance may be provided by the appropriate Region Planning and Environmental Manager (RPEM).

Cultural Resources - The applicant must request a file search of the permit area through the Colorado Office of Archaeology and Historic Preservation (OAHP), Denver, to ascertain if historic or archaeological resources have previously been identified (http://www.historycolorado.org/oahp/file-search). Inventory of the permit area by a qualified cultural resources specialist may be necessary, per the recommendation of CDOT. If archaeological sites/artifacts or historic resources are known to exist prior to the initiation of the permitted work or are encountered as the project progresses, all work in the subject area shall be halted and the CDOT Regional Permitting Office and Region Planning and Environmental Manager shall be contacted immediately. Authorization must be provided by CDOT prior to the continuation of work. Additional guidance may be provided by the Regional Permitting Office and RPEM. ***Contact Information:*** Contact the OAHP for file searches at (303) 866-3395.

Paleontological Resources - The applicant must request a fossil locality file search through the University of Colorado Museum, Boulder (https://cumuseum.colorado.edu/research/paleontology/vertebrates/policies), and the Denver Museum of Nature and Science (http://www.dmns.org/science/collections/earth-science-collections/) to ascertain if paleontological resources have been previously identified in or near the permit area. Inventory of the permit area by a qualified paleontologist may be necessary, per the recommendation of CDOT. If fossils are encountered during the permitted work, all work in the subject area shall be halted and the CDOT Regional Permitting Office and Region Planning and Environmental Manager shall be contacted immediately. Authorization must be provided by CDOT prior to the continuation of work. Additional guidance may be provided by the Regional Permitting Office in the Permit Special Provisions. **Contact Information:** See the museum websites listed above for Paleontological Collections Manager contact information. Contact the CDOT Paleontologist for further information at nicole.peavey@state.co.us or (303) 757-9632. The CDOT Paleontologist will not conduct a comprehensive file search independently of the museums.

Hazardous Materials, Solid Waste - The Solid Wastes Disposal Sites and Facilities Act C.R.S. 30-20-100, et al, and Regulations Pertaining to Solid Waste Disposal Sites and Facilities (6 CCR 1007-2), prohibit solid waste disposal without an approved Certificate of Designation (a landfill permit). The Colorado Hazardous Waste Act C.R.S. 25-15-301 et al, and the Colorado Hazardous Waste Regulations (6 CCR 1007-3) prohibit the transfer, storage or disposal (TSD) of hazardous waste except at permitted TSD sites. There are no permitted landfills or TSD sites within the State Highway Right of Way. Therefore, all solid or hazardous wastes that might be generated by the activities of entities entering the State Highway Right of Way must be removed from the ROW and disposed of at a permitted facility or designated collection point (e.g., for solid waste, a utility or construction company's own dumpster). If pre-existing solid waste or hazardous materials contamination (including oil or petroleum contaminated soil, asbestos, chemicals, mine tailings, etc.) is encountered during the performance of work, the permittee shall halt work in the affected area and immediately contact the CDOT Regional Permitting Office for direction as to how to proceed. ***Contact Information:*** Theresa Santangelo-Dreiling, CDOT Hazardous Materials Project Manager, (303) 512-5524, or Andy Flurkey, (303) 512-5520.

Asbestos Containing Materials, Asbestos Contaminated Soil - All work on asbestos containing materials (ACM) must comply with the applicable requirements of the CDPHE Air Pollution Control Division's (APCD) Regulation 8. Disposal of ACM, and work done in asbestos-contaminated soil, must comply with the CDPHE Hazardous Materials and Waste Management Division's (HMWMD) Solid

Waste Regulations. The application for any CDOT permit must specifically identify any ACM involved in the work for which authorization is being requested. Additional guidance or requirements may be specified in the permit special provisions. ***Contact Info:*** CDPHE APCD and HMWMD Regulations can be accessed via the CDPHE Environmental Permitting Website listed above. Additional information **concerning clearance on CDOT projects** is available from the CDOT Asbestos Project Manager (303) 512-5519, or Theresa Santangelo-Dreiling, Hazardous Materials Management Supervisor (303) 512-5524.

Transportation of Hazardous Materials - No person may offer or accept a hazardous material for transportation in commerce unless that person is registered in conformance with the United States Department of Transportation regulations at 49 CFR, Part 171. The hazardous material must be properly classed, described, packaged, marked, labeled, and in condition for shipment as required or authorized by applicable requirements, or an exemption, approval or registration has been issued. Vehicles requiring a placard, must obtain authorization and a State HAZMAT Permit from the Colorado Public Utilities Commission. ***Contact Information:*** For authorization and more info call the Federal Motor Safety Carrier Administration, US DOT for inter- and intra-state HAZMAT Registration (303) 969-6748. Colorado Public Utilities Commission: (303) 894-2868.

Discharge of Dredged or Fill Material – 404 Permits Administered By the U.S. Army Corps of Engineers, and Section 401 Water Quality Certifications Issued by the CDPHE WQCD - Corps of Engineers 404 permits are required for the discharge of dredged or fill materials into waters of the United States, including wetlands. There are various types of 404 permits, including nationwide permits, which are issued for activities with relatively minor impacts. For example, there is a nationwide permit for utility line activities (nwp #12). Depending upon the specific circumstances, it is possible that either a "general" or "individual" 404 permit would be required. If an individual 404 permit is required, section 401 water quality certification from the CDPHE WQCD is also required. Contact the appropriate Corps District Regulatory Office for information about what type of 404 permit may be required (contact information above). Contact the CDPHE Water Quality Control Division at (303) 692-3500.

Working on or in any stream or its bank - In order to protect and preserve the state's fish and wildlife resources from actions that may obstruct, diminish, destroy, change, modify, or vary a natural existing stream or its banks or tributaries, it may be necessary to obtain a Senate Bill 40 certification from the Colorado Department of Natural Resources. A stream is defined as 1) represented by a solid blue line on USGS 7.5' quadrangle maps; and/or 2) intermittent streams providing live water beneficial to fish and wildlife; and/or 3) segments of streams supporting 25% or more cover within 100 yards upstream or downstream of the project; and/or 4) segments of streams having wetlands present within 200 yards upstream or downstream of the project measured by valley length. The CPW application, as per guidelines agreed upon by CDOT and CPW, can be accessed at http://www.coloradodot.info/programs/environmental/wildlife/guidelines.

Stormwater Construction Permit (SCP) and Stormwater Discharge From Industrial Facilities - Discharges of stormwater runoff from construction sites disturbing one acre or more - or certain types of industrial facilities, such as concrete batch plants - requires a CDPS Stormwater Permit. ***Contact Information:*** Contact the CDPHE Water Quality Control Division at (303) 692-3500. Website: https://www.colorado.gov/pacific/cdphe/wq-construction-general-permits and https://colorado.gov/pacific/cdphe/wq-commerce-and-industry-permits.

Construction Dewatering (Discharge or Infiltration) and Remediation Activities - Discharges of water encountered during excavation or work in wet areas may require a Construction Dewatering or Remediation Activities Discharge Permit. ***Contact Information:*** For Construction Dewatering and Remediation Activities Discharge Permits, contact the CDPHE WQCD at (303) 692-3500. For Applications and Instructions (CDPHE website): https://www.colorado.gov/pacific/cdphe/wq-construction-general-permits.

Municipal Separate Storm Sewer System (MS4) Discharge Permit - Discharges from the storm sewer systems of larger municipalities, and from the CDOT highway drainage system that lies within those municipalities, are subject to MS4 Permits issued by the CDPHE WQCD. For facilities that lie within the boundaries of a municipality that is subject to an MS4 permit, the owner of such facility should contact the municipality regarding stormwater related clearances that may have been established under that municipality's MS4 permit. All discharges to the CDOT highway drainage system or within the Right of Way (ROW) must comply with the applicable provisions of the Colorado Water Quality Control Act, the Water Quality Control Commission (WQCC) Regulations (https://www.colorado.gov/pacific/cdphe/wqcc-regulations-and-policies-and-water-quality-statutes) and the CDOT MS4 Permit # COS-000005 (https://www.codot.gov/programs/environmental/water-quality/documents). Discharges are subject to inspection by CDOT and CDPHE. Contact the CDPHE Water Quality Control Division at (303) 692-3500 for a listing of municipalities required to obtain MS4 Permits, or go to https://www.colorado.gov/pacific/cdphe/wq-municipal-ms4-permits.

General Prohibition – Discharges - All discharges are subject to the provisions of the Colorado Water Quality Control Act and the Colorado Discharge Permit Regulations. Prohibited discharges include, but are not limited to, substances such as wash water, paint, automotive fluids, solvents, oils or soaps and sediment. ***Contact Information****:* Contact the CDPHE Water Quality Control Division at (303) 692-3500.

General Authorization - Allowable Non-Stormwater Discharges - Unless otherwise identified by CDOT or the WQCD as significant sources of pollutants to the waters of the State, the following discharges to stormwater systems are allowed without a Colorado Discharge Permit System permit: landscape irrigation, diverted stream flows, uncontaminated ground water infiltration to separate storm sewers, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, uncontaminated springs, footing drains, water line flushing, flows from riparian habitats and wetlands, and flow from firefighting activities. Allowable non-stormwater discharges can be found at https://www.codot.gov/programs/environmental/water-quality/glossary.html. ***Contact Information****:* The CDPHE Water Quality Control Division (telephone #'s listed above).

Erosion and Sediment Control Practices - For activities requiring a Stormwater Construction Permit, erosion control requirements will be specified in that permit. In those situations where a stormwater permit is not required, all reasonable measures should be taken in order to minimize erosion and sedimentation according to CDOT Standard Specifications 107.25 and 208. All disturbances require a stabilization plan, native seeding or landscape design plan according to applicable CDOT Standard Specifications 212-217 and 623. In any case, the CDOT Erosion Control and Stormwater Quality Guide (most recent version) should be used to design erosion controls and to restore disturbed vegetation. ***Contact Information****:* The CDOT Erosion Control and Stormwater Quality Guide may be obtained from the Bid Plans Office at (303) 757-9313 or from: https://www.codot.gov/programs/environmental/landscape-architecture/erosion-storm-quality.

Disposal of Drilling Fluids - Drilling fluids used in operations such as Horizontal Directional Drilling may be classified as "discharges" or "solid wastes," and in general, should be pumped or vacuumed from the construction area, removed from the State Highway Right of Way, and disposed of at permitted facilities that specifically accept such wastes. Disposal of drilling fluids into storm drains, storm sewers, roadside ditches or any other type of man-made or natural waterway is prohibited by Water Quality Control and/or Solid Waste regulations. Small quantities of drilling fluid solids (less than 1 cubic yard of solids) may be left on-site after either being separated from fluids or after infiltration of the water, provided: 1) the drilling fluid consists of only water and bentonite clay, or, if required for proper drilling properties, small quantities of polymer additives that are approved for use in drinking water well drilling; 2) the solids are fully contained in a pit, and are not likely to pose a nuisance to future work in the area, 3) the solids are covered and the area restored as required by CDOT permit requirements (Utility, Special Use, or Access Permits, etc.). ***Contact Information:*** Contact CDPHE (telephone #'s listed above).

Noxious Weeds and Invasive Species Management Plan – Noxious Weeds and Invasive Species guidance can be found by contacting the Colorado Department of Agriculture (https://www.colorado.gov/pacific/agconservation/noxiousweeds) and the Colorado Division of Parks and Wildlife (http://cpw.state.co.us/aboutus/Pages/RS-NoxiousWeeds.aspx). In either case, management plans involving the control of noxious weeds associated with the permitted activity and cleaning of equipment will be required.

Concrete Washout - Waste generated from concrete activities shall NOT be allowed to flow into the drainage ways, inlets, receiving waters, or in the CDOT ROW. Concrete waste shall be placed in a temporary concrete washout facility and must be located a minimum of 50 feet from state waters, drainageways, and inlets. Concrete washout shall only be performed as specified by the CDOT Environmental Program and shall be in accordance to CDOT specifications and guidelines. ***Contact Information****:* Contact CDPHE or find additional information on the CDOT website: https://www.codot.gov/business/designsupport/2011-construction-specifications/2011-Specs and refer to the specifications and their revisions for sections 101, 107 and 208.

Spill Reporting - Spills shall be contained and cleaned up as soon as possible. Spills shall NOT be washed down into the storm drain or buried. All spills shall be reported to the CDOT Illicit Discharge Hotline at (303) 512-4446 (4H20), as well as the Regional Permitting Office and Regional Maintenance Supervisor. Spills on highways, into waterways, any spill in the highway right-of-way exceeding 25 gallons, or that may otherwise present an immediate danger to the public shall be reported by calling 911, and shall also be reported to the CDPHE at 1-877-518-5608. More information can be found at https://www.colorado.gov/pacific/cdphe/emergency-reporting-line.

About This Form - Questions or comments about this Information Summary may be directed to Alex Karami, Program Administrator, CDOT Access Management Unit, at (303) 757-9841, alex.karami@state.co.us.

COLORADO
Department of Transportation
Region 3

R3 Traffic Section, Access Unit
222 S 6th St, Rm 100
Grand Junction, CO 81501
PH (970) 683-6284 FAX (970) 683-6290

<<<<< e-mailed >>>>>

August 22, 2019 **Permit No. 319105**

City of Glenwood Springs
101 W 8th St
Glenwood Springs, Colorado 81601

Dear Permittee:

1. Please review the attached State Highway Access Permit (Form #101) and all enclosed attachments.
2. If you choose NOT to act on the permit, please return the permit unsigned.
3. If you ACCEPT the Permit and its Terms and Conditions (and are authorized to sign as legal owner of the property, or as an authorized representative), please sign and date the Access Permit form on the line marked "**PERMITTEE**" within 60 days of the transmittal date on the permit. Your signature confirms your agreement to all the listed Terms and Conditions.
4. If you fail to sign and return the attached Access Permit within 60 days of the permit transmittal date, the Colorado Department of Transportation (CDOT) will consider this permit withdrawn.
5. You must return the signed Access Permit hard copies with original signature(s), including all pages of terms and conditions and all attachments, with your payment to the Colorado Department of Transportation (CDOT) at the address noted below. The Department will return an executed copy of this permit. You may retain this cover letter for your records.
6. Provide a check or money order made payable to "CDOT" for the total amount due of .
7. If you wish to APPEAL the Terms and Conditions of the permit, please refer to the attached Form 101, Pages 2 and 3 for an explanation of the appeal procedures.
8. As described in the additional attached Terms and Conditions, you must make a written request to obtain a Notice to Proceed. DO NOT begin any work within the State Highway Right-of-Way without a validated Access Permit and Notice to Proceed. Use of this permit without the Colorado Department of Transportation's validation shall be considered a violation of State Law.

If you have any questions please call Kandis Aggen, Access Coordinator, at (970) 683-6270 or Dan Roussin, Region 3 Permit Manager, at the number above.

Please return Access Permit and attachments to: Region 3 Access Unit
Attn: Kandis Aggen, Access Coordinator
222 S 6th St, Rm 100
Grand Junction, CO 81501

COLORADO DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ACCESS PERMIT

CDOT Permit No.	State Highway No / Mp / Side	Permit Fee	Date of Transmittal	Region / Section / Patrol / Name	Local Jurisdiction
319105	082A / 2.190 / Left	$100.00	08/22/2019	3 / 02 / 2K12 Alan Hayes	Glenwood Springs

The Permittee(s): The Applicant(s):

City of Glenwood Springs
101 W 8th St
Glenwood Springs, Colorado 81601
(970) 384-6388

is hereby granted permission to have an access to the state highway at the location noted below. The access shall be constructed, maintained and used in accordance with this permit, including the State Highway Access Code and any attachments, terms, conditions and exhibits. This permit may be revoked by the Issuing Authority if at any time the permitted access and its use violate any parts of this permit. The issuing authority, the Department and their duly appointed agents and employees shall be held harmless against any action for personal injury or property damage sustained by reason of the exercise of the permit.

Location: Located on the north (east) side of Hwy 082A at Blake St. and approximately 1050 feet east of MP 2

Access to Provide Service to:	(Land Use Code)	(Size)	(Units)
	999 - City Street Blake Street	**750**	**DHV**

Additional Information:

No Construction needed

MUNICIPALITY OR COUNTY APPROVAL
Required only when the appropriate local authority retains issuing authority.

Signature	Print Name	Date	Title

Upon the signing of this permit the permittee agrees to the terms and conditions and referenced attachments contained herein. All construction shall be completed in an expeditious and safe manner and shall be finished within 45 days from Initiation. The permitted access shall be completed in accordance with the terms and conditions of the permit prior to being used.

The permittee shall notify Les Stanton 2K2 with the Colorado Department of Transportation, at (970) 384-3357 at least 48 hours prior to commencing construction within the State Highway right-of-way.

The person signing as the permittee must be the owner or legal representative of the property served by the permitted access and have full authority to accept the permit and its terms and conditions.

Permittee Signature:	Print Name	Date
Co-Permittee Signature: (if applicable)	Print Name	Date

This permit is not valid until signed by a duly authorized representative of the Department.
COLORADO DEPARTMENT OF TRANSPORTATION

Signature	Print Name	Title	Date (of issue)

Copy Distribution: Required: 1.Region 2.Applicant 3.Staff Access Section 4.Central Files
Make copies as necessary for: Local Authority Inspector MTCE Patrol Traffic Engineer

Previous editions are obsolete and may not be used

State Highway Access Permit
Form 101, Page 2

The following paragraphs are excerpts of the State Highway Access Code. These are provided for your convenience but do not alleviate compliance with all sections of the Access Code. A copy of the State Highway Access Code is available from your local issuing authority (local government) or the Colorado Department of Transportation (Department). When this permit was issued, the issuing authority made its decision based in part on information submitted by the applicant, on the access category which is assigned to the highway, what alternative access to other public roads and streets is available, and safety and design standards. Changes in use or design not approved by the permit or the issuing authority may cause the revocation or suspension of the permit.

APPEALS

1. Should the permittee or applicant object to the denial of a permit application by the Department or object to any of the terms or conditions of a permit placed there by the Department, the applicant and permittee (appellant) have a right to appeal the decision to the [Transportation] Commission [of Colorado]. To appeal a decision, submit a request for administrative hearing to the Transportation Commission of Colorado within 60 days of transmittal of notice of denial or transmittal of the permit for signature. Submit the request to the Transportation Commission of Colorado, 4201 East Arkansas Avenue, Denver, Colorado 80222-3400. The request shall include reasons for the appeal and may include changes, revisions, or conditions that would be acceptable to the permittee or applicant.

2. Any appeal by the applicant or permittee of action by a local issuing authority shall be filed with the local authority and be consistent with the appeal procedures of the local authority.

3. In submitting the request for administrative hearing, the appellant has the option of including within the appeal a request for a review by the Department's internal administrative review committee pursuant to [Code] subsection 2.10. When such committee review is requested, processing of the appeal for formal administrative hearing, 2.9(5) and (6), shall be suspended until the appellant notifies the Commission to proceed with the administrative hearing, or the appellant submits a request to the Commission or the administrative law judge to withdraw the appeal. The two administrative processes, the internal administrative review committee, and the administrative hearing, may not run concurrently.

4. Regardless of any communications, meetings, administrative reviews or negotiations with the Department or the internal administrative review Committee regarding revisions or objections to the permit or a denial, if the permittee or applicant wishes to appeal the Department's decision to the Commission for a hearing, the appeal must be brought to the Commission within 60 days of transmittal of notice of denial or transmittal of the permit.

PERMIT EXPIRATION

1. A permit shall be considered expired if the access is not under construction within one year of the permit issue date or before the expiration of any authorized extension. When the permittee is unable to commence construction within one year after the permit issue date, the permittee may request a one year extension from the issuing authority. No more than two one-year extensions may be granted under any circumstances. If the access is not under construction within three years from date of issue the permit will be considered expired. Any request for an extension must be in writing and submitted to the issuing authority before the permit expires. The request should state the reasons why the extension is necessary, when construction is anticipated, and include a copy of page 1 (face of permit) of the access permit. Extension approvals shall be in writing. The local issuing authority shall obtain the concurrence of the Department prior to the approval of an extension, and shall notify the Department of all denied extensions within ten days. Any person wishing to reestablish an access permit that has expired may begin again with the application procedures. An approved Notice to Proceed, automatically renews the access permit for the period of the Notice to Proceed.

CONSTRUCTION

1. Construction may not begin until a Notice to Proceed is approved. (Code subsection 2.4]

2. The construction of the access and its appurtenances as required by the terms and conditions of the permit shall be completed at the expense of the permittee except as provided in subsection 2.14. All materials used in the construction of the access within the highway right-of-way or on permanent easements, become public property. Any materials removed from the highway right-of-way will be disposed of only as directed by the Department. All fencing, guard rail, traffic control devices and other equipment and materials removed in the course of access construction shall be given to the Department unless otherwise instructed by the permit or the Department inspector.

3. The permittee shall notify the individual or the office specified on the permit or Notice to Proceed at least two working days prior to any construction within state highway right-of-way. Construction of the access shall not proceed until both the access permit and the Notice to Proceed are issued. The access shall be completed in an expeditious and safe manner and shall be finished within 45 days from initiation of construction within the highway right-of-way. A construction time extension not to exceed 30 working days may be requested from the individual or office specified on the permit.

4. The issuing authority and the Department may inspect the access during construction and upon completion of the access to ensure that all terms and conditions of the permit are met. Inspectors are authorized to enforce the conditions of the permit during construction and to halt any activities within state right-of-way that do not comply with the provisions of the permit, that conflict with concurrent highway construction or maintenance work, that endanger highway property, natural or cultural resources protected by law, or the health and safety of workers or the public.

5. Prior to using the access, the permittee is required to complete the construction according to the terms and conditions of the permit. Failure by the permittee to abide by all permit terms and conditions shall be sufficient cause for the Department or issuing authority to initiate action to suspend or revoke the permit and close the access. If in the determination of the Department or issuing authority the failure to comply with or complete the construction requirements of the permit create a highway safety hazard, such shall be sufficient cause for the summary suspension of the permit. If the permittee wishes to use the access prior to completion, arrangements must be approved by the issuing authority and Department and included in the permit. The Department or issuing authority may order a halt to any unauthorized use of the access pursuant to statutory and regulatory powers. Reconstruction or improvement of the access may be required when the permittee has failed to meet required specifications of design or materials. If any construction element fails within two years due to improper construction or material specifications, the permittee shall be responsible for all repairs. Failure to make such repairs may result in suspension of the permit and closure of the access.

6. The permittee shall provide construction traffic control devices at all times during access construction, in conformance with the M.U.T.C.D. as required by section 42-4-104, C.R.S., as amended.

7. A utility permit shall be obtained for any utility work within highway right-of-way. Where necessary to remove, relocate, or repair a traffic control device or public or private utilities for the construction of a permitted access, the relocation, removal or repair shall be accomplished by the permittee without cost to the Department or issuing authority, and at the direction of the Department or utility company. Any damage to the state highway or other public right-of-way beyond that which is allowed in the permit shall be repaired immediately. The permittee is responsible for the repair of any utility damaged in the course of access construction, reconstruction or repair.

8. In the event it becomes necessary to remove any right-of-way fence, the posts on either side of the access shall be securely braced with an approved end post before the fence is cut to prevent any slacking of the remaining fence. All posts and wire removed are Department property and shall be turned over to a representative of the Department.

9. The permittee shall ensure that a copy of the permit is available for review at the construction site at all times. The permit may require the contractor to notify the individual or office specified on the permit at any specified phases in construction to allow the field inspector to inspect various aspects of construction such as concrete forms, subbase, base course compaction, and materials specifications. Minor changes and additions may be ordered by the Department or local authority field inspector to meet unanticipated site conditions.

10. Each access shall be constructed in a manner that shall not cause water to enter onto the roadway or shoulder, and shall not interfere with the existing drainage system on the right-of-way or any adopted municipal system and drainage plan.

11. By accepting the permit, permittee agrees to save, indemnify, and hold harmless to the extent allowed by law, the issuing authority, the Department, its officers, and employees from suits, actions, claims of any type or character brought because of injuries or damage sustained by any person resulting from the permittee's use of the access permit during the construction of the access.

CHANGES IN ACCESS USE AND PERMIT VIOLATIONS

1. It is the responsibility of the property owner and permittee to ensure that the use of the access to the property is not in violation of the Code, permit terms and conditions or the Act. The terms and conditions of any permit are binding upon all assigns, successors-in-interest, heirs and occupants. If any significant changes are made or will be made in the use of the property which will affect access operation, traffic volume and or vehicle type, the permittee or property owner shall contact the local issuing authority or the Department to determine if a new access permit and modifications to the access are required.

2. When an access is constructed or used in violation of the Code, section 43-2-147(5)(c), C.R.S., of the Act applies. The Department or issuing authority may summarily suspend an access permit and immediately order closure of the access when its continued use presents an immediate threat to public health, welfare or safety. Summary suspension shall comply with article 4 of title 24, C.R.S.

MAINTENANCE

1. The permittee, his or her heirs, successors-in-interest, assigns, and occupants of the property serviced by the access shall be responsible for meeting the terms and conditions of the permit, the repair and maintenance of the access beyond the edge of the roadway including any cattle guard and gate, and the removal or clearance of snow or ice upon the access even though deposited on the access in the course of Department snow removal operations. Within unincorporated areas the Department will keep access culverts clean as part of maintenance of the highway drainage system. However, the permittee is responsible for the repair and replacement of any access-related culverts within the right-of-way. Within incorporated areas, drainage responsibilities for municipalities are determined by statute and local ordinance. The Department will maintain the roadway including auxiliary lanes and shoulders, except in those cases where the access installation has failed due to improper access construction and/or failure to follow permit requirements and specifications in which case the permittee shall be responsible for such repair. Any significant repairs such as culvert replacement, resurfacing, or changes in design or specifications, requires authorization from the Department.

STATE of COLORADO HIGHWAY ACCESS PERMIT
ADDITIONAL TERMS and CONDITIONS

August 22, 2019 **PERMIT No. 319105**
Permittee(s): City of Glenwood Springs
Location: Garfield County on CO Highway 082A, near Mile Ref. Pt. 2.19 Left

1. This permitted access is only for the use and purpose stated in the Application and Permit. This Permit is issued in accordance with the State Highway Access Code (2 CCR 601-1), also referred to as the Access Code (Code), and is based in part upon the information submitted by the Permittee.
2. Any subsequent relocation, reconstruction, or modifications to the access (or changes in the traffic volume or traffic nature using the access) shall be requested from CDOT by the means of a new application. Any changes to the access that causes non-compliance with the Access Code may render this permit void, and shall require a new application for a new permit.
3. This permit replaces any and all additional access permits that may be in existence for this access.
4. This permit is for an as-constructed access with a change in use for Blake Avenue.
5. The total traffic volume shall be 750 DHV (1 vehicle in the peak hour-- passenger vehicle equivalents).
6. This access shall have a full-turning movement signalized intersection.
7. The Permittee is responsible for obtaining any necessary additional Federal, State and/or City/County permits or clearances required for construction of the access. Approval of this access permit does not constitute verification of this action by the Permittee. Permittee is also responsible for obtaining all necessary utility permits in addition to this access permit.
8. The permittee, his or her heirs, successors-in-interest, assigns, and occupants of the property serviced by the access shall be responsible for meeting the terms and conditions of the permit, the repair and maintenance of the access beyond the edge of the roadway including any cattle guard and gate, and the removal or clearance of snow or ice upon the access driveway, even if the deposited material is on the access in the course of the Department's snow-removal operations. Within unincorporated areas, the Department will keep access culverts clean as part of maintenance of the highway drainage system. However, the permittee is responsible for the repair and replacement of any access-related culverts within the right-of-way. Within incorporated areas, drainage responsibilities for municipalities are determined by statute and local ordinance. The Department will maintain the roadway including auxiliary lanes and shoulders, except in those cases where the access construction has failed due to improper access installation and/or failure to follow permit requirements and specifications in which case the permittee shall be responsible for such repair. Any significant repair such as culvert replacement, resurfacing, or changes in design or specifications, requires authorization from the Department.

COLORADO
Department of Transportation

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like roads and sidewalks prevent stormwater from naturally soaking into the ground

Why is stormwater runoff a problem?

Stormwater can pick up debris, chemicals, dirt and other pollutants and flow into CDOT's storm drain system or directly into a stream, river, lake, wetland or reservoir. Anything that enters CDOT's storm drain system is discharged untreated into the waterways we use for fishing, swimming, and providing drinking water.

Dredged spoil, dirt, slurry, solid waste, incinerator residue, sewage, sewage sludge, garbage, trash, chemical waste, biological nutrient, biological material, radioactive material, heat, pH, wrecked or discarded equipment, rock, sand, any industrial, municipal, or agricultural waste.

Tips for Reporting an Illicit Discharge

Call the illicit discharge hotline at **(303) 512-4426**
From a safe distance try to estimate the amount of the discharge.
Identify characteristics of the discharge (color, odor, algae, etc.).
Obtain information on the vehicle dumping the waste (if applicable).
Do not approach!
Call *CSP for illicit dumping.
If possible, take a photo, record a license plate.

REMEMBER:
Never get too close to the illicit discharge, it may be dangerous!!!

For more information on CDOT Utility Permits:

https://www.codot.gov/business/permits/utilitiesspecialuse

For more information on CDOT Access Permits:

https://www.codot.gov/business/permits/accesspermits

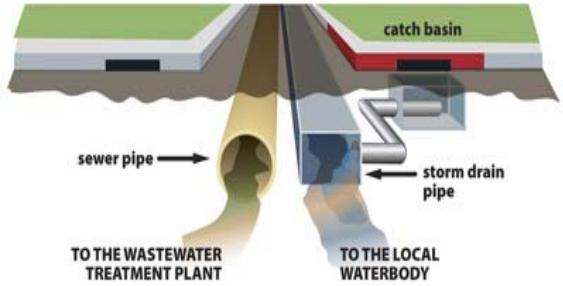
For more information on CDOT Water Quality Program:

Water Quality Program Manager
4201 E. Arkansas Ave.
Shumate Building
Denver, Colorado 80222
303-757-9343

COLORADO
Department of Transportation

Water Quality Program Industrial Facilities Program

CDOT has a Municipal Separate Storm Sewer System permit, otherwise known as (MS4) from the Colorado Department of Public Health and Environment. The permit states that only stormwater can be discharged from CDOT's storm drain system

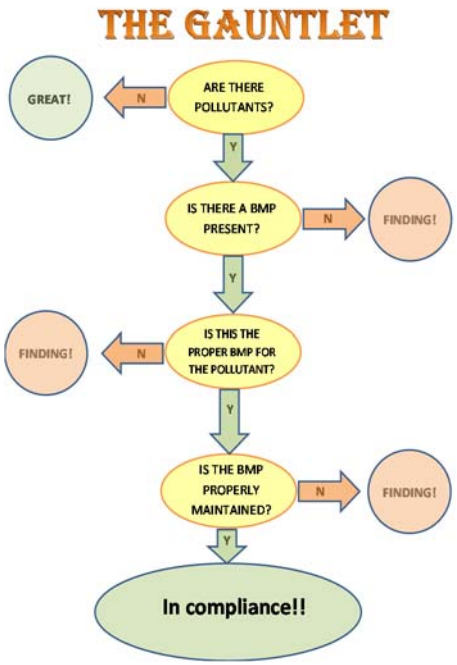


As part of the permit, CDOT has several different programs to prevent pollutants from entering into the storm drain system:

- Construction Site Program
- New Development Redevelopment Program
- Illicit Discharge Program
- Industrial Facilities Program
- Public Education and Outreach Program
- Pollution Prevention and Good Housekeeping Program
- Wet Weather Monitoring Program

Control Measures for Industrial Facilities

Industrial facilities can use control measures (CM) otherwise known as Best Management Practices (BMP) during the construction of a facility and when operating the facility. Control measures are schedules of activities, maintenance procedures, and other management practices to prevent and reduce pollution entering into CDOT's storm drain system. Control Measures also include treatment, operating procedures, and practices to control site run off which can include structural and non-structural controls.



CDOT defines a utility, or utility facility as any privately, publicly, or cooperatively owned line, facility, or system producing, transmitting or distributing the following:

- ✓ Communications
- ✓ Cable television
- ✓ Power
- ✓ Electricity
- ✓ Light
- ✓ Heat Gas
- ✓ Oil
- ✓ Crude Products
- ✓ Water
- ✓ Stream
- ✓ Waste
- ✓ Stormwater not connected with highway drainage
- ✓ Similar Commodity

Industrial Facilities Program Elements:

1. **Educate and outreach to owners or operators that have potential to contribute substantial pollutant to water.**
2. **Report and include information on discharge and water quality concerns. Provide written notification within 15 days of discovery to CDPHE.**
3. **Submit an annual report to CDPHE containing the number of informational brochures distributed; name and title of each individual trained.**

Education

There are instances when a utility company or other entity doing work in the state highway right-of-way will require some type of environmental permit or clearance for that work. CDOT has put together an Environmental Clearances Information Summary for those applying for a CDOT Utility and Special Use Permit or Access Permit to obtain all required clearances. This fact sheet is given to each permittee and is available at: http://www.coloradodot.info/programs/environmental/resources/guidance-standards/Environmental%20Clearances%20Info%20Summary.pdf

COLORADO DEPARTMENT OF TRANSPORTATION
Environmental Clearances Information Summary

PURPOSE - This summary is intended to inform entities external to CDOT that may be entering the state highway right-of-way to perform work related to their own facilities (such as Utility, Special Use or Access Permittees), about some of the more commonly encountered environmental permits/clearances that may apply to their activities. This listing is not all-inclusive - additional environmental or cultural resource permits/clearances may be required in certain instances. Appropriate local, state and federal agencies should be contacted for additional information if there is any uncertainty about what permits/clearances are required for a specific activity. **IMPORTANT – Please Review The Following Information Carefully – Failure to Comply With Regulatory Requirements May Result In Suspension or Revocation of Your CDOT Permit, Or Enforcement Actions By Other Agencies**

CLEARANCE CONTACTS - As indicated in the permit/clearance descriptions listed below, the following individuals or agencies may be contacted for additional information:

- Colorado Department of Public Health and Environment (CDPHE): General Information – (303) 692-2035
  Water Quality Control Division (WQCD): (303) 692-3500
  Environmental Permitting Website https://www.colorado.gov/pacific/cdphe/all-permits
- CDOT Water Quality Program Manager: (303) 757-9343 https://www.codot.gov/programs/environmental/water-quality
- CDOT Asbestos Project Manager: Phil Kangas, (303) 512-5519
- Colorado Office of Archaeology and Historic Preservation: (303) 866-3395
- U.S. Army Corps of Engineers, District Regulatory Offices:
  Omaha District (NE CO), Denver Office (303) 979-4120
  http://www.nwo.usace.army.mil/Missions/RegulatoryProgram/Colorado.aspx
  Sacramento Dist. (Western CO), Grand Junction Office (970) 243-1199
  http://www.spk.usace.army.mil/Missions/Regulatory.aspx
  Albuquerque District (SE CO), Pueblo Office (719)-543-9459
  http://www.spa.usace.army.mil/Missions/RegulatoryProgramandPermits.aspx
- CDOT Utilities, Special Use and Access Permitting: (303) 757-9654 https://www.codot.gov/business/permits

Wildlife Resources - Disturbance of wildlife shall be avoided to the maximum extent practicable. Entry into areas of known or suspected threatened or endangered species habitat will require special authorization from the CDOT permitting office. If any threatened or endangered species are encountered during the progress of the permitted work, work in the subject area shall be halted and the CDOT Regional Permitting Office and Region Planning and Environmental Manager shall be contacted immediately. Authorization must be provided by CDOT prior to the continuation of work. Information about threatened or endangered species may be obtained from the CDOT website, http://www.codot.gov/programs/environmental/wildlife/guidelines, or the Colorado Parks and Wildlife (CPW) website, http://www.cpw.state.co.us/learn/Pages/SOC-ThreatenedEndangeredList.aspx. Additional guidance may be provided by the appropriate Region Planning and Environmental Manager (RPEM).

Cultural Resources - The applicant must request a file search of the permit area through the Colorado Office of Archaeology and Historic Preservation (OAHP), Denver, to ascertain if historic or archaeological resources have previously been identified (http://www.historycolorado.org/oahp/file-search). Inventory of the permit area by a qualified cultural resources specialist may be necessary, per the recommendation of CDOT. If archaeological sites/artifacts or historic resources are known to exist prior to the initiation of the permitted work or are encountered as the project progresses, all work in the subject area shall be halted and the CDOT Regional Permitting Office and Region Planning and Environmental Manager shall be contacted immediately. Authorization must be provided by CDOT prior to the continuation of work. Additional guidance may be provided by the Regional Permitting Office and RPEM. ***Contact Information:*** Contact the OAHP for file searches at (303) 866-3395.

Paleontological Resources - The applicant must request a fossil locality file search through the University of Colorado Museum, Boulder (https://cumuseum.colorado.edu/research/paleontology/vertebrates/policies), and the Denver Museum of Nature and Science (http://www.dmns.org/science/collections/earth-science-collections/) to ascertain if paleontological resources have been previously identified in or near the permit area. Inventory of the permit area by a qualified paleontologist may be necessary, per the recommendation of CDOT. If fossils are encountered during the permitted work, all work in the subject area shall be halted and the CDOT Regional Permitting Office and Region Planning and Environmental Manager shall be contacted immediately. Authorization must be provided by CDOT prior to the continuation of work. Additional guidance may be provided by the Regional Permitting Office in the Permit Special Provisions. **Contact Information:** See the museum websites listed above for Paleontological Collections Manager contact information. Contact the CDOT Paleontologist for further information at nicole.peavey@state.co.us or (303) 757-9632. The CDOT Paleontologist will not conduct a comprehensive file search independently of the museums.

Hazardous Materials, Solid Waste - The Solid Wastes Disposal Sites and Facilities Act C.R.S. 30-20-100, et al, and Regulations Pertaining to Solid Waste Disposal Sites and Facilities (6 CCR 1007-2), prohibit solid waste disposal without an approved Certificate of Designation (a landfill permit). The Colorado Hazardous Waste Act C.R.S. 25-15-301 et al, and the Colorado Hazardous Waste Regulations (6 CCR 1007-3) prohibit the transfer, storage or disposal (TSD) of hazardous waste except at permitted TSD sites. There are no permitted landfills or TSD sites within the State Highway Right of Way. Therefore, all solid or hazardous wastes that might be generated by the activities of entities entering the State Highway Right of Way must be removed from the ROW and disposed of at a permitted facility or designated collection point (e.g., for solid waste, a utility or construction company's own dumpster). If pre-existing solid waste or hazardous materials contamination (including oil or petroleum contaminated soil, asbestos, chemicals, mine tailings, etc.) is encountered during the performance of work, the permittee shall halt work in the affected area and immediately contact the CDOT Regional Permitting Office for direction as to how to proceed. ***Contact Information:*** Theresa Santangelo-Dreiling, CDOT Hazardous Materials Project Manager, (303) 512-5524, or Andy Flurkey, (303) 512-5520.

Asbestos Containing Materials, Asbestos Contaminated Soil - All work on asbestos containing materials (ACM) must comply with the applicable requirements of the CDPHE Air Pollution Control Division's (APCD) Regulation 8. Disposal of ACM, and work done in asbestos-contaminated soil, must comply with the CDPHE Hazardous Materials and Waste Management Division's (HMWMD) Solid

Waste Regulations. The application for any CDOT permit must specifically identify any ACM involved in the work for which authorization is being requested. Additional guidance or requirements may be specified in the permit special provisions. ***Contact Info:*** CDPHE APCD and HMWMD Regulations can be accessed via the CDPHE Environmental Permitting Website listed above. Additional information **concerning clearance on CDOT projects** is available from the CDOT Asbestos Project Manager (303) 512-5519, or Theresa Santangelo-Dreiling, Hazardous Materials Management Supervisor (303) 512-5524.

Transportation of Hazardous Materials - No person may offer or accept a hazardous material for transportation in commerce unless that person is registered in conformance with the United States Department of Transportation regulations at 49 CFR, Part 171. The hazardous material must be properly classed, described, packaged, marked, labeled, and in condition for shipment as required or authorized by applicable requirements, or an exemption, approval or registration has been issued. Vehicles requiring a placard, must obtain authorization and a State HAZMAT Permit from the Colorado Public Utilities Commission. ***Contact Information:*** For authorization and more info call the Federal Motor Safety Carrier Administration, US DOT for inter- and intra-state HAZMAT Registration (303) 969-6748. Colorado Public Utilities Commission: (303) 894-2868.

Discharge of Dredged or Fill Material – 404 Permits Administered By the U.S. Army Corps of Engineers, and Section 401 Water Quality Certifications Issued by the CDPHE WQCD - Corps of Engineers 404 permits are required for the discharge of dredged or fill materials into waters of the United States, including wetlands. There are various types of 404 permits, including nationwide permits, which are issued for activities with relatively minor impacts. For example, there is a nationwide permit for utility line activities (nwp #12). Depending upon the specific circumstances, it is possible that either a "general" or "individual" 404 permit would be required. If an individual 404 permit is required, section 401 water quality certification from the CDPHE WQCD is also required. Contact the appropriate Corps District Regulatory Office for information about what type of 404 permit may be required (contact information above). Contact the CDPHE Water Quality Control Division at (303) 692-3500.

Working on or in any stream or its bank - In order to protect and preserve the state's fish and wildlife resources from actions that may obstruct, diminish, destroy, change, modify, or vary a natural existing stream or its banks or tributaries, it may be necessary to obtain a Senate Bill 40 certification from the Colorado Department of Natural Resources. A stream is defined as 1) represented by a solid blue line on USGS 7.5' quadrangle maps; and/or 2) intermittent streams providing live water beneficial to fish and wildlife; and/or 3) segments of streams supporting 25% or more cover within 100 yards upstream or downstream of the project; and/or 4) segments of streams having wetlands present within 200 yards upstream or downstream of the project measured by valley length. The CPW application, as per guidelines agreed upon by CDOT and CPW, can be accessed at http://www.coloradodot.info/programs/environmental/wildlife/guidelines.

Stormwater Construction Permit (SCP) and Stormwater Discharge From Industrial Facilities - Discharges of stormwater runoff from construction sites disturbing one acre or more - or certain types of industrial facilities, such as concrete batch plants - requires a CDPS Stormwater Permit. ***Contact Information:*** Contact the CDPHE Water Quality Control Division at (303) 692-3500. Website: https://www.colorado.gov/pacific/cdphe/wq-construction-general-permits and https://colorado.gov/pacific/cdphe/wq-commerce-and-industry-permits.

Construction Dewatering (Discharge or Infiltration) and Remediation Activities - Discharges of water encountered during excavation or work in wet areas may require a Construction Dewatering or Remediation Activities Discharge Permit. ***Contact Information:*** For Construction Dewatering and Remediation Activities Discharge Permits, contact the CDPHE WQCD at (303) 692-3500. For Applications and Instructions (CDPHE website): https://www.colorado.gov/pacific/cdphe/wq-construction-general-permits.

Municipal Separate Storm Sewer System (MS4) Discharge Permit - Discharges from the storm sewer systems of larger municipalities, and from the CDOT highway drainage system that lies within those municipalities, are subject to MS4 Permits issued by the CDPHE WQCD. For facilities that lie within the boundaries of a municipality that is subject to an MS4 permit, the owner of such facility should contact the municipality regarding stormwater related clearances that may have been established under that municipality's MS4 permit. All discharges to the CDOT highway drainage system or within the Right of Way (ROW) must comply with the applicable provisions of the Colorado Water Quality Control Act, the Water Quality Control Commission (WQCC) Regulations (https://www.colorado.gov/pacific/cdphe/wqcc-regulations-and-policies-and-water-quality-statutes) and the CDOT MS4 Permit # COS-000005 (https://www.codot.gov/programs/environmental/water-quality/documents). Discharges are subject to inspection by CDOT and CDPHE. Contact the CDPHE Water Quality Control Division at (303) 692-3500 for a listing of municipalities required to obtain MS4 Permits, or go to https://www.colorado.gov/pacific/cdphe/wq-municipal-ms4-permits.

General Prohibition – Discharges - All discharges are subject to the provisions of the Colorado Water Quality Control Act and the Colorado Discharge Permit Regulations. Prohibited discharges include, but are not limited to, substances such as wash water, paint, automotive fluids, solvents, oils or soaps and sediment. ***Contact Information****:* Contact the CDPHE Water Quality Control Division at (303) 692-3500.

General Authorization - Allowable Non-Stormwater Discharges - Unless otherwise identified by CDOT or the WQCD as significant sources of pollutants to the waters of the State, the following discharges to stormwater systems are allowed without a Colorado Discharge Permit System permit: landscape irrigation, diverted stream flows, uncontaminated ground water infiltration to separate storm sewers, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, uncontaminated springs, footing drains, water line flushing, flows from riparian habitats and wetlands, and flow from firefighting activities. Allowable non-stormwater discharges can be found at https://www.codot.gov/programs/environmental/water-quality/glossary.html. ***Contact Information****:* The CDPHE Water Quality Control Division (telephone #'s listed above).

Erosion and Sediment Control Practices - For activities requiring a Stormwater Construction Permit, erosion control requirements will be specified in that permit. In those situations where a stormwater permit is not required, all reasonable measures should be taken in order to minimize erosion and sedimentation according to CDOT Standard Specifications 107.25 and 208. All disturbances require a stabilization plan, native seeding or landscape design plan according to applicable CDOT Standard Specifications 212-217 and 623. In any case, the CDOT Erosion Control and Stormwater Quality Guide (most recent version) should be used to design erosion controls and to restore disturbed vegetation. ***Contact Information****:* The CDOT Erosion Control and Stormwater Quality Guide may be obtained from the Bid Plans Office at (303) 757-9313 or from: https://www.codot.gov/programs/environmental/landscape-architecture/erosion-storm-quality.

Disposal of Drilling Fluids - Drilling fluids used in operations such as Horizontal Directional Drilling may be classified as "discharges" or "solid wastes," and in general, should be pumped or vacuumed from the construction area, removed from the State Highway Right of Way, and disposed of at permitted facilities that specifically accept such wastes. Disposal of drilling fluids into storm drains, storm sewers, roadside ditches or any other type of man-made or natural waterway is prohibited by Water Quality Control and/or Solid Waste regulations. Small quantities of drilling fluid solids (less than 1 cubic yard of solids) may be left on-site after either being separated from fluids or after infiltration of the water, provided: 1) the drilling fluid consists of only water and bentonite clay, or, if required for proper drilling properties, small quantities of polymer additives that are approved for use in drinking water well drilling; 2) the solids are fully contained in a pit, and are not likely to pose a nuisance to future work in the area, 3) the solids are covered and the area restored as required by CDOT permit requirements (Utility, Special Use, or Access Permits, etc.). ***Contact Information:*** Contact CDPHE (telephone #'s listed above).

Noxious Weeds and Invasive Species Management Plan – Noxious Weeds and Invasive Species guidance can be found by contacting the Colorado Department of Agriculture (https://www.colorado.gov/pacific/agconservation/noxiousweeds) and the Colorado Division of Parks and Wildlife (http://cpw.state.co.us/aboutus/Pages/RS-NoxiousWeeds.aspx). In either case, management plans involving the control of noxious weeds associated with the permitted activity and cleaning of equipment will be required.

Concrete Washout - Waste generated from concrete activities shall NOT be allowed to flow into the drainage ways, inlets, receiving waters, or in the CDOT ROW. Concrete waste shall be placed in a temporary concrete washout facility and must be located a minimum of 50 feet from state waters, drainageways, and inlets. Concrete washout shall only be performed as specified by the CDOT Environmental Program and shall be in accordance to CDOT specifications and guidelines. ***Contact Information****:* Contact CDPHE or find additional information on the CDOT website: https://www.codot.gov/business/designsupport/2011-construction-specifications/2011-Specs and refer to the specifications and their revisions for sections 101, 107 and 208.

Spill Reporting - Spills shall be contained and cleaned up as soon as possible. Spills shall NOT be washed down into the storm drain or buried. All spills shall be reported to the CDOT Illicit Discharge Hotline at (303) 512-4446 (4H20), as well as the Regional Permitting Office and Regional Maintenance Supervisor. Spills on highways, into waterways, any spill in the highway right-of-way exceeding 25 gallons, or that may otherwise present an immediate danger to the public shall be reported by calling 911, and shall also be reported to the CDPHE at 1-877-518-5608. More information can be found at https://www.colorado.gov/pacific/cdphe/emergency-reporting-line.

About This Form - Questions or comments about this Information Summary may be directed to Alex Karami, Program Administrator, CDOT Access Management Unit, at (303) 757-9841, alex.karami@state.co.us.

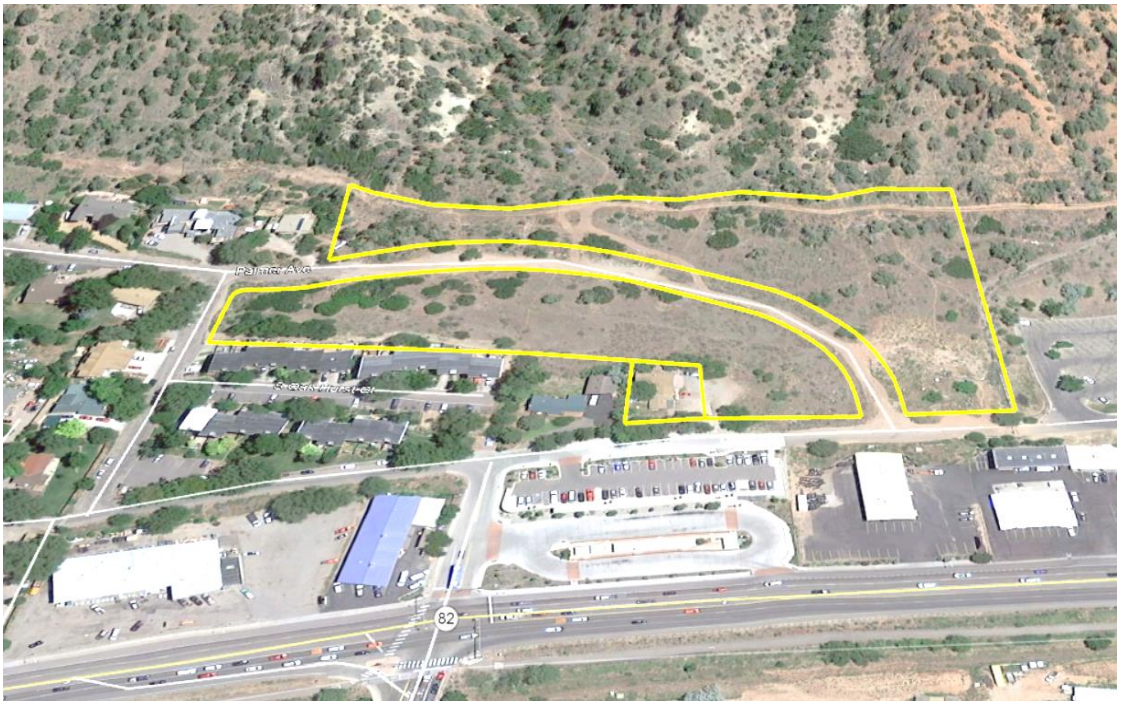
Boundaries Unlimited Inc.

Civil Engineering
Surveying
& Beyond

Major Drainage Report

Bell Rippy Neighborhood

March 3, 2020
BUI Project #20002.01



Google Earth 2020

"I hereby affirm that this report and the accompanying plans for the Bell Rippy Neighborhood was prepared by me (or under my supervision) for the owners thereof in accordance with the provisions of the City of Glenwood Springs Stormwater, Drainage, Water Quality and Erosion Control Chapter and approved variances and exceptions listed thereto. I understand that it is the policy of the City of Glenwood Springs that the City of Glenwood Springs does not and will not assume liability for drainage facilities designed by others."

COLORADO LICENSED
DERIC JON WALTER
37110
3/3//20
PROFESSIONAL ENGINEER

_____ *License No. 37110*
Licensed Professional Engineer, State of Colorado

(Seal)

Contents

A. Introduction 1
B. Existing Conditions 1
C. Existing Drainage Basins 1
1. Basin OS-1 4
2. Basin OS-2 4
3. Basin Ex-01 4
4. Basin Ex-02 4
5. Basin Ex-03 4
6. Basin Ex-04 5
7. Basin Ex-05 5
8. Floodplain 5
9. Existing Design Points 6
D. Proposed Conditions 6
E. Proposed Drainage Basins 10
1. Basin Pr-01 12
2. Basin Pr-02 12
3. Basin Pr-03 12
4. Basin Pr-04 13
5. Basin Pr-05 13
6. Basin Pr-06 13
7. Basin Pr-07 13
8. Basin Pr-08 14
9. Basin Pr-09 14
10. Basin Pr-10 14
11. Basin Pr-11 14
12. Basin Pr-12 15
13. Basin Pr-13 15
14. Basin Pr-14 15
15. Basin Pr-15 15
16. Basin Pr-16 16
17. Basin Pr-17 16
18. Basin Pr-18 16
19. Basin Pr-19 16
20. Basin Pr-20 17
21. Basin Pr-21 17
22. Design Point Impacts 17
F. Low Impact Site Design 18
G. Hydrologic Criteria 19
H. Hydraulic Criteria 19
I. Proposed Facilities 19
J. Operation and Maintenance 20
K. Works Cited 24

Appendix

A. Introduction

The purpose of this report is to provide an outline and basis of design for the drainage improvements proposed for the Bell Rippy Neighborhood in Glenwood Springs, Colorado (situated within Sections 15, 16, 21 & 22 of Township 6 South, Range 89 West of the Sixth Principal Meridian). The intent of the project is to construct several apartment buildings with associated roads/parking/sidewalks/landscaping and to mitigate the drainage impacts resulting from the development.

B. Existing Conditions

The project area consists of two (2) undeveloped parcels of land included in the Oakhurst Subdivision (First Filing) and the previously developed 2710 Blake Avenue (single family residence). The undeveloped parcels are bisected by the Palmer Avenue right-of-way. The project area is bounded by 26th Street to the north, Oakhurst Townhomes west/northwest, Blake Avenue to the west/southwest, Walmart to the south and very steep mountainous slopes to the east. The only significant disturbances on the project are the construction of a dirt road within the right-of-way, a retired irrigation ditch along the east boundary, the improvements to 2710 Blake Avenue (multi-family) and various utility installations. In general, the topography within the property slopes from east to west with slopes beginning from 40%-70% directly below the irrigation ditch which taper down to 20%-30% above the Oakhurst Townhomes and 10%-15% above Blake Avenue. Site vegetation consists primarily of sagebrush and native grasses with intermittent groupings of oak brush and sparse juniper trees. The USDA NRCS Web Soil Survey indicates that soils are primarily Atencio-Azeltine complex (hydrologic Group B) with a small section of Torriorthents-Rock outcrop complex (hydrologic Group D) along the southeast edge of the property.

C. Existing Drainage Basins

The construction of the Palmer Avenue dirt road and Oakhurst Townhomes has effectively divided the project area into five (5) existing drainage basins. The property is impacted by two (2) offsite drainage basins, OS-1 and OS-2. Please see Table 1 for basin areas, runoff coefficients, times of concentration and runoff rates and Figures 1 (offsite) and 2 (onsite) for basin boundaries and hydrologic soil groups.

Basin	Area		Runoff	Tc	Q_{25}	Q_{100}
	(sf)	(Ac.)		(min.)	(cfs)	(cfs)
H/Ex-01	67574	1.551	0.37	7.21	2.46	3.20
H/Ex-02	20084	0.461	0.37	6.51	0.77	0.99
H/Ex-03	15964	0.366	0.37	6.54	0.61	0.79
H/Ex-04	30586	0.702	0.37	7.39	1.10	1.43
H/Ex-05	170017	3.903	0.37	8.75	5.67	7.37
OS-1	5423220	124.500	0.36	22.45	102.44	131.82
OS-2	408157	9.370	0.28	6.32	11.93	15.50

Table 1: Existing Basins

A geotechnical investigation was performed by Huddleston-Berry Engineering & Testing, LLC (Job No. 01402-0002, dated December 2, 2017). The borings and test pits generally encountered red, moist, dense to very dense silty to clayey gravel soils with cobbles and boulders. Groundwater was not encountered.

923 Cooper Avenue, Ste. 201 | Glenwood Springs, CO 81601 | 970.945.5252 | www.bu-inc.com

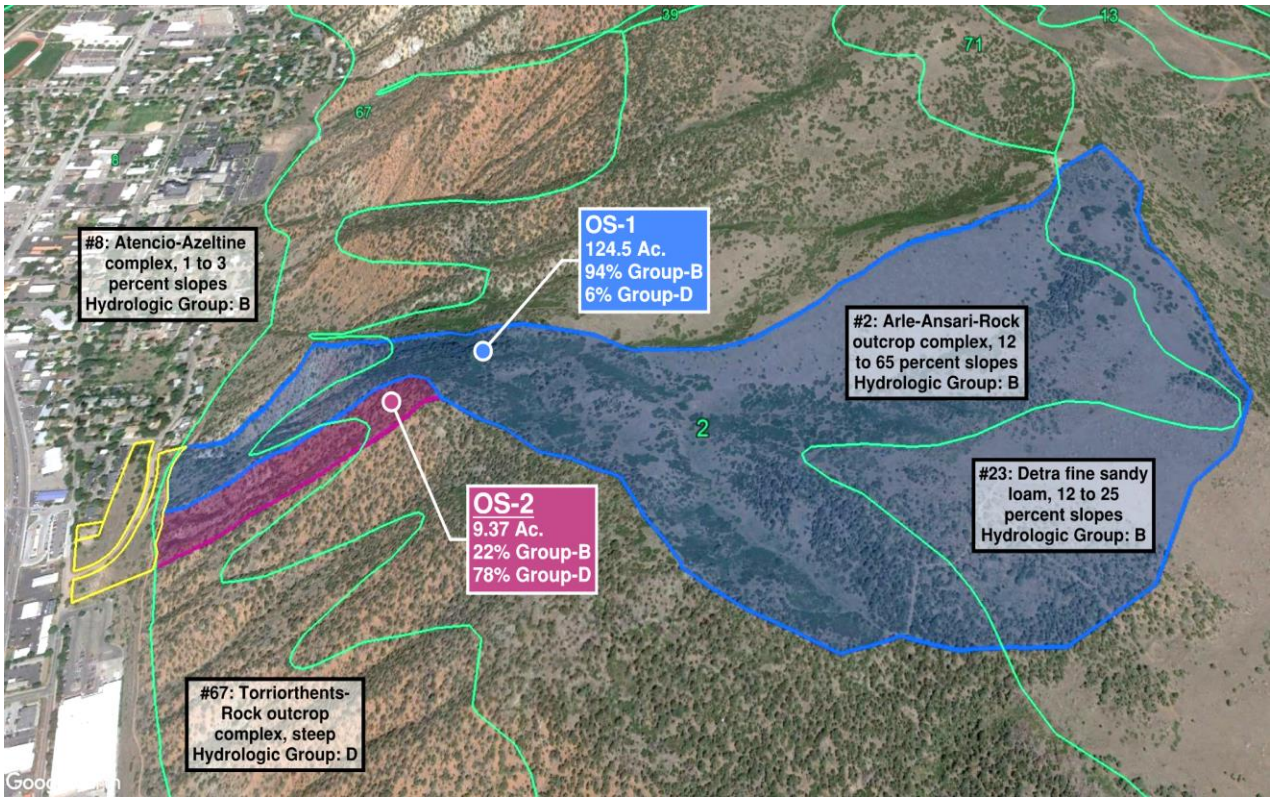


Figure 1: Existing Drainage Basins

923 Cooper Avenue, Ste. 201 | Glenwood Springs, CO 81601 | 970.945.5252 | www.bu-inc.com

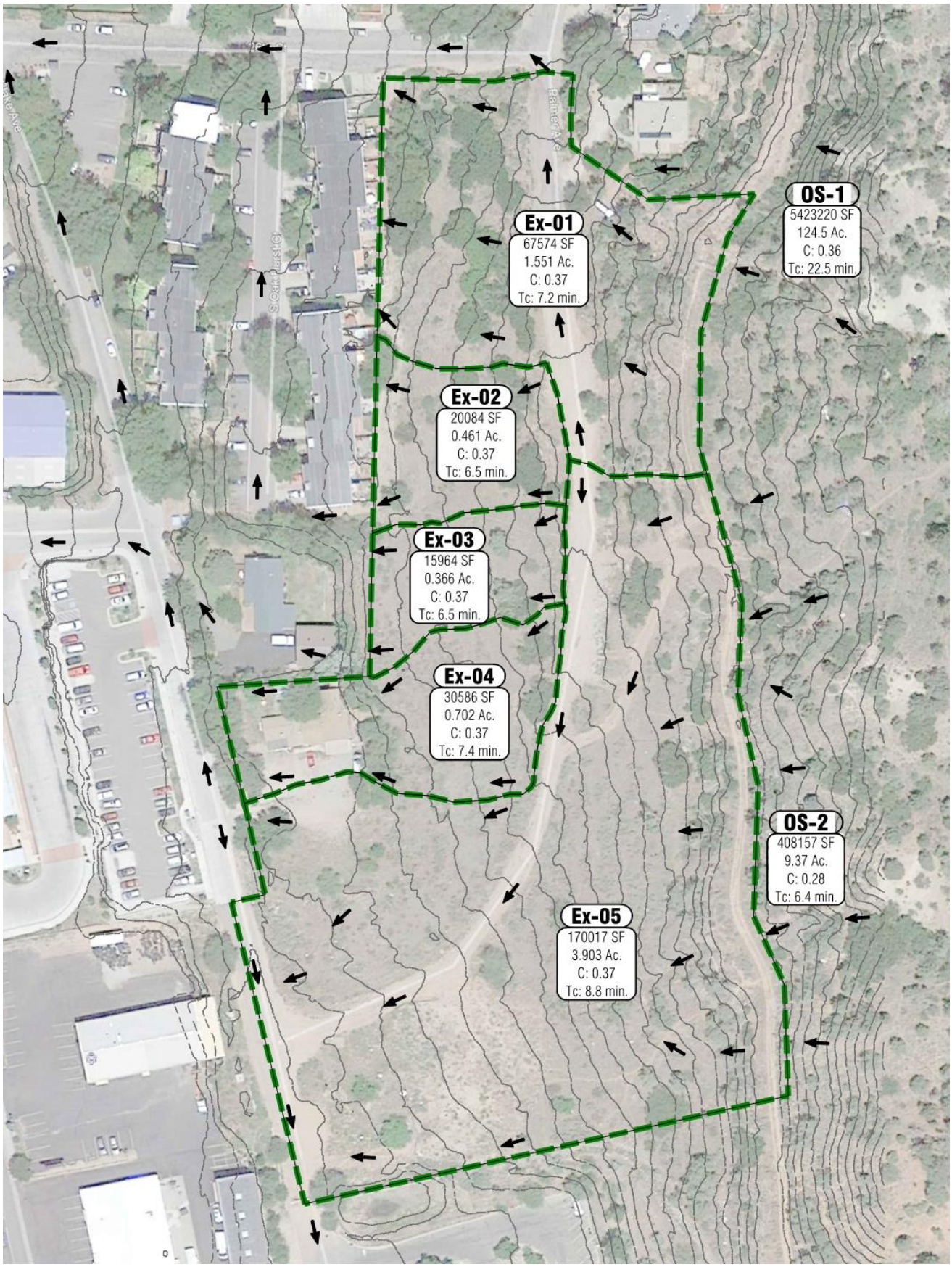


Figure 2: Existing Drainage Basins

923 Cooper Avenue, Ste. 201 | Glenwood Springs, CO 81601 | 970.945.5252 | www.bu-inc.com

1. Basin OS-1

Basin OS-1 exists above the north 1/3 of the site. The 124.5-acre basin extends up the steep mountain slope and then just over 3000-feet into the undisturbed upper mountain mesa. Vegetation consists primarily of juniper/pinyon trees, sagebrush and native grasses. Soil ratios are 94% hydrologic Group B and 6% Group D. Runoff sheet flows in the upper limits, shallow flows to the edge of the steep slope and then channel flows down the steep slope onto onsite Basin Ex-01. According to the Debris Flow Hazard Evaluation by Golder Associates Inc. (Project No. 1669256, dated July 29, 2019), offsite runoff from this basin is anticipated to consist of a sediment load of 20% during the major storm event which could result in flow depths greater than 2-feet.

2. Basin OS-2

Basin OS-2 exists above the south 2/3 of the site. The 9.4-acre basin extends up the steep mountain slope to a ridgeline adjacent to Basin OS-1. Vegetation consists primarily of juniper/pinyon trees and native grasses. Soil ratios are 22% hydrologic Group B and 78% Group D. Runoff sheet flows in the upper limits and shallow flows down the steep slope onto onsite Basin Ex-05. According to the Golder evaluation, runoff during the major storm event could result in flow depths greater than 1.5-feet.

3. Basin Ex-01

Basin Ex-01 (1.551 acres) consists of the northern portion of the site adjacent to 26th Street and above the north half of the Oakhurst Townhomes. During minor storm events, runoff sheet flows in the upper limits to Palmer Avenue where it concentrates and shallow flows north into 26th Street. There is an existing storm sewer system at the intersection of 26th Street/Blake Avenue that captures minor runoff flows. Runoff below Palmer Avenue sheet flows and shallow flows into the fence line of the Oakhurst Townhomes. Runoff may be deflected north to 26th Street by the fence line and/or the existing dirt maintenance trail. During major storm events, onsite runoff flows appear to peak and then recede prior to peak flows entering from Basin OS-1. When the offsite flows arrive, the Golder evaluation indicates that these flows are slightly redirected north, but that debris could still likely impact 4 to 5 of the northernmost townhomes.

4. Basin Ex-02

Basin Ex-02 (0.461 acres) consists of a central portion of the site above of the southern half of the Oakhurst Townhomes. During minor and major storm events, runoff sheet flows in the upper limits and shallow flows directly into a section of the Oakhurst Townhomes fence line which is relatively level and does not appear to deflect or redirect the runoff. Runoff onto the adjacent property may flood the existing townhomes or be redirected by interior grading. Whichever occurs, it is likely that runoff eventually continues downstream to Blake Avenue and then north towards 26th Street.

5. Basin Ex-03

Basin Ex-03 (0.366 acres) consists of a central portion of the site above 2707 Blake Avenue (existing single-family residence). During minor and major storm events, runoff sheet flows in the upper limits and shallow flows directly onto the adjacent property. Runoff onto the adjacent property may flood the existing building or be redirected by interior grading. Whichever occurs, it is likely that runoff eventually continues down to Blake Avenue and then north towards 27th Street and possibly further on to 26th Street. A storm sewer system exists at the intersection of 27th Street/Blake Avenue to capture runoff from minor storm events while excess runoff likely splits to continue down 27th Street to Highway 82 and north on Blake Avenue.

6. Basin Ex-04

Basin Ex-04 (0.702 acres) consists of 2710 Blake Avenue and a central portion of the site above. During minor and major storm events, runoff sheet flows in the upper limits and shallow flows directly onto 2710 Blake Avenue. Runoff may flood the existing building or be redirected by interior grading. Whichever occurs, it is likely that runoff eventually continues down to Blake Avenue and then north towards 27th Street where it follows the paths previously described.

7. Basin Ex-05

Basin Ex-05 (3.903 acres) consists of the southern portion of the site adjacent to Walmart and above Blake Avenue. During minor storm events, runoff sheet flows in the upper limits to Palmer Avenue where it concentrates and shallow flows south onto an incomplete section of Blake Avenue that slopes south at 1%-2%. There is an existing storm sewer system that was constructed by Walmart which includes a detention pond, outflow controls, a CDOT Type-R inlet at a sag location in the road and an 18"Ø storm sewer leading to 29th Street. The existing inlet/sag is located directly behind the Factor Surplus building. During major storm events, onsite runoff flows appear to peak and then partially recede prior to peak flows entering from Basin OS-2. When the offsite flows arrive at the site, the Golder evaluation indicates that these flows continue due west and that debris could impact the Factory Surplus and Alpine Tire properties. The Golder evaluation did not extend south towards the existing inlet, but an evaluation of the inlet concluded that it does not contain sufficient capacity to receive the peak offsite runoff rate from Basin OS-2.

8. Floodplain

The site is partially located in a floodplain per the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA) for Garfield County, Colorado, Community Panel Number 080071 1434 C, effective date: October 15, 1985. As indicated, most of the property is in Zone D - areas of undetermined, but possible, flood hazards. A portion of the site is within Zone A - areas of 100-year flood; base flood elevations and flood hazard factors have not been determined. That portion of the site north of Zone A is within Zone C - areas of minimal flooding. Please see Figure 3.

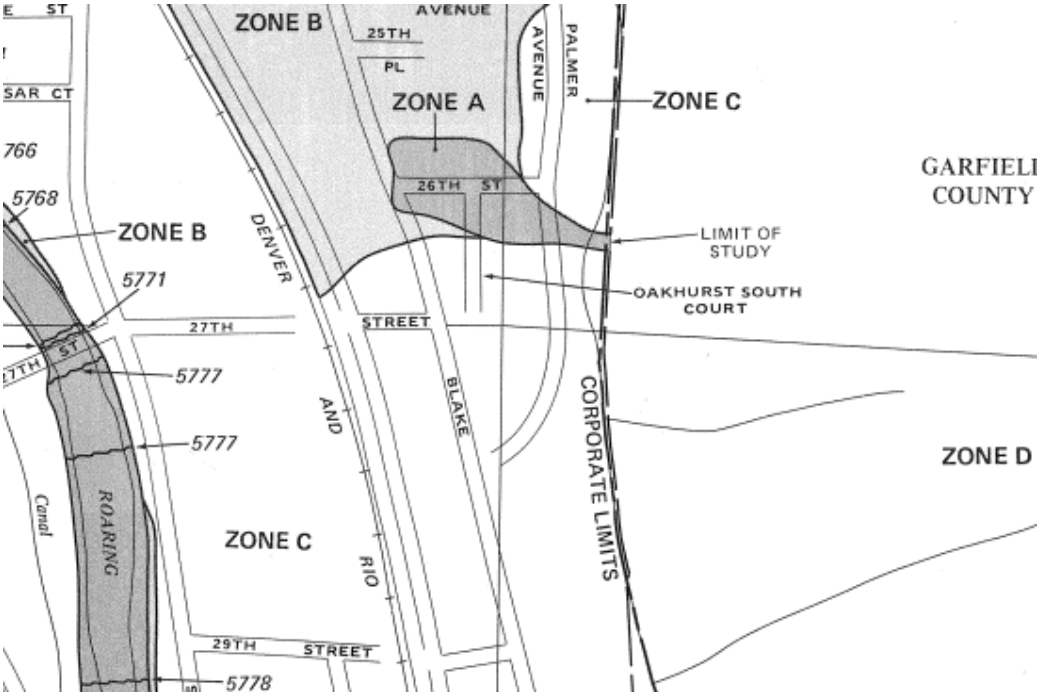


Figure 3: Existing Drainage Basins

9. Existing Design Points

The previous construction of Palmer Avenue (dirt road), 26th Street, Blake Avenue and adjacent properties largely confines the overall drainage basin boundary inside the property boundary. As discussed, there are three (3) topographic low points (outfalls/design points): the intersection of 26th Street/Blake Avenue; the intersection of 27th Street/Blake Avenue; and the existing CDOT Type-R inlet in Blake Avenue below Walmart. Please see the following Figure 4 (historic/existing peak runoff rates indicated).

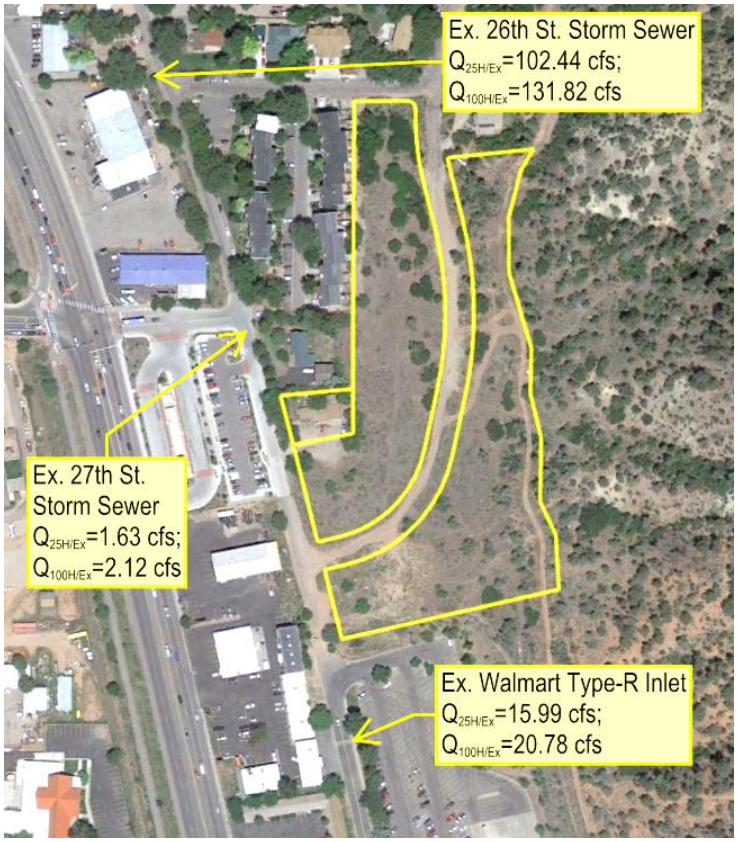


Figure 4: Outfalls/Design Points

D. Proposed Conditions

The proposed development will be multi-story multifamily residential apartments with three (3) topographic low points (outfalls/design points). These low points correspond with the existing conditions with concentrated flows at the intersection of 26th Street/Blake Avenue, 27th Street/Blake Avenue and the existing CDOT Type-R inlet in Blake Avenue below Walmart.

In planning out the design, several stormwater management alternatives were considered, including: bioretention; WQCV Drywells; Extended Detention Basin (EDB); Underground Detention (UGD) with hydrodynamic separators and conveyance structures. Per City requirements, the Project is required to treat runoff for the Water Quality Capture Volume (WQCV), manage runoff from the minor (25-year) and ensure conveyance of the 100-year storm event without adversely impacting downstream properties.

In preparing the design, it was determined that the soils were not suitable for infiltration and that the steep slopes and limited available flat areas negated the ability to utilize bioretention effectively. A previous study by Yarnell Consulting & Civil Design, LLC for the Glenwood Apartments (dated May 26, 2017) for a similar design on the site concluded that underground

detention with hydrodynamic separation was the best solution. The new Owner/Developer selected to expand the project site by purchasing 2710 Blake Avenue and utilize that property for a new EDB system which could serve the majority of the development. Despite all efforts to enable the EDB to serve the entire site, there remains a portion of land that is topographically lower than the EDB near the southwest corner where a UGD system is needed.

The Project has been designed to utilize roof gutters, downspouts, area inlets, curb inlets and storm sewer piping for the capture and conveyance of runoff to the treatment/detention facilities. Water Quality Capture Volume (WQCV) and runoff from impervious areas under the 25-year and 100-year, 1-hour storms will be managed using multi-stage outflow control in the EDB. A hydrodynamic separator will be installed upstream of the UGD for treatment and 25-year/100-year discharge will be managed using multi-stage outflow controls. The controlled discharge will be released into Blake Avenue for conveyance to the existing storm sewer systems. The undeveloped portion of Blake Avenue at the intersection of Blake Avenue/Palmer Avenue will be completed with curb, gutter and sidewalk. While the site runoff is well managed by the proposed systems, the offsite runoff exceeds feasible solutions. In an effort to better protect adjacent properties, earthen berms are proposed along the west side of Blake Avenue and along the north side of 26th Street to deflect the conveyed offsite runoff to the existing outfall points previously discussed. The existing CDOT Type-R Inlet below Walmart will also have to be increased from a single inlet (5' wide) to a triple inlet (15' wide). This should be accomplished in accordance with CDOT Standard Plan M-Standards using an "Inlet with Drop Box" configuration.

According to the Golder evaluation, the offsite debris flows are to be mitigated through the use of a 430± LF x 9' high flexible debris flow fence below Basin OS-1 and a combination of channels/berms below Basin OS-2. The debris flow fence is to be designed by others to extend across the basin fan and contain sediment while allowing relatively clear water to pass through which behaves as typical water flow rather than debris flow. A conveyance channel is to be constructed below the debris flow fence to capture and direct the clear water to a 24"x72" box culvert running under the new driveway of 2506 Palmer Avenue. The channel is to be 1.5' deep, have a 6.0' wide bottom width, have 1.5:1 side slopes and be lined with grouted riprap or a permanent UV stable erosion control fabric vegetated with native grasses. The box culvert needs to be angled to direct runoff north and down Palmer Avenue and towards 26th Street. Because of the steep slopes and high flow rates, the culvert headwall is required to be a wing/stem wall system which extends 4-feet up above the adjacent driveway. Grouted riprap needs to be installed below the culvert outfalls and extended to the top back of the street curb to control erosion. Dimensional details for the wing/stem wall and channel have been included in the Drainage Plans.

A deflection berm and conveyance channel are to be constructed across and below the debris fan of Basin OS-2. The berm is to be 3.0' high, have a 3.0' top width, have 2:1 side slopes and be lined with a permanent a permanent UV stable erosion control fabric vegetated with native grasses. The channel is to be 1.0' deep, have a 3.0' wide bottom width, have 1.5:1 side slopes and be lined with grouted riprap or a permanent UV stable erosion control fabric vegetated with native grasses.

A tiered retaining wall system is proposed along the east side of Palmer Avenue to minimize the amount of site disturbance, excavation and export. A drainage channel will need to be constructed above the wall to redirect runoff and protect the wall system. The channel is to be 1.0' deep, have a 1.0' wide bottom width, have 1.5:1 side slopes and be lined with grouted riprap or a permanent UV stable erosion control fabric vegetated with native grasses. Two (2) 24"Ø Nyloplast areas equipped with Agridrain heavy duty vertical debris guards are to be

installed in the channel above the retaining wall to capture the runoff and discharge it into Palmer Avenue.

As indicated on the attached Drainage Plans, a storm sewer system is to be installed in Palmer Avenue with branches into the adjacent parking lots and leads to the EDB. CDOT Type-R inlets are to be installed in Palmer Avenue to maximize on grade inlet capture and CDOT Type-16 inlets are to be installed in the parking areas to screen trash and maximize sump inlet capture. A detailed storm sewer analysis of this system has been performed using Autodesk Storm and Sanitary Sewer Analysis (SSA) v2020 software. Inlet and street capacities have also been confirmed using Mile High Flood District (MHFD) *Street and Inlet Hydraulics* software. Copies of each have been included in the Appendix.

A secondary storm sewer system is also to be installed in Palmer Avenue just above the intersection of Blake Avenue/Palmer Avenue because the area is topographically lower than the EDB. CDOT Type-13 valley inlets are to be installed across the driveway ramps and CDOT Type-16 inlets are to be installed in the parking areas. This storm sewer will direct runoff to a hydrodynamic separator positioned upstream of the underground detention facility.

In general, runoff from the roofs will be collected by roof gutters and downspouts connected to the storm sewer systems. Runoff from landscaped areas around the building will be captured by swales and area inlets also connected to the storm sewers. Runoff from the parking areas and street will be collected by the curb inlets previously described.

The available treatment/storage depth of the EDB is limited to just 3-feet by the elevation difference between the adjacent parking lot and Blake Avenue. The EDB treatment/storage requirements and outflow controls were designed using MHFD *Detention Basin Design Workbook* software for a three (3) zone system. The permissible outflow must be limited to the historic/existing runoff rates estimated at the intersection of Blake Avenue/27th Street and to prevent adverse impacts to downstream properties/systems. A copy has been included in the Appendix. The EDB storage requirements and proposed outflow controls are as follows:

Storm Event/ Zone	Storage Req'd (ac-ft)	Storage Req'd (cf)	Orifice Ø (in)	Weir Width (ft)	Weir Height (ft)	Weir Stage (ft)	Peak Outflow WQCV (cfs)	Peak Outflow Q25 (cfs)	Peak Outflow Q100 (cfs)
WQCV	0.074	3223	1	-	-	0	(40 hr)		
			1	-	-	0.25			
			1	-	-	0.5			
			1	-	-	0.75	0.07		
25-yr	0.219	9540	-	0.25	0.75	1.75		0.28	
100-yr*	0.262	11413	-	7.5*	-	2.5			2.09
*Overflow grate, not a typical weir									

Table 2: EDB Storage Requirements and Outflow Control

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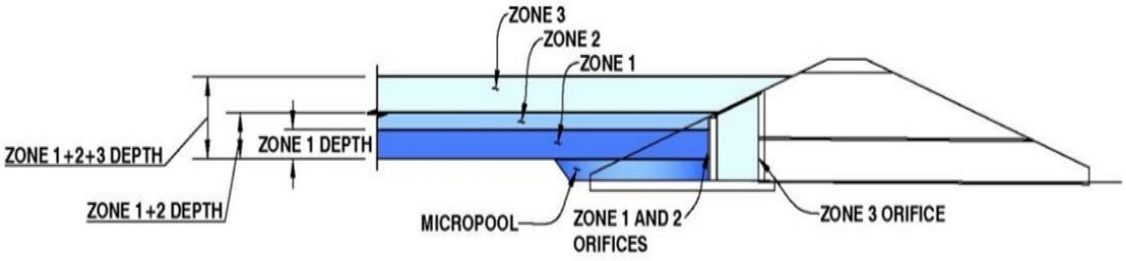

Figure 5: Extended Detention with 3 zones

The EDB has been depicted on the Drainage Plans to fit within the 2710 Blake Avenue parcel (available space). Steep 2:1 side slopes are required to meet the 100-year storage requirements above. The proposed Stage-Storage dimensions above the micropool are:

Stage (ft)	Area (sf)	Volume (cf)	Volume (ac-ft)	Storm Event/ Zone	HWL (ft)
-1 (micropool)	500	-	-	-	-
0	3139	0	0.000	WQCV	0.94
1	3774	3456	0.079	25-yr	2.45
2	4379	7533	0.173	100-yr	2.84
3	5044	12244	0.281		
4	5747	17640	0.405		

Table 3: EDB Stage-Storage

The EDB should contain a 500 sf x 12" deep micropool near the outflow control structure for sediment storage and a 10-foot wide access trail at the southwest corner at 6:1 max. The bottom of the micropool must be lined with 9"Ø nominal riprap and the remaining bottom of the EDB and side slopes must be lined with a permanent UV stable erosion control fabric vegetated with native grasses. Outflow control structure details have been included in the Drainage Plans.

The available treatment/storage depth of the UGD is limited to just 3-feet by the elevation difference between the rims of the Type-13 inlet proposed in Palmer Avenue and the existing curb flowline in Blake Avenue near the southwest corner of the site. Treatment will be obtained through the use of a hydrodynamic separator (Contech Vortech/CDS, ADS Barracuda, Forterra BioClean DSD or similar). The selected system will need to be sized by the manufacturer. Detention is proposed through the use of a large diameter perforated pipe network system (ADS LandMax or similar) backfilled with clean angular gravels with a 40% minimum void content. Alternative chamber systems capable of sustaining H-20 traffic loads may also be considered. Since the soils are not conducive to infiltration, the bottom and sides of the system will have to be lined with a full depth impermeable 30mil PVC pond liner. The UGD must have a minimum storage capacity of 2050 cf at a maximum depth of 2-feet. A suitable large diameter pipe system would consist of four (4) 24"Ø x 80 LF HDPE laterals with tee/bend manifolds, 24-inches of wall-to-wall separation, 4" of gravel subgrade, gravel backfill and 6" of gravel cover. The permissible outflow must be limited to the historic/existing runoff rates estimated at the intersection of Blake Avenue/27th Street at to prevent adverse impacts to downstream properties/systems. This is proposed to be accomplished through a two-stage weir as follows:

Storm Event/ Zone	Weir				
	Width (ft)	Height (ft)	Stage (ft)	Q25 (cfs)	Q100 (cfs)
WQCV	Hydrodynamic Separator			-	-
25-yr	0.25	1.5	0	5.43	

Table 4: UGD Outflow Control

E. Proposed Drainage Basins

Proposed drainage basin boundaries have been delineated in order to accurately size major receiving inlet structures. Please see Figure 6 for basin boundaries and Table 5 for areas, runoff coefficients, times of concentration and hydrology.

Basin	Area		Runoff C	Tc (min.)	WQCV (EDB) (in)	V_{WQ} (cf) (d6=0.34	Design Point V_{WQ} (cf)	Q_{25} (cfs)	Q_{100} (cfs)
	(sf)	(Ac.)							
OS-1	5423220	124.5	0.36	22.45	-	-	-	102.44	131.82
OS-2	408157	9.37	0.28	6.32	-	-	-	11.93	15.50
Pr-1	24815	0.570	0.48	5.00	0.126	206	-	1.38	1.79
Pr-2	5326	0.122	0.83	5.00	0.333	117	-	0.51	0.67
Pr-3	12339	0.283	0.79	5.00	0.300	244	-	0.82	1.06
Pr-4	14372	0.330	0.33	5.00	0.067	64	-	0.55	0.71
Pr-5	6391	0.147	0.77	5.00	0.281	118	-	0.57	0.74
Pr-6	12701	0.292	0.78	5.00	0.288	241	-	1.15	1.49
Pr-7	32430	0.744	0.77	5.00	0.282	602	-	2.90	3.76
Pr-8	7888	0.181	0.81	5.00	0.312	162	-	0.74	0.96
Pr-9	73048	1.677	0.38	5.00	0.047	228	-	3.22	4.18
Pr-10	18150	0.417	0.46	5.00	0.144	173	-	0.97	1.26
Pr-11	9605	0.221	0.87	5.00	0.367	232	-	0.97	1.26
Pr-12	6322	0.145	0.62	5.00	0.208	86	-	0.45	0.59
Pr-13	18045	0.414	0.67	5.00	0.211	251	-	1.40	1.82
Pr-14	8825	0.203	0.86	5.00	0.369	215	-	0.88	1.14
Pr-15	5669	0.130	0.79	5.00	0.298	111	-	0.52	0.67
Pr-16	2187	0.050	0.71	5.00	0.247	36	-	0.60	0.78
Pr-17	7280	0.167	0.63	5.00	0.213	102	3187	0.16	0.21
Pr-18	4945	0.114	0.95	5.00	0.471	154	-	0.55	0.71
Pr-19	4542	0.104	0.82	5.00	0.319	95	-	0.43	0.56
Pr-20	13454	0.309	0.82	5.00	0.315	279	-	1.28	1.66
Pr-21	15845	0.364	0.55	5.00	0.180	188	716	1.01	1.31
Walmart	67518	1.550	0.95	10.00	-	-	-	5.45	7.08
Blake @ Walmart	1743	0.040	0.97	5.00	-	-	-	0.20	0.26

Table 5: Proposed Basins

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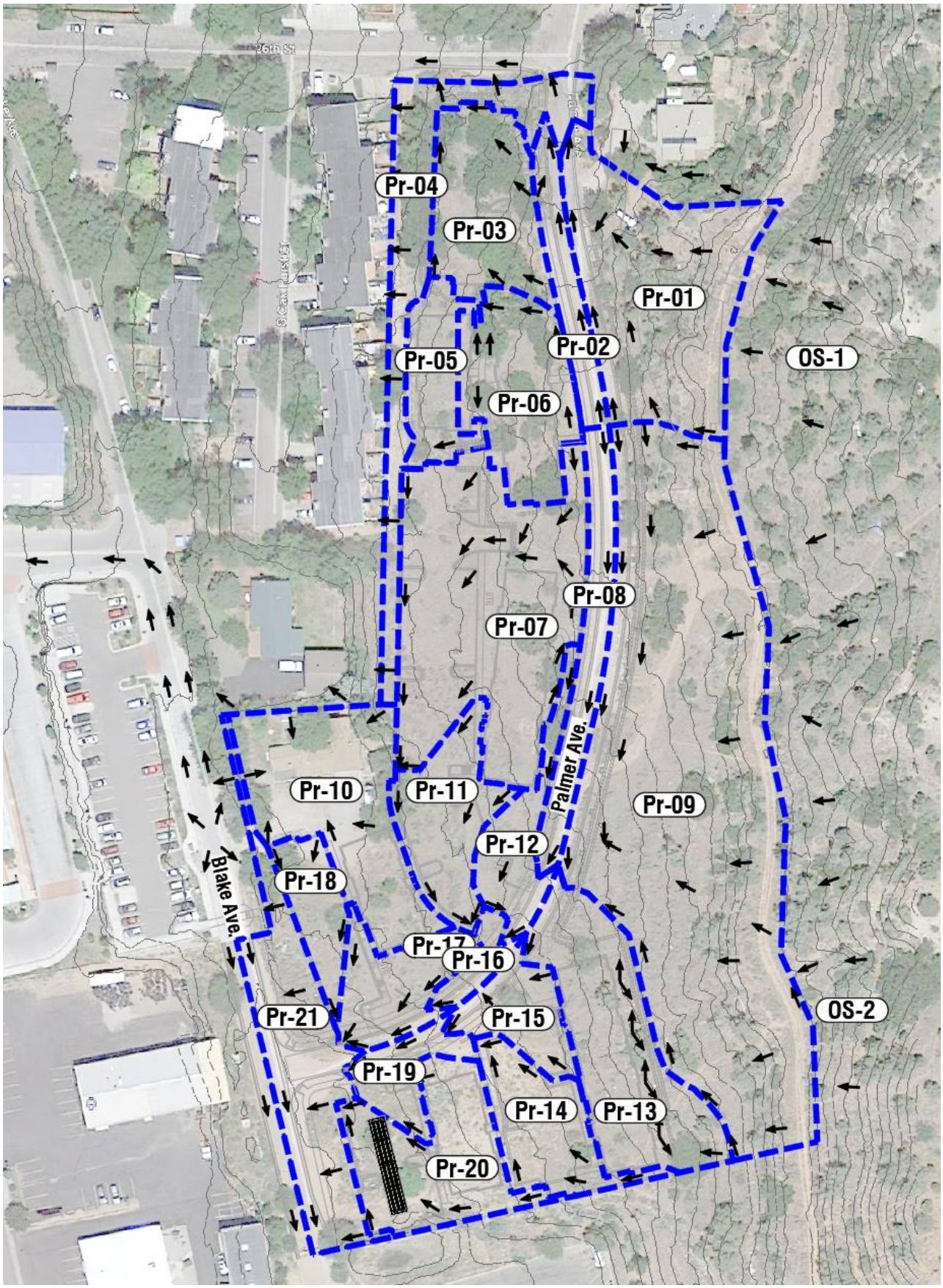

Figure 6: Proposed Drainage Basins

1. Basin Pr-01

Basin Pr-01 (0.570 acres; C=0.48; Tc=5 min. Q_{25}=1.38 cfs; Q_{100}=1.79 cfs) is situated at the northeast corner of the site below Offsite Basin OS-1 along with the east side of Palmer Avenue. As previously discussed, a conveyance channel is to be constructed across the basin below the proposed flexible debris flow fence to capture and direct the clear water from Offsite Basin OS-1 through the basin and to a 24"x72" box culvert running under the new driveway of 2506 Palmer Avenue. A 10-foot wide gravel maintenance trail will need to be constructed across the basin to obtain access to the debris flow fence for removal of debris and routine maintenance. A tiered retaining wall system is also proposed along the east side of Palmer Avenue to minimize the amount of site disturbance, excavation and export. A drainage channel will need to be constructed above the wall to redirect runoff and protect the wall system. The smaller wall channel is to be 1.0' deep, have a 1.0' wide bottom width, have 1.5:1 side slopes and be lined with grouted riprap or a permanent UV stable erosion control fabric vegetated with native grasses. No impervious buildings, streets or parking areas are proposed in this basin. In general, runoff will sheet flow in the upper limits, then shallow flow down to Palmer Avenue and shallow flow in Palmer Avenue to a proposed CDOT Type-R curb inlet located just above 26th Street. The inlet has a design intercept capacity of 2.2 cfs (minor) and 3.2 cfs (major) which in total is greater than the runoff from this basin. Uncaptured excess runoff from Offsite Basin OS-2 will bypass the inlets and continue down the roadway to the next set of inlets in Basin Pr-12. The inlet will also capture a minimal quantity of runoff from Offsite Basin OS-1. Although minimal, this capture will provide a net benefit for downstream properties/systems by reducing the peak runoff at Blake Avenue/26th Street from 131.82 cfs to 131.44 cfs. Captured runoff will be routed through a new storm sewer system to the EDB for treatment, detention and controlled release. The east half of Palmer Avenue has a street capacity of 1.4 cfs under the minor storm event with a maximum spread of 4-feet which is less than the runoff from this basin. Any disturbed slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native grasses.

2. Basin Pr-02

Basin Pr-02 (0.122 acres; C=0.83; Tc=5 min. Q_{25}=0.51 cfs; Q_{100}=0.67 cfs) is the west one-half of the proposed Palmer Avenue at the north end of the site which flows into 26th Street. Runoff from Offsite Basin OS-1 will likely overtop the crown and enter the lower limits of this basin. Impervious areas will include the street and sidewalk. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. No slopes steeper than 4:1 are anticipated which would require erosion control fabric. In general, runoff will sheet flow in the short upper limits, shallow flow in the street curb to two CDOT Type-R curb inlets located at the north end of the basin just above 26th Street, and channel (pipe) flow in the storm sewer. These inlets contain sufficient capacity to capture the anticipated minor and major runoff from this basin and onsite Basin Pr-01. The inlets will also capture a minimal quantity of runoff from Offsite Basin OS-1. Although minimal, this capture will provide a net benefit for downstream properties/systems by reducing the peak runoff at Blake Avenue/26th Street from 131.82 cfs to 131.44 cfs. Captured runoff will be routed through a new storm sewer system to the EDB for treatment, detention and controlled release. Palmer Avenue has a street capacity of 2.8 cfs (1.4 cfs on each side of the crown) under the minor storm event at a maximum spread of 4-feet which is less than the combined runoff from onsite Basins Pr-01/Pr-02.

3. Basin Pr-03

Basin Pr-03 (0.286 acres; C=0.79; Tc=5 min. Q_{25}=0.82 cfs; Q_{100}=1.06 cfs) is the north parking lot near the intersection Palmer Avenue/26th Street and adjacent landscape areas. Impervious areas will include the parking and entry sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be

lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Captured runoff will be routed through a new storm sewer system to the EDB for treatment, detention and controlled release. In general, runoff will be sheet flow in the upper limits, shallow flow in the parking curbs, and channel (pipe) flow in the storm sewer.

4. Basin Pr-04

Basin Pr-04 (0.330 acres; C=0.33; Tc=5 min. Q_{25}=0.55 cfs; Q_{100}=0.71 cfs) is the long narrow strip of undeveloped/revegetated land adjacent to the Oakhurst Townhomes and 26th Street. It also includes a minor portion of the impervious Palmer Avenue just below the Pr-02 curb inlets. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Runoff will not be captured from the basin and will sheet flow onto the adjacent properties and 26th Street. Historically, these adjacent properties received much more runoff from Basins Ex-01 (2.46/3.20 cfs), Ex-02 (0.77/0.99 cfs) and Ex-03 (0.61/0.79 cfs) than they will once site improvements have been completed. Therefore, development will result in a net benefit for downstream properties/systems.

5. Basin Pr-05

Basin Pr-05 (0.147 acres; C=0.77; Tc=5 min. Q_{25}=0.57 cfs; Q_{100}=0.74 cfs) is the majority of Building-F and the surrounding walks and landscaping. Impervious areas will include the building and sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Roof runoff will be captured by gutters/downspouts and piped directly into the storm sewer system leading to the EDB. Other surface areas will be captured by swales and area inlets also connected to the storm sewer. In general, runoff will be sheet flow on the roof/upper limits, shallow flow in swales, and channel (pipe) flow in the storm sewer.

6. Basin Pr-06

Basin Pr-06 (0.292 acres; C=0.78; Tc=5 min. Q_{25}=1.15 cfs; Q_{100}=1.49 cfs) is Building-E, a portion of Building-F and the surrounding walks and landscaping. Impervious areas will include the buildings and sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Roof runoff will be captured by gutters/downspouts and piped directly into the storm sewer system leading to the EDB. Other surface areas will be captured by swales and area inlets also connected to the storm sewer. In general, runoff will be sheet flow on the roof/upper limits, shallow flow in swales, and channel (pipe) flow in the storm sewer.

7. Basin Pr-07

Basin Pr-07 (0.292 acres; C=0.78; Tc=5 min. Q_{25}=1.15 cfs; Q_{100}=1.49 cfs) is Building-E, the majority of the adjacent parking, and the surrounding walks and landscaping. Impervious areas will include the building, parking and sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Roof runoff will be captured by gutters/downspouts and piped directly into the storm sewer system leading to the EDB. Parking runoff will be captured by curb and CDOT Type-16 curb inlets connected to the same storm sewer. Other surface areas will be captured by swales and area inlets also connected to the storm sewer. In general, runoff will be sheet flow on the roof/upper limits, shallow flow in swales/curbs, and channel (pipe) flow in the storm sewer.

8. Basin Pr-08

Basin Pr-08 (0.181 acres; C=0.81; Tc=5 min. Q_{25}=0.74 cfs; Q_{100}=0.96 cfs) is the west half of the upper portion of Palmer Avenue flowing south to Blake Avenue prior to the first set of curb inlets along with the adjacent landscape strips/sidewalk. Impervious areas will include the road and sidewalk. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. No slopes steeper than 4:1 are anticipated which would require erosion control fabric. In general, runoff will sheet flow in the short upper limits, shallow flow in the street curb to a CDOT Type-R curb inlet located just above the driveway of Building-D, and channel (pipe) flow in the storm sewer. The inlet has a design intercept capacity of 2.2 cfs (minor) and 3.2 cfs (major) which in total is greater than the runoff from the basin.

9. Basin Pr-09

Basin Pr-09 (1.677 acres; C=0.38; Tc=5 min. Q_{25}=3.22 cfs; Q_{100}=4.18 cfs) is the east half of Palmer Avenue adjacent to Basin Pr-08 and the undeveloped portion of the site above Palmer Avenue and Building-C. As previously discussed, a deflection berm/conveyance channel is to be constructed across the basin to capture and direct the runoff from Offsite Basin OS-2 through the basin and to an area inlet discharging into Palmer Avenue. Drainage channels will need to be constructed above the wall and Basin Pr-13 to redirect runoff and protect the wall systems and Building-C. The smaller channels are to be 1.0' deep, have a 1.0' wide bottom width, have 1.5:1 side slopes and be lined with grouted riprap or a permanent UV stable erosion control fabric vegetated with native grasses. No impervious buildings, streets or parking areas are proposed in this basin. In general, runoff will sheet flow in the upper limits and then shallow flow down to Palmer Avenue where it will join with the runoff from Offsite Basin OS-2 and enter a CDOT Type-R curb inlet. The inlet has a design intercept capacity of 2.2 cfs (minor) and 3.2 cfs (major) which in total is less than the combined runoff from this basin and the offsite basin. Uncaptured runoff will bypass the inlet and continue down the street to the next inlet in Basin Pr-13. Any disturbed slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native grasses.

10. Basin Pr-10

Basin Pr-10 (0.417 acres; C=0.46; Tc=5 min. Q_{25}=0.97 cfs; Q_{100}=1.26 cfs) is Building-A, the EDB, and the surrounding walks and landscaping. Impervious areas will include the building and sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Roof runoff will be captured by gutters/downspouts and piped directly into the storm sewer system leading to the EDB. Other surface areas will be captured by swales and area inlets also connected to the storm sewer or the EDB. In general, runoff will be sheet flow on the roof/upper limits, shallow flow in swales, and channel (pipe) flow in the storm sewer.

11. Basin Pr-11

Basin Pr-11 (0.221 acres; C=0.87; Tc=5 min. Q_{25}=0.97 cfs; Q_{100}=1.26 cfs) is the lower portion of the parking lot near Building-D and the surrounding walks and landscaping. Impervious areas will include the parking and sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Parking runoff will be captured by curb and a CDOT Type-16 curb inlet connected to the storm sewer leading to the EDB. Other surface areas will be captured by swales and area inlets also connected to the storm sewer. In general, runoff will be sheet flow on the upper limits, shallow flow in swales/curbs, and channel (pipe) flow in the storm sewer.

12. Basin Pr-12

Basin Pr-12 (0.221 acres; C=0.87; Tc=5 min. Q_{25}=0.97 cfs; Q_{100}=1.26 cfs) is the remainder of the parking lot near Building-D, one-half of Palmer Avenue below Basin Pr-08 and the surrounding walks and landscaping. Impervious areas will include the street, parking and sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Parking runoff will be captured by curb leading to a CDOT Type-16 curb inlets connected to the storm sewer leading to the EDB. Street runoff will be captured by a CDOT Type-R curb inlet connected to the same storm sewer. Other surface areas will be captured by swales and area inlets also connected to the storm sewer. In general, runoff will be sheet flow on the upper limits, shallow flow in swales/curbs, and channel (pipe) flow in the storm sewer. The Type-R inlet has a design intercept capacity of 2.2 cfs (minor) and 3.2 cfs (major) which is greater than the runoff from the basin.

13. Basin Pr-13

Basin Pr-13 (0.414 acres; C=0.67; Tc=5 min. Q_{25}=1.40 cfs; Q_{100}=1.82 cfs) is Building-C, one-half of Palmer Avenue below Basin-09, and the surrounding walks and landscaping. Impervious areas will include the street, building and sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Roof runoff will be captured by gutters/downspouts and piped directly into the storm sewer system leading to the EDB. Street runoff will be captured by curb and a CDOT Type-R curb inlet connected to the same storm sewer. Other surface areas will be captured by swales and area inlets also connected to the storm sewer. In general, runoff will be sheet flow on the roof/upper limits, shallow flow in swales/curbs, and channel (pipe) flow in the storm sewer. The Type-R inlet has a design intercept capacity of 2.2 cfs (minor) and 3.2 cfs (major) which is greater than the runoff from the basin, but less than the bypass runoff produced by Offsite Basin OS-2. Uncaptured runoff will bypass the inlet and continue down the street to the next inlet in Basin Pr-15.

14. Basin Pr-14

Basin Pr-14 (0.203 acres; C=0.86; Tc=5 min. Q_{25}=0.88 cfs; Q_{100}=1.14 cfs) is the majority of the parking lot adjacent to Building-C and the surrounding walks and landscaping. Impervious areas will include the parking and sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Parking runoff will be captured by curb and a CDOT Type-16 curb inlet connected to the storm sewer leading to the EDB. Other surface areas will be captured by swales and area inlets also connected to the storm sewer. In general, runoff will be sheet flow on the upper limits, shallow flow in swales/curbs, and channel (pipe) flow in the storm sewer.

15. Basin Pr-15

Basin Pr-15 (0.130 acres; C=0.79; Tc=5 min. Q_{25}=0.52 cfs; Q_{100}=0.67 cfs) is the remainder of the parking lot adjacent to Building-C, one-half of Palmer Avenue below Basin-13, and the surrounding walks and landscaping. Impervious areas will include the street and sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Street runoff will be captured by curb and a CDOT Type-R curb inlet connected to the storm sewer leading to the EDB. Other surface areas will be captured by swales and area inlets also connected to the storm sewer. In general, runoff will be sheet flow on the upper limits, shallow flow in swales/curbs, and channel (pipe) flow in the storm sewer. The Type-R inlet has a design intercept capacity of 2.2 cfs (minor) and 3.2 cfs (major)

which is greater than the runoff from the basin, but less than the bypass runoff produced by Offsite Basin OS-2. Uncaptured runoff will bypass the inlet and continue down the street to the next inlet in Basin Pr-19.

16. Basin Pr-16

Basin Pr-16 (0.050 acres; C=0.71; Tc=5 min. Q_{25}=0.60 cfs; Q_{100}=0.78 cfs) is one-half of Palmer Avenue below Basin Pr-12 and the surrounding walks and landscaping. Impervious areas will include the street and sidewalk. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Street runoff will be captured by a CDOT Type-R curb inlet connected to the storm sewer leading to the EDB. In general, runoff will be sheet flow on the upper limits, shallow flow in swales/curbs, and channel (pipe) flow in the storm sewer. The Type-R inlet has a design intercept capacity of 2.2 cfs (minor) and 3.2 cfs (major) which is greater than the runoff from the basin.

17. Basin Pr-17

Basin Pr-17 (0.167 acres; C=0.63; Tc=5 min. Q_{25}=0.16 cfs; Q_{100}=0.21 cfs) is one-half of Palmer Avenue below Basin Pr-16, the lower portion of the parking lot near Building-A and the surrounding walks and landscaping. Impervious areas will include the street, parking and sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Street/parking runoff will be captured by curb and a CDOT Type-13 valley inlet connected to the storm sewer leading to the UGD. Other surface areas will be captured by swales and area inlets also connected to the same storm sewer. In general, runoff will be sheet flow on the upper limits, shallow flow in swales/curbs, and channel (pipe) flow in the storm sewer. The Type-13 inlet has a design intercept capacity of 1.3 cfs (minor) and 1.5 cfs (major) which is greater than the runoff from the basin, but not all of the runoff is captured because of gutter spread and a minor amount of bypass from Basin Pr-18. Minor runoff bypassing the Type-13 inlet will continue down the street to Blake Avenue.

18. Basin Pr-18

Basin Pr-18 (0.114 acres; C=0.95; Tc=5 min. Q_{25}=0.55 cfs; Q_{100}=0.71 cfs) is the majority of the parking lot adjacent to Building-A and the surrounding walks and landscaping. Impervious areas will include the parking and sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Parking runoff will be captured by curb and a CDOT Type-16 curb inlet connected to the storm sewer leading to the UGD. In general, runoff will be sheet flow on the upper limits, shallow flow in swales/curbs, and channel (pipe) flow in the storm sewer. The Type-16 inlet has a design intercept capacity of 1.5 cfs (minor) and 2.0 cfs (major) which is greater than the runoff from the basin.

19. Basin Pr-19

Basin Pr-19 (0.104 acres; C=0.82; Tc=5 min. Q_{25}=0.43 cfs; Q_{100}=0.56 cfs) is a portion of the parking lot adjacent to Building-B, one-half of Palmer Avenue below Basin-15, and the surrounding walks and landscaping. Impervious areas will include the street, parking and sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Street/parking runoff will be captured by curb and a CDOT Type-13 valley inlet connected to the storm sewer leading to the UGD. In general, runoff will be sheet flow on the upper limits, shallow flow in swales/curbs, and channel (pipe) flow in the storm sewer. The Type-13 inlet has a design intercept capacity of 1.3 cfs (minor) and 1.5

cfs (major) which is greater than the runoff from the basin, but less than the bypass runoff produced by Offsite Basin OS-2. Uncaptured runoff will bypass the inlet and continue down the street to Blake Avenue to the existing Type-R inlet located below Walmart.

20. Basin Pr-20

Basin Pr-20 (0.309 acres; C=0.82; Tc=5 min. Q_{25}=1.28 cfs; Q_{100}=1.66 cfs) is Building-B, the majority of the adjacent parking, and the surrounding walks and landscaping. Impervious areas will include the building, parking and sidewalks. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Roof runoff will be captured by gutters/downspouts and piped directly into the storm sewer system leading to the UGD. Parking runoff will be captured by curb and a CDOT Type-16 curb inlet connected to the same storm sewer. Other surface areas will be captured by swales and area inlets also connected to the storm sewer. In general, runoff will be sheet flow on the roof/upper limits, shallow flow in swales/curbs, and channel (pipe) flow in the storm sewer.

21. Basin Pr-21

Basin Pr-21 (0.364 acres; C=0.55; Tc=5 min. Q_{25}=1.01 cfs; Q_{100}=1.31 cfs) is Blake Avenue, the uncaptured portion of Palmer Avenue, and the surrounding walks and landscaping. Disturbed areas will be vegetated with native grasses, lawn grasses and landscape shrubs/trees. Slopes steeper than 4:1 will need to be lined with a 3-year stable erosion control fabric vegetated with native/lawn grasses. Blake Avenue will be completed to connect to the existing curbed street below Walmart where an existing single (5-foot) Type-R inlet is located in a sag condition. The single inlet does not contain sufficient inflow capacity to receive the remaining 8.96 cfs of Offsite Basin OS-2 runoff being conveyed through the site. Therefore, and as previously discussed, the existing inlet must be expanded to a triple (15-foot) Type-R inlet constructed per CDOT Standard Plan M-Standards using an “Inlet with Drop Box” configuration.

22. Design Point Impacts

The proposed drainage system has been designed to reduce peak flow rates at each of the three (3) previously define design points. Please see the following Figure 5 for a comparison of (historic/existing peak runoff rates verses developed peak runoff rates.

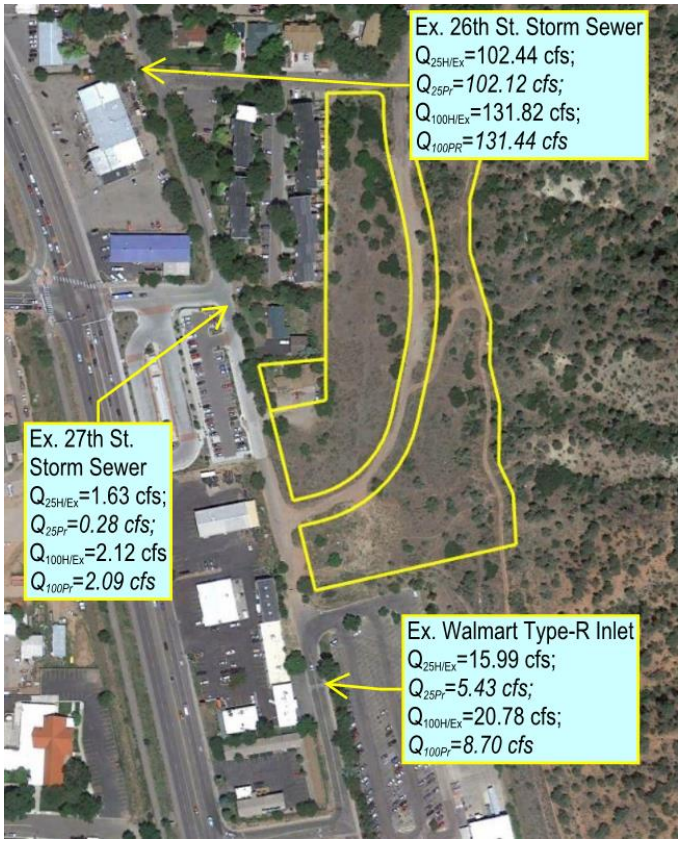

Figure 7: Outfall/Design Point Comparison

F. Low Impact Site Design

The landscaping strategy is to reduce impervious areas where possible and stabilize slopes with erosion fabric and vegetation and utilize low water demanding plants and grasses. Low Impact Site Design (LID) principals have been considered for implementation as follows:

Principle 1: Consider stormwater quality needs early in the design process

The need to manage and treat stormwater runoff was discussed during the design process affording the design team and owner an opportunity to discuss the options and evaluate their feasibility. Recognizing that the building footprints, parking and street would utilize the majority of this steep site, it was decided that detention/treatment would be more feasible than other BMP options. Plans were made to minimize the extent of hardscape improvements and install vegetative planting areas in parking islands and between the buildings and the parking. The use of grated inlets will, skim larger floating trash. The EDB will provide sediment fallout, hydrocarbon reduction and minor infiltration. The hydrodynamic separator will provide sediment fallout.

Principle 2: Use the entire site when planning for stormwater quality treatment

The design was prepared with the intent of promoting sheet flow (landscape areas between buildings/parking/walks), reducing imperviousness (minimized amount of parking/sidewalk), removing floating trash (grated inlets) and increasing sediment dropout (EDB/hydrodynamic separator).

Principle 3: Avoid unnecessary impervious area

The sidewalks and parking spaces were all reworked and reduced by utilizing some compact parking to minimize the amount of impervious area.

Principle 4: Reduce runoff rates and volumes to more closely match natural conditions

The use of the EDB and UGD with outflow control structures will reduce the runoff rates for the minor (25-year) and major (100-yr) storm events to the pre-developed level as required by City code.

Principle 5: Integrate stormwater quality management and flood control

The purposed use of vegetated planting areas around the building/parking provides for minor pretreatment while the EDB and hydrodynamic separator will provide more extensive treatment. The EDB, UGD and outflow control structures will reduce runoff rates.

Principle 6: Develop stormwater quality facilities that enhance the site, the community and the environment

Grading and area inlet placements have been designed to protect the building structures and capture large quantities of runoff. Treating the runoff will bolster the community and environment.

Principle 7: Use a treatment train approach

A train approach is not feasible on this site because of the steep topography and need to convey large quantities of runoff to the EDB and UGD.

Principle 8: Design sustainable facilities that can be safely maintained

The EDB will be equipped with a 6:1 access slope for maintenance and emergency ingress/egress. The water storage depth of the EDB has been kept shallow 3-feet. The bottom micropool will be lined with angular riprap to create a solid base and define the sediment removal limits.

Principle 9: Design and maintain facilities with public safety in mind

The 6:1 access slope in the EDB will enable humans and animals to enter/exit the EDB for maintenance or in emergency situations.

G. Hydrologic Criteria

The stormwater management system has been designed to treat polluted runoff, detain and release the 25-year and 100-year, 1-hour storm event runoffs and allow excess runoff beyond the 100-year event to overflow the EDB and UGD safely. Rainfall intensities are based on rainfall date contained in Chapter 4 of the City Engineering Design Standards. Runoff rates and volumes were estimated using Autodesk Storm and Sanitary Sewer Analysis (SSA) v2020 software and the Rational Method. Copies of these data sheets have been included in the Appendix.

H. Hydraulic Criteria

The EDB/outflow control structure was designed using MHFD calculation spreadsheets. Storm sewer pipes and inlets were sized using Autodesk SSA software. Curb and valley inlets were confirmed using MHFD calculation spreadsheets. The MHFD recommends a clogging factor of 50% for grates and 10% for curb openings. This study utilized 25% for curb openings because of the potential for debris flow entering from Offsite Basin OS-2. The box culvert was sized using the Autodesk Hydraflow Express extension. Copies of these data sheets have been included in the Appendix.

I. Proposed Facilities

Erosion control measures and Best Management Practices (BMPS) should be followed during construction to ensure that the property and the adjacent streets are not impacted from sedimentation. This should include a combination of temporary sediment control fence, erosion control logs, rock socks, inlet silt sacks, terraced excavations and erosion fabrics to minimize

erosion and control runoff. A detailed Stormwater Management and Erosion Control Plan will need to be design and approved by the City of Glenwood Springs Engineering Department prior to construction. Preparation of stormwater management plans, permitting and compliance are the responsibility of the contractor. This project will also require a permit for stormwater discharge associated with construction activity from the station of Colorado.

The EDB will treat the WQCV for the majority of the site. The hydrodynamic separator will treat the WQCV of the runoff which cannot be directed to the EDB. Runoff from the minor and major storm events will be captured and released at controlled rates as discussed. Excess runoff beyond the major event will safely pass through the control structures. The majority of the offsite runoff will be conveyed through the site with some minor capture which will provide a net benefit for downstream properties and systems.

J. Operation and Maintenance

During construction activities and until vegetation can be established, temporary rock socks should be installed in the roadside curb and gutter and around curb inlets. Temporary silt sacks should be installed in roadway drop inlets. Temporary certified weed free hay bales, check dams, silt dikes, erosion control logs or sediment control fencing should be installed around below all disturbances in Colorado Department of Transportation M-Standards. The Contractor shall be responsible for removing debris from the sediment structures after each storm event. The Contractor shall also repair any damaged erosion controls, remove accumulated sediment from the EDB, from the hydrodynamic separator and from behind hay bales/check dams/silt dikes/erosion control logs/sediment control fence after each storm event. After construction, the property owner shall be responsible for removing debris and sediment after each storm event and dredging sediment on an as-needed basis.

The hydrodynamic separator and EDB/UGD Outflow Control Structures must be inspected and maintained semi-annually to remove sediment and debris that has collected. Heat tape from the roof downspouts should be extended into nearby area inlets secured to the bottom of the inlet grates.

Extended detention basins have low to moderate maintenance requirements. Routine and non-routine maintenance is necessary to assure performance, enhance aesthetics, and protect structural integrity. The dry basins can result in nuisance complaints if not properly designed or maintained. Bio-degradable pesticides may be required to limit insect problems. Frequent debris removal and grass-mowing can reduce aesthetic complaints. If a shallow wetland or marshy area is included, mosquito breeding and nuisance odors could occur if the water becomes stagnant. The basic elements of the maintenance requirements are presented as follows:

Required Action	Maintenance Objective	Frequency of Action
Lawn mowing and lawn care	Occasional mowing to limit unwanted vegetation. Maintain irrigated turf grass as 2 to 4 inches tall and non-irrigated native turf grasses at 4 to 6 inches.	Routine – Depending on aesthetic requirements.
Debris and litter removal	Remove debris and litter from the entire pond to minimize outlet clogging and improve aesthetics.	Routine – Following spring runoff and following significant rainfall events.
Sediment removal from forebay and micro-pool	Remove accumulated sediment from the forebay and micro-pool. Dewatering of the micro-pool by pumping onto the EDB's bottom grasses and temporary diversion of all base flows will be needed to remove the accumulated sediment from micro-pool's bottom.	Routine – The sediment accumulations forebay and the micro-pool will need to be cleaned out every one to three years. Cleaning of micro-pool is important for mosquito control.

(AMEC Earth and Environmental Inc., Wright Water Engineers Inc., Wenk & Associates;, 2010, Rev. 12/2014)

Sediment and mud should be prevented from leaving the construction site by the immediate placement of a stabilized construction entrance. The Contractor should be responsible for cleaning and general upkeep of the site and adjacent roadways. As an effective dust control measure, water and weed-free straw may be utilized to minimize uprising of dust.

Forterra BioClean recommends the following inspection and maintenance procedures for underground detention: (BioClean, 2020)

Inspection and maintenance of the underground detention, retention, or infiltration system is vital for the performance and life cycle of the stormwater management system. All local, state, and federal permits and regulations must be followed for system compliance. Manway access locations are provided on each system for ease of ingress and egress for routine inspection and maintenance activities. Stormwater regulations require that all BMP(s) be inspected and maintained to ensure they are operating as designed and providing protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess the site specific conditions. Inspection after the first significant rainfall event and at quarterly intervals is typical. This is recommended because pollutant loading and pollutant characteristics can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding on roads, amount of daily traffic and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years to ensure appropriate maintenance is provided. Without appropriate maintenance a BMP can exceed its storage capacity, become blocked, or damaged, which can negatively affect its continued performance.

Inspection Equipment

Following is a list of equipment to allow for simple and effective inspection of the underground detention, retention, or infiltration system:

- *Bio Clean Environmental Inspection and Maintenance Report Form*
- *Flashlight*
- *Manhole hook or appropriate tools to access hatches and covers*
- *Appropriate traffic control signage and procedures*
- *Measuring pole and/or tape measure*
- *Protective clothing and eye protection*

Note: Entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections of the system.

Inspection Steps

The key to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the underground detention, retention, or infiltration system are quick and easy. As mentioned above, the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long term inspection and maintenance interval requirements.

The underground detention, retention, or infiltration system can be inspected though visual observation without entry into the system. All necessary pre-inspection steps must be carried out before inspection occurs, especially traffic control and other safety measures to protect the inspector and nearby pedestrians from any dangers associated with an open access hatch or manhole. Once these access covers have been safely opened the inspection process can proceed:

- *Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other information (see inspection form).*
- *Observe the upstream drainage area and look for sources of pollution, sediment, trash and debris.*
- *Observe the inside of the system through the access manholes. If minimal light is available and vision into the unit is impaired, utilize a flashlight to see inside the system and all of its modules.*
- *Look for any out of the ordinary obstructions in the inflow and outflow pipes. Check pipes for movement or leakage. Write down any observations on the inspection form.*
- *Observe any movement of modules.*
- *Observe concrete for cracks and signs of deterioration.*
- *In detention and retention systems inspect for any signs of leakage.*
- *In infiltration systems inspect for any signs of blockage or reasons that the soils are not infiltrating.*
- *Through observation and/or digital photographs, estimate the amount of floatable debris accumulated in the system. Record this information on the inspection form. Next, utilizing a tape measure or measuring stick, estimate the amount of sediment accumulated in the system. Sediment depth may vary throughout the system, depending on the flow path. Record this depth on the inspection form.*
- *Finalize inspection report for analysis by the maintenance manager to determine if maintenance is required.*

Maintenance Indicators

Based upon observations made during inspection, maintenance of the system may be required based on the following indicators:

- *Damaged inlet and outlet pipes.*
- *Obstructions in the system or its inlet or outlet.*
- *Excessive accumulation of floatables.*
- *Excessive accumulation of sediment of more than 6" in depth.*
- *Damaged joint sealant.*

Maintenance Equipment

While maintenance can be done fully by hand it is recommended that a vacuum truck be utilized to minimize time requirements required to maintain the underground detention, retention, or infiltration system:

- *Bio Clean Environmental Inspection and Maintenance Report Form*
- *Flashlight*
- *Manhole hook or appropriate tools to access hatches and covers*
- *Appropriate traffic control signage and procedures*
- *Measuring pole and/or tape measure*
- *Protective clothing and eye protection*
- *Vacuum truck*
- *Trash can*
- *Pressure washer*

Note: Entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections of the system. Entry into the system will be required if maintenance is required.

Maintenance Procedures

It is recommended that maintenance occurs at least three days after the most recent rain event to allow for drain down of the system and any upstream detention systems designed to drain down over an extended period of time. Maintaining the system while flows are still entering it will increase the time and complexity required for maintenance. Once all safety measures have been set up cleaning of the system can proceed as follows:

- *Using an extension on a boom on the vacuum truck, position the hose over the opened manway and lower into the system. Remove all floating debris, standing water (as needed) and sediment from the system. A power washer can be used to assist if sediments have become hardened and stuck to the walls and columns. Repeat the same procedure at each manway until the system has been fully maintained. Be sure not to pressure wash the infiltration area as it may scour.*

If maintenance requires entry into the vault:

- *Following rules for confined space entry use a gas meter to detect the presence of any hazardous gases. If hazardous gases are present do not enter the vault. Follow appropriate confined space procedures, such as utilizing venting system, to address the hazard. Once it is determined to be safe, enter utilizing appropriate entry equipment such as a ladder and tripod with harness.*
- *The last step is to close up and replace all manhole covers and remove all traffic control.*

- *All removed debris and pollutants shall be disposed of following local and state requirements.*

Good housekeeping BMP(s) should be followed throughout the entire life of the project. These include but are not limited to:

- refuge receptacles should be regularly emptied and equipped with lids;
- keeping machinery in good operating condition to prevent leakage;
- apply appropriate (not excessive) amounts of fertilizer to the landscaping;
- scheduled maintenance cleaning of any downstream curb and gutter, storm sewer inlets, culverts and ditches;
- general site cleanliness and proper training of employees;
- Grading must be performed (but not in excess) to ensure that drainage is directed away from all structures in all directions.

Once construction activities are completed, final stabilization of the disturbed areas should begin. Within one growing season of the project completion, uniform vegetative site coverage should be equal to or greater than 70% of the pre-disturbance levels, or equivalent permanent, physical erosion reduction methods should be employed. When the site is determined to have reached the final stabilization stage, erosion control structures can be removed.

K. Works Cited

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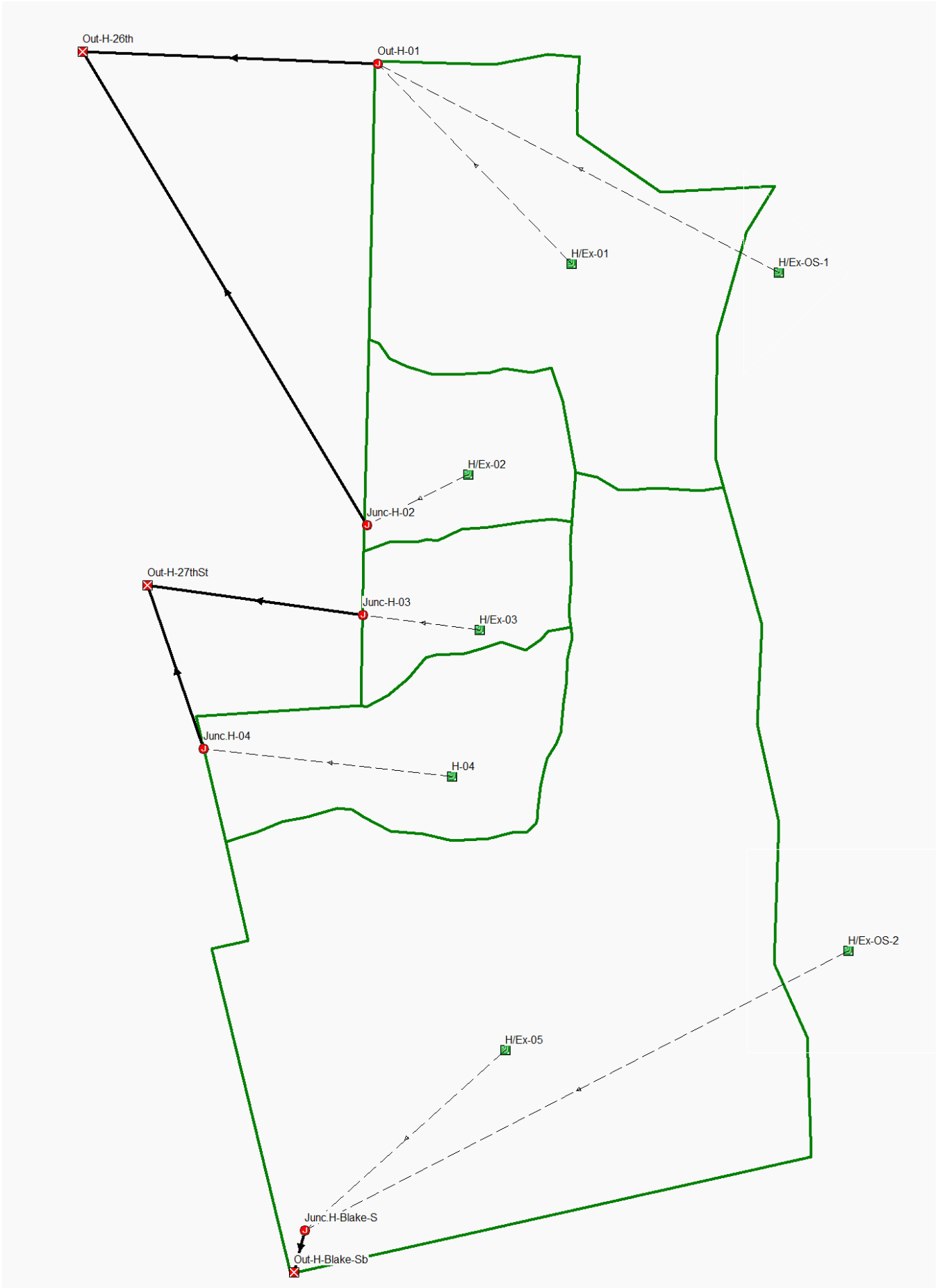
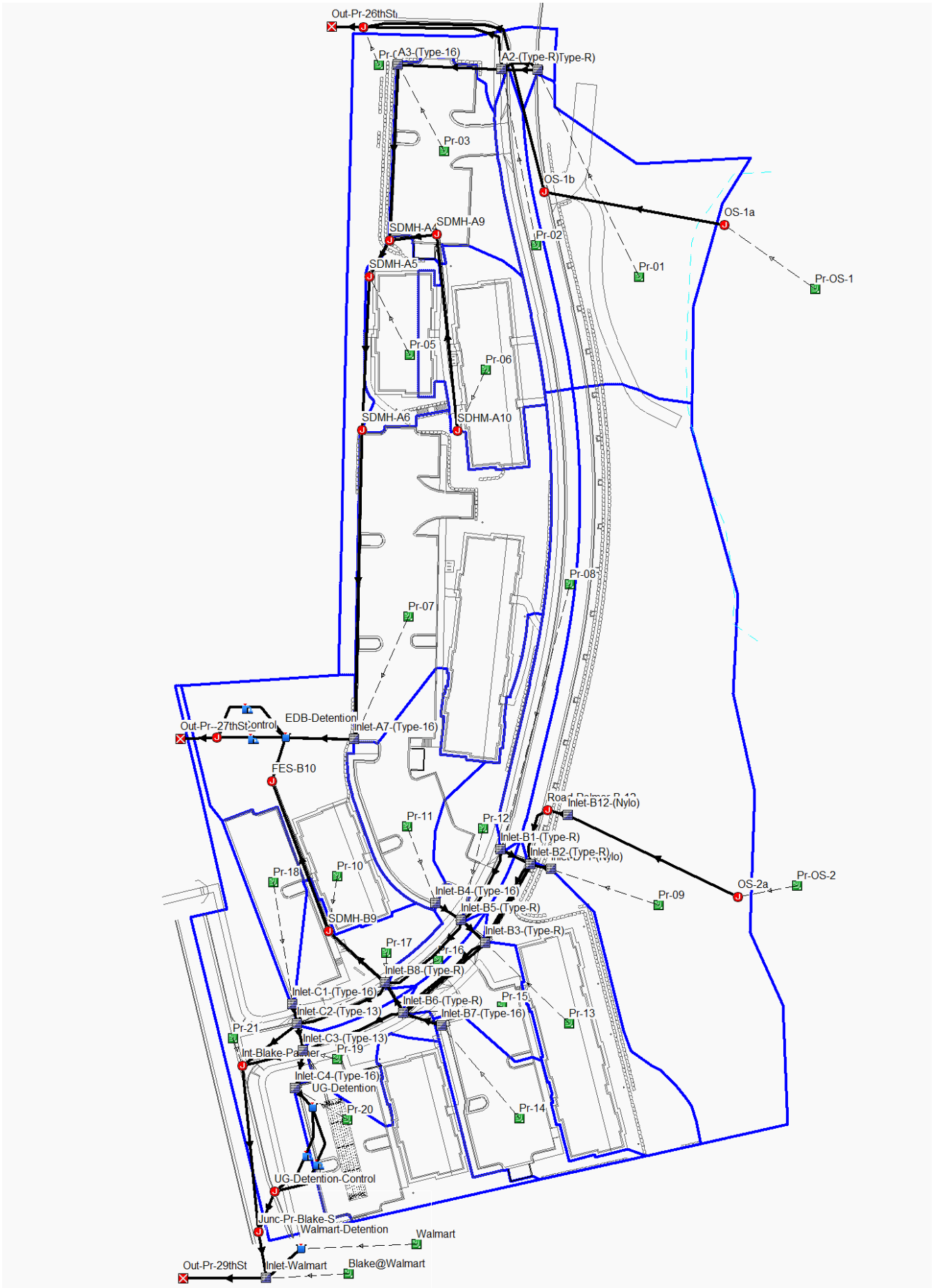
Appendix

- *Drainage Basin Summary Spreadsheet*
- *Autodesk Storm and Sanitary Sewer Analysis (SSA) datasheets*
- *MHFD Street and Inlet Hydraulics datasheets*
- *MHFD Detention Basin Design Workbook datasheets*
- *Autodesk Hydraflow Express datasheets*
- *NRCS Web Soil Survey*
- *Design Plans & Details (11”x17”)*
- *Contech Inline CDS Detail (to be confirmed)*
- *ADS Underground Detention Details & Specifications*

Drainage Basin Summary
Bell Rippy Townhouses

Basin	Area (sf)	Impervious		Soil Type B				Soil Type D		Runoff C	Tc (min.)	WQCV (EDB) (in)	V_{WQ} (cf) (d6=0.34)	Design Point V_{WQ} (cf)	Q_{25} (cfs)	Q_{100} (cfs)
				Open Space/LS		Natural Vegetation		Natural Vegetation								
		Area (sf)	%	Area (sf)	%	Area (sf)	%	Area (sf)	%							
H/Ex-01	67574	-	-	-	-	-	-	67574	100%	0.37	7.21	-	-	-	2.46	3.20
H/Ex-02	20084	-	-	-	-	-	-	20084	100%	0.37	6.51	-	-	-	0.77	0.99
H/Ex-03	15964	-	-	-	-	-	-	15964	100%	0.37	6.54	-	-	-	0.61	0.79
H/Ex-04	30586	-	-	-	-	-	-	30586	100%	0.37	7.39	-	-	-	1.10	1.43
H/Ex-05	170017	-	-	-	-	-	-	170017	100%	0.37	8.75	-	-	-	5.67	7.37
OS-1	5423220	-	-	5097827	94%	-	-	325393	6%	0.36	22.45	-	-	-	102.44	131.82
OS-2	408157	-	-	89794.58	22%	-	-	318363	78%	0.28	6.32	-	-	-	11.93	15.50
Pr-1	24815	5590	22.5%	1125	4.5%	14510	58.5%	3590	14.5%	0.48	5.00	0.126	206	-	1.38	1.79
Pr-2	5326	4301	80.8%	1025	19.2%	-	-	-	-	0.83	5.00	0.333	117	-	0.51	0.67
Pr-3	12339	9259	75.0%	3080	25.0%	-	-	-	-	0.79	5.00	0.300	244	-	0.82	1.06
Pr-4	14372	1442	10.0%	-	-	12930	90.0%	-	-	0.33	5.00	0.067	64	-	0.55	0.71
Pr-5	6391	4551	71.2%	1840	28.8%	-	-	-	-	0.77	5.00	0.281	118	-	0.57	0.74
Pr-6	12701	9241	72.8%	3460	27.2%	-	-	-	-	0.78	5.00	0.288	241	-	1.15	1.49
Pr-7	32430	23160	71.4%	9270	28.6%	-	-	-	-	0.77	5.00	0.282	602	-	2.90	3.76
Pr-8	7888	6098	77.3%	1790	22.7%	-	-	-	-	0.81	5.00	0.312	162	-	0.74	0.96
Pr-9	73048	4913	6.7%	1895	2.6%	51070	69.9%	15170	20.8%	0.38	5.00	0.047	228	-	3.22	4.18
Pr-10	18150	5040	27.8%	13110	72.2%	-	-	-	-	0.46	5.00	0.144	173	-	0.97	1.26
Pr-11	9605	8225	85.6%	1380	14.4%	-	-	-	-	0.87	5.00	0.367	232	-	0.97	1.26
Pr-12	6322	3192	50.5%	3130	49.5%	-	-	-	-	0.62	5.00	0.208	86	-	0.45	0.59
Pr-13	18045	9315	51.6%	1720	9.5%	7010	38.8%	-	-	0.67	5.00	0.211	251	-	1.40	1.82
Pr-14	8825	7585	85.9%	1240	14.1%	-	-	-	-	0.86	5.00	0.369	215	-	0.88	1.14
Pr-15	5669	4239	74.8%	1430	25.2%	-	-	-	-	0.79	5.00	0.298	111	-	0.52	0.67
Pr-16	2187	1382	63.2%	805	36.8%	-	-	-	-	0.71	5.00	0.247	36	-	0.60	0.78
Pr-17	7280	3830	52.6%	3450	47.4%	-	-	-	-	0.63	5.00	0.213	102	3187	0.16	0.21
Pr-18	4945	4815	97.4%	130	2.6%	-	-	-	-	0.95	5.00	0.471	154	-	0.55	0.71
Pr-19	4542	3562	78.4%	980	21.6%	-	-	-	-	0.82	5.00	0.319	95	-	0.43	0.56
Pr-20	13454	10464	77.8%	1495	11.1%	1495	11.1%	-	-	0.82	5.00	0.315	279	-	1.28	1.66
Pr-21	15845	6365	40.2%	9480	59.8%	-	-	-	-	0.55	5.00	0.180	188	716	1.01	1.31
Walmart	67518	67518	100.0%	-	-	-	-	-	-	0.95	10.00	-	-	-	5.45	7.08
Blake @ Walmart	1743	1743	100.0%	-	-	-	-	-	-	0.97	5.00	-	-	-	0.20	0.26


Out-H-26th
Out-H-01
H/Ex-01
H/Ex-OS-1
H/Ex-02
Junc-H-02
Out-H-27thSt
Junc-H-03
H/Ex-03
Junc.H-04
H-04
H/Ex-OS-2
H/Ex-05
Junc.H-Blake-S
Out-H-Blake-Sb


Out-Pr-26thSt
A2-(Type-R)Type-R)
Pr-03
OS-1b
OS-1a
Pr-OS-1
Pr-02
Pr-01
SDMH-A9
SDMH-A5
Pr-05
Pr-06
SDMH-A6
SDHM-A10
Pr-08
Pr-07
Out-Pr--27thSt-control
EDB-Detention
Inlet-A7-(Type-16)
FES-B10
Inlet-B12-(Nylo)
Pr-11
Pr-12
Inlet-B1-(Type-R)
Inlet-B2-(Type-R)
Pr-18
Pr-10
Pr-09
OS-2a
Pr-OS-2
Inlet-B4-(Type-16)
Inlet-B5-(Type-R)
SDMH-B9
Inlet-B3-(Type-R)
Pr-17
Pr-16
Inlet-B8-(Type-R)
Inlet-C1-(Type-16)
Inlet-B6-(Type-R)
Pr-15
Inlet-C2-(Type-13)
Inlet-B7-(Type-16)
Pr-13
Pr-21
Inlet-C3-(Type-13)
Pr-19
Pr-14
Inlet-C4-(Type-16)
UG-Detention
Pr-20
UG-Detention-Control
Junc-Pr-Blake-S
Walmart-Detention
Walmart
Out-Pr-29thSt
Inlet-Walmart
Blake@Walmart

Project Description

File Name 20002-SSA.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... Rational
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Kinematic Wave
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ..... YES

Rainfall Details

Return Period..... 25 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ft³)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Blake@Walmart	0.040	0.97	0.42	0.41	59.2	0.20	0 00:05:00
2	H/Ex-01	1.551	0.37	0.51	0.19	1064.3	2.46	0 00:07:12
3	H/Ex-02	0.461	0.37	0.49	0.18	301.3	0.77	0 00:06:30
4	H/Ex-03	0.366	0.37	0.49	0.18	238.1	0.61	0 00:06:32
5	H/Ex-05	3.903	0.37	0.58	0.21	3032.0	5.67	0 00:08:45
6	H/Ex-OS-1	124.700	0.36	0.86	0.31	139419.6	102.44	0 00:22:27
7	H/Ex-OS-2	9.370	0.28	0.48	0.13	4557.8	11.93	0 00:06:19
8	H-04	0.702	0.37	0.52	0.19	489.4	1.10	0 00:07:23
9	Pr-01	0.570	0.48	0.42	0.20	417.7	1.38	0 00:05:00
10	Pr-02	0.122	0.83	0.42	0.35	154.9	0.51	0 00:05:00
11	Pr-03	0.283	0.79	0.42	0.33	341.4	1.13	0 00:05:00
12	Pr-04	0.330	0.33	0.42	0.14	166.5	0.55	0 00:05:00
13	Pr-05	0.147	0.77	0.42	0.32	172.6	0.57	0 00:05:00
14	Pr-06	0.292	0.78	0.42	0.33	347.2	1.15	0 00:05:00
15	Pr-07	0.745	0.77	0.42	0.32	875.6	2.90	0 00:05:00
16	Pr-08	0.181	0.81	0.42	0.34	224.2	0.74	0 00:05:00
17	Pr-09	1.677	0.38	0.42	0.16	974.0	3.22	0 00:05:00
18	Pr-10	0.417	0.46	0.42	0.19	293.4	0.97	0 00:05:00
19	Pr-11	0.221	0.87	0.42	0.37	293.0	0.97	0 00:05:00
20	Pr-12	0.145	0.62	0.42	0.26	137.5	0.45	0 00:05:00
21	Pr-13	0.414	0.67	0.42	0.28	424.1	1.40	0 00:05:00
22	Pr-14	0.203	0.86	0.42	0.36	266.2	0.88	0 00:05:00
23	Pr-15	0.130	0.79	0.42	0.33	156.8	0.52	0 00:05:00
24	Pr-16	0.167	0.71	0.42	0.30	181.4	0.60	0 00:05:00
25	Pr-17	0.050	0.63	0.42	0.27	48.3	0.16	0 00:05:00
26	Pr-18	0.114	0.95	0.42	0.40	164.8	0.55	0 00:05:00
27	Pr-19	0.104	0.82	0.42	0.35	130.6	0.43	0 00:05:00
28	Pr-20	0.309	0.82	0.42	0.35	386.8	1.28	0 00:05:00
29	Pr-21	0.364	0.55	0.42	0.23	305.2	1.01	0 00:05:00
30	Pr-OS-1	124.700	0.36	0.86	0.31	139419.6	102.44	0 00:22:27
31	Pr-OS-2	9.370	0.28	0.48	0.13	4557.8	11.93	0 00:06:19
32	Walmart	1.550	0.95	0.62	0.59	3297.1	5.45	0 00:10:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ft³)	Total Time Flooded (min)
1	EDB-Control	Junction	5863.00	5866.00	5863.00	0.00	0.00	0.160	5863.10	0.00	2.90	0 00:00	0.00	0.00
2	FES-B10	Junction	5863.00	5869.00	5863.00	0.00	0.00	12.640	5864.09	0.00	4.91	0 00:00	0.00	0.00
3	Int-Blake-Palmer	Junction	5859.50	5859.50	5859.50	0.00	0.00	4.340	5859.82	0.00	0.28	0 00:00	0.00	0.00
4	Junc.H-04	Junction	5870.00	5876.00	5870.00	5876.00	0.00	1.100	5870.00	0.00	6.00	0 00:00	0.00	0.00
5	Junc.H-Blake-S	Junction	5858.00	5864.00	5858.00	5864.00	0.00	15.990	5858.00	0.00	6.00	0 00:00	0.00	0.00
6	Junc-H-02	Junction	5885.00	5891.00	5885.00	5891.00	0.00	0.770	5885.00	0.00	6.00	0 00:00	0.00	0.00
7	Junc-H-03	Junction	5888.00	5894.00	5888.00	5894.00	0.00	0.610	5888.00	0.00	6.00	0 00:00	0.00	0.00
8	Junc-Pr-Blake-S	Junction	5858.20	5858.20	5858.20	0.00	0.00	5.620	5858.70	0.00	0.75	0 00:00	0.00	0.00
9	OS-1a	Junction	5942.00	5942.00	5942.00	0.00	0.00	102.440	5942.96	0.00	0.54	0 00:00	0.00	0.00
10	OS-1b	Junction	5906.00	5906.00	5906.00	0.00	0.00	102.290	5906.96	0.00	0.54	0 00:00	0.00	0.00
11	OS-2a	Junction	5942.00	5942.00	5942.00	0.00	0.00	11.930	5942.30	0.00	0.20	0 00:00	0.00	0.00
12	Out-H-01	Junction	5875.00	5881.00	5875.00	5881.00	0.00	102.440	5875.00	0.00	6.00	0 00:00	0.00	0.00
13	Pr-26th	Junction	5876.00	5877.00	5876.00	11753.00	0.00	102.120	5876.52	0.00	0.48	0 00:00	0.00	0.00
14	Road-Palmer-B-12	Junction	5888.00	5888.00	5888.00	0.00	0.00	11.510	5888.73	0.00	0.52	0 00:00	0.00	0.00
15	SDHM-A10	Junction	5896.00	5899.00	5896.00	5899.00	0.00	1.150	5896.37	0.00	2.63	0 00:00	0.00	0.00
16	SDMH-A4	Junction	5889.50	5899.80	5889.50	5899.80	0.00	3.660	5894.15	0.00	5.65	0 00:00	0.00	0.00
17	SDMH-A5	Junction	5888.90	5893.65	5888.90	5893.65	0.00	4.160	5889.55	0.00	4.10	0 00:00	0.00	0.00
18	SDMH-A6	Junction	5886.30	5890.77	5886.30	5890.77	0.00	4.150	5887.15	0.00	3.63	0 00:00	0.00	0.00
19	SDMH-A9	Junction	5894.20	5900.19	5894.20	5900.19	0.00	1.110	5894.76	0.00	5.43	0 00:00	0.00	0.00
20	SDMH-B9	Junction	5864.00	5867.21	5864.00	5867.21	0.00	12.700	5865.09	0.00	2.12	0 00:00	0.00	0.00
21	UG-Detention-Control	Junction	5858.30	5858.30	5858.30	0.00	0.00	1.650	5858.80	0.00	1.50	0 00:00	0.00	0.00
22	Out-H-26th	Outfall	5841.00					102.440	5841.00					
23	Out-H-27thSt	Outfall	5858.00					1.630	5858.00					
24	Out-H-Blake-Sb	Outfall	5858.00					15.990	5858.00					
25	Out-Pr-26thSt	Outfall	5875.00					102.120	5875.00					
26	Out-Pr--27thSt	Outfall	5862.00					0.160	5862.10					
27	Out-Pr-29thSt	Outfall	5850.80					5.860	5852.30					
28	EDB-Detention	Storage Node	5863.00	5869.00	5863.00		0.00	19.080	5865.00				0.00	0.00
29	UG-Detention	Storage Node	5858.40	5861.40	5858.40		0.00	4.370	5859.96				0.00	0.00
30	Walmart-Detention	Storage Node	5852.00	5855.00	5852.00		0.00	5.450	5854.02				0.00	0.00

Replace w/ the MHFD Detention Basin Design Workbook value for an EDB outflow control (0.28 cfs)

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)
1	26thSt	Pipe	Pr-26th	Out-Pr-26thSt	25.49	5876.00	5875.00	3.9200	0.000	0.0120	102.120	0.00	0.00	0.00	0.00	0.00	0.00
2	Link-B10	Pipe	FES-B10	EDB-Detention	35.65	5863.00	5863.00	0.0000	0.000	0.0120	12.640	0.00	0.05	0.00	0.24	0.41	0.00
3	Link-H-01	Pipe	Out-H-01	Out-H-26th	230.30	5875.00	5841.00	14.7600	0.000	0.0120	102.440	0.00	0.13	0.00	0.31	0.52	0.00
4	Link-H-02	Pipe	Junc-H-02	Out-H-26th	177.03	5885.00	5841.00	24.8500	0.000	0.0120	0.770	0.00	0.13	0.00	0.31	0.52	0.00
5	Link-H-03	Pipe	Junc-H-03	Out-H-27thSt	169.29	5888.00	5858.00	17.7200	0.000	0.0120	0.610	0.00	0.13	0.00	0.31	0.52	0.00
6	Link-H-04	Pipe	Junc.H-04	Out-H-27thSt	134.40	5870.00	5858.00	8.9300	0.000	0.0120	1.100	0.00	0.13	0.00	0.31	0.52	0.00
7	Link-H-Blake-S	Pipe	Junc.H-Blake-S	Out-H-Blake-Sb	33.46	5858.00	5858.00	0.0000	0.000	0.0120	15.990	0.00	0.13	0.00	0.31	0.52	0.00
8	Pipe-29thSt	Pipe	Inlet-Walmart	Out-Pr-29thSt	265.00	5851.40	5850.80	0.2300	18.000	0.0120	5.860	5.41	1.08	3.85	1.41	0.94	0.00
9	Pipe-A1	Pipe	A1-(Type-R)	A2-(Type-R)	24.33	5892.50	5892.20	1.2300	12.000	0.0120	0.860	4.29	0.20	4.98	0.30	0.30	0.00
10	Pipe-A10	Pipe	SDHM-A10	SDMH-A9	153.02	5896.00	5894.40	1.0500	12.000	0.0120	1.110	3.95	0.28	7.14	0.36	0.36	0.00
11	Pipe-A2	Pipe	A2-(Type-R)	A3-(Type-16)	80.85	5892.00	5891.20	0.9900	12.000	0.0120	1.540	3.84	0.40	4.64	0.44	0.44	0.00
12	Pipe-A3	Pipe	A3-(Type-16)	SDMH-A4	133.17	5891.00	5889.70	0.9800	12.000	0.0120	2.570	3.81	0.67	5.26	0.60	0.60	0.00
13	Pipe-A4	Pipe	SDMH-A4	SDMH-A5	29.56	5889.50	5888.90	2.0300	15.000	0.0120	3.660	9.97	0.37	7.50	0.52	0.42	0.00
14	Pipe-A5	Pipe	SDMH-A5	SDMH-A6	117.00	5888.90	5886.50	2.0500	12.000	0.0120	4.150	5.53	0.75	7.77	0.65	0.65	0.00
15	Pipe-A6	Pipe	SDMH-A6	Inlet-A7-(Type-16)	240.10	5886.30	5879.80	2.7100	12.000	0.0120	4.110	6.35	0.65	8.72	0.58	0.58	0.00
16	Pipe-A7	Pipe	Inlet-A7-(Type-16)	EDB-Detention	54.21	5876.80	5863.00	25.4600	12.000	0.0120	6.480	19.47	0.33	22.29	0.40	0.40	0.00
17	Pipe-A9	Pipe	SDMH-A9	SDMH-A4	34.80	5894.20	5893.80	1.1500	12.000	0.0120	1.110	4.14	0.27	4.47	0.35	0.35	0.00
18	Pipe-B1	Pipe	Inlet-B1-(Type-R)	Inlet-B2-(Type-R)	24.33	5879.60	5879.30	1.2300	12.000	0.0120	0.570	4.29	0.13	4.34	0.25	0.25	0.00
19	Pipe-B11	Pipe	Inlet-B11-(Nylo)	Inlet-B2-(Type-R)	15.00	5883.00	5880.00	20.0000	15.000	0.0120	3.200	32.82	0.10	16.99	0.26	0.21	0.00
20	Pipe-B12	Pipe	Inlet-B12-(Nylo)	Road-Palmer-B-12	15.00	5889.00	5888.00	6.6700	15.000	0.0120	11.510	18.07	0.64	15.59	0.72	0.58	0.00
21	Pipe-B2	Pipe	Inlet-B2-(Type-R)	Inlet-B3-(Type-R)	65.73	5879.10	5872.80	9.5800	15.000	0.0120	5.810	21.67	0.27	14.97	0.44	0.35	0.00
22	Pipe-B3	Pipe	Inlet-B3-(Type-R)	Inlet-B6-(Type-R)	82.21	5872.60	5864.70	9.6100	15.000	0.0120	9.110	21.69	0.42	16.91	0.57	0.45	0.00
23	Pipe-B4	Pipe	Inlet-B4-(Type-16)	Inlet-B5-(Type-R)	20.78	5876.90	5873.30	17.3300	8.000	0.0120	0.880	5.45	0.16	11.47	0.18	0.27	0.00
24	Pipe-B5	Pipe	Inlet-B5-(Type-R)	Inlet-B3-(Type-R)	24.33	5873.10	5872.80	1.2300	12.000	0.0120	1.370	4.29	0.32	4.85	0.39	0.39	0.00
25	Pipe-B6	Pipe	Inlet-B6-(Type-R)	Inlet-B8-(Type-R)	24.34	5864.70	5864.50	0.8200	24.000	0.0120	11.730	22.21	0.53	7.17	1.03	0.52	0.00
26	Pipe-B7	Pipe	Inlet-B7-(Type-16)	Inlet-B6-(Type-R)	29.28	5870.20	5864.70	18.7800	8.000	0.0120	0.870	5.67	0.15	11.78	0.18	0.26	0.00
27	Pipe-B8	Pipe	Inlet-B8-(Type-R)	SDMH-B9	57.48	5864.50	5864.00	0.8700	24.000	0.0120	11.810	22.86	0.52	7.34	1.02	0.51	0.00
28	Pipe-B9	Pipe	SDMH-B9	FES-B10	125.34	5864.00	5863.00	0.8000	24.000	0.0120	12.640	21.89	0.58	7.24	1.09	0.55	0.00
29	Pipe-C1	Pipe	Inlet-C1-(Type-16)	Inlet-C2-(Type-13)	14.31	5859.60	5859.20	2.8000	8.000	0.0120	0.440	2.19	0.20	4.91	0.20	0.30	0.00
30	Pipe-C2	Pipe	Inlet-C2-(Type-13)	Inlet-C3-(Type-13)	19.75	5859.00	5858.80	1.0100	8.000	0.0120	1.120	1.32	0.85	4.24	0.47	0.71	0.00
31	Pipe-C3	Pipe	Inlet-C3-(Type-13)	Inlet-C4-(Type-16)	27.52	5858.80	5858.50	1.0900	15.000	0.0120	3.320	7.31	0.45	5.81	0.59	0.47	0.00
32	Pipe-C4	Pipe	Inlet-C4-(Type-16)	UG-Detention	20.00	5858.50	5858.40	0.5000	18.000	0.0120	4.370	8.05	0.54	4.65	0.79	0.52	0.00
33	Pipe-EDB-Control	Pipe	EDB-Control	Out-Pr--27thSt	28.55	5863.00	5862.00	3.5000	15.000	0.0120	0.160	13.10	0.01	3.66	0.10	0.08	0.00
34	Pipe-UG-Control	Pipe	UG-Detention-Control	Junc-Pr-Blake-S	20.00	5858.30	5858.20	0.5000	15.000	0.0120	1.650	4.95	0.33	3.62	0.50	0.40	0.00
35	Bypass-A1	Channel	A1-(Type-R)	A2-(Type-R)	31.56	5896.57	5896.57	0.0100	7.200	0.0160	0.480	19.28	0.02	1.79	0.20	0.34	0.00
36	Bypass-A2	Channel	A2-(Type-R)	Pr-26th	140.00	5896.57	5876.00	14.6900	12.000	0.0160	0.250	565.61	0.00	3.97	0.07	0.07	0.00
37	Bypass-B1	Channel	Inlet-B1-(Type-R)	Inlet-B5-(Type-R)	64.47	5883.39	5876.84	10.1700	7.200	0.0160	0.160	68.98	0.00	6.05	0.09	0.14	0.00
38	Bypass-B2	Channel	Inlet-B2-(Type-R)	Inlet-B3-(Type-R)	71.42	5883.39	5876.84	9.1800	7.200	0.0160	9.170	65.53	0.14	6.88	0.33	0.55	0.00
39	Bypass-B3	Channel	Inlet-B3-(Type-R)	Inlet-B6-(Type-R)	85.00	5876.84	5868.74	9.5300	7.200	0.0160	7.820	66.77	0.12	6.74	0.31	0.52	0.00
40	Bypass-B5	Channel	Inlet-B5-(Type-R)	Inlet-B8-(Type-R)	80.66	5876.84	5868.74	10.0300	7.200	0.0160	0.100	68.52	0.00	3.20	0.07	0.12	0.00
41	Bypass-B6	Channel	Inlet-B6-(Type-R)	Inlet-C3-(Type-13)	84.14	5868.74	5861.29	8.8600	7.200	0.0160	6.110	64.40	0.09	6.18	0.29	0.49	0.00
42	Bypass-B8	Channel	Inlet-B8-(Type-R)	Inlet-C2-(Type-13)	78.55	5868.74	5861.29	9.4900	7.200	0.0160	0.010	66.65	0.00	1.63	0.03	0.06	0.00
43	Bypass-C1	Channel	Inlet-C1-(Type-16)	Inlet-C2-(Type-13)	18.27	5862.19	5861.29	4.9300	7.200	0.0160	0.100	95.74	0.00	3.96	0.06	0.11	0.00
44	Bypass-C2	Channel	Inlet-C2-(Type-13)	Int-Blake-Palmer	51.37	5861.29	5859.50	3.4800	7.200	0.0160	0.170	80.42	0.00	2.08	0.08	0.14	0.00
45	Bypass-C3	Channel	Inlet-C3-(Type-13)	Int-Blake-Palmer	58.47	5861.29	5859.50	3.0600	7.200	0.0160	3.760	75.38	0.05	3.15	0.24	0.41	0.00
46	Link-Blake-S	Channel	Int-Blake-Palmer	Junc-Pr-Blake-S	230.46	5859.50	5858.20	0.5600	7.200	0.0160	4.100	32.38	0.13	4.25	0.31	0.52	0.00
47	Out-Pr-Blake	Channel	Junc-Pr-Blake-S	Inlet-Walmart	200.00	5858.20	5856.00	1.1000	7.200	0.0160	5.450	45.21	0.12	2.44	0.31	0.52	0.00
48	Road-B12	Channel	Road-Palmer-B-12	Inlet-B2-(Type-R)	48.58	5888.00	5883.39	9.4800	7.200	0.0160	11.500	132.73	0.09	6.23	0.28	0.48	0.00
49	Road-OS-1b	Channel	OS-1b	Pr-26th	240.00	5906.00	5876.00	12.5000	12.000	0.0160	102.120	521.70	0.20	14.29	0.52	0.52	0.00
50	Swale-OS-1a	Channel	OS-1a	OS-1b	143.20	5942.00	5804.00	96.3700	18.000	0.0300	102.290	260.63	0.39	18.12	0.96	0.64	0.00
51	Swale-OS-2	Channel	OS-2a	Inlet-B12-(Nylo)	146.88	5942.00	5889.00	36.0800	6.000	0.0300	11.820	30.08	0.39	10.14	0.30	0.60	0.00
52	Orifice-EDB-WQCV	Orifice	EDB-Detention	EDB-Control		5863.00	5863.00		1.250		0.060						
53	Walmart-Det-Control	Orifice	Walmart-Detention	Inlet-Walmart		5852.00	5851.40		5.600		1.130						
54	Weir-EDB-100	Weir	EDB-Detention	EDB-Control		5863.00	5863.00				0.000						
55	Weir-EDB-25	Weir	EDB-Detention	EDB-Control		5863.00	5863.00				0.100						
56	Weir-UG-100	Weir	UG-Detention	UG-Detention-Control		5858.40	5858.30				0.050						
57	Weir-UG-25	Weir	UG-Detention	UG-Detention-Control		5858.40	5858.30				1.590						

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Inlet Summary

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	A1-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5892.50	5896.57	5892.50	N/A	1.380	0.86	0.52	62.58	7.00	3.96	5896.75
2	A2-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5892.00	5896.57	5892.00	N/A	0.950	0.69	0.26	72.66	7.00	3.01	5896.72
3	A3-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5891.00	5896.76	5891.00	100.00	1.130	N/A	N/A	N/A	7.00	7.38	5897.15
4	Inlet-A7-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5876.80	5883.87	5876.80	100.00	2.890	N/A	N/A	N/A	7.00	15.58	5884.42
5	Inlet-B1-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5879.60	5883.39	5879.60	N/A	0.740	0.58	0.17	77.71	7.00	2.30	5883.53
6	Inlet-B11-(Nylo)	CALTRANS	GCP	On Sag	1	5883.30	5899.00	5883.30	36.00	3.220	N/A	N/A	N/A	7.00	18.39	5899.63
7	Inlet-B12-(Nylo)	CALTRANS	GCP	On Sag	1	5889.00	5901.00	5889.00	36.00	11.820	N/A	N/A	N/A	7.00	152.55	5905.09
8	Inlet-B2-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5879.10	5883.39	5879.10	N/A	11.500	2.32	9.18	20.19	7.00	11.23	5883.71
9	Inlet-B3-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5872.60	5876.84	5872.60	N/A	10.030	2.19	7.84	21.85	7.00	10.61	5877.15
10	Inlet-B4-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5876.90	5880.96	5876.90	100.00	0.970	N/A	N/A	N/A	7.00	6.52	5881.30
11	Inlet-B5-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5873.10	5876.84	5873.10	N/A	0.610	0.50	0.10	82.76	7.00	1.84	5876.97
12	Inlet-B6-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5864.70	5868.74	5864.70	N/A	8.130	2.00	6.13	24.66	7.00	9.71	5869.03
13	Inlet-B7-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5870.20	5874.26	5870.20	0.00	0.880	N/A	N/A	N/A	7.00	5.92	5874.59
14	Inlet-B8-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5864.50	5868.74	5864.50	N/A	0.100	0.09	0.01	88.56	7.00	0.30	5868.77
15	Inlet-C1-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5859.60	5862.19	5859.60	N/A	0.540	0.44	0.10	81.17	7.00	4.32	5862.36
16	Inlet-C2-(Type-13)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5859.00	5861.29	5859.00	N/A	0.860	0.68	0.18	78.89	7.00	5.60	5861.48
17	Inlet-C3-(Type-13)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5858.50	5861.29	5858.50	N/A	6.350	2.58	3.77	40.60	7.00	13.94	5861.65
18	Inlet-C4-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5853.50	5862.46	5853.50	0.00	1.280	N/A	N/A	N/A	7.00	8.14	5862.87
19	Inlet-Walmart	FHWA HEC-22 GENERIC	N/A	On Sag	1	5851.40	5856.00	5851.40	100.00	5.460	N/A	N/A	N/A	7.00	15.32	5856.57

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Subbasin Hydrology

Subbasin : Blake@Walmart

Input Data

Area (ac) 0.04
Weighted Runoff Coefficient 0.9700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.04	B (6%+)	0.97
Composite Area & Weighted Runoff Coeff.	0.04		0.97

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

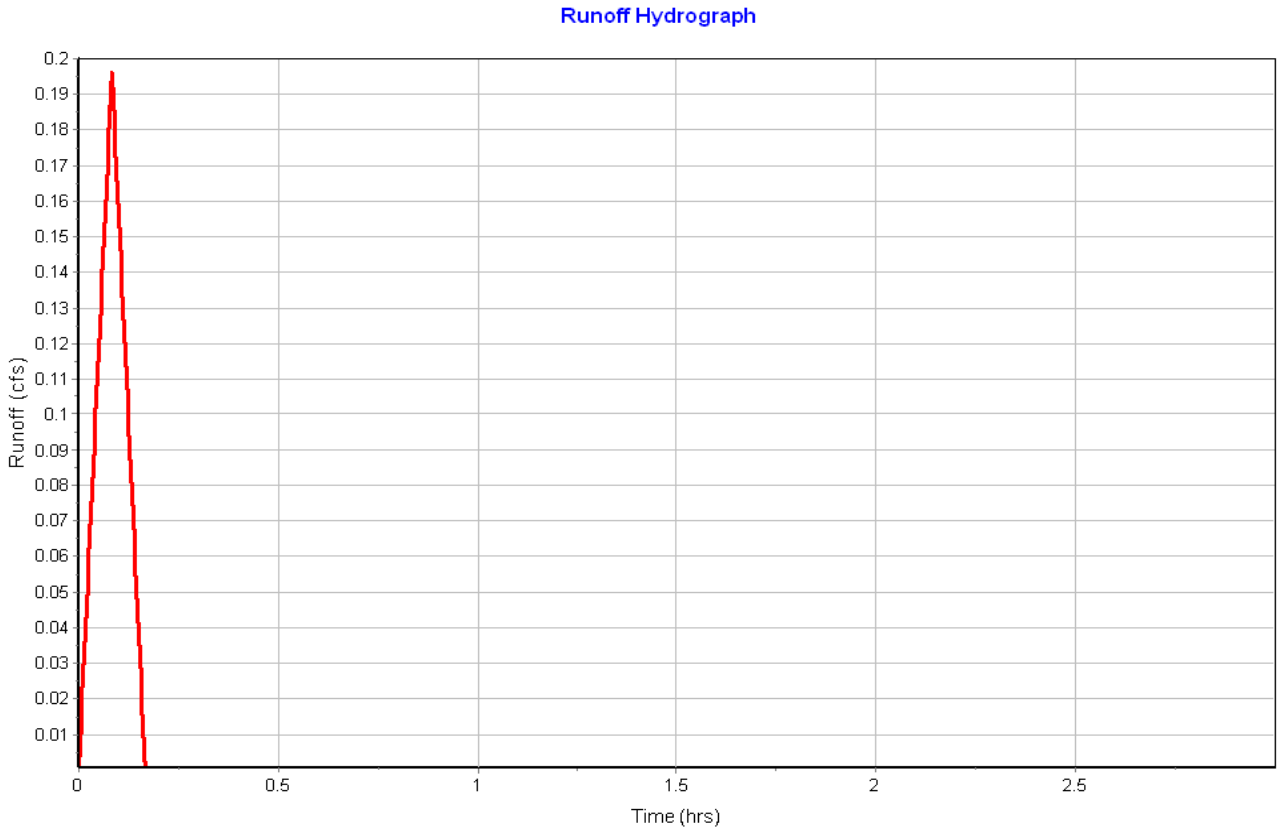
Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.41
Peak Runoff (cfs) 0.20
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.9700
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Blake@Walmart



Subbasin : H/Ex-01

Input Data

Area (ac) 1.55
Weighted Runoff Coefficient 0.3700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	1.55	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	1.55		0.37

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	23	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.29	0.00	0.00
Computed Flow Time (min) :	5.74	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	440	0.00	0.00
Slope (%) :	9.6	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	5.00	0.00	0.00
Computed Flow Time (min) :	1.47	0.00	0.00

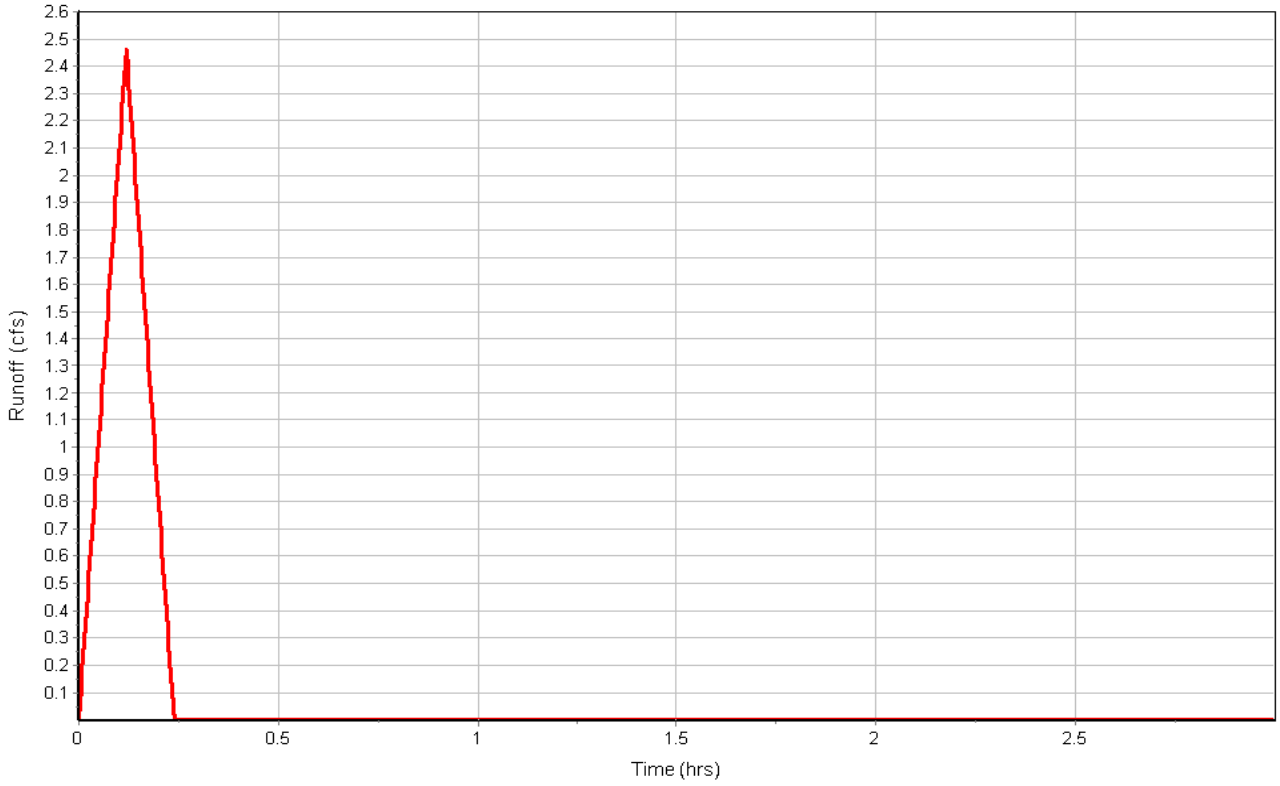
Total TOC (min) 7.21

Subbasin Runoff Results

Total Rainfall (in) 0.51
Total Runoff (in) 0.19
Peak Runoff (cfs) 2.46
Rainfall Intensity 4.285
Weighted Runoff Coefficient 0.3700
Time of Concentration (days hh:mm:ss) 0 00:07:13

Subbasin : H/Ex-01

Runoff Hydrograph



Subbasin : H/Ex-02

Input Data

Area (ac) 0.46
Weighted Runoff Coefficient 0.3700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	0.46	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	0.46		0.37

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	19	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.27	0.00	0.00
Computed Flow Time (min) :	6.20	0.00	0.00

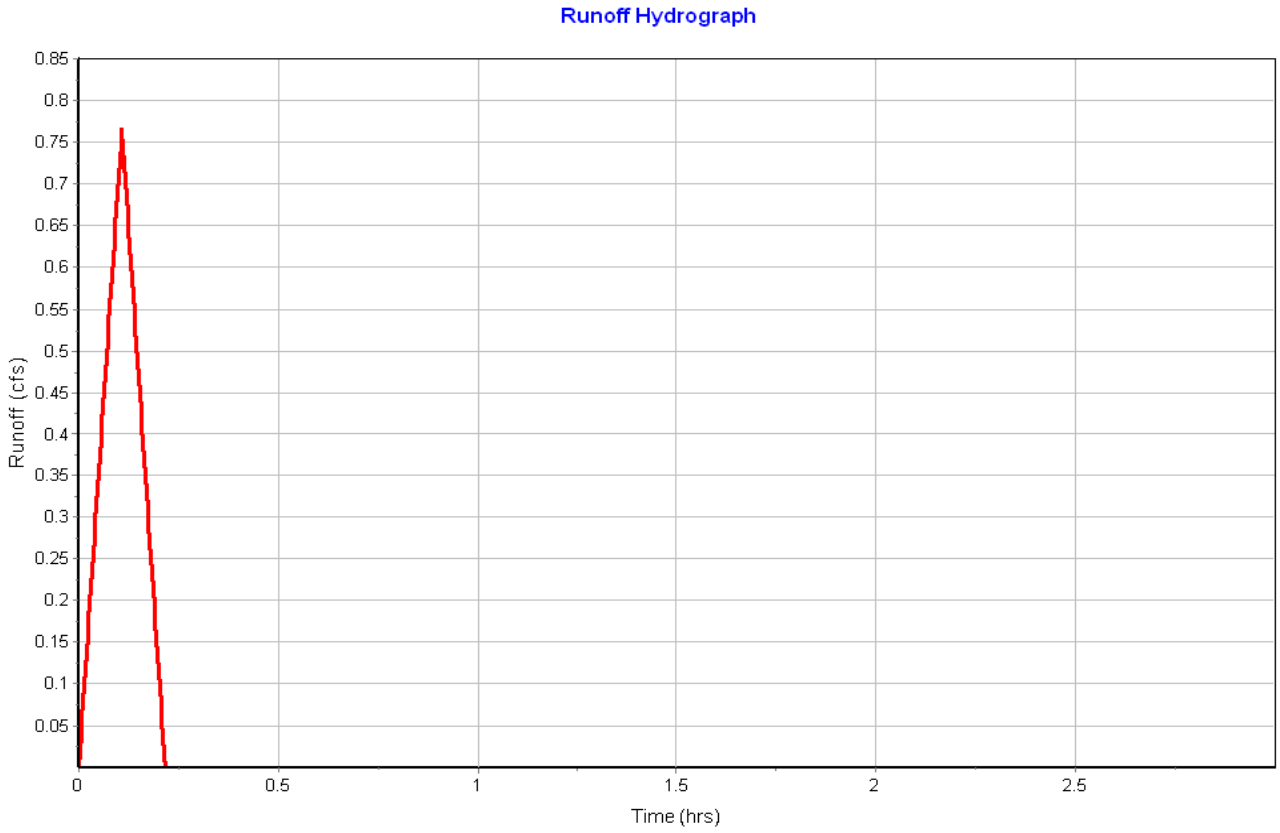
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	75	0.00	0.00
Slope (%) :	16	0.00	0.00
Surface Type :	Bare & untilled	Unpaved	Unpaved
Velocity (ft/sec) :	4.00	0.00	0.00
Computed Flow Time (min) :	0.31	0.00	0.00

Total TOC (min) 6.51

Subbasin Runoff Results

Total Rainfall (in) 0.49
Total Runoff (in) 0.18
Peak Runoff (cfs) 0.77
Rainfall Intensity 4.486
Weighted Runoff Coefficient 0.3700
Time of Concentration (days hh:mm:ss) 0 00:06:31

Subbasin : H/Ex-02



Subbasin : H/Ex-03

Input Data

Area (ac) 0.37
Weighted Runoff Coefficient 0.3700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	0.37	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	0.37		0.37

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	19	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.27	0.00	0.00
Computed Flow Time (min) :	6.20	0.00	0.00

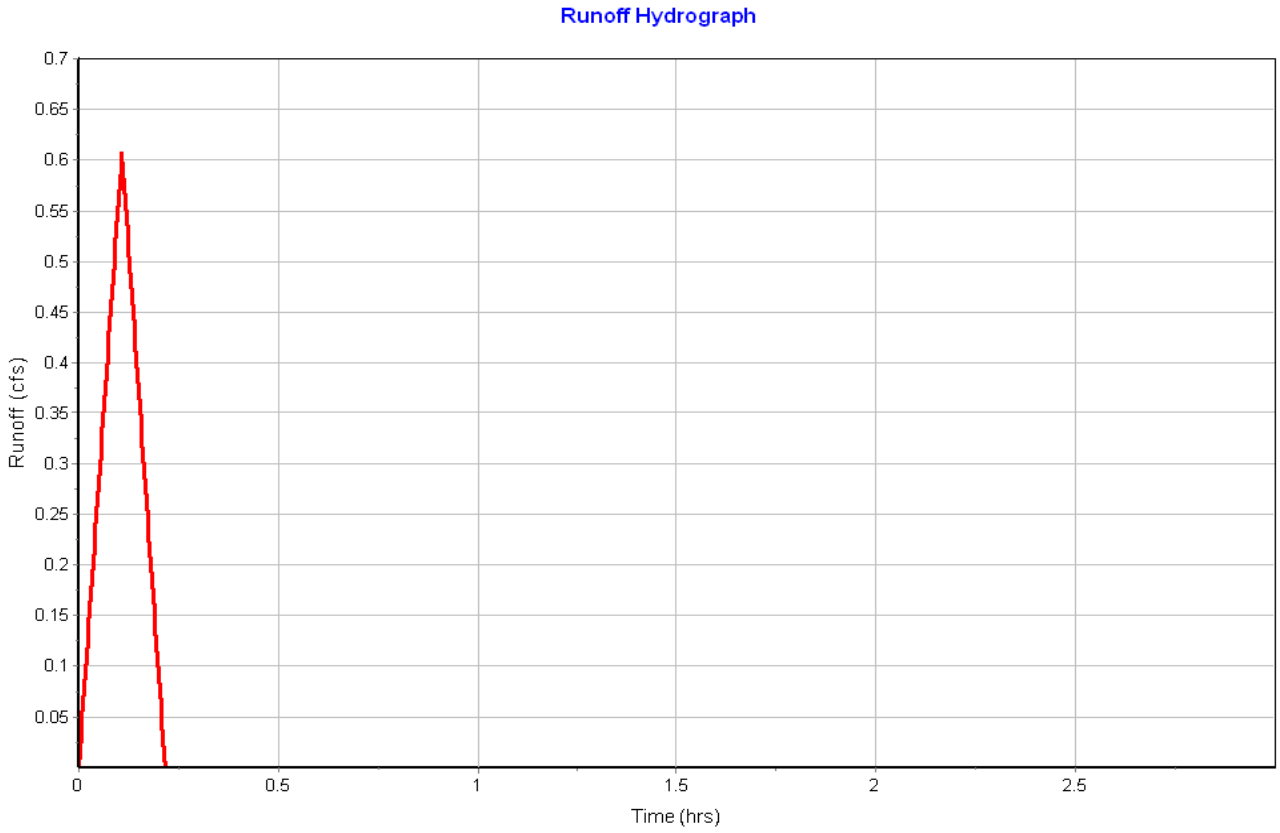
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	70	0.00	0.00
Slope (%) :	11.5	0.00	0.00
Surface Type :	Bare & untilled	Unpaved	Unpaved
Velocity (ft/sec) :	3.39	0.00	0.00
Computed Flow Time (min) :	0.34	0.00	0.00

Total TOC (min) 6.54

Subbasin Runoff Results

Total Rainfall (in) 0.49
Total Runoff (in) 0.18
Peak Runoff (cfs) 0.61
Rainfall Intensity 4.477
Weighted Runoff Coefficient 0.3700
Time of Concentration (days hh:mm:ss) 0 00:06:32

Subbasin : H/Ex-03



Subbasin : H/Ex-05

Input Data

Area (ac) 3.90
Weighted Runoff Coefficient 0.3700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	3.90	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	3.90		0.37

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	23	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.29	0.00	0.00
Computed Flow Time (min) :	5.74	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	560	140	0.00
Slope (%) :	10	1.5	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	5.10	1.98	0.00
Computed Flow Time (min) :	1.83	1.18	0.00

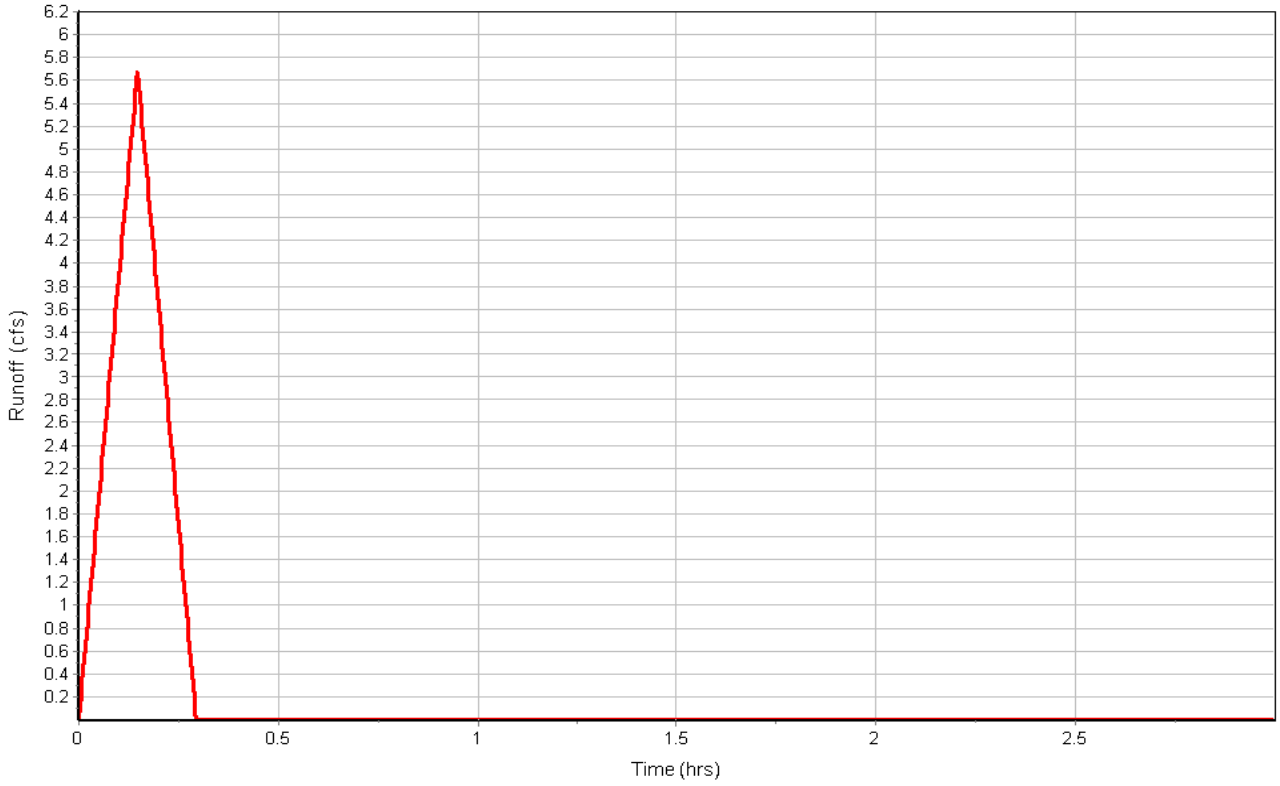
Total TOC (min) 8.75

Subbasin Runoff Results

Total Rainfall (in) 0.58
Total Runoff (in) 0.21
Peak Runoff (cfs) 5.67
Rainfall Intensity 3.928
Weighted Runoff Coefficient 0.3700
Time of Concentration (days hh:mm:ss) 0 00:08:45

Subbasin : H/Ex-05

Runoff Hydrograph



Subbasin : H/Ex-OS-1

Input Data

Area (ac) 124.70
Weighted Runoff Coefficient 0.3600

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	117.22	B (6%+)	0.37
Forest, 25 years or greater	7.48	D (6%+)	0.25
Composite Area & Weighted Runoff Coeff.	124.70		0.36

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	10	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.21	0.00	0.00
Computed Flow Time (min) :	8.01	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	3200	0.00	0.00
Slope (%) :	15	0.00	0.00
Surface Type :	Bare & untilled	Unpaved	Unpaved
Velocity (ft/sec) :	3.87	0.00	0.00
Computed Flow Time (min) :	13.78	0.00	0.00

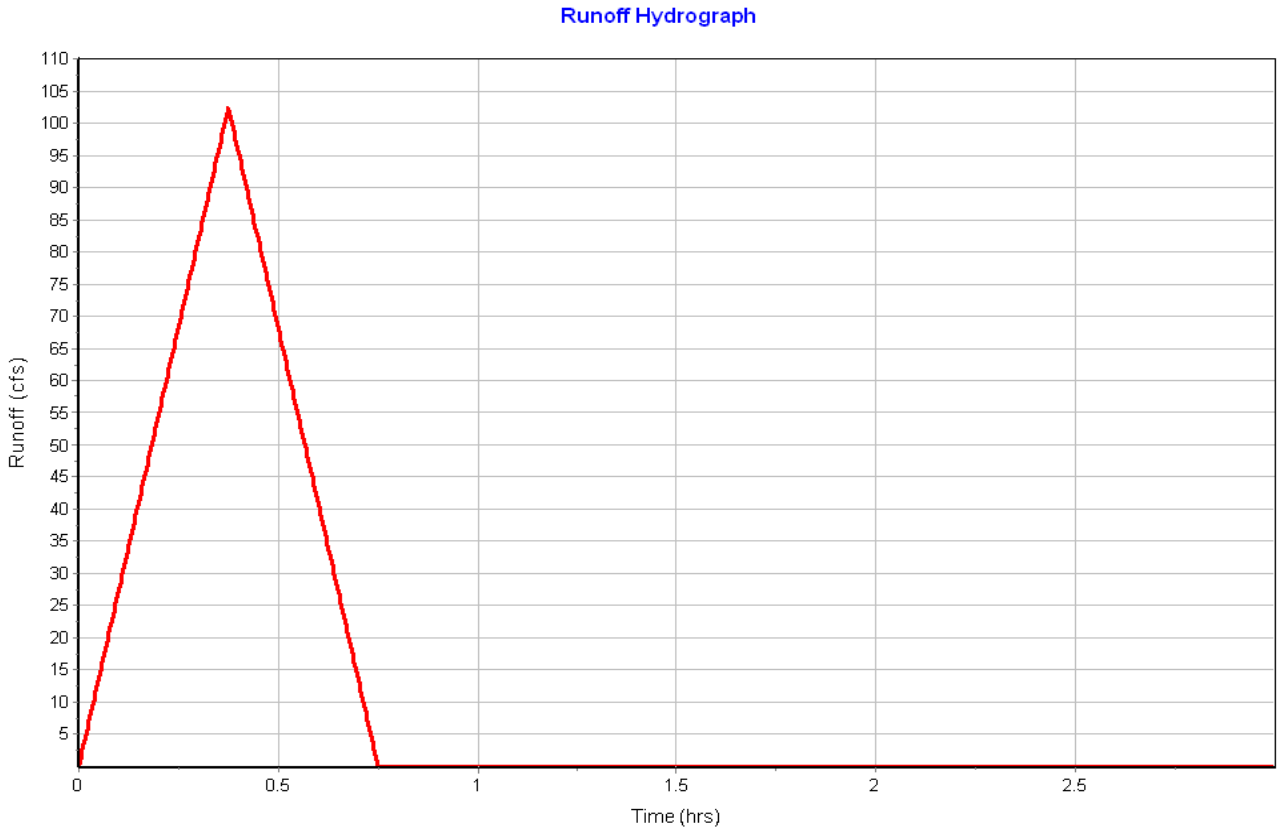
Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.030	0.00	0.00
Flow Length (ft) :	2200	0.00	0.00
Channel Slope (%) :	33	0.00	0.00
Cross Section Area (ft^2) :	62.5	0.00	0.00
Wetted Perimeter (ft) :	23	0.00	0.00
Velocity (ft/sec) :	55.56	0.00	0.00
Computed Flow Time (min) :	0.66	0.00	0.00

Total TOC (min) 22.45

Subbasin Runoff Results

Total Rainfall (in) 0.86
Total Runoff (in) 0.31
Peak Runoff (cfs) 102.44
Rainfall Intensity 2.282
Weighted Runoff Coefficient 0.3600
Time of Concentration (days hh:mm:ss) 0 00:22:27

Subbasin : H/Ex-OS-1



Subbasin : H/Ex-OS-2

Input Data

Area (ac) 9.37
Weighted Runoff Coefficient 0.2800

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	2.06	B (6%+)	0.37
Forest, 25 years or greater	7.31	D (6%+)	0.25
Composite Area & Weighted Runoff Coeff.	9.37		0.28

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	45	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.38	0.00	0.00
Computed Flow Time (min) :	4.39	0.00	0.00

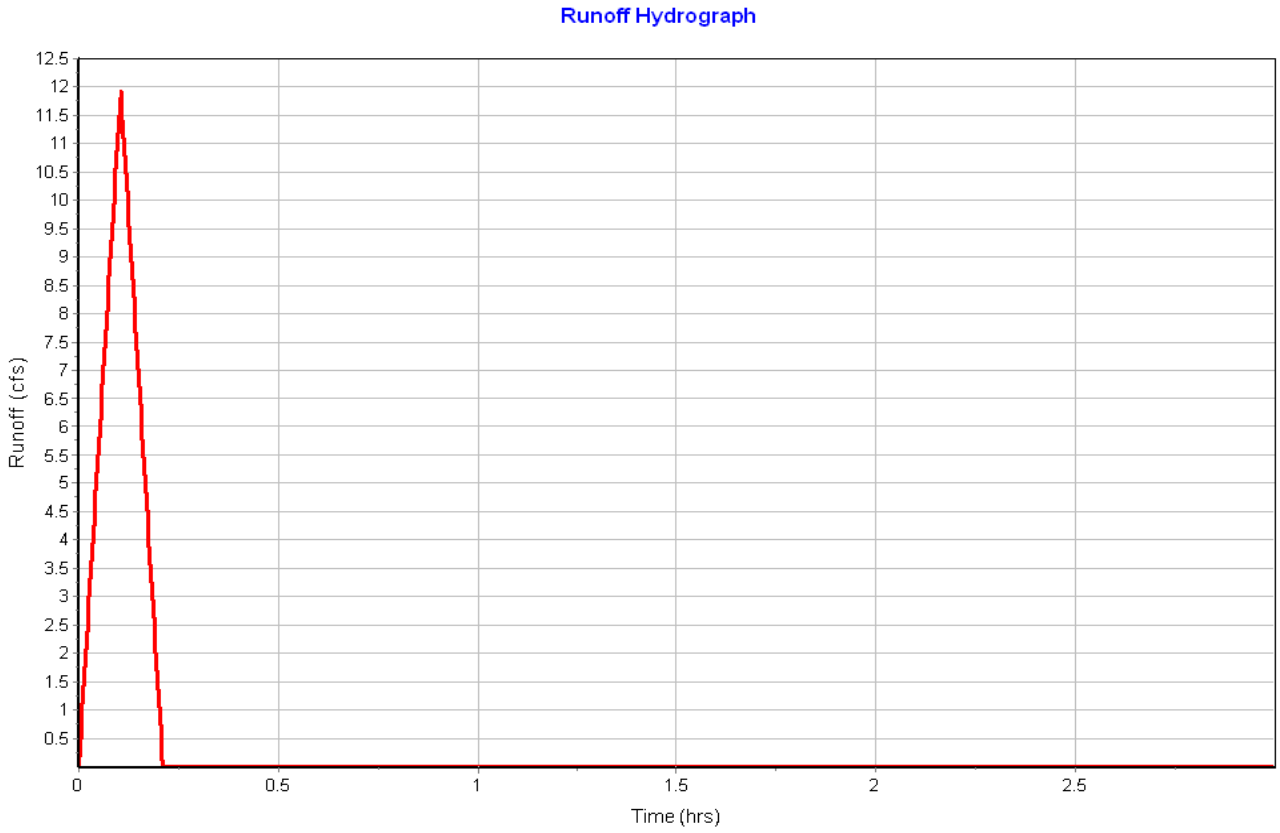
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	1360	0.00	0.00
Slope (%) :	53	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	11.75	0.00	0.00
Computed Flow Time (min) :	1.93	0.00	0.00

Total TOC (min) 6.32

Subbasin Runoff Results

Total Rainfall (in) 0.48
Total Runoff (in) 0.13
Peak Runoff (cfs) 11.93
Rainfall Intensity 4.546
Weighted Runoff Coefficient 0.2800
Time of Concentration (days hh:mm:ss) 0 00:06:19

Subbasin : H/Ex-OS-2



Subbasin : H-04

Input Data

Area (ac) 0.70
Weighted Runoff Coefficient 0.3700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	0.70	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	0.70		0.37

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	19	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.27	0.00	0.00
Computed Flow Time (min) :	6.20	0.00	0.00

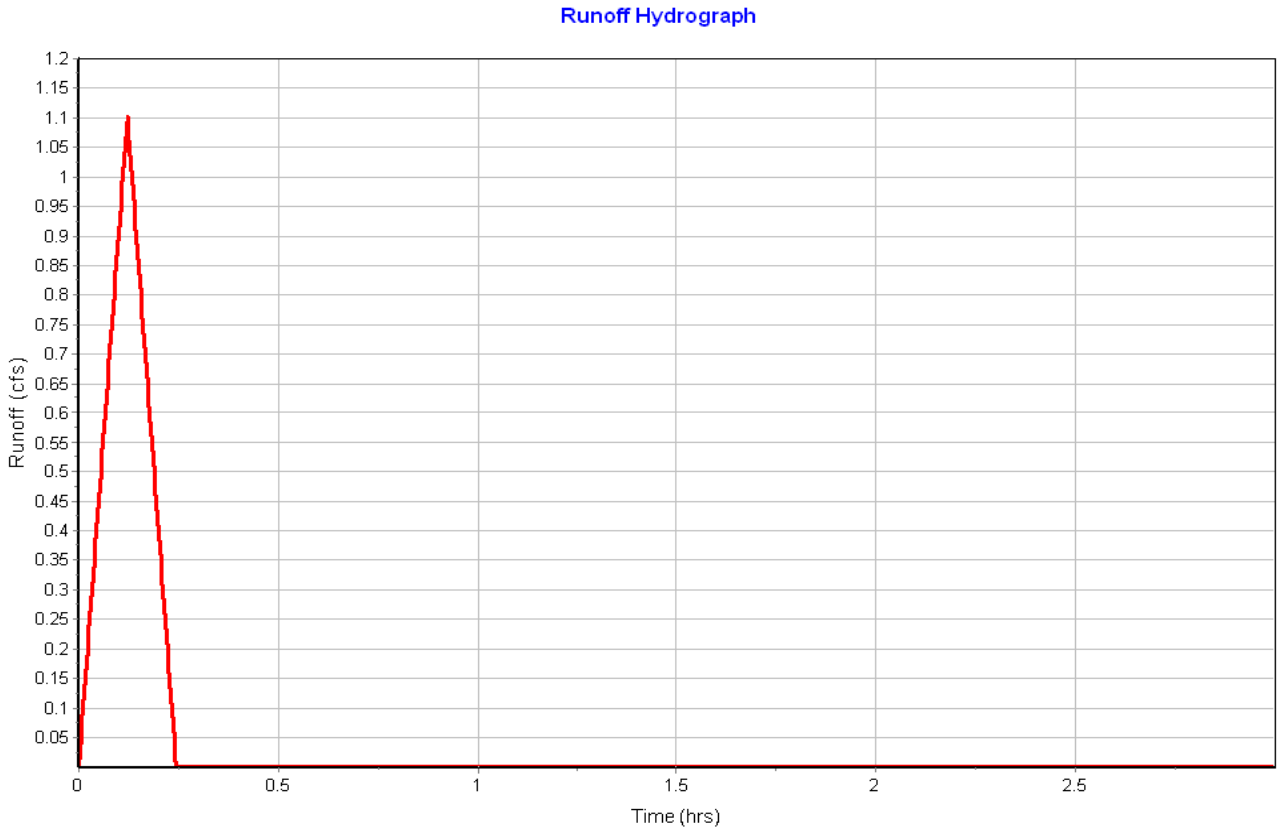
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	140	110	0.00
Slope (%) :	15	3.7	0.00
Surface Type :	Bare & untilled	Unpaved	Unpaved
Velocity (ft/sec) :	3.87	3.10	0.00
Computed Flow Time (min) :	0.60	0.59	0.00

Total TOC (min) 7.39

Subbasin Runoff Results

Total Rainfall (in) 0.52
Total Runoff (in) 0.19
Peak Runoff (cfs) 1.10
Rainfall Intensity 4.238
Weighted Runoff Coefficient 0.3700
Time of Concentration (days hh:mm:ss) 0 00:07:23

Subbasin : H-04



Subbasin : Pr-01

Input Data

Area (ac) 0.57
Weighted Runoff Coefficient 0.4800

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.13	B (6%+)	0.97
Open Space, 25 years or greater	0.03	B (6%+)	0.26
Meadow, 25 years or greater	0.33	B (6%+)	0.37
Forest, 25 years or greater	0.08	D (6%+)	0.25
Composite Area & Weighted Runoff Coeff.	0.57		0.48

Time of Concentration

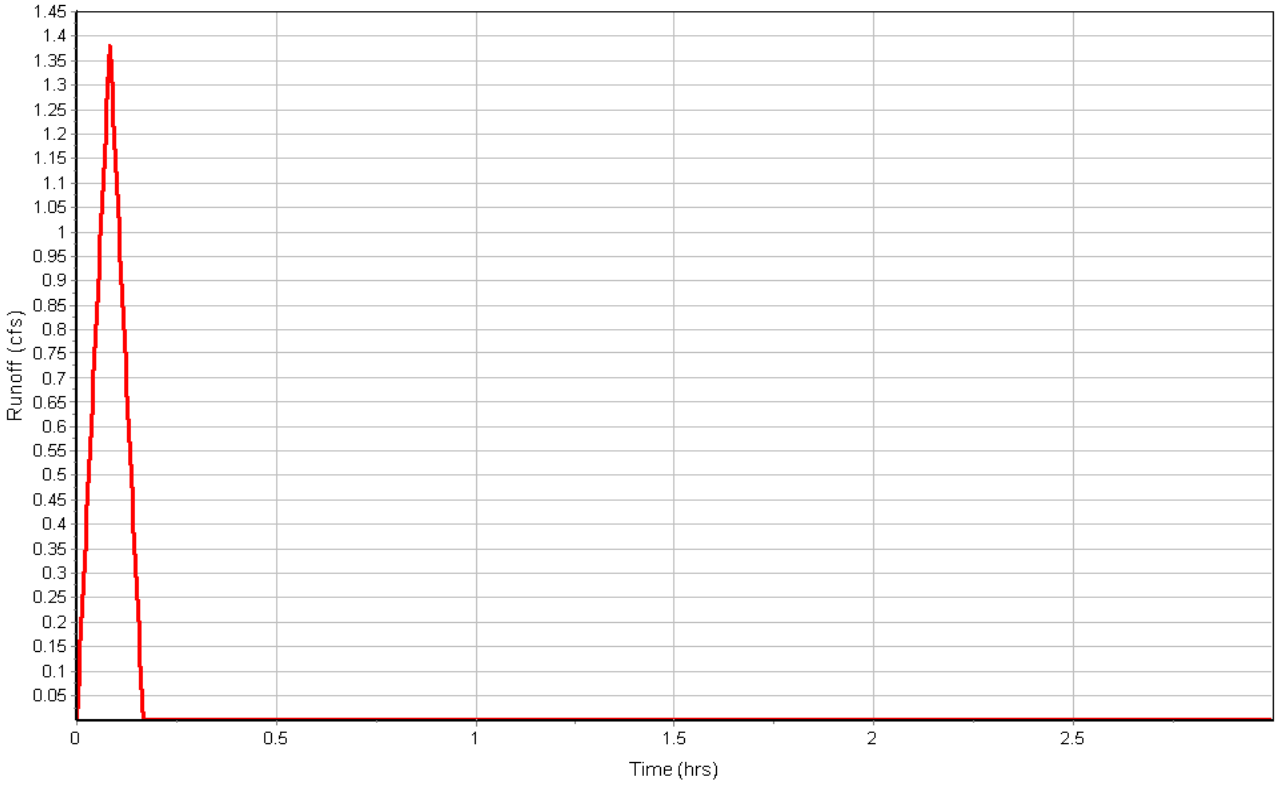
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.20
Peak Runoff (cfs) 1.38
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.4800
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-01

Runoff Hydrograph



Subbasin : Pr-02

Input Data

Area (ac) 0.12
Weighted Runoff Coefficient 0.8300

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.10	B (6%+)	0.97
Open Space, 25 years or greater	0.02	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.12		0.83

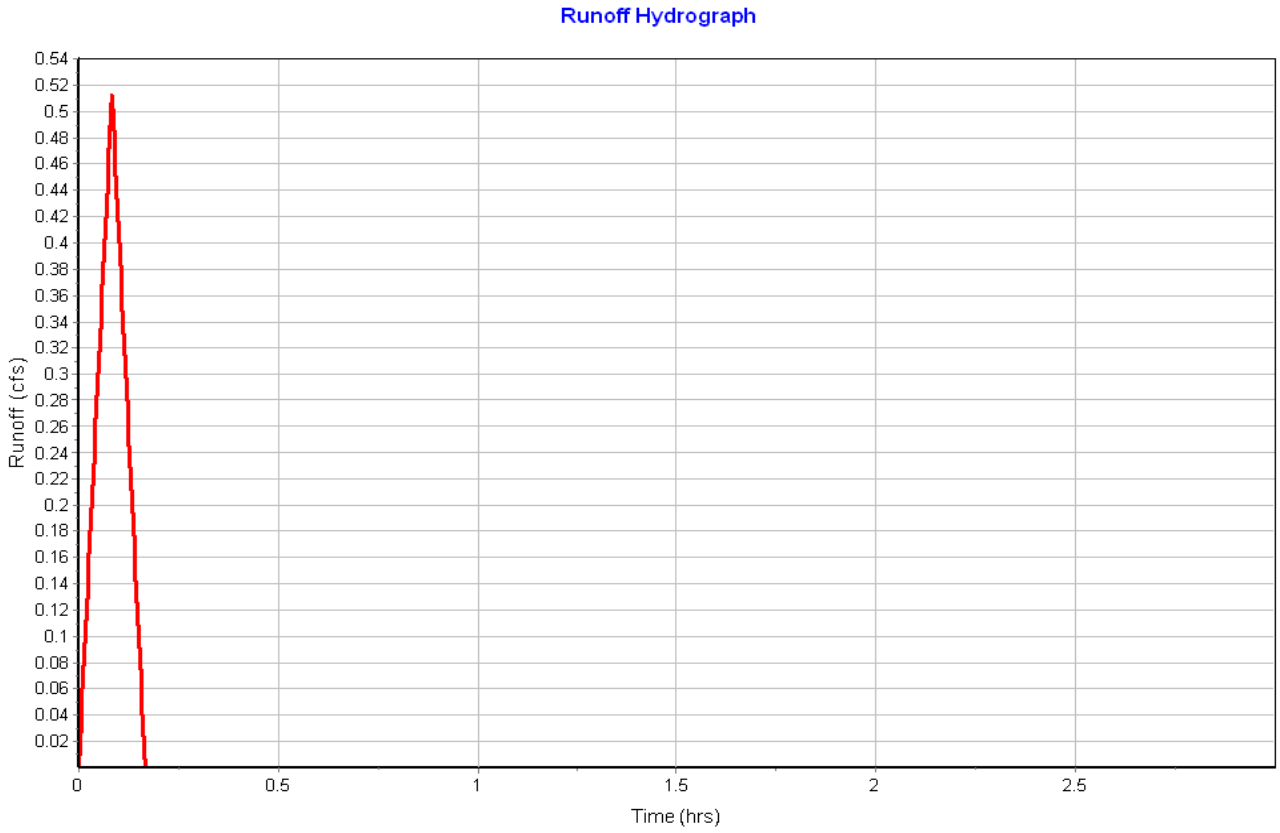
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.35
Peak Runoff (cfs) 0.51
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.8300
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-02



Subbasin : Pr-03

Input Data

Area (ac) 0.28
Weighted Runoff Coefficient 0.7900

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.21	B (6%+)	0.97
Open Space, 25 years or greater	0.07	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.28		0.79

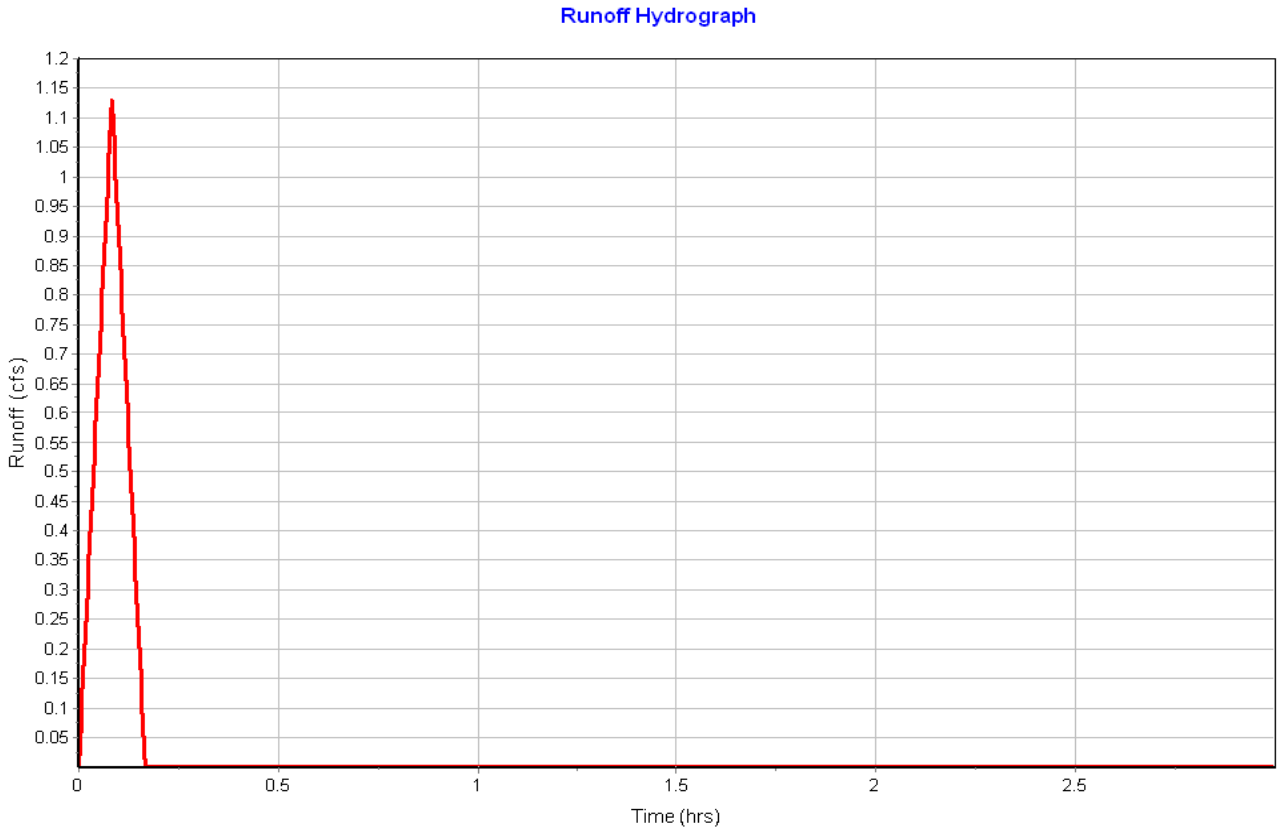
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.33
Peak Runoff (cfs) 1.13
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.7900
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-03



Subbasin : Pr-04

Input Data

Area (ac) 0.33
Weighted Runoff Coefficient 0.3300

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.03	B (6%+)	0.97
Open Space, 25 years or greater	0.30	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.33		0.33

Time of Concentration

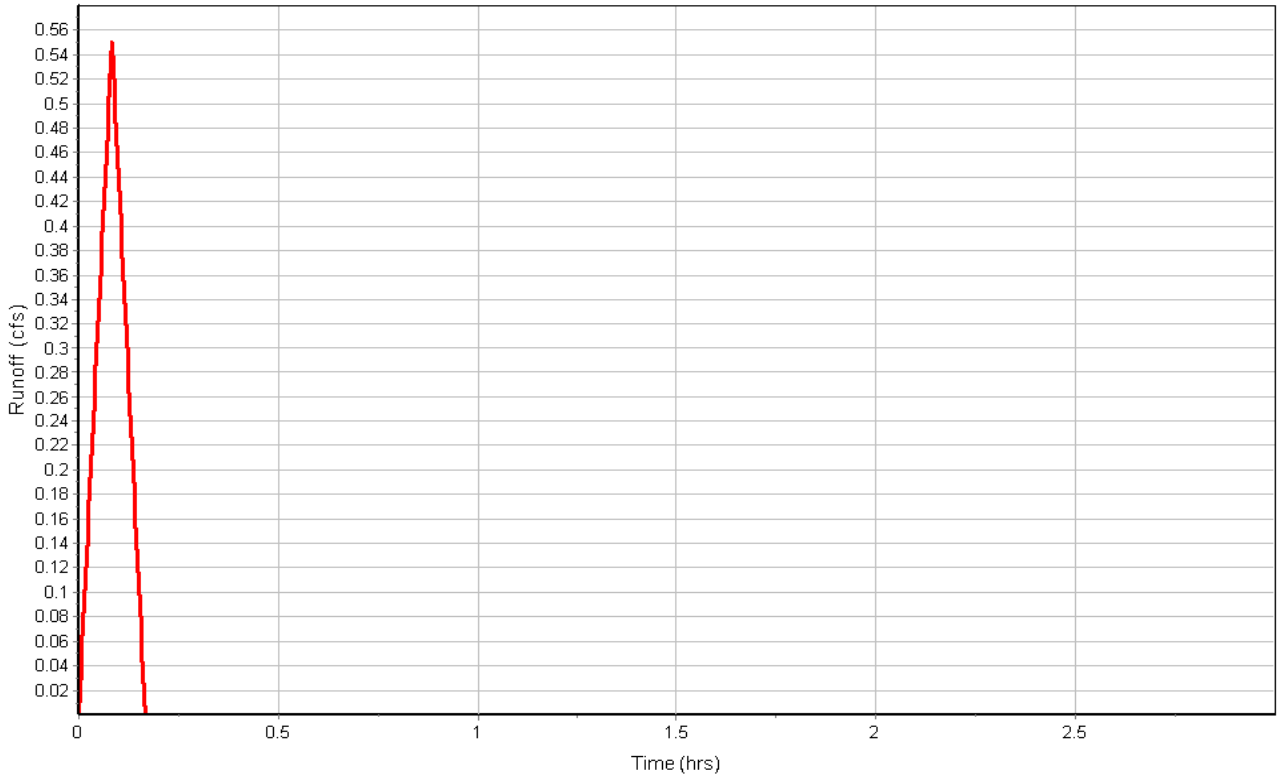
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.14
Peak Runoff (cfs) 0.55
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.3300
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-04

Runoff Hydrograph



Subbasin : Pr-05

Input Data

Area (ac) 0.15
Weighted Runoff Coefficient 0.7700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.10	B (6%+)	0.97
Open Space, 25 years or greater	0.04	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.14		0.77

Time of Concentration

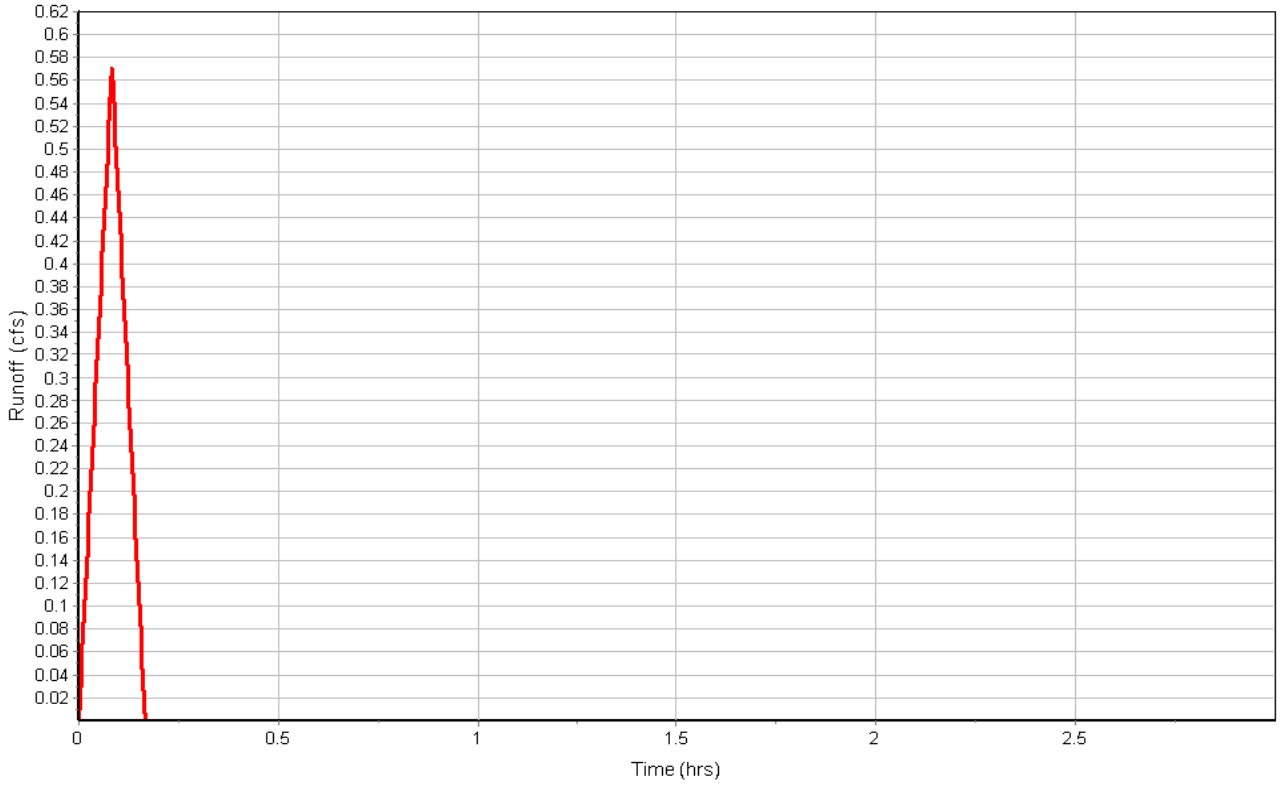
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.32
Peak Runoff (cfs) 0.57
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.7700
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-05

Runoff Hydrograph



Subbasin : Pr-06

Input Data

Area (ac) 0.29
Weighted Runoff Coefficient 0.7800

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.21	B (6%+)	0.97
Open Space, 25 years or greater	0.08	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.29		0.78

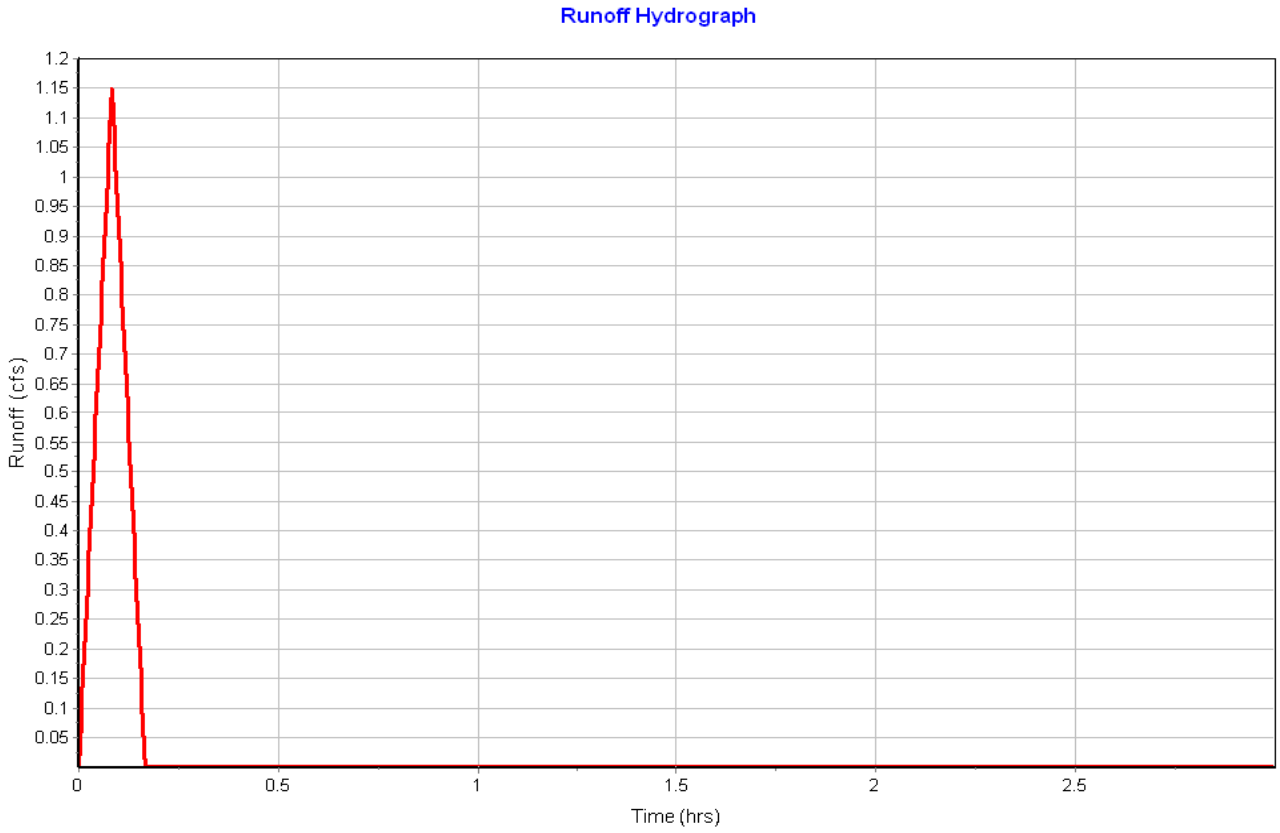
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.33
Peak Runoff (cfs) 1.15
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.7800
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-06



Subbasin : Pr-07

Input Data

Area (ac) 0.74
Weighted Runoff Coefficient 0.7700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.53	B (6%+)	0.97
Open Space, 25 years or greater	0.21	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.74		0.77

Time of Concentration

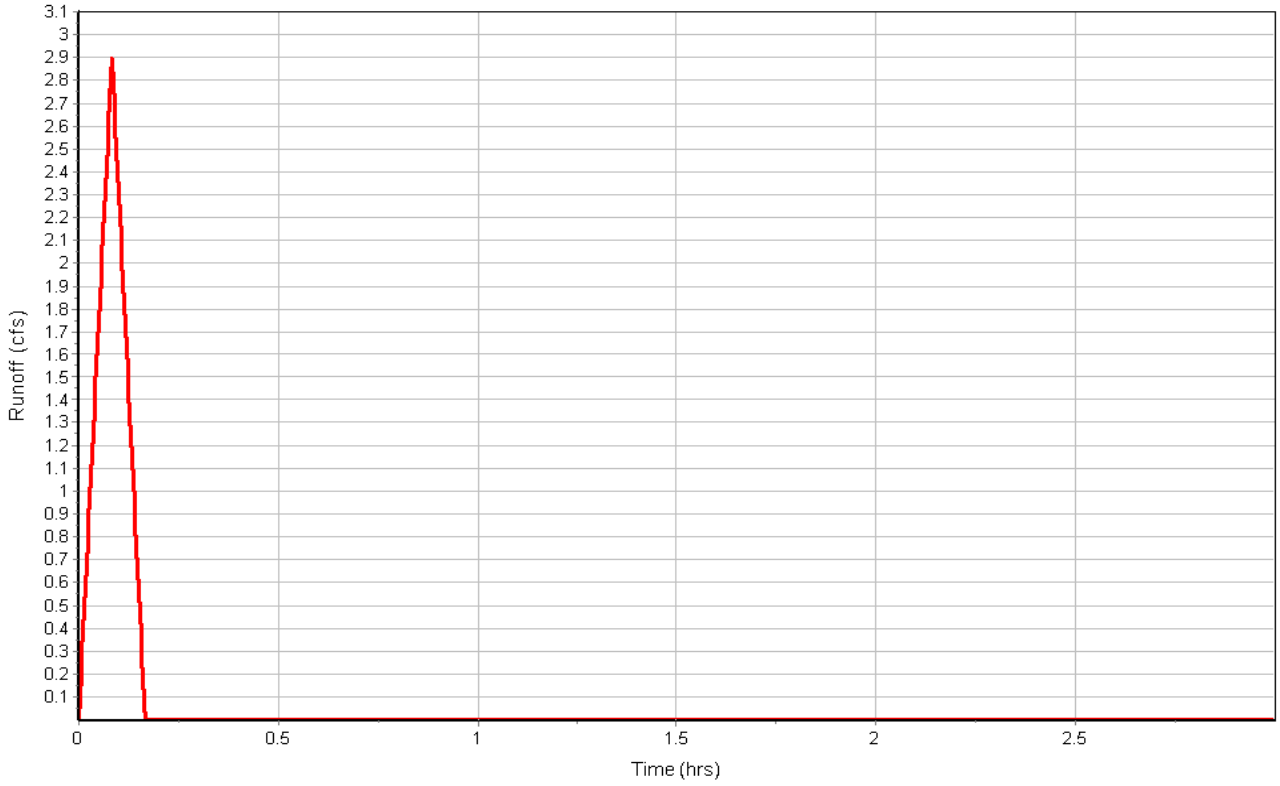
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.32
Peak Runoff (cfs) 2.90
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.7700
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-07

Runoff Hydrograph



Subbasin : Pr-08

Input Data

Area (ac) 0.18
Weighted Runoff Coefficient 0.8100

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.14	B (6%+)	0.97
Open Space, 25 years or greater	0.04	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.18		0.81

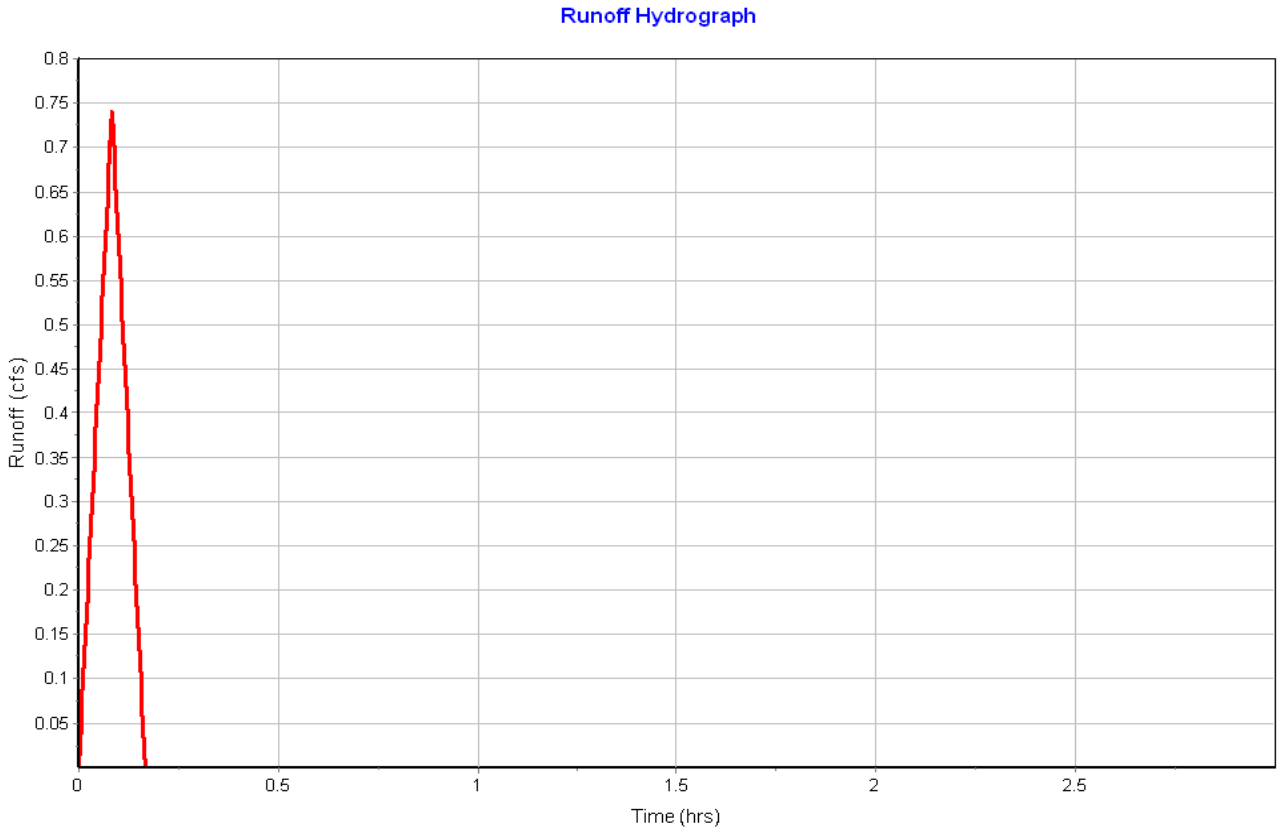
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.34
Peak Runoff (cfs) 0.74
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.8100
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-08



Subbasin : Pr-09

Input Data

Area (ac) 1.68
Weighted Runoff Coefficient 0.3800

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.11	B (6%+)	0.97
Open Space, 25 years or greater	0.04	B (6%+)	0.26
Meadow, 25 years or greater	1.17	B (6%+)	0.37
Forest, 25 years or greater	0.35	D (6%+)	0.25
Composite Area & Weighted Runoff Coeff.	1.67		0.38

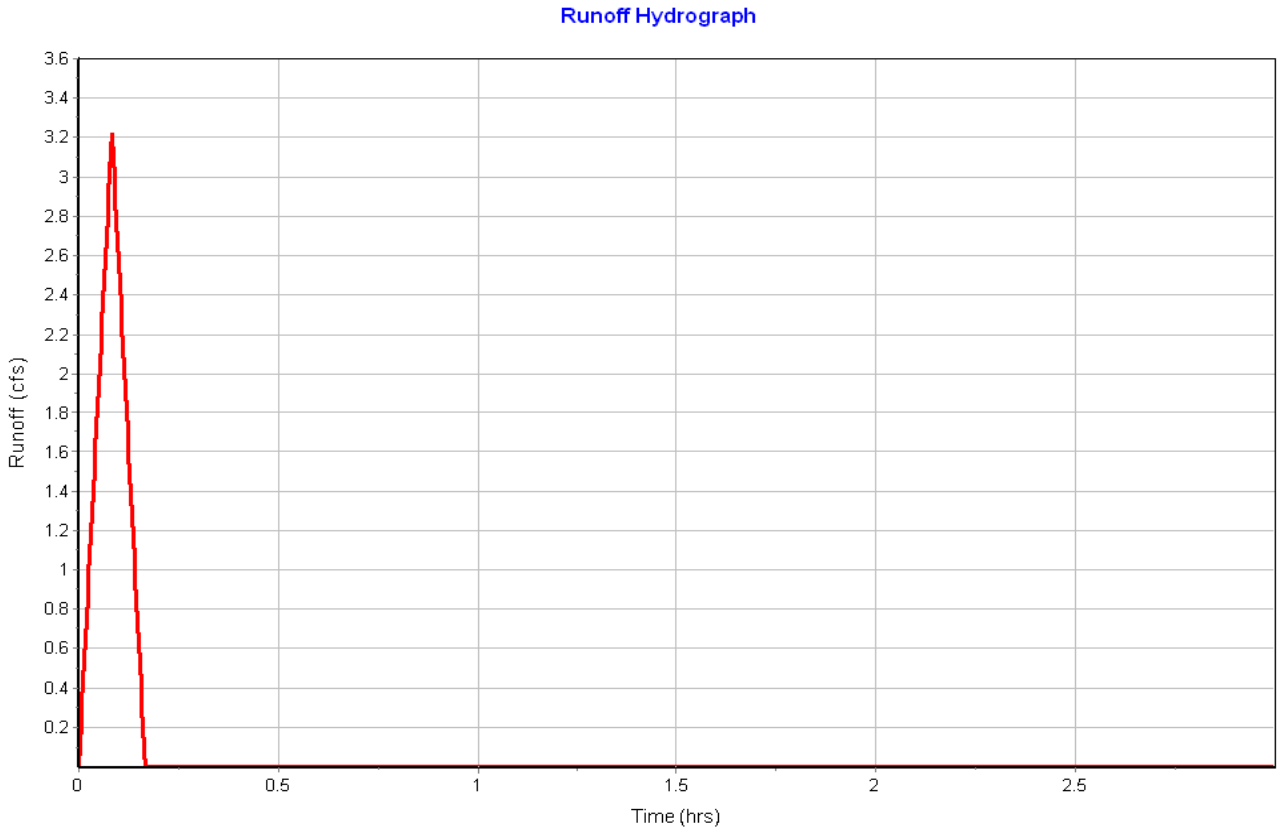
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.16
Peak Runoff (cfs) 3.22
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.3800
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-09



Subbasin : Pr-10

Input Data

Area (ac) 0.42
Weighted Runoff Coefficient 0.4600

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.12	B (6%+)	0.97
Open Space, 25 years or greater	0.30	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.42		0.46

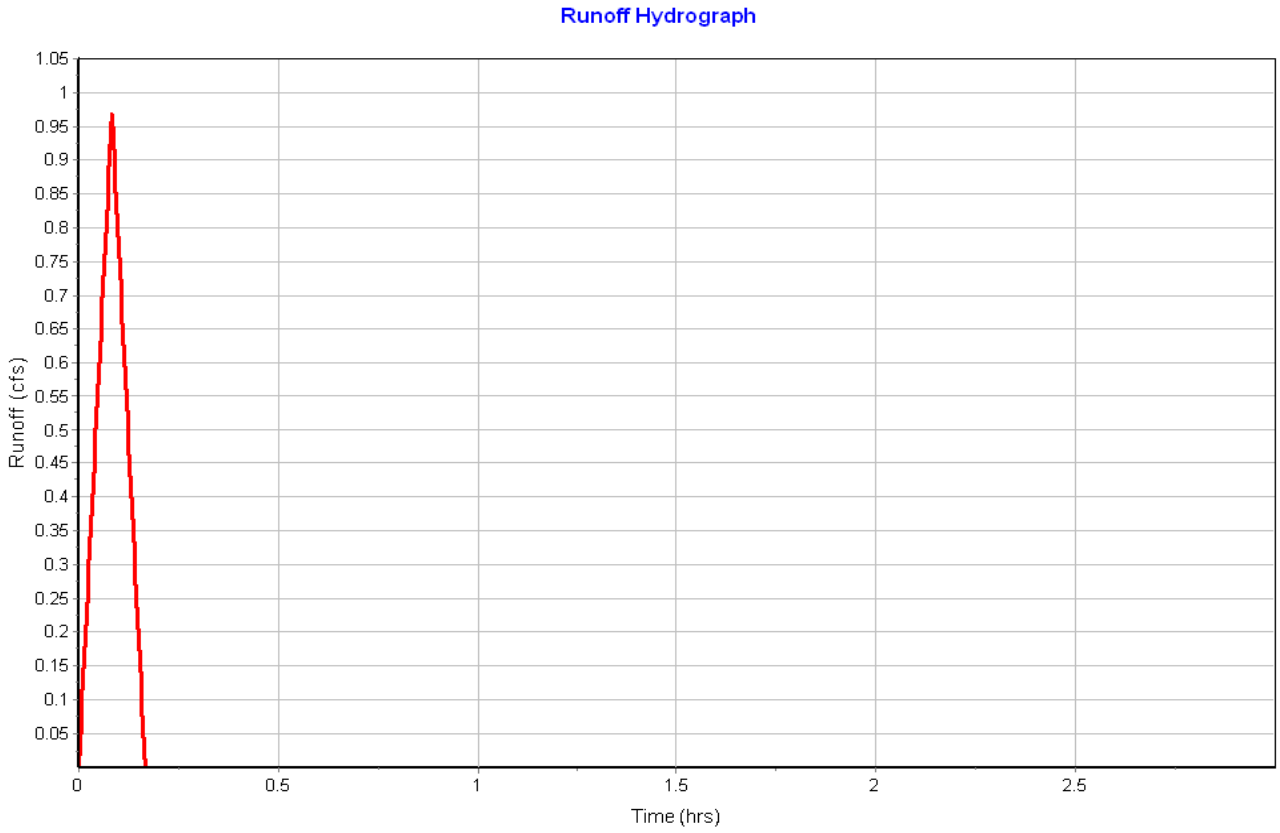
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.19
Peak Runoff (cfs) 0.97
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.4600
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-10



Subbasin : Pr-11

Input Data

Area (ac) 0.22
Weighted Runoff Coefficient 0.8700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.19	B (6%+)	0.97
Open Space, 25 years or greater	0.03	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.22		0.87

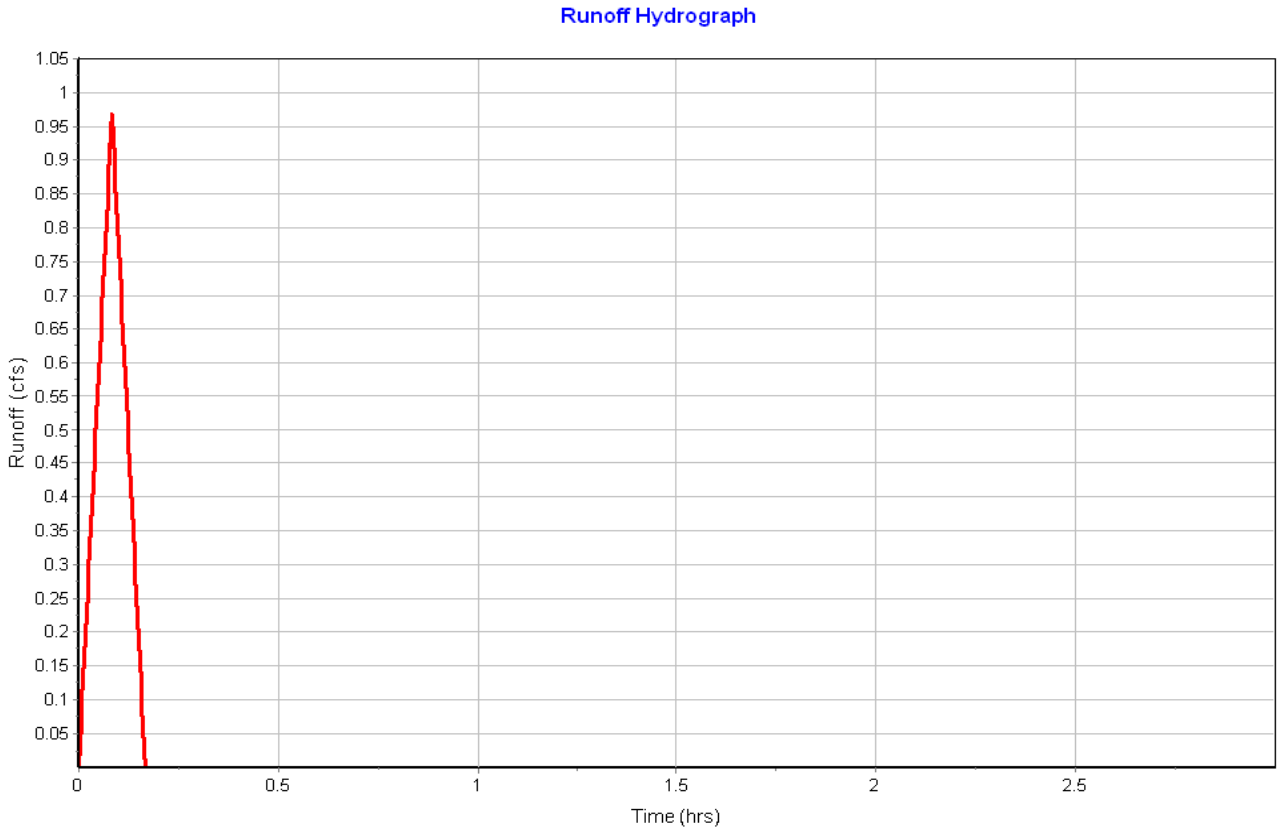
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.37
Peak Runoff (cfs) 0.97
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.8700
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-11



Subbasin : Pr-12

Input Data

Area (ac) 0.15
Weighted Runoff Coefficient 0.6200

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.07	B (6%+)	0.97
Open Space, 25 years or greater	0.07	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.14		0.62

Time of Concentration

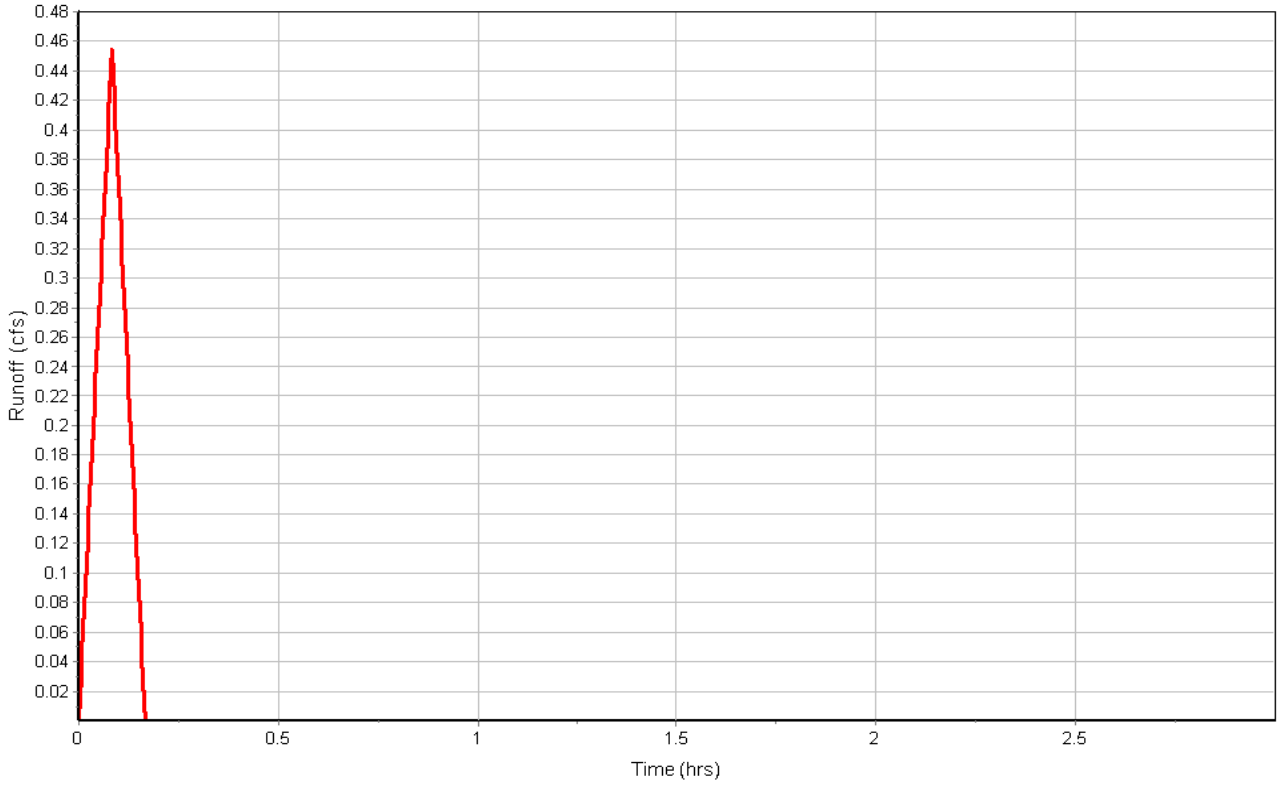
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.26
Peak Runoff (cfs) 0.45
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.6200
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-12

Runoff Hydrograph



Subbasin : Pr-13

Input Data

Area (ac) 0.41
Weighted Runoff Coefficient 0.6700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.21	B (6%+)	0.97
Open Space, 25 years or greater	0.04	B (6%+)	0.26
Meadow, 25 years or greater	0.16	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	0.41		0.67

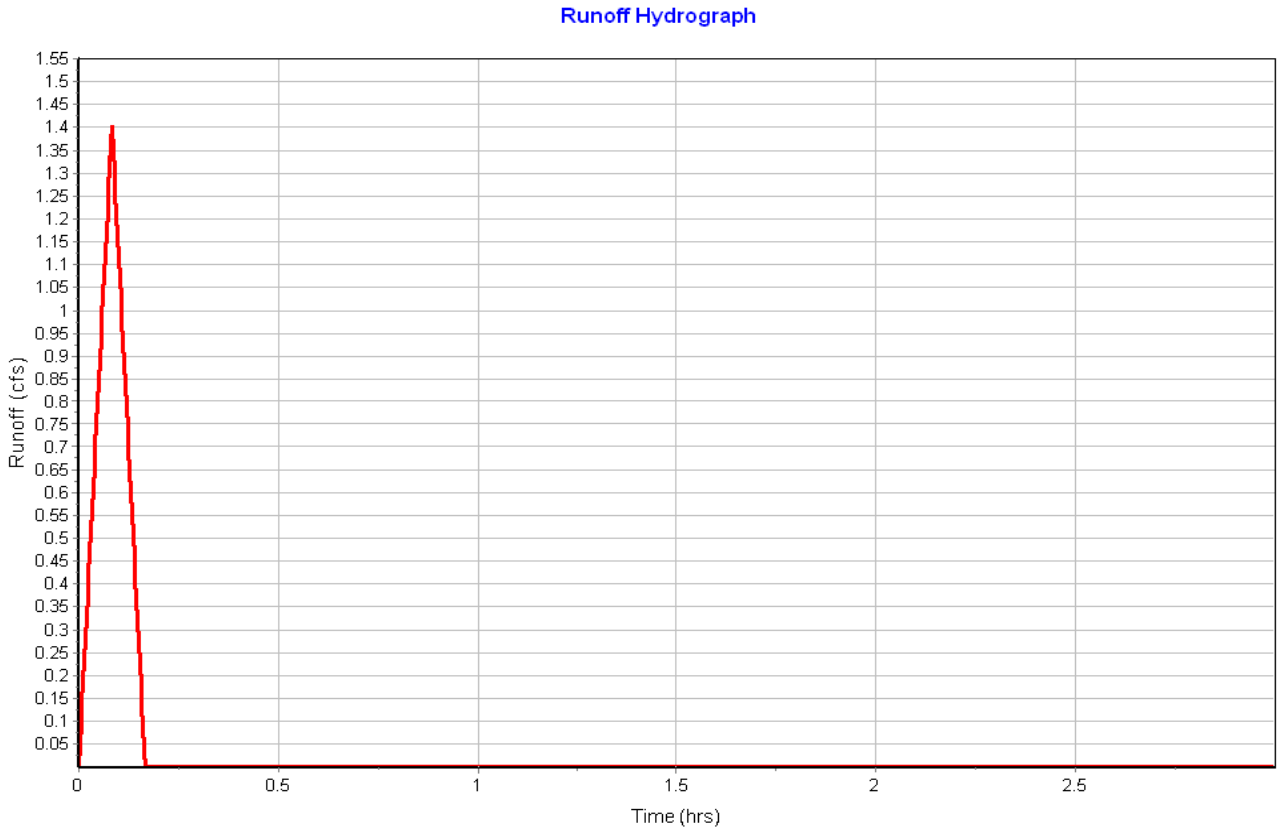
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.28
Peak Runoff (cfs) 1.40
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.6700
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-13



Subbasin : Pr-14

Input Data

Area (ac) 0.20
Weighted Runoff Coefficient 0.8600

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.17	B (2-6%)	0.96
Open Space, 25 years or greater	0.03	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.20		0.86

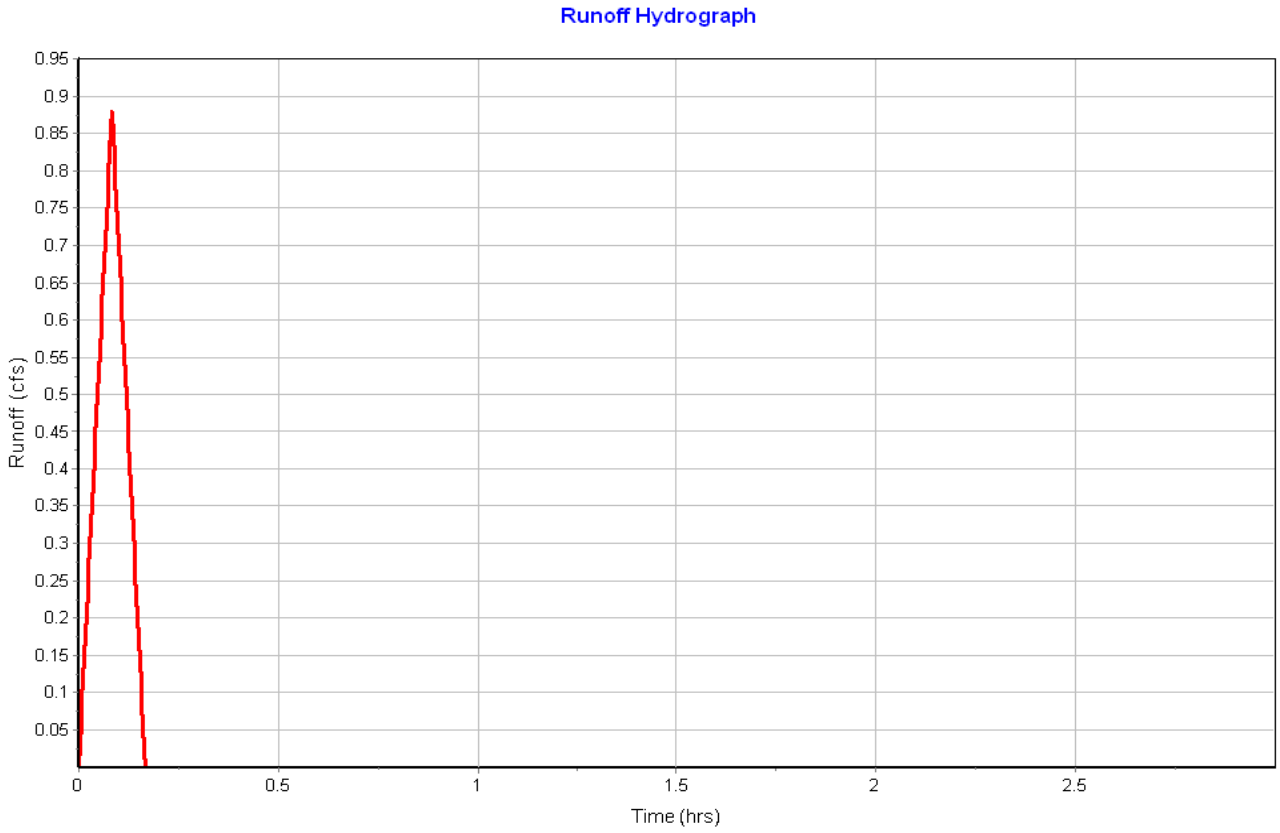
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.36
Peak Runoff (cfs) 0.88
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.8600
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-14



Subbasin : Pr-15

Input Data

Area (ac) 0.13
Weighted Runoff Coefficient 0.7900

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.10	B (6%+)	0.97
Open Space, 25 years or greater	0.03	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.13		0.79

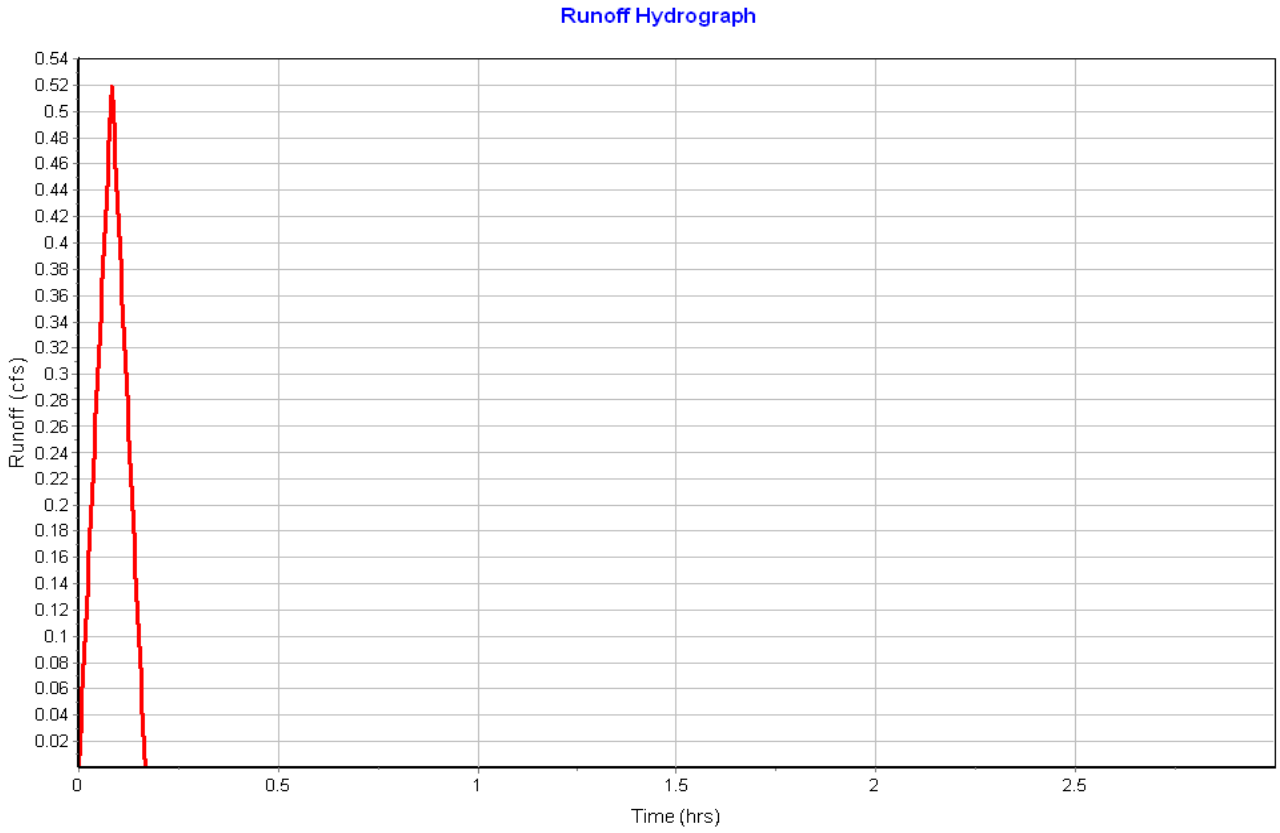
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.33
Peak Runoff (cfs) 0.52
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.7900
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-15



Subbasin : Pr-16

Input Data

Area (ac) 0.17
Weighted Runoff Coefficient 0.7100

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.11	B (6%+)	0.97
Open Space, 25 years or greater	0.06	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.17		0.71

Time of Concentration

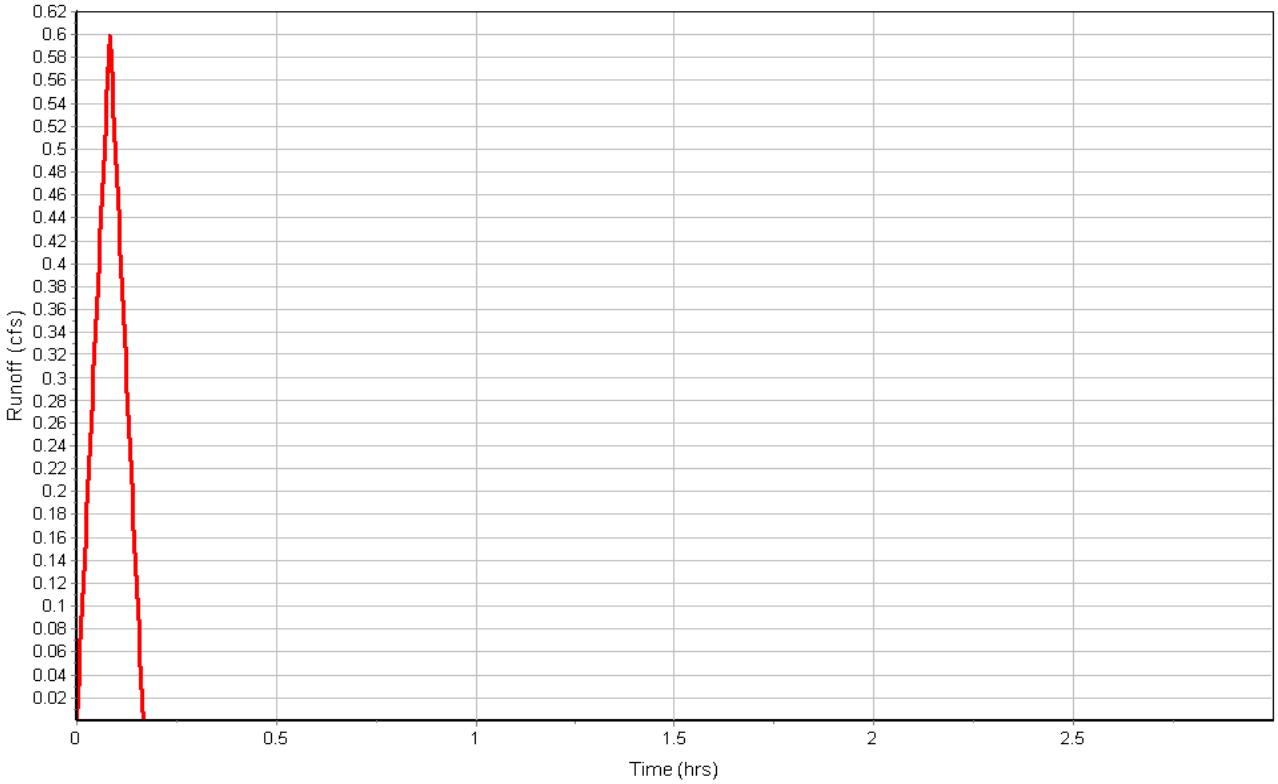
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.30
Peak Runoff (cfs) 0.60
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.7100
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-16

Runoff Hydrograph



Subbasin : Pr-17

Input Data

Area (ac) 0.05
Weighted Runoff Coefficient 0.6300

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.03	B (6%+)	0.97
Open Space, 25 years or greater	0.02	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.05		0.63

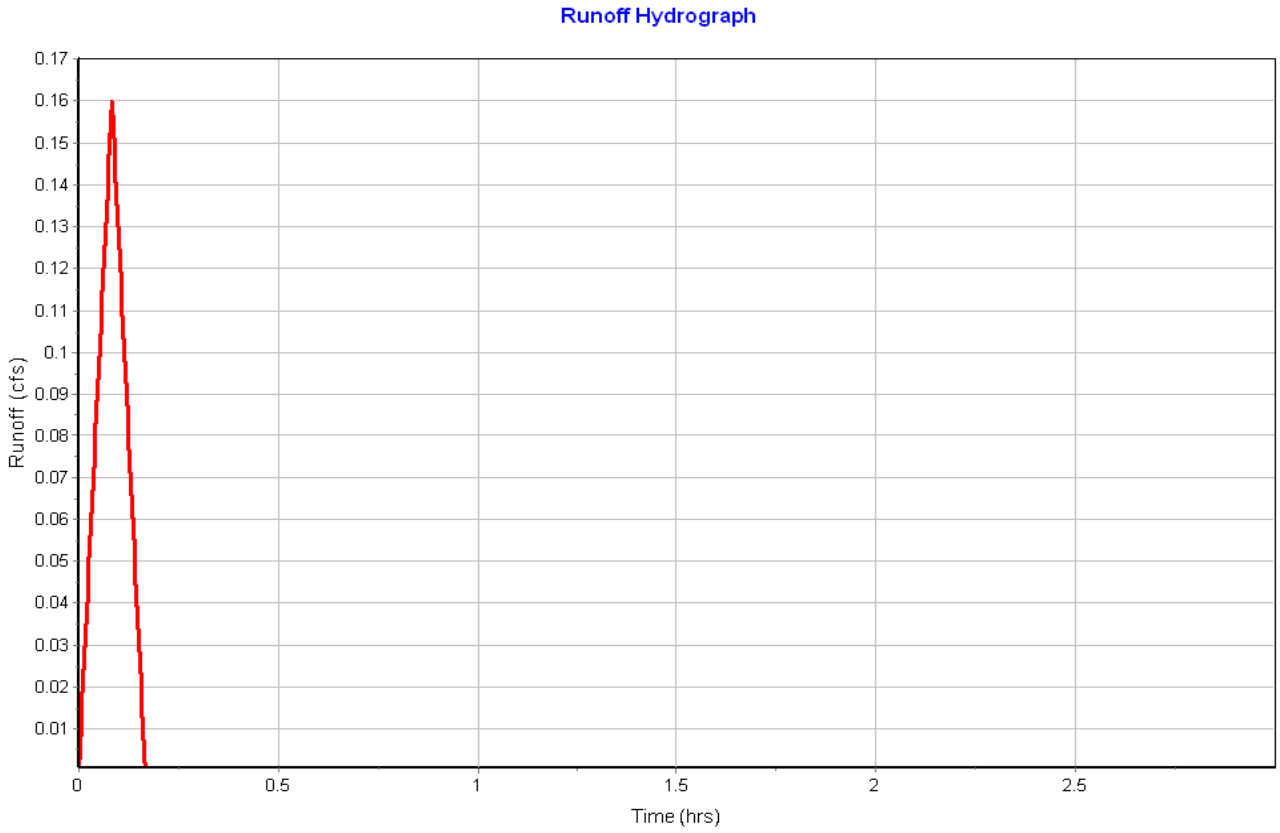
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.27
Peak Runoff (cfs) 0.16
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.6300
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-17



Subbasin : Pr-18

Input Data

Area (ac) 0.11
Weighted Runoff Coefficient 0.9500

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.11	B (6%+)	0.97
Open Space, 25 years or greater	0.00	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.11		0.95

Time of Concentration

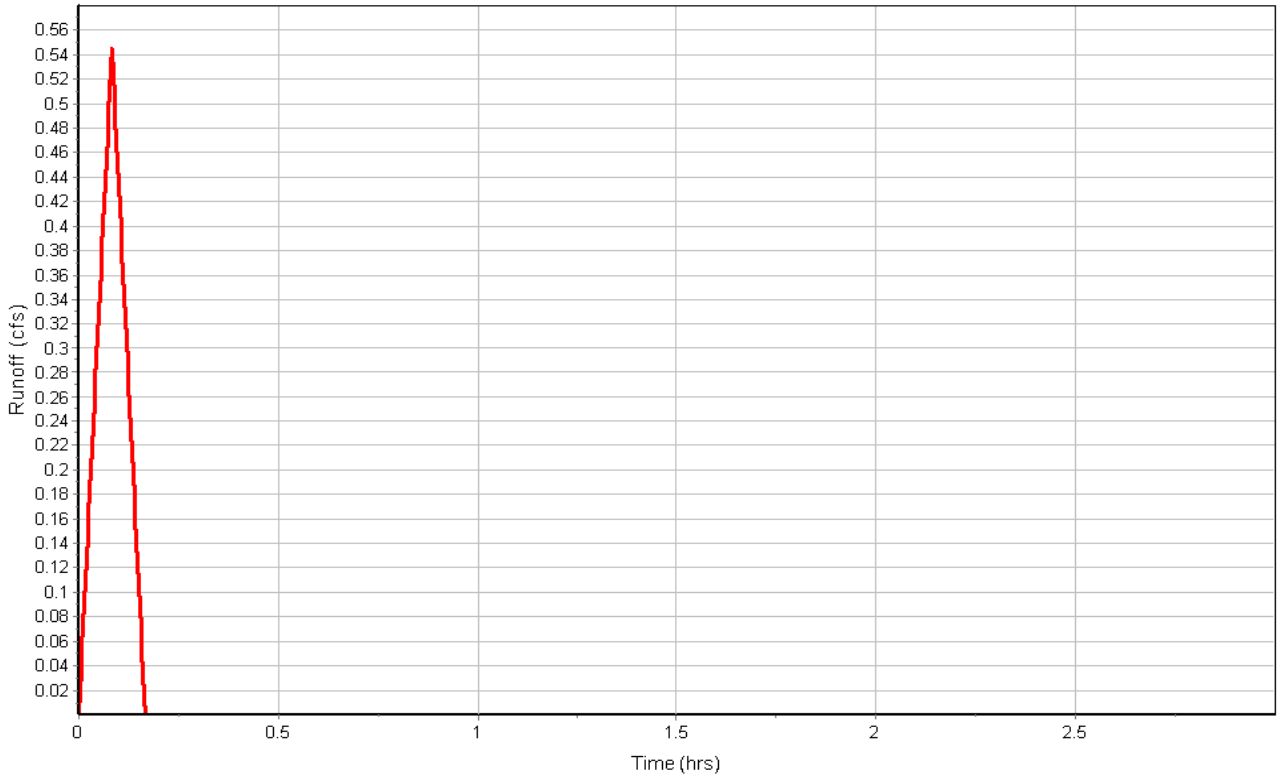
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.40
Peak Runoff (cfs) 0.55
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.9500
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-18

Runoff Hydrograph



Subbasin : Pr-19

Input Data

Area (ac) 0.10
Weighted Runoff Coefficient 0.8200

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.08	B (6%+)	0.97
Open Space, 25 years or greater	0.02	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.10		0.82

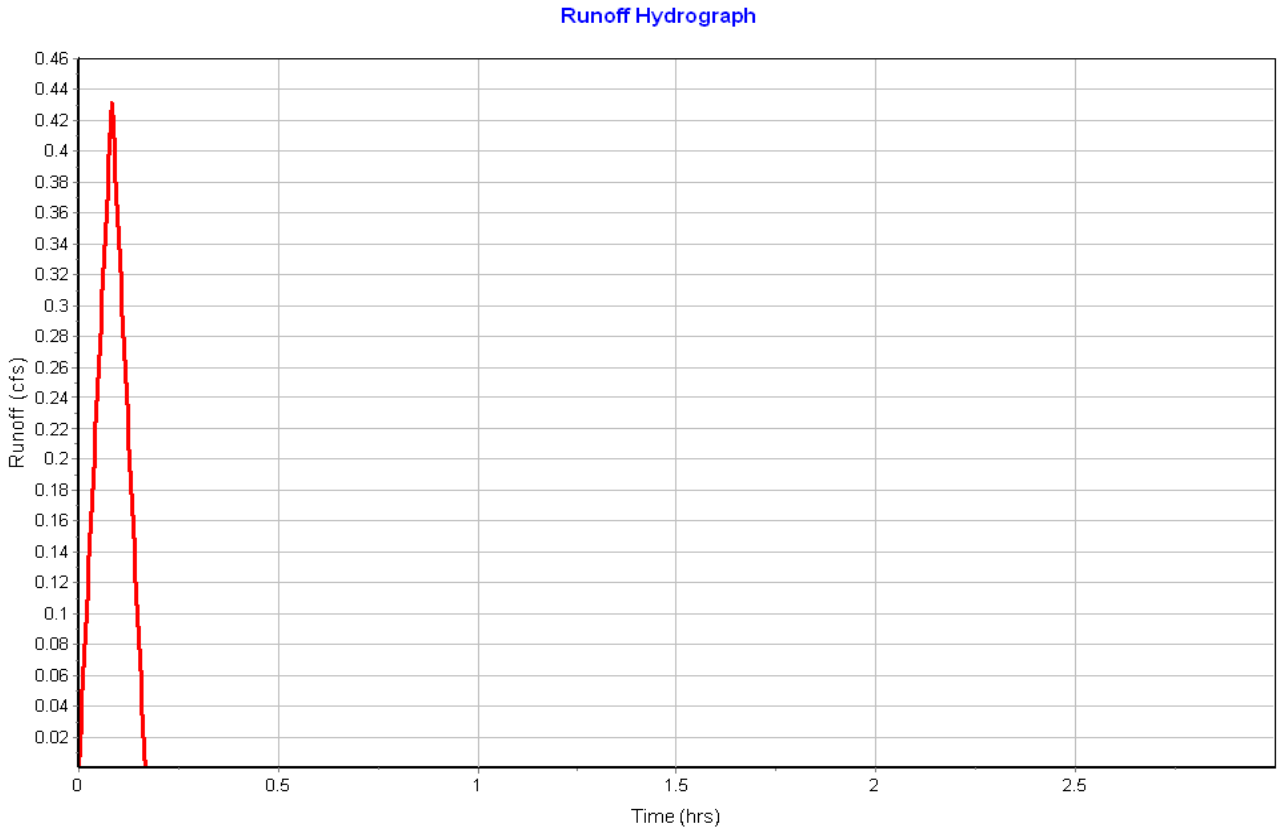
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.35
Peak Runoff (cfs) 0.43
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.8200
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-19



Subbasin : Pr-20

Input Data

Area (ac) 0.31
Weighted Runoff Coefficient 0.8200

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.24	B (6%+)	0.97
Open Space, 25 years or greater	0.03	B (6%+)	0.26
Meadow, 25 years or greater	0.03	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	0.30		0.82

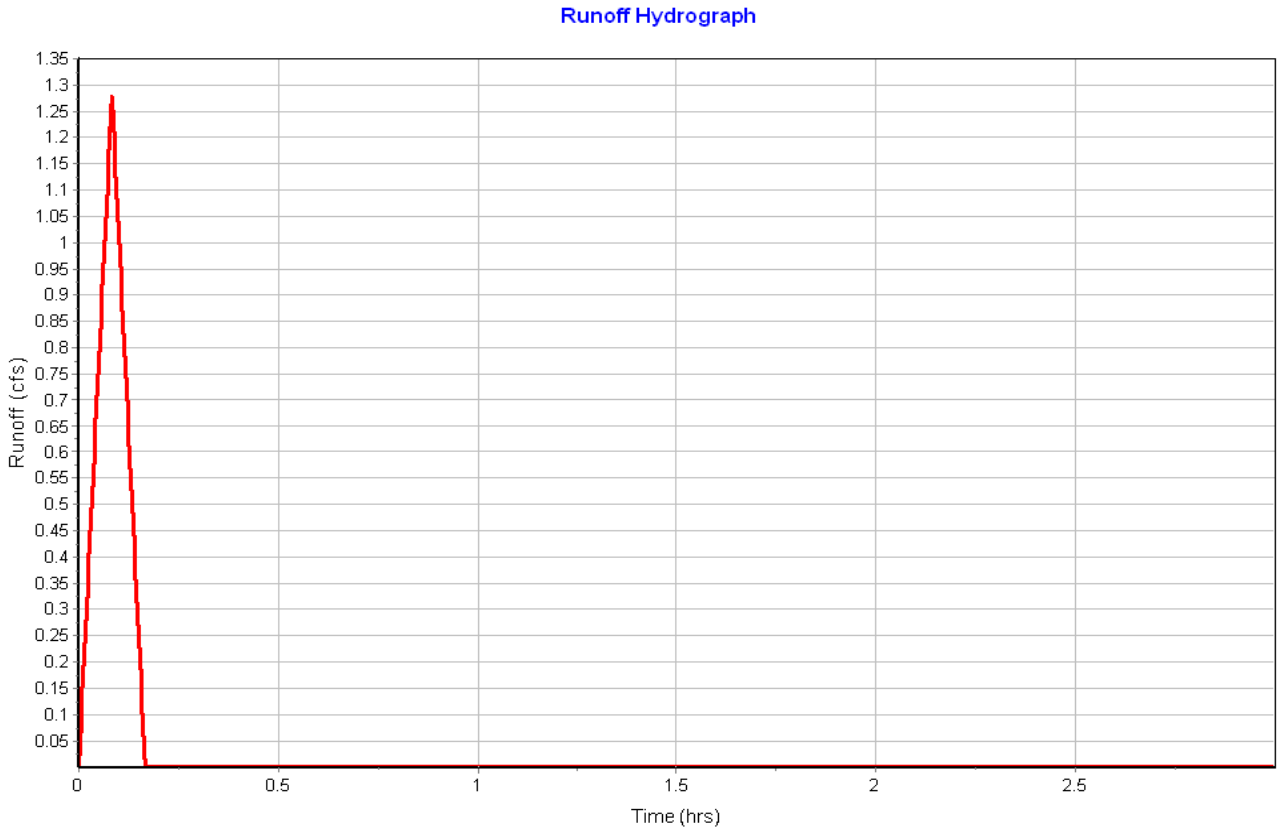
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.35
Peak Runoff (cfs) 1.28
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.8200
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-20



Subbasin : Pr-21

Input Data

Area (ac) 0.36
Weighted Runoff Coefficient 0.5500

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.15	B (6%+)	0.97
Open Space, 25 years or greater	0.22	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.37		0.55

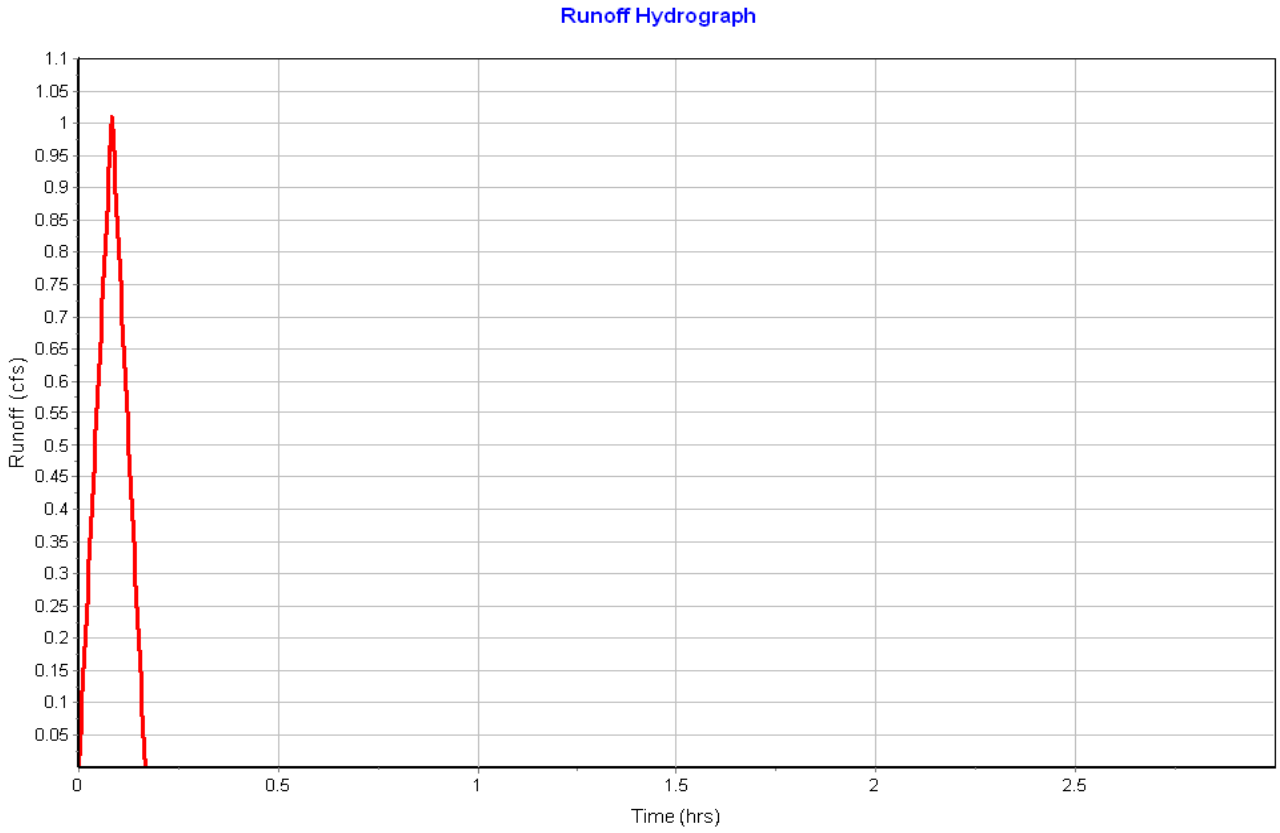
Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin Runoff Results

Total Rainfall (in) 0.42
Total Runoff (in) 0.23
Peak Runoff (cfs) 1.01
Rainfall Intensity 5.050
Weighted Runoff Coefficient 0.5500
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-21



Subbasin : Pr-OS-1

Input Data

Area (ac) 124.70
Weighted Runoff Coefficient 0.3600

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	117.22	B (6%+)	0.37
Forest, 25 years or greater	7.48	D (6%+)	0.25
Composite Area & Weighted Runoff Coeff.	124.70		0.36

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	10	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.21	0.00	0.00
Computed Flow Time (min) :	8.01	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	3200	0.00	0.00
Slope (%) :	15	0.00	0.00
Surface Type :	Bare & untilled	Unpaved	Unpaved
Velocity (ft/sec) :	3.87	0.00	0.00
Computed Flow Time (min) :	13.78	0.00	0.00

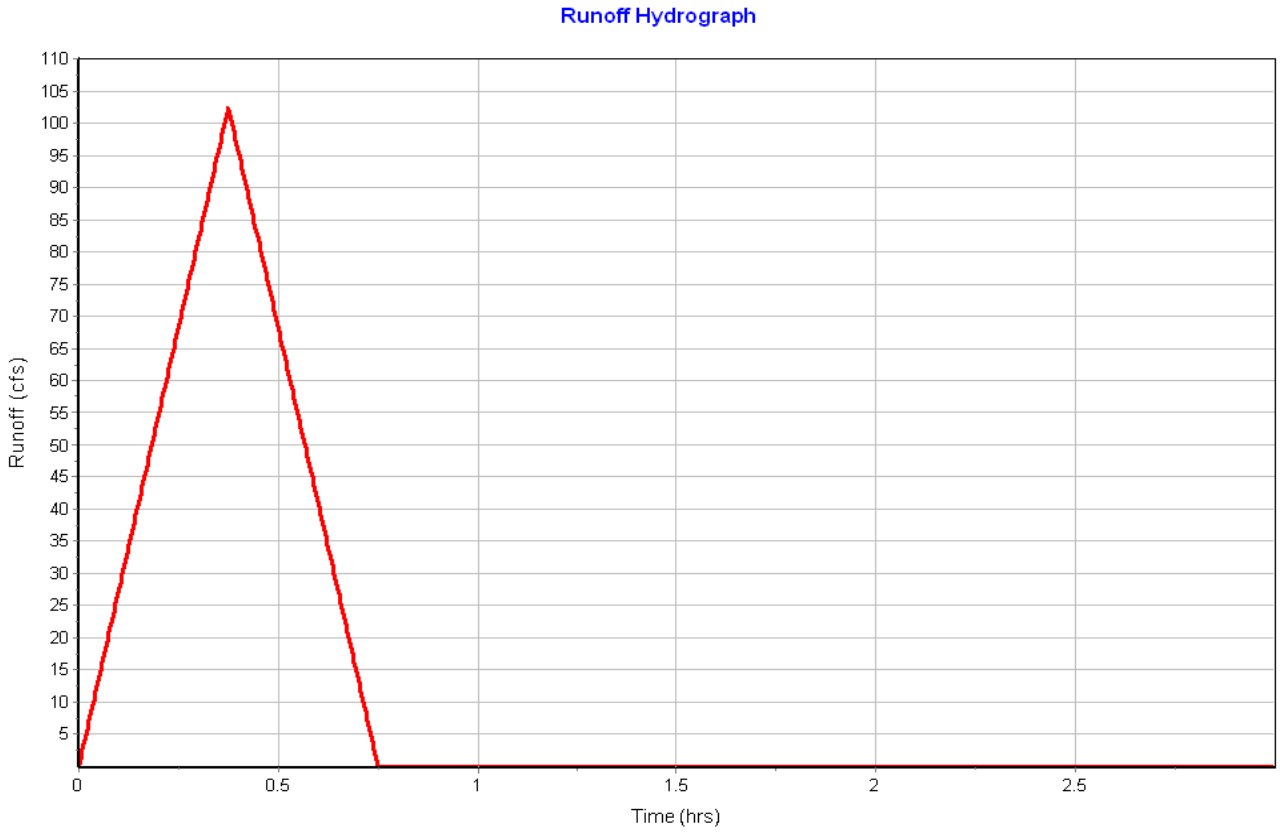
Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.030	0.00	0.00
Flow Length (ft) :	2200	0.00	0.00
Channel Slope (%) :	33	0.00	0.00
Cross Section Area (ft²) :	62.5	0.00	0.00
Wetted Perimeter (ft) :	23	0.00	0.00
Velocity (ft/sec) :	55.56	0.00	0.00
Computed Flow Time (min) :	0.66	0.00	0.00

Total TOC (min) 22.45

Subbasin Runoff Results

Total Rainfall (in) 0.86
Total Runoff (in) 0.31
Peak Runoff (cfs) 102.44
Rainfall Intensity 2.282
Weighted Runoff Coefficient 0.3600
Time of Concentration (days hh:mm:ss) 0 00:22:27

Subbasin : Pr-OS-1



Subbasin : Pr-OS-2

Input Data

Area (ac) 9.37
Weighted Runoff Coefficient 0.2800

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	2.06	B (6%+)	0.37
Forest, 25 years or greater	7.31	D (6%+)	0.25
Composite Area & Weighted Runoff Coeff.	9.37		0.28

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	45	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.38	0.00	0.00
Computed Flow Time (min) :	4.39	0.00	0.00

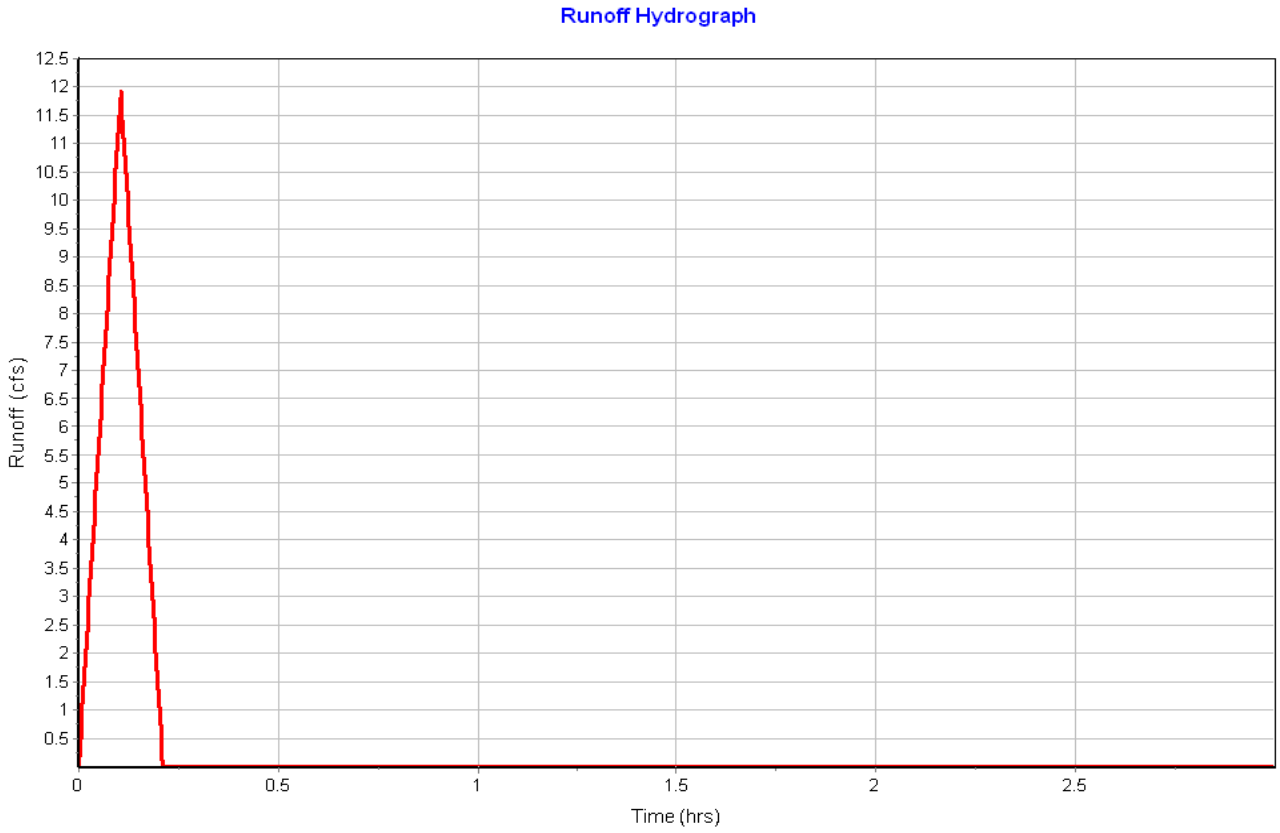
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	1360	0.00	0.00
Slope (%) :	53	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	11.75	0.00	0.00
Computed Flow Time (min) :	1.93	0.00	0.00

Total TOC (min) 6.32

Subbasin Runoff Results

Total Rainfall (in) 0.48
Total Runoff (in) 0.13
Peak Runoff (cfs) 11.93
Rainfall Intensity 4.546
Weighted Runoff Coefficient 0.2800
Time of Concentration (days hh:mm:ss) 0 00:06:19

Subbasin : Pr-OS-2



Subbasin : Walmart

Input Data

Area (ac) 1.55
Weighted Runoff Coefficient 0.9500

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	3.28	-	0.95
Composite Area & Weighted Runoff Coeff.	3.28		0.95

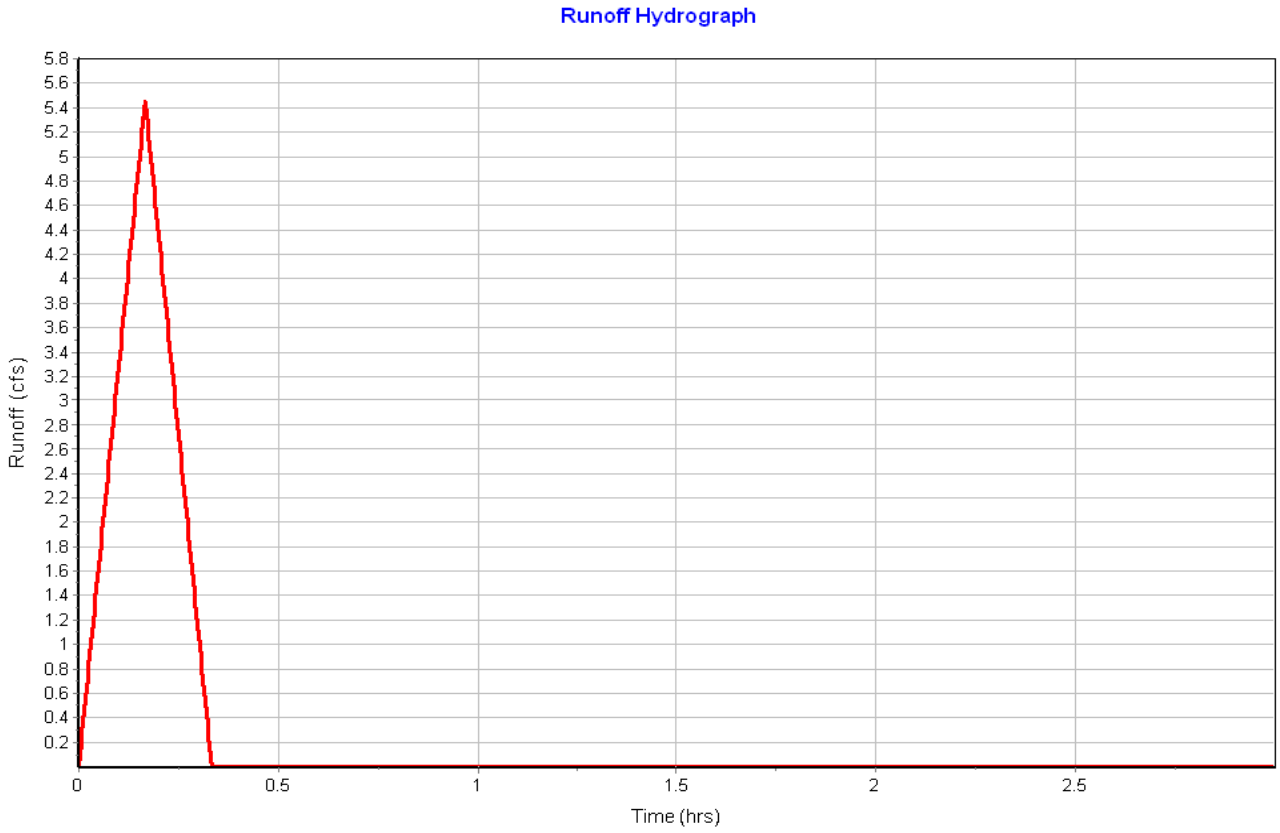
Time of Concentration

User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 0.62
Total Runoff (in) 0.59
Peak Runoff (cfs) 5.45
Rainfall Intensity 3.700
Weighted Runoff Coefficient 0.9500
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : Walmart



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)
1	EDB-Control	5863.00	5866.00	3.00	5863.00	0.00
2	FES-B10	5863.00	5869.00	6.00	5863.00	0.00
3	Int-Blake-Palmer	5859.50	5859.50	0.00	5859.50	0.00
4	Junc.H-04	5870.00	5876.00	6.00	5870.00	0.00
5	Junc.H-Blake-S	5858.00	5864.00	6.00	5858.00	0.00
6	Junc-H-02	5885.00	5891.00	6.00	5885.00	0.00
7	Junc-H-03	5888.00	5894.00	6.00	5888.00	0.00
8	Junc-Pr-Blake-S	5858.20	5858.20	0.00	5858.20	0.00
9	OS-1a	5942.00	5942.00	0.00	5942.00	0.00
10	OS-1b	5906.00	5906.00	0.00	5906.00	0.00
11	OS-2a	5942.00	5942.00	0.00	5942.00	0.00
12	Out-H-01	5875.00	5881.00	6.00	5875.00	0.00
13	Pr-26th	5876.00	5877.00	1.00	5876.00	0.00
14	Road-Palmer-B-12	5888.00	5888.00	0.00	5888.00	0.00
15	SDHM-A10	5896.00	5899.00	3.00	5896.00	0.00
16	SDMH-A4	5889.50	5899.80	10.30	5889.50	0.00
17	SDMH-A5	5888.90	5893.65	4.75	5888.90	0.00
18	SDMH-A6	5886.30	5890.77	4.47	5886.30	0.00
19	SDMH-A9	5894.20	5900.19	5.99	5894.20	0.00
20	SDMH-B9	5864.00	5867.21	3.21	5864.00	0.00
21	UG-Detention-Control	5858.30	5858.30	0.00	5858.30	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Total Flooded Volume (ft³)	Total Time Flooded (min)
1	EDB-Control	0.160	5863.10	0.10	2.90	5863.07	0.07	0 00:16	0.00	0.00
2	FES-B10	12.640	5864.09	1.09	4.91	5863.06	0.06	0 00:05	0.00	0.00
3	Int-Blake-Palmer	4.340	5859.82	0.32	0.28	5859.52	0.02	0 00:07	0.00	0.00
4	Junc.H-04	1.100	5870.00	0.00	6.00	5870.00	0.00	0 00:00	0.00	0.00
5	Junc.H-Blake-S	15.990	5858.00	0.00	6.00	5858.00	0.00	0 00:00	0.00	0.00
6	Junc-H-02	0.770	5885.00	0.00	6.00	5885.00	0.00	0 00:00	0.00	0.00
7	Junc-H-03	0.610	5888.00	0.00	6.00	5888.00	0.00	0 00:00	0.00	0.00
8	Junc-Pr-Blake-S	5.620	5858.70	0.50	0.75	5858.30	0.10	0 00:10	0.00	0.00
9	OS-1a	102.440	5942.96	0.96	0.54	5942.16	0.16	0 00:22	0.00	0.00
10	OS-1b	102.290	5906.96	0.96	0.54	5906.16	0.16	0 00:22	0.00	0.00
11	OS-2a	11.930	5942.30	0.30	0.20	5942.01	0.01	0 00:06	0.00	0.00
12	Out-H-01	102.440	5875.00	0.00	6.00	5875.00	0.00	0 00:00	0.00	0.00
13	Pr-26th	102.120	5876.52	0.52	0.48	5876.10	0.10	0 00:22	0.00	0.00
14	Road-Palmer-B-12	11.510	5888.73	0.73	0.52	5888.04	0.04	0 00:06	0.00	0.00
15	SDHM-A10	1.150	5896.37	0.37	2.63	5896.01	0.01	0 00:05	0.00	0.00
16	SDMH-A4	3.660	5894.15	4.65	5.65	5893.81	4.31	0 00:05	0.00	0.00
17	SDMH-A5	4.160	5889.55	0.65	4.10	5888.93	0.03	0 00:05	0.00	0.00
18	SDMH-A6	4.150	5887.15	0.85	3.63	5886.53	0.23	0 00:05	0.00	0.00
19	SDMH-A9	1.110	5894.76	0.56	5.43	5894.41	0.21	0 00:05	0.00	0.00
20	SDMH-B9	12.700	5865.09	1.09	2.12	5864.06	0.06	0 00:05	0.00	0.00
21	UG-Detention-Control	1.650	5858.80	0.50	1.50	5858.40	0.10	0 00:10	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)
1	Bypass-A1	31.56	5896.57	4.07	5896.57	4.57	0.00	0.0100	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
2	Bypass-A2	140.00	5896.57	4.57	5876.00	0.00	20.57	14.6900	User-Defined	1.000	32.000	0.0160	0.5000	0.5000	0.0000	0.000
3	Bypass-B1	64.47	5883.39	3.79	5876.84	3.74	6.55	10.1700	User-Defined	0.600	17.000	0.0160	0.5000	0.5000	0.0000	0.000
4	Bypass-B2	71.42	5883.39	4.29	5876.84	4.24	6.55	9.1800	User-Defined	0.600	17.000	0.0160	0.5000	0.5000	0.0000	0.000
5	Bypass-B3	85.00	5876.84	4.24	5868.74	4.04	8.10	9.5300	User-Defined	0.600	17.000	0.0160	0.5000	0.5000	0.0000	0.000
6	Bypass-B5	80.66	5876.84	3.74	5868.74	4.24	8.09	10.0300	User-Defined	0.600	17.000	0.0160	0.5000	0.5000	0.0000	0.000
7	Bypass-B6	84.14	5868.74	4.04	5861.29	2.79	7.46	8.8600	User-Defined	0.600	17.000	0.0160	0.5000	0.5000	0.0000	0.000
8	Bypass-B8	78.55	5868.74	4.24	5861.29	2.29	7.46	9.4900	User-Defined	0.600	17.000	0.0160	0.5000	0.5000	0.0000	0.000
9	Bypass-C1	18.27	5862.19	2.59	5861.29	2.29	0.90	4.9300	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
10	Bypass-C2	51.37	5861.29	2.29	5859.50	0.00	1.79	3.4800	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
11	Bypass-C3	58.47	5861.29	2.79	5859.50	0.00	1.79	3.0600	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
12	Link-Blake-S	230.46	5859.50	0.00	5858.20	0.00	1.30	0.5600	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
13	Out-Pr-Blake	200.00	5858.20	0.00	5856.00	4.60	2.20	1.1000	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
14	Road-B12	48.58	5888.00	0.00	5883.39	4.29	4.61	9.4800	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
15	Road-OS-1b	240.00	5906.00	0.00	5876.00	0.00	30.00	12.5000	User-Defined	1.000	32.000	0.0160	0.5000	0.5000	0.0000	0.000
16	Swale-OS-1a	143.20	5942.00	0.00	5804.00	-102.00	138.00	96.3700	Trapezoidal	1.500	12.000	0.0300	0.5000	0.5000	0.0000	0.000
17	Swale-OS-2	146.88	5942.00	0.00	5889.00	0.00	53.00	36.0800	Trapezoidal	0.500	6.000	0.0300	0.5000	0.5000	0.0000	0.000

Channel Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	Bypass-A1	0.480	0 00:05	19.280	0.02	1.79	0.29	0.20	0.34	0.00	
2	Bypass-A2	0.250	0 00:05	565.610	0.00	3.97	0.59	0.07	0.07	0.00	
3	Bypass-B1	0.160	0 00:05	68.980	0.00	6.05	0.18	0.09	0.14	0.00	
4	Bypass-B2	9.170	0 00:07	65.530	0.14	6.88	0.17	0.33	0.55	0.00	
5	Bypass-B3	7.820	0 00:07	66.770	0.12	6.74	0.21	0.31	0.52	0.00	
6	Bypass-B5	0.100	0 00:05	68.520	0.00	3.20	0.42	0.07	0.12	0.00	
7	Bypass-B6	6.110	0 00:07	64.400	0.09	6.18	0.23	0.29	0.49	0.00	
8	Bypass-B8	0.010	0 00:05	66.650	0.00	1.63	0.80	0.03	0.06	0.00	
9	Bypass-C1	0.100	0 00:05	95.740	0.00	3.96	0.08	0.06	0.11	0.00	
10	Bypass-C2	0.170	0 00:05	80.420	0.00	2.08	0.41	0.08	0.14	0.00	
11	Bypass-C3	3.760	0 00:07	75.380	0.05	3.15	0.31	0.24	0.41	0.00	
12	Link-Blake-S	4.100	0 00:08	32.380	0.13	4.25	0.90	0.31	0.52	0.00	
13	Out-Pr-Blake	5.450	0 00:09	45.210	0.12	2.44	1.37	0.31	0.52	0.00	
14	Road-B12	11.500	0 00:07	132.730	0.09	6.23	0.13	0.28	0.48	0.00	
15	Road-OS-1b	102.120	0 00:22	521.700	0.20	14.29	0.28	0.52	0.52	0.00	
16	Swale-OS-1a	102.290	0 00:22	260.630	0.39	18.12	0.13	0.96	0.64	0.00	
17	Swale-OS-2	11.820	0 00:06	30.080	0.39	10.14	0.24	0.30	0.60	0.00	

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	26thSt	25.49	5876.00	0.00	5875.00	0.00	1.00	3.9200	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
2	Link-B10	35.65	5863.00	0.00	5863.00	0.00	0.00	0.0000	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
3	Link-H-01	230.30	5875.00	0.00	5841.00	0.00	34.00	14.7600	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
4	Link-H-02	177.03	5885.00	0.00	5841.00	0.00	44.00	24.8500	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
5	Link-H-03	169.29	5888.00	0.00	5858.00	0.00	30.00	17.7200	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
6	Link-H-04	134.40	5870.00	0.00	5858.00	0.00	12.00	8.9300	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
7	Link-H-Blake-S	33.46	5858.00	0.00	5858.00	0.00	0.00	0.0000	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
8	Pipe-29thSt	265.00	5851.40	0.00	5850.80	0.00	0.60	0.2300	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.000	No	1
9	Pipe-A1	24.33	5892.50	0.00	5892.20	0.20	0.30	1.2300	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
10	Pipe-A10	153.02	5896.00	0.00	5894.40	0.20	1.60	1.0500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
11	Pipe-A2	80.85	5892.00	0.00	5891.20	0.20	0.80	0.9900	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
12	Pipe-A3	133.17	5891.00	0.00	5889.70	0.20	1.30	0.9800	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
13	Pipe-A4	29.56	5889.50	0.00	5888.90	0.00	0.60	2.0300	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
14	Pipe-A5	117.00	5888.90	0.00	5886.50	0.20	2.40	2.0500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
15	Pipe-A6	240.10	5886.30	0.00	5879.80	3.00	6.50	2.7100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
16	Pipe-A7	54.21	5876.80	0.00	5863.00	0.00	13.80	25.4600	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
17	Pipe-A9	34.80	5894.20	0.00	5893.80	4.30	0.40	1.1500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
18	Pipe-B1	24.33	5879.60	0.00	5879.30	0.20	0.30	1.2300	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
19	Pipe-B11	15.00	5883.00	-0.30	5880.00	0.90	3.00	20.0000	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
20	Pipe-B12	15.00	5889.00	0.00	5888.00	0.00	1.00	6.6700	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
21	Pipe-B2	65.73	5879.10	0.00	5872.80	0.20	6.30	9.5800	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
22	Pipe-B3	82.21	5872.60	0.00	5864.70	0.00	7.90	9.6100	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
23	Pipe-B4	20.78	5876.90	0.00	5873.30	0.20	3.60	17.3300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.000	No	1
24	Pipe-B5	24.33	5873.10	0.00	5872.80	0.20	0.30	1.2300	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
25	Pipe-B6	24.34	5864.70	0.00	5864.50	0.00	0.20	0.8200	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.000	No	1
26	Pipe-B7	29.28	5870.20	0.00	5864.70	0.00	5.50	18.7800	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.000	No	1
27	Pipe-B8	57.48	5864.50	0.00	5864.00	0.00	0.50	0.8700	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.000	No	1
28	Pipe-B9	125.34	5864.00	0.00	5863.00	0.00	1.00	0.8000	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.000	No	1
29	Pipe-C1	14.31	5859.60	0.00	5859.20	0.20	0.40	2.8000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.000	No	1
30	Pipe-C2	19.75	5859.00	0.00	5858.80	0.30	0.20	1.0100	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.000	No	1
31	Pipe-C3	27.52	5858.80	0.30	5858.50	5.00	0.30	1.0900	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
32	Pipe-C4	20.00	5858.50	5.00	5858.40	0.00	0.10	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.000	No	1
33	Pipe-EDB-Control	28.55	5863.00	0.00	5862.00	0.00	1.00	3.5000	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
34	Pipe-UG-Control	20.00	5858.30	0.00	5858.20	0.00	0.10	0.5000	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)
1	26thSt	102.120	0 00:22	0.00	0.00	0.00		0.00	0.00	0.00
2	Link-B10	12.640	0 00:05	0.00	0.05	0.00		0.24	0.41	0.00
3	Link-H-01	102.440	0 00:22	0.00	0.13	0.00		0.31	0.52	0.00
4	Link-H-02	0.770	0 00:06	0.00	0.13	0.00		0.31	0.52	0.00
5	Link-H-03	0.610	0 00:06	0.00	0.13	0.00		0.31	0.52	0.00
6	Link-H-04	1.100	0 00:07	0.00	0.13	0.00		0.31	0.52	0.00
7	Link-H-Blake-S	15.990	0 00:06	0.00	0.13	0.00		0.31	0.52	0.00
8	Pipe-29thSt	5.860	0 00:12	5.41	1.08	3.85	1.15	1.41	0.94	0.00
9	Pipe-A1	0.860	0 00:05	4.29	0.20	4.98	0.08	0.30	0.30	0.00
10	Pipe-A10	1.110	0 00:05	3.95	0.28	7.14	0.36	0.36	0.36	0.00
11	Pipe-A2	1.540	0 00:05	3.84	0.40	4.64	0.29	0.44	0.44	0.00
12	Pipe-A3	2.570	0 00:05	3.81	0.67	5.26	0.42	0.60	0.60	0.00
13	Pipe-A4	3.660	0 00:05	9.97	0.37	7.50	0.07	0.52	0.42	0.00
14	Pipe-A5	4.150	0 00:05	5.53	0.75	7.77	0.25	0.65	0.65	0.00
15	Pipe-A6	4.110	0 00:06	6.35	0.65	8.72	0.46	0.58	0.58	0.00
16	Pipe-A7	6.480	0 00:06	19.47	0.33	22.29	0.04	0.40	0.40	0.00
17	Pipe-A9	1.110	0 00:05	4.14	0.27	4.47	0.13	0.35	0.35	0.00
18	Pipe-B1	0.570	0 00:05	4.29	0.13	4.34	0.09	0.25	0.25	0.00
19	Pipe-B11	3.200	0 00:05	32.82	0.10	16.99	0.01	0.26	0.21	0.00
20	Pipe-B12	11.510	0 00:06	18.07	0.64	15.59	0.02	0.72	0.58	0.00
21	Pipe-B2	5.810	0 00:05	21.67	0.27	14.97	0.07	0.44	0.35	0.00
22	Pipe-B3	9.110	0 00:05	21.69	0.42	16.91	0.08	0.57	0.45	0.00
23	Pipe-B4	0.880	0 00:05	5.45	0.16	11.47	0.03	0.18	0.27	0.00
24	Pipe-B5	1.370	0 00:05	4.29	0.32	4.85	0.08	0.39	0.39	0.00
25	Pipe-B6	11.730	0 00:05	22.21	0.53	7.17	0.06	1.03	0.52	0.00
26	Pipe-B7	0.870	0 00:05	5.67	0.15	11.78	0.04	0.18	0.26	0.00
27	Pipe-B8	11.810	0 00:05	22.86	0.52	7.34	0.13	1.02	0.51	0.00
28	Pipe-B9	12.640	0 00:05	21.89	0.58	7.24	0.29	1.09	0.55	0.00
29	Pipe-C1	0.440	0 00:05	2.19	0.20	4.91	0.05	0.20	0.30	0.00
30	Pipe-C2	1.120	0 00:05	1.32	0.85	4.24	0.08	0.47	0.71	0.00
31	Pipe-C3	3.320	0 00:07	7.31	0.45	5.81	0.08	0.59	0.47	0.00
32	Pipe-C4	4.370	0 00:05	8.05	0.54	4.65	0.07	0.79	0.52	0.00
33	Pipe-EDB-Control	0.160	0 00:16	13.10	0.01	3.66	0.13	0.10	0.08	0.00
34	Pipe-UG-Control	1.650	0 00:10	4.95	0.33	3.62	0.09	0.50	0.40	0.00

Inlet Input

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	A1-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5892.50	5896.57	4.07	5892.50	0.00	N/A	25.00
2	A2-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5892.00	5896.57	4.57	5892.00	0.00	N/A	25.00
3	A3-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5891.00	5896.76	5.76	5891.00	0.00	100.00	50.00
4	Inlet-A7-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5876.80	5883.87	7.07	5876.80	0.00	100.00	50.00
5	Inlet-B1-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5879.60	5883.39	3.79	5879.60	0.00	N/A	25.00
6	Inlet-B11-(Nylo)	CALTRANS	GCP	On Sag	1	5883.30	5899.00	15.70	5883.30	0.00	36.00	50.00
7	Inlet-B12-(Nylo)	CALTRANS	GCP	On Sag	1	5889.00	5901.00	12.00	5889.00	0.00	36.00	50.00
8	Inlet-B2-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5879.10	5883.39	4.29	5879.10	0.00	N/A	25.00
9	Inlet-B3-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5872.60	5876.84	4.24	5872.60	0.00	N/A	25.00
10	Inlet-B4-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5876.90	5880.96	4.06	5876.90	0.00	100.00	50.00
11	Inlet-B5-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5873.10	5876.84	3.74	5873.10	0.00	N/A	25.00
12	Inlet-B6-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5864.70	5868.74	4.04	5864.70	0.00	N/A	25.00
13	Inlet-B7-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5870.20	5874.26	4.06	5870.20	0.00	0.00	50.00
14	Inlet-B8-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5864.50	5868.74	4.24	5864.50	0.00	N/A	25.00
15	Inlet-C1-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5859.60	5862.19	2.59	5859.60	0.00	N/A	50.00
16	Inlet-C2-(Type-13)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5859.00	5861.29	2.29	5859.00	0.00	N/A	50.00
17	Inlet-C3-(Type-13)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5858.50	5861.29	2.79	5858.50	0.00	N/A	50.00
18	Inlet-C4-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5853.50	5862.46	8.96	5853.50	0.00	0.00	50.00
19	Inlet-Walmart	FHWA HEC-22 GENERIC	N/A	On Sag	1	5851.40	5856.00	4.60	5851.40	0.00	100.00	25.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	A1-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
2	A2-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
3	A3-(Type-16)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
4	Inlet-A7-(Type-16)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
5	Inlet-B1-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
6	Inlet-B11-(Nylo)	N/A	0.0208	0.0300	0.0620	2.00	0.0656	7.00
7	Inlet-B12-(Nylo)	N/A	0.0208	0.0300	0.0620	2.00	0.3937	7.00
8	Inlet-B2-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
9	Inlet-B3-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
10	Inlet-B4-(Type-16)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
11	Inlet-B5-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
12	Inlet-B6-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
13	Inlet-B7-(Type-16)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
14	Inlet-B8-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
15	Inlet-C1-(Type-16)	0.0100	0.0200	0.0160	0.0620	2.00	0.0656	7.00
16	Inlet-C2-(Type-13)	0.0100	0.0200	0.0160	0.0620	2.00	0.0656	7.00
17	Inlet-C3-(Type-13)	0.0100	0.0200	0.0160	0.0620	2.00	0.0656	7.00
18	Inlet-C4-(Type-16)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
19	Inlet-Walmart	N/A	0.0200	0.0160	0.0830	1.50	0.0656	7.00

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	Total Flooded Volume (ft^3)	Total Time Flooded (hr)
1	A1-(Type-R)	1.380	1.38	0.86	0.52	62.58	3.96	5896.75	0.17	0 00:05	0.00	0.00
2	A2-(Type-R)	0.950	0.51	0.69	0.26	72.66	3.01	5896.72	0.15	0 00:05	0.00	0.00
3	A3-(Type-16)	1.130	1.13	N/A	N/A	N/A	7.38	5897.15	0.39	0 00:05	0.00	0.00
4	Inlet-A7-(Type-16)	2.890	2.89	N/A	N/A	N/A	15.58	5884.42	0.56	0 00:06	0.00	0.00
5	Inlet-B1-(Type-R)	0.740	0.74	0.58	0.17	77.71	2.30	5883.53	0.14	0 00:05	0.00	0.00
6	Inlet-B11-(Nylo)	3.220	3.22	N/A	N/A	N/A	18.39	5899.63	0.63	0 00:05	0.00	0.00
7	Inlet-B12-(Nylo)	11.820	0.00	N/A	N/A	N/A	152.55	5905.09	4.09	0 00:06	0.00	0.00
8	Inlet-B2-(Type-R)	11.500	0.00	2.32	9.18	20.19	11.23	5883.71	0.32	0 00:05	0.00	0.00
9	Inlet-B3-(Type-R)	10.030	1.40	2.19	7.84	21.85	10.61	5877.15	0.31	0 00:05	0.00	0.00
10	Inlet-B4-(Type-16)	0.970	0.97	N/A	N/A	N/A	6.52	5881.30	0.34	0 00:05	0.00	0.00
11	Inlet-B5-(Type-R)	0.610	0.45	0.50	0.10	82.76	1.84	5876.97	0.13	0 00:05	0.00	0.00
12	Inlet-B6-(Type-R)	8.130	0.52	2.00	6.13	24.66	9.71	5869.03	0.29	0 00:05	0.00	0.00
13	Inlet-B7-(Type-16)	0.880	0.88	N/A	N/A	N/A	5.92	5874.59	0.33	0 00:05	0.00	0.00
14	Inlet-B8-(Type-R)	0.100	0.00	0.09	0.01	88.56	0.30	5868.77	0.02	0 00:05	0.00	0.00
15	Inlet-C1-(Type-16)	0.540	0.54	0.44	0.10	81.17	4.32	5862.36	0.17	0 00:05	0.00	0.00
16	Inlet-C2-(Type-13)	0.860	0.76	0.68	0.18	78.89	5.60	5861.48	0.20	0 00:05	0.00	0.00
17	Inlet-C3-(Type-13)	6.350	0.43	2.58	3.77	40.60	13.94	5861.65	0.36	0 00:07	0.00	0.00
18	Inlet-C4-(Type-16)	1.280	1.28	N/A	N/A	N/A	8.14	5862.87	0.41	0 00:05	0.00	0.00
19	Inlet-Walmart	5.460	0.20	N/A	N/A	N/A	15.32	5856.57	0.57	0 00:08	0.00	0.00

Storage Nodes

Storage Node : EDB-Detention

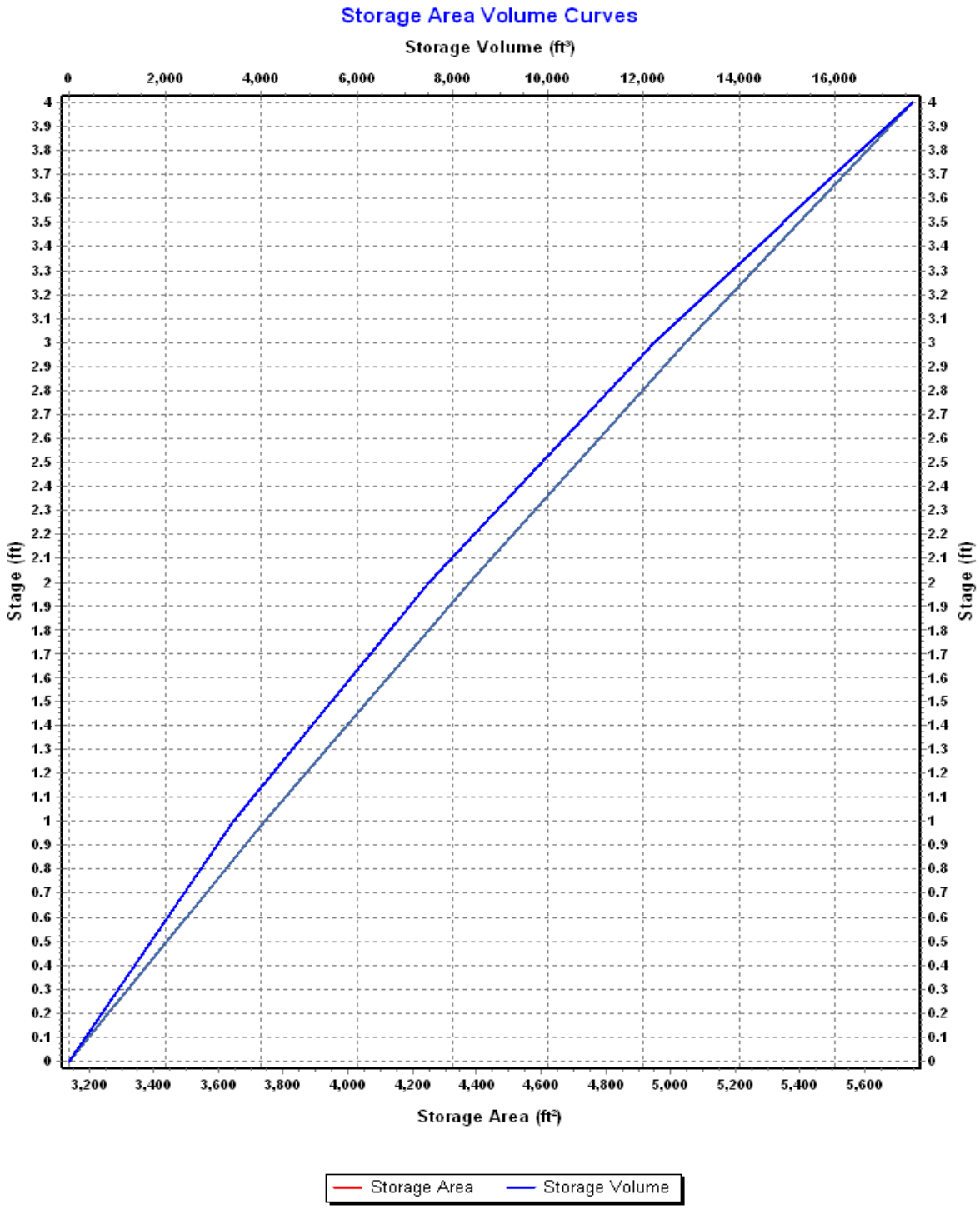
Input Data

Invert Elevation (ft)	5863.00
Max (Rim) Elevation (ft)	5869.00
Max (Rim) Offset (ft)	6.00
Initial Water Elevation (ft)	5863.00
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : EDB

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	3139	0.000
1	3744	3441.50
2	4379	7503.00
3	5044	12214.50
4	5747	17610.00


Storage Area Volume Curves
Storage Volume (ft³)
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
Stage (ft)
Stage (ft)
Storage Area (ft²)
3,200
3,400
3,600
3,800
4,000
4,200
4,400
4,600
4,800
5,000
5,200
5,400
5,600
Storage Area
Storage Volume

Storage Node : EDB-Detention (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-EDB-100	Rectangular	No	5865.50	2.50	7.50	0.50	3.33
2	Weir-EDB-25	Rectangular	No	5864.75	1.75	0.25	0.75	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	Orifice-EDB-WQCV	Side	CIRCULAR	No	1.25			5863.00	0.61

Output Summary Results

Peak Inflow (cfs)	19.08
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.16
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	5865.00
Max HGL Depth Attained (ft)	2
Average HGL Elevation Attained (ft)	5864.81
Average HGL Depth Attained (ft)	1.81
Time of Max HGL Occurrence (days hh:mm)	0 00:16
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : UG-Detention

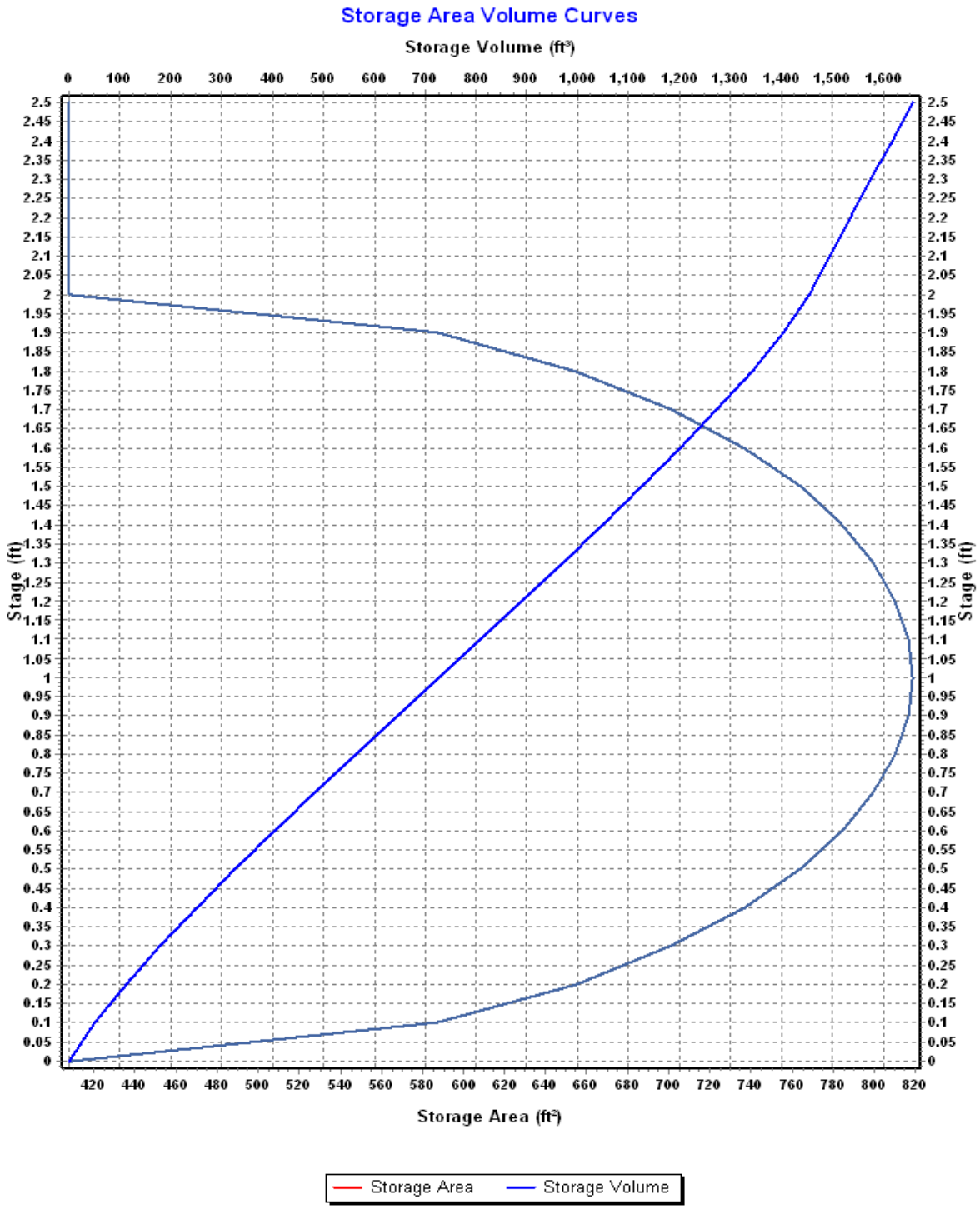
Input Data

Invert Elevation (ft)	5858.40
Max (Rim) Elevation (ft)	5861.40
Max (Rim) Offset (ft)	3.00
Initial Water Elevation (ft)	5858.40
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : UG-Detention

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	408.0000	0.000
0.1	586.8892	49.74
0.2	654.2400	111.80
0.3	701.0842	179.57
0.4	736.3200	251.44
0.5	763.4168	326.43
0.6	784.1378	403.81
0.7	799.4966	482.99
0.8	810.1082	563.47
0.9	816.3428	644.79
1	818.4000	726.53
1.1	816.3428	808.27
1.2	810.1082	889.59
1.3	799.4966	970.07
1.4	784.1378	1049.25
1.5	763.4168	1126.63
1.6	736.3200	1201.62
1.7	701.0842	1273.49
1.8	654.2400	1341.26
1.9	586.8892	1403.32
2	408.0000	1453.06
2.1	408.0000	1493.86
2.2	408.0000	1534.66
2.3	408.0000	1575.46
2.4	408.0000	1616.26
2.5	408.0000	1657.06


Storage Area Volume Curves
Storage Volume (ft³)
0 100 200 300 400 500 600 700 800 900 1,000 1,100 1,200 1,300 1,400 1,500 1,600
Stage (ft)
2.5 2.45 2.4 2.35 2.3 2.25 2.2 2.15 2.1 2.05 2 1.95 1.9 1.85 1.8 1.75 1.7 1.65 1.6 1.55 1.5 1.45 1.4 1.35 1.3 1.25 1.2 1.15 1.1 1.05 1 0.95 0.9 0.85 0.8 0.75 0.7 0.65 0.6 0.55 0.5 0.45 0.4 0.35 0.3 0.25 0.2 0.15 0.1 0.05 0
420 440 460 480 500 520 540 560 580 600 620 640 660 680 700 720 740 760 780 800 820
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : UG-Detention (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-UG-100	Rectangular	No	5859.90	1.50	1.00	0.50	3.33
2	Weir-UG-25	Rectangular	No	5858.40	0.00	0.25	1.50	3.33

Output Summary Results

Peak Inflow (cfs)	4.37
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	1.65
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	5859.96
Max HGL Depth Attained (ft)	1.56
Average HGL Elevation Attained (ft)	5858.63
Average HGL Depth Attained (ft)	0.23
Time of Max HGL Occurrence (days hh:mm)	0 00:10
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : Walmart-Detention

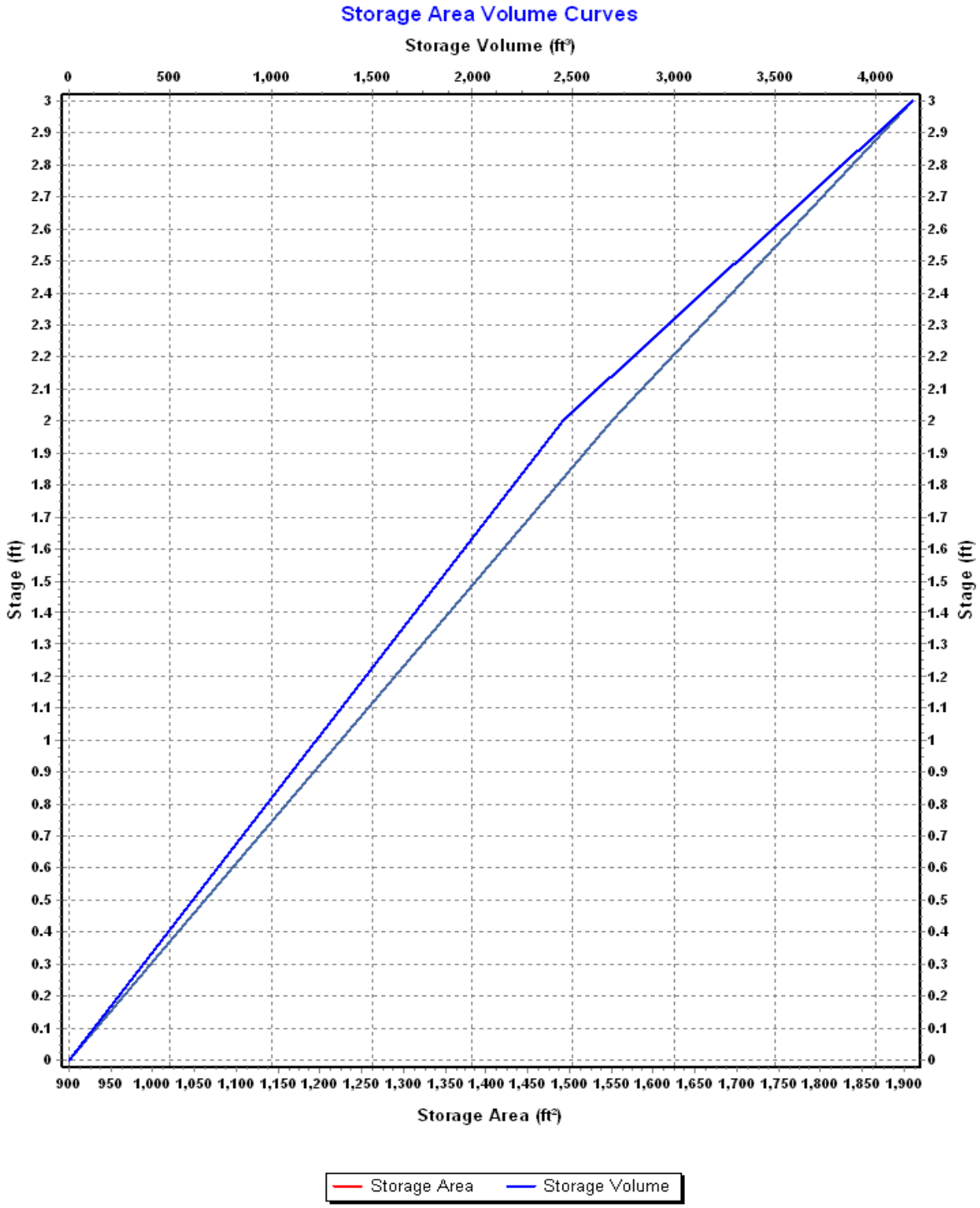
Input Data

Invert Elevation (ft)	5852.00
Max (Rim) Elevation (ft)	5855.00
Max (Rim) Offset (ft)	3.00
Initial Water Elevation (ft)	5852.00
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Walmart

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	900	0.000
2	1550	2450.00
3	1910	4180.00


Storage Area Volume Curves
Storage Volume (ft³)
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
Stage (ft)
Storage Area (ft²)
900
950
1,000
1,050
1,100
1,150
1,200
1,250
1,300
1,350
1,400
1,450
1,500
1,550
1,600
1,650
1,700
1,750
1,800
1,850
1,900
Storage Area
Storage Volume

Storage Node : Walmart-Detention (continued)

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	Walmart-Det-Control	Side	CIRCULAR	No	5.60			5852.00	0.61

Output Summary Results

Peak Inflow (cfs)	5.45
Peak Lateral Inflow (cfs)	5.45
Peak Outflow (cfs)	1.13
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	5854.02
Max HGL Depth Attained (ft)	2.02
Average HGL Elevation Attained (ft)	5852.47
Average HGL Depth Attained (ft)	0.47
Time of Max HGL Occurrence (days hh:mm)	0 00:18
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Project Description

File Name 20002-SSA.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... Rational
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Kinematic Wave
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ..... YES

Rainfall Details

Return Period..... 100 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ft³)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Blake@Walmart	0.040	0.97	0.55	0.53	77.0	0.26	0 00:05:00
2	H/Ex-01	1.551	0.37	0.67	0.25	1385.3	3.20	0 00:07:12
3	H/Ex-02	0.461	0.37	0.63	0.23	391.6	0.99	0 00:06:30
4	H/Ex-03	0.366	0.37	0.63	0.23	310.0	0.79	0 00:06:32
5	H/Ex-05	3.903	0.37	0.75	0.28	3938.8	7.37	0 00:08:45
6	H/Ex-OS-1	124.700	0.36	1.10	0.40	179253.8	131.82	0 00:22:27
7	H/Ex-OS-2	9.370	0.28	0.62	0.18	5952.3	15.50	0 00:06:19
8	H-04	0.702	0.37	0.67	0.25	634.7	1.43	0 00:07:23
9	Pr-01	0.570	0.48	0.55	0.26	541.8	1.79	0 00:05:00
10	Pr-02	0.122	0.83	0.55	0.45	201.5	0.67	0 00:05:00
11	Pr-03	0.283	0.79	0.55	0.43	444.3	1.47	0 00:05:00
12	Pr-04	0.330	0.33	0.55	0.18	215.6	0.71	0 00:05:00
13	Pr-05	0.147	0.77	0.55	0.42	224.2	0.74	0 00:05:00
14	Pr-06	0.292	0.78	0.55	0.43	450.9	1.49	0 00:05:00
15	Pr-07	0.745	0.77	0.55	0.42	1137.8	3.76	0 00:05:00
16	Pr-08	0.181	0.81	0.55	0.44	291.2	0.96	0 00:05:00
17	Pr-09	1.677	0.38	0.55	0.21	1266.2	4.18	0 00:05:00
18	Pr-10	0.417	0.46	0.55	0.25	379.6	1.26	0 00:05:00
19	Pr-11	0.221	0.87	0.55	0.48	381.0	1.26	0 00:05:00
20	Pr-12	0.145	0.62	0.55	0.34	178.6	0.59	0 00:05:00
21	Pr-13	0.414	0.67	0.55	0.37	550.4	1.82	0 00:05:00
22	Pr-14	0.203	0.86	0.55	0.47	345.6	1.14	0 00:05:00
23	Pr-15	0.130	0.79	0.55	0.43	204.1	0.67	0 00:05:00
24	Pr-16	0.167	0.71	0.55	0.39	235.4	0.78	0 00:05:00
25	Pr-17	0.050	0.63	0.55	0.34	62.7	0.21	0 00:05:00
26	Pr-18	0.114	0.95	0.55	0.52	213.8	0.71	0 00:05:00
27	Pr-19	0.104	0.82	0.55	0.45	169.6	0.56	0 00:05:00
28	Pr-20	0.309	0.82	0.55	0.45	502.3	1.66	0 00:05:00
29	Pr-21	0.364	0.55	0.55	0.30	397.7	1.31	0 00:05:00
30	Pr-OS-1	124.700	0.36	1.10	0.40	179253.8	131.82	0 00:22:27
31	Pr-OS-2	9.370	0.28	0.62	0.18	5952.3	15.50	0 00:06:19
32	Walmart	1.550	0.95	0.80	0.76	4287.4	7.08	0 00:10:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ft³)	Total Time Flooded (min)
1	EDB-Control	Junction	5863.00	5866.00	5863.00	0.00	0.00	0.470	5863.16	0.00	2.84	0 00:00	0.00	0.00
2	FES-B10	Junction	5863.00	5869.00	5863.00	0.00	0.00	15.550	5864.25	0.00	4.75	0 00:00	0.00	0.00
3	Int-Blake-Palmer	Junction	5859.50	5859.50	5859.50	0.00	0.00	6.800	5859.86	0.00	0.24	0 00:00	0.00	0.00
4	Junc.H-04	Junction	5870.00	5876.00	5870.00	5876.00	0.00	1.430	5870.00	0.00	6.00	0 00:00	0.00	0.00
5	Junc.H-Blake-S	Junction	5858.00	5864.00	5858.00	5864.00	0.00	20.780	5858.00	0.00	6.00	0 00:00	0.00	0.00
6	Junc-H-02	Junction	5885.00	5891.00	5885.00	5891.00	0.00	0.990	5885.00	0.00	6.00	0 00:00	0.00	0.00
7	Junc-H-03	Junction	5888.00	5894.00	5888.00	5894.00	0.00	0.790	5888.00	0.00	6.00	0 00:00	0.00	0.00
8	Junc-Pr-Blake-S	Junction	5858.20	5858.20	5858.20	0.00	0.00	9.140	5858.88	0.00	0.57	0 00:00	0.00	0.00
9	OS-1a	Junction	5942.00	5942.00	5942.00	0.00	0.00	131.820	5943.09	0.00	0.41	0 00:00	0.00	0.00
10	OS-1b	Junction	5906.00	5906.00	5906.00	0.00	0.00	131.640	5907.09	0.00	0.41	0 00:00	0.00	0.00
11	OS-2a	Junction	5942.00	5942.00	5942.00	0.00	0.00	15.500	5942.35	0.00	0.15	0 00:00	0.00	0.00
12	Out-H-01	Junction	5875.00	5881.00	5875.00	5881.00	0.00	131.820	5875.00	0.00	6.00	0 00:00	0.00	0.00
13	Pr-26th	Junction	5876.00	5877.00	5876.00	11753.00	0.00	131.440	5876.57	0.00	0.43	0 00:00	0.00	0.00
14	Road-Palmer-B-12	Junction	5888.00	5888.00	5888.00	0.00	0.00	14.830	5888.86	0.00	0.39	0 00:00	0.00	0.00
15	SDHM-A10	Junction	5896.00	5899.00	5896.00	5899.00	0.00	1.490	5896.43	0.00	2.57	0 00:00	0.00	0.00
16	SDMH-A4	Junction	5889.50	5899.80	5889.50	5899.80	0.00	4.660	5894.21	0.00	5.59	0 00:00	0.00	0.00
17	SDMH-A5	Junction	5888.90	5893.65	5888.90	5893.65	0.00	5.320	5889.69	0.00	3.96	0 00:00	0.00	0.00
18	SDMH-A6	Junction	5886.30	5890.77	5886.30	5890.77	0.00	5.300	5887.28	0.00	3.49	0 00:00	0.00	0.00
19	SDMH-A9	Junction	5894.20	5900.19	5894.20	5900.19	0.00	1.440	5894.82	0.00	5.37	0 00:00	0.00	0.00
20	SDMH-B9	Junction	5864.00	5867.21	5864.00	5867.21	0.00	15.640	5865.25	0.00	1.96	0 00:00	0.00	0.00
21	UG-Detention-Control	Junction	5858.30	5858.30	5858.30	0.00	0.00	2.860	5858.98	0.00	1.32	0 00:00	0.00	0.00
22	Out-H-26th	Outfall	5841.00					131.820	5841.00					
23	Out-H-27thSt	Outfall	5858.00					2.120	5858.00					
24	Out-H-Blake-Sb	Outfall	5858.00					20.780	5858.00					
25	Out-Pr-26thSt	Outfall	5875.00					131.440	5875.00					
26	Out-Pr--27thSt	Outfall	5862.00					0.470	5862.16					
27	Out-Pr-29thSt	Outfall	5850.80					5.860	5852.30					
28	EDB-Detention	Storage Node	5863.00	5869.00	5863.00		0.00	24.020	5865.37				0.00	0.00
29	UG-Detention	Storage Node	5858.40	5861.40	5858.40		0.00	5.640	5860.33				0.00	0.00
30	Walmart-Detention	Storage Node	5852.00	5855.00	5852.00		0.00	7.080	5854.54				0.00	0.00

Replace w/ the MHFD Detention Basin Design Workbook value for an EDB outflow control (2.09 cfs)

The existing 18"dia pipe leading from the inlet near Walmart will be slightly surcharged, but should not exceed the structure rim.

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)
1	26thSt	Pipe	Pr-26th	Out-Pr-26thSt	25.49	5876.00	5875.00	3.9200	0.000	0.0120	131.440	0.00	0.00	0.00	0.00	0.00	0.00
2	Link-B10	Pipe	FES-B10	EDB-Detention	35.65	5863.00	5863.00	0.0000	0.000	0.0120	15.550	0.00	0.08	0.00	0.28	0.46	0.00
3	Link-H-01	Pipe	Out-H-01	Out-H-26th	230.30	5875.00	5841.00	14.7600	0.000	0.0120	131.820	0.00	0.20	0.00	0.36	0.59	0.00
4	Link-H-02	Pipe	Junc-H-02	Out-H-26th	177.03	5885.00	5841.00	24.8500	0.000	0.0120	0.990	0.00	0.20	0.00	0.36	0.59	0.00
5	Link-H-03	Pipe	Junc-H-03	Out-H-27thSt	169.29	5888.00	5858.00	17.7200	0.000	0.0120	0.790	0.00	0.20	0.00	0.36	0.59	0.00
6	Link-H-04	Pipe	Junc.H-04	Out-H-27thSt	134.40	5870.00	5858.00	8.9300	0.000	0.0120	1.430	0.00	0.20	0.00	0.36	0.59	0.00
7	Link-H-Blake-S	Pipe	Junc.H-Blake-S	Out-H-Blake-Sb	33.46	5858.00	5858.00	0.0000	0.000	0.0120	20.780	0.00	0.20	0.00	0.36	0.59	0.00
8	Pipe-29thSt	Pipe	Inlet-Walmart	Out-Pr-29thSt	265.00	5851.40	5850.80	0.2300	18.000	0.0120	5.860	5.41	1.08	3.88	1.50	1.00	5.00
9	Pipe-A1	Pipe	A1-(Type-R)	A2-(Type-R)	24.33	5892.50	5892.20	1.2300	12.000	0.0120	0.990	4.29	0.23	5.26	0.33	0.33	0.00
10	Pipe-A10	Pipe	SDHM-A10	SDMH-A9	153.02	5896.00	5894.40	1.0500	12.000	0.0120	1.440	3.95	0.37	7.54	0.42	0.42	0.00
11	Pipe-A2	Pipe	A2-(Type-R)	A3-(Type-16)	80.85	5892.00	5891.20	0.9900	12.000	0.0120	1.830	3.84	0.48	4.85	0.49	0.49	0.00
12	Pipe-A3	Pipe	A3-(Type-16)	SDMH-A4	133.17	5891.00	5889.70	0.9800	12.000	0.0120	3.220	3.81	0.85	5.53	0.70	0.70	0.00
13	Pipe-A4	Pipe	SDMH-A4	SDMH-A5	29.56	5889.50	5888.90	2.0300	15.000	0.0120	4.660	9.97	0.47	7.99	0.60	0.48	0.00
14	Pipe-A5	Pipe	SDMH-A5	SDMH-A6	117.00	5888.90	5886.50	2.0500	12.000	0.0120	5.300	5.53	0.96	8.11	0.78	0.78	0.00
15	Pipe-A6	Pipe	SDMH-A6	Inlet-A7-(Type-16)	240.10	5886.30	5879.80	2.7100	12.000	0.0120	5.260	6.35	0.83	9.20	0.69	0.69	0.00
16	Pipe-A7	Pipe	Inlet-A7-(Type-16)	EDB-Detention	54.21	5876.80	5863.00	25.4600	12.000	0.0120	8.520	19.47	0.44	23.96	0.46	0.46	0.00
17	Pipe-A9	Pipe	SDMH-A9	SDMH-A4	34.80	5894.20	5893.80	1.1500	12.000	0.0120	1.440	4.14	0.35	4.80	0.41	0.41	0.00
18	Pipe-B1	Pipe	Inlet-B1-(Type-R)	Inlet-B2-(Type-R)	24.33	5879.60	5879.30	1.2300	12.000	0.0120	0.700	4.29	0.16	4.60	0.27	0.27	0.00
19	Pipe-B11	Pipe	Inlet-B11-(Nylo)	Inlet-B2-(Type-R)	15.00	5883.00	5880.00	20.0000	15.000	0.0120	4.160	32.82	0.13	18.34	0.30	0.24	0.00
20	Pipe-B12	Pipe	Inlet-B12-(Nylo)	Road-Palmer-B-12	15.00	5889.00	5888.00	6.6700	15.000	0.0120	14.830	18.07	0.82	16.43	0.86	0.69	0.00
21	Pipe-B2	Pipe	Inlet-B2-(Type-R)	Inlet-B3-(Type-R)	65.73	5879.10	5872.80	9.5800	15.000	0.0120	7.130	21.67	0.33	15.83	0.49	0.39	0.00
22	Pipe-B3	Pipe	Inlet-B3-(Type-R)	Inlet-B6-(Type-R)	82.21	5872.60	5864.70	9.6100	15.000	0.0120	11.160	21.69	0.51	17.82	0.64	0.51	0.00
23	Pipe-B4	Pipe	Inlet-B4-(Type-16)	Inlet-B5-(Type-R)	20.78	5876.90	5873.30	17.3300	8.000	0.0120	1.230	5.45	0.23	12.60	0.22	0.32	0.00
24	Pipe-B5	Pipe	Inlet-B5-(Type-R)	Inlet-B3-(Type-R)	24.33	5873.10	5872.80	1.2300	12.000	0.0120	1.850	4.29	0.43	5.26	0.46	0.46	0.00
25	Pipe-B6	Pipe	Inlet-B6-(Type-R)	Inlet-B8-(Type-R)	24.34	5864.70	5864.50	0.8200	24.000	0.0120	14.320	22.21	0.64	7.51	1.17	0.58	0.00
26	Pipe-B7	Pipe	Inlet-B7-(Type-16)	Inlet-B6-(Type-R)	29.28	5870.20	5864.70	18.7800	8.000	0.0120	1.140	5.67	0.20	12.74	0.20	0.30	0.00
27	Pipe-B8	Pipe	Inlet-B8-(Type-R)	SDMH-B9	57.48	5864.50	5864.00	0.8700	24.000	0.0120	14.470	22.86	0.63	7.71	1.16	0.58	0.00
28	Pipe-B9	Pipe	SDMH-B9	FES-B10	125.34	5864.00	5863.00	0.8000	24.000	0.0120	15.550	21.89	0.71	7.60	1.24	0.62	0.00
29	Pipe-C1	Pipe	Inlet-C1-(Type-16)	Inlet-C2-(Type-13)	14.31	5859.60	5859.20	2.8000	8.000	0.0120	0.520	2.19	0.24	5.15	0.22	0.33	0.00
30	Pipe-C2	Pipe	Inlet-C2-(Type-13)	Inlet-C3-(Type-13)	19.75	5859.00	5858.80	1.0100	8.000	0.0120	1.410	1.32	1.07	4.42	0.61	0.92	0.00
31	Pipe-C3	Pipe	Inlet-C3-(Type-13)	Inlet-C4-(Type-16)	27.52	5858.80	5858.50	1.0900	15.000	0.0120	4.200	7.31	0.58	6.16	0.68	0.54	0.00
32	Pipe-C4	Pipe	Inlet-C4-(Type-16)	UG-Detention	20.00	5858.50	5858.40	0.5000	18.000	0.0120	5.640	8.05	0.70	4.93	0.92	0.62	0.00
33	Pipe-EDB-Control	Pipe	EDB-Control	Out-Pr--27thSt	28.55	5863.00	5862.00	3.5000	15.000	0.0120	0.470	13.10	0.04	5.04	0.16	0.13	0.00
34	Pipe-UG-Control	Pipe	UG-Detention-Control	Junc-Pr-Blake-S	20.00	5858.30	5858.20	0.5000	15.000	0.0120	2.860	4.95	0.58	4.18	0.68	0.55	0.00
35	Bypass-A1	Channel	A1-(Type-R)	A2-(Type-R)	31.56	5896.57	5896.57	0.0100	7.200	0.0160	0.750	19.28	0.04	1.92	0.23	0.38	0.00
36	Bypass-A2	Channel	A2-(Type-R)	Pr-26th	140.00	5896.57	5876.00	14.6900	12.000	0.0160	0.500	565.61	0.00	4.65	0.09	0.09	0.00
37	Bypass-B1	Channel	Inlet-B1-(Type-R)	Inlet-B5-(Type-R)	64.47	5883.39	5876.84	10.1700	7.200	0.0160	0.260	68.98	0.00	6.05	0.10	0.17	0.00
38	Bypass-B2	Channel	Inlet-B2-(Type-R)	Inlet-B3-(Type-R)	71.42	5883.39	5876.84	9.1800	7.200	0.0160	12.230	65.53	0.19	7.49	0.35	0.59	0.00
39	Bypass-B3	Channel	Inlet-B3-(Type-R)	Inlet-B6-(Type-R)	85.00	5876.84	5868.74	9.5300	7.200	0.0160	10.870	66.77	0.16	7.30	0.34	0.57	0.00
40	Bypass-B5	Channel	Inlet-B5-(Type-R)	Inlet-B8-(Type-R)	80.66	5876.84	5868.74	10.0300	7.200	0.0160	0.200	68.52	0.00	3.79	0.09	0.16	0.00
41	Bypass-B6	Channel	Inlet-B6-(Type-R)	Inlet-C3-(Type-13)	84.14	5868.74	5861.29	8.8600	7.200	0.0160	8.950	64.40	0.14	6.77	0.33	0.54	0.00
42	Bypass-B8	Channel	Inlet-B8-(Type-R)	Inlet-C2-(Type-13)	78.55	5868.74	5861.29	9.4900	7.200	0.0160	0.020	66.65	0.00	2.19	0.04	0.07	0.00
43	Bypass-C1	Channel	Inlet-C1-(Type-16)	Inlet-C2-(Type-13)	18.27	5862.19	5861.29	4.9300	7.200	0.0160	0.180	95.74	0.00	4.05	0.08	0.13	0.00
44	Bypass-C2	Channel	Inlet-C2-(Type-13)	Int-Blake-Palmer	51.37	5861.29	5859.50	3.4800	7.200	0.0160	0.320	80.42	0.00	2.36	0.11	0.18	0.00
45	Bypass-C3	Channel	Inlet-C3-(Type-13)	Int-Blake-Palmer	58.47	5861.29	5859.50	3.0600	7.200	0.0160	5.980	75.38	0.08	3.49	0.28	0.46	0.00
46	Link-Blake-S	Channel	Int-Blake-Palmer	Junc-Pr-Blake-S	230.46	5859.50	5858.20	0.5600	7.200	0.0160	6.520	32.38	0.20	4.72	0.36	0.59	0.00
47	Out-Pr-Blake	Channel	Junc-Pr-Blake-S	Inlet-Walmart	200.00	5858.20	5856.00	1.1000	7.200	0.0160	8.950	45.21	0.20	2.73	0.36	0.60	0.00
48	Road-B12	Channel	Road-Palmer-B-12	Inlet-B2-(Type-R)	48.58	5888.00	5883.39	9.4800	7.200	0.0160	14.830	132.73	0.11	6.62	0.31	0.51	0.00
49	Road-OS-1b	Channel	OS-1b	Pr-26th	240.00	5906.00	5876.00	12.5000	12.000	0.0160	131.440	521.70	0.25	15.75	0.57	0.57	0.00
50	Swale-OS-1a	Channel	OS-1a	OS-1b	143.20	5942.00	5804.00	96.3700	18.000	0.0300	131.640	260.63	0.51	19.39	1.09	0.72	0.00
51	Swale-OS-2	Channel	OS-2a	Inlet-B12-(Nylo)	146.88	5942.00	5889.00	36.0800	6.000	0.0300	15.370	30.08	0.51	11.00	0.35	0.69	0.00
52	Orifice-EDB-WQCV	Orifice	EDB-Detention	EDB-Control		5863.00	5863.00		1.250		0.060						
53	Walmart-Det-Control	Orifice	Walmart-Detention	Inlet-Walmart		5852.00	5851.40		5.600		1.280						
54	Weir-EDB-100	Weir	EDB-Detention	EDB-Control		5863.00	5863.00				0.000						
55	Weir-EDB-25	Weir	EDB-Detention	EDB-Control		5863.00	5863.00				0.400						
56	Weir-UG-100	Weir	UG-Detention	UG-Detention-Control		5858.40	5858.30				0.940						
57	Weir-UG-25	Weir	UG-Detention	UG-Detention-Control		5858.40	5858.30				1.920						

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Inlet Summary

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	A1-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5892.50	5896.57	5892.50	N/A	1.790	1.00	0.80	55.59	7.00	4.66	5896.76
2	A2-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5892.00	5896.57	5892.00	N/A	1.370	0.86	0.51	62.76	7.00	3.94	5896.74
3	A3-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5891.00	5896.76	5891.00	100.00	1.470	N/A	N/A	N/A	7.00	9.09	5897.19
4	Inlet-A7-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5876.80	5883.87	5876.80	100.00	3.760	N/A	N/A	N/A	7.00	22.92	5884.55
5	Inlet-B1-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5879.60	5883.39	5879.60	N/A	0.960	0.70	0.26	72.52	7.00	3.04	5883.55
6	Inlet-B11-(Nylo)	CALTRANS	GCP	On Sag	1	5883.30	5899.00	5883.30	36.00	4.180	N/A	N/A	N/A	7.00	21.82	5899.70
7	Inlet-B12-(Nylo)	CALTRANS	GCP	On Sag	1	5889.00	5901.00	5889.00	36.00	15.370	N/A	N/A	N/A	7.00	257.50	5907.06
8	Inlet-B2-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5879.10	5883.39	5879.10	N/A	14.830	2.58	12.24	17.43	7.00	12.45	5883.74
9	Inlet-B3-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5872.60	5876.84	5872.60	N/A	13.350	2.47	10.88	18.52	7.00	11.93	5877.17
10	Inlet-B4-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5876.90	5880.96	5876.90	100.00	1.260	N/A	N/A	N/A	7.00	8.03	5881.37
11	Inlet-B5-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5873.10	5876.84	5873.10	N/A	0.840	0.63	0.21	75.07	7.00	2.62	5876.98
12	Inlet-B6-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5864.70	5868.74	5864.70	N/A	11.270	2.30	8.96	20.43	7.00	11.13	5869.06
13	Inlet-B7-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5870.20	5874.26	5870.20	0.00	1.140	N/A	N/A	N/A	7.00	7.45	5874.65
14	Inlet-B8-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5864.50	5868.74	5864.50	N/A	0.200	0.18	0.02	88.56	7.00	0.61	5868.79
15	Inlet-C1-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5859.60	5862.19	5859.60	N/A	0.710	0.52	0.18	73.94	7.00	4.98	5862.37
16	Inlet-C2-(Type-13)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5859.00	5861.29	5859.00	N/A	1.180	0.85	0.33	72.34	7.00	6.65	5861.51
17	Inlet-C3-(Type-13)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5858.50	5861.29	5858.50	N/A	9.270	3.27	6.00	35.27	7.00	16.20	5861.70
18	Inlet-C4-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5853.50	5862.46	5853.50	0.00	1.660	N/A	N/A	N/A	7.00	10.07	5862.91
19	Inlet-Walmart	FHWA HEC-22 GENERIC	N/A	On Sag	1	5851.40	5856.00	5851.40	100.00	8.980	N/A	N/A	N/A	7.00	21.39	5856.69

The existing inlet is a single (5') CDOT Type-R. The inlet curb opening must be increased to a triple (15') to accomodate the increased flow.

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Subbasin Hydrology

Subbasin : Blake@Walmart

Input Data

Area (ac) 0.04
Weighted Runoff Coefficient 0.9700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.04	B (6%+)	0.97
Composite Area & Weighted Runoff Coeff.	0.04		0.97

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

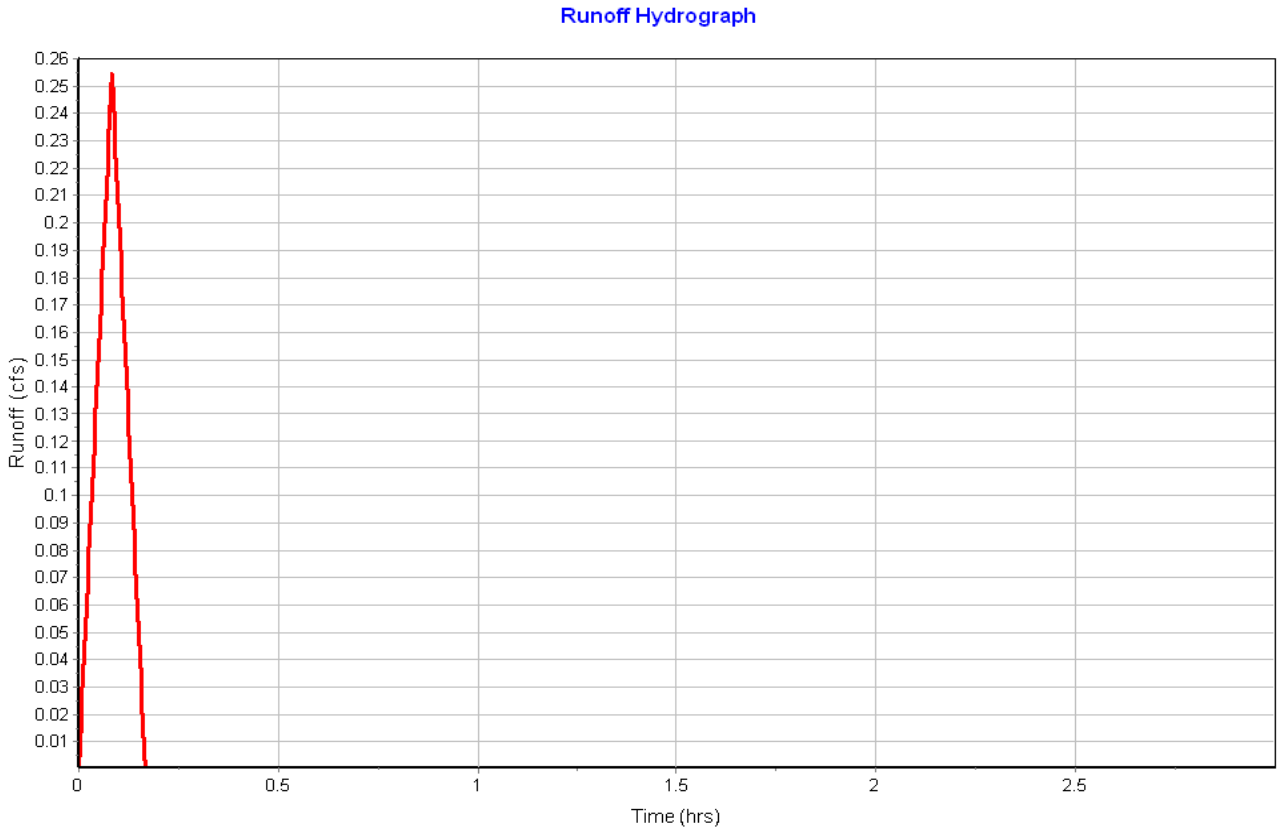
Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.53
Peak Runoff (cfs) 0.26
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.9700
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Blake@Walmart



Subbasin : H/Ex-01

Input Data

Area (ac) 1.55
Weighted Runoff Coefficient 0.3700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	1.55	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	1.55		0.37

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	23	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.29	0.00	0.00
Computed Flow Time (min) :	5.74	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	440	0.00	0.00
Slope (%) :	9.6	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	5.00	0.00	0.00
Computed Flow Time (min) :	1.47	0.00	0.00

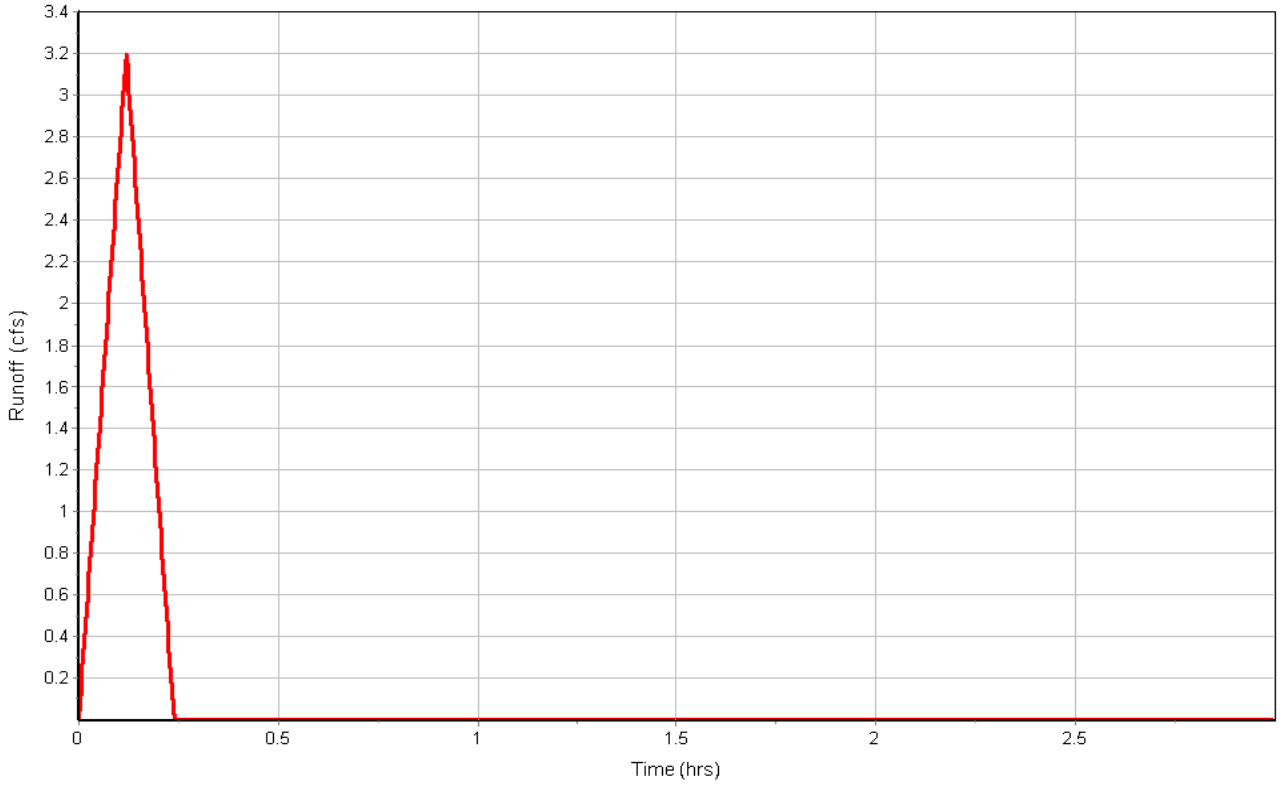
Total TOC (min) 7.21

Subbasin Runoff Results

Total Rainfall (in) 0.67
Total Runoff (in) 0.25
Peak Runoff (cfs) 3.20
Rainfall Intensity 5.569
Weighted Runoff Coefficient 0.3700
Time of Concentration (days hh:mm:ss) 0 00:07:13

Subbasin : H/Ex-01

Runoff Hydrograph



Subbasin : H/Ex-02

Input Data

Area (ac) 0.46
Weighted Runoff Coefficient 0.3700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	0.46	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	0.46		0.37

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	19	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.27	0.00	0.00
Computed Flow Time (min) :	6.20	0.00	0.00

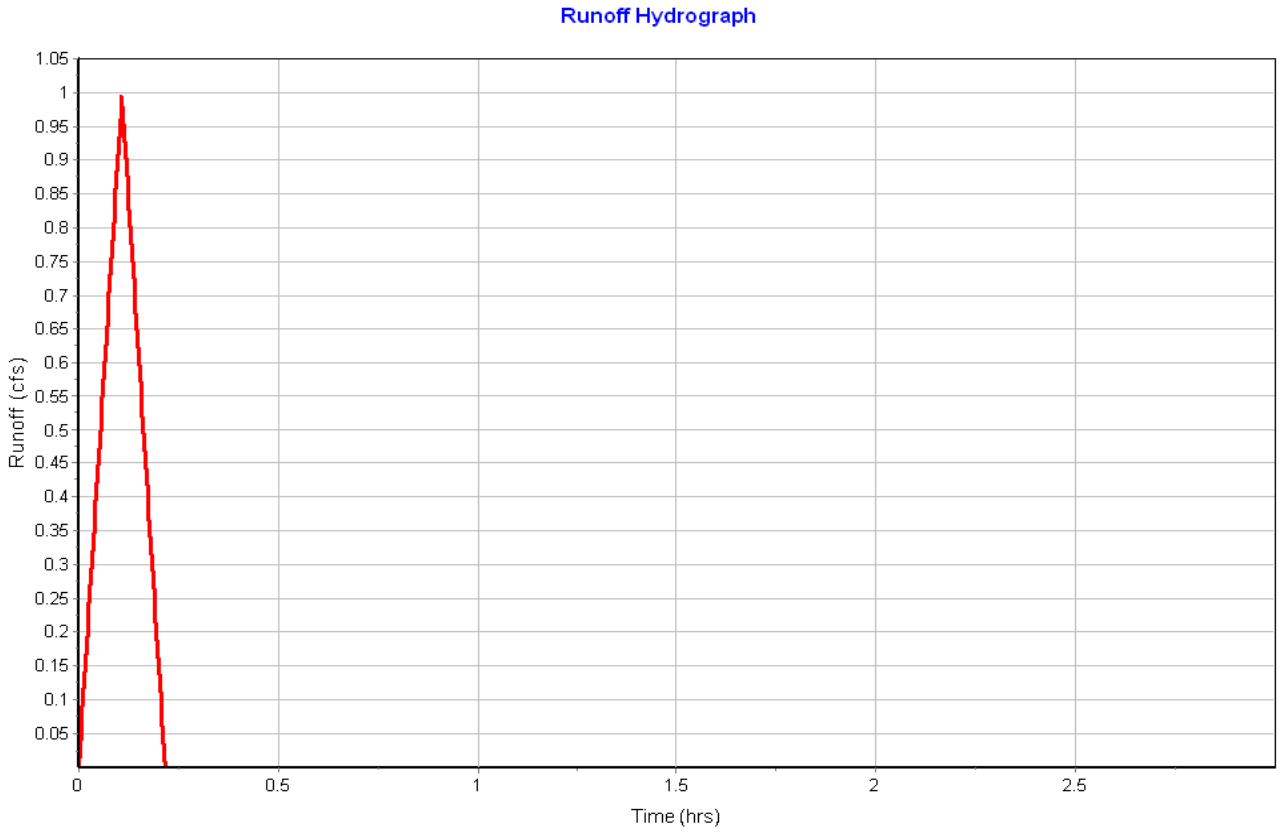
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	75	0.00	0.00
Slope (%) :	16	0.00	0.00
Surface Type :	Bare & untilled	Unpaved	Unpaved
Velocity (ft/sec) :	4.00	0.00	0.00
Computed Flow Time (min) :	0.31	0.00	0.00

Total TOC (min) 6.51

Subbasin Runoff Results

Total Rainfall (in) 0.63
Total Runoff (in) 0.23
Peak Runoff (cfs) 0.99
Rainfall Intensity 5.829
Weighted Runoff Coefficient 0.3700
Time of Concentration (days hh:mm:ss) 0 00:06:31

Subbasin : H/Ex-02



Subbasin : H/Ex-03

Input Data

Area (ac) 0.37
Weighted Runoff Coefficient 0.3700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	0.37	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	0.37		0.37

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	19	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.27	0.00	0.00
Computed Flow Time (min) :	6.20	0.00	0.00

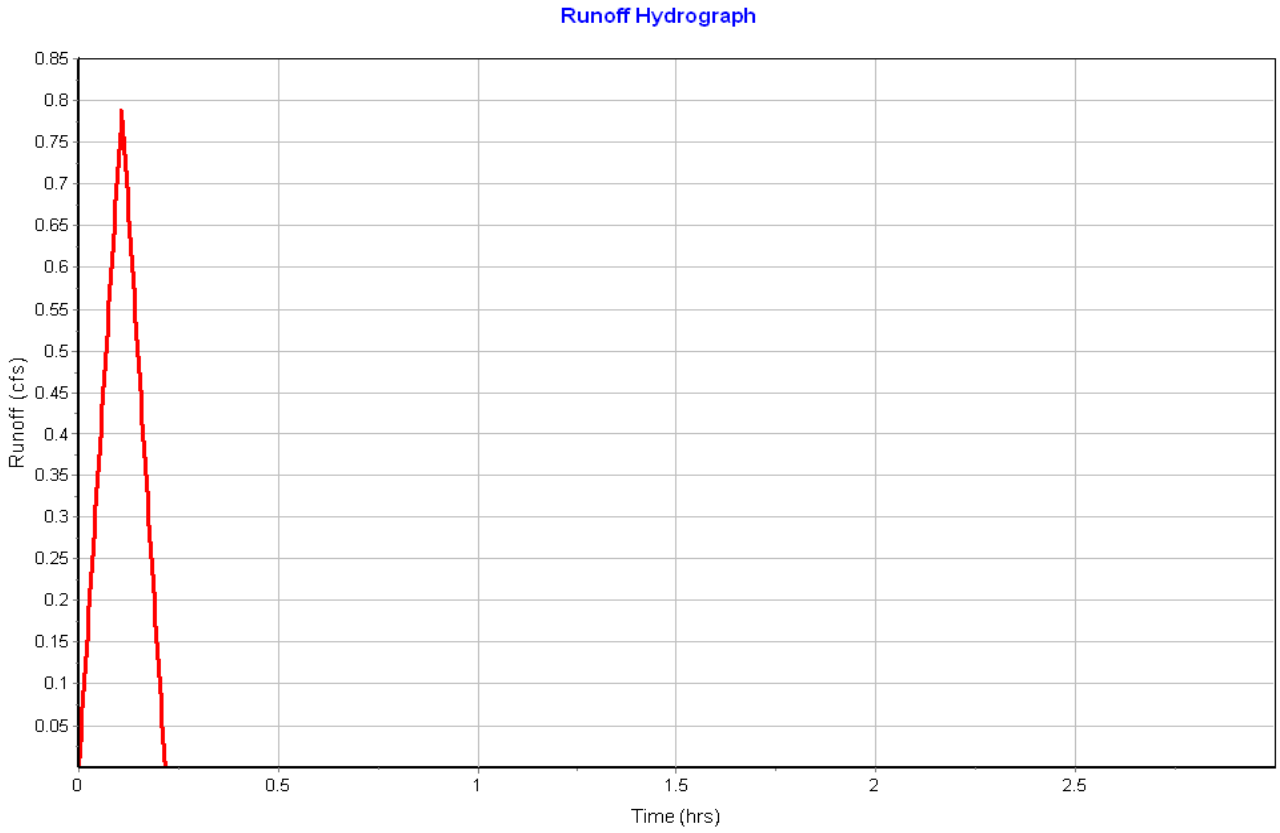
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	70	0.00	0.00
Slope (%) :	11.5	0.00	0.00
Surface Type :	Bare & untilled	Unpaved	Unpaved
Velocity (ft/sec) :	3.39	0.00	0.00
Computed Flow Time (min) :	0.34	0.00	0.00

Total TOC (min) 6.54

Subbasin Runoff Results

Total Rainfall (in) 0.63
Total Runoff (in) 0.23
Peak Runoff (cfs) 0.79
Rainfall Intensity 5.817
Weighted Runoff Coefficient 0.3700
Time of Concentration (days hh:mm:ss) 0 00:06:32

Subbasin : H/Ex-03



Subbasin : H/Ex-05

Input Data

Area (ac) 3.90
Weighted Runoff Coefficient 0.3700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	3.90	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	3.90		0.37

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	23	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.29	0.00	0.00
Computed Flow Time (min) :	5.74	0.00	0.00

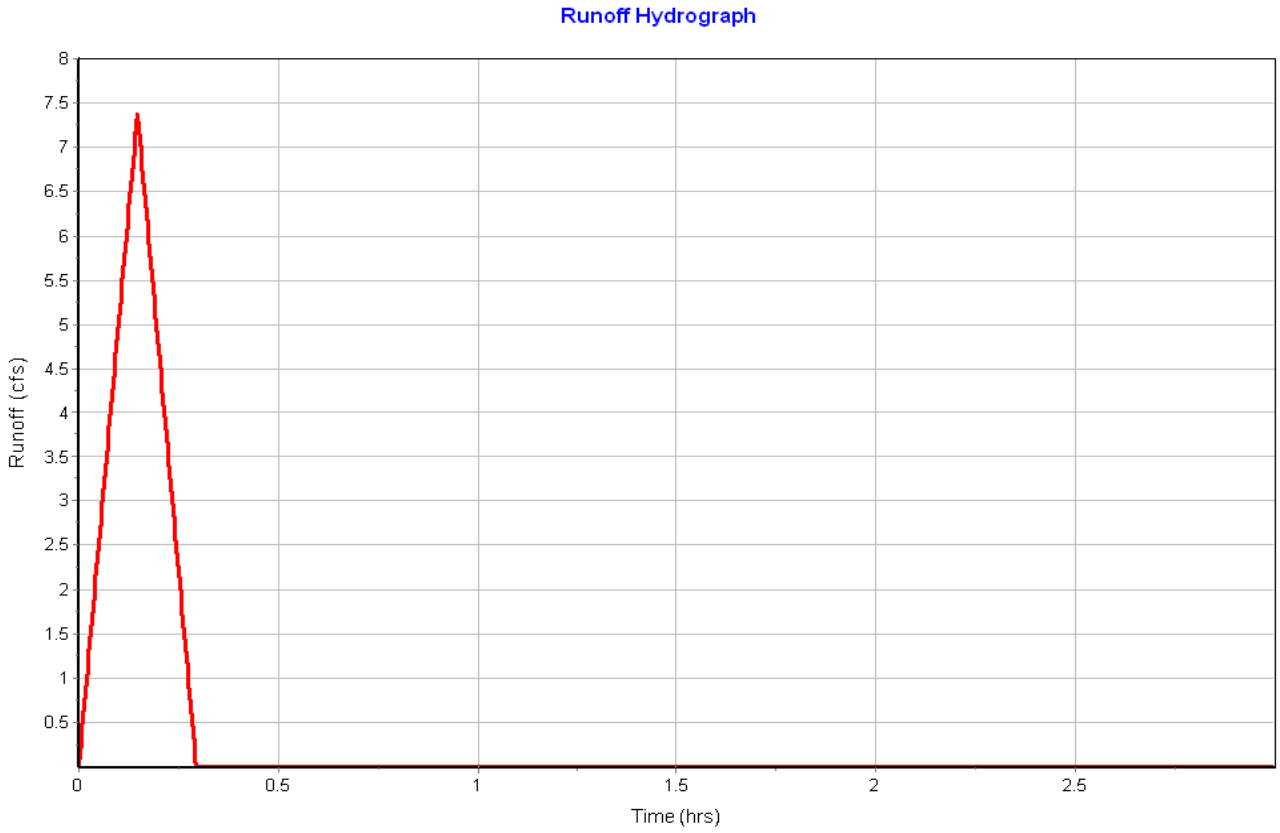
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	560	140	0.00
Slope (%) :	10	1.5	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	5.10	1.98	0.00
Computed Flow Time (min) :	1.83	1.18	0.00

Total TOC (min) 8.75

Subbasin Runoff Results

Total Rainfall (in) 0.75
Total Runoff (in) 0.28
Peak Runoff (cfs) 7.37
Rainfall Intensity 5.106
Weighted Runoff Coefficient 0.3700
Time of Concentration (days hh:mm:ss) 0 00:08:45

Subbasin : H/Ex-05



Subbasin : H/Ex-OS-1

Input Data

Area (ac) 124.70
Weighted Runoff Coefficient 0.3600

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	117.22	B (6%+)	0.37
Forest, 25 years or greater	7.48	D (6%+)	0.25
Composite Area & Weighted Runoff Coeff.	124.70		0.36

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	10	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.21	0.00	0.00
Computed Flow Time (min) :	8.01	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	3200	0.00	0.00
Slope (%) :	15	0.00	0.00
Surface Type :	Bare & untilled	Unpaved	Unpaved
Velocity (ft/sec) :	3.87	0.00	0.00
Computed Flow Time (min) :	13.78	0.00	0.00

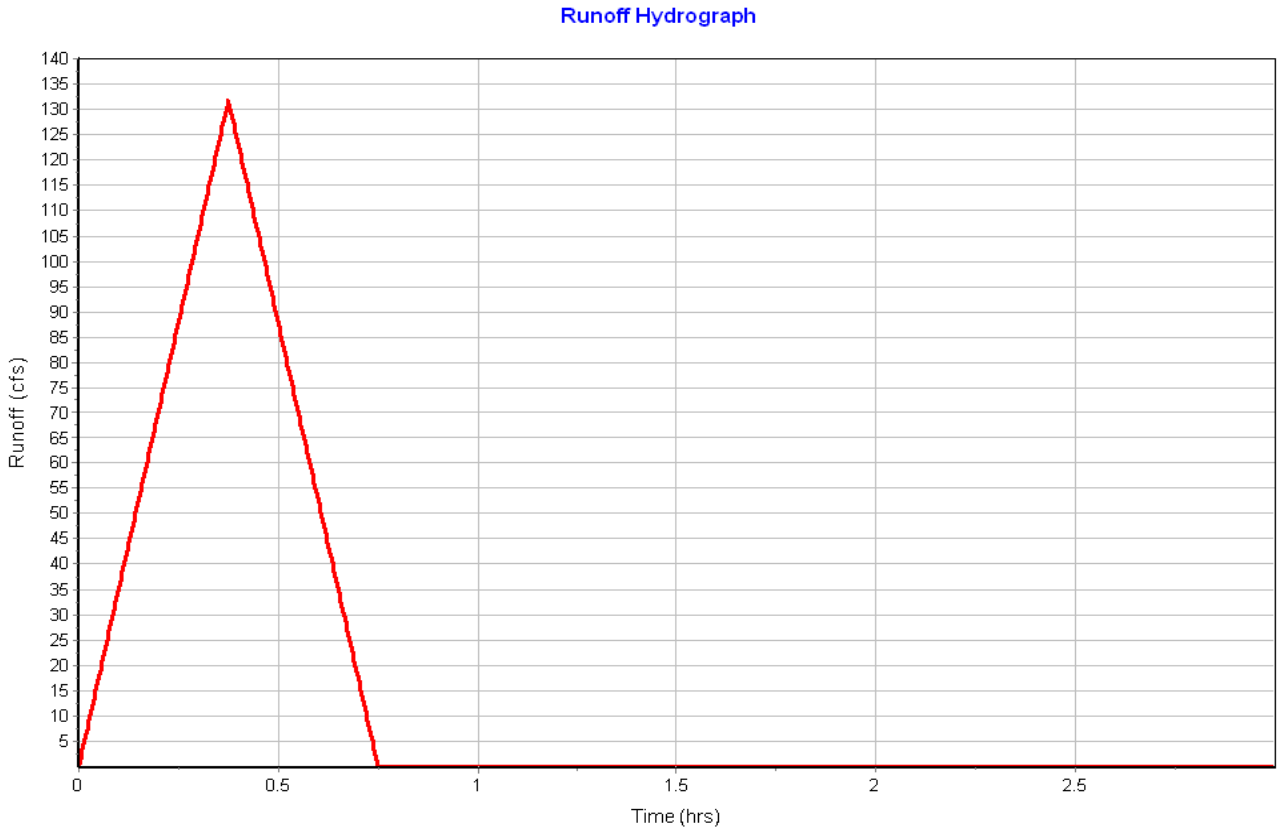
Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.030	0.00	0.00
Flow Length (ft) :	2200	0.00	0.00
Channel Slope (%) :	33	0.00	0.00
Cross Section Area (ft²) :	62.5	0.00	0.00
Wetted Perimeter (ft) :	23	0.00	0.00
Velocity (ft/sec) :	55.56	0.00	0.00
Computed Flow Time (min) :	0.66	0.00	0.00

Total TOC (min) 22.45

Subbasin Runoff Results

Total Rainfall (in) 1.10
Total Runoff (in) 0.40
Peak Runoff (cfs) 131.82
Rainfall Intensity 2.936
Weighted Runoff Coefficient 0.3600
Time of Concentration (days hh:mm:ss) 0 00:22:27

Subbasin : H/Ex-OS-1



Subbasin : H/Ex-OS-2

Input Data

Area (ac) 9.37
Weighted Runoff Coefficient 0.2800

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	2.06	B (6%+)	0.37
Forest, 25 years or greater	7.31	D (6%+)	0.25
Composite Area & Weighted Runoff Coeff.	9.37		0.28

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	45	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.38	0.00	0.00
Computed Flow Time (min) :	4.39	0.00	0.00

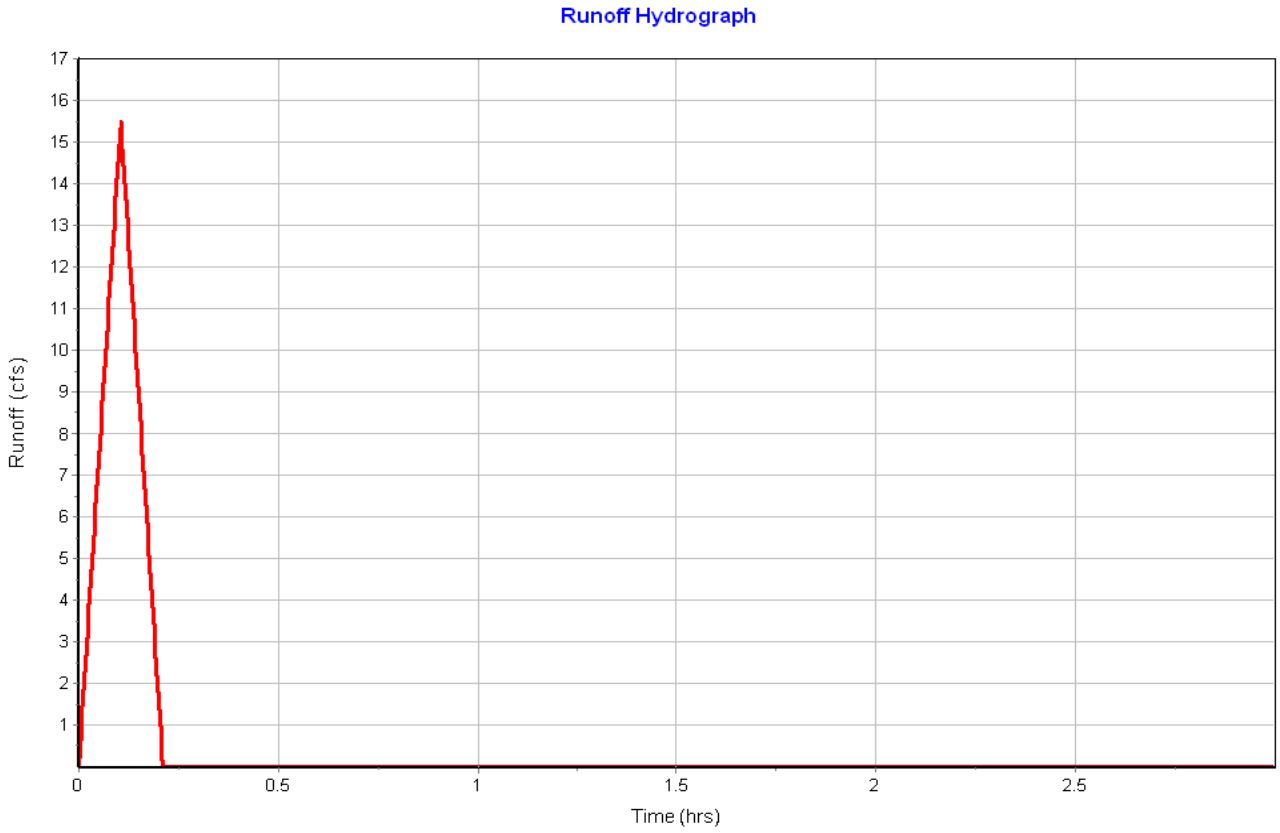
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	1360	0.00	0.00
Slope (%) :	53	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	11.75	0.00	0.00
Computed Flow Time (min) :	1.93	0.00	0.00

Total TOC (min) 6.32

Subbasin Runoff Results

Total Rainfall (in) 0.62
Total Runoff (in) 0.18
Peak Runoff (cfs) 15.50
Rainfall Intensity 5.907
Weighted Runoff Coefficient 0.2800
Time of Concentration (days hh:mm:ss) 0 00:06:19

Subbasin : H/Ex-OS-2



Subbasin : H-04

Input Data

Area (ac) 0.70
Weighted Runoff Coefficient 0.3700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	0.70	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	0.70		0.37

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	19	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.27	0.00	0.00
Computed Flow Time (min) :	6.20	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	140	110	0.00
Slope (%) :	15	3.7	0.00
Surface Type :	Bare & untilled	Unpaved	Unpaved
Velocity (ft/sec) :	3.87	3.10	0.00
Computed Flow Time (min) :	0.60	0.59	0.00

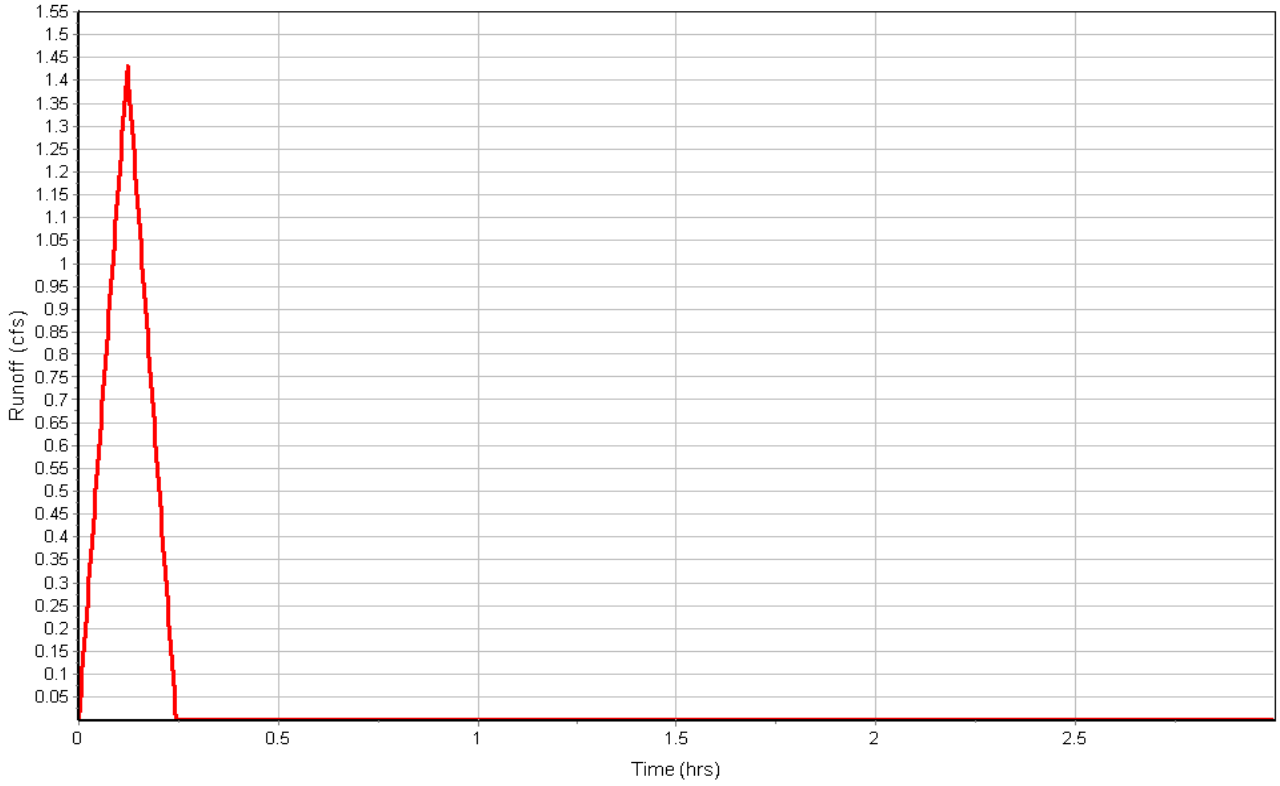
Total TOC (min) 7.39

Subbasin Runoff Results

Total Rainfall (in) 0.67
Total Runoff (in) 0.25
Peak Runoff (cfs) 1.43
Rainfall Intensity 5.507
Weighted Runoff Coefficient 0.3700
Time of Concentration (days hh:mm:ss) 0 00:07:23

Subbasin : H-04

Runoff Hydrograph



Subbasin : Pr-01

Input Data

Area (ac) 0.57
Weighted Runoff Coefficient 0.4800

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.13	B (6%+)	0.97
Open Space, 25 years or greater	0.03	B (6%+)	0.26
Meadow, 25 years or greater	0.33	B (6%+)	0.37
Forest, 25 years or greater	0.08	D (6%+)	0.25
Composite Area & Weighted Runoff Coeff.	0.57		0.48

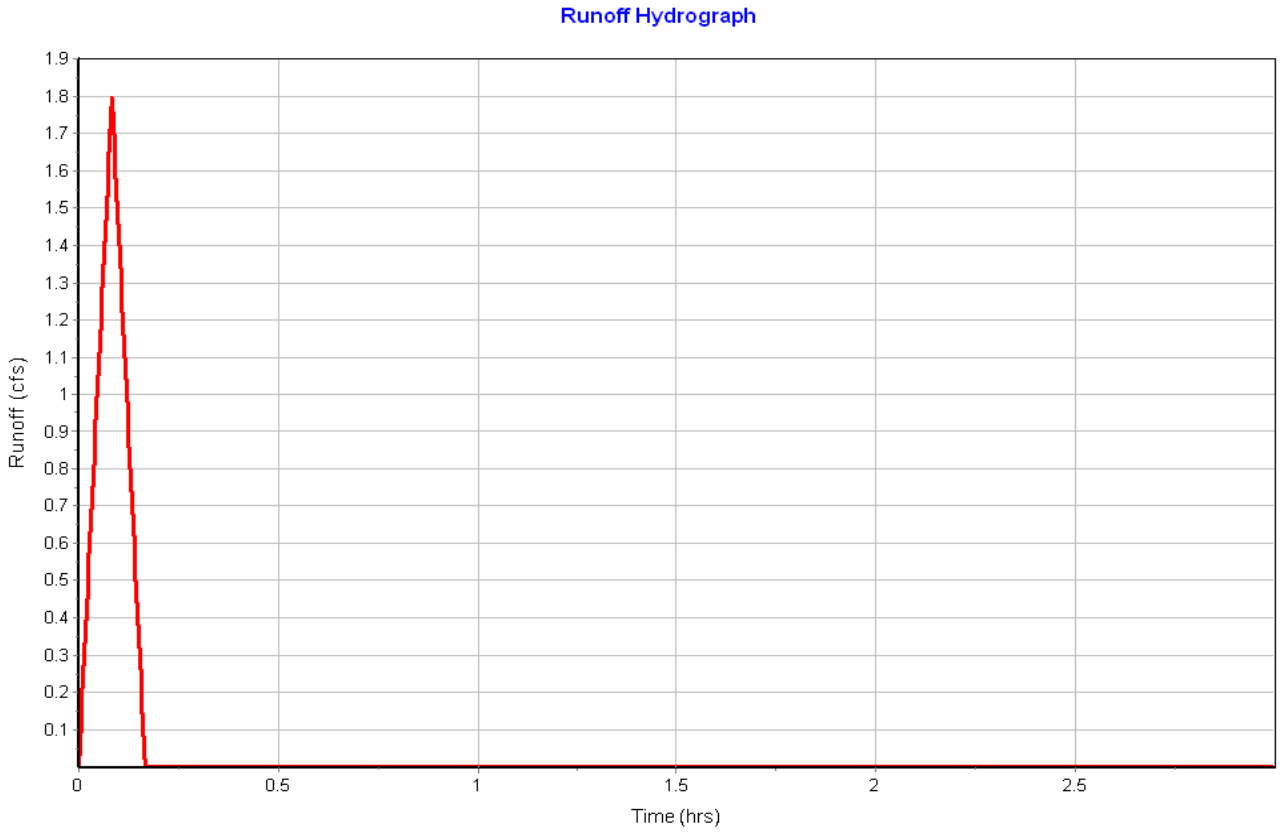
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.26
Peak Runoff (cfs) 1.79
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.4800
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-01



Subbasin : Pr-02

Input Data

Area (ac) 0.12
Weighted Runoff Coefficient 0.8300

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.10	B (6%+)	0.97
Open Space, 25 years or greater	0.02	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.12		0.83

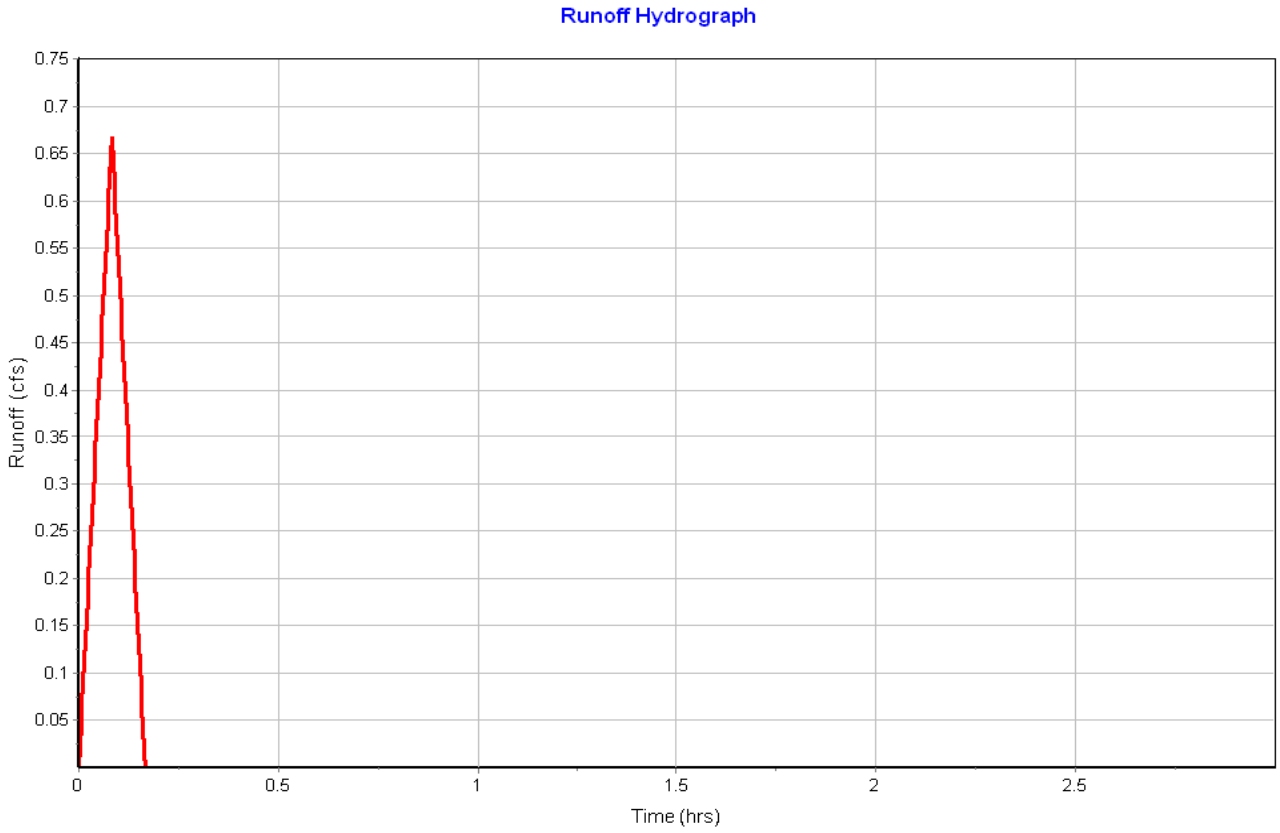
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.45
Peak Runoff (cfs) 0.67
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.8300
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-02



Subbasin : Pr-03

Input Data

Area (ac) 0.28
Weighted Runoff Coefficient 0.7900

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.21	B (6%+)	0.97
Open Space, 25 years or greater	0.07	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.28		0.79

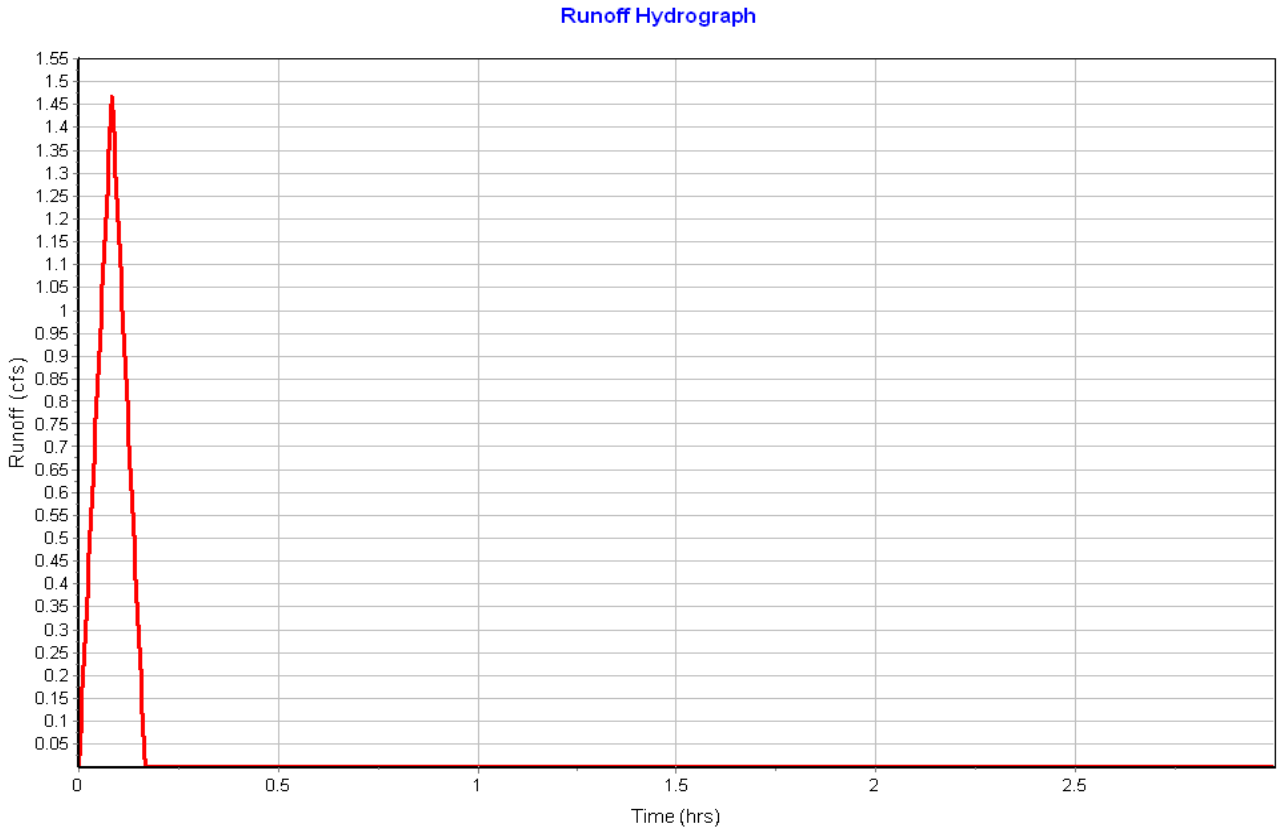
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.43
Peak Runoff (cfs) 1.47
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.7900
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-03



Subbasin : Pr-04

Input Data

Area (ac) 0.33
Weighted Runoff Coefficient 0.3300

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.03	B (6%+)	0.97
Open Space, 25 years or greater	0.30	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.33		0.33

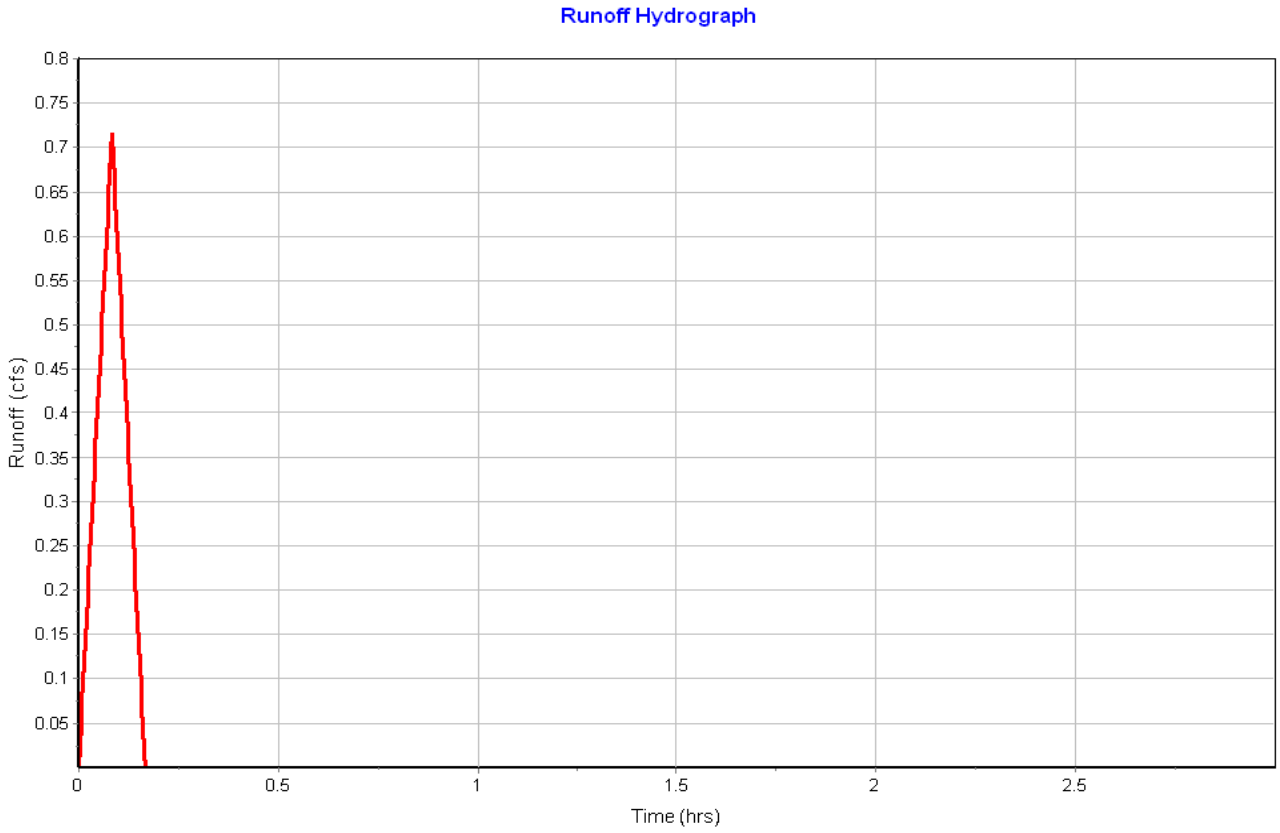
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.18
Peak Runoff (cfs) 0.71
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.3300
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-04



Subbasin : Pr-05

Input Data

Area (ac) 0.15
Weighted Runoff Coefficient 0.7700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.10	B (6%+)	0.97
Open Space, 25 years or greater	0.04	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.14		0.77

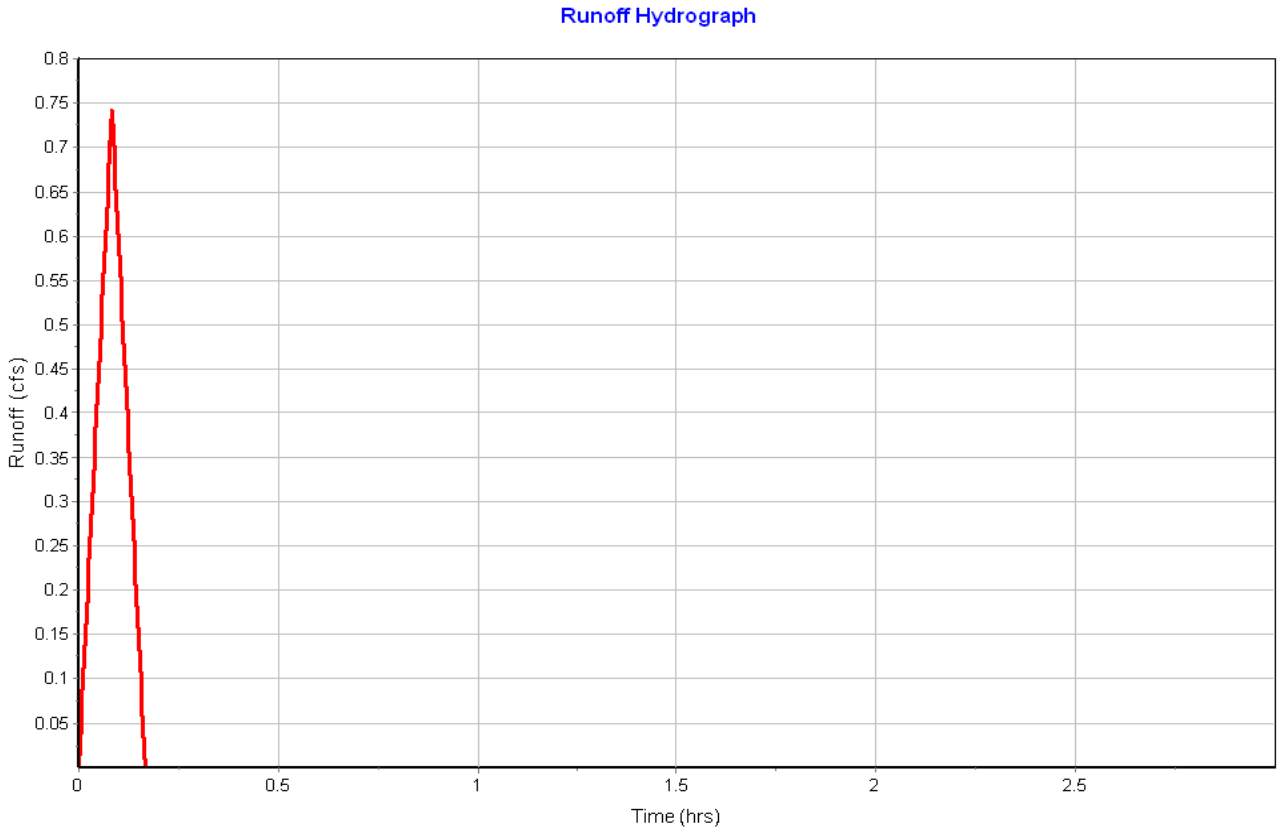
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.42
Peak Runoff (cfs) 0.74
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.7700
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-05



Subbasin : Pr-06

Input Data

Area (ac) 0.29
Weighted Runoff Coefficient 0.7800

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.21	B (6%+)	0.97
Open Space, 25 years or greater	0.08	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.29		0.78

Time of Concentration

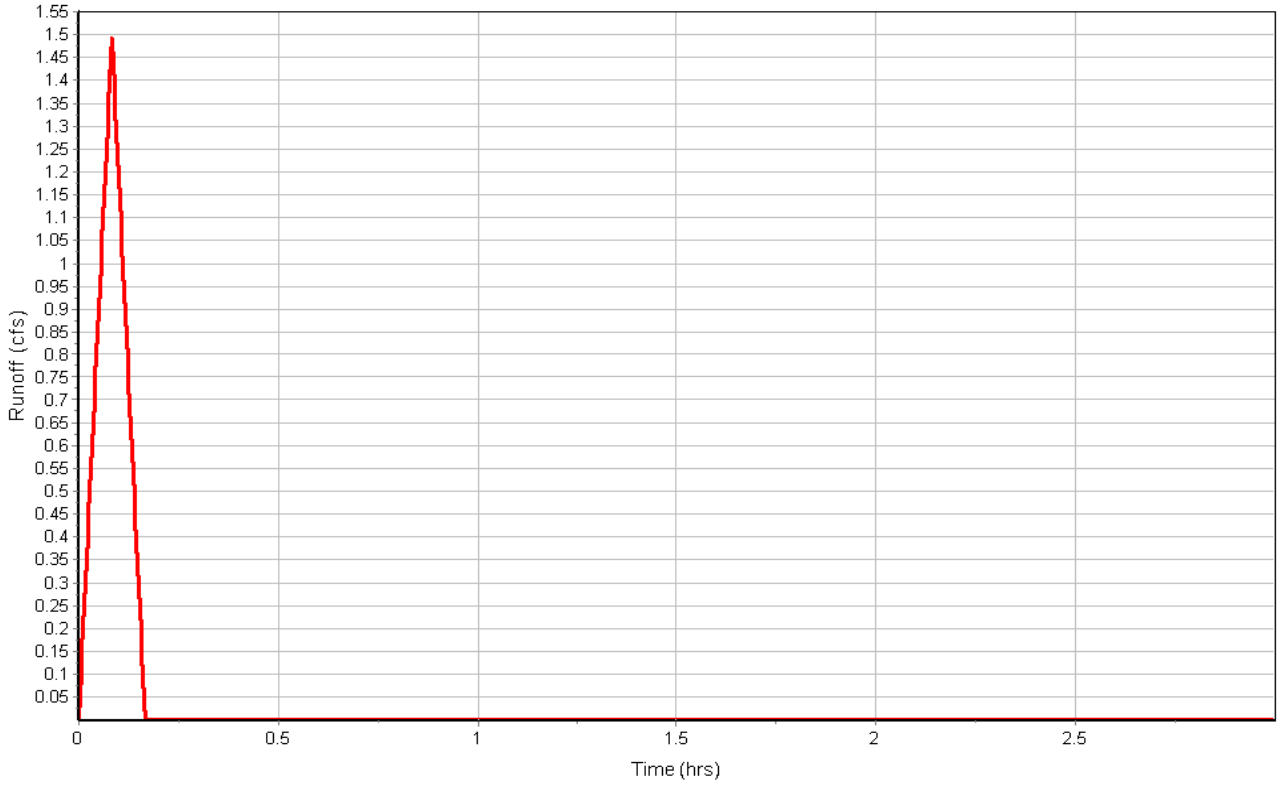
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.43
Peak Runoff (cfs) 1.49
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.7800
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-06

Runoff Hydrograph



Subbasin : Pr-07

Input Data

Area (ac) 0.74
Weighted Runoff Coefficient 0.7700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.53	B (6%+)	0.97
Open Space, 25 years or greater	0.21	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.74		0.77

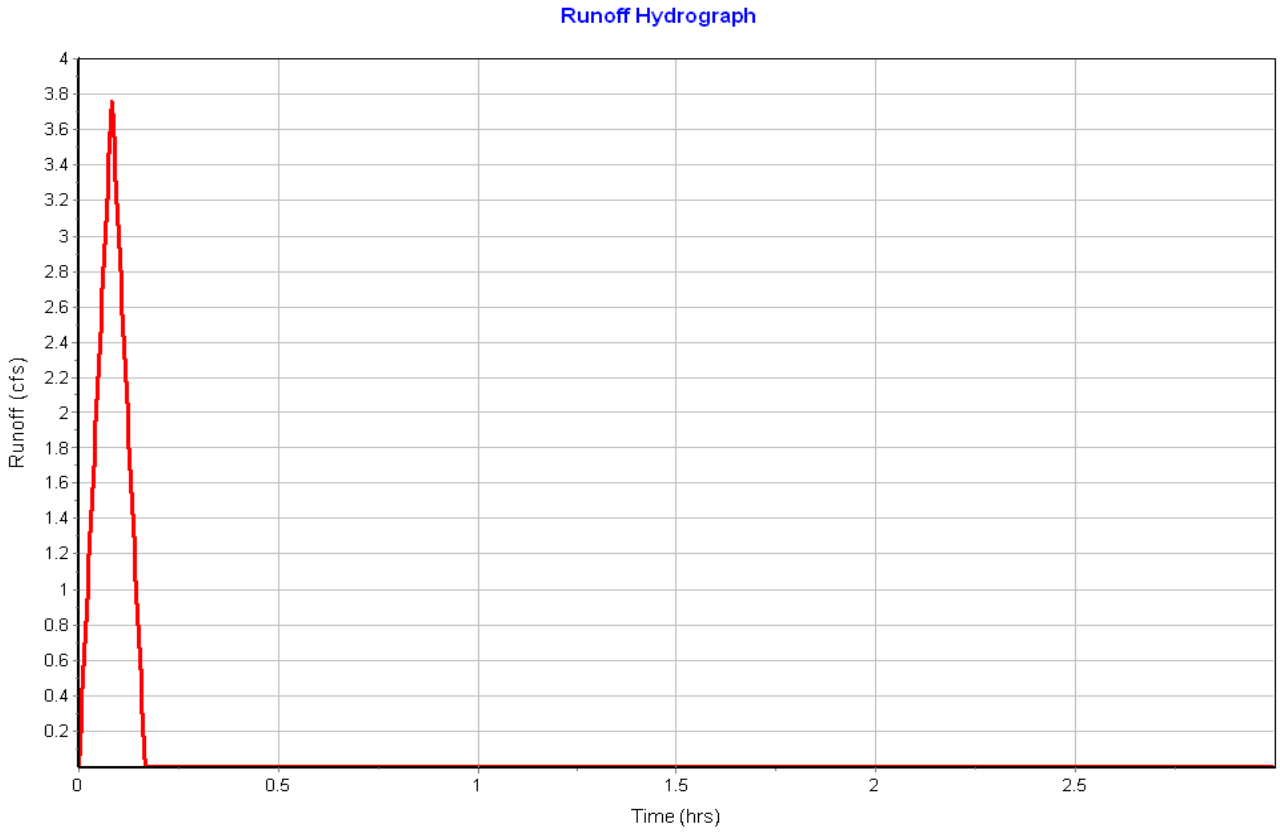
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.42
Peak Runoff (cfs) 3.76
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.7700
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-07



Subbasin : Pr-08

Input Data

Area (ac) 0.18
Weighted Runoff Coefficient 0.8100

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.14	B (6%+)	0.97
Open Space, 25 years or greater	0.04	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.18		0.81

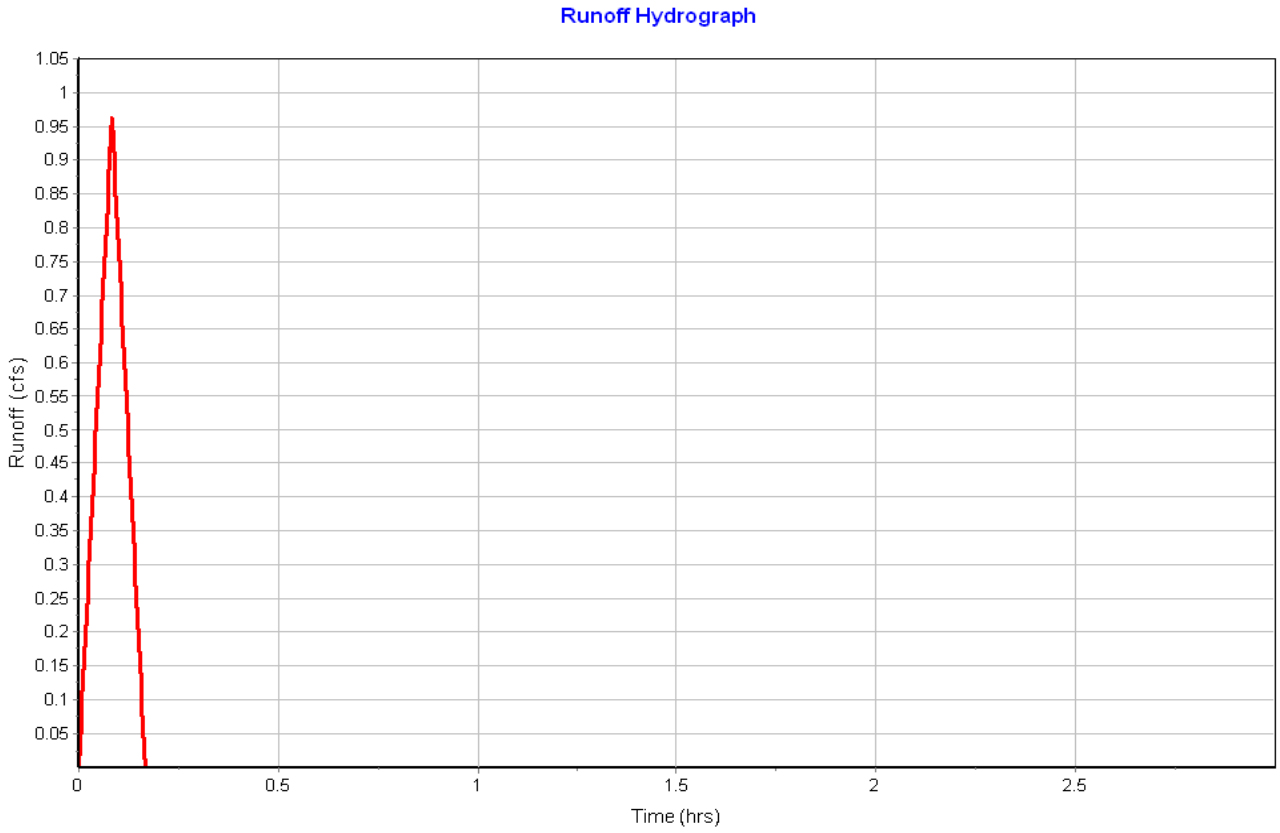
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.44
Peak Runoff (cfs) 0.96
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.8100
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-08



Subbasin : Pr-09

Input Data

Area (ac) 1.68
Weighted Runoff Coefficient 0.3800

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.11	B (6%+)	0.97
Open Space, 25 years or greater	0.04	B (6%+)	0.26
Meadow, 25 years or greater	1.17	B (6%+)	0.37
Forest, 25 years or greater	0.35	D (6%+)	0.25
Composite Area & Weighted Runoff Coeff.	1.67		0.38

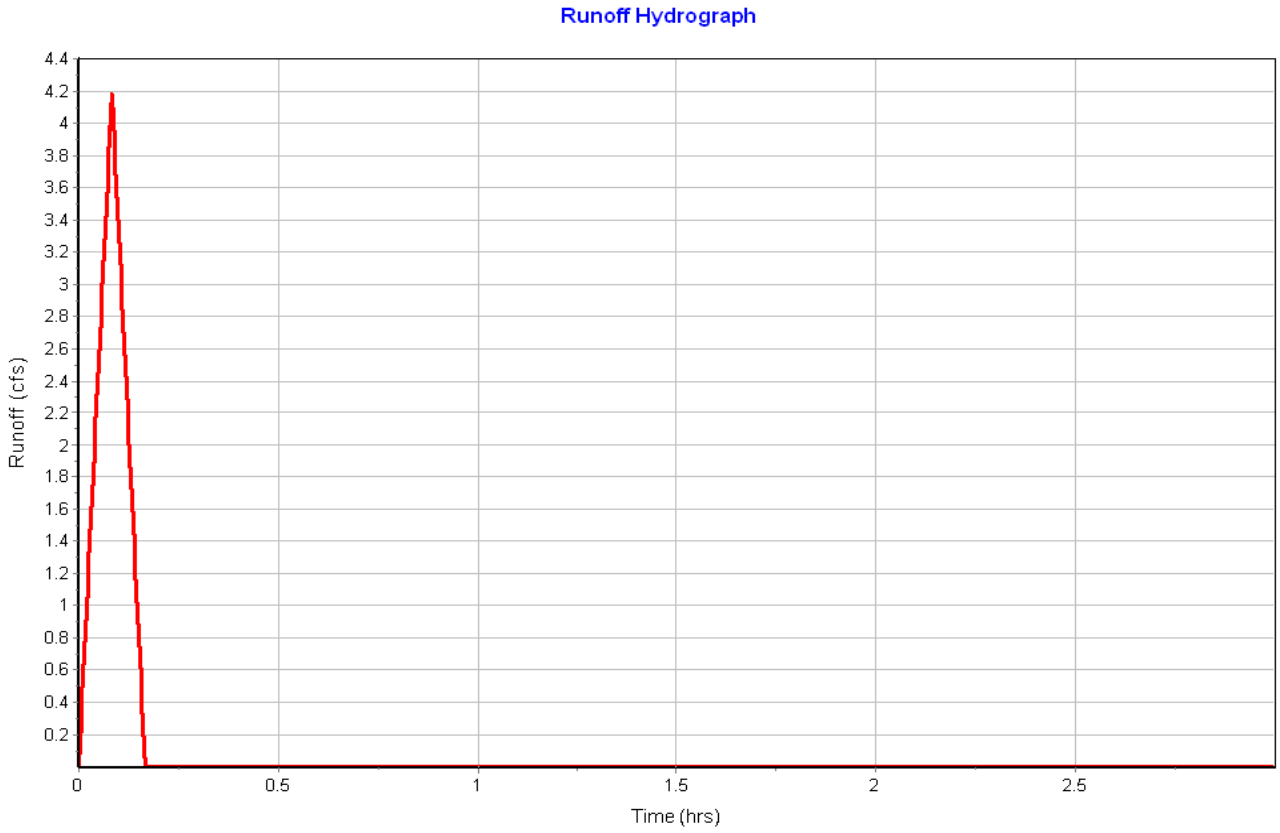
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.21
Peak Runoff (cfs) 4.18
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.3800
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-09



Subbasin : Pr-10

Input Data

Area (ac) 0.42
Weighted Runoff Coefficient 0.4600

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.12	B (6%+)	0.97
Open Space, 25 years or greater	0.30	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.42		0.46

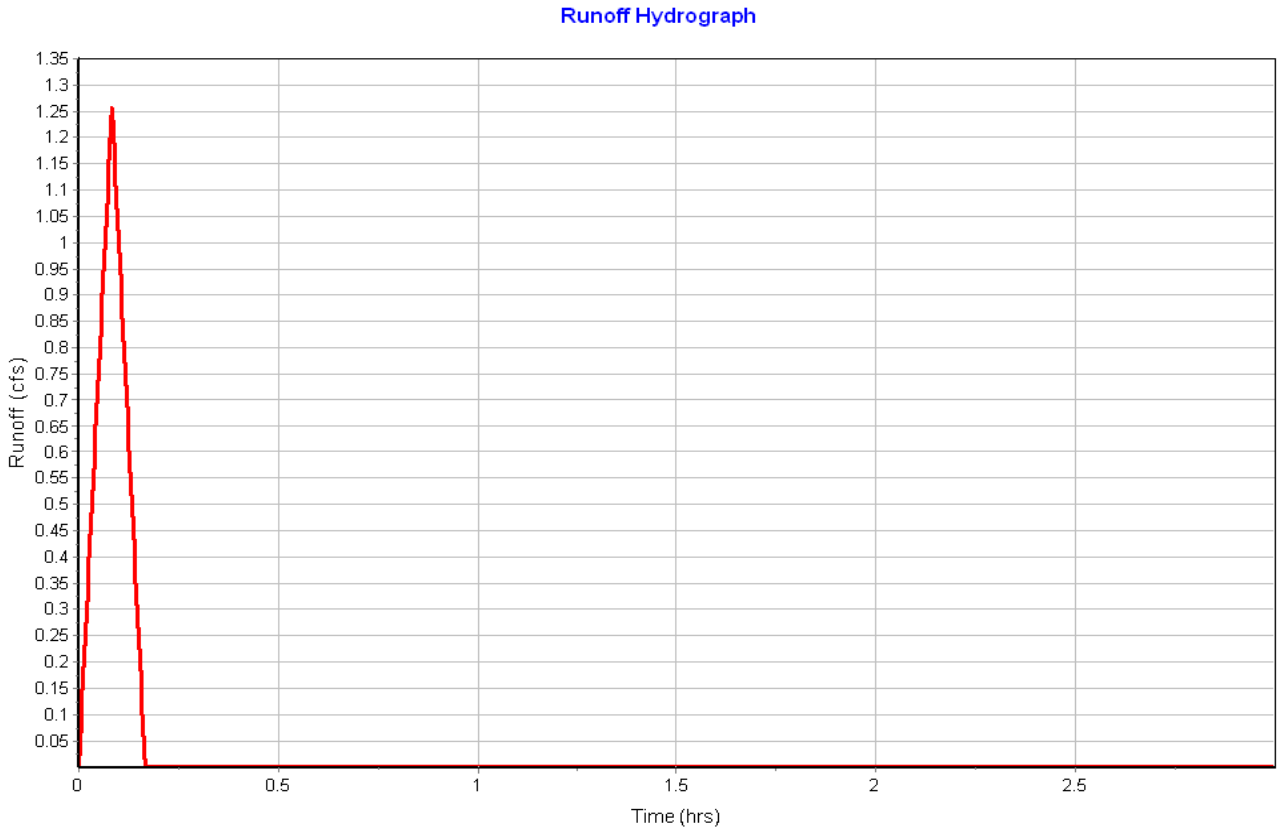
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.25
Peak Runoff (cfs) 1.26
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.4600
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-10



Subbasin : Pr-11

Input Data

Area (ac) 0.22
Weighted Runoff Coefficient 0.8700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.19	B (6%+)	0.97
Open Space, 25 years or greater	0.03	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.22		0.87

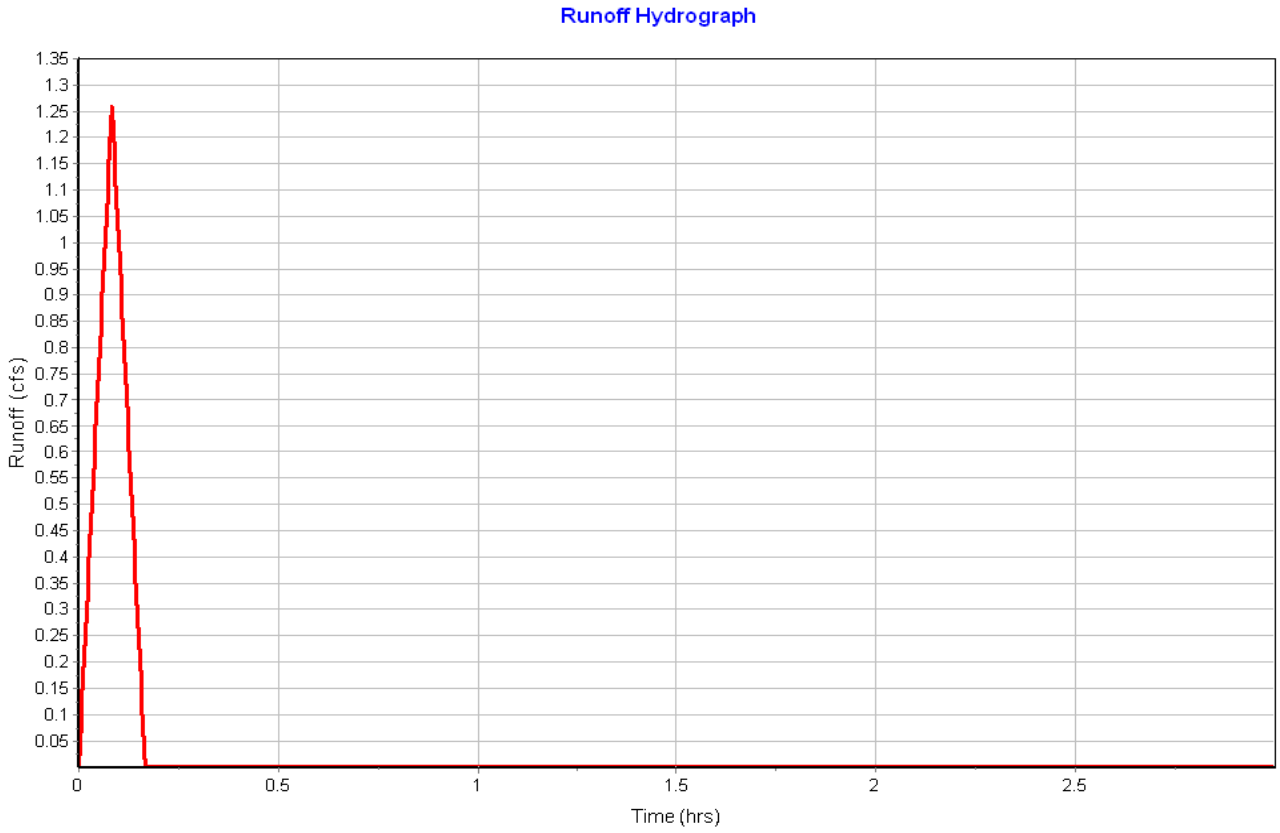
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.48
Peak Runoff (cfs) 1.26
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.8700
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-11



Subbasin : Pr-12

Input Data

Area (ac) 0.15
Weighted Runoff Coefficient 0.6200

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.07	B (6%+)	0.97
Open Space, 25 years or greater	0.07	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.14		0.62

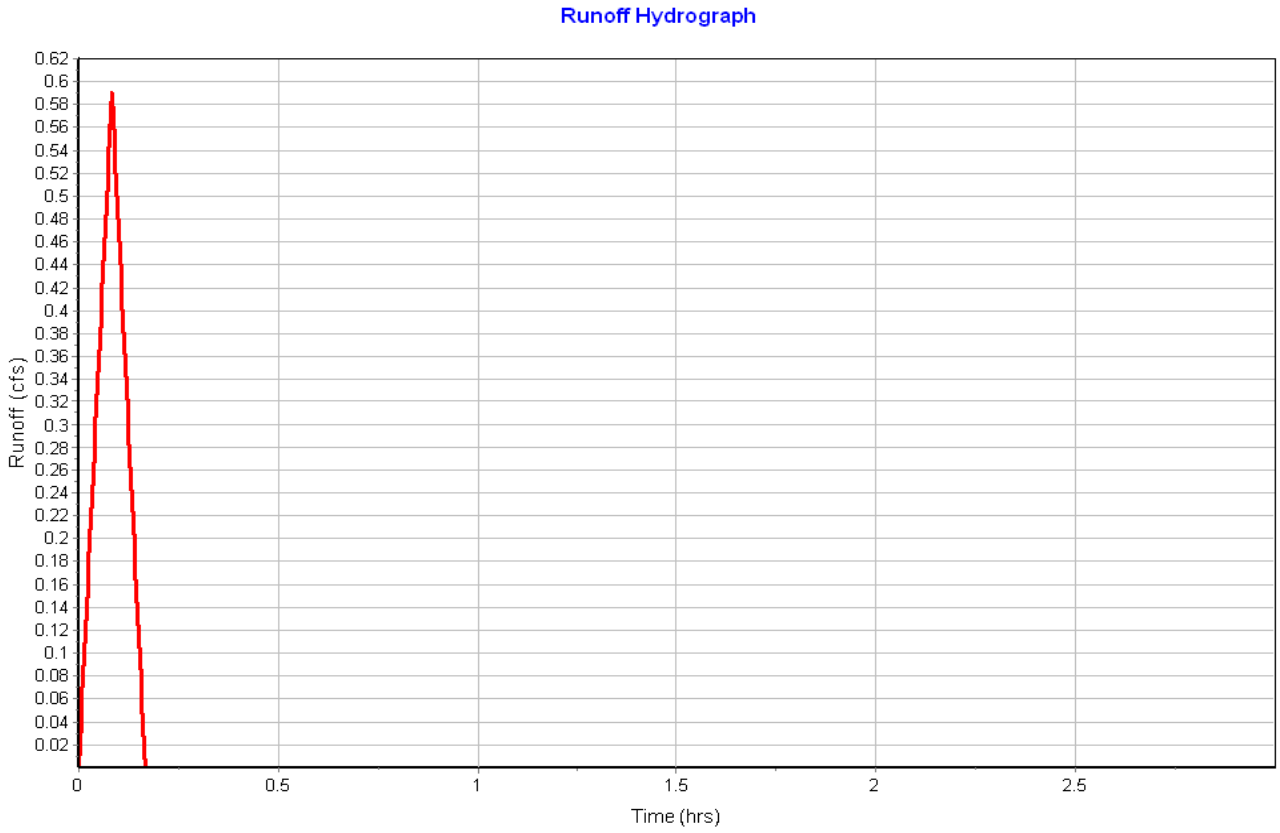
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.34
Peak Runoff (cfs) 0.59
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.6200
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-12



Subbasin : Pr-13

Input Data

Area (ac) 0.41
Weighted Runoff Coefficient 0.6700

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.21	B (6%+)	0.97
Open Space, 25 years or greater	0.04	B (6%+)	0.26
Meadow, 25 years or greater	0.16	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	0.41		0.67

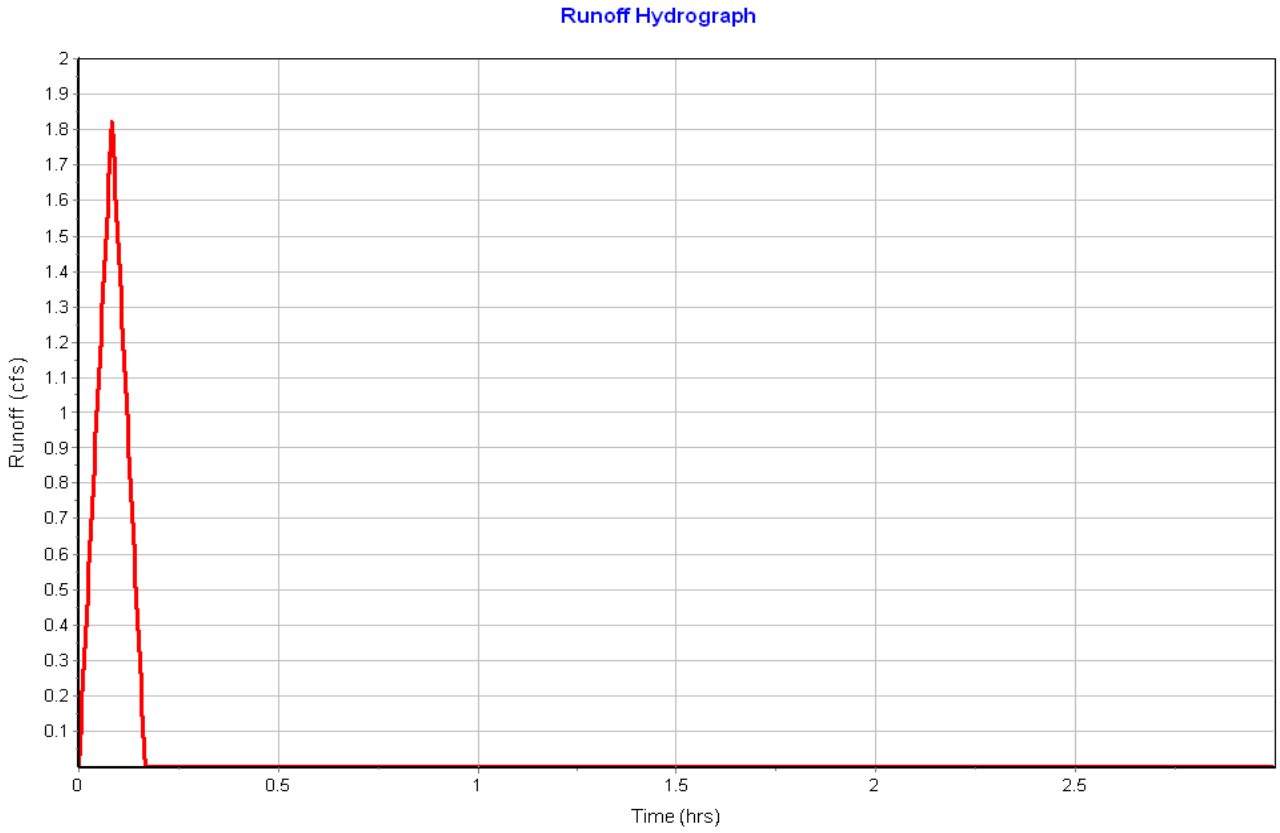
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.37
Peak Runoff (cfs) 1.82
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.6700
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-13



Subbasin : Pr-14

Input Data

Area (ac) 0.20
Weighted Runoff Coefficient 0.8600

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.17	B (2-6%)	0.96
Open Space, 25 years or greater	0.03	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.20		0.86

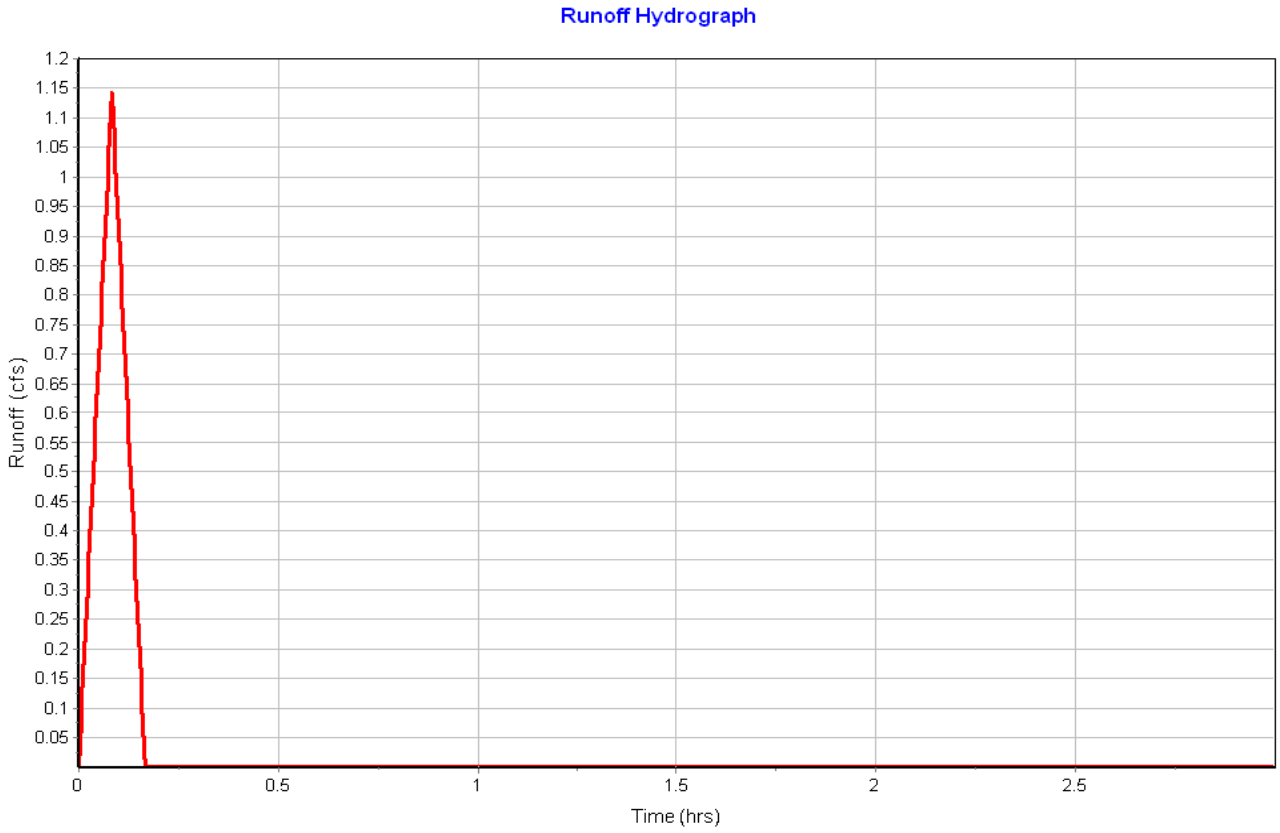
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.47
Peak Runoff (cfs) 1.14
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.8600
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-14



Subbasin : Pr-15

Input Data

Area (ac) 0.13
Weighted Runoff Coefficient 0.7900

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.10	B (6%+)	0.97
Open Space, 25 years or greater	0.03	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.13		0.79

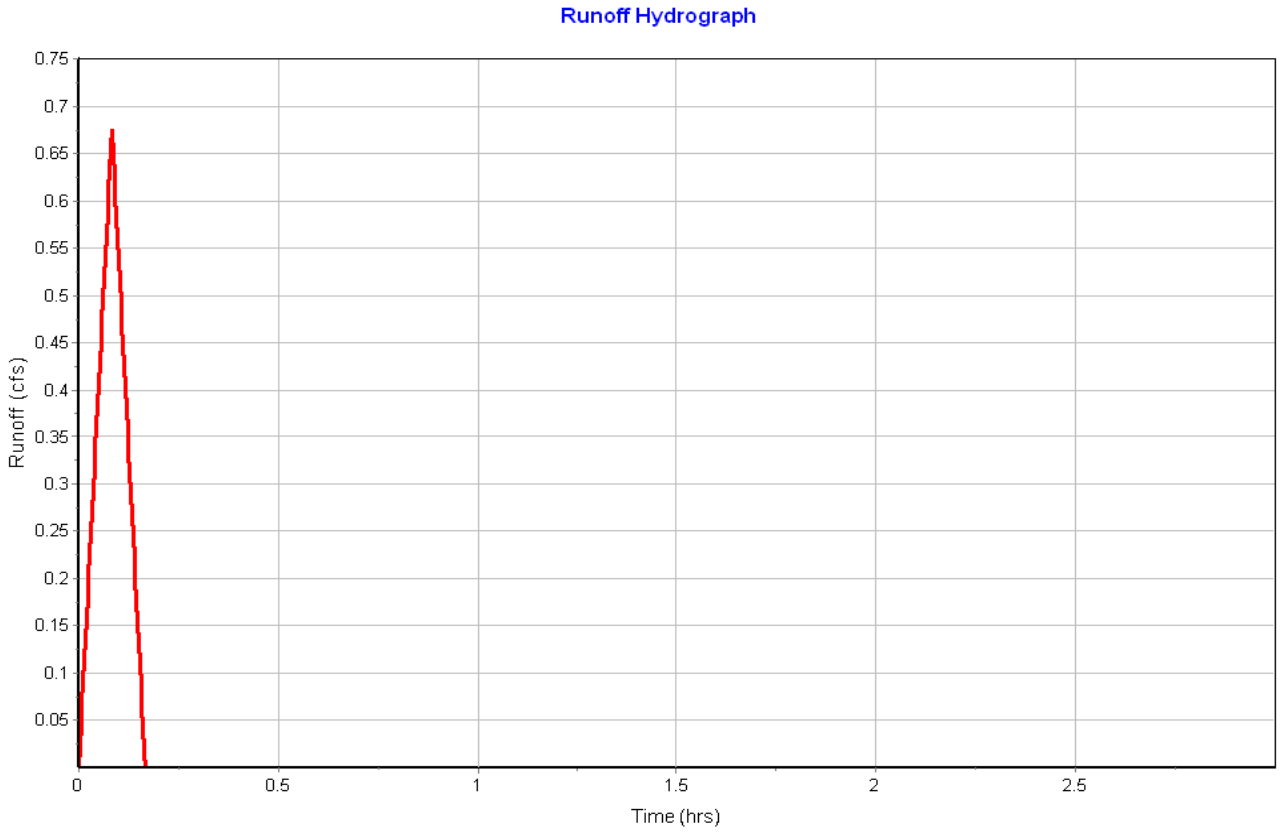
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.43
Peak Runoff (cfs) 0.67
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.7900
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-15



Subbasin : Pr-16

Input Data

Area (ac) 0.17
Weighted Runoff Coefficient 0.7100

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.11	B (6%+)	0.97
Open Space, 25 years or greater	0.06	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.17		0.71

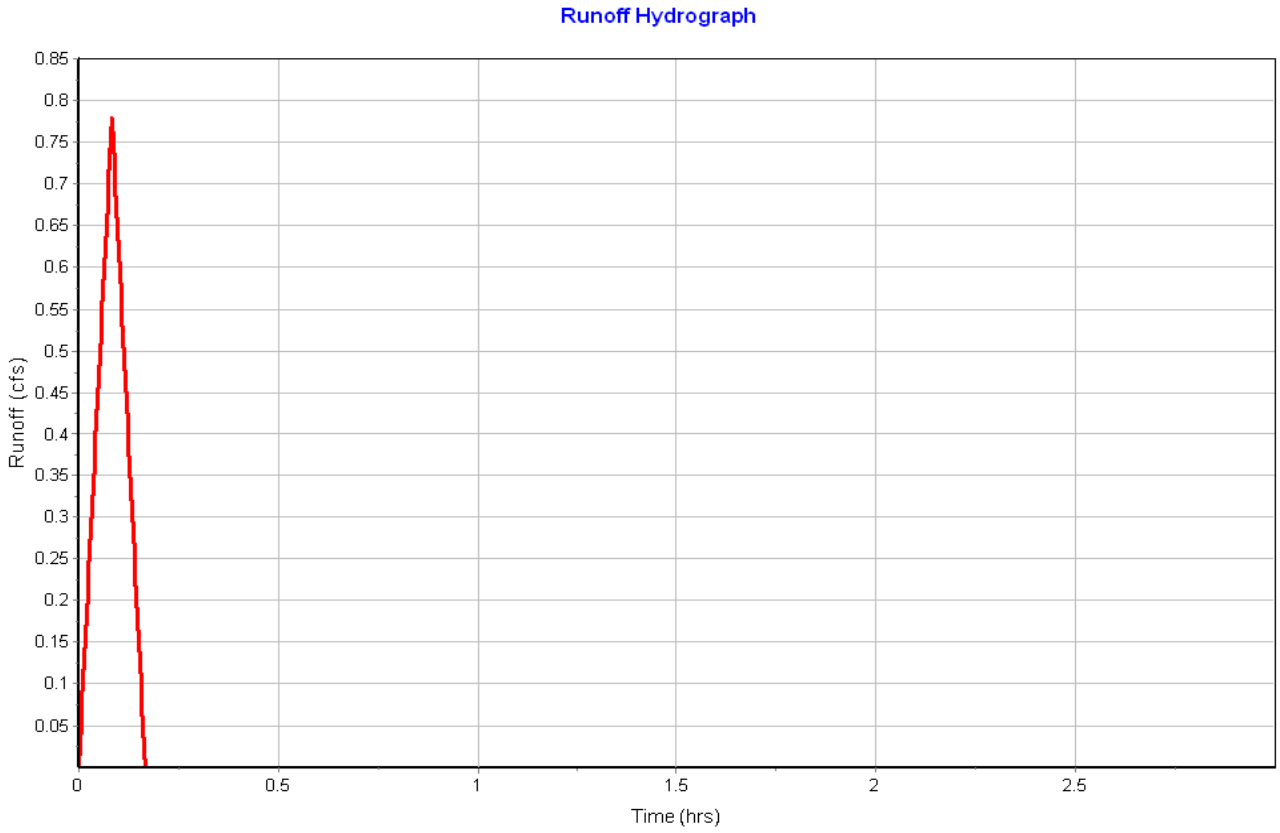
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.39
Peak Runoff (cfs) 0.78
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.7100
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-16



Subbasin : Pr-17

Input Data

Area (ac) 0.05
Weighted Runoff Coefficient 0.6300

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.03	B (6%+)	0.97
Open Space, 25 years or greater	0.02	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.05		0.63

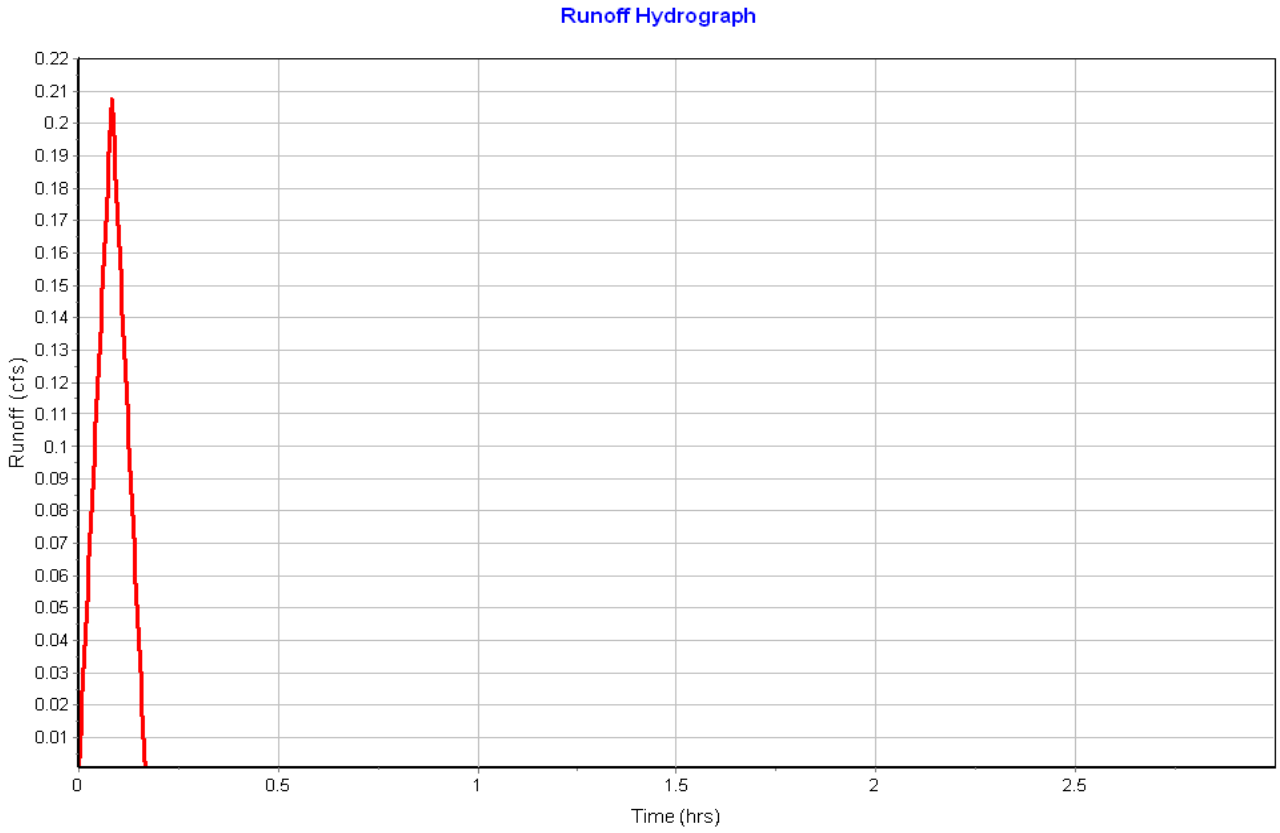
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.34
Peak Runoff (cfs) 0.21
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.6300
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-17



Subbasin : Pr-18

Input Data

Area (ac) 0.11
Weighted Runoff Coefficient 0.9500

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.11	B (6%+)	0.97
Open Space, 25 years or greater	0.00	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.11		0.95

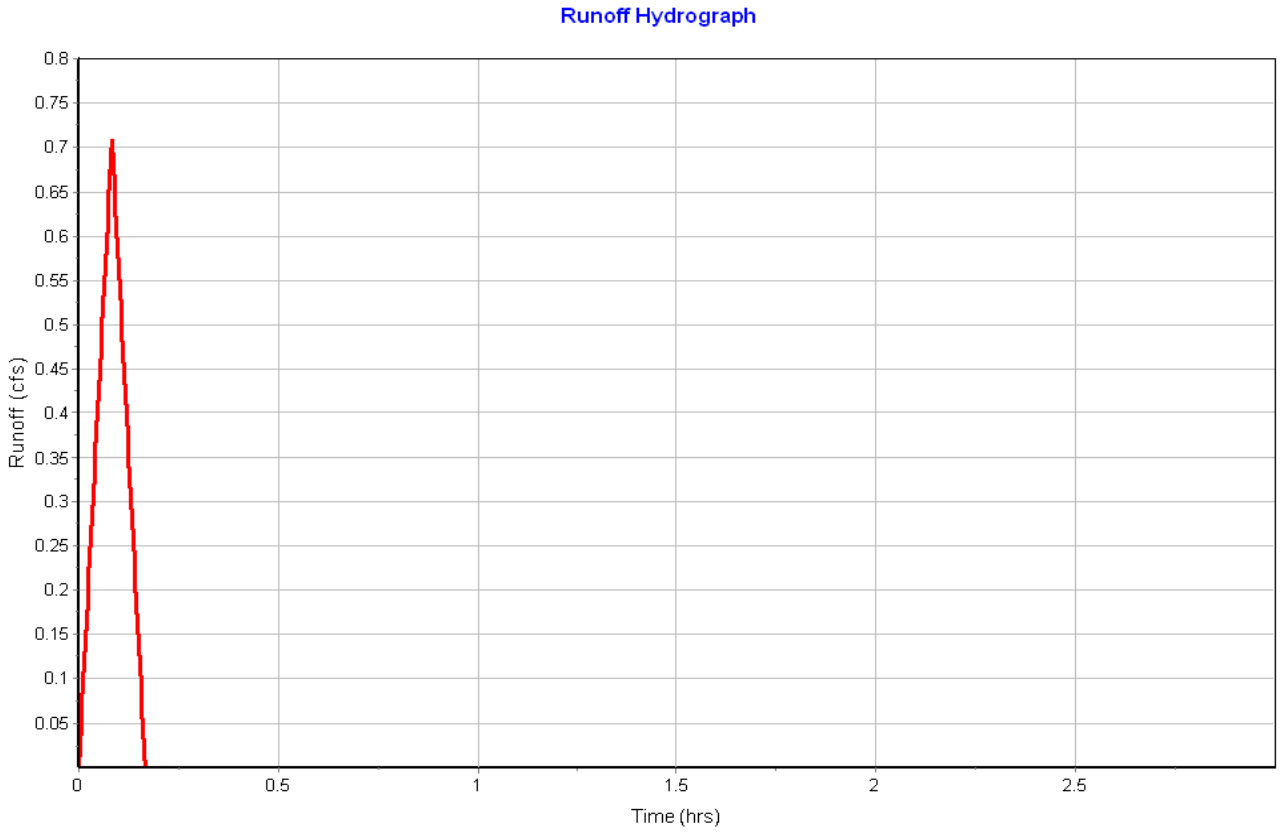
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.52
Peak Runoff (cfs) 0.71
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.9500
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-18



Subbasin : Pr-19

Input Data

Area (ac) 0.10
Weighted Runoff Coefficient 0.8200

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.08	B (6%+)	0.97
Open Space, 25 years or greater	0.02	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.10		0.82

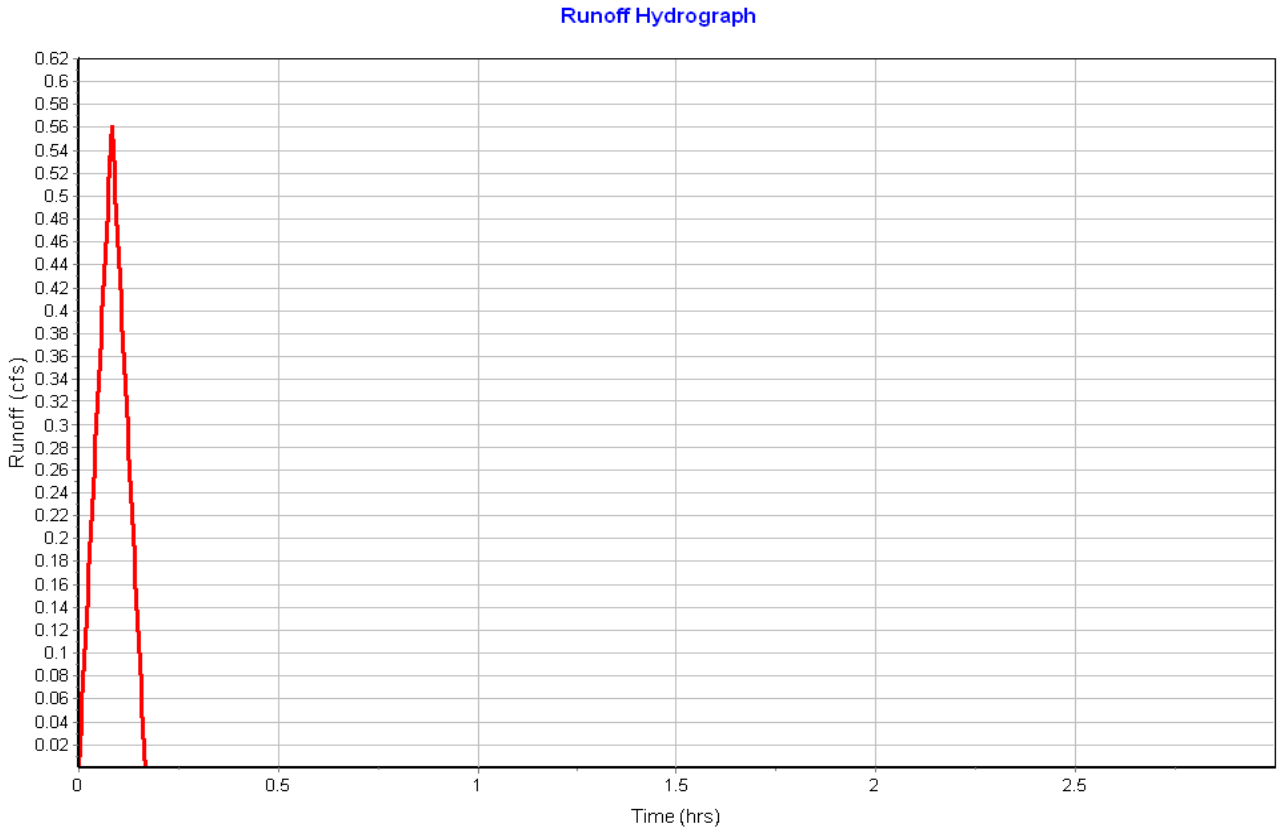
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.45
Peak Runoff (cfs) 0.56
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.8200
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-19



Subbasin : Pr-20

Input Data

Area (ac) 0.31
Weighted Runoff Coefficient 0.8200

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.24	B (6%+)	0.97
Open Space, 25 years or greater	0.03	B (6%+)	0.26
Meadow, 25 years or greater	0.03	B (6%+)	0.37
Composite Area & Weighted Runoff Coeff.	0.30		0.82

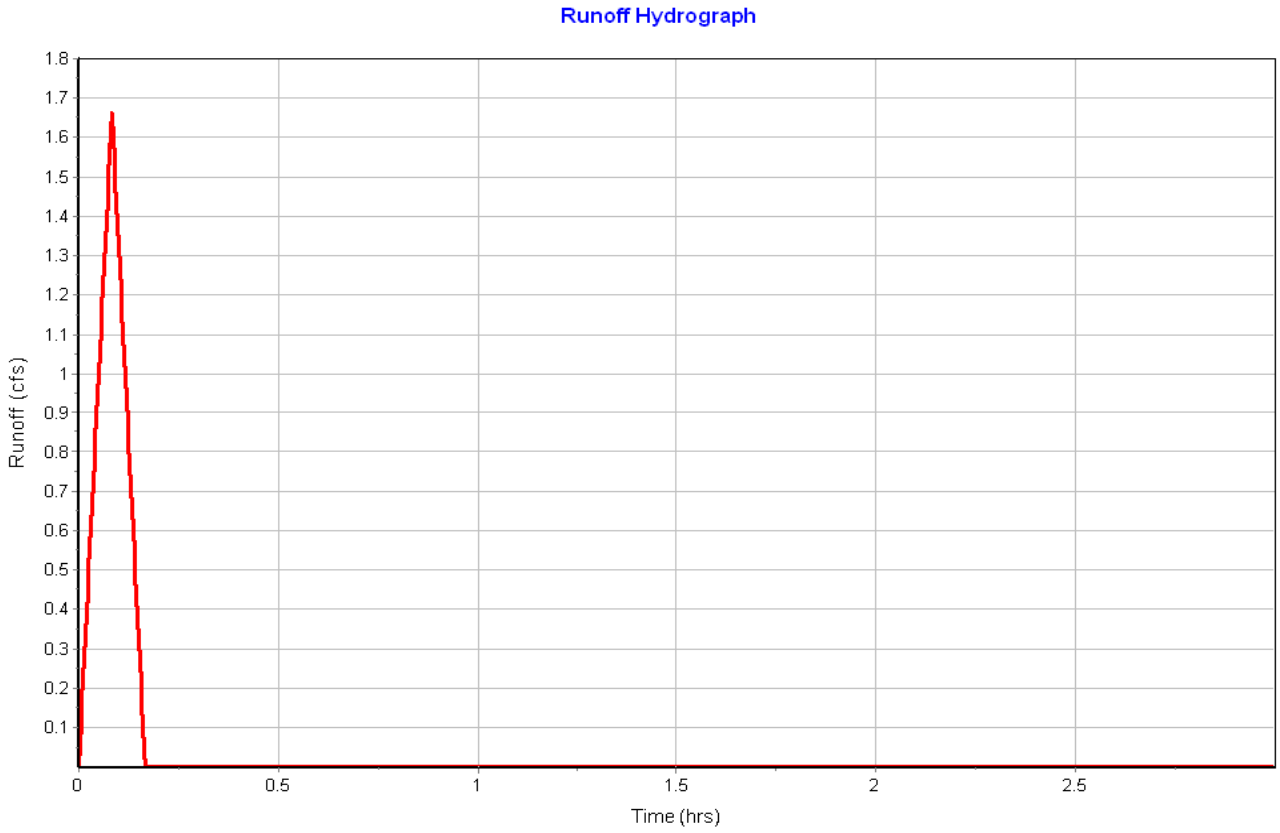
Time of Concentration

User-Defined TOC override (minutes): 5

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.45
Peak Runoff (cfs) 1.66
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.8200
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-20



Subbasin : Pr-21

Input Data

Area (ac) 0.36
Weighted Runoff Coefficient 0.5500

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Parking, 25 years or greater	0.15	B (6%+)	0.97
Open Space, 25 years or greater	0.22	B (6%+)	0.26
Composite Area & Weighted Runoff Coeff.	0.37		0.55

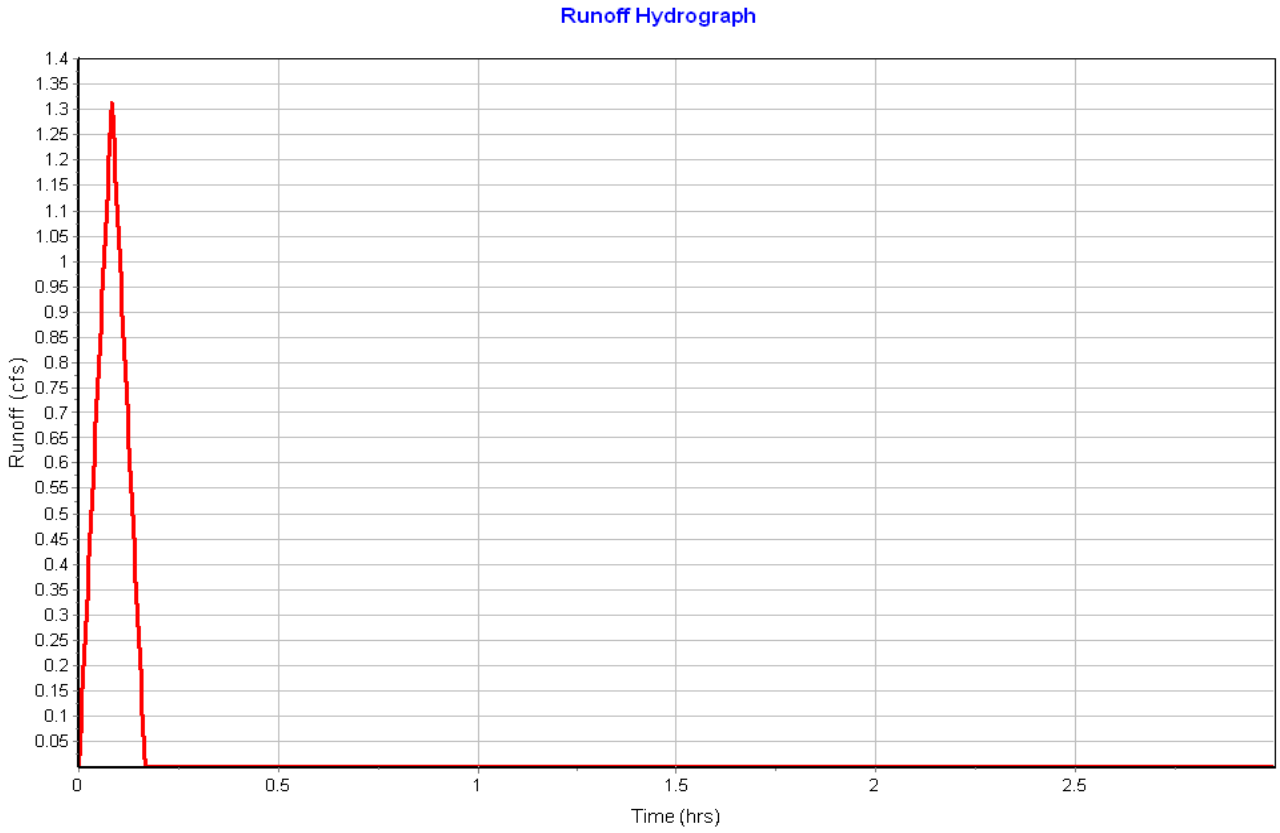
Time of Concentration

User-Defined TOC override (minutes): 5.00

Subbasin Runoff Results

Total Rainfall (in) 0.55
Total Runoff (in) 0.30
Peak Runoff (cfs) 1.31
Rainfall Intensity 6.560
Weighted Runoff Coefficient 0.5500
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : Pr-21



Subbasin : Pr-OS-1

Input Data

Area (ac) 124.70
Weighted Runoff Coefficient 0.3600

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	117.22	B (6%+)	0.37
Forest, 25 years or greater	7.48	D (6%+)	0.25
Composite Area & Weighted Runoff Coeff.	124.70		0.36

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	10	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.21	0.00	0.00
Computed Flow Time (min) :	8.01	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	3200	0.00	0.00
Slope (%) :	15	0.00	0.00
Surface Type :	Bare & untilled	Unpaved	Unpaved
Velocity (ft/sec) :	3.87	0.00	0.00
Computed Flow Time (min) :	13.78	0.00	0.00

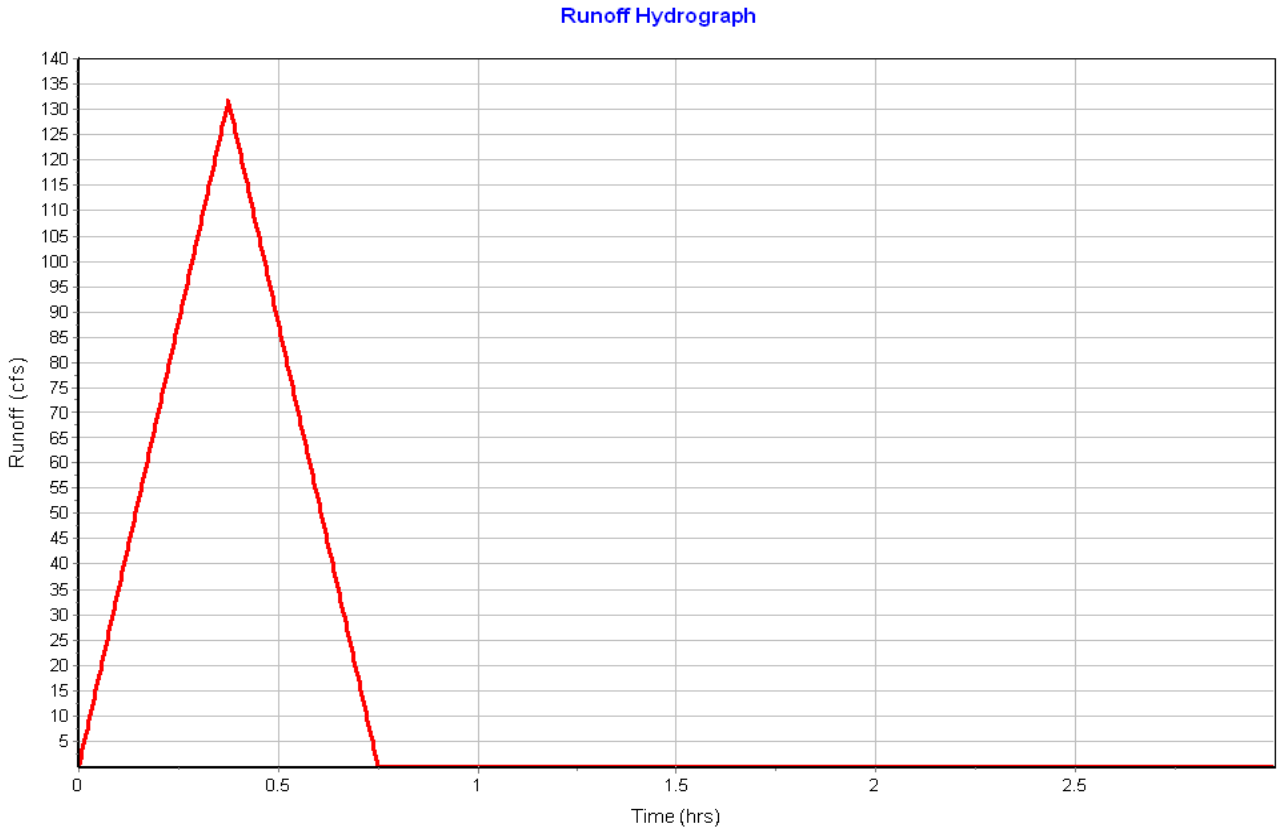
Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.030	0.00	0.00
Flow Length (ft) :	2200	0.00	0.00
Channel Slope (%) :	33	0.00	0.00
Cross Section Area (ft²) :	62.5	0.00	0.00
Wetted Perimeter (ft) :	23	0.00	0.00
Velocity (ft/sec) :	55.56	0.00	0.00
Computed Flow Time (min) :	0.66	0.00	0.00

Total TOC (min) 22.45

Subbasin Runoff Results

Total Rainfall (in) 1.10
Total Runoff (in) 0.40
Peak Runoff (cfs) 131.82
Rainfall Intensity 2.936
Weighted Runoff Coefficient 0.3600
Time of Concentration (days hh:mm:ss) 0 00:22:27

Subbasin : Pr-OS-1



Subbasin : Pr-OS-2

Input Data

Area (ac) 9.37
Weighted Runoff Coefficient 0.2800

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Meadow, 25 years or greater	2.06	B (6%+)	0.37
Forest, 25 years or greater	7.31	D (6%+)	0.25
Composite Area & Weighted Runoff Coeff.	9.37		0.28

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.13	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	45	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.05	0.00	0.00
Velocity (ft/sec) :	0.38	0.00	0.00
Computed Flow Time (min) :	4.39	0.00	0.00

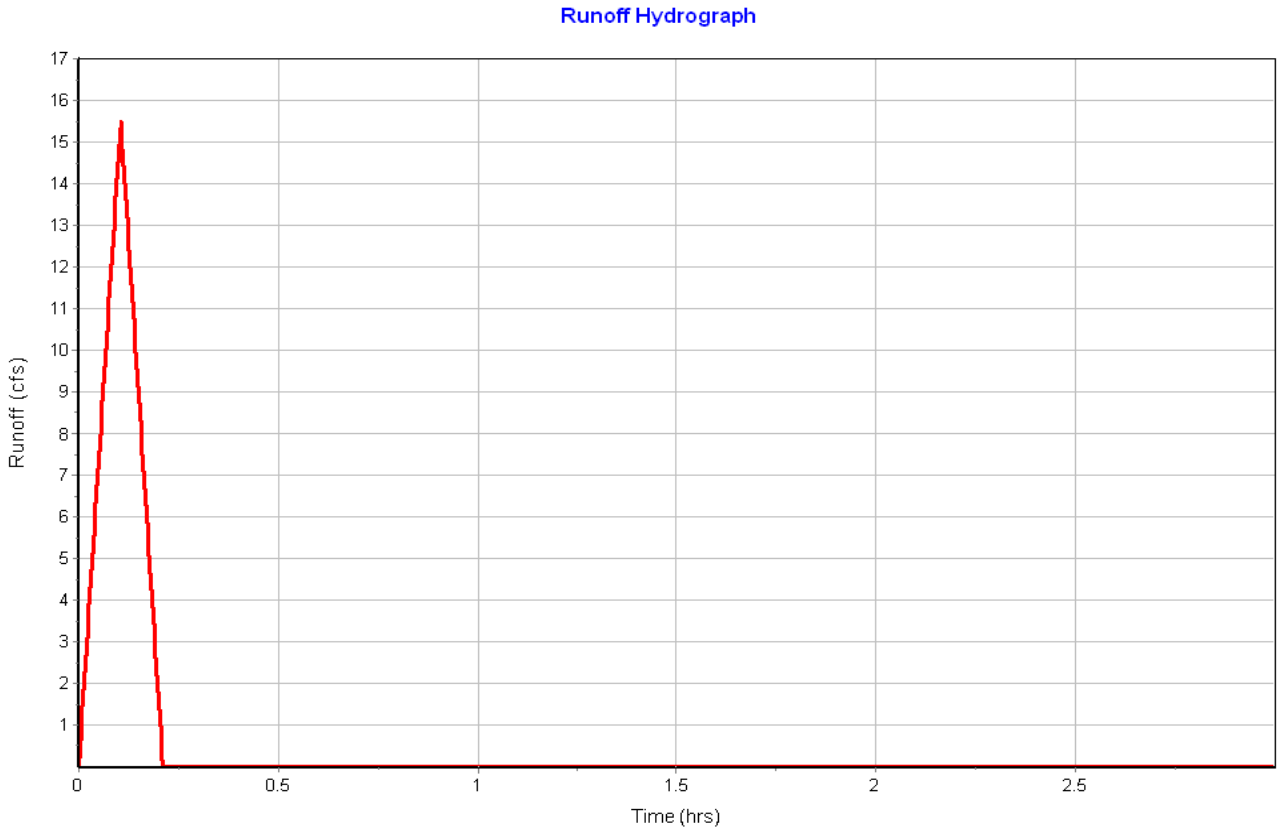
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	1360	0.00	0.00
Slope (%) :	53	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	11.75	0.00	0.00
Computed Flow Time (min) :	1.93	0.00	0.00

Total TOC (min) 6.32

Subbasin Runoff Results

Total Rainfall (in) 0.62
Total Runoff (in) 0.18
Peak Runoff (cfs) 15.50
Rainfall Intensity 5.907
Weighted Runoff Coefficient 0.2800
Time of Concentration (days hh:mm:ss) 0 00:06:19

Subbasin : Pr-OS-2



Subbasin : Walmart

Input Data

Area (ac) 1.55
Weighted Runoff Coefficient 0.9500

Runoff Coefficient

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	3.28	-	0.95
Composite Area & Weighted Runoff Coeff.	3.28		0.95

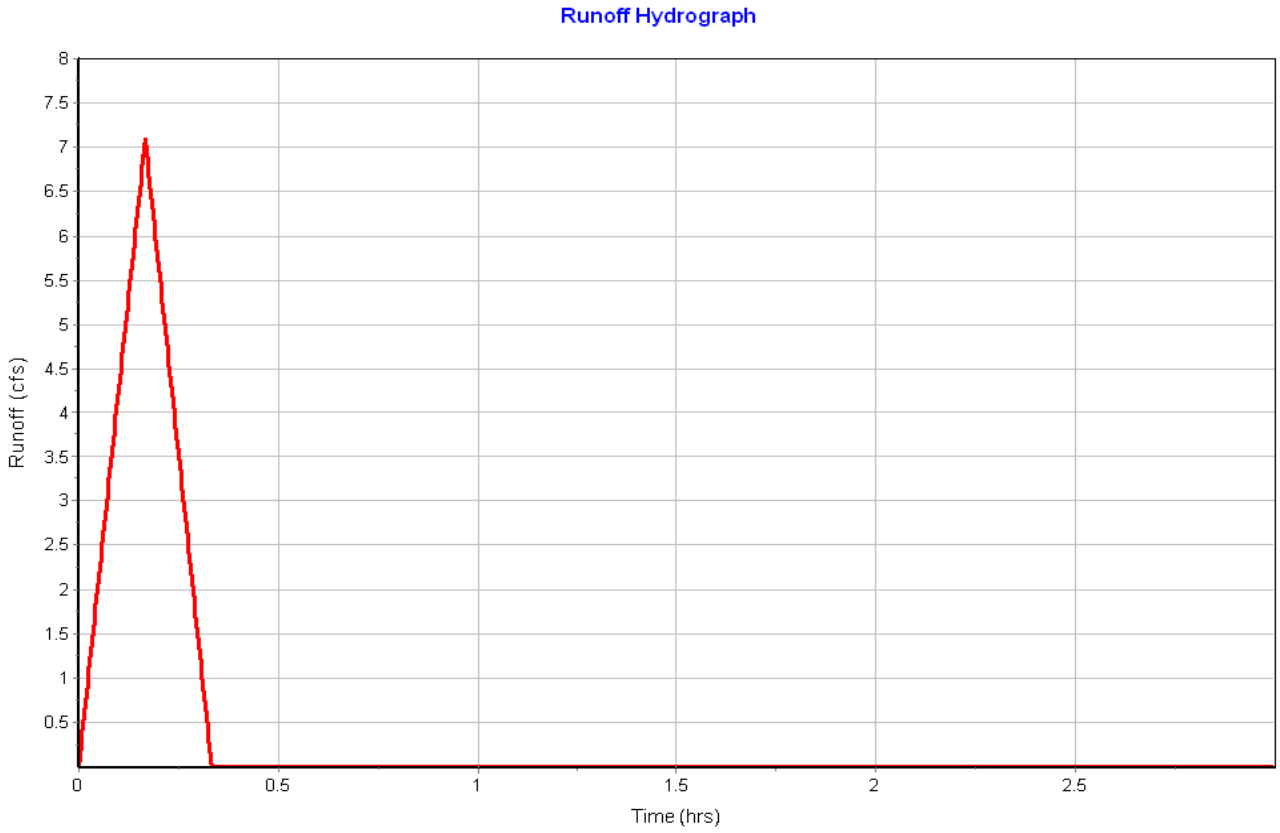
Time of Concentration

User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 0.80
Total Runoff (in) 0.76
Peak Runoff (cfs) 7.08
Rainfall Intensity 4.810
Weighted Runoff Coefficient 0.9500
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : Walmart



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)
1	EDB-Control	5863.00	5866.00	3.00	5863.00	0.00
2	FES-B10	5863.00	5869.00	6.00	5863.00	0.00
3	Int-Blake-Palmer	5859.50	5859.50	0.00	5859.50	0.00
4	Junc.H-04	5870.00	5876.00	6.00	5870.00	0.00
5	Junc.H-Blake-S	5858.00	5864.00	6.00	5858.00	0.00
6	Junc-H-02	5885.00	5891.00	6.00	5885.00	0.00
7	Junc-H-03	5888.00	5894.00	6.00	5888.00	0.00
8	Junc-Pr-Blake-S	5858.20	5858.20	0.00	5858.20	0.00
9	OS-1a	5942.00	5942.00	0.00	5942.00	0.00
10	OS-1b	5906.00	5906.00	0.00	5906.00	0.00
11	OS-2a	5942.00	5942.00	0.00	5942.00	0.00
12	Out-H-01	5875.00	5881.00	6.00	5875.00	0.00
13	Pr-26th	5876.00	5877.00	1.00	5876.00	0.00
14	Road-Palmer-B-12	5888.00	5888.00	0.00	5888.00	0.00
15	SDHM-A10	5896.00	5899.00	3.00	5896.00	0.00
16	SDMH-A4	5889.50	5899.80	10.30	5889.50	0.00
17	SDMH-A5	5888.90	5893.65	4.75	5888.90	0.00
18	SDMH-A6	5886.30	5890.77	4.47	5886.30	0.00
19	SDMH-A9	5894.20	5900.19	5.99	5894.20	0.00
20	SDMH-B9	5864.00	5867.21	3.21	5864.00	0.00
21	UG-Detention-Control	5858.30	5858.30	0.00	5858.30	0.00

Junction Results

SN	Element ID	Peak Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Total Flooded Volume	Total Time Flooded
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(ft³)	(min)
1	EDB-Control	0.470	5863.16	0.16	2.84	5863.11	0.11	0 00:15	0.00	0.00
2	FES-B10	15.550	5864.25	1.25	4.75	5863.07	0.07	0 00:05	0.00	0.00
3	Int-Blake-Palmer	6.800	5859.86	0.36	0.24	5859.52	0.02	0 00:07	0.00	0.00
4	Junc.H-04	1.430	5870.00	0.00	6.00	5870.00	0.00	0 00:00	0.00	0.00
5	Junc.H-Blake-S	20.780	5858.00	0.00	6.00	5858.00	0.00	0 00:00	0.00	0.00
6	Junc-H-02	0.990	5885.00	0.00	6.00	5885.00	0.00	0 00:00	0.00	0.00
7	Junc-H-03	0.790	5888.00	0.00	6.00	5888.00	0.00	0 00:00	0.00	0.00
8	Junc-Pr-Blake-S	9.140	5858.88	0.68	0.57	5858.31	0.11	0 00:09	0.00	0.00
9	OS-1a	131.820	5943.09	1.09	0.41	5942.18	0.18	0 00:22	0.00	0.00
10	OS-1b	131.640	5907.09	1.09	0.41	5906.18	0.18	0 00:22	0.00	0.00
11	OS-2a	15.500	5942.35	0.35	0.15	5942.02	0.02	0 00:06	0.00	0.00
12	Out-H-01	131.820	5875.00	0.00	6.00	5875.00	0.00	0 00:00	0.00	0.00
13	Pr-26th	131.440	5876.57	0.57	0.43	5876.11	0.11	0 00:22	0.00	0.00
14	Road-Palmer-B-12	14.830	5888.86	0.86	0.39	5888.04	0.04	0 00:06	0.00	0.00
15	SDHM-A10	1.490	5896.43	0.43	2.57	5896.02	0.02	0 00:05	0.00	0.00
16	SDMH-A4	4.660	5894.21	4.71	5.59	5893.82	4.32	0 00:05	0.00	0.00
17	SDMH-A5	5.320	5889.69	0.79	3.96	5888.93	0.03	0 00:05	0.00	0.00
18	SDMH-A6	5.300	5887.28	0.98	3.49	5886.53	0.23	0 00:05	0.00	0.00
19	SDMH-A9	1.440	5894.82	0.62	5.37	5894.42	0.22	0 00:05	0.00	0.00
20	SDMH-B9	15.640	5865.25	1.25	1.96	5864.06	0.06	0 00:05	0.00	0.00
21	UG-Detention-Control	2.860	5858.98	0.68	1.32	5858.41	0.11	0 00:09	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)
1	Bypass-A1	31.56	5896.57	4.07	5896.57	4.57	0.00	0.0100	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
2	Bypass-A2	140.00	5896.57	4.57	5876.00	0.00	20.57	14.6900	User-Defined	1.000	32.000	0.0160	0.5000	0.5000	0.0000	0.000
3	Bypass-B1	64.47	5883.39	3.79	5876.84	3.74	6.55	10.1700	User-Defined	0.600	17.000	0.0160	0.5000	0.5000	0.0000	0.000
4	Bypass-B2	71.42	5883.39	4.29	5876.84	4.24	6.55	9.1800	User-Defined	0.600	17.000	0.0160	0.5000	0.5000	0.0000	0.000
5	Bypass-B3	85.00	5876.84	4.24	5868.74	4.04	8.10	9.5300	User-Defined	0.600	17.000	0.0160	0.5000	0.5000	0.0000	0.000
6	Bypass-B5	80.66	5876.84	3.74	5868.74	4.24	8.09	10.0300	User-Defined	0.600	17.000	0.0160	0.5000	0.5000	0.0000	0.000
7	Bypass-B6	84.14	5868.74	4.04	5861.29	2.79	7.46	8.8600	User-Defined	0.600	17.000	0.0160	0.5000	0.5000	0.0000	0.000
8	Bypass-B8	78.55	5868.74	4.24	5861.29	2.29	7.46	9.4900	User-Defined	0.600	17.000	0.0160	0.5000	0.5000	0.0000	0.000
9	Bypass-C1	18.27	5862.19	2.59	5861.29	2.29	0.90	4.9300	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
10	Bypass-C2	51.37	5861.29	2.29	5859.50	0.00	1.79	3.4800	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
11	Bypass-C3	58.47	5861.29	2.79	5859.50	0.00	1.79	3.0600	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
12	Link-Blake-S	230.46	5859.50	0.00	5858.20	0.00	1.30	0.5600	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
13	Out-Pr-Blake	200.00	5858.20	0.00	5856.00	4.60	2.20	1.1000	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
14	Road-B12	48.58	5888.00	0.00	5883.39	4.29	4.61	9.4800	User-Defined	0.600	30.000	0.0160	0.5000	0.5000	0.0000	0.000
15	Road-OS-1b	240.00	5906.00	0.00	5876.00	0.00	30.00	12.5000	User-Defined	1.000	32.000	0.0160	0.5000	0.5000	0.0000	0.000
16	Swale-OS-1a	143.20	5942.00	0.00	5804.00	-102.00	138.00	96.3700	Trapezoidal	1.500	12.000	0.0300	0.5000	0.5000	0.0000	0.000
17	Swale-OS-2	146.88	5942.00	0.00	5889.00	0.00	53.00	36.0800	Trapezoidal	0.500	6.000	0.0300	0.5000	0.5000	0.0000	0.000

Channel Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	Bypass-A1	0.750	0 00:05	19.280	0.04	1.92	0.27	0.23	0.38	0.00	
2	Bypass-A2	0.500	0 00:05	565.610	0.00	4.65	0.50	0.09	0.09	0.00	
3	Bypass-B1	0.260	0 00:05	68.980	0.00	6.05	0.18	0.10	0.17	0.00	
4	Bypass-B2	12.230	0 00:07	65.530	0.19	7.49	0.16	0.35	0.59	0.00	
5	Bypass-B3	10.870	0 00:07	66.770	0.16	7.30	0.19	0.34	0.57	0.00	
6	Bypass-B5	0.200	0 00:05	68.520	0.00	3.79	0.35	0.09	0.16	0.00	
7	Bypass-B6	8.950	0 00:07	64.400	0.14	6.77	0.21	0.33	0.54	0.00	
8	Bypass-B8	0.020	0 00:05	66.650	0.00	2.19	0.60	0.04	0.07	0.00	
9	Bypass-C1	0.180	0 00:05	95.740	0.00	4.05	0.08	0.08	0.13	0.00	
10	Bypass-C2	0.320	0 00:05	80.420	0.00	2.36	0.36	0.11	0.18	0.00	
11	Bypass-C3	5.980	0 00:07	75.380	0.08	3.49	0.28	0.28	0.46	0.00	
12	Link-Blake-S	6.520	0 00:08	32.380	0.20	4.72	0.81	0.36	0.59	0.00	
13	Out-Pr-Blake	8.950	0 00:09	45.210	0.20	2.73	1.22	0.36	0.60	0.00	
14	Road-B12	14.830	0 00:07	132.730	0.11	6.62	0.12	0.31	0.51	0.00	
15	Road-OS-1b	131.440	0 00:22	521.700	0.25	15.75	0.25	0.57	0.57	0.00	
16	Swale-OS-1a	131.640	0 00:22	260.630	0.51	19.39	0.12	1.09	0.72	0.00	
17	Swale-OS-2	15.370	0 00:06	30.080	0.51	11.00	0.22	0.35	0.69	0.00	

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	26thSt	25.49	5876.00	0.00	5875.00	0.00	1.00	3.9200	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
2	Link-B10	35.65	5863.00	0.00	5863.00	0.00	0.00	0.0000	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
3	Link-H-01	230.30	5875.00	0.00	5841.00	0.00	34.00	14.7600	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
4	Link-H-02	177.03	5885.00	0.00	5841.00	0.00	44.00	24.8500	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
5	Link-H-03	169.29	5888.00	0.00	5858.00	0.00	30.00	17.7200	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
6	Link-H-04	134.40	5870.00	0.00	5858.00	0.00	12.00	8.9300	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
7	Link-H-Blake-S	33.46	5858.00	0.00	5858.00	0.00	0.00	0.0000	Dummy	0.000	0.000	0.0120	0.5000	0.5000	0.000	No	1
8	Pipe-29thSt	265.00	5851.40	0.00	5850.80	0.00	0.60	0.2300	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.000	No	1
9	Pipe-A1	24.33	5892.50	0.00	5892.20	0.20	0.30	1.2300	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
10	Pipe-A10	153.02	5896.00	0.00	5894.40	0.20	1.60	1.0500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
11	Pipe-A2	80.85	5892.00	0.00	5891.20	0.20	0.80	0.9900	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
12	Pipe-A3	133.17	5891.00	0.00	5889.70	0.20	1.30	0.9800	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
13	Pipe-A4	29.56	5889.50	0.00	5888.90	0.00	0.60	2.0300	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
14	Pipe-A5	117.00	5888.90	0.00	5886.50	0.20	2.40	2.0500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
15	Pipe-A6	240.10	5886.30	0.00	5879.80	3.00	6.50	2.7100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
16	Pipe-A7	54.21	5876.80	0.00	5863.00	0.00	13.80	25.4600	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
17	Pipe-A9	34.80	5894.20	0.00	5893.80	4.30	0.40	1.1500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
18	Pipe-B1	24.33	5879.60	0.00	5879.30	0.20	0.30	1.2300	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
19	Pipe-B11	15.00	5883.00	-0.30	5880.00	0.90	3.00	20.0000	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
20	Pipe-B12	15.00	5889.00	0.00	5888.00	0.00	1.00	6.6700	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
21	Pipe-B2	65.73	5879.10	0.00	5872.80	0.20	6.30	9.5800	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
22	Pipe-B3	82.21	5872.60	0.00	5864.70	0.00	7.90	9.6100	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
23	Pipe-B4	20.78	5876.90	0.00	5873.30	0.20	3.60	17.3300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.000	No	1
24	Pipe-B5	24.33	5873.10	0.00	5872.80	0.20	0.30	1.2300	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.000	No	1
25	Pipe-B6	24.34	5864.70	0.00	5864.50	0.00	0.20	0.8200	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.000	No	1
26	Pipe-B7	29.28	5870.20	0.00	5864.70	0.00	5.50	18.7800	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.000	No	1
27	Pipe-B8	57.48	5864.50	0.00	5864.00	0.00	0.50	0.8700	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.000	No	1
28	Pipe-B9	125.34	5864.00	0.00	5863.00	0.00	1.00	0.8000	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.000	No	1
29	Pipe-C1	14.31	5859.60	0.00	5859.20	0.20	0.40	2.8000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.000	No	1
30	Pipe-C2	19.75	5859.00	0.00	5858.80	0.30	0.20	1.0100	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.000	No	1
31	Pipe-C3	27.52	5858.80	0.30	5858.50	5.00	0.30	1.0900	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
32	Pipe-C4	20.00	5858.50	5.00	5858.40	0.00	0.10	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.000	No	1
33	Pipe-EDB-Control	28.55	5863.00	0.00	5862.00	0.00	1.00	3.5000	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1
34	Pipe-UG-Control	20.00	5858.30	0.00	5858.20	0.00	0.10	0.5000	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.000	No	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)
1	26thSt	131.440	0 00:22	0.00	0.00	0.00		0.00	0.00	0.00
2	Link-B10	15.550	0 00:05	0.00	0.08	0.00		0.28	0.46	0.00
3	Link-H-01	131.820	0 00:22	0.00	0.20	0.00		0.36	0.59	0.00
4	Link-H-02	0.990	0 00:06	0.00	0.20	0.00		0.36	0.59	0.00
5	Link-H-03	0.790	0 00:06	0.00	0.20	0.00		0.36	0.59	0.00
6	Link-H-04	1.430	0 00:07	0.00	0.20	0.00		0.36	0.59	0.00
7	Link-H-Blake-S	20.780	0 00:06	0.00	0.20	0.00		0.36	0.59	0.00
8	Pipe-29thSt	5.860	0 00:14	5.41	1.08	3.88	1.14	1.50	1.00	5.00
9	Pipe-A1	0.990	0 00:05	4.29	0.23	5.26	0.08	0.33	0.33	0.00
10	Pipe-A10	1.440	0 00:05	3.95	0.37	7.54	0.34	0.42	0.42	0.00
11	Pipe-A2	1.830	0 00:05	3.84	0.48	4.85	0.28	0.49	0.49	0.00
12	Pipe-A3	3.220	0 00:05	3.81	0.85	5.53	0.40	0.70	0.70	0.00
13	Pipe-A4	4.660	0 00:05	9.97	0.47	7.99	0.06	0.60	0.48	0.00
14	Pipe-A5	5.300	0 00:05	5.53	0.96	8.11	0.24	0.78	0.78	0.00
15	Pipe-A6	5.260	0 00:06	6.35	0.83	9.20	0.43	0.69	0.69	0.00
16	Pipe-A7	8.520	0 00:06	19.47	0.44	23.96	0.04	0.46	0.46	0.00
17	Pipe-A9	1.440	0 00:05	4.14	0.35	4.80	0.12	0.41	0.41	0.00
18	Pipe-B1	0.700	0 00:05	4.29	0.16	4.60	0.09	0.27	0.27	0.00
19	Pipe-B11	4.160	0 00:05	32.82	0.13	18.34	0.01	0.30	0.24	0.00
20	Pipe-B12	14.830	0 00:06	18.07	0.82	16.43	0.02	0.86	0.69	0.00
21	Pipe-B2	7.130	0 00:05	21.67	0.33	15.83	0.07	0.49	0.39	0.00
22	Pipe-B3	11.160	0 00:05	21.69	0.51	17.82	0.08	0.64	0.51	0.00
23	Pipe-B4	1.230	0 00:05	5.45	0.23	12.60	0.03	0.22	0.32	0.00
24	Pipe-B5	1.850	0 00:05	4.29	0.43	5.26	0.08	0.46	0.46	0.00
25	Pipe-B6	14.320	0 00:05	22.21	0.64	7.51	0.05	1.17	0.58	0.00
26	Pipe-B7	1.140	0 00:05	5.67	0.20	12.74	0.04	0.20	0.30	0.00
27	Pipe-B8	14.470	0 00:05	22.86	0.63	7.71	0.12	1.16	0.58	0.00
28	Pipe-B9	15.550	0 00:05	21.89	0.71	7.60	0.27	1.24	0.62	0.00
29	Pipe-C1	0.520	0 00:05	2.19	0.24	5.15	0.05	0.22	0.33	0.00
30	Pipe-C2	1.410	0 00:05	1.32	1.07	4.42	0.07	0.61	0.92	0.00
31	Pipe-C3	4.200	0 00:07	7.31	0.58	6.16	0.07	0.68	0.54	0.00
32	Pipe-C4	5.640	0 00:05	8.05	0.70	4.93	0.07	0.92	0.62	0.00
33	Pipe-EDB-Control	0.470	0 00:15	13.10	0.04	5.04	0.09	0.16	0.13	0.00
34	Pipe-UG-Control	2.860	0 00:09	4.95	0.58	4.18	0.08	0.68	0.55	0.00

The existing 18"dia pipe leading from the inlet near Walmart will be slightly surcharged, but should not exceed the structure rim.

Inlet Input

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	A1-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5892.50	5896.57	4.07	5892.50	0.00	N/A	25.00
2	A2-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5892.00	5896.57	4.57	5892.00	0.00	N/A	25.00
3	A3-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5891.00	5896.76	5.76	5891.00	0.00	100.00	50.00
4	Inlet-A7-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5876.80	5883.87	7.07	5876.80	0.00	100.00	50.00
5	Inlet-B1-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5879.60	5883.39	3.79	5879.60	0.00	N/A	25.00
6	Inlet-B11-(Nylo)	CALTRANS	GCP	On Sag	1	5883.30	5899.00	15.70	5883.30	0.00	36.00	50.00
7	Inlet-B12-(Nylo)	CALTRANS	GCP	On Sag	1	5889.00	5901.00	12.00	5889.00	0.00	36.00	50.00
8	Inlet-B2-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5879.10	5883.39	4.29	5879.10	0.00	N/A	25.00
9	Inlet-B3-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5872.60	5876.84	4.24	5872.60	0.00	N/A	25.00
10	Inlet-B4-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5876.90	5880.96	4.06	5876.90	0.00	100.00	50.00
11	Inlet-B5-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5873.10	5876.84	3.74	5873.10	0.00	N/A	25.00
12	Inlet-B6-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5864.70	5868.74	4.04	5864.70	0.00	N/A	25.00
13	Inlet-B7-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5870.20	5874.26	4.06	5870.20	0.00	0.00	50.00
14	Inlet-B8-(Type-R)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5864.50	5868.74	4.24	5864.50	0.00	N/A	25.00
15	Inlet-C1-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5859.60	5862.19	2.59	5859.60	0.00	N/A	50.00
16	Inlet-C2-(Type-13)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5859.00	5861.29	2.29	5859.00	0.00	N/A	50.00
17	Inlet-C3-(Type-13)	FHWA HEC-22 GENERIC	N/A	On Grade	1	5858.50	5861.29	2.79	5858.50	0.00	N/A	50.00
18	Inlet-C4-(Type-16)	FHWA HEC-22 GENERIC	N/A	On Sag	1	5853.50	5862.46	8.96	5853.50	0.00	0.00	50.00
19	Inlet-Walmart	FHWA HEC-22 GENERIC	N/A	On Sag	1	5851.40	5856.00	4.60	5851.40	0.00	100.00	25.00

The existing inlet is a single (5') CDOT Type-R. The inlet curb opening must be increased to a triple (15') to accomodate the increased flow.

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	A1-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
2	A2-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
3	A3-(Type-16)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
4	Inlet-A7-(Type-16)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
5	Inlet-B1-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
6	Inlet-B11-(Nylo)	N/A	0.0208	0.0300	0.0620	2.00	0.0656	7.00
7	Inlet-B12-(Nylo)	N/A	0.0208	0.0300	0.0620	2.00	0.3937	7.00
8	Inlet-B2-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
9	Inlet-B3-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
10	Inlet-B4-(Type-16)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
11	Inlet-B5-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
12	Inlet-B6-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
13	Inlet-B7-(Type-16)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
14	Inlet-B8-(Type-R)	0.0980	0.0200	0.0160	0.0830	1.50	0.0656	7.00
15	Inlet-C1-(Type-16)	0.0100	0.0200	0.0160	0.0620	2.00	0.0656	7.00
16	Inlet-C2-(Type-13)	0.0100	0.0200	0.0160	0.0620	2.00	0.0656	7.00
17	Inlet-C3-(Type-13)	0.0100	0.0200	0.0160	0.0620	2.00	0.0656	7.00
18	Inlet-C4-(Type-16)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
19	Inlet-Walmart	N/A	0.0200	0.0160	0.0830	1.50	0.0656	7.00

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	Total Flooded Volume (ft^3)	Total Time Flooded (hr)
1	A1-(Type-R)	1.790	1.79	1.00	0.80	55.59	4.66	5896.76	0.19	0 00:05	0.00	0.00
2	A2-(Type-R)	1.370	0.67	0.86	0.51	62.76	3.94	5896.74	0.17	0 00:05	0.00	0.00
3	A3-(Type-16)	1.470	1.47	N/A	N/A	N/A	9.09	5897.19	0.43	0 00:05	0.00	0.00
4	Inlet-A7-(Type-16)	3.760	3.76	N/A	N/A	N/A	22.92	5884.55	0.68	0 00:06	0.00	0.00
5	Inlet-B1-(Type-R)	0.960	0.96	0.70	0.26	72.52	3.04	5883.55	0.16	0 00:05	0.00	0.00
6	Inlet-B11-(Nylo)	4.180	4.18	N/A	N/A	N/A	21.82	5899.70	0.70	0 00:05	0.00	0.00
7	Inlet-B12-(Nylo)	15.370	0.00	N/A	N/A	N/A	257.50	5907.06	6.06	0 00:06	0.00	0.00
8	Inlet-B2-(Type-R)	14.830	0.00	2.58	12.24	17.43	12.45	5883.74	0.34	0 00:05	0.00	0.00
9	Inlet-B3-(Type-R)	13.350	1.82	2.47	10.88	18.52	11.93	5877.17	0.33	0 00:05	0.00	0.00
10	Inlet-B4-(Type-16)	1.260	1.26	N/A	N/A	N/A	8.03	5881.37	0.41	0 00:05	0.00	0.00
11	Inlet-B5-(Type-R)	0.840	0.59	0.63	0.21	75.07	2.62	5876.98	0.15	0 00:05	0.00	0.00
12	Inlet-B6-(Type-R)	11.270	0.67	2.30	8.96	20.43	11.13	5869.06	0.32	0 00:05	0.00	0.00
13	Inlet-B7-(Type-16)	1.140	1.14	N/A	N/A	N/A	7.45	5874.65	0.40	0 00:05	0.00	0.00
14	Inlet-B8-(Type-R)	0.200	0.00	0.18	0.02	88.56	0.61	5868.79	0.05	0 00:05	0.00	0.00
15	Inlet-C1-(Type-16)	0.710	0.71	0.52	0.18	73.94	4.98	5862.37	0.18	0 00:05	0.00	0.00
16	Inlet-C2-(Type-13)	1.180	0.99	0.85	0.33	72.34	6.65	5861.51	0.22	0 00:04	0.00	0.02
17	Inlet-C3-(Type-13)	9.270	0.56	3.27	6.00	35.27	16.20	5861.70	0.41	0 00:07	0.00	0.00
18	Inlet-C4-(Type-16)	1.660	1.66	N/A	N/A	N/A	10.07	5862.91	0.45	0 00:05	0.00	0.00
19	Inlet-Walmart	8.980	0.25	N/A	N/A	N/A	21.39	5856.69	0.69	0 00:07	0.00	0.00

Storage Nodes

Storage Node : EDB-Detention

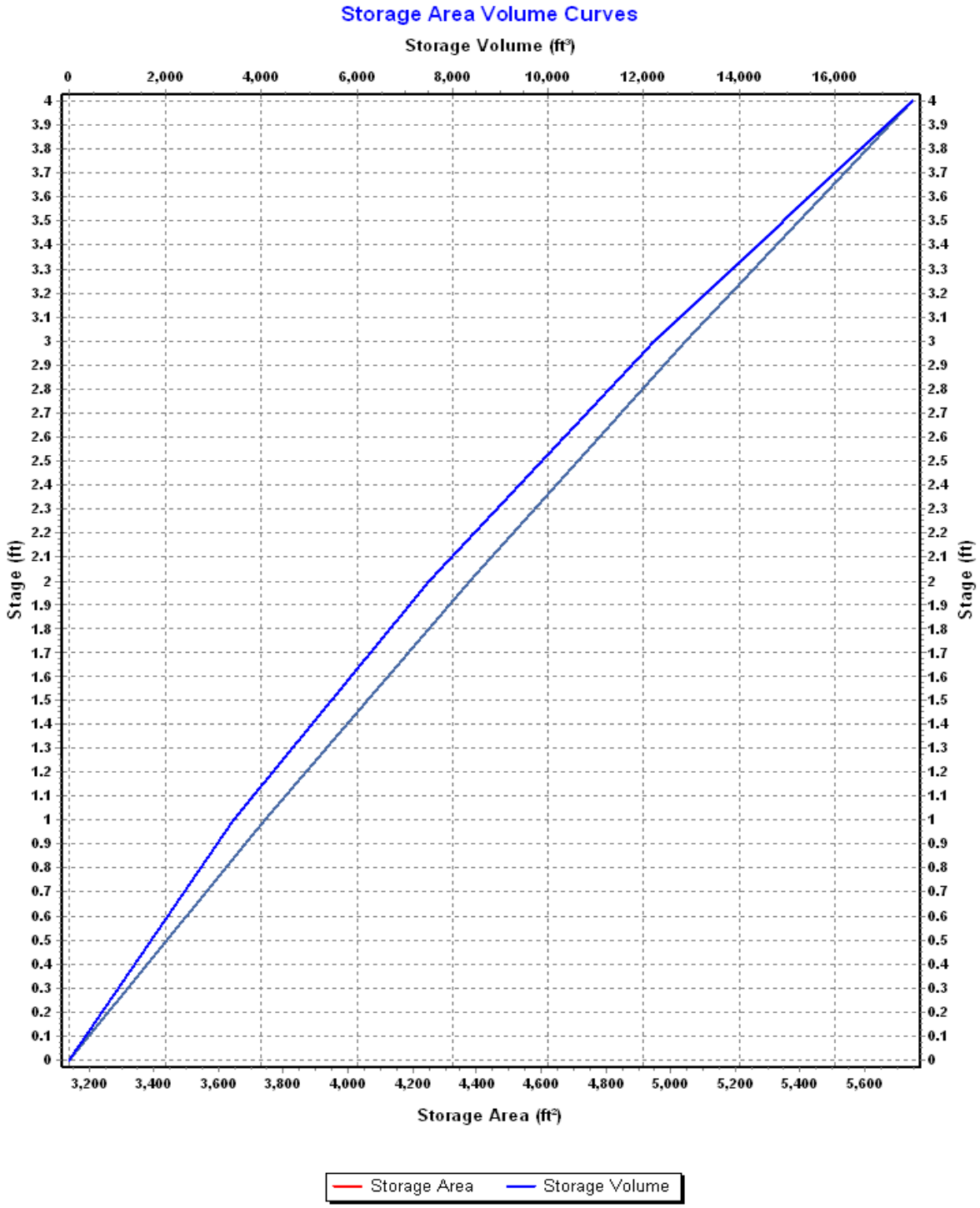
Input Data

Invert Elevation (ft)	5863.00
Max (Rim) Elevation (ft)	5869.00
Max (Rim) Offset (ft)	6.00
Initial Water Elevation (ft)	5863.00
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : EDB

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	3139	0.000
1	3744	3441.50
2	4379	7503.00
3	5044	12214.50
4	5747	17610.00


Storage Area Volume Curves
Storage Volume (ft³)
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
Stage (ft)
Stage (ft)
Storage Area (ft²)
3,200
3,400
3,600
3,800
4,000
4,200
4,400
4,600
4,800
5,000
5,200
5,400
5,600
Storage Area
Storage Volume

Storage Node : EDB-Detention (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-EDB-100	Rectangular	No	5865.50	2.50	7.50	0.50	3.33
2	Weir-EDB-25	Rectangular	No	5864.75	1.75	0.25	0.75	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	Orifice-EDB-WQCV	Side	CIRCULAR	No	1.25			5863.00	0.61

Use MHFD Spreadsheet design

Output Summary Results

Peak Inflow (cfs)	24.02
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.47
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	5865.37
Max HGL Depth Attained (ft)	2.37
Average HGL Elevation Attained (ft)	5865.01
Average HGL Depth Attained (ft)	2.01
Time of Max HGL Occurrence (days hh:mm)	0 00:15
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Set pond top of berm at 5866.5' for 12" min. freeboard

Storage Node : UG-Detention

Input Data

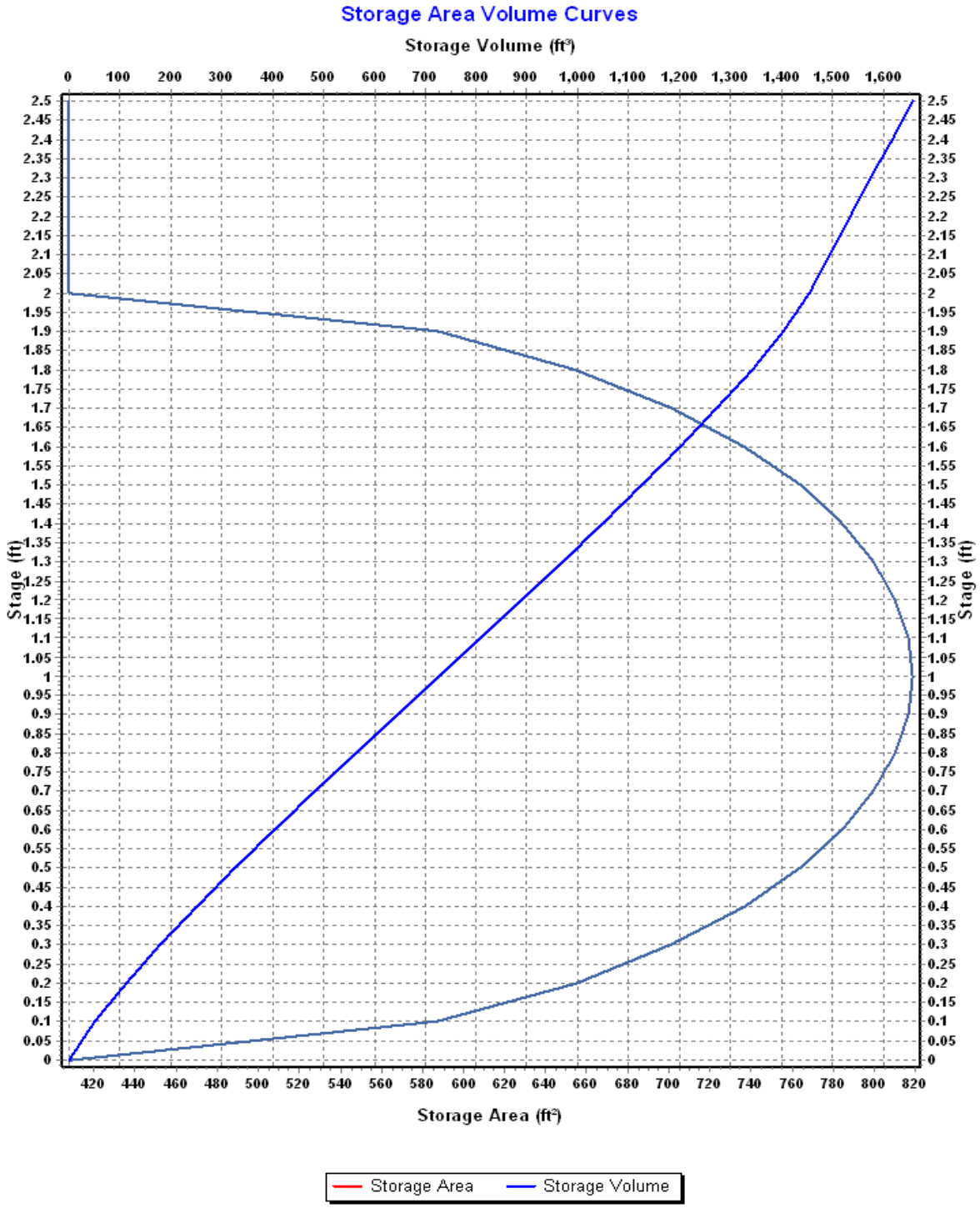
Invert Elevation (ft)	5858.40
Max (Rim) Elevation (ft)	5861.40
Max (Rim) Offset (ft)	3.00
Initial Water Elevation (ft)	5858.40
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : UG-Detention

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	408.0000	0.000
0.1	586.8892	49.74
0.2	654.2400	111.80
0.3	701.0842	179.57
0.4	736.3200	251.44
0.5	763.4168	326.43
0.6	784.1378	403.81
0.7	799.4966	482.99
0.8	810.1082	563.47
0.9	816.3428	644.79
1	818.4000	726.53
1.1	816.3428	808.27
1.2	810.1082	889.59
1.3	799.4966	970.07
1.4	784.1378	1049.25
1.5	763.4168	1126.63
1.6	736.3200	1201.62
1.7	701.0842	1273.49
1.8	654.2400	1341.26
1.9	586.8892	1403.32
2	408.0000	1453.06
2.1	408.0000	1493.86
2.2	408.0000	1534.66
2.3	408.0000	1575.46
2.4	408.0000	1616.26
2.5	408.0000	1657.06

Underground Pipe Lateral Storage
(4) 24"dia 80 LF Laterals
24" pipe clearance
Gravel backfill/storage (40% voids)
6" gravel cover
30 mil PVC pond liner (No Infiltration)


Storage Area Volume Curves
Storage Volume (ft³)
0 100 200 300 400 500 600 700 800 900 1,000 1,100 1,200 1,300 1,400 1,500 1,600
Stage (ft)
2.5 2.45 2.4 2.35 2.3 2.25 2.2 2.15 2.1 2.05 2 1.95 1.9 1.85 1.8 1.75 1.7 1.65 1.6 1.55 1.5 1.45 1.4 1.35 1.3 1.25 1.2 1.15 1.1 1.05 1 0.95 0.9 0.85 0.8 0.75 0.7 0.65 0.6 0.55 0.5 0.45 0.4 0.35 0.3 0.25 0.2 0.15 0.1 0.05 0
420 440 460 480 500 520 540 560 580 600 620 640 660 680 700 720 740 760 780 800 820
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : UG-Detention (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-UG-100	Rectangular	No	5859.90	1.50	1.00	0.50	3.33
2	Weir-UG-25	Rectangular	No	5858.40	0.00	0.25	1.50	3.33

Output Summary Results

Peak Inflow (cfs)	5.64
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	2.86
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	5860.33
Max HGL Depth Attained (ft)	1.93
Average HGL Elevation Attained (ft)	5858.66
Average HGL Depth Attained (ft)	0.26
Time of Max HGL Occurrence (days hh:mm)	0 00:09
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Peak Developed Outflow is less than the onsite existing/historic from Basin H/Ex-05 of 7.37 cfs

Storage Node : Walmart-Detention

Input Data

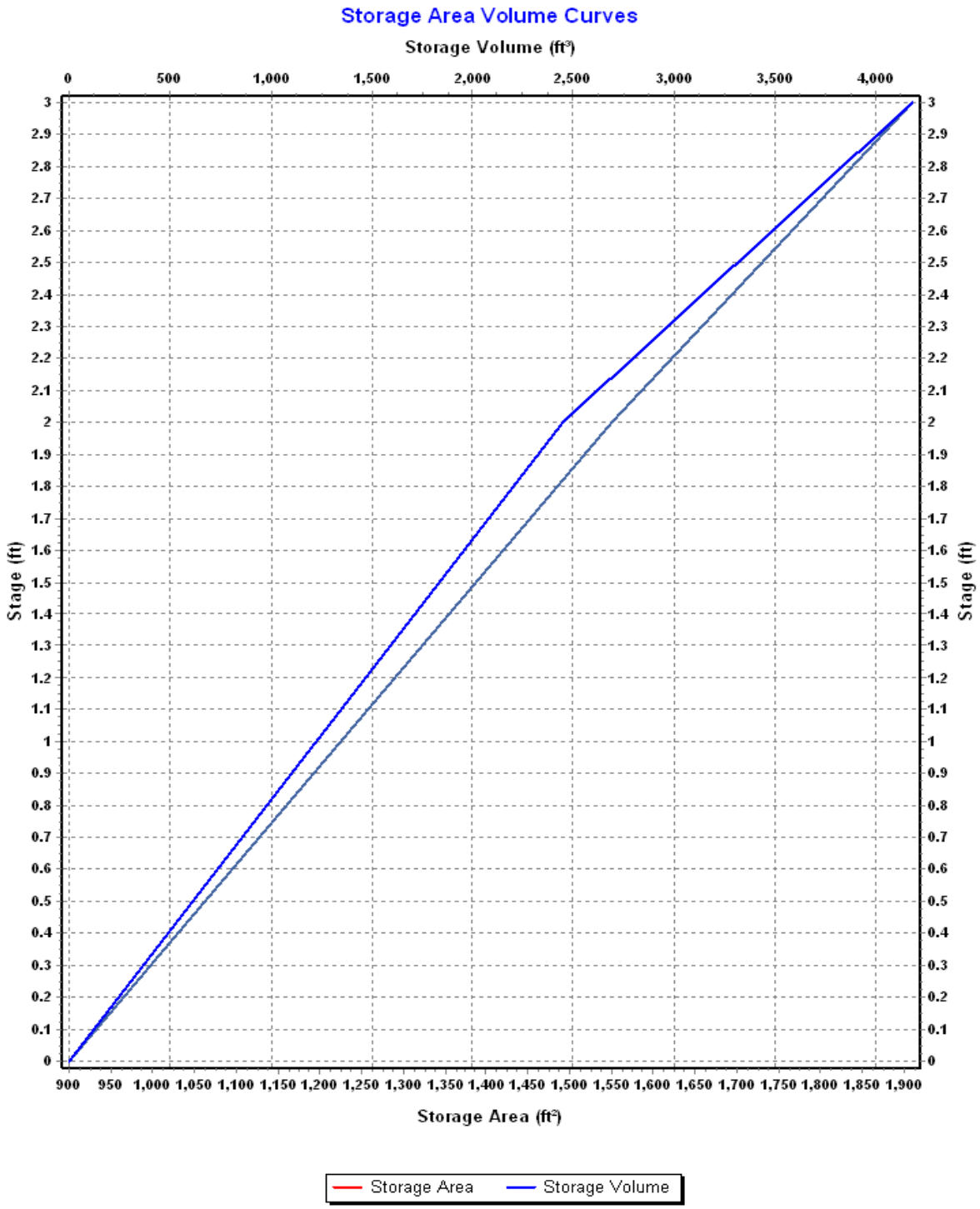
Invert Elevation (ft)	5852.00
Max (Rim) Elevation (ft)	5855.00
Max (Rim) Offset (ft)	3.00
Initial Water Elevation (ft)	5852.00
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Walmart

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	900	0.000
2	1550	2450.00
3	1910	4180.00

Based on design by SGM (1987) for 2' deep pond and approx. existing pond dimensions.


Storage Area Volume Curves
Storage Volume (ft³)
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
Stage (ft)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
2.1
2.2
2.3
2.4
2.5
2.6
2.7
2.8
2.9
3
Storage Area (ft²)
900
950
1,000
1,050
1,100
1,150
1,200
1,250
1,300
1,350
1,400
1,450
1,500
1,550
1,600
1,650
1,700
1,750
1,800
1,850
1,900
Storage Area
Storage Volume

Storage Node : Walmart-Detention (continued)

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	Walmart-Det-Control	Side	CIRCULAR	No	5.60			5852.00	0.61

Output Summary Results

Peak Inflow (cfs)	7.08
Peak Lateral Inflow (cfs)	7.08
Peak Outflow (cfs)	1.28
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	5854.54
Max HGL Depth Attained (ft)	2.54
Average HGL Elevation Attained (ft)	5852.65
Average HGL Depth Attained (ft)	0.65
Time of Max HGL Occurrence (days hh:mm)	0 00:18
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

1.27 cfs permitted (historic 25-yr) per SGM (1987). Study did not calculate the 100-yr runoff.

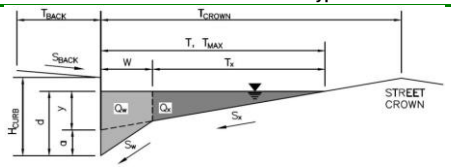
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Enter Your Project Name Here

Inlet ID: Type-R on 9.8% Grade



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.040	ft/ft
Warning 01 Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.025	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	11.5	ft
Gutter Width	W =	1.50	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.098	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	4.0	11.5	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**1.4**	**58.9**	**cfs**

WARNING: MINOR STORM max. allowable capacity is less than the design flow given on sheet 'Inlet Management'

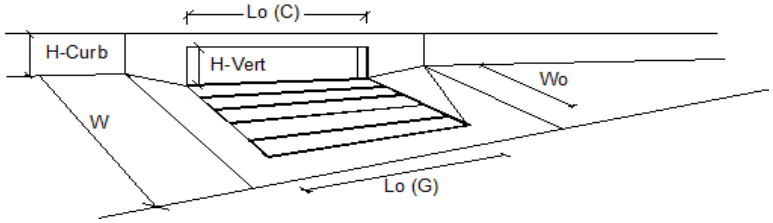
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Warning 01: Manning's n-value does not meet the USDCM recommended design range.

This is used to estimate the street capacity for 1/2 of Palmer Avenue which has a longitudinal slope of 9.8%.

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



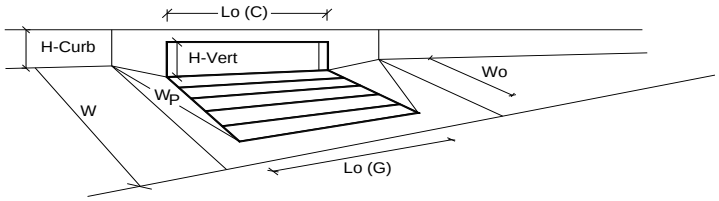
	Design Information (Input)		MINOR	MAJOR	
	Type of Inlet	Type =	CDOT Type R Curb Opening		
Warning 1	Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	2.0	2.0	inches
	Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
	Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
	Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
	Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Warning 1	Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.25	0.10	
	Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MINOR STORM'		MINOR	MAJOR	
	Total Inlet Interception Capacity	**Q =**	**2.0**	**2.6**	**cfs**
	Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**2.0**	**2.6**	**cfs**
	Capture Percentage = Q_a/Q_o =	**C% =**	**50**	**50**	**%**

Warning 1: Dimension entered is not a typical dimension for inlet type specified.

This is used to estimate the inlet capacity of a CDOT Type-R Inlet on grade with longitudinal slope of 9.8%.

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



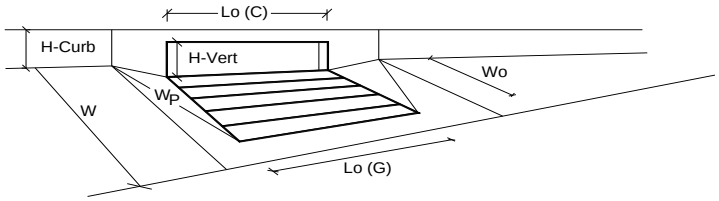
		MINOR	MAJOR	
Design Information (Input)				
Type of Inlet (Denver No. 16 Combination)	Type =	Denver No. 16 Combination		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	8.5	inches
Grate Information		MINOR	MAJOR	Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.31	0.31	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.60	3.60	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	3.00	3.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.50	6.50	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	5.25	5.25	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	0.00	0.00	degrees
Warning 1 Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	1.50	1.50	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.25	0.25	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.70	3.70	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.66	0.66	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.512	0.721	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.36	0.57	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.94	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.94	1.00	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**3.5**	**5.4**	**cfs**
WARNING: Inlet Capacity less than Q Peak for Minor and Major Storms	$Q_{PEAK\ REQUIRED}$ =	5.0	8.0	cfs

Warning 1: Dimension entered is not a typical dimension for inlet type specified.

This is used to estimate the inlet capacity of a CDOT Type-16 Combination Inlet at a sag location.

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017

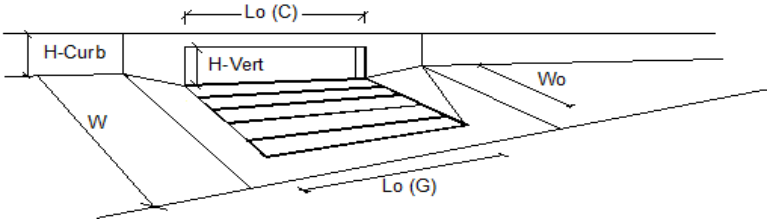


Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.9	8.3	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	1.50	1.50	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.37	0.57	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.76	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.6**	**9.8**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	5.0	8.0	cfs

This is used to estimate the inlet capacity of a CDOT Type-R Inlet at a sag location.

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



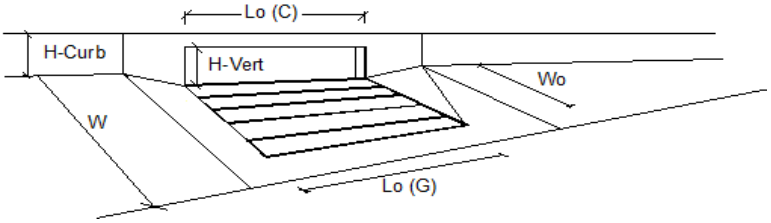
	Design Information (Input)		MINOR	MAJOR	
	Type of Inlet	Type =	CDOT/Denver 13 Valley Grate		
Warning 1	Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	1.0	1.0	inches
	Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
	Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	3.00	3.00	ft
	Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	1.73	1.73	ft
	Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	0.50	0.50	
	Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	N/A	N/A	
	Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MINOR STORM'		MINOR	MAJOR	
	Total Inlet Interception Capacity	**Q =**	**1.3**	**1.5**	**cfs**
	Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**3.7**	**6.5**	**cfs**
	Capture Percentage = Q_a/Q_o =	**C% =**	**26**	**18**	**%**

Warning 1: Dimension entered is not a typical dimension for inlet type specified.

This is used to estimate the inlet capacity of a CDOT Type-13 Valley Inlet on grade with longitudinal slope of 9.8%.

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



	Design Information (Input)		MINOR	MAJOR	
	Type of Inlet	Type =	Denver No. 16 Combination		
	Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	2.0	2.0	inches
	Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
	Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	3.00	3.00	ft
	Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	1.73	1.73	ft
	Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	0.50	0.50	
Warning 2	Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.25	0.25	
	Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
	Total Inlet Interception Capacity	**Q =**	**1.5**	**2.0**	**cfs**
	Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**1.5**	**3.0**	**cfs**
	Capture Percentage = Q_a/Q_o =	**C% =**	**51**	**40**	**%**

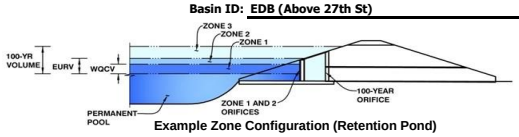
This is used to estimate the inlet capacity of a CDOT Type-16 Combination Inlet on grade with longitudinal slope of 2%.

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.00 (December 2019)

Project: Bell Rippy Neighborhood

Basin ID: EDB (Above 27th St)



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	6.093	acres
Watershed Length =	800	ft
Watershed Length to Centroid =	300	ft
Watershed Slope =	0.030	ft/ft
Watershed Imperviousness =	41.60%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	93.8%	percent
Percentage Hydrologic Soil Groups C/D =	6.2%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

		Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.074 acre-feet	0.074	acre-feet
Excess Urban Runoff Volume (EURV) =	0.265 acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.51 in.) =	0.077 acre-feet	0.510	inches
5-yr Runoff Volume (P1 = 0.71 in.) =	0.114 acre-feet	0.706	inches
10-yr Runoff Volume (P1 = 0.86 in.) =	0.149 acre-feet	0.858	inches
25-yr Runoff Volume (P1 = 1.05 in.) =	0.210 acre-feet	1.050	inches
50-yr Runoff Volume (P1 = 1.19 in.) =	0.269 acre-feet	1.190	inches
100-yr Runoff Volume (P1 = 1.32 in.) =	0.339 acre-feet	1.320	inches
500-yr Runoff Volume (P1 = 1.45 in.) =	0.401 acre-feet	1.450	inches
Approximate 2-yr Detention Volume =	0.085 acre-feet		
Approximate 5-yr Detention Volume =	0.131 acre-feet		
Approximate 10-yr Detention Volume =	0.184 acre-feet		
Approximate 25-yr Detention Volume =	0.219 acre-feet		
Approximate 50-yr Detention Volume =	0.231 acre-feet		
Approximate 100-yr Detention Volume =	0.262 acre-feet		

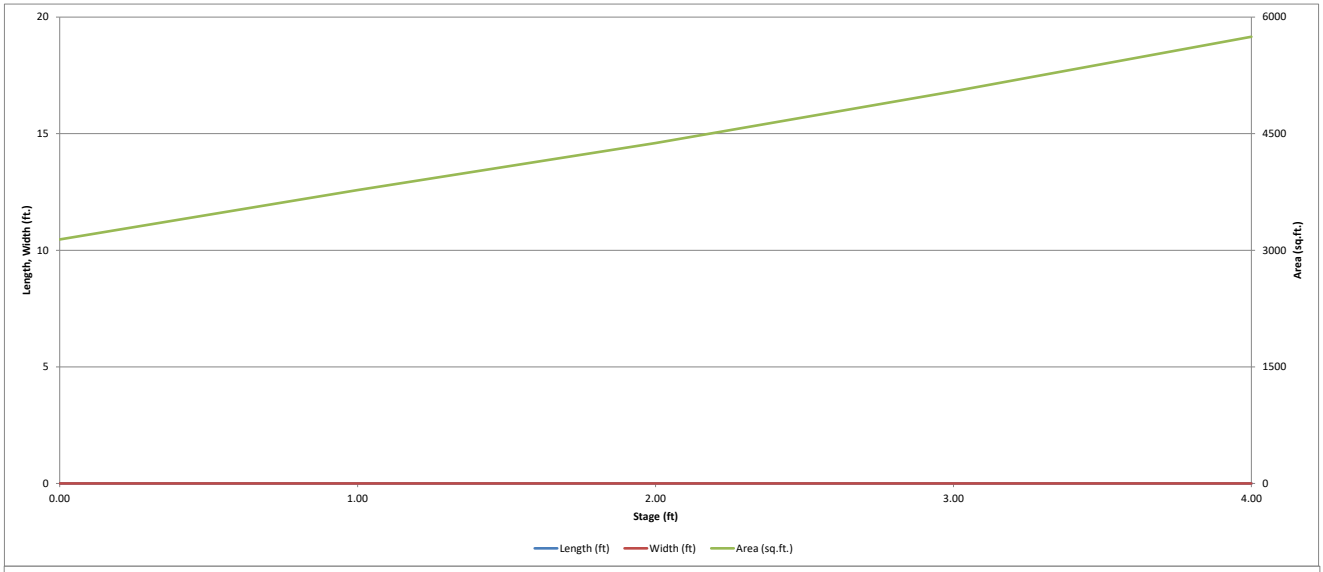
Define Zones and Basin Geometry

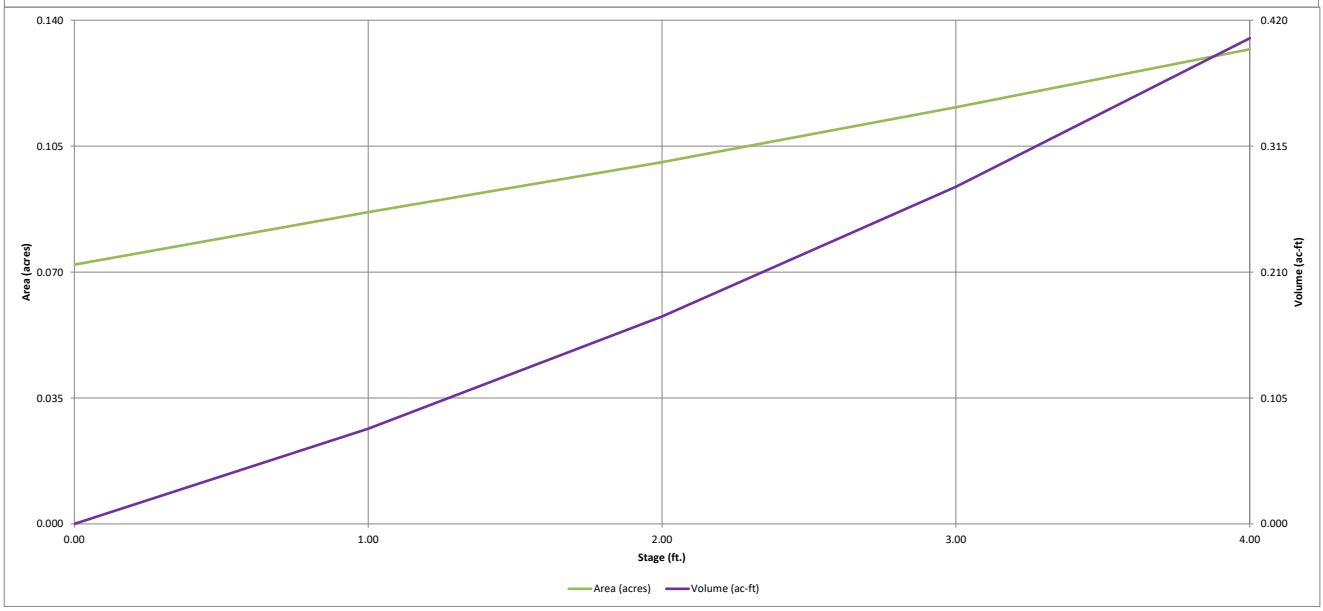
Zone 1 Volume (WQCV) =	0.074	acre-feet
Zone 2 Volume (25-year - Zone 1) =	0.146	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.043	acre-feet
Total Detention Basin Volume =	0.262	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = 1.00 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	3,139	0.072		
	--	1.00	--	--	--	3,774	0.087	3,456	0.079
	--	2.00	--	--	--	4,379	0.101	7,533	0.173
	--	3.00	--	--	--	5,044	0.116	12,244	0.281
	--	4.00	--	--	--	5,747	0.132	17,640	0.405


20
15
10
5
0
6000
4500
3000
1500
0
Length, Width (ft.)
Area (sq.ft.)
0.00
1.00
2.00
3.00
4.00
Stage (ft)
Length (ft)
Width (ft)
Area (sq.ft.)

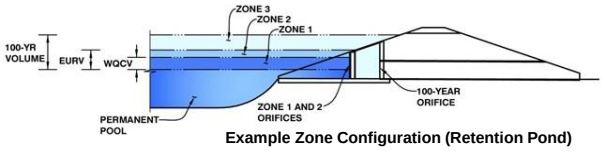

0.140
0.105
0.070
0.035
0.000
0.420
0.315
0.210
0.105
0.000
Area (acres)
Volume (ac-ft)
0.00
1.00
2.00
3.00
4.00
Stage (ft.)
Area (acres)
Volume (ac-ft)

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)

Project: **Bell Rippy Neighborhood**

Basin ID: **EDB (Above 27th St)**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	0.94	0.074	Orifice Plate
Zone 2 (25-year)	2.45	0.146	Weir&Pipe (Restrict)
Zone 3 (100-year)	2.84	0.043	Weir&Pipe (Restrict)
Total (all zones)		0.262	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)

Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft^2

Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)

Depth at top of Zone using Orifice Plate = 3.00 ft (relative to basin bottom at Stage = 0 ft)

Orifice Plate: Orifice Vertical Spacing = N/A inches

Orifice Plate: Orifice Area per Row = N/A inches

Calculated Parameters for Plate

WQ Orifice Area per Row = N/A ft^2

Elliptical Half-Width = N/A feet

Elliptical Slot Centroid = N/A feet

Elliptical Slot Area = N/A ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.000	0.250	0.500	0.750				
Orifice Area (sq. inches)	0.785	0.785	0.785	0.785				

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft^2
Vertical Orifice Centroid =	N/A	N/A	feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe)

	Zone 2 Weir	Zone 3 Weir	
Overflow Weir Front Edge Height, Ho =	1.75	2.50	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	0.25	2.50	feet
Overflow Weir Grate Slope =	0.00	0.00	H:V
Horiz. Length of Weir Sides =	N/A	2.50	feet
Overflow Grate Open Area % =	100%	70%	%, grate open area/total area
Debris Clogging % =	0%	50%	%

Calculated Parameters for Overflow Weir

	Zone 2 Weir	Zone 3 Weir	
Height of Grate Upper Edge, H_t =	N/A	2.50	feet
Overflow Weir Slope Length =	N/A	2.50	feet
Grate Open Area / 100-yr Orifice Area =	N/A	12.53	
1 erflow Grate Open Area w/o Debris =	N/A	4.38	ft^2
Overflow Grate Open Area w/ Debris =	N/A	2.19	ft^2

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 2 Restrictor	Zone 3 Restrictor	
Depth to Invert of Outlet Pipe =	0.00	0.00	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	8.00	8.00	inches
Restrictor Plate Height Above Pipe Invert =	8.00	8.00	inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 2 Restrictor	Zone 3 Restrictor	
Outlet Orifice Area =	0.35	0.35	ft^2
Outlet Orifice Centroid =	0.33	0.33	feet
Half-Central Angle of Restrictor Plate on Pipe =	3.14	3.14	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage= ft (relative to basin bottom at Stage = 0 ft)

Spillway Crest Length = feet

Spillway End Slopes = H:V

Freeboard above Max Water Surface = feet

Calculated Parameters for Spillway

Spillway Design Flow Depth= feet

Stage at Top of Freeboard = feet

Basin Area at Top of Freeboard = acres

Basin Volume at Top of Freeboard = acre-ft

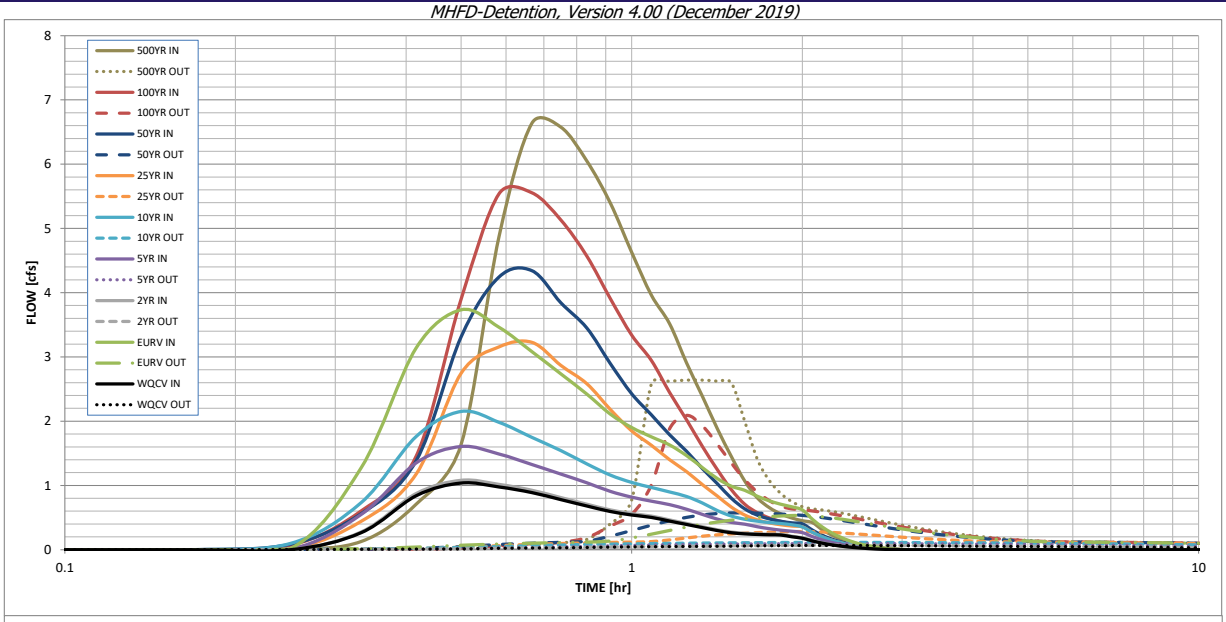
Routed Hydrograph Results

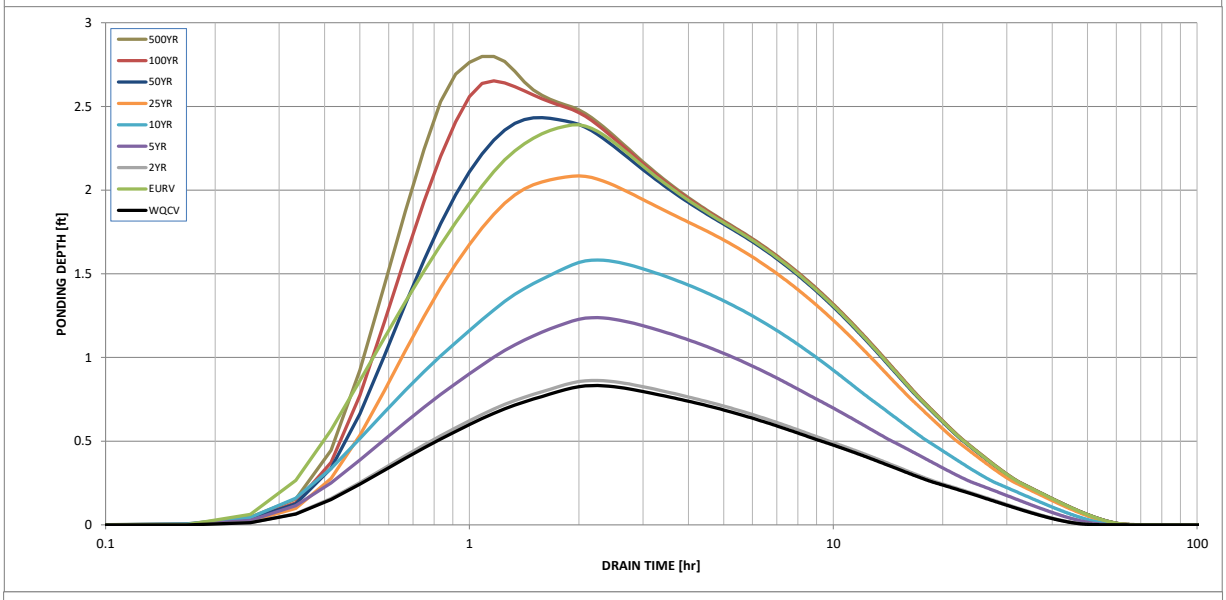
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

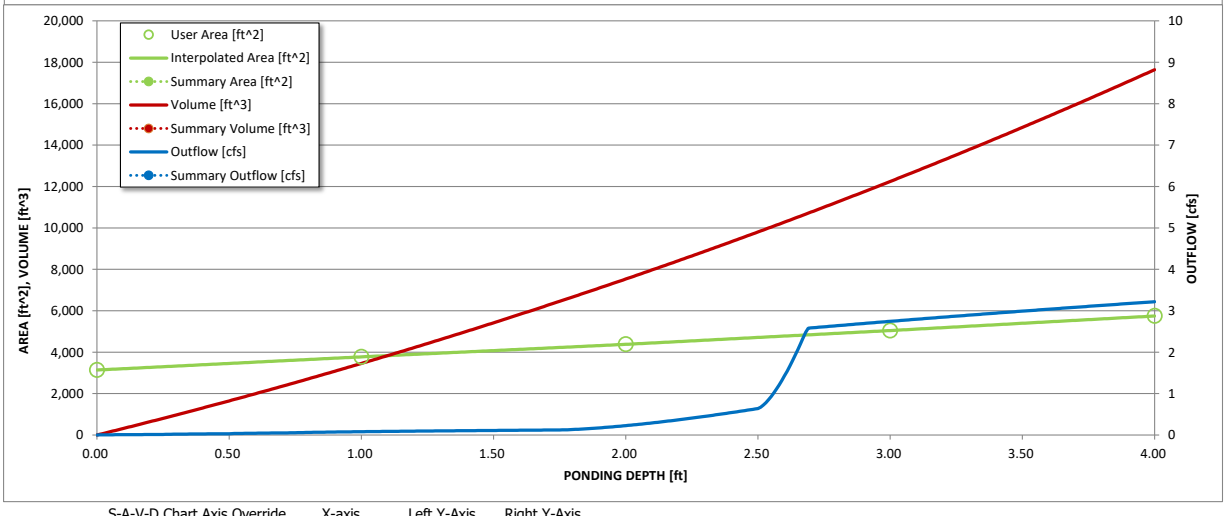
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	1.07	0.51	0.71	0.86	1.05	1.19	1.32	1.45
CUHP Runoff Volume (acre-ft) =	0.074	0.265	0.077	0.114	0.149	0.210	0.269	0.339	0.401
Inflow Hydrograph Volume (acre-ft) =	0.074	0.264	0.077	0.114	0.149	0.210	0.269	0.339	0.401
CUHP Predevelopment Peak Q (cfs) =	0.0	0.0	0.0	0.0	0.1	0.3	1.1	2.0	2.8
OPTIONAL Override Predevelopment Peak Q (cfs) =	0.0	0.0							
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.00	0.00	0.01	0.05	0.18	0.33	0.46
Peak Inflow Q (cfs) =	1.04	3.73	1.08	1.61	2.15	3.23	4.34	5.55	6.64
Peak Outflow Q (cfs) =	0.07	0.53	0.07	0.10	0.11	0.28	0.57	2.09	2.64
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	3.2	2.1	0.9	0.5	1.0	1.0
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 2	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.3	0.4
Time to Drain 97% of Inflow Volume (hours) =	41	45	42	44	45	46	44	42	39
Time to Drain 99% of Inflow Volume (hours) =	**46**	54	47	50	52	54	54	52	51
Maximum Ponding Depth (ft) =	0.83	2.39	0.86	1.24	1.58	2.09	2.43	2.65	2.80
Area at Maximum Ponding Depth (acres) =	0.08	0.11	0.08	0.09	0.09	0.10	0.11	0.11	0.11
Maximum Volume Stored (acre-ft) =	0.065	0.213	0.067	0.100	0.132	0.181	0.218	0.242	0.257

DETENTION BASIN OUTLET STRUCTURE DESIGN

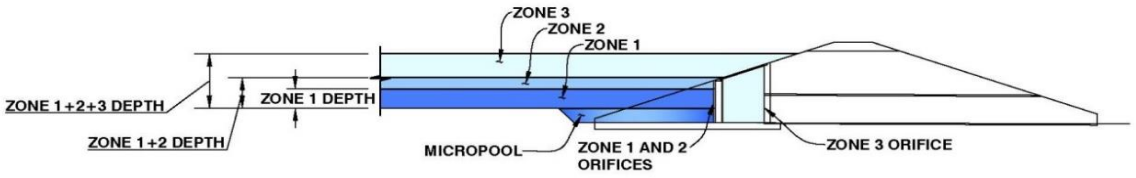
MHFD-Detention, Version 4.00 (December 2019)



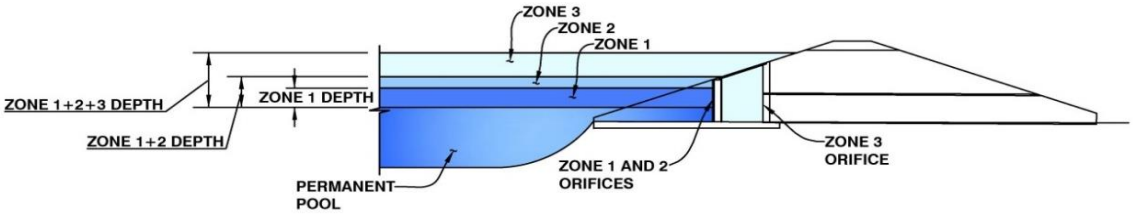




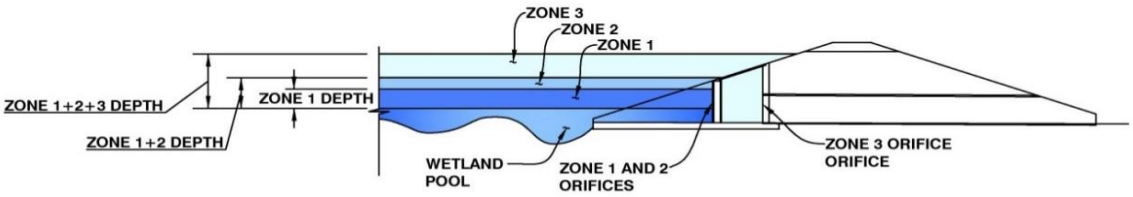
S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			



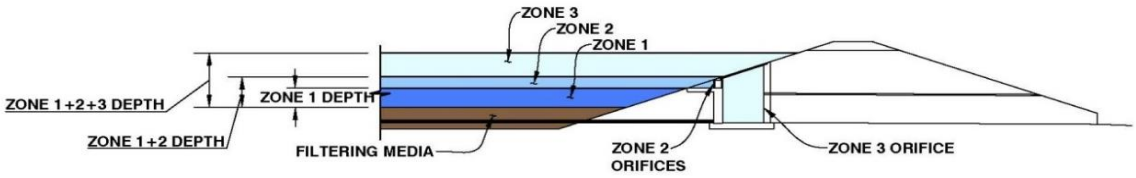
EXTENDED DETENTION BASIN WITH 3 ZONES



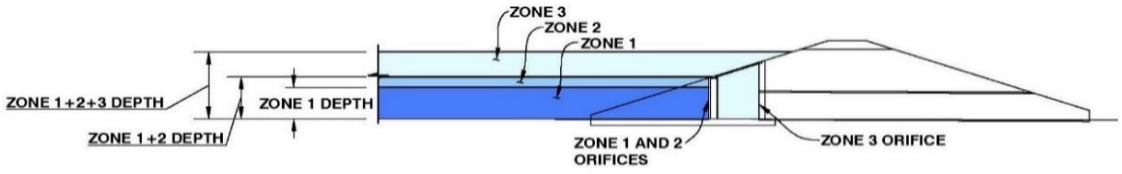
RETENTION POND WITH 3 ZONES



CONSTRUCTED WETLAND POND WITH 3 ZONES



FILTERING BMP WITH 3 ZONES



FLOOD CONTROL WITH THREE ZONES

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Mar 4 2020

20002-Bell Rippy Box Culvert (Q100=132 cfs)

Invert Elev Dn (ft)	=	5902.00
Pipe Length (ft)	=	40.00
Slope (%)	=	1.25
Invert Elev Up (ft)	=	5902.50
Rise (in)	=	24.0
Shape	=	Box
Span (in)	=	36.0
No. Barrels	=	2
n-Value	=	0.012
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	30D to 75D wingwall flares
Coeff. K,M,c,Y,k	=	0.026, 1, 0.0347, 0.81, 0.4

Embankment

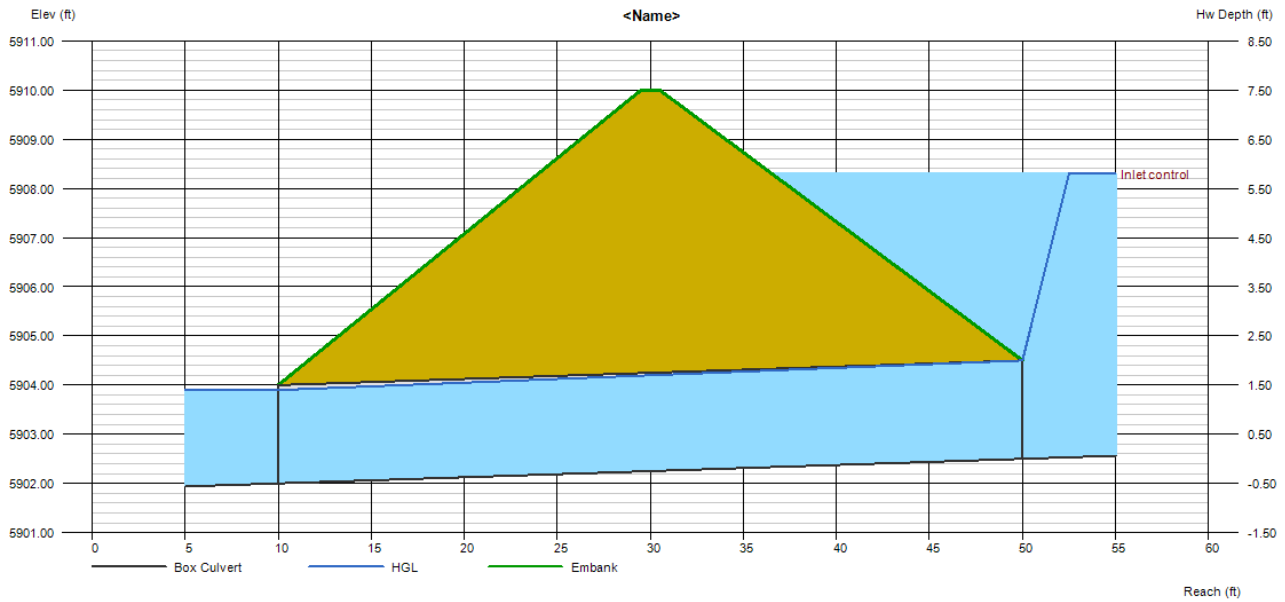
Top Elevation (ft)	=	5910.00
Top Width (ft)	=	1.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	132.00
Tailwater Elev (ft)	=	Critical

Highlighted

Qtotal (cfs)	=	132.00
Qpipe (cfs)	=	132.00
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	11.58
Veloc Up (ft/s)	=	11.00
HGL Dn (ft)	=	5903.90
HGL Up (ft)	=	5904.50
Hw Elev (ft)	=	5908.31
Hw/D (ft)	=	2.90
Flow Regime	=	Inlet Control



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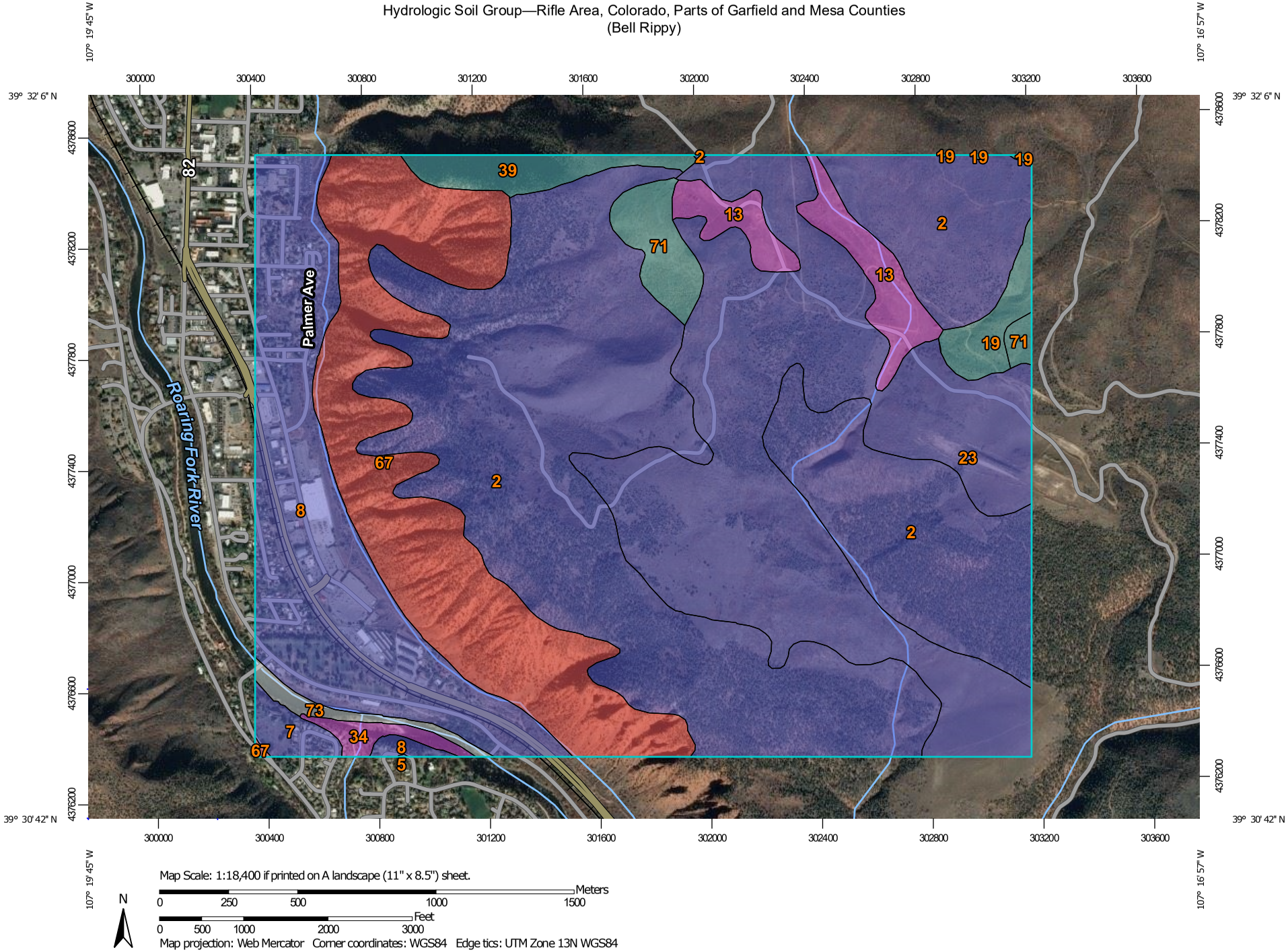
Hydrologic Soil Group—Rifle Area, Colorado, Parts of Garfield and Mesa Counties
(Bell Rippy)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 12, Sep 13, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 24, 2015—Nov 2, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Arle-Ansari-Rock outcrop complex, 12 to 65 percent slopes	B	603.3	40.0%
5	Ascalon fine sandy loam, 1 to 6 percent slopes	B	0.1	0.0%
7	Ascalon-Pena complex, 6 to 25 percent slopes	B	11.5	0.8%
8	Atencio-Azeltine complex, 1 to 3 percent slopes	B	197.7	13.1%
13	Chilton channery loam, 3 to 6 percent slopes	A	43.1	2.9%
19	Cochetopa-Jerry complex, 25 to 50 percent slopes	C	18.1	1.2%
23	Detra fine sandy loam, 12 to 25 percent slopes	B	346.4	23.0%
34	Ildefonso stony loam, 25 to 45 percent slopes	A	9.0	0.6%
39	Jerry loam, 12 to 50 percent slopes	C	23.5	1.6%
67	Torriorthents-Rock outcrop complex, steep	D	218.6	14.5%
71	Villa Grove-Zoltay loams, 15 to 30 percent slopes	C	27.1	1.8%
73	Water		9.1	0.6%
Totals for Area of Interest			**1,507.4**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

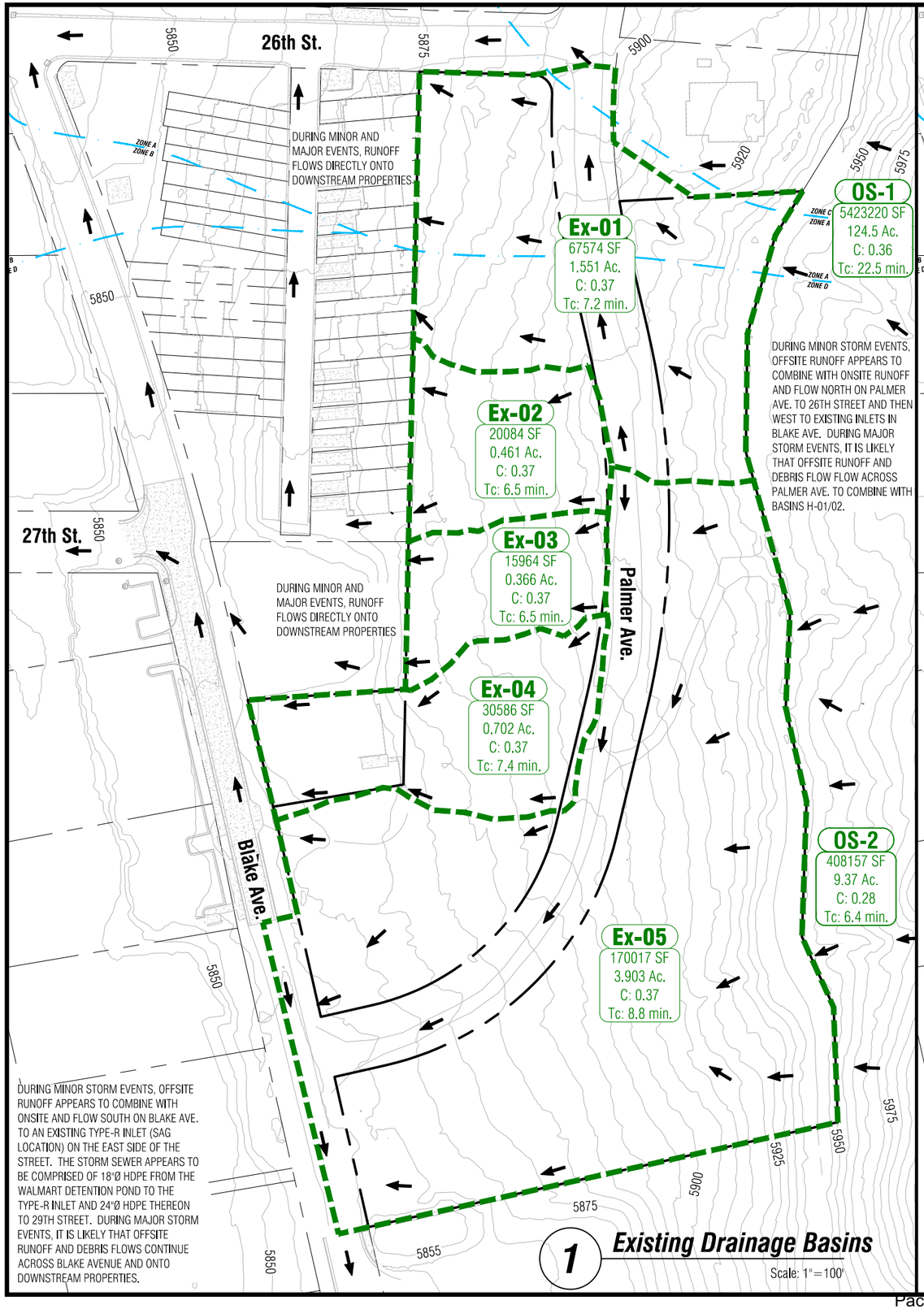
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

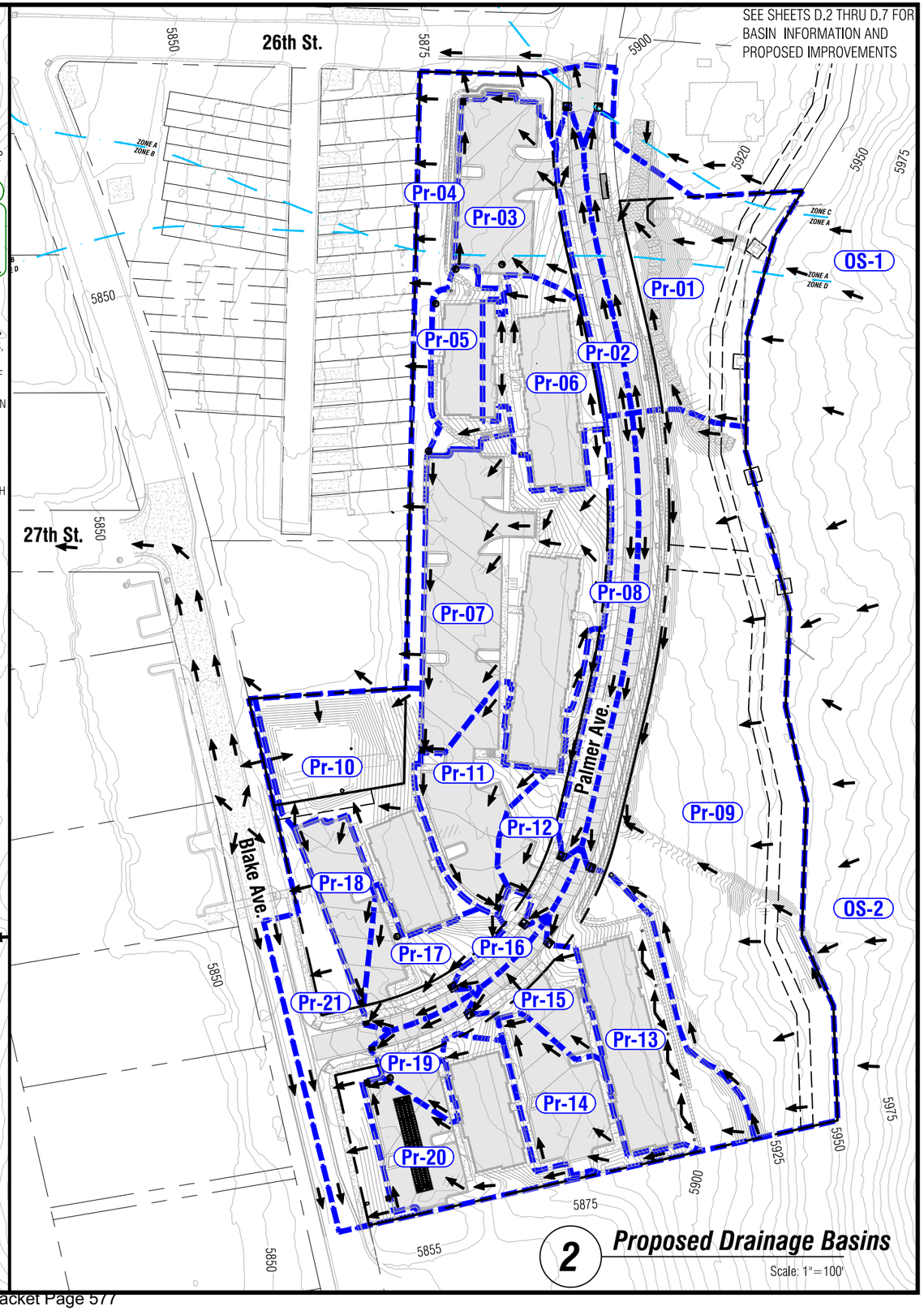
Component Percent Cutoff: None Specified

Tie-break Rule: Higher



1 **Existing Drainage Basins**

Scale: 1"=100'



2 **Proposed Drainage Basins**

Scale: 1"=100'

Boundaries Unlimited Inc.
Civil Engineering
Surveying
& Beyond
923 Cooper Ave., Ste. 201
Glenwood Springs, CO 81601
(T) 970.945.5252
www.bu-inc.com

Client Information:
Town Of Silt
PO Box 70
Silt, CO 81652
970.876.2353

NORTH
0 50' 100'
Scale: 1" = 100'

Main Street Improvements Project

Overall Drainage Basin Map
Construction Set

Silt, Colorado

No.	Date	Revision	By
##	##		

PROJECT NO. *11104*
Designer: *DJW*
Drafter: *BUI*
Date: *2/5/13*

Sheet *D.1*

File Name: *20002-C-Drainage.dwg*

N:\PROJECTS\2020\20002-Bell Rippy Townhouses\dwg\20002-C-Drainage.dwg 3/5/2020 1:58 PM

CONSTRUCT A DEFLECTION BERM (2'H, 2' TOP WIDTH, 3:1 SIDE SLOPES) TO DIRECT OFFSITE & ONSITE RUNOFF WEST INTO 26TH ST.

RUNOFF (OFFSITE PASS-THRU MINUS A MINOR AMOUNT CAPTURED BY INLETS A1/A2)) WILL CONTINUE NORTH ON 26TH ST. TO EXISTING AREA INLETS ON BLAKE AVE.

DESIGN POINT #1
HISTORIC:
Q25: 102.44 CFS
Q100: 131.82 CFS
PROPOSED:
Q25: 102.12 CFS
Q100: 131.44 CFS

A3 (Type-16)
Rim:5896.76'
II:5891.20' (A2)
IO:5891.00' (A4)

A2 (Type-R)
Rim:5896.57'
II:5892.20' (A1)
IO:5892.00' (A3)

A1 (Type-R)
Rim:5896.57'
IO:5892.50' (A2)

81 LF 12"Ø @ 1.0%

25 LF 12"Ø @ 1.2%

RUNOFF CAPTURE HEAD/STEM WALL W/ CONCRETE APRON & A 24"x72" CONCRETE BOX CULVERT @ 1% MIN.
TOW: 5910.00'
II:5902.50'; IO:5902.00'
INSTALL GROUTED RIPRAP (5'x20') FROM THE OUTLET TO THE CURB.

Pr-04
14401 SF
0.331 Ac.
C: 0.33
Tc: 5.0 min.

133 LF 12"Ø @ 1.0%

Pr-03
12339 SF
0.283 Ac.
C: 0.79
Tc: 5.0 min.

RUNOFF FROM PR-04 WILL SHEET FLOW WEST ONTO ADJACENT PROPERTIES AT A PEAK FLOW RATE AND QUANTITY LESS THAN HISTORIC

CONSTRUCT 16'W DRIVE (8% MAX.)

CONSTRUCT SWALE/BERM #1 (SEE DETAIL). LINE SWALE WITH PERMANENT EROSION CONTROL FABRIC & SLOPES W/ 3-YR EROSION CONTROL FABRIC.

ZONE C
ZONE A

DEBRIS FLOW FENCE (BY OTHERS) (SEE DEBRIS FLOW HAZARD EVALUATION, GOLDER ASSOC., INC. (7/29/19)

34 LF 12"Ø @ 1.1%

A9 (SDMH)
Rim:5900.19'
II:5894.40' (A10)
IO:5894.20' (A4)

A4 (SDMH)
Rim:5899.80'
II:5889.70' (A3)
II:5893.80' (A9)
IO:5889.50' (A5)

29 LF 15"Ø @ 1.4%

A5 (SDMH)
Rim:5893.65'
II:5889.10' (A4)
IO:5888.90' (A6)

1.5:1 SLOPES W/ 3-YR EROSION CONTROL FABRIC

CONSTRUCT 10'W ACCESS TRAIL (18% MAX.)

ZONE A
ZONE D

Pr-01
24815 SF
0.570 Ac.
C: 0.48
Tc: 5.0 min.

RETIRED IRRIGATION DITCH

OS-1
5423220 SF
124.5 Ac.
C: 0.36
Tc: 22.5 min.

CUT IN SWALE BEHIND THE FENCE TO DIRECT RUNOFF TO SWALE/BERM #1

Pr-05
6391 SF
0.147 Ac.
C: 0.77
Tc: 5.0 min.

152 LF 12"Ø @ 1.0%

Pr-02
5326 SF
0.122 Ac.
C: 0.83
Tc: 5.0 min.

Match D.3

Boundaries Unlimited Inc.
Civil Engineering Surveying & Beyond
923 Cooper Ave., Ste. 201
Glenwood Springs, CO 81601
(T) 970.945.5252
www.bu-inc.com

Client Information:
Town Of Silt
PO Box 70
Silt, CO 81652
970.876.2353

NORTH
0 15' 30'
Scale: 1" = 30'

Main Street Improvements Project
Proposed Drainage Construction Set
Silt, Colorado

No.	Date	Revision	By
##	##		

PROJECT NO. *11104*
Designer: *DJW*
Drafter: *BUI*
Date: *2/5/13*
Sheet *D.2*
File Name: *20002-C-Drainage.dwg*

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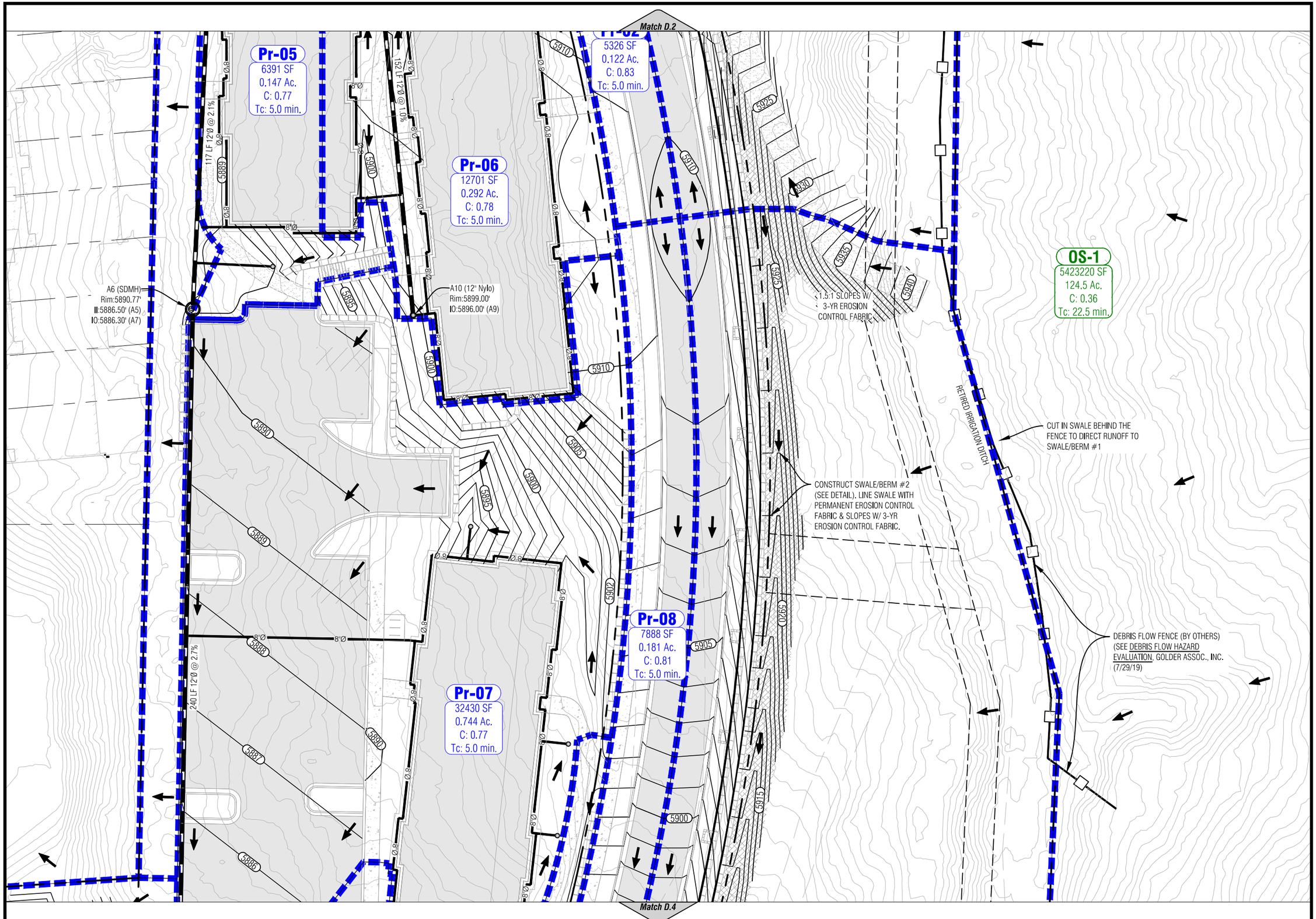

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Sill, CO 81652
970.876.2353

NORTH
0 15' 30'
Scale: 1" = 30'

Main Street Improvements Project
Sill, Colorado
Proposed Drainage
Construction Set

No.	Date	Revision	By
##	##		
##	##		
##	##		
##	##		
##	##		
##	##		
##	##		

PROJECT NO. *11104*
Designer: *DJH*
Drafter: *BUI*
Date: *2/5/13*
Sheet *D.3*
File Name: *20002-C-Drainage.dwg*

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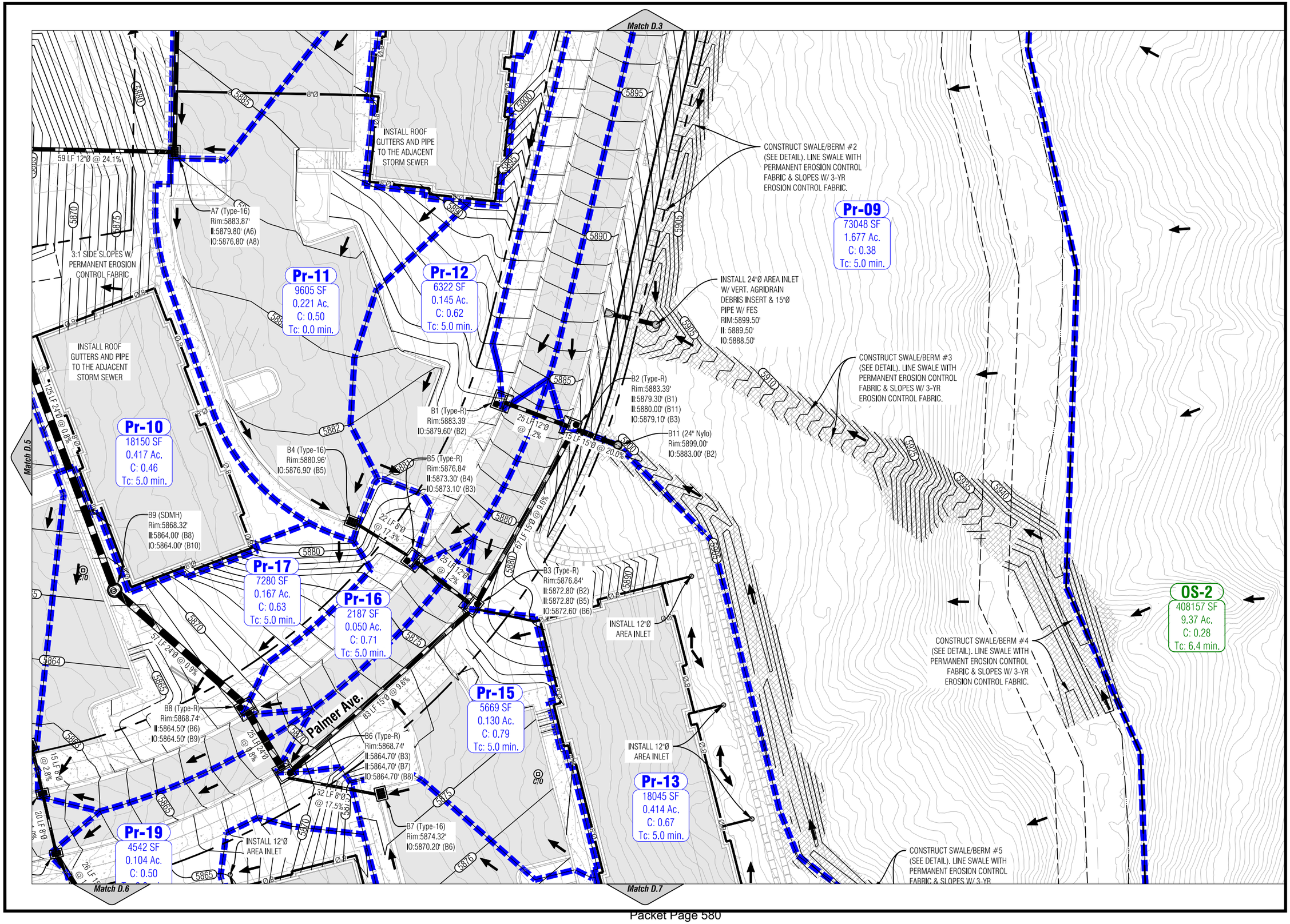

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Main Street Improvements Project

Silt, Colorado

Proposed Drainage Construction Set

No.	Date	Revision	By
##	##		

PROJECT NO. *11104*
Designer: *DJW*
Drafter: *BUI*
Date: *2/5/13*

Sheet *D.4*

File Name: *20002-C-Drainage.dwg*

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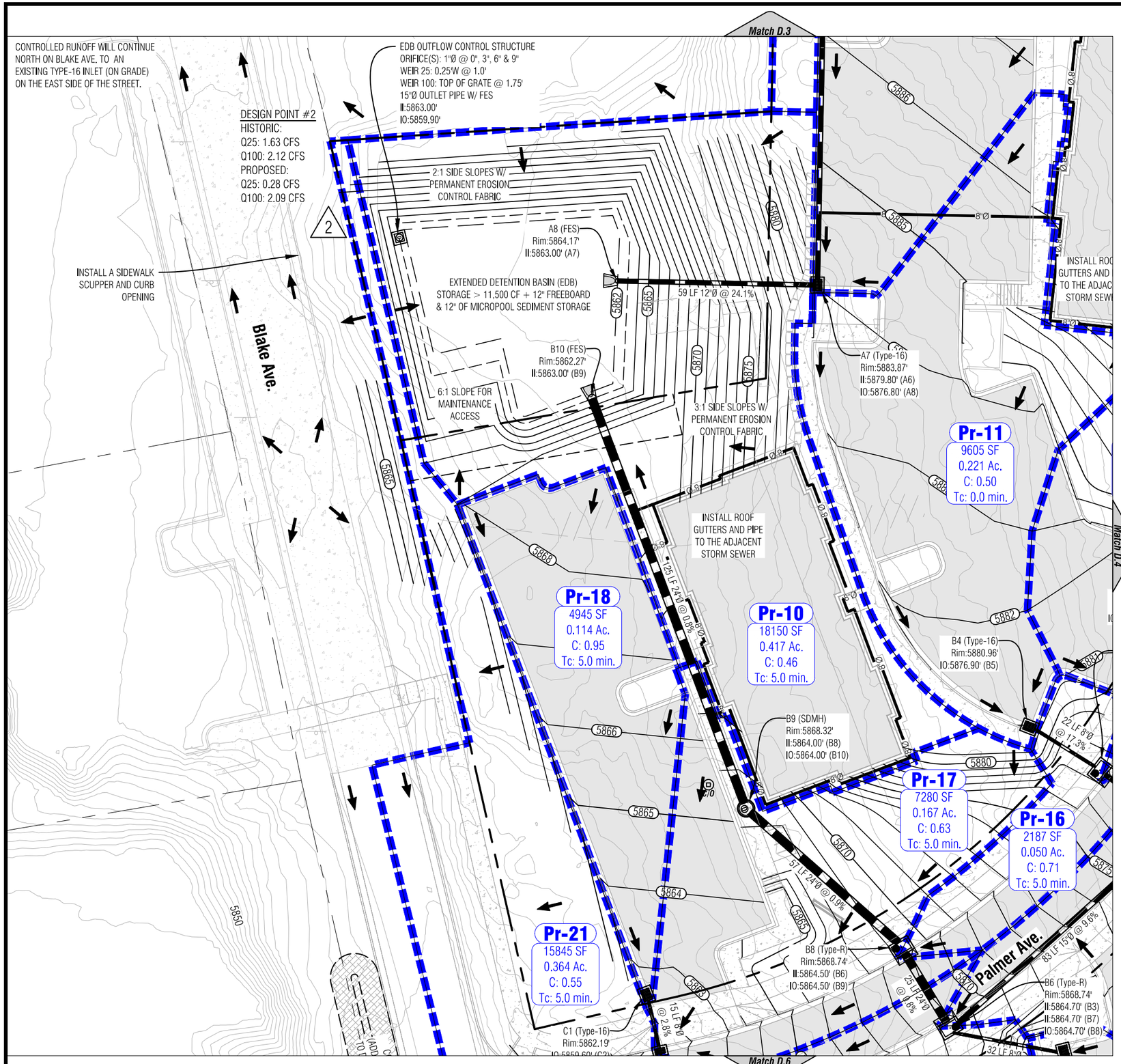

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NORTH
0 15' 30'
Scale: 1" = 30'

Main Street Improvements Project
Silt, Colorado
Proposed Drainage
Construction Set

No.	Date	Revision	By
##			
##			
##			
##			
##			
##			
##			
##			

PROJECT NO. *11104*
Designer: *DJW*
Drafter: *BUI*
Date: *2/5/13*

Sheet **D.5**

File Name: *20002-C-Drainage.dwg*

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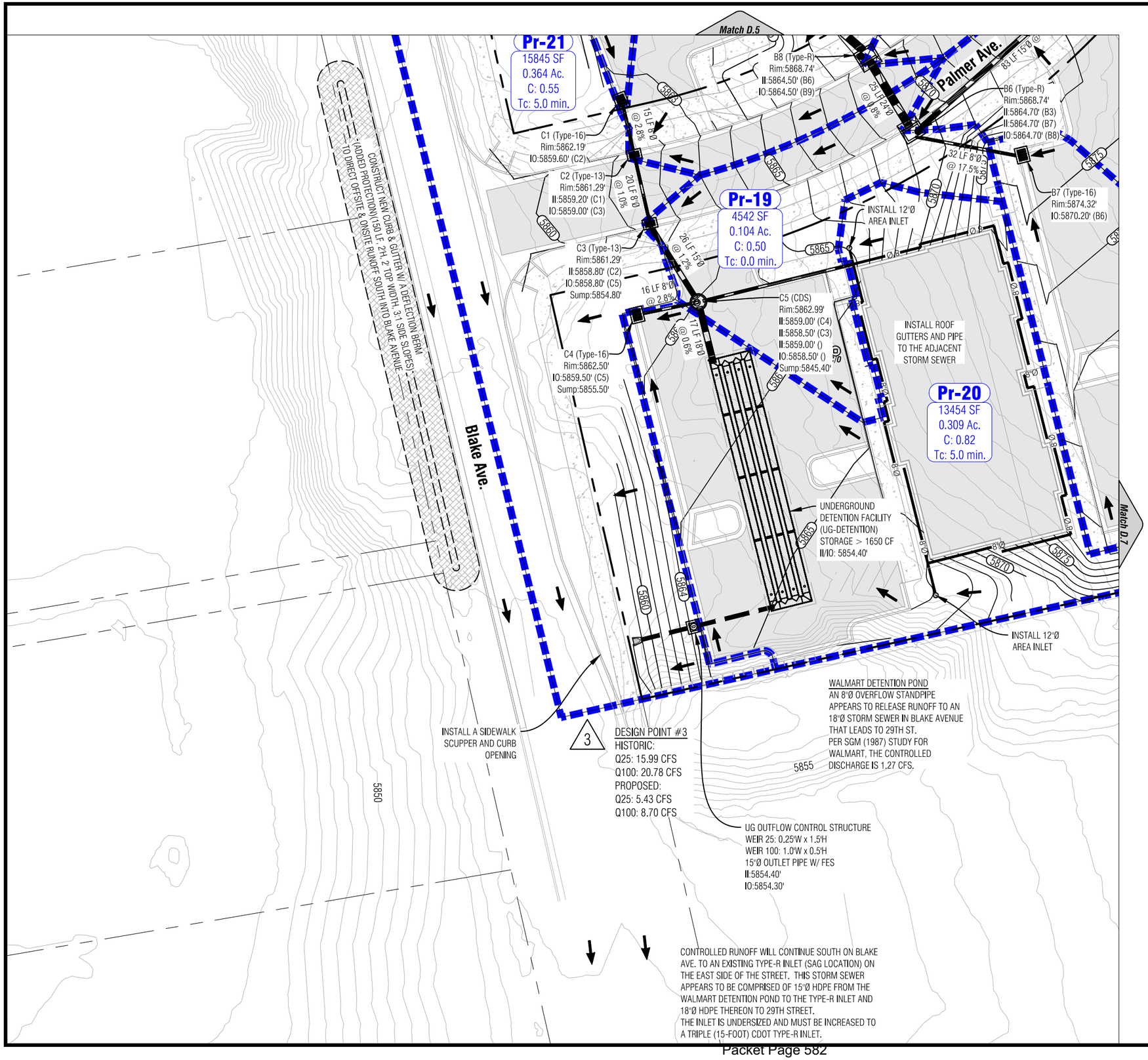

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NORTH
0 15' 30'
Scale: 1" = 30'

Main Street Improvements Project

Silt, Colorado

Proposed Drainage
Construction Set

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##	##		

PROJECT NO. 11104
Designer: DJW
Drafter: BU
Date: 2/5/13

Sheet D.6

File Name: 20002-C-Drainage.dwg

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Pr-16
7280 SF
0.167 Ac.
C: 0.63
Tc: 5.0 min.

Pr-16
2187 SF
0.050 Ac.
C: 0.71
Tc: 5.0 min.

Pr-15
5669 SF
0.130 Ac.
C: 0.79
Tc: 5.0 min.

Pr-13
18045 SF
0.414 Ac.
C: 0.67
Tc: 5.0 min.

Pr-19
4542 SF
0.104 Ac.
C: 0.50
Tc: 0.0 min.

Pr-14
8825 SF
0.203 Ac.
C: 0.86
Tc: 5.0 min.

Pr-20
13454 SF
0.309 Ac.
C: 0.82
Tc: 5.0 min.

OS-2
408157 SF
9.37 Ac.
C: 0.28
Tc: 6.4 min.

Palmer Ave.

Match D.4

Match D.6

B8 (Type-R)
Rim:5868.74'
II:5864.50' (B6)
IO:5864.50' (B9)

B6 (Type-R)
Rim:5868.74'
II:5864.70' (B3)
II:5864.70' (B7)
IO:5864.70' (B8)

B7 (Type-16)
Rim:5874.32'
IO:5870.20' (B6)

C5 (CDS)
Rim:5862.99'
II:5859.00' (C4)
II:5858.50' (C3)
II:5859.00' ()
IO:5858.50' ()
Sump:5845.40'

Rim:5876.84'
II:5872.80' (B2)
II:5872.80' (B5)
IO:5872.60' (B6)

57 LF 24"Ø @ 0.9%
83 LF 15"Ø @ 9.6%
25 LF 24"Ø @ 0.8%
15 LF 8"Ø @ 2.8%
20 LF 8"Ø @ 2%
32 LF 8"Ø @ 17.5%
26 LF 15"Ø @ 2%
16 LF 8"Ø @ 2.8%
17 LF 18"Ø @ 0.6%

INSTALL 12"Ø AREA INLET

INSTALL ROOF GUTTERS AND PIPE TO THE ADJACENT STORM SEWER

CONSTRUCT SWALE/BERM #4 (SEE DETAIL). LINE SWALE WITH PERMANENT EROSION CONTROL FABRIC & SLOPES W/ 3-YR EROSION CONTROL FABRIC.

CONSTRUCT SWALE/BERM #5 (SEE DETAIL). LINE SWALE WITH PERMANENT EROSION CONTROL FABRIC & SLOPES W/ 3-YR EROSION CONTROL FABRIC.

RETIRED IRRIGATION DITCH

UNDERGROUND DETENTION FACILITY (UG-DETENTION) STORAGE > 1650 CF
II/IO: 5854.40'

INSTALL 12"Ø AREA INLET

WALMART DETENTION POND
AN 8"Ø OVERFLOW STANDPIPE APPEARS TO RELEASE RUNOFF TO AN 18"Ø STORM SEWER IN BLAKE AVENUE THAT LEADS TO 29TH ST.
PER SGM (1987) STUDY FOR WALMART, THE CONTROLLED DISCHARGE IS 1.27 CFS.

ESIGN POINT #3
STORIC:
25: 15.99 CFS
100: 20.78 CFS
ROPOSED:
25: 5.43 CFS
100: 8.70 CFS

UG OUTFLOW CONTROL STRUCTURE
WEIR 25: 0.25'W x 1.5'H
WEIR 100: 1.0'W x 0.5'H
15"Ø OUTLET PIPE W/ FES
II:5854.40'
IO:5854.30'

5855 5860 5864 5865 5870 5875 5880 5885 5900 5910 5915 5925 5950 5975

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NORTH
0 15' 30'
Scale: 1" = 30'

Main Street Improvements Project

Silt, Colorado

Proposed Drainage Construction Set

No.	Date	Revision	By
##	##		

PROJECT NO.
11104
Designer:
DJW
Drafter:
BUI
Date:
2/5/13

Sheet
D.7

File Name: *Z0002-C-Drainage.dwg*

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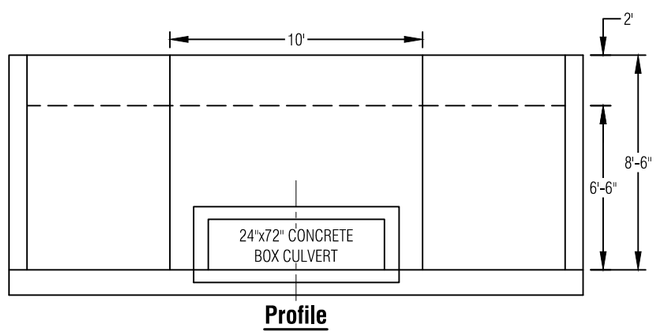
STORMWATER MANAGEMENT AND EROSION/SEDIMENT CONTROL NOTES

1. THE PREPARATION OF STORMWATER MANAGEMENT PLANS, PERMITTING AND COMPLIANCE ARE THE RESPONSIBILITY OF THE CONTRACTOR. THIS PROJECT MAY ALSO REQUIRE A PERMIT FOR STORMWATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITY FROM THE STATE OF COLORADO. THE CONTRACTOR IS TO COMMENCE WORK ON THIS SITE ONLY AFTER AN ACTIVE PERMIT NUMBER HAS BEEN OBTAINED FROM THE STATE OF COLORADO. THE STORMWATER MANAGEMENT PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO APPLYING FOR THE PERMIT. THE CONTRACTOR IS TO PROVIDE EROSION CONTROL IN ACCORDANCE WITH STATE OF COLORADO GUIDELINES.
2. THE CONTRACTOR SHALL CONTINUOUSLY PROVIDE ADEQUATE STORMWATER MANAGEMENT IN ACCORDANCE WITH AN APPROVED STORMWATER MANAGEMENT PLAN (SWMP) FROM THE STATE OF COLORADO.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING THE PUBLIC STREETS, ACCESS ROUTES, AND WATERWAYS IN THE VICINITY OF THE JOB SITE CLEAN AND FREE OF ROCKS, SOIL AND DEBRIS.
4. THE CONTRACTOR SHALL INSTALL EROSION AND SEDIMENTATION CONTROL "BEST MANAGEMENT PRACTICES" (BMPS) PRIOR TO ANY SITE PREPARATION WORK (E.G., CLEARING, GRUBBING, DEMOLITION, OR EXCAVATION).
5. A GROUNDWATER DISCHARGE PERMIT MAY BE REQUIRED FROM THE STATE GOVERNING AUTHORITY PRIOR TO DISCHARGE. GROUNDWATER SHALL BE SAMPLED AND SENT TO AN APPROVED LABORATORY FOR TESTING PRIOR TO BEING DISCHARGED. TESTING SHALL BE IN ACCORDANCE WITH THE PERMIT FOR STORMWATER DISCHARGE.
6. A WATER SOURCE MUST BE AVAILABLE ON SITE DURING EARTHWORK OPERATIONS AND UTILIZED AS REQUIRED TO MINIMIZE DUST FROM EARTHWORK EQUIPMENT AND WIND.
7. ALL DITCHES & EROSION CONTROL SHOULD BE COMPLETED TO THE RECEIVING STREAM.
8. THE PLACEMENT OF EROSION AND SEDIMENT BMPS SHALL BE IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL PLAN IF IT WAS PREPARED FOR THE PROJECT. CONTRACTOR TO ADJUST QUANTITY, LOCATION, AND TYPE OF EROSION AND SEDIMENT CONTROL BMPS AS NECESSARY FOR THE VARIOUS PHASES OF THE WORK AND AS ACTUAL CONDITIONS WARRANT. CONTRACTOR SHALL CONTINUOUSLY MODIFY THE EROSION AND SEDIMENT CONTROL PLAN WITH CURRENT BMPS IN ACCORDANCE WITH THE CONSTRUCTION STORMWATER PERMIT REQUIREMENTS. ADDITIONAL EROSION AND SEDIMENT CONTROL BMPS EMPLOYED BY THE CONTRACTOR AT HIS DISCRETION WILL NOT BE MEASURED OR PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
9. APPROVED EROSION AND SEDIMENT CONTROL BMPS SHALL BE MAINTAINED AND KEPT IN GOOD REPAIR FOR THE DURATION OF THIS PROJECT. UNLESS OTHERWISE REQUIRED BY THE STATE'S CONSTRUCTION STORMWATER PERMIT, AT A MINIMUM THE CONTRACTOR SHALL INSPECT ALL BMPS EVERY 14 DAYS, AND AFTER ALL SIGNIFICANT PRECIPITATION EVENTS I.E. RAINFALL, SNOWMELT. ALL NECESSARY MAINTENANCE AND REPAIR ACTIVITIES SHALL BE COMPLETED WITHIN TWENTY-FOUR (24) HOURS AFTER DIRECTION BY THE INSPECTOR. ACCUMULATED SEDIMENT AND CONSTRUCTION DEBRIS SHALL BE REMOVED WEEKLY FROM ALL BMPS, OR AT ANY TIME THAT SEDIMENT OR CONSTRUCTION DEBRIS ADVERSELY IMPACTS THE FUNCTIONING OF THE BMPS.
10. TOPSOIL AND SUITABLE EARTHEN MATERIALS SHALL BE SEGREGATED AND STOCKPILED WITHIN THE LIMITS OF CONSTRUCTION FOR USE ON AREAS TO BE FILLED AND RE-VEGETATED. ANY AND ALL STOCKPILES SHALL BE PLACED IN AN APPROVED LOCATION AND PROTECTED FROM EROSIVE ELEMENTS USING MEASURES SPECIFIED IN THE EROSION/SEDIMENT CONTROL PLAN AND APPROVED STORMWATER MANAGEMENT PLAN (SWMP) FROM THE STATE OF COLORADO.
11. SOILS THAT WILL BE STOCKPILED FOR MORE THAN THIRTY (30) DAYS SHALL BE MULCHED AND SEEDED WITH A TEMPORARY OR PERMANENT GRASS COVER WITHIN FOURTEEN (14) DAYS OF STOCKPILE CONSTRUCTION.
12. ANY SETTLEMENT OR SOIL ACCUMULATIONS BEYOND THE LIMITS OF CONSTRUCTION DUE TO GRADING OR EROSION SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR REMEDIATION OF ANY ADVERSE IMPACTS TO ADJACENT WATERWAYS, WETLANDS, PROPERTIES, ETC. RESULTING FROM WORK DONE AS PART OF THIS PROJECT.
13. THE CONTRACTOR MUST KEEP ALL POLLUTANTS, INCLUDING SEDIMENT, CONSTRUCTION DEBRIS, AND TRENCH BACKFILL MATERIALS FROM ENTERING THE STORM SEWER SYSTEM.
14. ALL SPILLS INCLUDING, BUT NOT LIMITED TO, PETROLEUM PRODUCTS, SOLVENTS, AND CEMENT SHALL BE CLEANED UP IMMEDIATELY. THE LOCAL TOWN/CITY/COUNTY AND STATE'S GOVERNING AUTHORITY SHALL BE NOTIFIED IMMEDIATELY.
15. THE CONTRACTOR SHALL ENSURE THAT ALL LOADS OF CUT AND FILL MATERIAL IMPORTED TO OR EXPORTED FROM THE SITE SHALL BE PROPERLY COVERED TO PREVENT LOSS OF THE MATERIAL DURING TRANSPORT ON PUBLIC RIGHT-OF-WAY. ALL MATERIAL EXPORTED FROM THE SITE SHALL BE DISPOSED OF AT A SITE PERMITTED TO ACCEPT SUCH MATERIAL.
16. THE USE OF REBAR, STEEL STAKES OR STEEL FENCE POSTS FOR STAKING DOWN STRAW OR HAY BALES, OR TO SUPPORT SILT FENCING USED AS AN EROSION CONTROL MEASURE, IS PROHIBITED.
17. THE CLEANING OF CONCRETE DELIVERY TRUCK CHUTES IS RESTRICTED TO APPROVED LOCATIONS ON THE JOB SITE. THE DISCHARGE OF WATER CONTAINING WASTE CEMENT TO THE STORM SEWER SYSTEM IS PROHIBITED. ALL CONCRETE WASTE SHALL BE PROPERLY CLEANED UP AND DISPOSED OF AT AN APPROPRIATE LOCATION.
18. CONTRACTOR SHALL PROVIDE A COMPLETED "NOTICE OF TERMINATION" TO OWNER, FOR OWNERS SUBMITTAL TO THE STATE'S GOVERNING AUTHORITY ONCE THE PROJECT IS COMPLETE, ALL DISTURBED AREAS HAVE BEEN STABILIZED AND TEMPORARY BMPS HAVE BEEN REMOVED.
19. THE CONTRACTOR SHALL CLEAN OUT ALL EXISTING AND PROPOSED INLETS, PIPES AND MANHOLES OF DEBRIS AND SEDIMENTATION AT COMPLETION OF SITEWORK. THIS WORK SHALL BE DONE TO THE SATISFACTION OF THE OWNER AND LOCAL AUTHORITIES. ANY CONSTRUCTION DEBRIS OR MUD DROPPED INTO MANHOLES, INLETS, PIPES OR TRACKED ONTO EXISTING ROADWAYS SHALL BE REMOVED IMMEDIATELY BY THE CONTRACTOR. THE CONTRACTOR SHALL REPAIR ANY EXCAVATIONS OR PAVEMENT FAILURES CAUSED BY HIS CONSTRUCTION.
20. THE CONTRACTOR SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO SIGNIFICANTLY REDUCE ANY POTENTIAL POLLUTION CAUSED BY HIS ACTIVITIES, INCLUDING VEHICLE FUELING, STORAGE OF FERTILIZERS OR CHEMICALS, ETC. THE CONTRACTOR SHALL HAVE IDENTIFIED PROCEDURES FOR HANDLING POTENTIAL POLLUTANTS AND HAVE IDENTIFIED SPILL PREVENTION AND RESPONSE PROCEDURES PRIOR TO ANY ACTIVITIES AT THE PROJECT SITE.
21. GRADE LANDSCAPED AREAS TO PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDINGS AND SIDEWALKS IN CONFORMANCE WITH THE REQUIREMENTS OF THE PROJECT GEOTECHNICAL REPORT.
22. IN CASE OF ANY DISCREPANCIES REGARDING EARTHWORK BETWEEN THE GEOTECHNICAL REPORT AND THE SPECIFICATIONS SHOWN IN THESE PLANS, NOTIFY THE PROJECT ENGINEER AND OWNER'S CONSTRUCTION PROJECT MANAGER IMMEDIATELY.
23. ROOF GUTTERS ARE REQUIRED ON ALL BUILDINGS AND DOWNSPOUTS ARE TO BE PIPED INTO THE STORMSEWER SYSTEM. ROOF RUNOFF IS NOT PERMITTED TO DISCHARGE ONTO THE GROUND SURFACE.
24. STORM SEWER PIPE MATERIALS SHALL BE WATER TIGHT HDPE DOUBLE-WALL, SMOOTH INTERIOR PIPE (ADS N-12-WT OR ENGINEER APPROVED EQUAL) OR RUBBER GASKET REINFORCED CONCRETE PIPE (RCP) UNLESS OTHERWISE SPECIFIED IN THE PLANS.
25. STORM SEWER STRUCTURES SHALL BE COMPLY WITH COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARD PLANS (M-STANDARDS) AND/OR MILE HIGH FLOOD DISTRICT (MHFD) STANDARDS, LATEST EDITIONS.
26. SOIL EROSION CONTROL FABRIC SHALL BE NORTH AMERICAN GREEN VMAX P500 (PERMANENT) IN FLOW CHANNELS/SWALES AND C125 (3-YR) ON DISTURBED SLOPES STEEPER THAN 3:1), OR ENGINEER APPROVED EQUAL.
27. BEARINGS ARE BASED ON THE SOUTH LINE OF OAKHURST SUBDIVISION FIRST FILING ACCORDING TO THE PLAT FILED AT RECEPTION NO. 241379 IN THE OFFICE OF THE GARFIELD COUNTY CLERK AND RECORDER. THE VALUE USED, S77°23'50"W AS SHOWN THEREON WAS DETERMINED FROM A FOUND PLASTIC CAP STAMPED LS 37935 AT THE WEST AND EAST ENDS OF SAID LINE.



NOTES

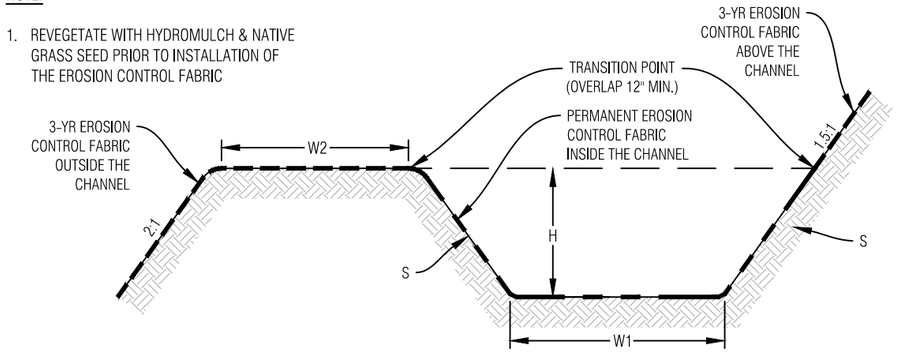
1. CONSTRUCTION SHALL CONFORM TO CDOT STANDARD PLAN NO(S). M-601-1 "SINGLE CONCRETE BOX CULVERT (CAST-IN-PLACE)", M-610-10 "HEADWALL FOR PIPES", M-610-20 "WINGWALLS FOR PIPE OR BOX CULVERTS", AND M-603-12 "TRAVERSABLE END SECTIONS AND SAFETY GRATES", LATEST EDITION.

1 Wing/Stem Wall

Scale: 1"=12"

NOTE:

1. REVEGETATE WITH HYDROMULCH & NATIVE GRASS SEED PRIOR TO INSTALLATION OF THE EROSION CONTROL FABRIC



SWALE/BERM DIMENSION				
NO.	H (FT)	W1 (FT)	W2 (FT)	S
1	1.5' MIN.	6'	N/A	1.5 : 1
2	1.0' MIN.	1'	3'	1.5 : 1
3	1.0' MIN.	3'	3	1.5 : 1
4	1.0' MIN.	3'	3	1.5 : 1
5	1.0' MIN.	2'	1	1.5 : 1

Drainage Berm/Swales

Scale: N.T.S.

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970.876.2353

NORTH
0 0.5' 1'
Scale: 1" = 1'

No.	Date	Revision	By
##	##		

PROJECT NO. *11104*
Designer: *DJW*
Drafter: *BUI*
Date: *2/5/13*

Sheet *D.8*

File Name: *20002-C-Drainage.dwg*

Silt, Colorado

Main Street Improvements Project

Drainage Notes & Details
Construction Set

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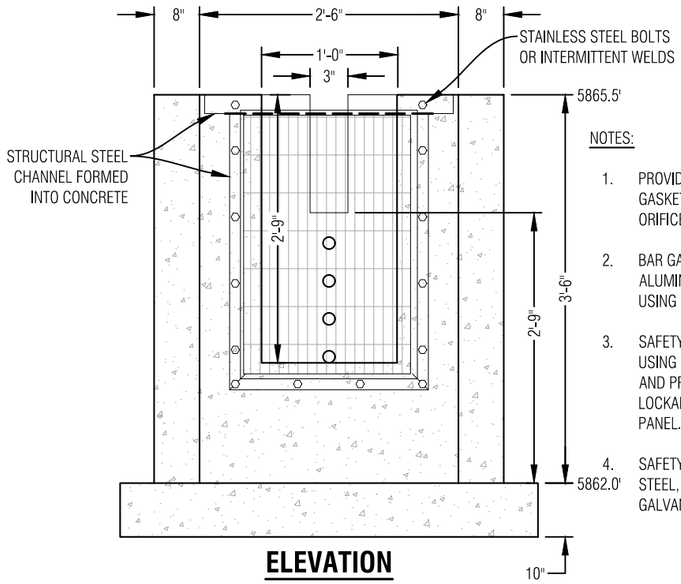
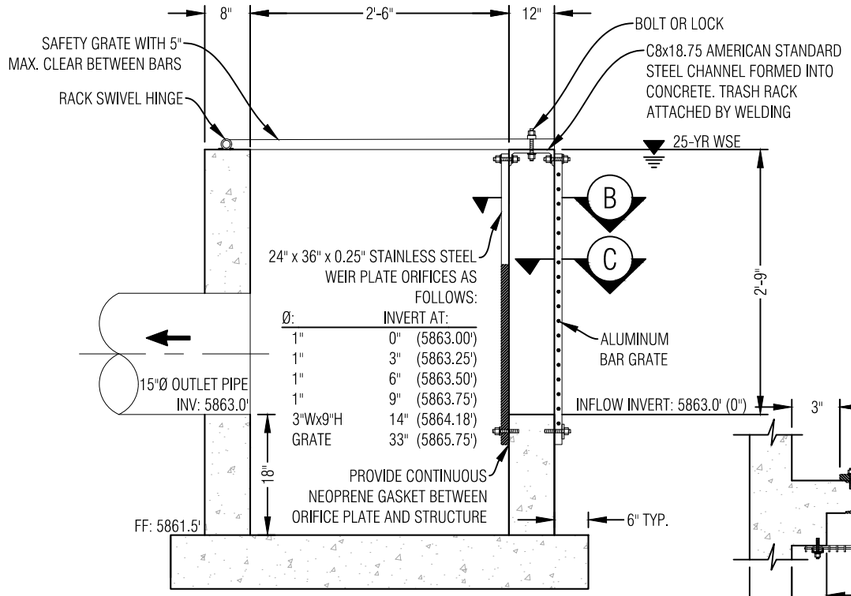


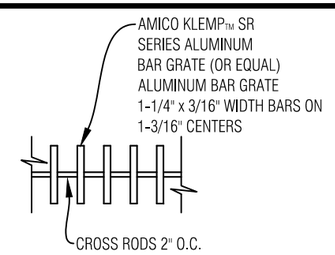
ELEVATION

NOTES:

1. PROVIDE CONTINUOUS NEOPRENE GASKET MATERIAL BETWEEN THE ORIFICE PLATE AND CONCRETE.
2. BAR GATE TRASH RACK SHALL BE ALUMINUM AND SHALL BE BOLTED USING STAINLESS STEEL HARDWARE.
3. SAFETY GRATE SHALL BE MOUNTED USING STAINLESS STEEL HARDWARE AND PROVIDED WITH HINGED AND LOCKABLE OR BOLTABLE ACCESS PANEL.
4. SAFETY GRATE SHALL BE STAINLESS STEEL, ALUMINUM OR HOT DIP GALVANIZED STEEL.



SECTION VIEW



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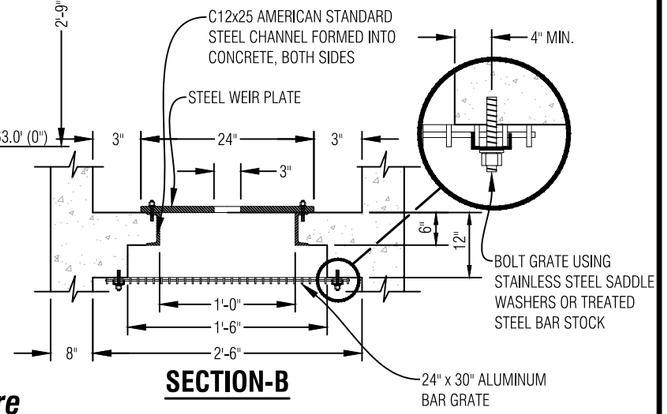
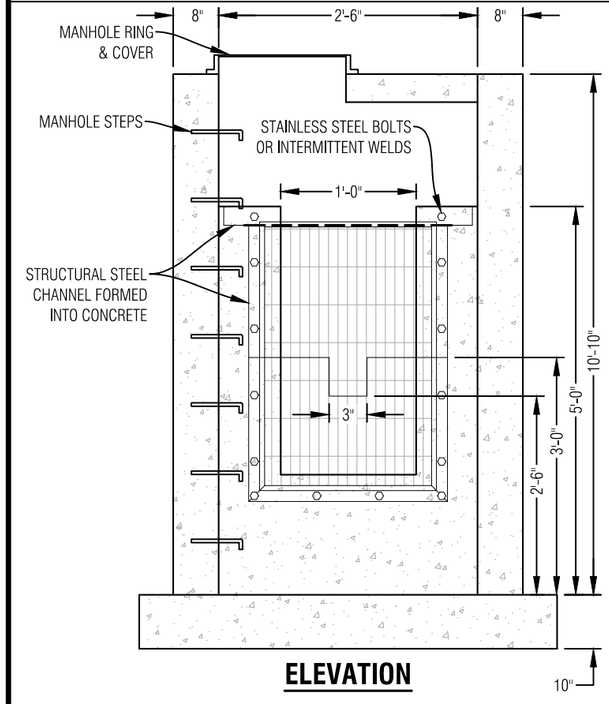


SECTION-B

Extended Detention Basin (EDB) Outflow Control Structure

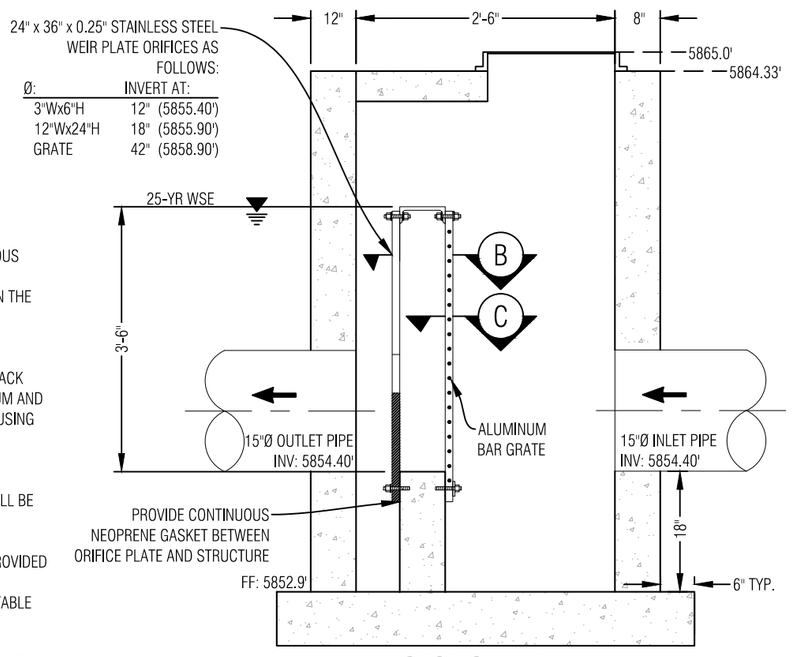
Scale: N.T.S.



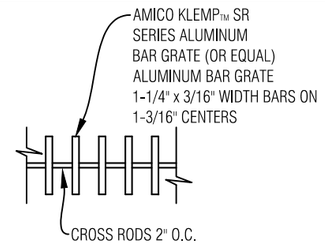
ELEVATION

NOTES:

1. PROVIDE CONTINUOUS NEOPRENE GASKET MATERIAL BETWEEN THE ORIFICE PLATE AND CONCRETE.
2. BAR GATE TRASH RACK SHALL BE ALUMINUM AND SHALL BE BOLTED USING STAINLESS STEEL HARDWARE.
3. SAFETY GRATE SHALL BE MOUNTED USING STAINLESS STEEL HARDWARE AND PROVIDED WITH HINGED AND LOCKABLE OR BOLTABLE ACCESS PANEL.
4. SAFETY GRATE SHALL BE STAINLESS STEEL, ALUMINUM OR HOT DIP GALVANIZED STEEL.



SECTION VIEW



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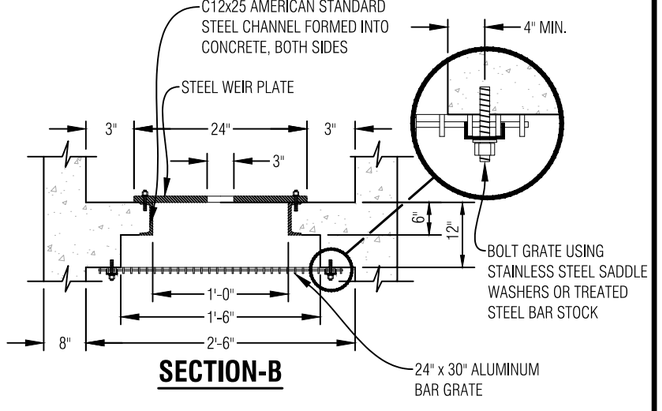

SECTION-B

Underground (UG) Outflow Control Structure

Scale: N.T.S.

Boundaries Unlimited Inc.
Civil Engineering Surveying & Beyond
923 Cooper Ave., Ste. 201
Glenwood Springs, CO 81601
(T) 970.945.5252
www.bu-inc.com

Client Information:
Town Of Silt
PO Box 70
Silt, CO 81652
970.876.2353

NORTH
0 0.5' 1'
Scale: 1" = 1'

Main Street Improvements Project
Silt, Colorado
Drainage Details
Construction Set

No.	Date	Revision	By
##	##		
##	##		
##	##		
##	##		
##	##		
##	##		
##	##		

PROJECT NO. 11104
Designer: DJW
Drafter: BUI
Date: 2/5/13
Sheet D.9
File Name: 20002-C-Drainage.dwg

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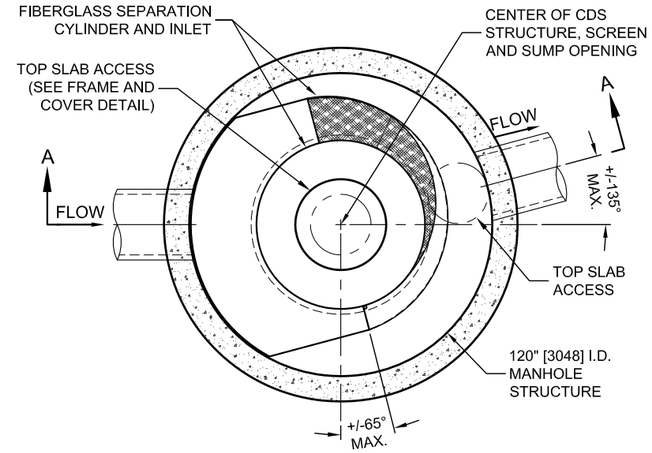
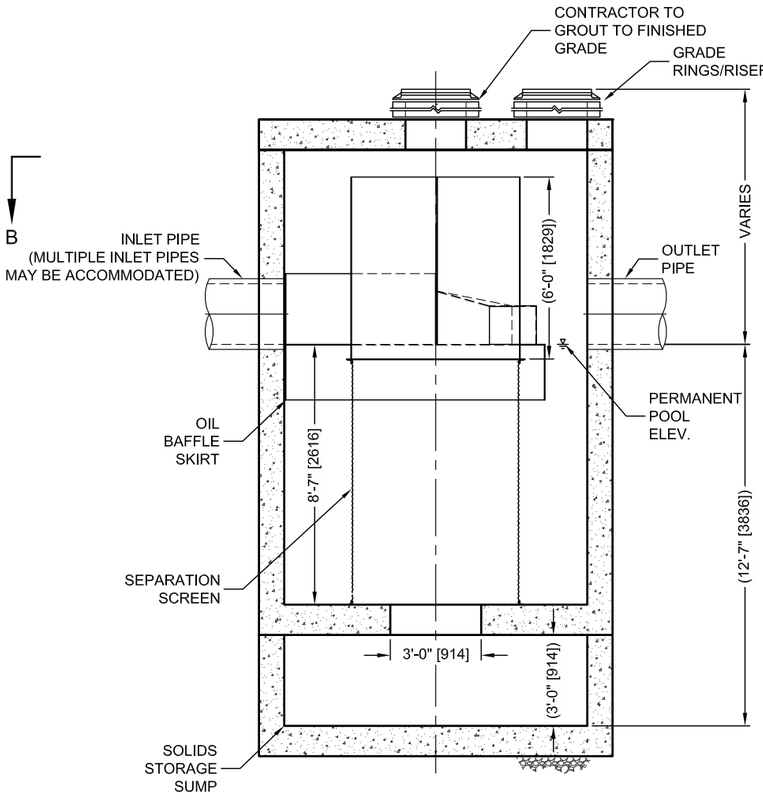


PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.

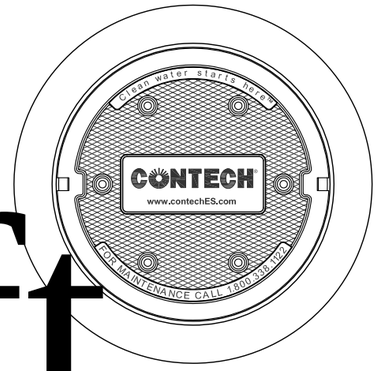
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,782; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

Draft

CDS5678-10-C DESIGN NOTES

THE STANDARD CDS5678-10-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECHENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS5678-10-C
INLINE CDS
STANDARD DETAIL

C:\USERS\SCHLACHTERH\DESKTOP\CDS DETAILS 180 MICRON SIZING\ACAD\CDS5678-10-C-DTL.DWG 5/19/2014 5:39 PM

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	EPM NAME EPM NUMBER EPM EMAIL
ADS SALES REP	SALES NAME SALES NUMBER SALES EMAIL
PROJECT NO.	

ADVANCED DRAINAGE SYSTEMS, INC.

BELL RIPPY NEIGHBORHOOD

GLENWOOD SPRINGS, CO

ADS RETENTION/DETENTION PIPE SYSTEM SPECIFICATION

SCOPE

THIS SPECIFICATION DESCRIBES ADS RETENTION/DETENTION PIPE SYSTEMS FOR USE IN NON-PRESSURE GRAVITY-FLOW STORM WATER COLLECTION SYSTEMS UTILIZING A CONTINUOUS OUTFALL STRUCTURE.

PIPE REQUIREMENTS

ADS RETENTION/DETENTION SYSTEMS MAY UTILIZE ANY OF THE VARIOUS PIPE PRODUCTS BELOW:

- N-12® STIB PIPE (PER AASHTO) SHALL MEET AASHTO M 294, TYPE S OR ASTM F2306
- N-12® STIB PIPE (PER ASTM F2648) SHALL MEET ASTM F2648
- N-12® MEGA GREEN™ STIB SHALL MEET ASTM F2648

ALL PRODUCTS SHALL HAVE A SMOOTH INTERIOR AND ANNULAR EXTERIOR CORRUGATIONS. ALL STIB PIPE PRODUCTS ARE AVAILABLE AS PERFORATED OR NON-PERFORATED. WTIB PIPE PRODUCTS ARE ONLY AVAILABLE AS NON-PERFORATED. PRODUCT-SPECIFIC PIPE SPECIFICATIONS ARE AVAILABLE IN THE DRAINAGE HANDBOOK SECTION 1 "SPECIFICATIONS".

JOINT PERFORMANCE

PLAIN END / SOIL-TIGHT (STIB):
STIB PIPE SHALL BE JOINED USING A BELL AND SPIGOT JOINT. THE BELL AND SPIGOT JOINT SHALL MEET THE SOIL-TIGHT REQUIREMENTS OF ASTM F2306 AND GASKETS SHALL MEET THE REQUIREMENTS OF ASTM F477.

PLAIN END PIPE AND FITTINGS CONNECTIONS SHALL BE JOINED WITH COUPLING BANDS COVERING AT LEAST TWO FULL CORRUGATIONS ON EACH END OF THE PIPE. GASKETED SOIL-TIGHT COUPLING BAND CONNECTIONS SHALL INCORPORATE A CLOSED-CELL SYNTHETIC EXPANDED RUBBER GASKET MEETING THE REQUIREMENTS OF ASTM D1056 GRADE 2A2. GASKETS, WHEN APPLICABLE, SHALL BE INSTALLED BY THE PIPE MANUFACTURER.

FITTINGS

FITTINGS SHALL CONFORM TO ASTM F2306 AND MEET JOINT PERFORMANCE INDICATED ABOVE FOR FITTINGS CONNECTIONS. CUSTOM FITTINGS ARE AVAILABLE AND MAY REQUIRE SPECIAL INSTALLATION CRITERION.

INSTALLATION

INSTALLATION SHALL BE IN ACCORDANCE WITH ASTM D2321 AND ADS RECOMMENDED INSTALLATION GUIDELINES, WITH THE EXCEPTION THAT MINIMUM COVER IN NON-TRAFFIC AREAS FOR 12-60 INCH (300-1500 mm) DIAMETERS SHALL BE 1 FT (0.3 m). MINIMUM COVER IN TRAFFICKED AREAS FOR 12-36 INCH (300-900 mm) DIAMETERS SHALL BE 1 FT (0.3 m) AND FOR 42-60 INCH (1050-1500 mm) DIAMETERS, THE MINIMUM COVER SHALL BE 2 FT (0.6 m). BACKFILL SHALL CONSIST OF CLASS I (COMPACTED) OR CLASS II (MINIMUM 95% SPD) MATERIAL, WITH THE EXCEPTION THAT 60 INCH (1500 mm) SYSTEMS SHALL USE CLASS I MATERIAL ONLY. MINIMUM COVER HEIGHTS DO NOT ACCOUNT FOR PIPE BUOYANCY. REFER TO ADS TECHNICAL NOTE 5.05 "PIPE FLOTATION" FOR BUOYANCY DESIGN CONSIDERATIONS. MAXIMUM COVER OVER SYSTEM USING STANDARD BACKFILL IS 8 FT (2.4 m); CONTACT A REPRESENTATIVE WHEN MAXIMUM FILL HEIGHT MAY BE EXCEEDED. ADDITIONAL INSTALLATION REQUIREMENTS ARE PROVIDED IN THE DRAINAGE HANDBOOK SECTION 6 "RETENTION/DETENTION".

ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES:

1) ALL ELEVATIONS, DIMENSIONS AND LOCATIONS OF RISERS, INLETS AND OUTLETS, SHALL BE VERIFIED BY THE ENGINEER PRIOR TO RELEASING FOR FABRICATION.

2) IN SITUATIONS WHERE A FINE-GRAINED BACKFILL MATERIAL IS USED ADJACENT TO THE PIPE SYSTEM, AND ESPECIALLY INVOLVING GROUND WATER CONDITIONS, CONSIDERATION SHOULD BE GIVEN TO THE USE OF GASKETED PIPE JOINTS. AT THE VERY LEAST THE PIPE JOINTS SHOULD BE WRAPPED IN A SUITABLE, NON-WOVEN GEOTEXTILE FABRIC TO PREVENT INFILTRATION OF FINES INTO THE PIPE SYSTEM.

3) CONSIDERATION FOR CONSTRUCTION EQUIPMENT LOADS MUST BE TAKEN INTO ACCOUNT.

4) ALL PIPE DIMENSIONS ARE SUBJECT TO MANUFACTURERS TOLERANCES.

5) ALL RISERS TO BE FIELD EXTENDED OR TRIMMED TO FINAL GRADE.

THE UNDERSIGNED HERBY APPROVES THE ATTACHED PAGES.

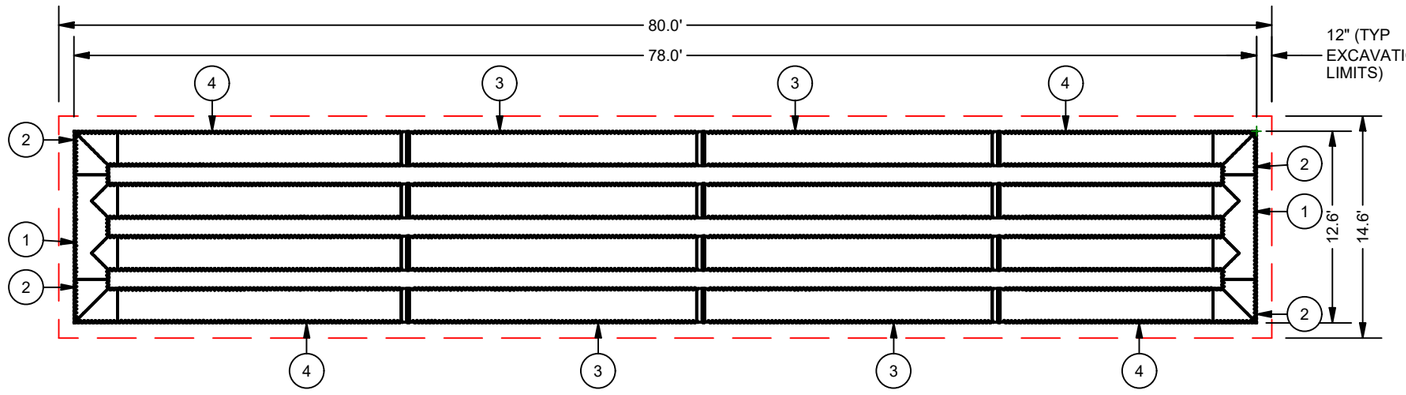
CUSTOMER DATE

©2013 ADS, INC.

ITEM	QTY	ALT. QTY	PART #	DESCRIPTION	STAN.	VENDOR	NOTE
1	2		2452AN	24".DOUBLE MANIFOLD TEE	STAN	ADS	SEE DETAIL
2	4		2498AN	24".MANIFOLD 90 DEG BEND	STAN	ADS	SEE DETAIL
3	8 STICKS	156 LF	24810020IB	24".N12 HWY.STIB.PERF.20'	STAN	ADS	AS SHOWN
4	7 STICKS	134 LF	24810020IB	24".N12 HWY.STIB.PERF.20'	STAN	ADS	FIELD CUT
5	12		2465AA	24".SPLIT COUPLER.(100/PALLET)	STAN	ADS	NOT SHOWN
6	1 ROLLS	417 SY	0601TG	601.15' X 300'.(500 SY).(NTPEP SCAN) (20% OVERAGE)	STAN	ADS	SEE DETAIL
7	139 TONS	100 CY	BY OTHERS	STONE (0% OVERAGE)	NA	BY OTHERS	NOT SHOWN
8	3683 CF	137 CY	NA	EXCAVATION	NA	NA	NOT SHOWN

NOTES

- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE PIPE COVER REQUIREMENTS ARE MET.
- STUB SIZES AND INVERTS TO BE VERIFIED BY THE SITE DESIGN ENGINEER PRIOR TO FABRICATION.
- ADS RISERS ARE FABRICATED 36" (900 mm) FROM TOP OF PIPE TO TOP OF RISER DUE TO SHIPPING LIMITATIONS. ADDITIONAL PIPE AND COUPLERS CAN BE USED TO EXTEND THE RISERS TO GRADE.
- LAYOUT SHOWN DOES NOT INCLUDE ADDITIONAL PIPE & MANIFOLD NEEDED FOR PROPER PIPE INSERTION INTO STRUCTURES.
- NOT FOR CONSTRUCTION



ADS GEOTEXTILE FABRIC

BELL RIPPY NEIGHBORHOOD
GLENWOOD SPRINGS, CO

DATE:
DRAWN: DW
PROJECT #:
CHECKED: N/A

REV	DRW	CHK	DESCRIPTION

24" STIB PERF
DETENTION SYSTEM

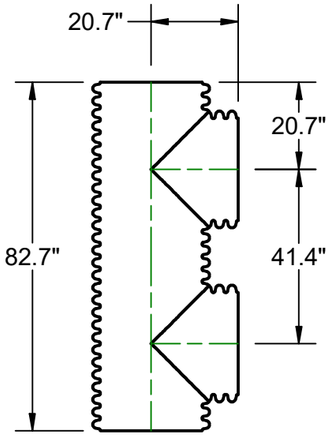
HDPE N-12

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473
ADVANCED DRAINAGE SYSTEMS, INC.

0 10' 20'

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

24" DOUBLE MANIFOLD TEE [2452AN]



ITEM #: 1
QTY: 2
2452AN

BELL RIPPY NEIGHBORHOOD
GLENWOOD SPRINGS, CO

DATE:
DRAWN: DW
PROJECT #:
CHECKED: N/A

REV	DRW	CHK	DESCRIPTION

24" STIB PERF
DETENTION SYSTEM

HDPE N-12

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

ADS
ADVANCED DRAINAGE SYSTEMS, INC.

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OF RECORD. IT IS THE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

SHEET
3 OF 5

24" X 90.00° MANIFOLD BEND [2498AN]

ITEM #: 2
QTY: 4
2498AN

BELL RIPPY NEIGHBORHOOD
GLENWOOD SPRINGS, CO

DATE:
DRAWN: DW
PROJECT #:
CHECKED: N/A

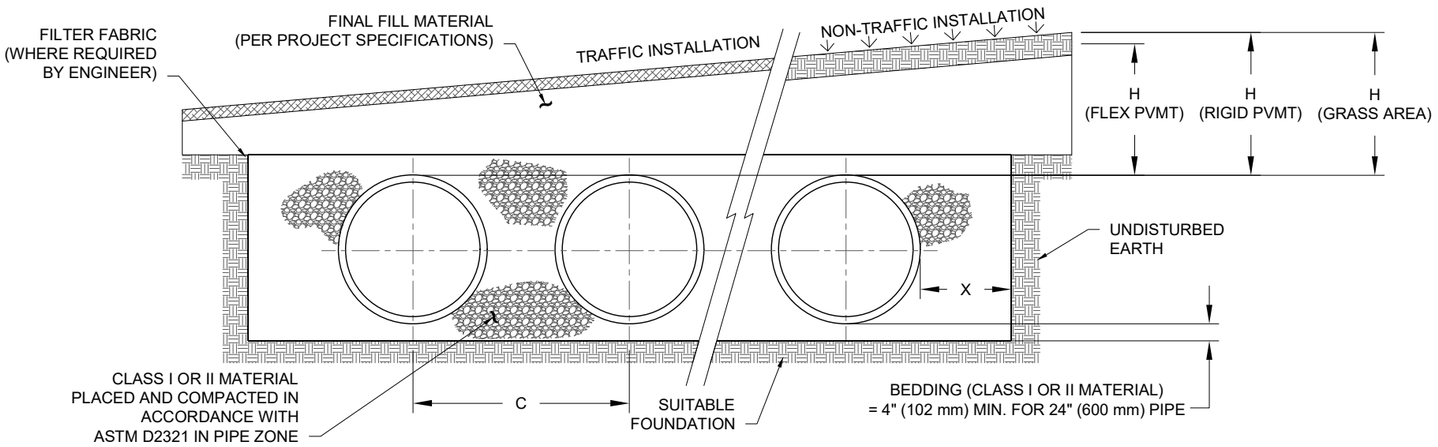
REV	DRW	CHK	DESCRIPTION

24" STIB PERF
DETENTION SYSTEM

HDPE N-12

ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.



NOMINAL DIAMETER	NOMINAL O.D.	TYPICAL SPACING "C"	TYPICAL SIDE WALL "X"	MIN. H (NON-TRAFFIC)	MIN. H (TRAFFIC)	MAX. H*
24" (600 mm)	28" (711 mm)	41.4" (1052 mm)	10" (254 mm)	12" (305 mm)	12" (305 mm)	8' (2.4 m)

* MAXIMUM FILL HEIGHTS OVER MANIFOLD FITTINGS. CONTACT MANUFACTURER'S REPRESENTATIVE FOR INSTALLATION CONSIDERATIONS WHEN COVER EXCEEDS 8 FT (2.4 m).

NOTES:

1. ALL REFERENCES TO CLASS I OR II MATERIAL ARE PER ASTM D2321 "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST EDITION.
2. ALL RETENTION AND DETENTION SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, LATEST EDITION AND THE MANUFACTURER'S PUBLISHED INSTALLATION GUIDELINES.
3. MEASURES SHOULD BE TAKEN TO PREVENT THE MIGRATION OF NATIVE FINES INTO THE BACKFILL MATERIAL, WHEN REQUIRED. SEE ASTM D2321.
4. FILTER FABRIC: A GEOTEXTILE FABRIC MAY BE USED AS SPECIFIED BY THE ENGINEER TO PREVENT THE MIGRATION OF FINES FROM THE NATIVE SOIL INTO THE SELECT BACKFILL MATERIAL.
5. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE. THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
6. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I OR II. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (102 mm) FOR 4"-24" (100-600 mm); 6" (152 mm) FOR 30-60" (750-900 mm).
7. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I OR II IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" (152 mm) ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
8. COVER: MINIMUM COVER OVER ALL RETENTION/DETENTION SYSTEMS IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" (305 mm) FROM TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER IS 12" (305 mm) UP TO 36" (900 mm) DIAMETER PIPE AND 24" (610 mm) OF COVER FOR 42-60" (1050-1500 mm) DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT. MAXIMUM FILL HEIGHT LIMITED TO 8 FT (2.4 m) OVER FITTINGS FOR STANDARD INSTALLATIONS. CONTACT A SALES REPRESENTATIVE WHEN MAXIMUM FILL HEIGHTS EXCEED 8 FT (2.4 m) FOR INSTALLATION CONSIDERATIONS.

BELL RIPPY NEIGHBORHOOD
GLENWOOD SPRINGS, CO

DATE:
DRAWN: DW
PROJECT #:
CHECKED: N/A

REV	DRW	CHK	DESCRIPTION

24" STIB PERF
DETENTION SYSTEM

HDPE N-12

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473
ADVANCED DRAINAGE SYSTEMS, INC.

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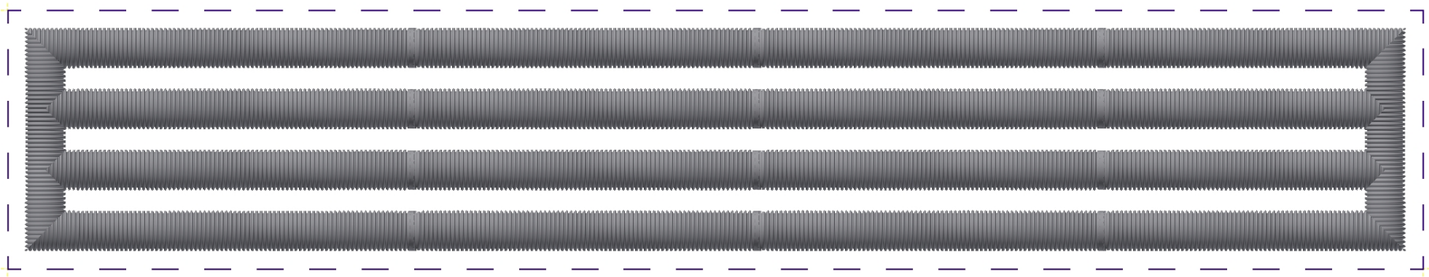


REPORT

Debris Flow Hazard Evaluation

Glenwood Multifamily
Glenwood Springs, Colorado

Submitted to:

Mr. Dave Forenza
P.O. Box 2882
Edwards, Colorado

Submitted by:

Golder Associates Inc.
7245 W. Alaska Avenue, Suite 200 Lakewood, Colorado, USA 80226

+1 303 980-0540

1669256

July 29, 2019

Table of Contents

1.0 INTRODUCTION 3

2.0 SITE INVESTIGATION AND SITE CONDITIONS 3

3.0 HYDROLOGY 4

3.1 Methodology 4

3.2 Data and Assumptions 4

3.3 Analysis 4

3.4 Results 5

4.0 HYDRAULIC MODELING 5

4.1 Methodology 6

4.2 Data and Assumptions 6

4.3 Hydraulic Model Analysis 6

4.4 Results 7

4.5 Preliminary Mitigation Options 7

5.0 CONCLUSIONS AND RECOMMENDATIONS 9

6.0 LIMITATIONS 9

7.0 CLOSING 9

REFERENCES 10

FIGURES

Figure 1 Flexible Debris Flow Fence Example 8

Figure 1 Flexible Debris Flow Fence Example

Figure 2 Site Location Map

Figure 3 Existing Conditions – Maximum Flow Depth

Figure 4 Proposed Conditions – Maximum Flow Depth

1.0 INTRODUCTION

In accordance with Golder Associates Inc.'s (Golder's) November 22, 2016, proposed Scope of Work, we have prepared this report to present the findings of our debris flow hazards evaluation and hydraulic modeling conducted for the Glenwood Multifamily project, Glenwood Springs, Colorado. The evaluation is intended to provide an assessment of the debris flow hazards, which may affect the planned development of the property. The report also describes hydraulic modeling completed in support of our evaluation and recommendations for additional mitigation.

Planned improvements at this site include ten apartment buildings, streets and associated infrastructure on the lower part of the property. The client is seeking land use approvals for the lot and the City of Glenwood Springs has required an evaluation of the debris flow hazards impacting the property. Site plans, topographic information, hydrologic inputs, and drainage plans with proposed mitigation were provided by RAL Architects, Inc (RAL) and Yarnell Consulting & Civil Design, LLC (Yarnell). The Yarnell drawings show drainage improvements including cast-in-place (CIP) walls and berms for routing storm water and some debris through the development. Golder analyzed the existing conditions and the conditions with the proposed mitigation shown on the Yarnell drawings to estimate how debris flow paths and depths change after construction of the proposed development.

Golder understands that a portion of the development is within Zone A of the FEMA Flood Insurance Rate Map for the area and that debris flows occurred in 1977 at this site as well as several others nearby. The Colorado Geological Survey (CGS) produced a report for this site that estimates a recurrence interval of approximately 50 years (2-percent chance of exceedance in any year) for the flow events and recommends mitigating the hazard by additional structural reinforcement of foundations walls and structural "catch" fences (CGS 1977). The CGS states that when debris flows occur in the basins, the flow depths can be expected to be approximately 5 ft deep.

2.0 SITE INVESTIGATION AND SITE CONDITIONS

The site is located on the east side of the Roaring Fork River valley within the city limits of Glenwood Springs, Colorado. The site location is shown on Figure 2. Golder's investigation consisted of review of existing documents and observations made during a site visit. Two Golder staff visited the site on June 29, 2017, to observe conditions on the fan, within the site, as well as within the drainages to the east contributing to the site.

The proposed development is located on an alluvial debris fan. Two basins contribute to the site, a larger basin on the north end (OS-1) and a smaller one on the south (OS-2). Based on the landforms observed during our site visit, it appears that recent, minor deposition onto the property has been generated from both basins. There is no development upstream of the property that has modified the natural flow paths. The apparently abandoned Glenwood irrigation ditch and maintenance road is located along the base of the steeper terrain to the east of the proposed development. The ditch and road provides a horizontal platform at the toe of the slope and apex of the fan that varies between 15 and 20 feet wide.

The fan and contributing basins are mapped hazards in at least two previous reports from 1977 and 1978. The reports were prepared in response to debris flow events on July 24, 1977, that caused significant damage to homes and infrastructure. Anecdotal evidence indicates that a previous flow event occurred around 1940. Reports from the 1977 event indicate entrained trees and boulders up to 5 feet in diameter in a muddy, fluid matrix. Post-flow observation indicates flow depths of 4 to 5 feet in the channels and in the oak trees where the channel gradient lessens at the top of the fan. This is supported by current observations of the fan surface and channels within the basin.

The basins on the east side of the valley are incised into the Maroon Formation, which consists of grey to reddish siltstone and silty sandstone with layers of red and purple arkosic sandstone. The Eagle Valley Evaporite Formation inter-fingers with the Maroon Formation but is not considered to be a major contributor of sediment for the two subject basins. Bedrock outcroppings are visible in the basin but the surface consists primarily of clayey, silty sandy soil with gravel, cobbles, and boulders. The Maroon Formation weathers to form silty, clayey sand and sandy, clayey silt soils, which have a significant fraction passing the #200 US Sieve but are relatively low plasticity. Locally, the Maroon Formation is the source for the majority of debris flow events in the Roaring Fork Valley due to its minerology, specifically clay forming minerals, and its differentially erodible layers that form cliffs interspersed with unconsolidated sediment that is available to scour as water flows over the cliffs.

Slope that are less than 35 degrees are moderately to well vegetated with Pinion, Gamble Oak, Juniper, grasses and undergrowth. The upper parts of the basins are moderately to well vegetated with modest slopes of 10 to 20 degrees. The lower part of the basin above the fan has slopes typically steeper than 40 degrees and areas of near vertical slopes and rock outcroppings. The steeper slopes are slightly vegetated to unvegetated and are subject to erosion of the bed load in the main and side channels along with sheet erosion and rill formation on the slopes adjacent to the channel. The fan consists of clayey, silty sand with gravel, cobbles, and boulders to 5 feet in diameter. The fan is populated with intermittent Juniper, Pinion and well mature cover of native grasses.

3.0 HYDROLOGY

A hydrologic analysis was conducted to determine flow hydrographs reporting to the apex of the fan that contributes to the subject property. The design storm event used for the debris flows is the 100-year, 24-hour event (1-percent annual exceedance probability). A flow hydrograph for the design storm was developed to which sediment was added to model the debris flow.

3.1 Methodology

Using parameters previously calculated by Yarnell for the two basins contributing to the property, the Hydrologic Engineering Center's Hydrologic Modeling Software (HEC-HMS) was used to estimate peak 100-year, 24-hour flow rates and hydrographs reporting to the alluvial fan apex (USACE 2017).

3.2 Data and Assumptions

Parameter	OS-1	OS-2
Subbasin Area (mi^2)	0.202	0.016
Composite Curve Number	82	85
Basin Lag Time (min)	15.8	6.12
100-year, 24-hour Rain Depth (in)	2.67	
NRCS Storm Distribution	Type II	

Note: Parameters from Yarnell Drainage Study for the Site (Yarnell 2017)

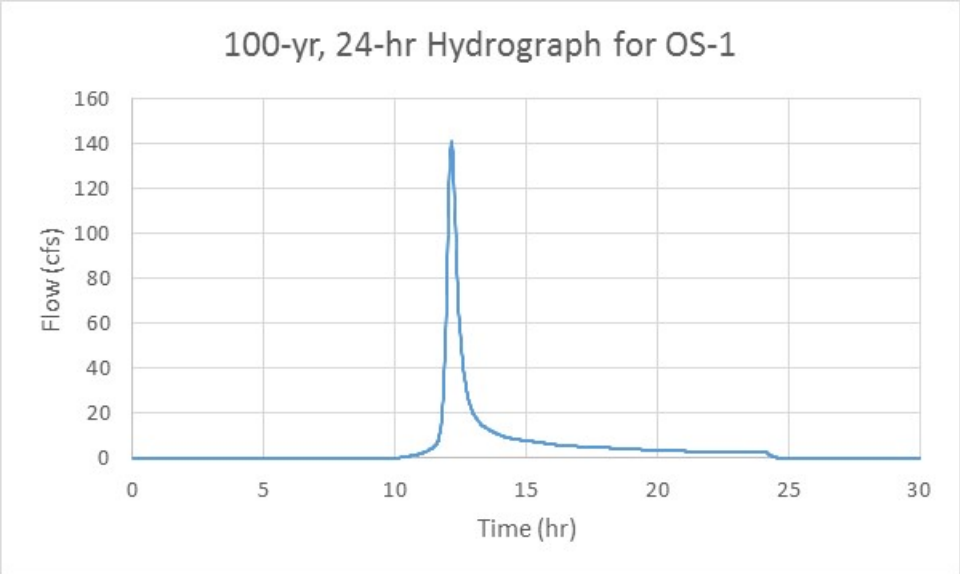
3.3 Analysis

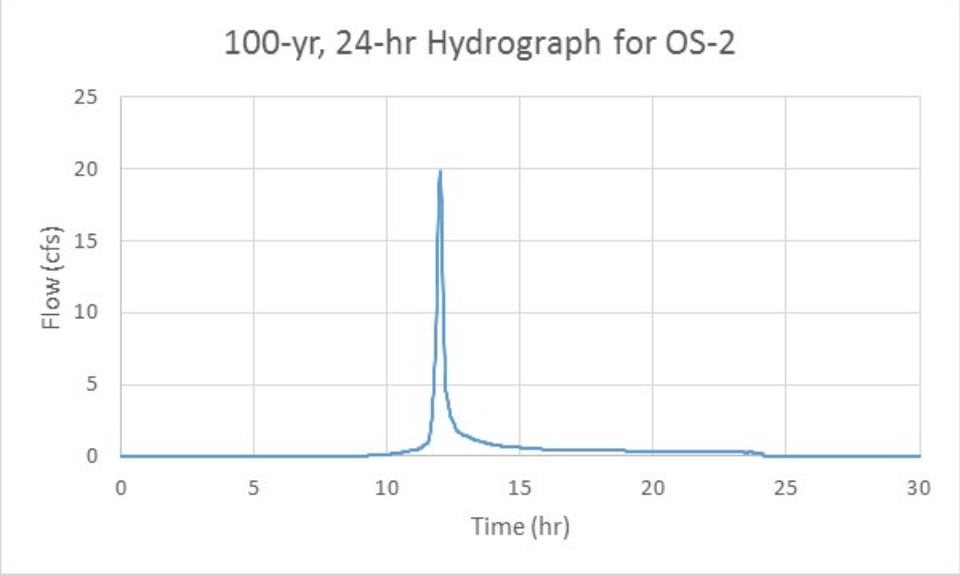
Calculations were performed by Yarnell for off-site basins OS-1 and OS-2 that correspond to the north and south contributing basins, respectively, subject to debris flows (Yarnell 2017). Precipitation that falls directly on the fan will not contribute significantly to the potential for debris flow at the proposed development location and therefore runoff generated by rainfall on the fan itself was not analyzed for this study. The analysis by Yarnell used the TR-55 tabular method (USSCS 1986) to determine peak flows for the two off-site basins. Because the entire flow

hydrograph is needed for debris flow modeling, Golder used the hydrologic parameters developed by Yarnell as inputs to HEC-HMS to develop the hydrographs required for OS-1 and OS-2.

3.4 Results

The results of the HEC-HMS model show that the peak flow contributing to the fan apex is estimated to be 141.4 cfs for OS-1 and 19.8 cfs for OS-2. The full hydrograph output from HEC-HMS was input to FLO-2D for routing of the debris flow through the alluvial fan. The hydrograph output from the HEC-HMS model is provided below (water only).





4.0 HYDRAULIC MODELING

A hydraulic model was created to route the design storm hydrograph, bulked with sediment, through the site and surrounding area. Debris flow models were developed for both existing and proposed conditions as shown on the

Yarnell drawings. The existing conditions model was used to compare against the proposed conditions models to determine the effectiveness of the berms and wall currently shown on the drawings.

4.1 Methodology

The potential debris flow depths and extents from the 100-year frequency, 24-hour duration event were simulated using FLO-2D modeling software (FLO-2D 2014a). FLO-2D preserves continuity for both water and sediment during mudflow simulations. The hydrograph developed during the hydrology analysis was input into FLO-2D and was bulked to account for sediment. The mud/debris flow function in FLO-2D was used and parameters for viscosity, yield stress, and laminar flow resistance were estimated and input into the model.

4.2 Data and Assumptions

- Incoming sediment specific gravity = 2.65
- Laminar Flow Resistance (LFR) values modeled (FLO-2D 2014b): 2,480 – FLO-2D recommended for sparse vegetation
- Coefficients and exponents for use in calculation of yield stress and viscosity (Glenwood 4 soil – FLO-2D recommended to represent high viscosity and moderate yield stress with high sediment concentrations) (FLO-2D 2014b):

	Yield Stress	**Viscosity**
α	0.00172	0.000602
β	29.5	33.1

4.3 Hydraulic Model Analysis

The FLO-2D model for the site was developed using the available topography, design storm hydrograph from HEC-HMS (100-yr, 24-hr), and sediment parameters as laid out above. The model grid encompasses the proposed development and surrounding properties/streets. The sediment concentration was specified for each incremental hydrograph flow at each inflow cell. Total sediment volume and sediment concentration during the hydrograph are extremely difficult to predict. Golder estimated these values based on empirical relationships developed for muddy debris flows (Rickenmann 1999), Golder's understanding of the site based on visual inspections during the site visit and aerial imagery, and comparison to historical debris flows recorded at this site. Sediment parameters were input globally for the entire model run. The model was set up and run with the existing topography to develop base conditions. Following this, the proposed features were input to the model including buildings, parking, streets, and proposed mitigation and used to analyze the differences in flow patterns from existing conditions.

FLO-2D documentation cautions that large flood events such as the 100-year event may not have enough sediment and rock supply to produce a high enough sediment concentration to constitute a mud flow (45% to 55% concentration by volume at the peak of the hydrograph) unless there is evidence of significant hill slope failure, recent wildfire, etc. (FLO-2D 2014b). There is no evidence in the contributing watershed of any of these characteristics from aerial imagery or site reconnaissance. Golder used the 100-year, 24-hour storm event as the design storm to be consistent with stormwater design requirements, however, more frequent storm events, such as the 10-year or 25-year event may trigger a debris flow event.

A constant sediment load of 20% over the design storm event hydrograph was deemed reasonable for the debris flow modeling. To create a conservative condition with higher concentrations, the sediment load was redistributed to create a period of high concentration discharge at the peak of the hydrograph. This was done by calculating the total sediment volume with a constant 20% concentration by volume and modifying the distribution to have a maximum 45% concentration by volume at the peak of the water hydrograph while maintaining the same sediment volume through the storm event.

Estimating sediment yield available for transport during a debris flow event is difficult. Golder used a power equation in a paper by Dieter Rickenmann entitled “Empirical Relationship’s for Debris Flows” (Rickenmann 1999) to estimate debris flow volumes with a given peak water flow rate. This paper presents several equations relating debris flow volume to water peak flow for a variety of conditions. The equation that was deemed most reasonable to the Glenwood Multifamily site is the equation for a muddy debris flow. Using the peak flow calculated for basins OS-1 and OS-2, the Rickenmann equation gives a sediment volume of 31,275 and 2,597 ft^3, respectively. Using Golder’s method to determine sediment volume, the modeled volume for each basin is 68,231 ft^3 for OS-1 and 6,274 ft^3 for OS-2, which is significantly higher than the empirical relationships suggested by Rickenmann. However, given the high uncertainty in estimating potential sediment volumes during debris flow events, the estimated volume of 68,231 ft^3 and 6,274 ft^3 was used in the model to provide a conservative, yet reasonable, estimation of the total volume of sediment based on Golder’s understanding of the site.

The incoming sediment inputs do not require a gradation; however, sediment properties and variables must be estimated to determine FLO-2D parameters for use in the mud flow computations. Variables for viscosity, yield stress, and laminar flow resistance are required for use in the FLO-2D model. FLO-2D provides tables of coefficients derived from lab data (viscosity and yield stress) and flow path roughness (laminar flow resistance). Viscosity and yield stress variables are difficult to choose without laboratory testing of on-site soil samples. FLO-2D however, recommends the “Glenwood 4” parameters when no lab data is available to calculate coefficients. The laminar flow resistance parameter (LFR) varies from 24 to 50,000 depending on flow path roughness. The LFR value chosen was 2,480, which is recommended by FLO-2D for urban areas and watersheds consisting of sparse vegetation.

4.4 Results

Results of the existing conditions debris flow modeling are presented in Figure 3. The existing conditions topography is based on available contours derived from the USGS National Elevation Dataset (10 m digital elevation model). The results of the preliminary proposed mitigation are shown in Figure 4 and include the initial mitigation options for debris flow events by Yarnell. The concept includes walls and diversion channels to pass the flow on to Palmer Avenue where it can be removed.

With minor adjustments, the proposed mitigation for flows contributing to the site from basin OS-2 is effective in reducing impact to proposed structures in the flow path. Results show up to approximately 1.5 feet of debris flow accumulation against the east side of proposed Building 10, which could be eliminated by modifying the berm. Flow from basin OS-1 overwhelms the currently proposed mitigation, bypassing and overtopping the mitigation and impacting Buildings 1 and 2 with flow depths greater than 2 feet.

4.5 Preliminary Mitigation Options

Several alternative options were discussed and analyzed to better protect the proposed development and neighboring properties from potential debris flow impacts from basin OS-1 including the following:

- Berms/swales to redirect flow to the north east of Palmer Avenue
- Detention basin above fan apex
- Flexible debris flow fencing

Several variations of berms were modeled to direct flow to the north and on to 26th Street, but the topography and required access for a neighboring house makes these options infeasible. Detention was deemed unpractical due to the large basin that would be required to contain the sediment-laden water along with the need to access the basin for maintenance, the steep terrain, and potentially problematic soils.

The flexible debris flow fencing appears to be the best option of those considered. Figure 1 below shows an image of a similar style fence as is being considered for the Glenwood Multifamily site. The concept for the fence is to place it on the downhill side of the existing ditch access road to allow for maintenance and cleaning. The fence will have to extend the entire width of the alluvial fan in the area, approximately 430 feet, for storage and to allow for changes in the flow paths as is common in an alluvial fan. Initial, preliminary calculations to determine the required height of the fence based only on the ability to store the sediment from a debris event in basin OS-1 show that the fence would have to be approximately 9 feet high.

Figure 1 Flexible Debris Flow Fence Example

Alluvial fans are very complex systems and modeling the effects of a mudflow on them is very difficult. It is impossible to predict how the flow paths will change throughout a mudflow event due to factors such as large boulders, trees, etc. blocking flow paths or avulsion due to a flow path filling with sediment and/or debris. These figures represent an estimate of possible maximum flow depths and extents encountered during a mudflow as a result of a major storm event.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The proposed development for the Glenwood Multifamily site in Glenwood Springs, Colorado sits on an alluvial fan and has been subject to debris flows in the past. Debris flow mitigation is recommended to protect the proposed development. The recommended mitigation is a combination of a wall and channels/berms for basin OS-2 on the south and a flexible debris flow fence for basin OS-1 on the north.

Debris flow modeling using FLO-2D shows that the mitigation currently shown on the Yarnell plans for basin OS-2 will, with minor modification, effectively limit inundation for buildings on the site while not increasing flows into surrounding properties.

The addition of a debris flow fence, as recommended by this report for OS-1, will contain sediment while allowing relatively clear water to pass downstream thereby decreasing the hazard to the proposed development and surrounding properties during debris flow events. The relatively clear portion of the hydrograph may still be turbid and consists of sediment concentrations less than 20% by volume behaving more as a water flow (i.e. Newtonian flow) rather than debris flow (i.e. non-homogeneous, nonnewtonian, higher viscosity flow). The debris flow fence will need to extend over the width of the OS-1 fan for storage and in case the flow path changes due to avulsion. Preliminary dimensions for the fence indicate that its length will be approximately 430 feet with a height of 9 feet. The fence will be designed to contain the sediment while allowing relatively clear water to flow downstream to be handled by the storm water controls for the site. As such, limited impacts from debris flows should be seen on either the Glenwood Multifamily site or neighboring properties from OS-1. The debris fence shall be designed to withstand the impact forces from the expected debris based on the recommendations of the fence manufacturer.

6.0 LIMITATIONS

This report has been prepared in accordance with generally accepted geological and engineering practices in this area for use by the client for preliminary planning purposes. The preliminary conclusions and recommendations submitted in this report are based upon data obtained from the observations made in the field, results of hydrologic/hydraulic modeling and from information provided by the client. It should be noted that geological hazard events are sporadic and unpredictable. The findings and recommendations given in this report are site-specific, and are only valid for the subject site.

7.0 CLOSING

Golder expects that this report meets your needs for this facility and appreciates the opportunity to work on this project. Please feel free to contact us for if you have any questions or wish to discuss the results in further detail.

GOLDER ASSOCIATES INC.

Elizabeth Kidner, PE
Senior Engineer

Roger Pihl, PG
Senior Geologist

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Figures

LEGEND

SITE LOCATION

0 1,000 2,000 4,000 Feet

REFERENCE

1. AERIAL IMAGERY: ESRI BASEMAP SERVICES, BING MAPS, MICROSOFT CORPORATION.

CLIENT
GLENWOOD MULTIFAMILY, LLC

PROJECT
BELL RIPPY PARCEL DEBRIS FLOW HAZARD EVALUATION

TITLE
SITE LOCATION MAP

CONSULTANT

Golder Associates

YYYY-MM-DD	2017-08-16
PREPARED	KJC
DESIGN	KJC
REVIEW	CPB
APPROVED	

PROJECT No.
1669256

FIGURE
2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:

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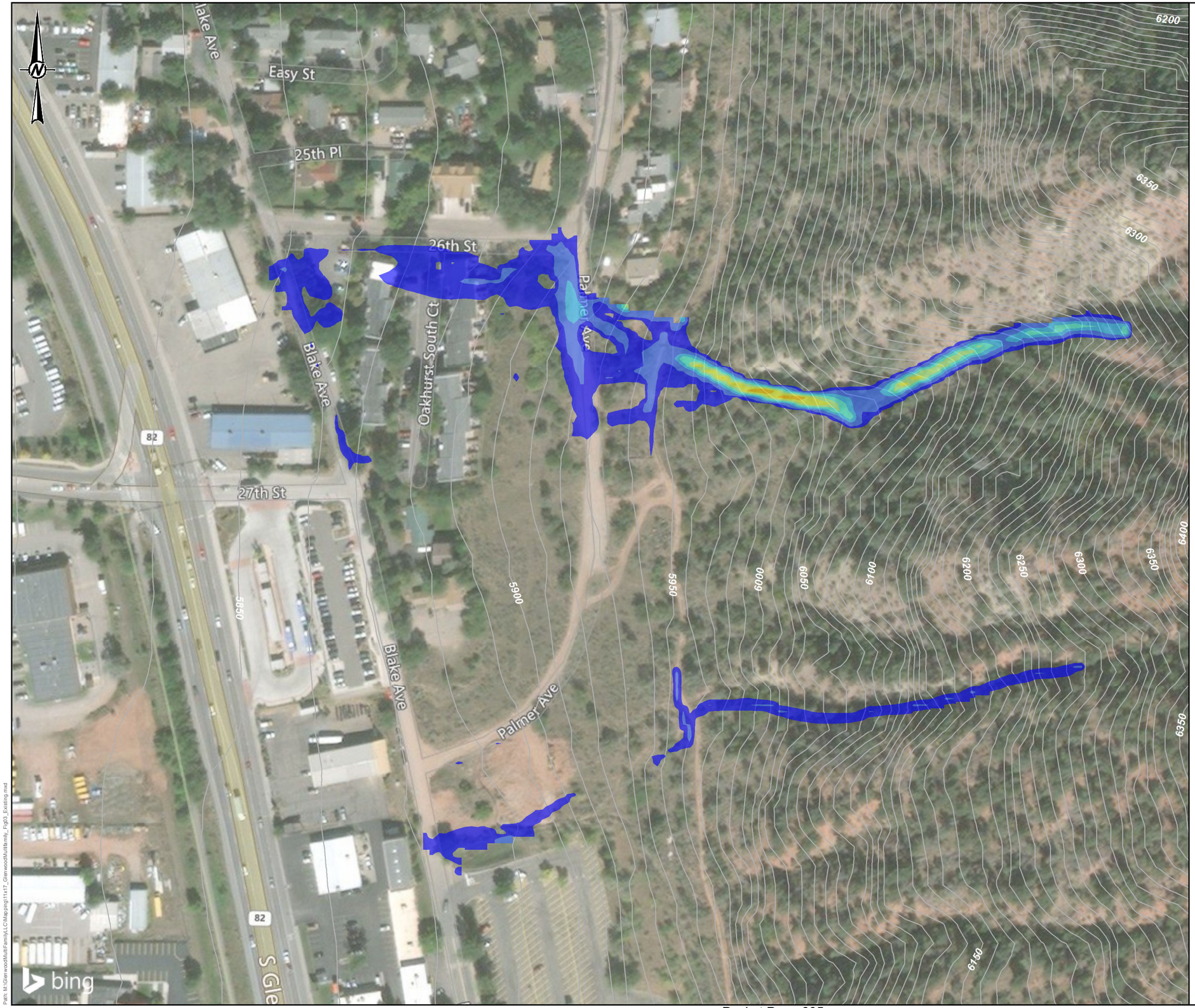

LEGEND

MAXIMUM FLOW DEPTH (FT)

- < 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- 3 - 4
- 4 - 5
- > 5
- EXISTING TOPOGRAPHY (10-FT CONTOUR INTERVAL)

Feet

0 75 150 300

REFERENCE

1. AERIAL IMAGERY: ESRI BASEMAP SERVICES, BING MAPS, MICROSOFT CORPORATION.
2. EXISTING TOPOGRAPHY: CONTOURS DERIVED FROM THE USGS NATIONAL ELEVATION DATASET (NED) 10-METER DIGITAL ELEVATION MODEL.

CLIENT
GLENWOOD MULTIFAMILY, LLC

PROJECT
BELL RIPPY PARCEL DEBRIS FLOW HAZARD EVALUATION

TITLE
EXISTING CONDITIONS
MAXIMUM FLOW DEPTH

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-08-16
PREPARED	KJC
DESIGN	KJC
REVIEW	CPB
APPROVED	SWR

PROJECT No.
1669256

FIGURE
3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
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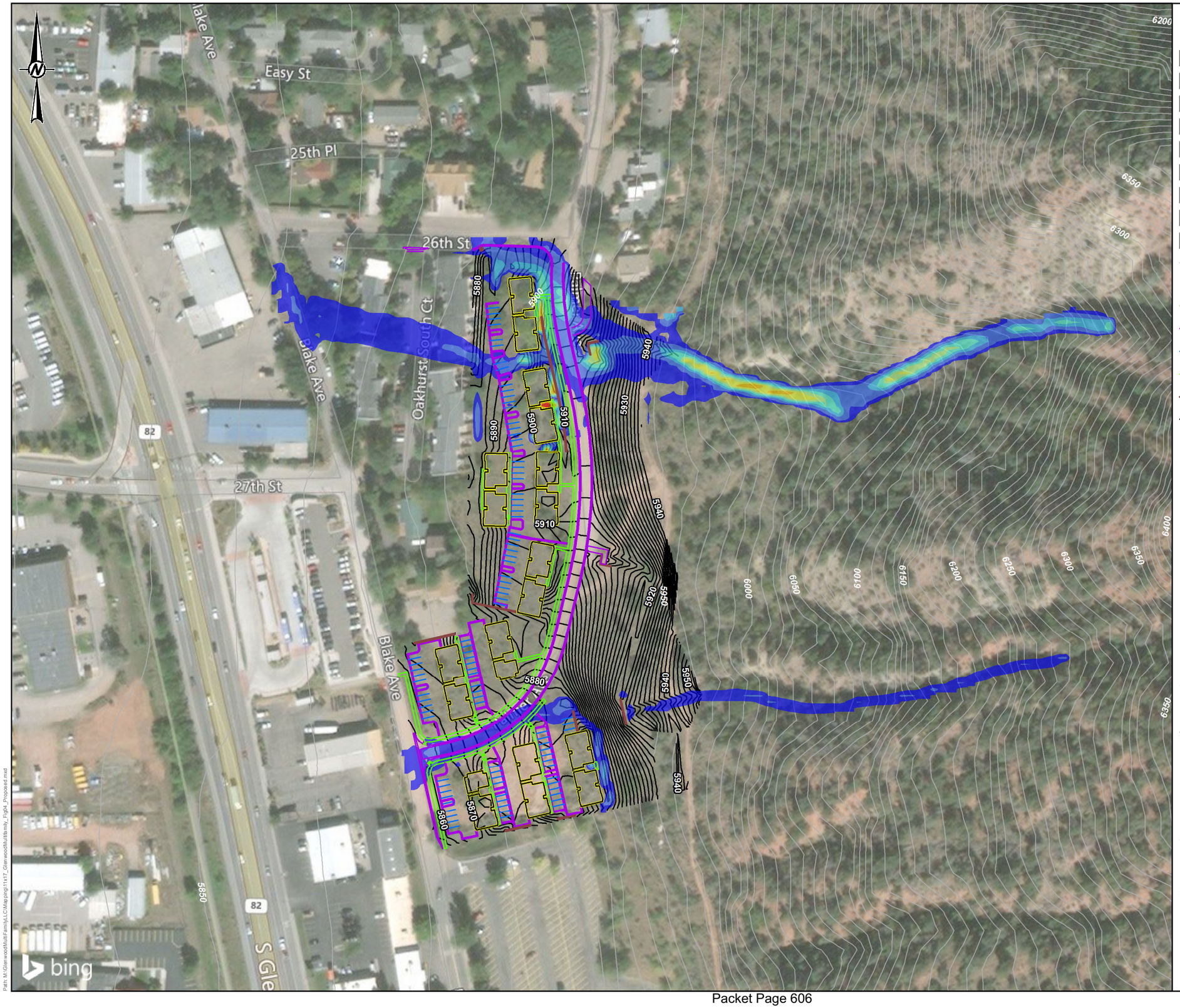

LEGEND

MAXIMUM FLOW DEPTH (FT)

- < 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- 3 - 4
- 4 - 5
- > 5
- EXISTING TOPOGRAPHY (10-FT CONTOUR INTERVAL)

PROPOSED FEATURES

- BUILDING FOOTPRINT
- CURB
- PAVEMENT MARKING
- SIDEWALK
- WALL
- PROPOSED TOPOGRAPHY (1-FT CONTOUR INTERVAL)

Feet
0 75 150 300

REFERENCE

1. AERIAL IMAGERY: ESRI BASEMAP SERVICES, BING MAPS, MICROSOFT CORPORATION.
2. PROPOSED SITE TOPOGRAPHY AND SITE FEATURES RECEIVED FROM RAL ARCHITECTS ON JUNE 27, 2017.
3. EXISTING TOPOGRAPHY: CONTOURS DERIVED FROM THE USGS NATIONAL ELEVATION DATASET (NED) 10-METER DIGITAL ELEVATION MODEL.

CLIENT
GLENWOOD MULTIFAMILY, LLC

PROJECT
BELL RIPPY PARCEL DEBRIS FLOW HAZARD EVALUATION

TITLE
PROPOSED CONDITIONS MAXIMUM FLOW DEPTH

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-08-16
PREPARED	KJC
DESIGN	KJC
REVIEW	CPB
APPROVED	SWR

PROJECT No.
1669256

FIGURE
4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
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golder.com

Transportation Impact Study

for

Glenwood Multifamily Development
(Formerly Bell Rippy Apartments)
Glenwood Springs, Colorado

March 10, 2017
Revised April 9, 2019

PREPARED FOR:
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Project Number: M1247

Statement of Engineering Qualifications

Kari J. McDowell Schroeder, PE, PTOE is a Transportation and Traffic Engineer for McDowell Engineering, LLC. Ms. McDowell Schroeder has over twenty-two years of extensive traffic and transportation engineering experience. She has completed numerous transportation studies and roadway design projects throughout the State of Colorado. Ms. McDowell Schroeder is a licensed Professional Engineer in the State of Colorado and has her certification as a Professional Traffic Operations Engineer from the Institute of Transportation Engineers.

Traffic Impact Study for
Glenwood Multifamily Development Project

Table of Contents

1.0 PROJECT DESCRIPTION 5

2.0 EXISTING CONDITIONS 7

2.1 Description of Existing Transportation System 7
2.2 Traffic Data Collection 8
2.3 Background Infrastructure Assumptions 8
2.4 Background Traffic Growth 9
2.5 Year 2019 and 2040 Background Traffic Capacity Analysis 13

3.0 PROJECT TRAFFIC 16

3.1 Trip Generation for Proposed Land Use 16
3.1 Trip Distribution 18
3.2 Traffic Assignment and Total Traffic 18
3.3 Year 2019 and Year 2040 Total Traffic Capacity Analysis 27

4.0 TRANSPORTATION IMPACT ANALYSIS 29

4.1 State Highway Access Permits 29
4.2 State Highway Turn Lane Analysis 30
4.3 Access Design Criteria 30
4.4 Recommended Design Vehicle for Site Access 30

5.0 RECOMMENDATIONS AND CONCLUSIONS 32

6.0 APPENDIX 34

Tables and Figures

FIGURE 1: AREA MAP 5

FIGURE 2: SITE PLAN 6

FIGURE 3: YEAR 2019 BACKGROUND TRAFFIC 11

FIGURE 4: YEAR 2040 BACKGROUND TRAFFIC 12

TABLE 1: HCM 2010 LEVEL-OF-SERVICE CRITERIA 13

TABLE 2: BACKGROUND TRAFFIC LEVEL OF SERVICE AND QUEUES 14

TABLE 3: PROJECT TRIP GENERATION 17

FIGURE 5: DIRECTIONAL DISTRIBUTION – BLAKE STREET GATE REMAINS CLOSED 19

FIGURE 6: DIRECTIONAL DISTRIBUTION – BLAKE STREET GATE IS OPENED 20

FIGURE 7: PROJECT-GENERATED TRAFFIC - BLAKE STREET GATE REMAINS CLOSED 21

FIGURE 8: PROJECT-GENERATED TRAFFIC - BLAKE STREET GATE IS OPENED 22

FIGURE 9: YEAR 2019 TOTAL TRAFFIC – BLAKE STREET GATE REMAINS CLOSED 23

FIGURE 10: YEAR 2019 TOTAL TRAFFIC – BLAKE STREET GATE IS OPENED 24

FIGURE 11: YEAR 2040 TOTAL TRAFFIC – BLAKE STREET GATE REMAINS CLOSED 25

FIGURE 12: YEAR 2040 TOTAL TRAFFIC – BLAKE STREET GATE IS OPENED 26

TABLE 4: TOTAL TRAFFIC LEVEL OF SERVICE 28

TABLE 5: AUXILIARY TURN LANE REQUIREMENTS 31

1.0 Project Description

McDowell Engineering has prepared this Transportation Impact Study for the proposed Glenwood Multifamily (formerly Bell Rippy Apartments) Development in Glenwood Springs, Colorado. The purpose of this study is to forecast and analyze the impacts of the additional traffic volumes associated with this project on the surrounding roadway network. Recommendations to mitigate any traffic impacts are also included. The analysis complies with the City of Glenwood Springs and Colorado Department of Transportation standards.

The applicant is proposing to develop a 79-unit apartment project on Blocks 1 and 3 of the Oakhurst Subdivision located on Palmer Avenue in Glenwood Springs.

Refer to the area map in **Figure 1** and site plan in **Figure 2**.

Direct access to the project will be from Palmer Avenue at Blake Avenue and 26th Street.

It is anticipated that access to State Highway 82 will occur via the 23rd Street and 27th Street intersections.

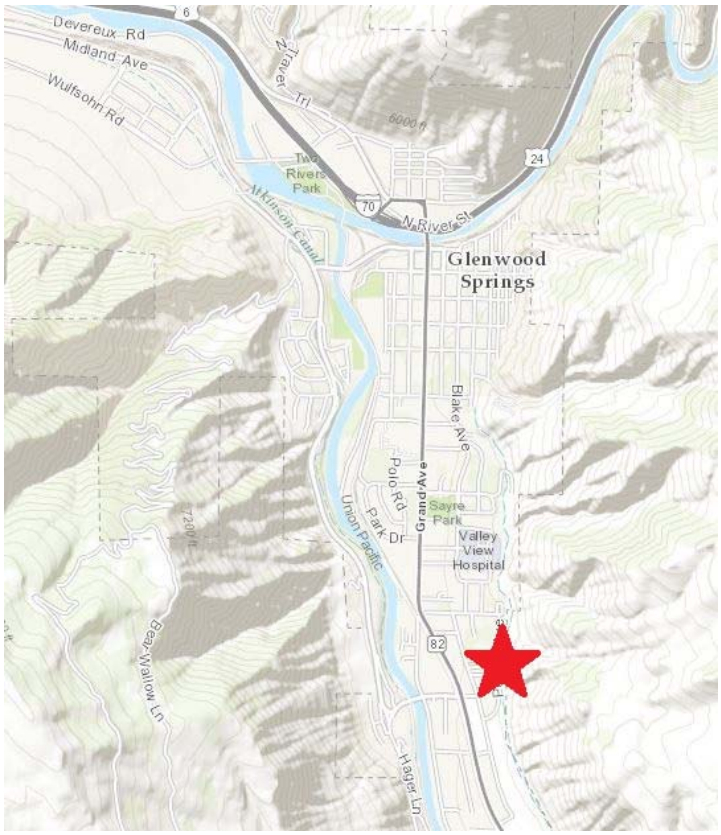
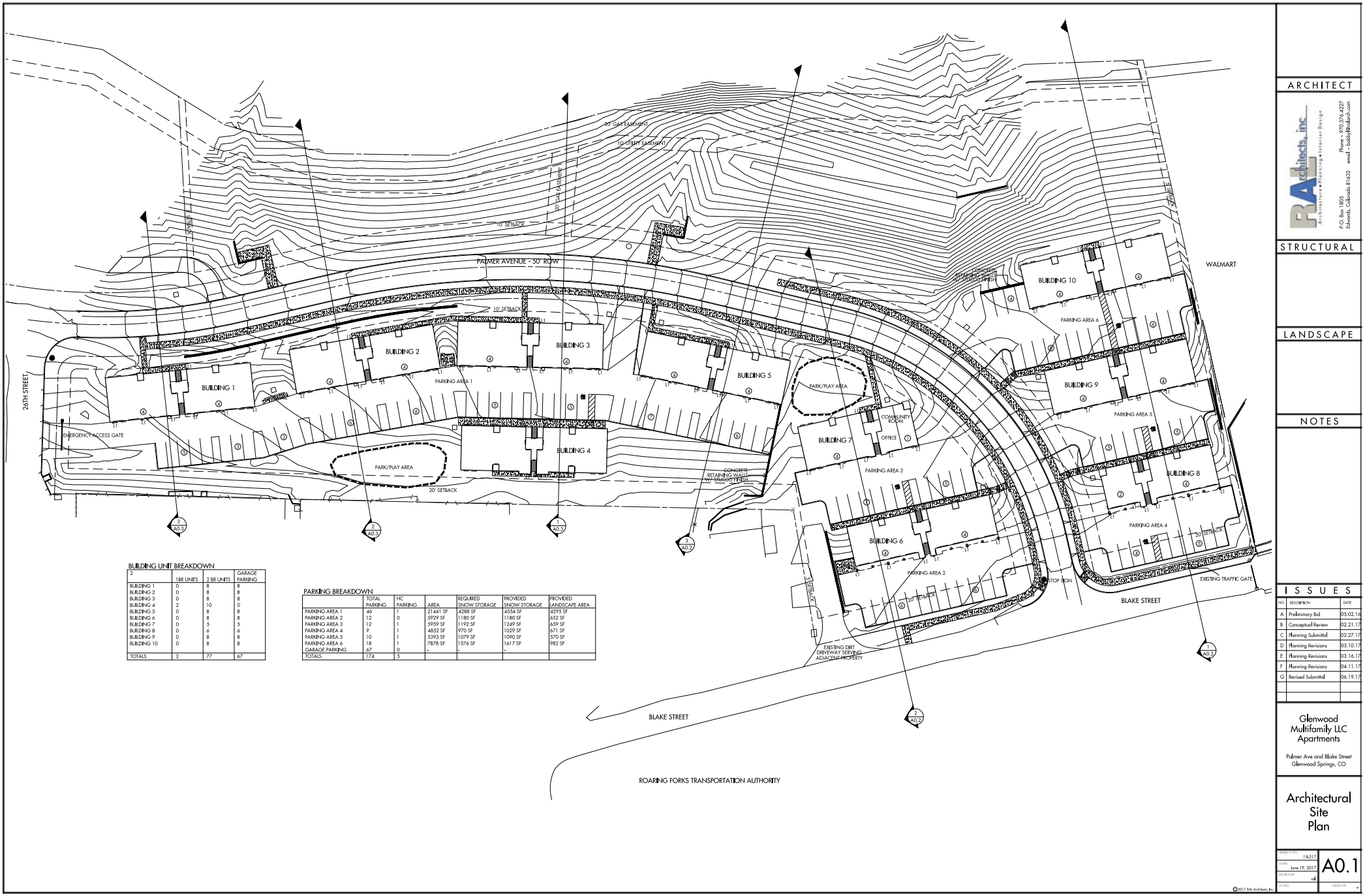


Figure 1: Area Map

Figure 2: Site Plan



BUILDING UNIT BREAKDOWN

2	1BR UNITS	2 BR UNITS	GARAGE PARKING
BUILDING 1	0	8	8
BUILDING 2	0	8	8
BUILDING 3	0	8	8
BUILDING 4	2	10	0
BUILDING 5	0	8	8
BUILDING 6	0	8	8
BUILDING 7	0	5	5
BUILDING 8	0	6	6
BUILDING 9	0	8	8
BUILDING 10	0	8	8
TOTALS	2	77	67

PARKING BREAKDOWN

	TOTAL PARKING	HC PARKING	AREA	REQUIRED SNOW STORAGE	PROVIDED SNOW STORAGE	PROVIDED LANDSCAPE AREA
PARKING AREA 1	46	1	21441 SF	4288 SF	4554 SF	4295 SF
PARKING AREA 2	12	0	5929 SF	1180 SF	1180 SF	652 SF
PARKING AREA 3	12	1	5959 SF	1192 SF	1249 SF	659 SF
PARKING AREA 4	9	1	4852 SF	970 SF	1029 SF	671 SF
PARKING AREA 5	10	1	5393 SF	1079 SF	1090 SF	570 SF
PARKING AREA 6	18	1	7878 SF	1576 SF	1617 SF	982 SF
GARAGE PARKING	67	0	-	-	-	
TOTALS	174	5				

ARCHITECT

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STRUCTURAL

LANDSCAPE

NOTES

ISSUES

NO.	DESCRIPTION	DATE
A	Preliminary Bid	05.02.16
B	Conceptual Review	02.21.17
C	Planning Submittal	02.27.17
D	Planning Revisions	03.10.17
E	Planning Revisions	03.16.17
F	Planning Revisions	04.11.17
G	Revised Submittal	06.19.17

Glenwood Multifamily LLC Apartments

Palmer Ave and Blake Street
Glenwood Springs, CO

Architectural Site Plan

PROJECT NO. 15-217
DATE: June 19, 2017
DRAWN BY: rd
CHECKED BY:
SHEET NO. A0.1

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2.0 Existing Conditions

2.1 Description of Existing Transportation System

SH 82 (South Glen Avenue): SH 82 is a State Highway that connects Interstate 70 at Glenwood Springs to US 24 south of Leadville. This major regional route is classified by the State as Access Category NR-B, Non-Rural Arterial, in the vicinity of the project. While SH 82 is generally considered an east/west highway, the alignment in this area is more north/south in nature. The posted speed limit is 35mph south of 23rd Street and 25mph north of 23rd Street. SH 82 is a four-lane facility from Glenwood Springs to just north of the City of Aspen.

23rd Street / South Grand Avenue: 23rd Street is a two-lane collector that provides access to residential development to the east of SH 82. The posted speed on 23rd Street is 25mph. 23rd Street is located approximately 0.3 miles north of 27th Street and 0.2 miles south of 20th Street.

South Grand Avenue is a two-lane collector that provides access to residential and commercial development to the west, parallel to SH 82. The posted speed on South Grand Avenue is 25mph. South Grand Avenue begins at the intersection of SH 82 / 23rd Street / South Grand Avenue and connects to 27th Street on the south.

The intersection of 23rd Street / South Grand Avenue and SH 82 is signalized.

27th Street: 27th Street is a two-lane collector roadway that connects SH 82 to Blake Avenue to the east and SH 82 to Midland Avenue to the west. The posted speed limit on 27th Street is 25 mph. 27th Street accesses local businesses and residential neighborhoods on both sides of SH 82 including a RFTA transit station just east of SH 82.

The intersection of 27th Street and SH 82 is signalized.

Palmer Avenue: Palmer Avenue is a local access road that will provide access to the project from 26th Street and Blake Avenue.

Blake Avenue: Blake Avenue is a local access road that begins at 7th Street and connects to SH 82 at the Roaring Fork Marketplace. Just south of the project the road is gated, restricting direct access to the Roaring Fork Marketplace. Blake Avenue serves residential and local businesses. The posted speed limit of Blake Avenue is 25mph south of 27th Street and 15mph north of 27th Street.

2.2 Traffic Data Collection

The original Transportation Impact Study used traffic data from October 2016. CDOT required updated current traffic data collection. Traffic data was collected at the following intersections on Wednesday, January 16 and Thursday, January 17, 2019.

- State Highway 82 / 23rd Street / South Grand Avenue
- State Highway 82 / 27th Street
- State Highway 82 / Blake Avenue (Roaring Fork Marketplace)
- 23rd Street / Blake Avenue
- 23rd Street / Palmer Avenue
- 26th Street / Blake Avenue
- 27th Street / Blake Avenue

Turning movement counts were collected from 7:00 – 9:00am and 4:00 – 6:00pm. The weather was mostly clear with a few periods of rain. This data was taken after the Grand Avenue bridge construction was complete and before construction started on the 27th Street bridge.

2.3 Background Infrastructure Assumptions

The following background infrastructure assumptions have been made based on previous studies:

23rd Street: The *City of Glenwood Springs State Highway 82 Access Study*[4] anticipates that there will be realignment of South Grand Avenue to create a more perpendicular intersection and improve safety for vehicles and trail users. It is not anticipated that the realignment would change the lane configuration of the intersection.

27th Street: The west leg of this intersection was recently reconstructed to include a left turn lane, shared left turn and through lane, and a separate right turn lane. Modeling reflects this recent modification.

SH 82 Signals: CDOT implemented adaptive signal coordination on the SH 82 corridor prior to the 2017-2018 construction of the new Grand Avenue Bridge at the Colorado River.

Per July 2017 conversations with CDOT Region 3 Traffic Operations staff, the adaptive signal controllers are anticipated optimize traffic flow on SH 82. This has the possibility to decrease the necessary green time for mainline SH 82, thus allowing for more time for side street traffic. CDOT will be analyzing the data from the new adaptive controllers and determining the impacts.

Per January 2019 conversations with CDOT Region 3 Traffic Operations staff, a new timing plan for the corridor has not been implemented. Therefore, the previous 2017 signal timing is used in the study analysis.

Blake Street: The City of Glenwood Springs staff requested an alternative analysis to evaluate the impact of opening the existing gate on Blake Avenue, north of Walmart. CDOT feels that from a traffic operations perspective, it is beneficial to provide the off-system interconnectivity, keeping some of the local traffic off the highway.

The City of Glenwood Springs' staff requested an alternative analysis to evaluate a one-way southbound Blake option. Some of the previous exhibits are included in the **Appendix** of the report. Please note that these exhibits were completed in February 2018 for a City Council presentation. These exhibits were based upon the previous set of traffic counts.

2.4 Background Traffic Growth

SH 82 Forecasting:

The City of Glenwood Springs and CDOT completed the *City of Glenwood Springs State Highway 82 Access Study*[4] in September 2013. The Study provides Year 2032 traffic volume projections for the SH 82 corridor including the intersections of SH 82 / 23rd / South Grand Avenue, SH 82 / 27th Street, and SH 82 / Blake Avenue. The *Access Control Plan* recommends a background traffic growth rate of 2%. This growth rate was used for all traffic forecasts. The methodology for traffic forecasting was reviewed with CDOT and City of Glenwood Springs staff. Refer to correspondence in the **Appendix**.

The model data used in this analysis can be seen in the **Appendix**. The resulting projected Year 2019 and Year 2040 background traffic volumes can be seen in **Figure 3** and **Figure 4**, respectively.

Seasonal Adjustment Factor:

Historic data from CDOT's Automated Traffic Recorders (ATRs) on SH 82 at mile marker 2.3, near the south end of Glenwood Springs, were reviewed to determine a seasonal adjustment factor for each off-peak month that counts were taken.

The AADTs by month were averaged over the past four years (January 2014 to February 2019) to determine the seasonal factors of SH 82 traffic. The seasonal adjustment factor was 1.20 to adjust January data to July peak volumes. Data for this derivation can be found in the **Appendix** of the report.

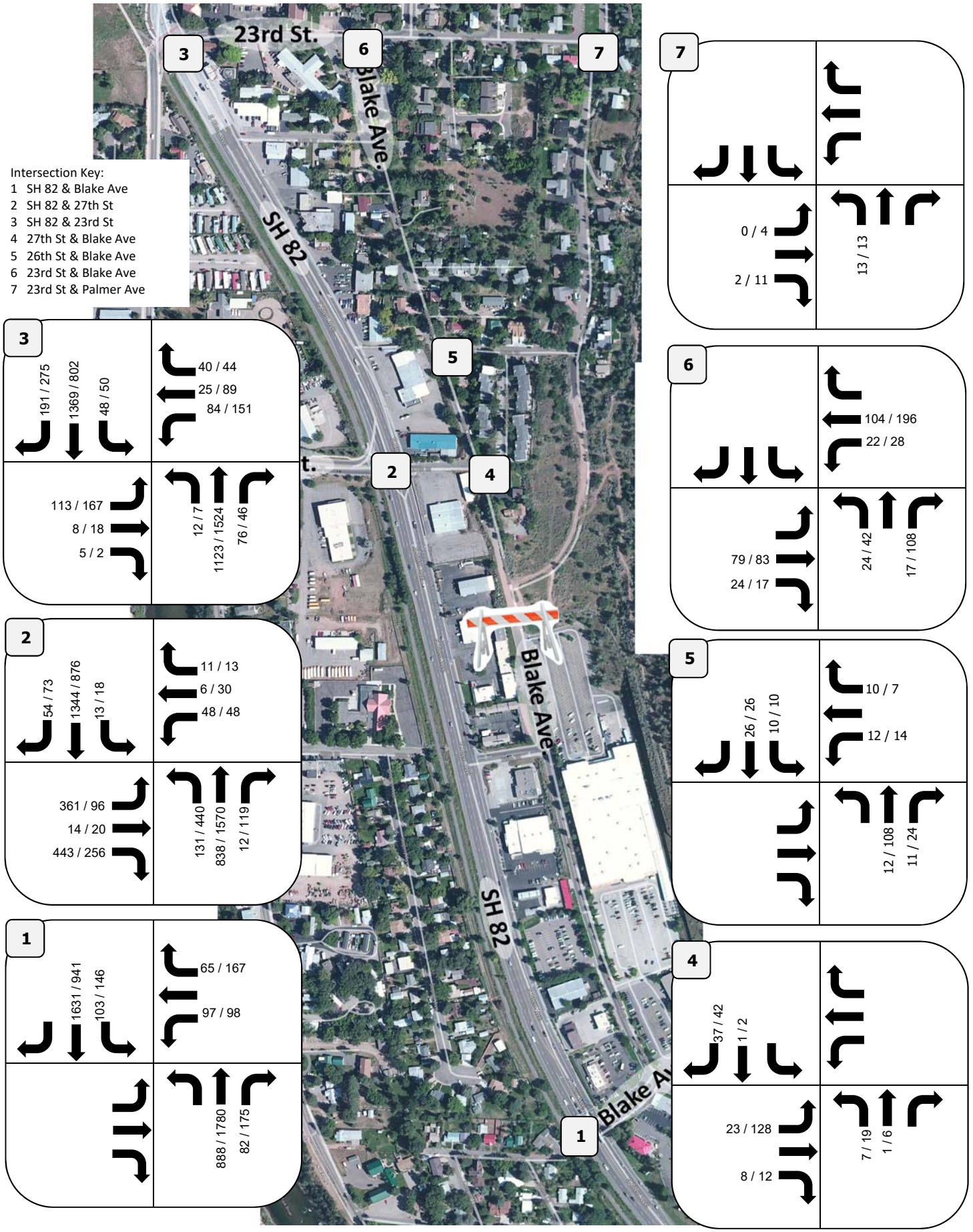
Existing Land Use:

The project site is currently vacant with no traffic activity.

Year 2019 and 2040 Background Traffic Forecasts:

The resulting Year 2019, seasonally-adjusted background traffic volumes can be found in **Figure 3**. Year 2040 background traffic volumes can be found in **Figure 4**.

Figure 3: Year 2019 Background Traffic - Blake Ave. Gate Remains Closed



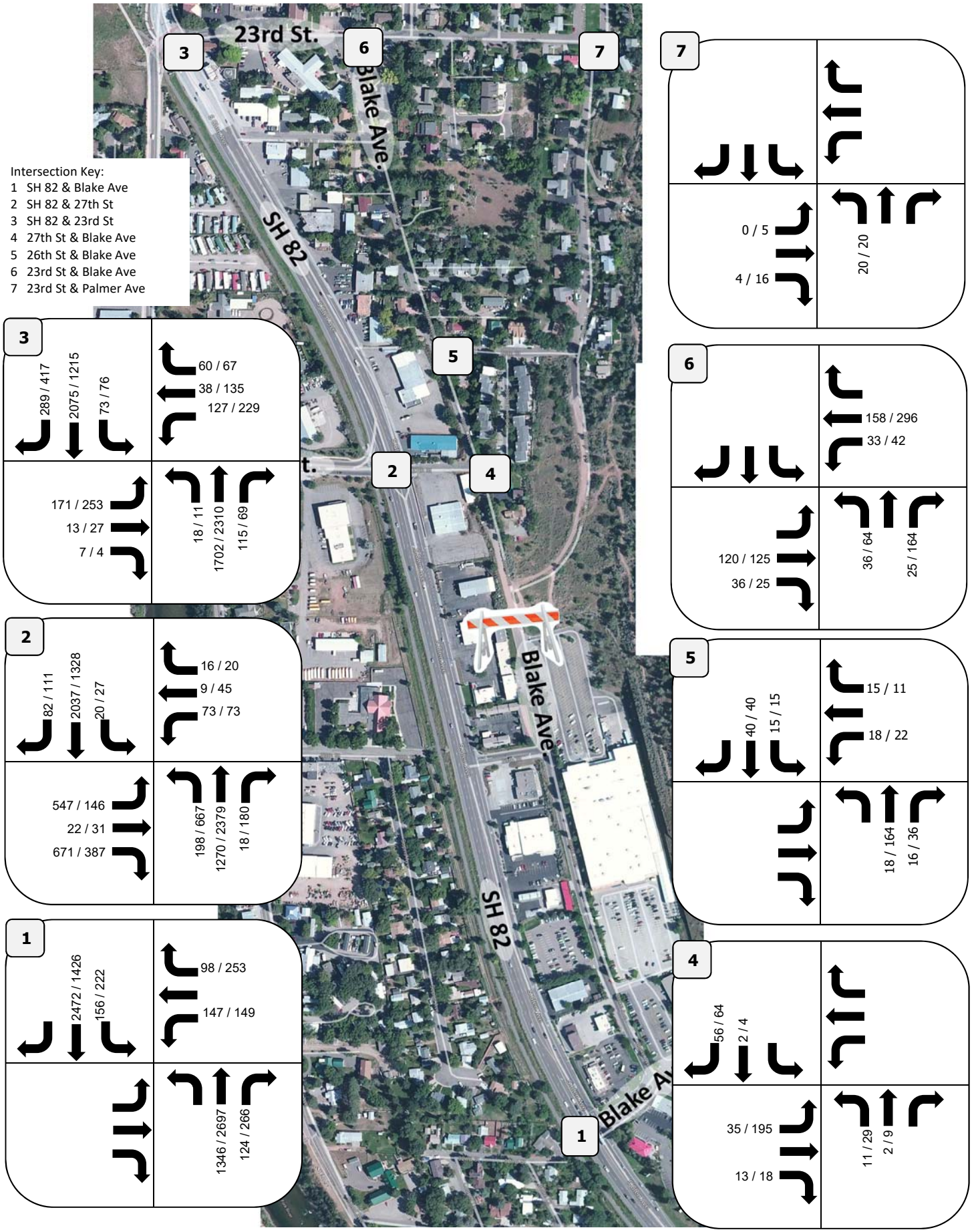
Project Number: 1247
Prepared By: KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX veh

April 9, 2019

Figure 4: Year 2040 Background Traffic - Blake Ave. Gate Remains Closed



Project Number: 1247
Prepared By: KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX veh

April 9, 2019

2.5 Year 2019 and 2040 Background Traffic Capacity Analysis

Intersection Level of Service: Using *Highway Capacity Manual 2010* (HCM) methodology, Synchro Version 8 software was used to determine the delay and Level-of-Service (LOS) at the following study area intersections:

- SH 82 & Blake Ave.
- SH 82 & 27th St.
- SH 82 & 23rd St.
- 27th St. & Blake Ave.
- 26th St. & Blake Ave.
- 23rd St. & Blake Ave.
- 23rd St. & Palmer Ave.

HCM LOS is defined by the following criteria:

Table 1: HCM 2010 Level-of-Service Criteria

LOS	Expected Delay to Minor Street Traffic	Average Signal Delay (seconds/vehicle)	Average Stop-Controlled Delay (seconds/vehicle)
A	Little or no delay.	0-10	0-10
B	Short traffic delays.	>10-20	>10-15
C	Average traffic delays.	>20-35	>15-25
D	Long traffic delays.	>35-55	>25-35
E	Very long traffic delays.	>55-80	>35-50
F	When volume exceeds the capacity of the lane extreme delays will be encountered with queuing that may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improving the intersection.	>80	>50

The following **Table 2** shows the resulting LOS under background conditions as determined by the HCM analysis:

Table 2: Background Traffic Level of Service and Queues

Intersection	Traffic Control	Approach	Year 2019 HCM Level of Service (Delay in Seconds) AM	Year 2019 HCM Level of Service (Delay in Seconds) PM	Year 2019 95th Percentile Queue (Feet) AM	Year 2019 95th Percentile Queue (Feet) PM	Year 2040 HCM Level of Service (Delay in Seconds) AM	Year 2040 HCM Level of Service (Delay in Seconds) PM	Year 2040 95th Percentile Queue (Feet) AM	Year 2040 95th Percentile Queue (Feet) PM
#1 - SH 82 & Blake Ave.	Signal	NB	A (5.7)	B (18.5)	221	767	A (9.9)	F (217.0)	453	1316
		SB	B (12.3)	B (13.7)	651	286	B (16.9)	A (8.7)	707	292
		WB	E (76.5)	C (21.5)	168	80	E (71.8)	C (22.9)	242	126
#2 - SH 82 & 27th St.	Signal	NB	C (23.4)	E (72.0)	177	742	D (38.4)	F (363.4)	791	732
		SB	C (31.0)	C (30.7)	259	284	F (118.9)	F (140.5)	1714	605
		EB	F (809.1)	C (32.2)	600	106	F (1442.3)	E (78.8)	1006	188
		WB	E (75.5)	D (35.7)	84	48	E (79.8)	D (42.9)	122	82
#3 - SH 82 & 23rd St.	Signal	NB	A (9.1)	B (18.4)	277	220	C (28.4)	F (102.7)	497	200
		SB	B (11.8)	A (6.5)	604	147	C (22.9)	A (7.0)	1359	265
		EB	E (62.4)	D (48.5)	161	141	F (82.5)	F (198.4)	252	295
		WB	D (49.1)	D (45.2)	100	161	E (60.6)	F (123.7)	163	265
#4 - 27th St. & Blake Ave.	Stop	NB	A (9.3)	B (11.8)	1	4	A (9.9)	C (16.6)	7	30
		SB	A (8.5)	A (8.6)	3	4	A (9.4)	B (13.1)	10	24
		EB	A (5.4)	A (6.8)	1	7	A (4.8)	A (6.9)	1	10
#5 - 26th St. & Blake Ave.	Stop	NB	A (0.0)	A (0.0)	0	0	A (0.0)	A (0.0)	0	0
		SB	A (2.1)	A (2.1)	1	1	A (2.2)	A (2.2)	1	1
		WB	A (8.7)	A (9.4)	2	2	A (9.2)	B (10.1)	4	4
#6 - 23rd St. & Blake Ave.	Stop	NB	A (9.8)	B (10.4)	4	18	B (10.8)	B (12.7)	8	39
		EB	A (0.0)	A (0.0)	0	0	A (0.0)	A (0.0)	0	0
		WB	A (1.4)	A (1.0)	1	2	A (1.5)	A (1.2)	2	2
#7 - Blake Ave. & Palmer Ave.	Stop	NB	A (8.6)	A (9.3)	1	1	A (8.6)	A (8.7)	2	2
		SB	A (0.0)	A (8.5)	0	3	A (0)	A (0)	0	0
		EB	A (0.0)	A (5.4)	0	1	A (0)	A (1.7)	0	0

SH 82 / Blake Avenue: As can be seen in **Table 2**, this intersection currently has excessive delays on the side street. Delay is anticipated to increase through Year 2040 background traffic conditions. This is partially due to the 120 seconds of the 160 second cycle length being allocated to SH 82 movements.

SH 82 / 27th Street: As can be seen in **Table 2**, this intersection currently has excessive delays on the side street. Delay is anticipated to increase through Year 2040

background traffic conditions. This is partially due to the 120 seconds of the 160 second cycle length being allocated to SH 82 movements. The observed and modeled southbound queues are excessing in the morning peak hour. The City and/or CDOT may consider re-striping the southbound left turn lane to the north. Cars are currently backing into the existing two-way, left turn lane.

SH 82 / 23rd Street/ South Grand Avenue: As can be seen in **Table 2**, this intersection currently has excessive delays on the side street. Delay is anticipated to increase through Year 2040 background traffic conditions. This is partially due to the 120 seconds of the 160 second cycle length being allocated to SH 82 movements.

27th / Blake Avenue: As can be seen in **Table 2**, this intersection is anticipated to operate at an acceptable LOS through Years 2019 and 2040 based on background traffic forecasts. This is true whether the Blake Avenue gate remains closed or is opened to through traffic to the Roaring Fork Marketplace.

26th / Blake Avenue: As can be seen in **Table 2**, this intersection is anticipated to operate at an acceptable LOS through Years 2019 and 2040 based on background traffic forecasts. This is true whether the Blake Avenue gate remains closed or is opened to through traffic to the Roaring Fork Marketplace.

23rd / Blake Avenue: As can be seen in **Table 2**, this intersection is anticipated to operate at an acceptable LOS through Years 2019 and 2040 based on background traffic forecasts. This is true whether the Blake Avenue gate remains closed or is opened to through traffic to the Roaring Fork Marketplace.

23rd / Palmer Avenue: As can be seen in **Table 2**, this intersection is anticipated to operate at an acceptable LOS through Years 2019 and 2040 based on background traffic forecasts.

3.0 Project Traffic

3.1 Trip Generation for Proposed Land Use

The applicant is proposing a new, 79-unit, rental apartment complex located on Palmer Avenue between 26th Street and Blake Avenue in Glenwood Springs, Colorado.

The anticipated traffic generation for this project was calculated using the Institute of Transportation Engineers' (ITE's) 9*th Edition of the Trip Generation Manual.* The national standard rates were applied to the size/number of each use to determine the average weekday and morning/evening peak hour traffic volumes.

The trip generation calculations in **Table 3** summarize the anticipated traffic volumes that will be generated by the development.

Multi-Modal Trip Reduction

Due to the project location and proximity to transit, a 10 percent multi-modal reduction was applied to site generated trips. The 10% Multi-Modal Trip Reduction is believed to be justified conservative estimate.

Project Trip Generation

Based upon the applicant's proposed land uses, the site is anticipated to generate 543 vehicle trips per day. This includes 43 trips during the morning peak hour and 57 trips during the evening peak hour.

Internal Capture

The number of residents accessing the adjacent commercial area to the south may be 5-10% of the site traffic during the morning and evening peak hours. With the gate closed, residents will likely walk along Blake Avenue or drive on SH 82. With the gate open, residents will likely walk or drive Blake Avenue to access the retail and restaurants to the south. This equates to approximately 3-6vph per hour. This nominal reduction will not impact our traffic impact analysis and recommendations.

Project Number: M1247
Prepared By: KJS
Date: 12/27/2016
Revised: 7/9/2017

Table 3: Project Trip Generation
Bell Rippy Apartments
Glenwood Springs, Colorado
Estimated Project-Generated Traffic[1]

					Average Weekday	Morning Peak Hour[2]				Evening Peak Hour[3]			
						Inbound		Outbound		Inbound		Outbound	
ITE Code	Units	AM Peak Hour	PM Peak Hour	Avg. Weekday	Trips (vpd)	% Trips	Trips	% Trips	Trips	% Trips	Trips	% Trips	Trips
Residential													
#220, Apartment	79 DU	Regression Equation			603	29%	14	71%	33	61%	39	39%	25
Multi-Modal Trip Reduction	-10%				-60		-1		-3		-4		-3
Total Project Generated Traffic					**543**		**13**		**30**		**35**		**22**

[1] Values obtained from *Trip Generation, 9th Edition,* Institute of Transportation Engineers, 2012.
[2] AM Peak Hour of Generator - T = 0.54(X) + 2.45
[3] PM Peak Hour of Generator - T = 0.60(X) + 14.91

3.1 Trip Distribution

The anticipated directional distribution of the project-generated traffic is largely based upon the locations of employment, schools, and commercial centers that will be utilized by residents of the proposed apartment complex. Therefore, the project's directional distribution is anticipated to be:

- 30% of site traffic will come from/head to the north.
- 60% of site traffic will come from/head to the south.
- 10% of site traffic will come from/head to the west.

The anticipated directional distribution of project-generated traffic is depicted in **Figure 5**. **Figure 6** depicts the anticipated directional distribution is the Blake Street gate is opened.

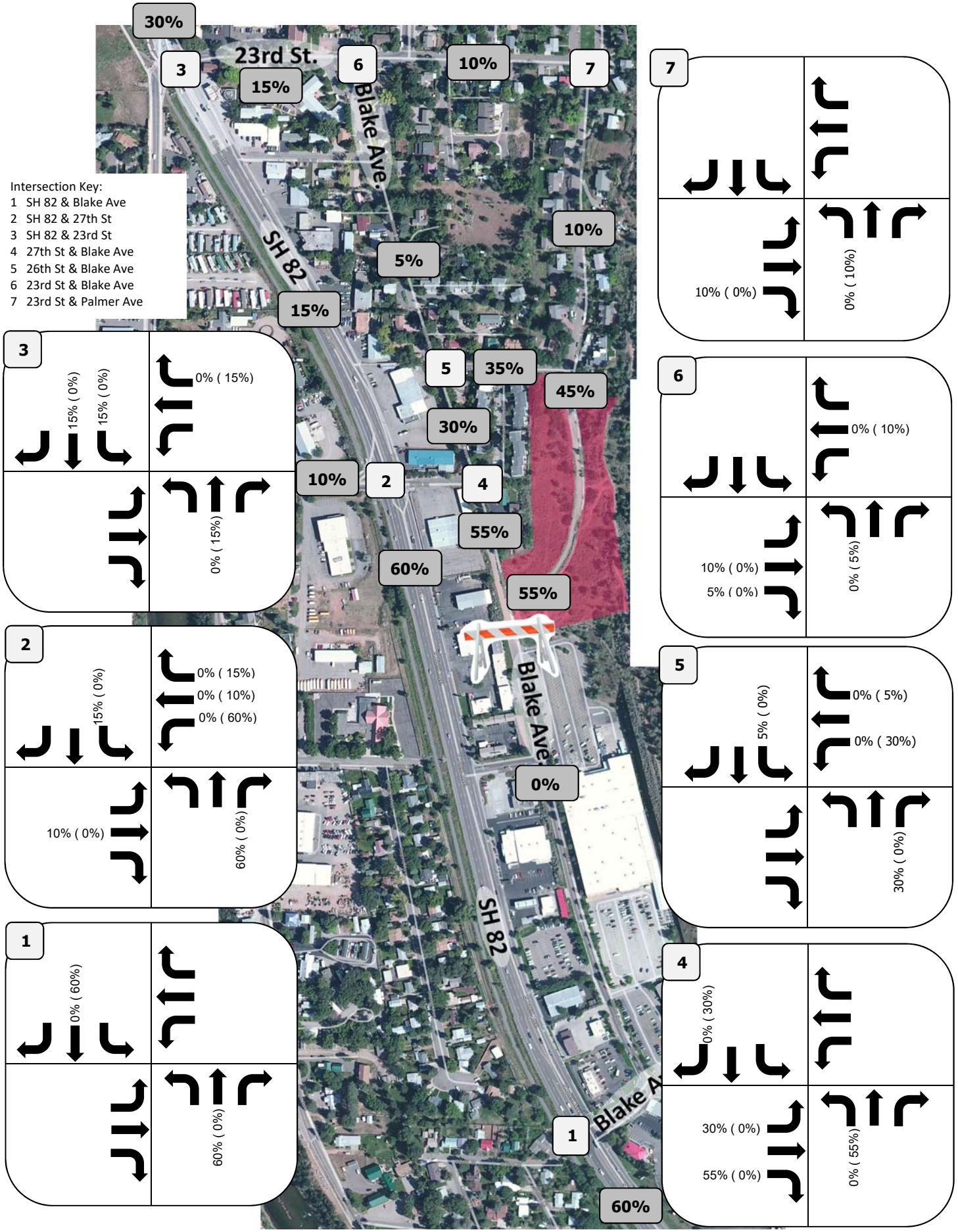
3.2 Traffic Assignment and Total Traffic

When the trip generation expected for this site is applied to the estimated trip distribution, the result is the anticipated assignment of trips on the roadway system. **Figure 7** depicts the new vehicle trips that are anticipated from the proposed Glenwood Multifamily Development project.

The Year 2019 total traffic with the Blake Avenue gate remaining closed is the sum of Year 2019 background traffic **(Figure 3)** with **Figure 7** and can be seen in **Figure 9.** Similarly, Year 2040 total traffic with the Blake Avenue gate remaining closed is the sum of **Figure 4** with **Figure 7** and can be seen in **Figure 11.**

The City of Glenwood Springs has requested an alternative analysis to evaluate the impact of opening the Blake Avenue gate. The Year 2019 total traffic with the Blake Avenue gate open can be seen in **Figure 10.** Similarly, Year 2040 total traffic with the Blake Avenue gate remaining closed can be seen in **Figure 12.**

Figure 5: Directional Distribution of Project Traffic - Blake Ave. Gate Remains Closed

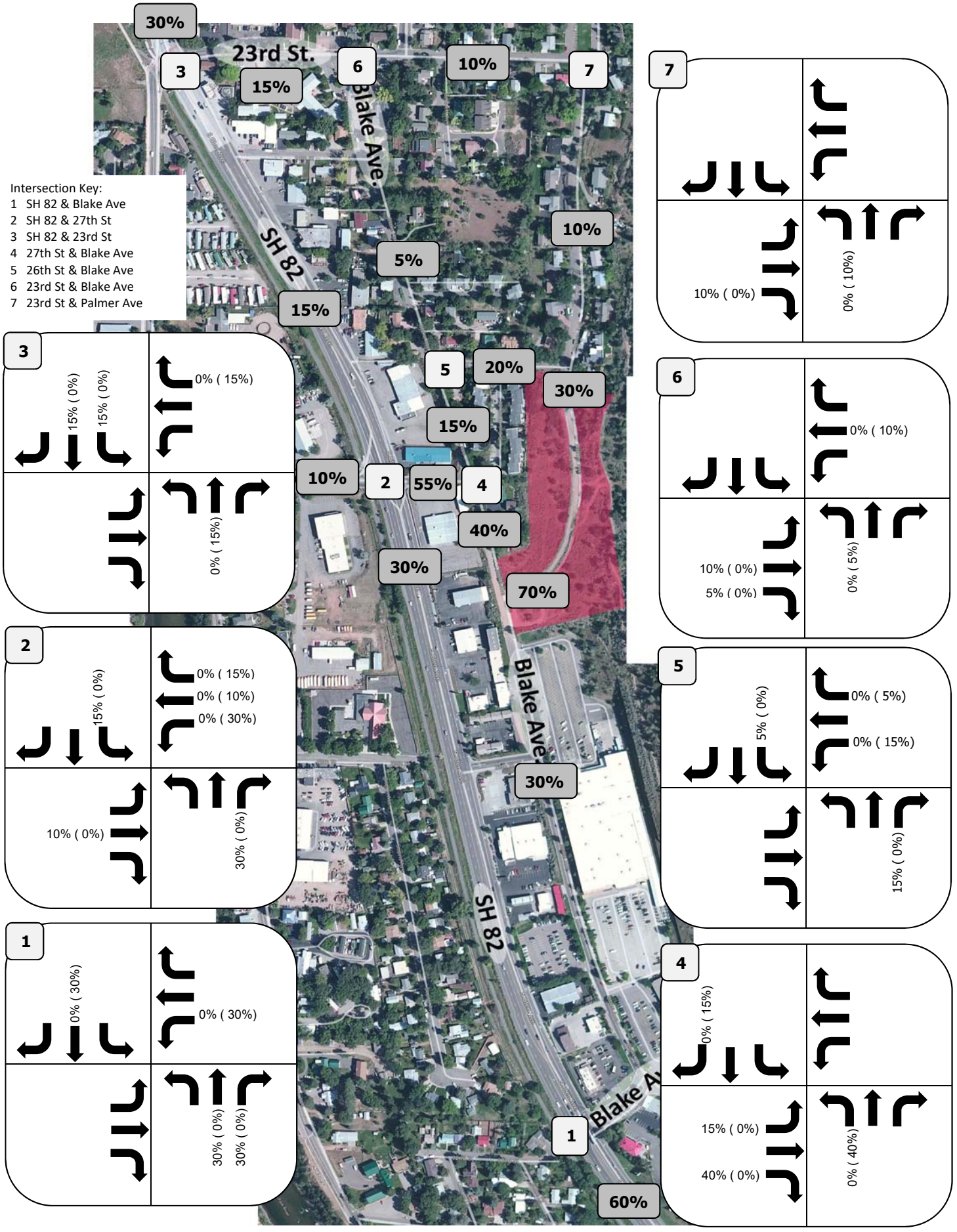


Project Number: 1247
Prepared By: KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND
INBOUND % (OUTBOUND %) = XX% (XX%)
DIRECTIONAL DISTRIBUTION

April 9, 2019

Figure 6: Directional Distribution of Project Traffic - Blake Ave. Gate is Opened

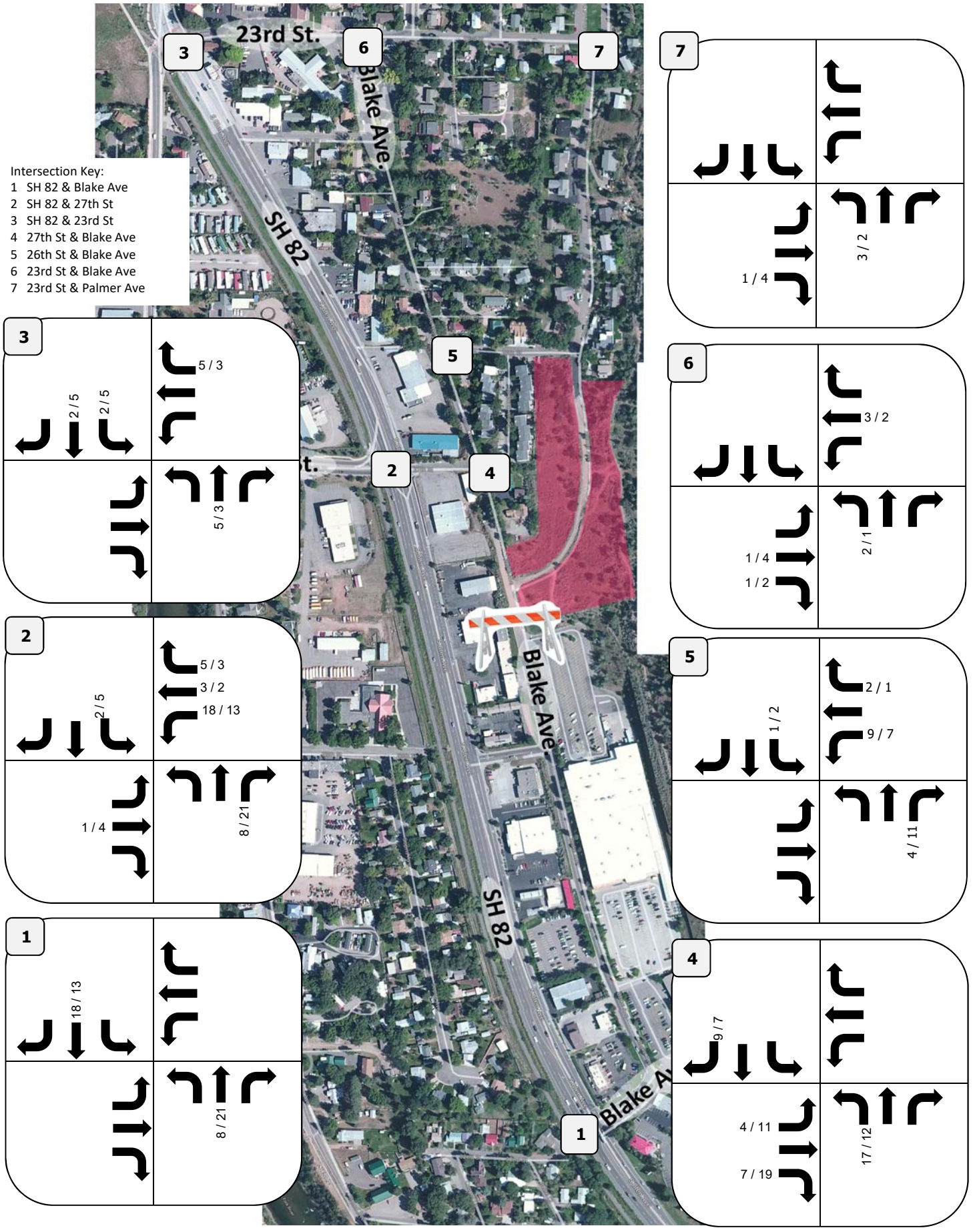


Project Number: 1247
Prepared By: KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND
INBOUND % (OUTBOUND %) = XX% (XX%)
DIRECTIONAL DISTRIBUTION

April 9, 2019

Figure 7: Project-Generated Traffic Assignment - Blake Ave. Gate Remains Closed



Project Number: 1247
Prepared By: KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XXvph

April 9, 2019

Figure 8: Project-Generated Traffic Assignment - Blake Ave. Gate is Opened

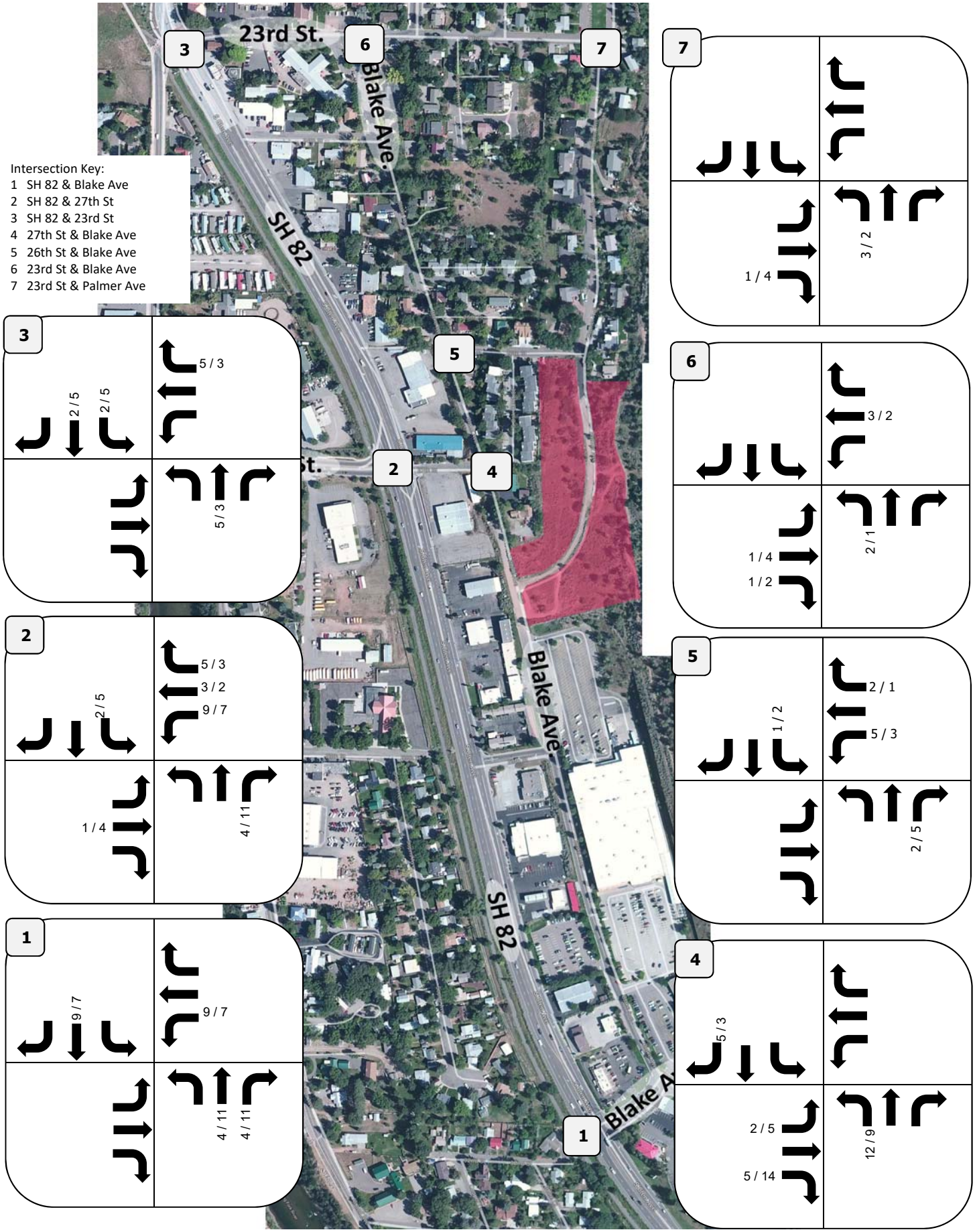


Figure 9: Year 2019 Total Traffic - Blake Ave. Gate Remains Closed

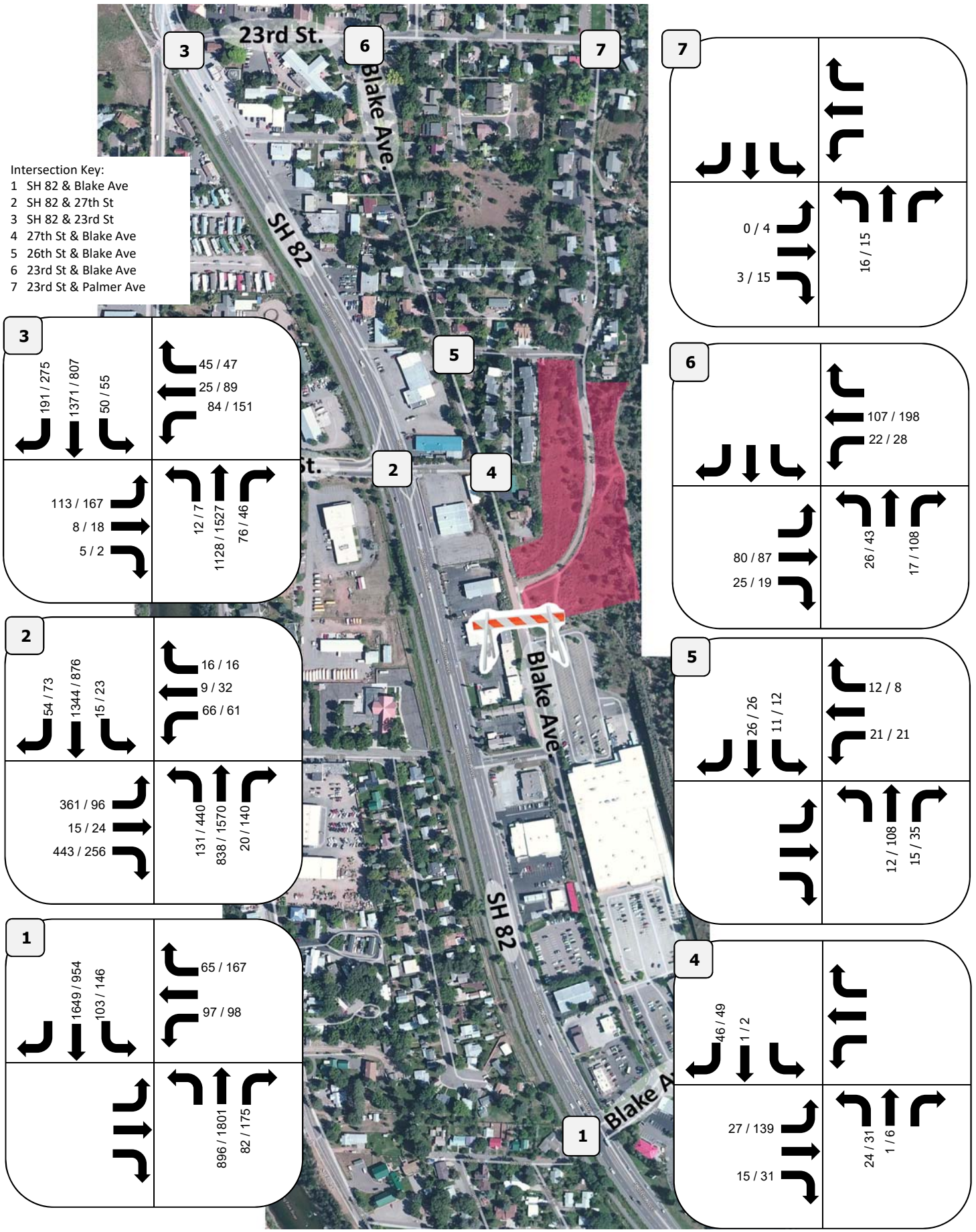
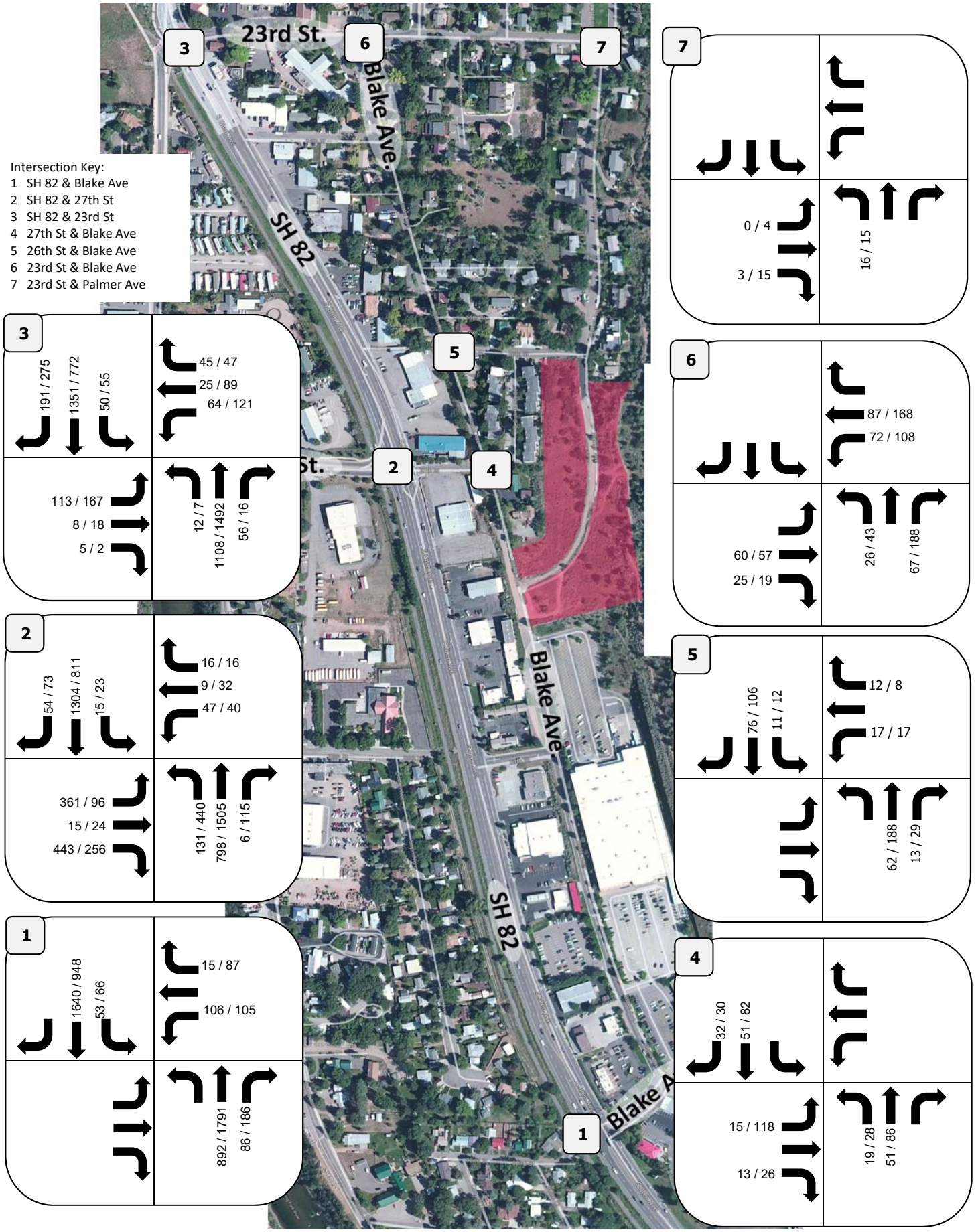


Figure 10: Year 2019 Total Traffic - Blake Ave. Gate is Opened



Project Number: 1247
Prepared By: KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX veh

April 9, 2019

Figure 11: Year 2040 Total Traffic - Blake Ave. Gate Remains Closed, Blake is Two-Way

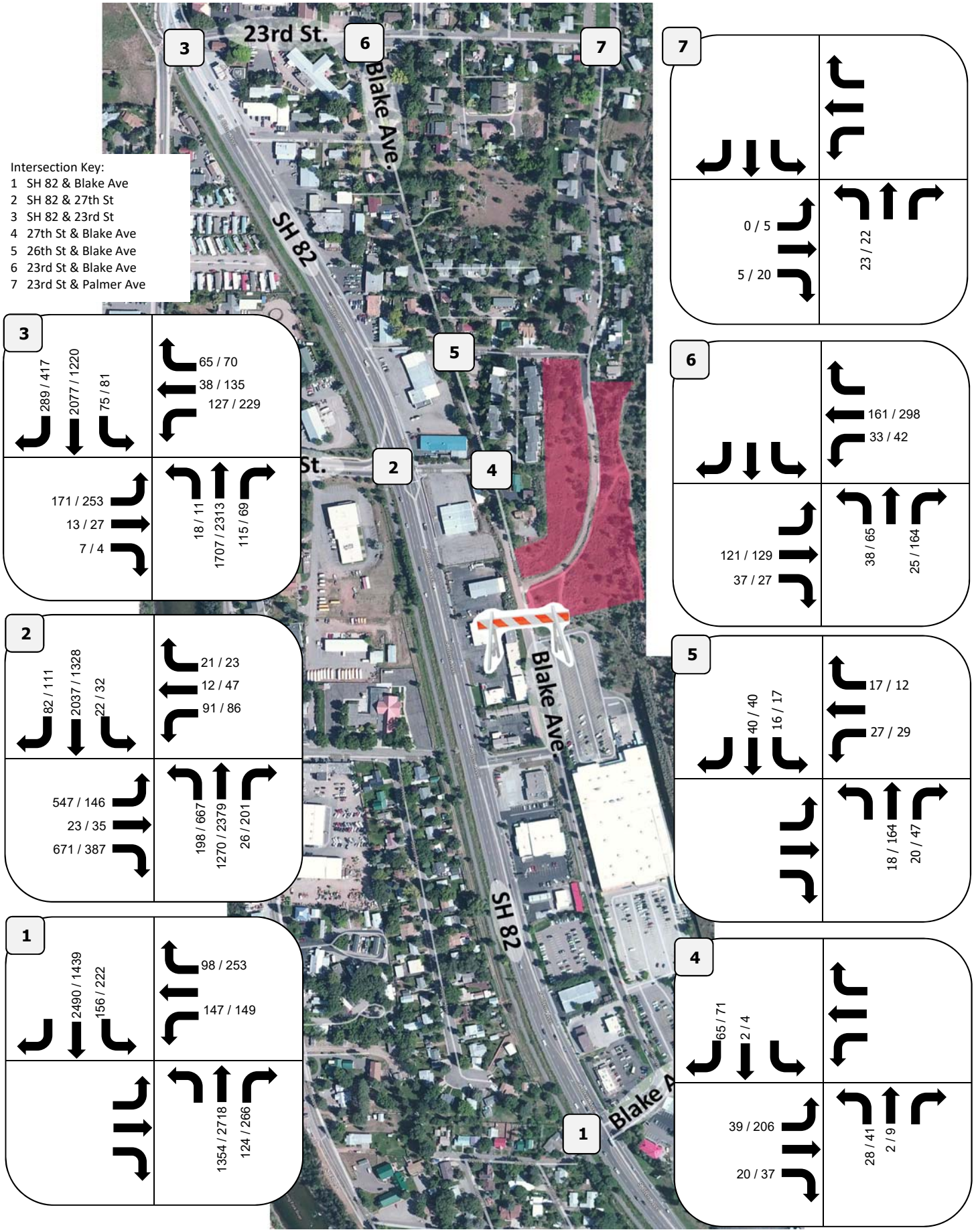
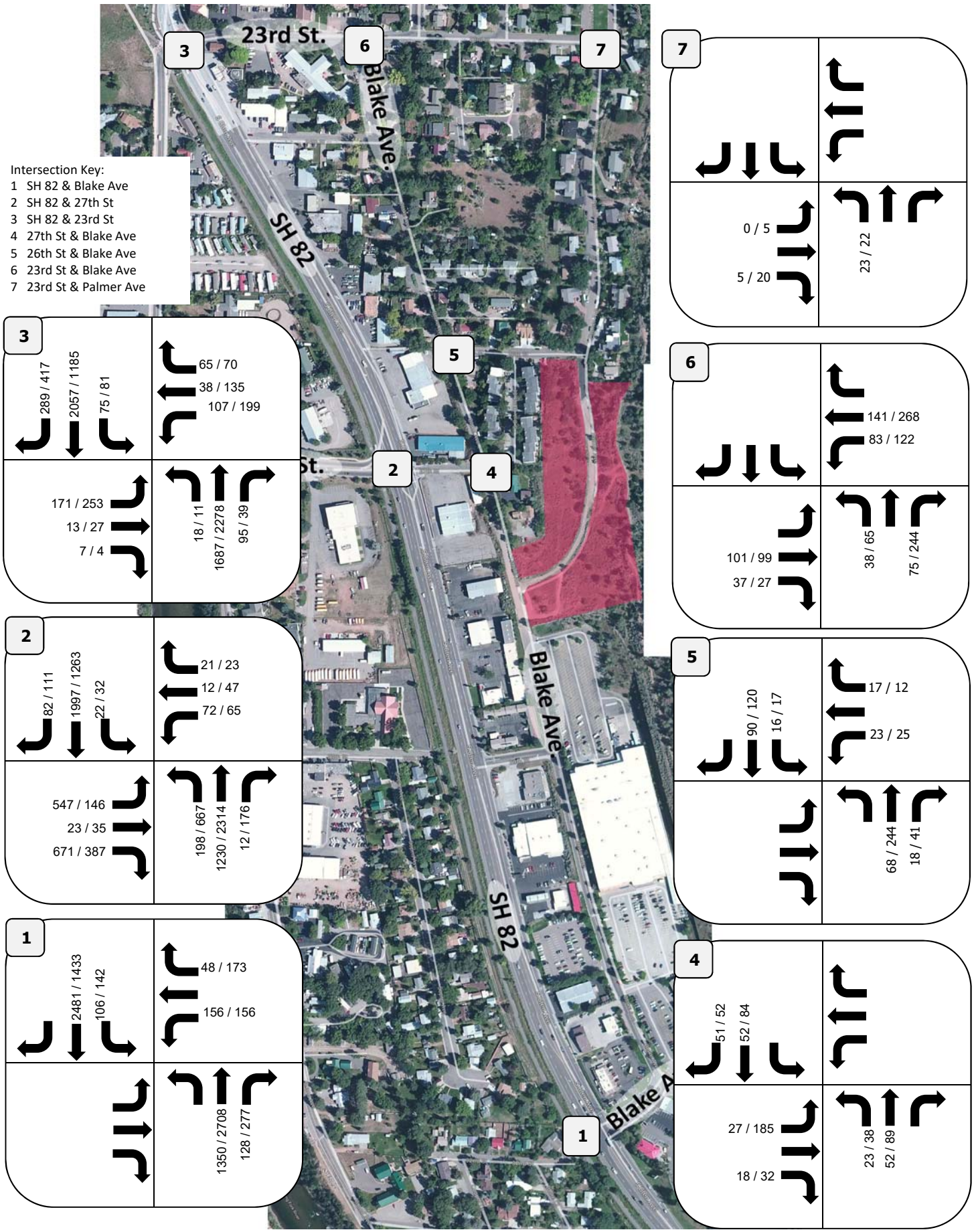


Figure 12: Year 2040 Total Traffic - Blake Ave. Gate is Opened



Project Number: 1247
Prepared By: McDowell Engineering, KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX veh

April 9, 2019

3.3 Year 2019 and Year 2040 Total Traffic Capacity Analysis

Intersection Level of Service: Using *Highway Capacity Manual 2010* (HCM) methodology, Synchro Version 8 software was used to determine the delay and Level-of-Service (LOS) at the at the study area intersections. **Table 4** on the following page shows the anticipated LOS and queues for Year 2019 and 2040 total traffic conditions.

SH 82 / Blake Avenue: As can be seen in **Table 4**, this intersection currently has excessive delays on the side street. Delay is anticipated to increase through Year 2040 background traffic conditions. This is partially due to the 120 seconds of the 160 second cycle length being allocated to SH 82 movements.

SH 82 / 27th Street: As can be seen in **Table 4**, this intersection currently has excessive delays on the side street. Delay is anticipated to increase through Year 2040 background traffic conditions. This is partially due to the 120 seconds of the 160 second cycle length being allocated to SH 82 movements.

With site-generated traffic the length of the southbound queue at this intersection can be anticipated to increase by two cars or fifty feet. The City and/or CDOT may consider re-striping the southbound left turn lane to the north to address this existing operational concern.

SH 82 / 23rd Street/ South Grand Avenue: As can be seen in **Table 4**, this intersection currently has excessive delays on the side street. Delay is anticipated to increase through Year 2040 background traffic conditions. This is partially due to the 120 seconds of the 160 second cycle length being allocated to SH 82 movements.

27th / Blake Avenue: As can be seen in **Table 4**, this intersection is anticipated to operate at an acceptable LOS through Years 2019 and 2040 based on background traffic forecasts. This is true whether the Blake Avenue gate remains closed or is opened to through traffic to the Roaring Fork Marketplace.

26th / Blake Avenue: As can be seen in **Table 4**, this intersection is anticipated to operate at an acceptable LOS through Years 2019 and 2040 based on background traffic forecasts. This is true whether the Blake Avenue gate remains closed or is opened to through traffic to the Roaring Fork Marketplace.

23rd / Blake Avenue: As can be seen in **Table 4**, this intersection is anticipated to operate at an acceptable LOS through Years 2019 and 2040 based on background traffic forecasts. This is true whether the Blake Avenue gate remains closed or is opened to through traffic to the Roaring Fork Marketplace.

23rd / Palmer Avenue: As can be seen in **Table 4**, this intersection is anticipated to operate at an acceptable LOS through Years 2019 and 2040 based on background traffic forecasts.

Table 4: Total Traffic Level of Service

Intersection	Traffic Control	Approach	Year 2019 - Blake Ave. Gate Closed				Year 2019 - Blake Ave. Gate Open				Year 2040 - Blake Ave. Gate Closed				Year 2040 - Blake Ave. Gate Open			
			HCM Level of Service (Delay in Seconds)		95th Percentile Queue (Feet)		HCM Level of Service (Delay in Seconds)		95th Percentile Queue (Feet)		HCM Level of Service (Delay in Seconds)		95th Percentile Queue (Feet)		HCM Level of Service (Delay in Seconds)		95th Percentile Queue (Feet)	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
#1 - SH 82 & Blake Ave.	Signal	NB	A (6.3)	C (27.8)	232	781	A (5.9)	B (18.9)	222	775	B (11.9)	F (283.8)	533	1335	B (10.3)	F (224.1)	457	1329
		SB	B (13.8)	B (16.2)	722	281	B (12.8)	B (13.8)	653	288	B (18.6)	B (10.2)	672	297	B (17.7)	A (9.0)	724	300
		WB	E (57.0)	B (17.6)	168	80	E (78.1)	C (22.1)	181	84	E (59.3)	C (26.4)	242	124	E (73.2)	C (23.1)	257	131
#2 - SH 82 & 27th St.	Signal	NB	C (24.0)	F (83.1)	187	706	C (23.8)	E (74.6)	179	742	D (44.2)	F (506.0)	871	691	D (40.4)	F (393.1)	794	721
		SB	C (33.8)	C (33.4)	289	348	C (31.8)	C (30.7)	260	284	F (150.5)	F (165.3)	1764	646	F (125.8)	F (140.0)	1714	606
		EB	F (823.9)	D (37.8)	593	112	F (820.8)	D (36.1)	601	112	F (1469.0)	F (86.1)	1071	234	F (1454.0)	F (84.4)	1029	195
		WB	E (79.1)	D (44.5)	127	87	E (74.3)	D (36.7)	99	52	F (81.9)	E (63.8)	165	130	E (76.9)	D (46.1)	135	95
#3 - SH 82 & 23rd St.	Signal	NB	A (9.1)	B (16.1)	277	218	A (9.0)	B (16.7)	277	217	C (27.2)	F (121.5)	460	148	C (28.4)	F (140.8)	472	177
		SB	B (11.9)	A (6.0)	621	157	B (11.8)	A (6.2)	605	148	C (24.1)	A (7.3)	1389	279	C (23.3)	A (7.1)	1365	266
		EB	E (62.5)	E (64.2)	161	158	E (62.7)	D (50.2)	161	142	F (83.7)	F (198.4)	251	295	F (83.8)	F (198.4)	251	295
		WB	D (50.0)	D (50.3)	124	164	D (47.9)	D (50.5)	100	164	E (61.6)	F (134.4)	191	267	E (60.2)	F (125.8)	163	267
#4 - 27th St. & Blake Ave.	Stop	NB	A (9.6)	B (12.5)	3	6	A (9.8)	B (13.3)	8	21	B (10.2)	C (16.1)	3	12	B (10.2)	C (17.9)	9	36
		SB	A (8.5)	A (8.6)	4	4	A (9.4)	B (11.7)	8	17	A (8.6)	A (8.9)	5	7	A (9.5)	B (13.3)	10	25
		EB	A (4.7)	A (6.2)	1	8	A (3.9)	A (6.2)	1	6	A (4.9)	A (6.6)	2	12	A (4.4)	A (6.6)	1	11
#5 - 26th St. & Blake Ave.	Stop	NB	A (0.0)	A (0.0)	0	0	A (0.0)	A (0.0)	0	0	A (0.0)	A (0.0)	0	0	A (0.0)	A (0.0)	0	0
		SB	A (2.2)	A (2.4)	1	1	A (1.0)	A (0.9)	1	1	A (2.2)	A (2.4)	1	1	A (1.2)	A (1.1)	1	1
		WB	A (8.9)	A (9.6)	3	3	A (9.3)	B (10.5)	3	3	A (9.1)	B (10.2)	4	5	A (9.5)	B (11.4)	4	5
#6 - 24th St. & Blake Ave.	Stop	NB	A (9.8)	B (10.5)	5	19	A (9.8)	B (11.2)	10	32	B (10.9)	B (12.8)	8	40	B (10.9)	B (14.5)	15	64
		EB	A (0.0)	A (0.0)	0	0	A (0.0)	A (0.0)	0	0	A (0.0)	A (0.0)	0	0	A (0.0)	A (0.0)	0	0
		WB	A (1.4)	A (1.1)	1	2	A (3.6)	A (3.4)	4	6	A (1.5)	A (1.2)	2	3	A (3.2)	A (3.0)	5	8
#7 - Blake Ave. & Palmer Ave.	Stop	NB	A (8.6)	A (8.7)	1	1	A (8.6)	A (8.7)	1	1	A (8.6)	A (8.7)	2	2	A (8.6)	A (8.7)	2	2
		SB	A (0.0)	A (0.0)	0	0	A (0.0)	A (0.0)	0	0	A (0.0)	A (0.0)	0	0	A (0.0)	A (0.0)	0	0
		EB	A (0.0)	A (1.5)	0	0	A (0.0)	A (1.5)	0	0	A (0.0)	A (1.5)	0	0	A (0.0)	A (1.5)	0	0

4.0 Transportation Impact Analysis

4.1 State Highway Access Permits

Section 2.6(3) of the *State Highway Access Code* (*Access Code*) requires a new access permit when there is a new access, land use change, or the approach volume is anticipated to increase by more than twenty percent or safety issues have been identified.

SH 82 / Blake Avenue: If the Blake Avenue gate remains closed the project would add no peak hour trips to the SH 82 / Blake Avenue intersection.

If the Blake Avenue gate were to be opened it is anticipated that the project will add a total of 13 AM / 18 PM peak hour project generated trips to the east leg of the SH 82 / Blake Avenue intersection.

The Year 2019 background traffic for this leg is 347 AM / 454 PM peak hour trips. The project will add 3.6% AM / 3.8% PM to the westbound leg of the SH 80 / Blake Avenue intersection.

A new Access Permit will not be required for the SH 82 / Blake Avenue intersection because the increase in traffic volume is less than 20% and because safety issues have been identified.

SH 82 / 27th Street: The east leg of the intersection is currently permitted for 163 ADT per Access Permit #312051.

The project is anticipated to add a total of 24 AM / 32 PM peak hour trips to this leg resulting in an increase of 12.8% AM / 16.4% PM over the permitted volume.

A new State Highway Access Permit will not be required for the SH 82 / 27th Street intersection because the increase in traffic volume is less than 20% and because safety issues have been identified.

SH 82 / 23rd Street: The project will add a total of 7 AM / 8 PM peak hour trips to the east leg of the SH 82 and 23rd Street.

The Year 2019 background traffic for this leg is 281 AM / 398 PM peak hour trips. The project will add 2.4% AM / 2.0% PM to the east leg of the SH 82 / 23rd Street / South Grand Avenue intersection.

A new Access Permit will not be required for the SH 82 / 23rd Street / South Grand Avenue intersection because the increase in traffic volume is less than 20% and because safety issues have been identified.

4.2 State Highway Turn Lane Analysis

The *State Highway Access Code* establishes the need for auxiliary turn lanes. Several criteria apply when determining the traffic volume thresholds. SH 82 is a four-lane highway with a posted speed limit of 25-35mph in the vicinity of the proposed project site. It is classified by the Colorado Department of Transportation (CDOT) as an access category NR-B, non-rural arterial. Refer to **Table 5** for calculations of the required turn lane modifications and triggers.

Acceleration lanes are generally not used on low speed roadways.

SH 82 / Blake Avenue: The existing auxiliary turn lanes on SH 82 are sufficient for the anticipated Year 2040 traffic at this intersection. The turn lanes on Blake Avenue should be extended to accommodate the projected traffic volumes. However, the current shopping center configuration does not allow for these turn lanes to be extended due to the 90-degree bend and internal intersections. No infrastructure improvements are anticipated at this intersection.

SH 82 / 27th Street: Based upon the Year 2040 total traffic volumes, the existing turn lanes meet or exceed the requirements of the Access Code as shown in **Table 5.** However, the intersection is currently seeing peak hour queues that exceed the deceleration lane lengths. It is recommended that the City and CDOT review the impacts of the installation of the adaptive signals on SH 82. Without observed operational improvements, the northbound left turn lane will need to be extended to accommodate 800 feet of storage by Year 2040.

SH 82 / 23rd Street: Year 2019 background traffic conditions require the construction of a longer westbound left turn lane and a northbound right turn lane. Refer to **Table 5** for the geometric requirements.

Blake Avenue / 27th Street: Year 2019 background traffic conditions require the construction of an eastbound left turn lane and northbound left turn lane. Refer to **Table 5** for the geometric requirements.

4.3 Access Design Criteria

The proposed access shall be constructed per Section 4 of the *Access Code.* The City of Glenwood Springs design standards will also apply.

4.4 Recommended Design Vehicle for Site Access

Based upon the anticipated deliveries to the site, McDowell Engineering recommends the use of a WB-50 as the design vehicle for the site access.

Table 5: Auxiliary Turn Lane Requirements

Intersection	Movement	Roadway Classification	Posted Speed	Year 2019 Background		Year 2040 Total Traffic - Blake Gate Closed		Year 2040 Total Traffic - Blake Gate Open		*Access Code*[3] Threshold	Exsting Turn Lane	*Access Code*[3] Required Turn Lane (Based upon Blake Gate Open Scenario)[1,2]	Notes
			(mph)	AM	PM	AM	PM	AM	PM				
SH 82 / Blake Avenue**	WBL	Comm. Collector	25	97	98	147	149	156	156	>25vph	200' Total	156 'Storage +90' Taper	Limited by shopping center configuration
	WBR	Comm. Collector	25	65	167	98	253	48	173	>50vph	200' Total	173 'Storage +90' Taper	Limited by shopping center configuration
	NBR	NRB	35	82	175	124	266	128	277	>50vph	290' Storage + 120' Taper	277 'Storage +120' Taper	Existing Adequate
	SBL	NRB	35	103	146	156	222	106	142	>25vph	170' Storage + 150' Taper	142 'Storage +120' Taper	Existing Adequate
SH 82 /27th Street	WBL	Comm. Collector	25	48	48	91	86	72	65	>25vph	80' Storage + 90' Taper	65 'Storage +90' Taper	Existing Adequate
	WBR	Comm. Collector	25	11	13	21	23	21	23	>50vph	None	Not Required	Existing Adequate
	NBR	NRB	35	12	119	26	201	12	176	>50vph	270' Storage + 280' Shared Lane	176 'Storage +120' Taper	Existing Adequate
	SBL	NRB	35	13	18	22	32	22	32	>25vph	320' Storage + 220' Taper	41 'Storage +120' Taper	Existing Adequate
SH 82 / 23rd Street	WBL	Neighborhood Collector	25	84	151	127	229	107	199	>25vph	50' Storage + 90'+/- Taper	199 'Storage +90' Taper	Turn lane extension required by 2019 background
	WBR	Neighborhood Collector	25	40	44	65	70	65	70	>50vph	None	63 'Storage +90' Taper	Turn lane construction required by 2019 background
	NBR	NRB	35	76	46	115	69	95	39	>50vph	None	94 'Storage +120' Taper	Turn lane construction required by 2019 background
	SBL	NRB	25	48	50	75	81	75	81	>25vph	70' Storage + 95' Taper	77 'Storage +90' Taper	Existing Adequate
27th Street / Blake Avenue	EBL	Neighborhood Collector	25	23	128	39	206	27	185	>25vph	None	185 'Storage +90' Taper	Turn lane construction required by 2019 background
	EBR	Neighborhood Collector	25	8	12	20	37	18	32	>50vph	None	Not Required	Existing Adequate
	NBL	Neighborhood Collector	25	7	19	28	41	23	38	>25vph	None	43 'Storage +90' Taper	Turn lane construction required by 2040 background
	SBR	Neighborhood Collector	15	37	42	65	71	51	52	N/A	None	Not Required	Existing Adequate

[1]It is recommended that bay tapers (asymmetrical reverse curves) be used for deceleration transition tapers and that straight transition tapers be used for acceleration transition tapers. The taper length shall be calculated using CDOT SHAC Table 4-6 and be designed in accordance with CDOT SHAC

[2]SH 82 & Blake Ave volumes assume Blake Ave gate is open. If gate remains closed the project has no impact on the intersection.

5.0 Recommendations and Conclusions

The proposed Glenwood Multifamily Development Project is anticipated to be successfully accommodated into the greater roadway system.

Trip Generation:

The applicant is proposing to develop a 79-unit apartment project on Blocks 1 and 3 of the Oakhurst Subdivision located on Palmer Avenue in Glenwood Springs.

Based upon the applicant's proposed land uses, the site is anticipated to generate 543 vehicle trips per day. This includes 43 trips during the morning peak hour and 57 trips during the evening peak hour.

Intersection Level of Service:

Generally side street approaches to SH 82 will experience excessive delay through Year 2019 and Year 2040 primarily due to the current cycle length and signal timing.

CDOT has been considering adaptive signal coordination on the SH 82 corridor. Adaptive signal control technology adjusts the timing to accommodate changing traffic patterns and ease traffic congestion. Implementation of the adaptive signals should improve operations on the corridor.

State Highway Access Permits:

The proposed project will not require new State Highway Access Permits, as the project's anticipated increase in traffic on the east legs of SH 82 / 27th Street, SH 82 / 23rd Street, and SH 82 / Blake Avenue intersection will not exceed 20% and because safety issues have been identified.

Auxiliary Turn Lanes:

As described in **Section 4.2**, current Year 2019 background traffic volumes warrant the installation of additional auxiliary turn lanes at the following locations:

- SH 82 & 27th Street – With site-generated traffic the length of the southbound queue at this intersection can be anticipated to increase by two cars or fifty feet. The City and/or CDOT may consider re-striping the southbound left turn lane to the north to address this existing operational concern.

- SH 82 & 23rd Street – Year 2019 background traffic conditions require the construction of a longer westbound left turn lane and a northbound right turn lane.

- 27th Street & Blake Avenue - Year 2019 background traffic conditions require the construction of an eastbound left turn lane and northbound left turn lane.

Refer to **Table 5** for geometric requirements for these turn lanes. All of these improvements are needed with or without the construction of the proposed Glenwood Multifamily Development. In addition, new State Highway Access permits are not required for these intersections.

Side Street Delay Recommendations: Per conversations with CDOT Region 3 Traffic Operations staff, the adaptive signal controllers are anticipated optimize traffic flow on SH 82. This can decrease the necessary green time for mainline SH 82, thus allowing for more time for side street traffic. CDOT will be analyzing the data from the new adaptive controllers and determining the impacts.

6.0 Appendix

Reference Documents

1. OTIS Traffic Data. Colorado Department of Transportation. http://apps.coloradodot.info/dataaccess/
2. *Highway Capacity Manual.* Transportation Research Board, 2010.
3. *State Highway Access Code.* State of Colorado, 2002.
4. *City of Glenwood Springs State Highway 82 Access Study*. Stolfus & Associates, 2013.
5. *Trip Generation Manual*, *9th Edition*. Institute of Transportation Engineers, 2012.
6. *27th Street Bridge Study.* SGM, 2016.

Included Documents

1. Traffic Study Scoping Correspondence with CDOT
2. Traffic Counts
3. Seasonal Adjustment Factor Calculations
4. Alternative Analysis – One-Way Blake Southbound (February 2018 Analysis for Council)
5. HCM Reports
    a. SH 82 & Blake Ave.
    b. SH 82 & 27th St.
    c. SH 82 & 23rd St.
    d. 27th St. & Blake Ave.
    e. 26th St. & Blake Ave.
    f. 23rd St. & Blake Ave.
    g. 23rd St. & Palmer Ave.

April 9, 2019

City of Glenwood Springs
Terri Partch, City Engineer
101 W. 8th Street
Glenwood Springs, CO 81601

Glenwood Multifamily
Transportation Impact Study Revisions

McDowell Engineering has reviewed the comments from the City of Glenwood Springs' and CDOT staff. Per CDOT's request, we have collected new traffic data for the *Glenwood Multifamily Transportation Impact Study*. The new study dated April 11, 2019 incorporates the new data and the following revisions.

City of Glenwood Springs' Comments:

1. Page 3 -Study title refers to Winter Park.
   McDowell's Response: The revised study corrects this typo.

2. Page 7 – Second paragraph -This intersection is 23rd Street and South Grand Avenue. Please correct. Also, South Grand connects on the south end to 27th Street (last sentence in this section). Final sentence- This intersection is signalized.
   McDowell's Response: The revisions have been incorporated into the revised study.

3. Page 7 - Palmer Avenue section -Palmer Avenue connects from 26th Street to Blake .
   McDowell's Response: This revision has been incorporated into the revised study.

4. Page 9, Section 2.3 first paragraph – Grand should be re-labeled South Grand.
   McDowell's Response: This revision has been incorporated into the revised study.

5. Page 9, Section 2.3 third paragraph – I am not sure that the adaptive signal timing will represent an improvement for the City's side streets. My understanding is that these systems optimize on delay, which will favor the mainline, particularly as volume on the corridor increases.
   McDowell's Response: Several paragraphs have been added that detail our conversations with CDOT Region 3 Traffic Operations staff regarding the status of the adaptive controllers on SH 82.

6. Page 9, Section 2.4, first paragraph – This paragraph refers to Grand Avenue. It should be corrected to South Grand.
   McDowell's Response: This revision has been incorporated into the revised study.

7. Page 9, Section 2.4, fourth paragraph – The Access Control Plan recommends a background traffic growth rate of 2%. Please use this number for all projections.
   McDowell's Response: A growth rate of 2% has been applied to all movements of the study intersections per the City's request.

8. Page 10, Seasonal Adjustment Factor – Averaging this number over 10 years lowers the adjustment factor. Please reevaluate by month comparing October to July over the past four years.
   McDowell's Response: Per CDOT's requirement, McDowell collected new traffic data at the study intersections in January 2019. The seasonal adjustment factor was updated to use Year 2014 – 2019 data

to convert the January data to a July equivalent. The seasonal adjustment factor calculations are included in the Appendix.

9. Throughout the document you reference the completion of background infrastructure improvements in Section 2.4. No improvements are listed. Please revise, or if you are recommending certain improvements, please list them.
   McDowell's Response: A list of the assumed or recommended infrastructure improvements has been added to Section 2.4.

10. Your table labels and references are incorrect throughout the document. You have a Table 3, but no Table 1 or 2. I believe Table 3 should be Table 1, Trip Generation Calculations. Figure 11- Should be 2040 Total Traffic.
    McDowell's Response: The revised study updates all table references.

11. Figure 12 – Should be 2040 Total Traffic. Please revise/correct.
    McDowell's Response: The revised study updates all table references.

12. Page 27, Section 3.3, Table 4 – It appears that SH 82 NB fails in the pm peak hour under both a gate open and gate closed scenario. However, the gate open scenario has over 60s less delay.
    McDowell's Response: The gate open scenario does reduce some traffic volume on SH 82. Therefore, this observation makes sense at the Blake Avenue and 27th Street intersections.

13. Page 29, Section 4.1, paragraph 9 does not reference roads in Glenwood Springs.
    McDowell's Response: The revised study corrects this typo.

14. Page 30, SH 82/27th Street. I disagree with your conclusions based on the current intersection operations. The north bound left turn lane fails in the pm peak hour today. Queues extend into the north bound travel lanes and take several cycles to clear. Please reevaluate.
    McDowell's Response: Cars are currently backing into the existing two-way, left turn lane. With site-generated traffic the length of the southbound queue at this intersection can be anticipated to increase by two cars or fifty feet. The City and/or CDOT may consider re-striping the southbound left turn lane to the north to address this existing operational concern. This has been added to Section 2.5 and 3.3.

15. Overall – The study confirms poor levels of service on side streets at 23rd, 27th and Blake both in the existing condition and with the added traffic from development of the Bell Rippy parcel. I understand that most of this delay is related to the signal timing at each of these intersections, favoring the mainline. However, it does appear the project causes increasing delay in these intersections in the 2040 year. Please make recommendations to reduce delay on the side streets.
    McDowell's Response: CDOT is currently working on the adaptive signal timing for the SH 82corridor. The project will construct sidewalks and multimodal improvements that will encourage multimodal travel throughout the neighborhood.

16. There is a concern about changing the volume of people from the project using Blake gate to 0%. I don't have the model, but intuitively, 27th Street already functions at LOS E and is highly impacted by RFTA busses and traffic. The LOS at Blake and SH 82 is a D with a reduced delay of about 20 seconds. The queue is longer in the am peak, though. It doesn't seem like routing all project traffic to 27th street would be a true condition. Also it does conflict with the earlier reports. It would be good to see a revised report with the intersection LOS to verify.
    McDowell's Response: The directional distribution with the 1)gate open and 2)gate closed scenarios have been revised.

17. Figures 5 and 6: 30% is added to intersection 1 in the gate open scenario (figure 6). This brings the total directional distribution to 130%.

McDowell's Response: The directional distribution has been revised.

18. Figures 7 and 8: Intersections 5,7 and 4 all stayed the same from gate open to gate closed, except some turning volume was added at intersection 1 in the gate open scenario. It seems like volume at intersection 1 should reduce project traffic at intersections 4 and 5?
McDowell's Response: The directional distribution has been revised. Opening the gate now reflects a reduced amount of project traffic at intersections 4 and 5.

19. Figure 4A and Figure 5A: East west movement at intersection 2 stayed the same from gate closed to gate open. I think there may be a fair amount of traffic crossing from south Glenwood across SH 82 to Blake and heading south to the Walmart complex?
McDowell's Response: The directional distribution has been revised. Opening the gate now reflects a reduced amount of project traffic at intersections 4 and 5.

20. Intersection 4, Figure 5A- There was a large increase in the pm volume in the east bound to north bound turn that didn't make sense to me as a result of the gate opening…Also the east bound to south bound counts were the same, gate open and gate closed. AM movement seems low (14) …So many people use the BRT facility. When was the am peak hour?
McDowell's Response: The directional distribution has been revised. Opening the gate now reflects a reduced amount of project traffic at intersections 4 and 5. The morning peak hour for the intersection of SH 82 and 27th Street occurs from 7:30am – 8:30am.

21. Intersection 6, west bound to south bound movement. There was a large increase with the gate open. Is this traffic going to Walmart and avoiding SH 82? It seems like SH 82 might be easier due to the condition and width of Blake.
McDowell's Response: The study conservatively assumes that an average of one to two cars per minute will utilize the opened Blake Street connection during the morning peak hour with or without the construction of the Glenwood Multifamily project. In the evening peak hour, it is assumed that approximately two to three cars every minute will utilize the opened connection. The delay to turn left at the 23rd Street signal is such that, neighborhood drivers may use the Blake Street connection instead.

22. Figure 7 and Figure 8: Intersection 4- It seems like volumes should be reduced with the gate opening.
The directional distribution has been revised. Opening the gate now reflects a reduced amount of project traffic at intersections 4 and 5.

23. Figure 11 and 11A: Intersection 6 -eastbound movement. Why is there an increase from two-way configuration to one-way configuration south bound?
McDowell's Response: We added a paragraph in Section 2.3 describing the alternative analysis that was performed for the City Engineer to look at a one-way southbound Blake option. Some of the previous exhibits are included in the Appendix of the report. Please note that these exhibits were completed in February 2018 for a City Council presentation. These exhibits were based upon the previous set of traffic counts.

24. Figure 12: Intersection 6 east to south bound turning movement, no change from gate open to gate closed? Intersection 5, south bound through. The volume more than doubled. Why?
McDowell's Response: The eastbound to southbound movement at intersection 6 is not anticipated to increase by a measurable volume with the opening of the Blake gate.

<u>CDOT Comments:</u>

1. §1.0 Project Description and §5.0 Recommendations and Conclusions say a 105-unit apartment project is proposed, but 79 units were used for the trip generation in Table 3 and subsequent figures.

McDowell's Response: The revised study updates the unit count to 79.

2. Since the apartment residents can access commercial properties, especially WalMart, without accessing onto SH 82 an internal capture reduction can be applied. The amount of the reduction will differ between the scenarios with the gate opened or closed.
   McDowell's Response: The number of residents accessing the adjacent commercial area to the south may be 5-10% of the site traffic during the morning and evening peak hours. With the gate closed, residents will likely walk along Blake Avenue or drive on SH 82. With the gate open, residents will likely walk or drive Blake Avenue to access the retail and restaurants to the south. This equates to approximately 3-6vph per hour. This nominal reduction will not impact our traffic impact analysis and recommendations. Refer to Section 3.1.

3. Figures 3 and 4 show the background traffic for the scenario with the closed gate. The distribution will be different with the opened gate scenario. It could be emphasized that from a traffic operations perspective it is beneficial to provide the off-system interconnectivity, keeping some of the local traffic off the highway.
   McDowell's Response: The directional distribution has been reevaluated. The revised study added language about the importance of off-system interconnectivity in Section 2.3.

4. §4.1 State Highway Access Permits: The 20% increase in traffic volume threshold for requiring an access permit applies "unless there are identified safety problems." Include something to the effect of: "A new access permit will not be required for the xxx intersection because the increase in traffic volume is less than 20% and because safety issues have been identified."
   McDowell's Response: The revised study has added language in Section 4.1 about safety issues have been identified."

5. §4.1 State Highway Access Permits: Will a new access permit be required for the SH 82/23rd Street intersection for both scenarios; with and without the gate?
   McDowell's Response: No. Refer to Section 4.1.

6. §4.2 State Highway Turn Lane Analysis: For a category NR-B highway there are different turn lane thresholds for speeds above and below 40 mph; cf.: SHAC §3.11(4).
   McDowell's Response: The study's turn lane analysis has been revisited in Section 4.2 and Table 5.

7. §4.2 State Highway Turn Lane Analysis: Indicate which speed limits apply each of the intersections on SH 82. According to the strip map there are sections with speed limits of 25, 35 and 45 mph. Some speed limits change at or near the intersections so different criteria may apply opposite directions of travel.
   McDowell's Response: The study's turn lane analysis has been revisited in Section 4.2 and Table 5.

8. §4.2 State Highway Turn Lane Analysis: For the existing conditions where it says "plus taper" include the length of the taper.
   McDowell's Response: The taper lengths have been added in Table 5.

9. §4.2 State Highway Turn Lane Analysis: There is not a northbound right turn lane at 23rd Street.
   McDowell's Response: The study's turn lane analysis has been revisited in Section 4.2 and Table 5.

10. §4.2 State Highway Turn Lane Analysis, SH 82/23rd Street: The bullet point lists the existing length of the southbound left turn lane as 400-ft plus taper. The second paragraph says it is 86' plus a taper.
    McDowell's Response: The study's turn lane analysis has been revisited in Section 4.2 and Table 5.

11. Table 5:
    a. In the "Access Code Required Turn Lane" column all the tapers are listed as 120', but that is only applicable in the 35 mph sections.

b. For NR-B >40 mph the required lane length is the deceleration length; cf.: SHAC Table 4-5.
c. For the WBL and WBR movements it appears the lengths are referring to the deceleration lanes on the side streets. These movements may also cross the thresholds for acceleration lanes.
d. For the SH 82/23rd Street WBR acceleration(?) lane is listed as "Not Required" but the a.m. volume exceeds the threshold.
e. For the SH 82/23rd Street NBR deceleration lane is listed as "Not Required" but both the a.m. and the p.m. volumes exceed the threshold.
McDowell's Response: The study's turn lane analysis has been revisited in Section 4.2 and Table 5. Acceleration lanes are generally not used on low speed roadways.

Please call with any questions on the revisions to the study.

Thank you,
McDowell Engineering,

Kari J. McDowell Schroeder, PE, PTOE
Senior Traffic and Transportation Engineer

Encl. *Glenwood Multifamily Transportation Impact Study*. McDowell Engineering, April 9, 2019

T. Kent Harbert, PE
Access Engineer
CDOT Region 3, Traffic and Safety Residency

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Ben Gerdes <ben@mcdowelleng.com> Mon, Jan 9, 2017 at 9:45 AM
To: "Harbert - CDOT, Kent" <kent.harbert@state.co.us>
Cc: Daniel Roussin <Daniel.Roussin@state.co.us>, Kari McDowell Schroeder <kari@mcdowelleng.com>

Kent,

Attached is the scoping form for the Bell Rippy Apartments. Please let me know if you have questions or comments.

Thanks, Ben

Ben Gerdes, PE
Traffic / Transportation Engineer

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2017-01-09 McDowell Engineering Traffic Study Scoping Form for Bell Rippy Apts - Glenwood Springs.pdf
3439K

Traffic Study Scoping Form

Contact Information	
Consultant Name: Tele: E-mail:	McDowell Engineering; Kari McDowell Schroeder, PE, PTOE 970-623-0788 kari@mcdowelleng.com
Developer/Owner Name:	Glenwood Multi-Family, LLC

Project Information	*(Attach proposed Site Plan)*				
Project Name:	Bell Rippy Apartments				
Project Location:	Palmer Avenue - near 26th Street & Blake Avenue				
Project Description: Application type (rezoning, subdivision), acreage, new or re-development, etc.	105 Rental Apts (8 one-bedroom / 97 two-bedroom)				
Existing / Proposed Land Uses	ITE Code	#units or Size	Existing / Proposed Land Uses	ITE Code	#units or Size
Apartment	220	105			
Please attach Trip Generation Summary table for large or mixed use projects					

Assumptions			
Study Horizons	Current Year: 2017	Build-out : 2018	Long Term : 2040
Study Area Boundaries *(Attach map if needed)*	North: 23rd Street	South: Walmart (Blake)	
	East: Palmer Avenue	West: SH 82	
Intersections and Road Segments to be Evaluated *(Attach map if needed)*	1. All Site entrances	5. 23rd St & SH 82	
	2. 27th St & SH 82	6. 26th St & Blake Ave	
	3. 27th St & Blake Ave	7. 23rd St & Blake Ave	
	4. Walmart (Ave) & SH 82	8. 23rd & Palmer Ave	
Trip Distribution	*See Attached Sketch*		

Assumptions (continued)				
Trip Reductions *(include in Trip Generation table if provided)* (See below also.)	Internal Capture	Use: 0 % Use: ____ %	Pass By	Use: ____ % Use: ____ %
Anticipated Future Traffic Growth Rates (*Describe methodology*)	2014 Access Control Plan 2032 volumes adjusted to 2040 using CDOT Otis data to develop growth rates (Sta ID 000214 20yr factor = 1.26 equals 1.16% annual growth rate for Blake / Sta ID 103503 20yr factor = 1.06 equals 0.29% annual growth rate at 23rd & 27th)	Study Time Periods *(circle all that apply)*	(AM (7-9)) (PM (4-6)) SAT (noon) Other	
Other Factors proposed/assumed transp. improvements, other studies, nearby proposed developments, etc.	Seasonal Adjustment Factor = 1.07 Side street growth rates will be calculated by interpolating between existing counts and 2032 projections from the Access Control Plan			
Analysis Methods & Issues *(check all that apply)*	☒ Synchro ☐ HCS ☐ aaSidra or Rodel ☒ Intersections ☐ Roadway Sections ☐ Signal Warrants ☒ Safety/Sight Distance ☒ Queuing & Storage ☒ CDOT (Access Permit, other) ☐ Identify Bicycle, Pedestrian & Transit Accommodations ☐ TDM ☐ Neighborhood Impacts ☐ Other ____			

ATTACHMENTS, NOTES, & other ASSUMPTIONS:

Study will evaluate a scenario where the Blake gate is closed and a second alternative where it is open.

SIGNED: Kari McDowell Schroeder
Applicant or Consultant

PRINT NAME: Kari McDowell Schroeder, PE, PTOE
Applicant or Consultant

DATE: 1/09/2017

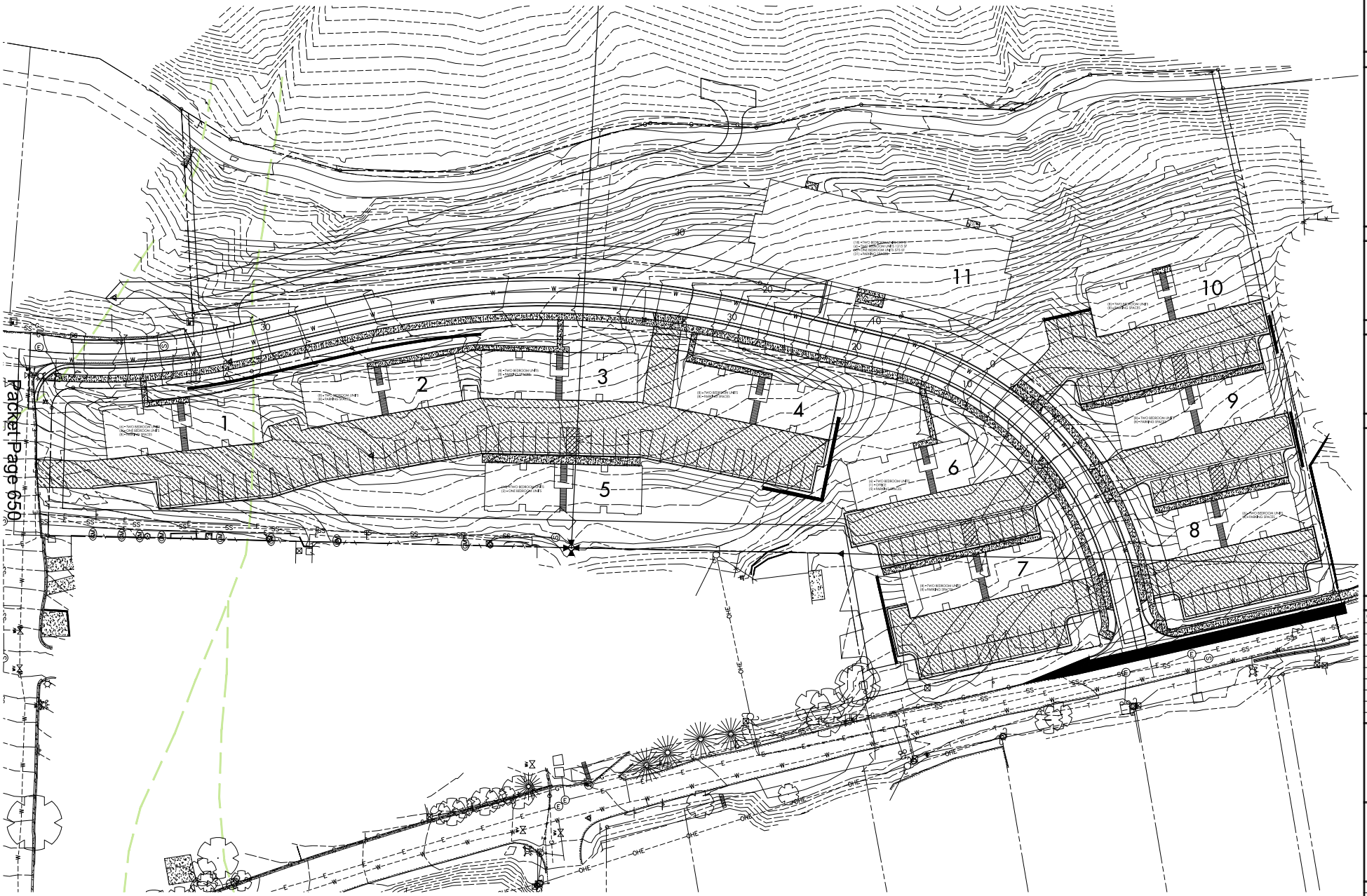
REVIEW AGENCY:

DEPARTMENT:

SIGNED:

PRINT NAME:

DATE:



ARCHITECT

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Edwards, Colorado 81632
Phone – 970.376.4227
email – bobby@raarch.com

STRUCTURAL

LANDSCAPE

NOTES

ISSUES

NO.	DESCRIPTION	DATE
A	Preliminary Bid	05.02.16

Bell Rippy Apartments

Palmer Ave and Blake Street
Glenwood Springs, CO

ARCHITECTURAL SITE PLAN

PROJECT NO.: 15-217
DATE: October 24, 2016
DRAWN BY: nl
SCALE:

A0.1

SHEET OF 1

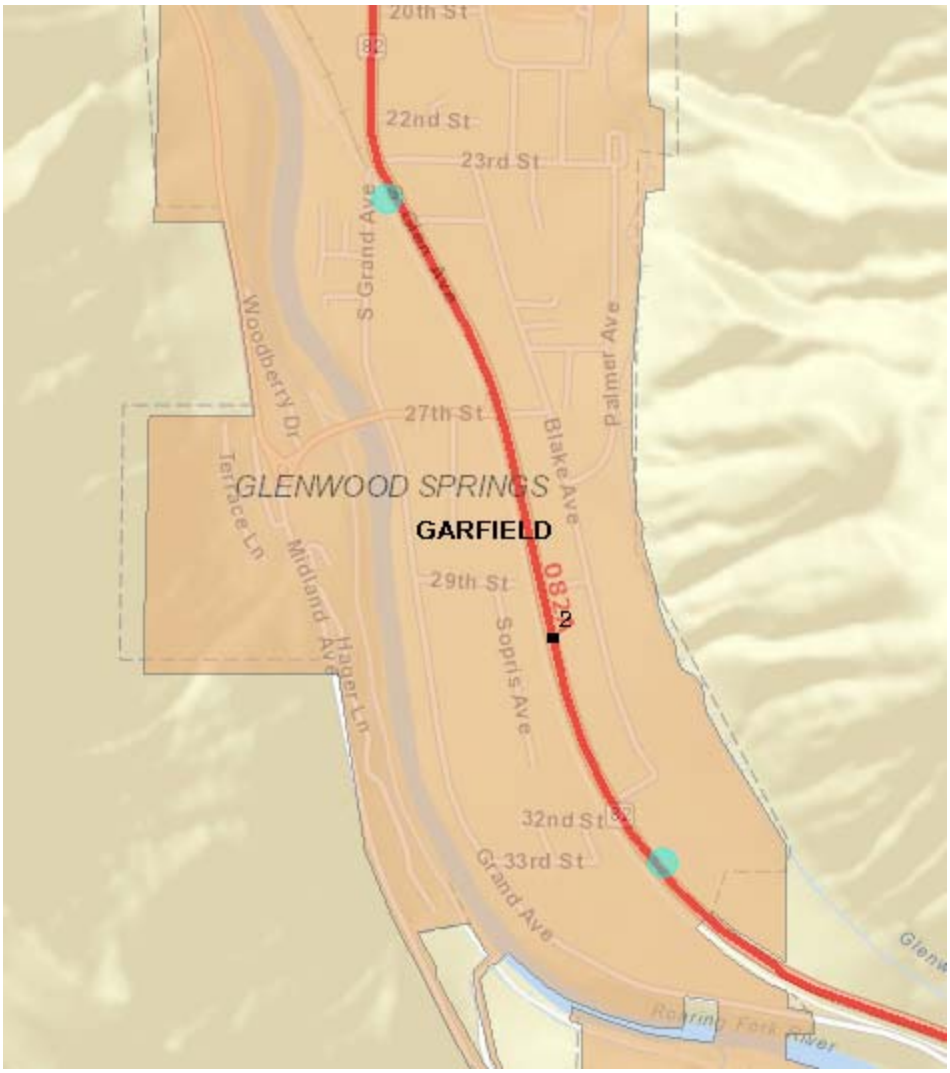
©2016 RAL Architects, Inc

Project N
Prepared
Date:
Revised:

Table 1 - Total Project Trip Generation
Bell Rippy Apartments
Glenwood Springs, Colorado
Estimated Project-Generated Traffic[1]

					Average Weekday	Morning Peak Hour				Evening Peak Hour			
						Inbound		Outbound		Inbound		Outbound	
ITE Code	Units	AM Peak Hour	PM Peak Hour	Avg. Weekday	Trips (vpd)	% Trips	Trips	% Trips	Trips	% Trips	Trips	% Trips	Trips
Residential													
#220, Apartment	105 DU		Regression Equation		760	29%	18	71%	42	61%	48	39%	31
Multi-Modal Trip Reduction	-10%				-76		-2		-4		-5		-3
Total Project Generated Traffic					**684**		**16**		**38**		**43**		**28**

[1] Values obtained from *Trip Generation, 9th Edition,* Institute of Transportation Engineers, 2012.



CDOT OTIS Station ID 103503 = 0.29% annual growth rate

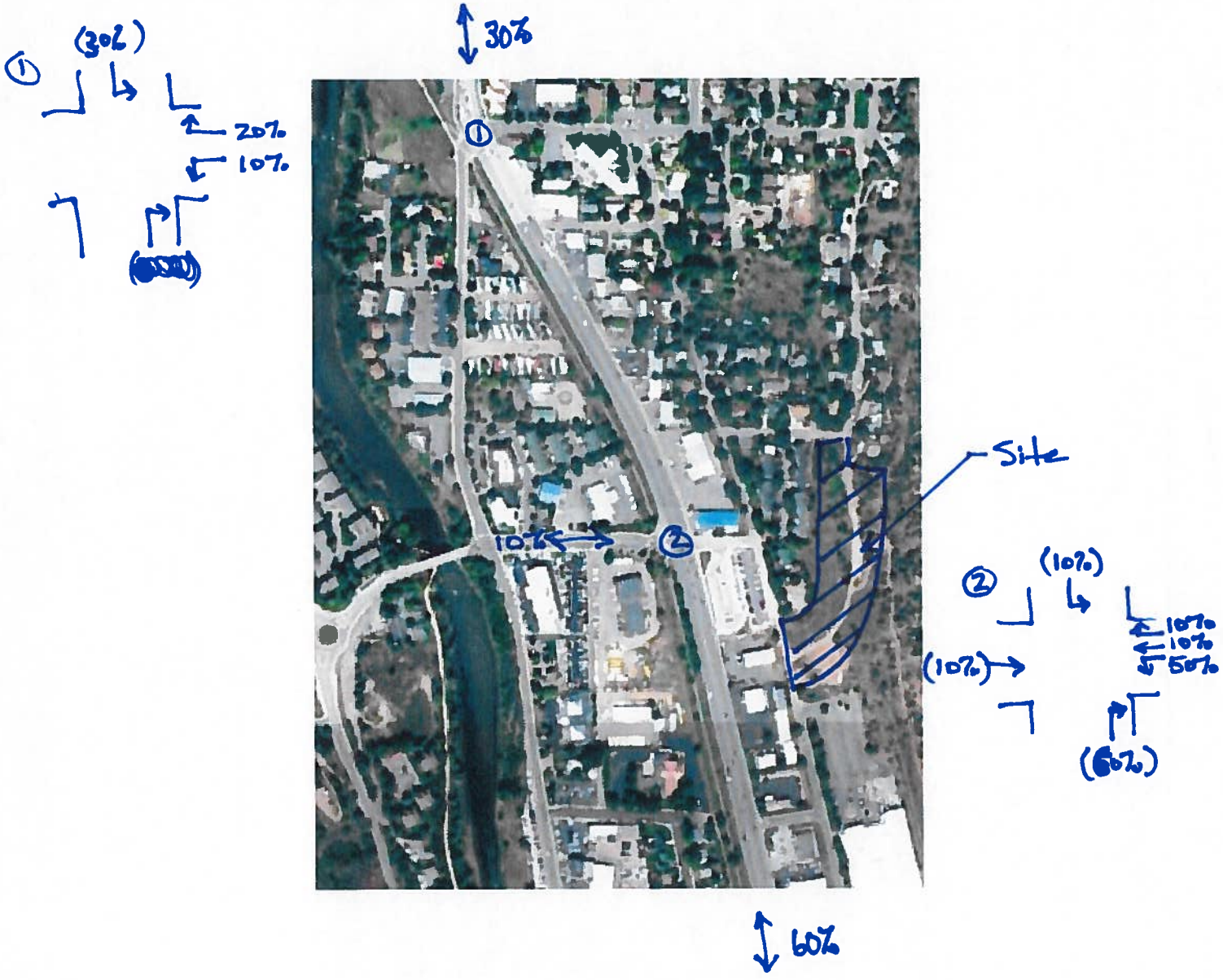
	Route	Start	End	Description	AADT	Year	Single Unit	Comb Trucks	% Trucks	20 Year Factor	DHV	DVMT	DD
	082A	1.405	2.194	ON SH 82, GLEN AVE SE/O SOUTH GR...	26,000	2015	650	360	3.9	1.06	10	20,384	63

CDOT OTIS Station ID 000214 = 1.16% annual growth rate

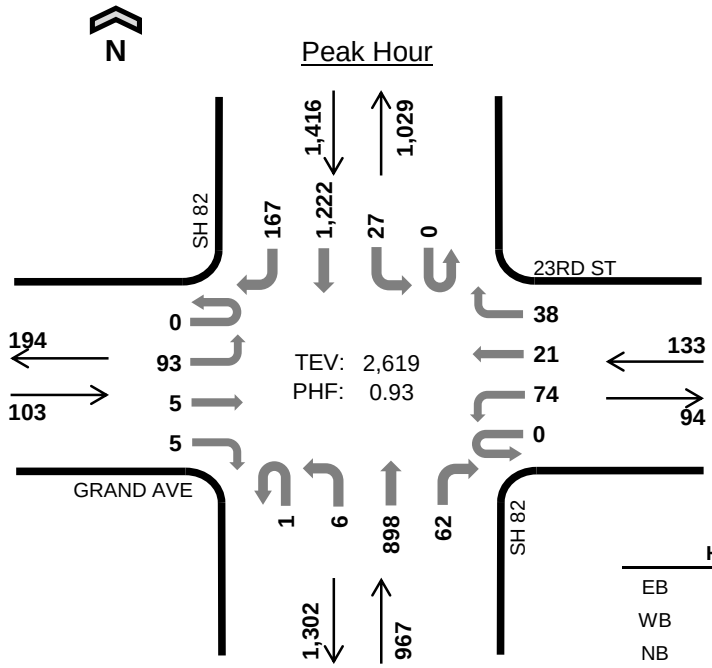
	Route	Start	End	Description	AADT	Year	Single Unit	Comb Trucks	% Trucks	20 Year Factor	DHV	DVMT	DD
	082A	2.194	7.824	ON SH 82, GLEN AVE S/O BLAKE AVE, ...	25,000	2015	580	350	3.7	1.26	11	138,725	57

Seasonal Adjustment = October to July = 1.07

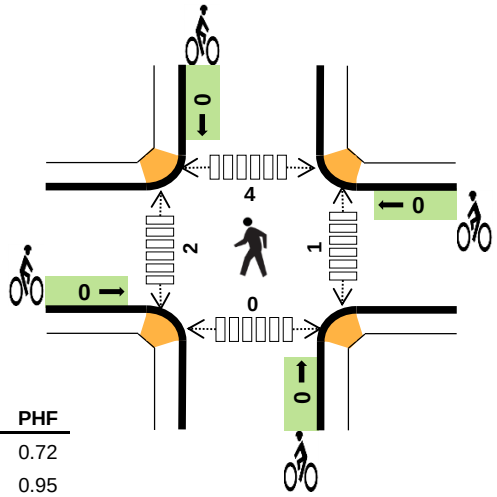
82 A	South end of Glenwood Springs	18,506	19,241	20,046	20,345	20,736	22,446	22,919	22,855	22,317	21,269	19,371	19,235
MM 2.3	Entire record: 1991 - 2016	1.24	1.19	1.14	1.13	1.11	1.02	1.00	1.00	1.03	1.08	1.18	1.19
	South end of Glenwood Springs	20,879	21,311	22,160	22,447	22,930	24,534	25,133	24,949	24,689	23,515	21,504	21,170
	Most recent 10 full years: 2006 - 2015	1.20	1.18	1.13	1.12	1.10	1.02	1.00	1.01	1.02	1.07	1.17	1.19


30%
(30%)
①
20%
10%
①
10%
②
Site
(10%)
②
10%
10%
50%
(10%)
(60%)
60%

SH 82
23RD ST



Date: Thu, Jan 17, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM



	HV %:	PHF
EB	2.9%	0.72
WB	3.8%	0.95
NB	3.8%	0.75
SB	4.3%	0.90
TOTAL	4.0%	0.93

Two-Hour Count Summaries

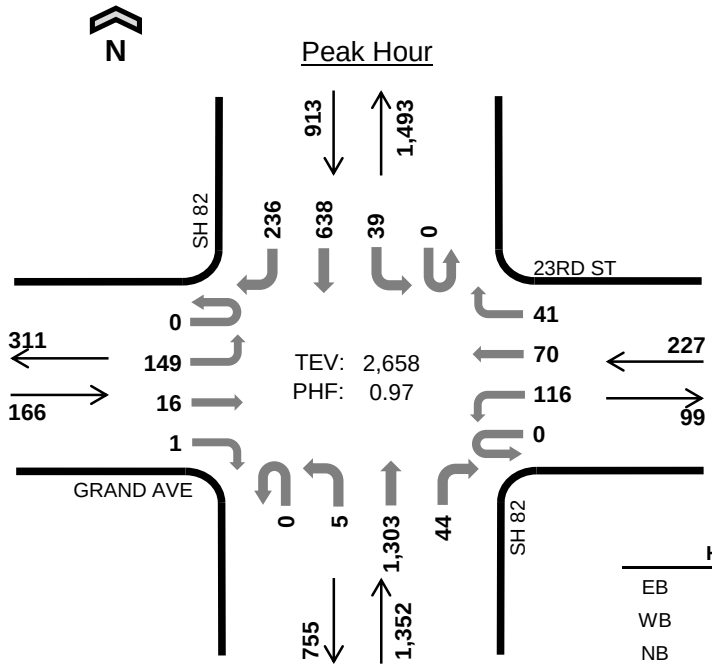
Interval Start	GRAND AVE Eastbound				23RD ST Westbound				SH 82 Northbound				SH 82 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	8	0	2	0	8	1	1	0	2	97	7	0	2	259	21	408	0
7:15 AM	**0**	**15**	**1**	**1**	**0**	**20**	**3**	**12**	**0**	**0**	**155**	**11**	**0**	**0**	**307**	**30**	**555**	0
7:30 AM	**0**	**22**	**2**	**1**	**0**	**22**	**5**	**6**	**0**	**1**	**216**	**8**	**0**	**9**	**326**	**45**	**663**	0
7:45 AM	**0**	**33**	**1**	**2**	**0**	**19**	**6**	**8**	**1**	**4**	**299**	**19**	**0**	**10**	**256**	**39**	**697**	2,323
8:00 AM	**0**	**23**	**1**	**1**	**0**	**13**	**7**	**12**	**0**	**1**	**228**	**24**	**0**	**8**	**333**	**53**	**704**	**2,619**
8:15 AM	0	16	3	0	0	16	3	7	0	3	193	12	0	13	226	22	514	2,578
8:30 AM	0	23	3	1	0	16	5	4	0	2	172	12	0	9	245	40	532	2,447
8:45 AM	0	30	3	1	0	16	6	6	0	0	176	15	0	6	214	27	500	2,250
Count Total	0	170	14	9	0	130	36	56	1	13	1,536	108	0	57	2,166	277	4,573	0
Peak Hour	**0**	**93**	**5**	**5**	**0**	**74**	**21**	**38**	**1**	**6**	**898**	**62**	**0**	**27**	**1,222**	**167**	**2,619**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

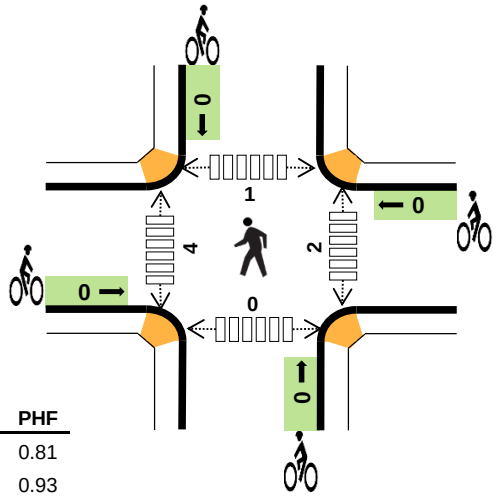
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	2	0	8	11	*21*	0	0	0	0	*0*	0	0	0	1	*1*
7:15 AM	**1**	**0**	**11**	**16**	***28***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**1**	**2**	**8**	**15**	***26***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**2**	**0**	*4*
7:45 AM	**0**	**1**	**12**	**17**	***30***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	*1*
8:00 AM	**1**	**2**	**6**	**13**	***22***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**1**	**0**	***2***
8:15 AM	0	0	5	14	*19*	0	0	0	0	*0*	2	0	0	0	*2*
8:30 AM	1	0	11	17	*29*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	0	10	14	*24*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	6	5	71	117	*199*	0	0	0	0	*0*	3	2	4	1	*10*
Peak Hour	**3**	**5**	**37**	**61**	***106***	**0**	**0**	**0**	**0**	***0***	**1**	**2**	**4**	**0**	***7***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

SH 82
23RD ST



Date: Wed, Jan 16, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM



	HV %:	PHF
EB	1.2%	0.81
WB	0.0%	0.93
NB	2.0%	0.97
SB	2.5%	0.90
TOTAL	2.0%	0.97

Two-Hour Count Summaries

Interval Start	GRAND AVE Eastbound				23RD ST Westbound				SH 82 Northbound				SH 82 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	43	1	2	0	21	11	12	1	5	293	10	0	8	144	56	607	0
4:15 PM	**0**	**44**	**7**	**0**	**0**	**26**	**12**	**11**	**0**	**1**	**328**	**15**	**0**	**8**	**143**	**52**	**647**	0
4:30 PM	**0**	**40**	**3**	**0**	**0**	**34**	**20**	**6**	**0**	**2**	**295**	**13**	**0**	**15**	**175**	**65**	**668**	0
4:45 PM	**0**	**36**	**6**	**0**	**0**	**23**	**24**	**10**	**0**	**0**	**343**	**6**	**0**	**5**	**146**	**60**	**659**	2,581
5:00 PM	**0**	**29**	**0**	**1**	**0**	**33**	**14**	**14**	**0**	**2**	**337**	**10**	**0**	**11**	**174**	**59**	**684**	**2,658**
5:15 PM	0	34	6	1	0	36	16	7	0	2	295	9	0	11	173	45	635	2,646
5:30 PM	0	32	5	0	0	33	9	10	0	2	327	15	0	4	133	62	632	2,610
5:45 PM	0	32	2	1	0	13	5	6	1	2	320	9	0	4	143	46	584	2,535
Count Total	0	290	30	5	0	219	111	76	2	16	2,538	87	0	66	1,231	445	5,116	0
Peak Hour	**0**	**149**	**16**	**1**	**0**	**116**	**70**	**41**	**0**	**5**	**1,303**	**44**	**0**	**39**	**638**	**236**	**2,658**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	0	8	13	*22*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	**0**	**0**	**7**	**6**	***13***	**0**	**0**	**0**	**0**	***0***	**1**	**1**	**1**	**0**	*3*
4:30 PM	**1**	**0**	**3**	**6**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**3**	**0**	**0**	*3*
4:45 PM	**0**	**0**	**9**	**3**	***12***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	*1*
5:00 PM	**1**	**0**	**8**	**8**	***17***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:15 PM	0	0	11	5	*16*	0	0	0	0	*0*	0	1	3	0	*4*
5:30 PM	1	0	7	2	*10*	0	0	0	0	*0*	3	1	0	1	*5*
5:45 PM	0	0	8	4	*12*	0	0	0	0	*0*	1	1	1	1	*4*
Count Total	4	0	61	47	*112*	0	0	0	0	*0*	6	7	5	2	*20*
Peak Hour	**2**	**0**	**27**	**23**	***52***	**0**	**0**	**0**	**0**	***0***	**2**	**4**	**1**	**0**	***7***

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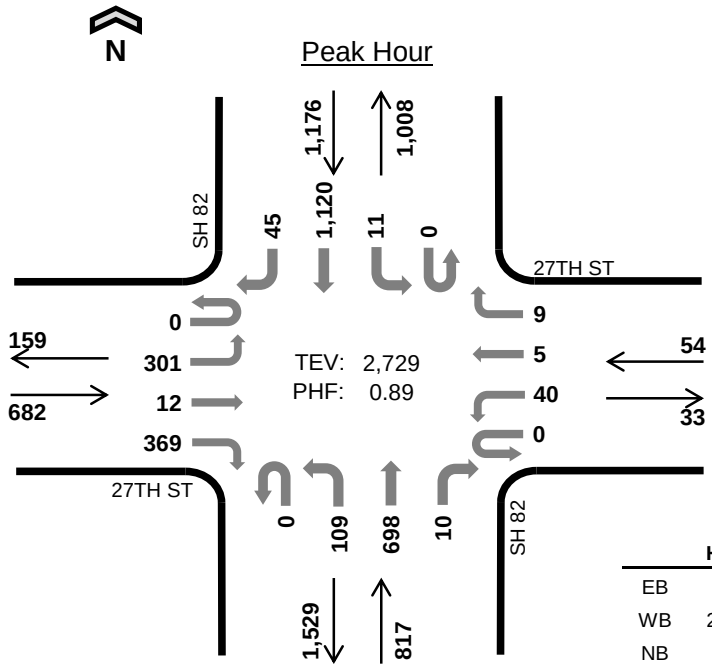
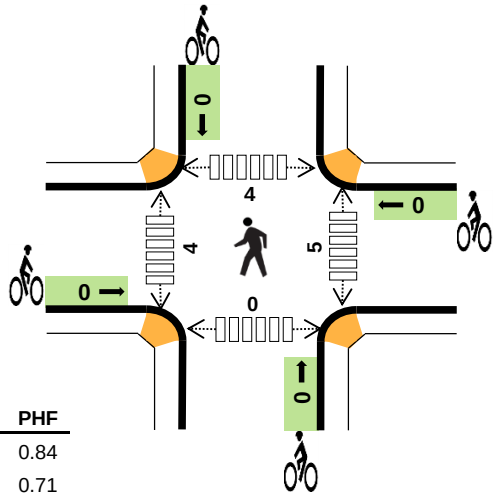
SH 82
27TH ST



Date: Thu, Jan 17, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	2.3%	0.84
WB	24.1%	0.71
NB	3.5%	0.82
SB	4.2%	0.95
TOTAL	3.9%	0.89

Two-Hour Count Summaries

Interval Start	27TH ST Eastbound				27TH ST Westbound				SH 82 Northbound				SH 82 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	27	5	69	0	13	5	3	0	22	78	1	0	4	282	13	522	0
7:15 AM	0	57	2	113	0	7	1	1	0	18	99	0	0	4	281	12	595	0
7:30 AM	**0**	**77**	**5**	**94**	**0**	**5**	**3**	**2**	**0**	**21**	**158**	**3**	**0**	**0**	**298**	**11**	**677**	0
7:45 AM	**0**	**90**	**4**	**108**	**0**	**12**	**1**	**2**	**0**	**22**	**225**	**2**	**0**	**4**	**285**	**11**	**766**	2,560
8:00 AM	**0**	**76**	**2**	**87**	**0**	**6**	**1**	**3**	**0**	**39**	**174**	**2**	**0**	**3**	**254**	**8**	**655**	2,693
8:15 AM	**0**	**58**	**1**	**80**	**0**	**17**	**0**	**2**	**0**	**27**	**141**	**3**	**0**	**4**	**283**	**15**	**631**	**2,729**
8:30 AM	0	32	3	71	0	7	2	1	0	33	143	1	0	3	241	12	549	2,601
8:45 AM	0	29	3	71	0	5	2	4	0	35	164	3	0	2	217	7	542	2,377
Count Total	0	446	25	693	0	72	15	18	0	217	1,182	15	0	24	2,141	89	4,937	0
Peak Hour	**0**	**301**	**12**	**369**	**0**	**40**	**5**	**9**	**0**	**109**	**698**	**10**	**0**	**11**	**1,120**	**45**	**2,729**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	5	3	9	9	*26*	0	0	0	0	*0*	1	1	3	0	*5*
7:15 AM	7	3	6	17	*33*	0	0	0	0	*0*	2	0	2	0	*4*
7:30 AM	**6**	**3**	**6**	**14**	***29***	**0**	**0**	**0**	**0**	***0***	**1**	**2**	**1**	**0**	*4*
7:45 AM	**3**	**5**	**10**	**15**	***33***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
8:00 AM	**3**	**1**	**5**	**9**	***18***	**0**	**0**	**0**	**0**	***0***	**3**	**1**	**3**	**0**	*7*
8:15 AM	**4**	**4**	**8**	**11**	***27***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	***1***
8:30 AM	3	2	9	17	*31*	0	0	0	0	*0*	2	0	2	0	*4*
8:45 AM	2	2	11	12	*27*	0	0	0	0	*0*	1	0	1	0	*2*
Count Total	33	23	64	104	*224*	0	0	0	0	*0*	11	5	12	0	*28*
Peak Hour	**16**	**13**	**29**	**49**	***107***	**0**	**0**	**0**	**0**	***0***	**5**	**4**	**4**	**0**	***13***

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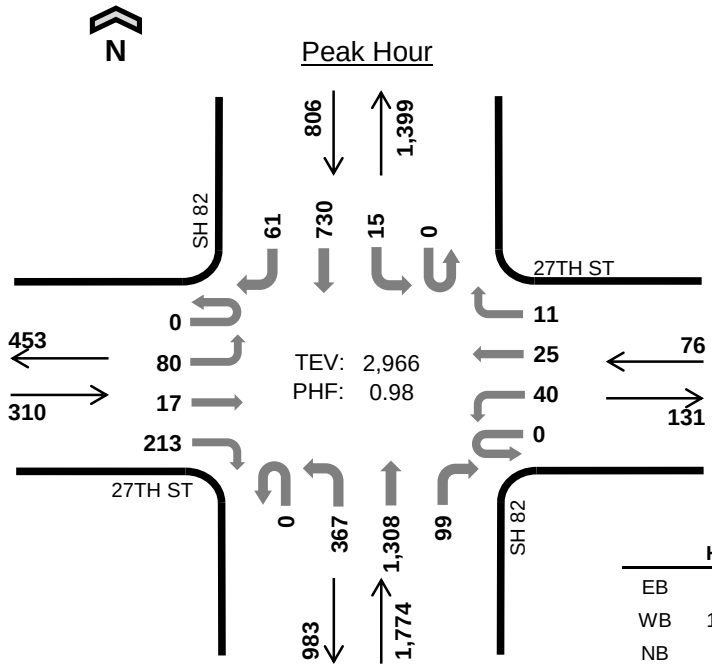
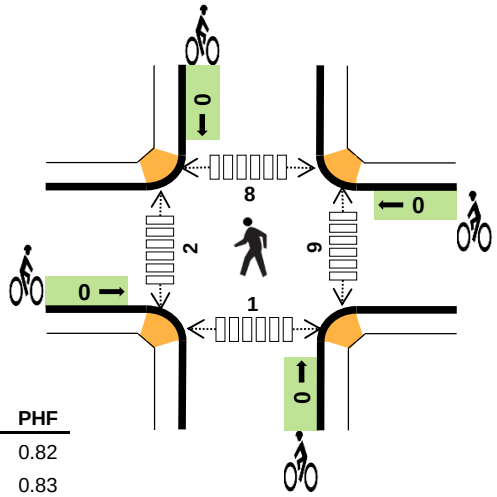
SH 82
27TH ST



Date: Wed, Jan 16, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	1.9%	0.82
WB	14.5%	0.83
NB	2.1%	0.99
SB	2.5%	0.91
TOTAL	2.5%	0.98

Two-Hour Count Summaries

Interval Start	27TH ST Eastbound				27TH ST Westbound				SH 82 Northbound				SH 82 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	13	0	44	0	5	3	5	0	76	283	5	0	5	153	7	599	0
4:15 PM	0	29	9	58	0	8	4	5	0	100	338	10	0	2	123	8	694	0
4:30 PM	**0**	**23**	**3**	**57**	**0**	**8**	**5**	**1**	**0**	**90**	**326**	**20**	**0**	**6**	**201**	**15**	**755**	0
4:45 PM	**0**	**22**	**6**	**37**	**0**	**10**	**8**	**5**	**0**	**98**	**314**	**31**	**0**	**2**	**157**	**7**	**697**	2,745
5:00 PM	**0**	**23**	**6**	**66**	**0**	**9**	**6**	**2**	**0**	**80**	**345**	**23**	**0**	**4**	**176**	**20**	**760**	2,906
5:15 PM	**0**	**12**	**2**	**53**	**0**	**13**	**6**	**3**	**0**	**99**	**323**	**25**	**0**	**3**	**196**	**19**	**754**	**2,966**
5:30 PM	0	26	4	49	0	4	7	4	0	88	279	17	0	3	143	12	636	2,847
5:45 PM	0	18	2	28	0	7	4	3	0	71	291	7	0	3	135	10	579	2,729
Count Total	0	166	32	392	0	64	43	28	0	702	2,499	138	0	28	1,284	98	5,474	0
Peak Hour	**0**	**80**	**17**	**213**	**0**	**40**	**25**	**11**	**0**	**367**	**1,308**	**99**	**0**	**15**	**730**	**61**	**2,966**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	2	11	12	*25*	0	0	0	0	*0*	1	0	1	0	*2*
4:15 PM	2	5	5	7	*19*	0	0	0	0	*0*	3	1	1	0	*5*
4:30 PM	**3**	**3**	**5**	**6**	***17***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**1**	**0**	*3*
4:45 PM	**2**	**3**	**8**	**4**	***17***	**0**	**0**	**0**	**0**	***0***	**4**	**0**	**3**	**1**	*8*
5:00 PM	**0**	**3**	**12**	**5**	***20***	**0**	**0**	**0**	**0**	***0***	**2**	**0**	**2**	**0**	*4*
5:15 PM	**1**	**2**	**12**	**5**	***20***	**0**	**0**	**0**	**0**	***0***	**3**	**0**	**2**	**0**	***5***
5:30 PM	3	4	5	1	*13*	0	0	0	0	*0*	0	2	0	0	*2*
5:45 PM	0	5	11	4	*20*	0	0	0	0	*0*	4	1	0	0	*5*
Count Total	11	27	69	44	*151*	0	0	0	0	*0*	17	6	10	1	*34*
Peak Hour	**6**	**11**	**37**	**20**	***74***	**0**	**0**	**0**	**0**	***0***	**9**	**2**	**8**	**1**	***20***

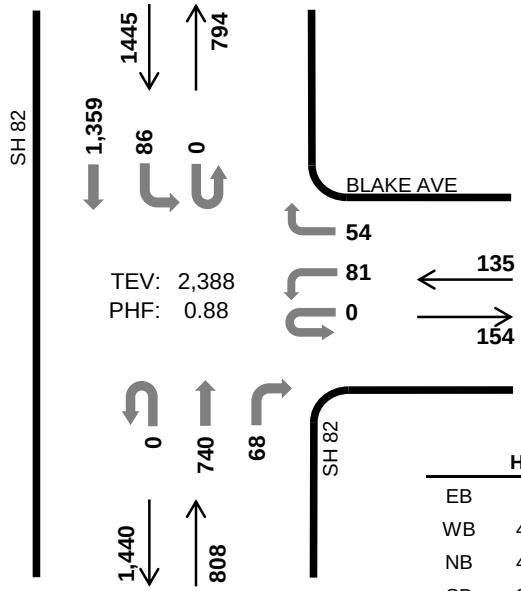
Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

SH 82
BLAKE AVE

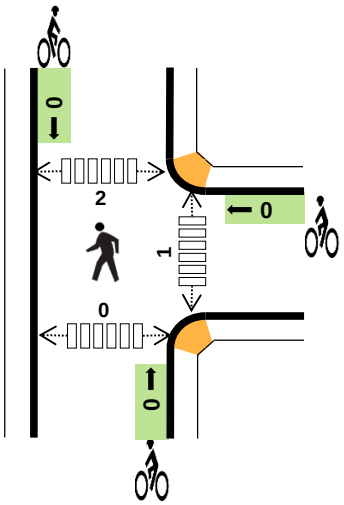
Date: Thu, Jan 17, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM

N

Peak Hour



	HV %:	PHF
EB	-	-
WB	4.4%	0.89
NB	4.3%	0.79
SB	3.7%	0.95
TOTAL	4.0%	0.88



Two-Hour Count Summaries

Interval Start	0				BLAKE AVE				SH 82				SH 82				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	22	0	9	0	0	78	7	0	15	300	0	431	0
7:15 AM	0	0	0	0	0	12	0	14	0	0	114	4	0	15	375	0	534	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**23**	**0**	**7**	**0**	**0**	**169**	**12**	**0**	**16**	**363**	**0**	**590**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**20**	**0**	**18**	**0**	**0**	**239**	**17**	**0**	**24**	**358**	**0**	**676**	2,231
8:00 AM	**0**	**0**	**0**	**0**	**0**	**22**	**0**	**14**	**0**	**0**	**179**	**20**	**0**	**26**	**322**	**0**	**583**	2,383
8:15 AM	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**15**	**0**	**0**	**153**	**19**	**0**	**20**	**316**	**0**	**539**	**2,388**
8:30 AM	0	0	0	0	0	24	0	11	0	0	155	0	0	14	289	0	493	2,291
8:45 AM	0	0	0	0	0	29	0	14	0	0	166	15	0	20	251	0	495	2,110
Count Total	0	0	0	0	0	168	0	102	0	0	1,253	94	0	150	2,574	0	4,341	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**81**	**0**	**54**	**0**	**0**	**740**	**68**	**0**	**86**	**1,359**	**0**	**2,388**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	1	10	10	*21*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	0	3	6	17	*26*	0	0	0	0	*0*	0	1	1	0	*2*
7:30 AM	**0**	**3**	**8**	**13**	***24***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**1**	**0**	*2*
7:45 AM	**0**	**3**	**13**	**16**	***32***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
8:00 AM	**0**	**0**	**3**	**13**	***16***	**0**	**0**	**0**	**0**	***0***	**1**	**1**	**1**	**0**	*3*
8:15 AM	**0**	**0**	**11**	**12**	***23***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:30 AM	0	1	8	13	*22*	0	0	0	0	*0*	0	1	0	0	*1*
8:45 AM	0	0	15	8	*23*	0	0	0	0	*0*	0	2	1	0	*3*
Count Total	0	11	74	102	*187*	0	0	0	0	*0*	1	7	4	0	*12*
Peak Hr	**0**	**6**	**35**	**54**	***95***	**0**	**0**	**0**	**0**	***0***	**1**	**3**	**2**	**0**	***6***

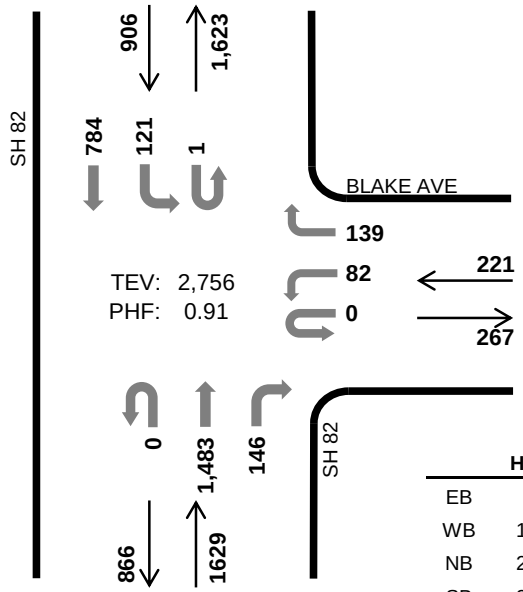
Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

SH 82
BLAKE AVE

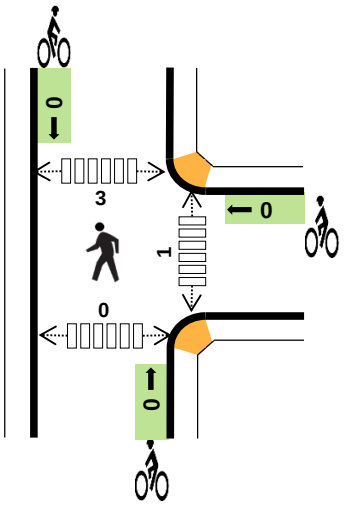
Date: Wed, Jan 16, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM

N

Peak Hour



	HV %:	PHF
EB	-	-
WB	1.4%	0.94
NB	2.4%	0.89
SB	2.4%	0.92
TOTAL	2.3%	0.91



Two-Hour Count Summaries

Interval Start	0				BLAKE AVE				SH 82				SH 82				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	22	0	32	0	0	275	39	0	20	148	0	536	0
4:15 PM	0	0	0	0	0	25	0	28	0	0	393	36	0	28	150	0	660	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**15**	**0**	**40**	**0**	**0**	**416**	**41**	**0**	**25**	**218**	**0**	**755**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**23**	**0**	**36**	**0**	**0**	**325**	**37**	**0**	**36**	**147**	**0**	**604**	2,555
5:00 PM	**0**	**0**	**0**	**0**	**0**	**27**	**0**	**27**	**0**	**0**	**376**	**29**	**0**	**25**	**220**	**0**	**704**	2,723
5:15 PM	**0**	**0**	**0**	**0**	**0**	**17**	**0**	**36**	**0**	**0**	**366**	**39**	**1**	**35**	**199**	**0**	**693**	**2,756**
5:30 PM	0	0	0	0	0	29	0	33	0	0	319	28	0	27	146	0	582	2,583
5:45 PM	0	0	0	0	0	25	0	38	0	0	281	38	0	21	146	0	549	2,528
Count Total	0	0	0	0	0	183	0	270	0	0	2,751	287	1	217	1,374	0	5,083	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**82**	**0**	**139**	**0**	**0**	**1,483**	**146**	**1**	**121**	**784**	**0**	**2,756**	**0**

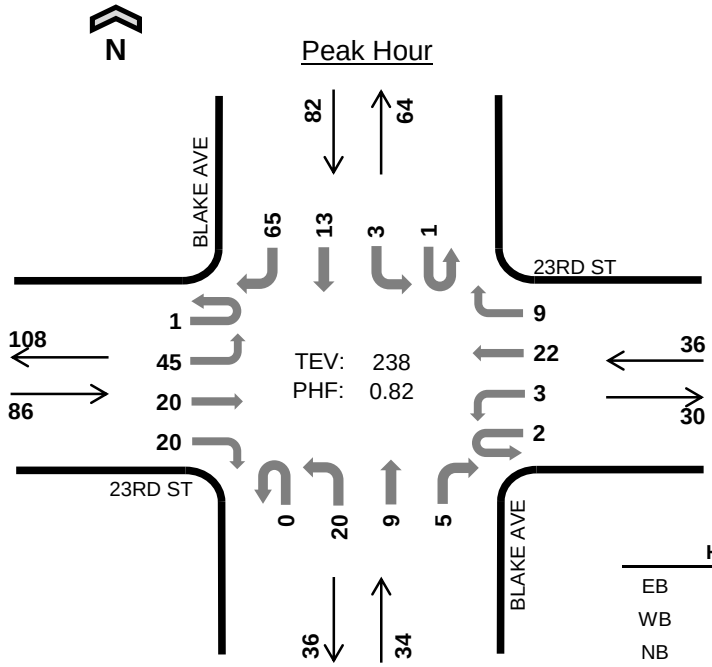
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

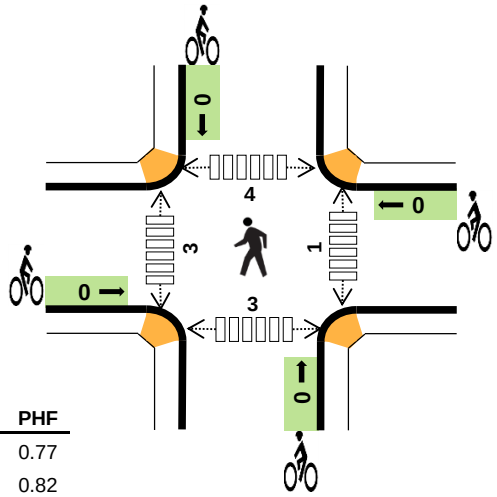
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	2	10	10	*22*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	1	6	10	*17*	0	0	0	0	*0*	1	3	1	0	*5*
4:30 PM	**0**	**0**	**6**	**7**	***13***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	*1*
4:45 PM	**0**	**2**	**10**	**5**	***17***	**0**	**0**	**0**	**0**	***0***	**0**	**3**	**1**	**0**	*4*
5:00 PM	**0**	**1**	**13**	**6**	***20***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**0**	**10**	**4**	***14***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**2**	**0**	***3***
5:30 PM	0	1	7	4	*12*	0	0	0	0	*0*	0	1	0	0	*1*
5:45 PM	0	1	16	5	*22*	0	0	0	0	*0*	0	2	2	0	*4*
Count Total	0	8	78	51	*137*	0	0	0	0	*0*	2	10	6	0	*18*
Peak Hr	**0**	**3**	**39**	**22**	***64***	**0**	**0**	**0**	**0**	***0***	**1**	**4**	**3**	**0**	***8***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

BLAKE AVE
23RD ST

Date: Thu, Jan 17, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM





	HV %:	PHF
EB	2.3%	0.77
WB	2.8%	0.82
NB	0.0%	0.77
SB	4.9%	0.76
TOTAL	2.9%	0.82

Two-Hour Count Summaries

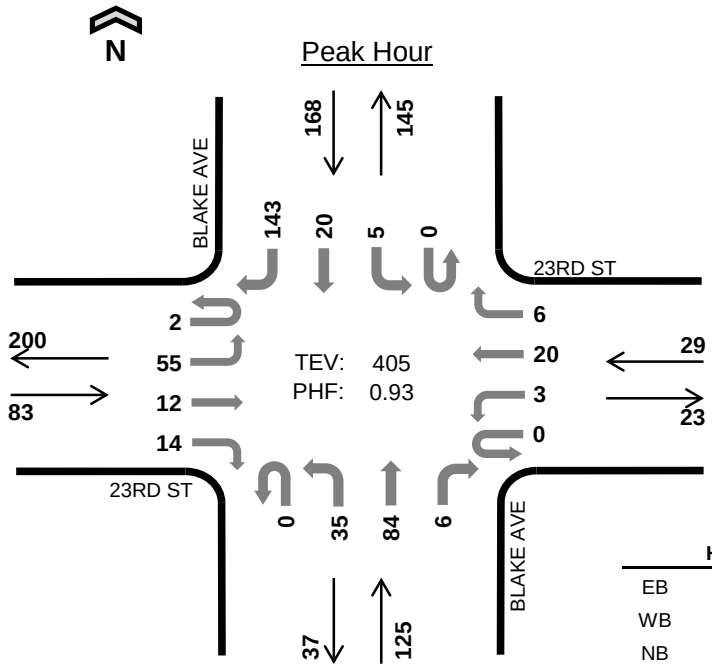
Interval Start	23RD ST Eastbound				23RD ST Westbound				BLAKE AVE Northbound				BLAKE AVE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	5	2	0	0	1	3	0	0	0	0	0	0	1	3	7	22	0
7:15 AM	0	13	0	0	0	0	9	2	0	3	2	0	0	0	1	19	49	0
7:30 AM	**1**	**5**	**4**	**4**	**2**	**1**	**5**	**1**	**0**	**3**	**3**	**2**	**1**	**0**	**3**	**19**	**54**	0
7:45 AM	**0**	**10**	**10**	**4**	**0**	**1**	**6**	**4**	**0**	**5**	**4**	**2**	**0**	**1**	**3**	**23**	**73**	198
8:00 AM	**0**	**18**	**3**	**7**	**0**	**0**	**8**	**3**	**0**	**8**	**1**	**0**	**0**	**1**	**2**	**10**	**61**	237
8:15 AM	**0**	**12**	**3**	**5**	**0**	**1**	**3**	**1**	**0**	**4**	**1**	**1**	**0**	**1**	**5**	**13**	**50**	**238**
8:30 AM	0	8	8	1	0	0	2	0	0	1	0	0	0	0	3	19	42	226
8:45 AM	0	12	1	4	0	0	3	1	0	2	3	0	0	0	1	13	40	193
Count Total	1	83	31	25	2	4	39	12	0	26	14	5	1	4	21	123	391	0
Peak Hour	**1**	**45**	**20**	**20**	**2**	**3**	**22**	**9**	**0**	**20**	**9**	**5**	**1**	**3**	**13**	**65**	**238**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

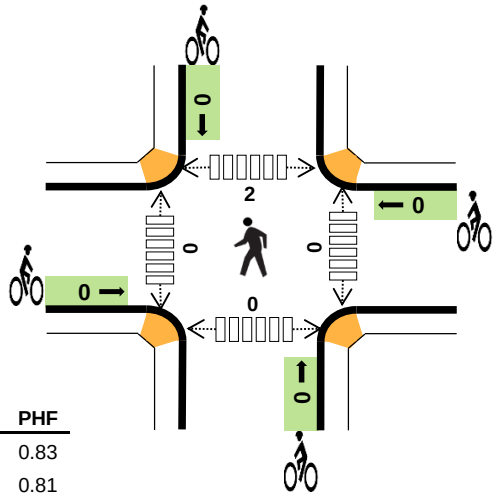
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	2	0	0	0	*2*	0	0	0	0	*0*	0	0	0	1	*1*
7:15 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	1	0	*1*
7:30 AM	**1**	**0**	**0**	**1**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	*1*
7:45 AM	**0**	**0**	**0**	**2**	***2***	**0**	**0**	**0**	**0**	***0***	**1**	**3**	**2**	**3**	*9*
8:00 AM	**1**	**1**	**0**	**1**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	***1***
8:30 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	2	0	0	0	*2*	0	0	0	0	*0*	0	1	0	0	*1*
Count Total	6	1	0	4	*11*	0	0	0	0	*0*	1	4	5	4	*14*
Peak Hour	**2**	**1**	**0**	**4**	***7***	**0**	**0**	**0**	**0**	***0***	**1**	**3**	**4**	**3**	***11***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

BLAKE AVE
23RD ST



Date: Wed, Jan 16, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	0.0%	0.83
WB	0.0%	0.81
NB	0.0%	0.92
SB	0.0%	0.79
TOTAL	0.0%	0.93

Two-Hour Count Summaries

Interval Start	23RD ST Eastbound				23RD ST Westbound				BLAKE AVE Northbound				BLAKE AVE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	10	3	2	0	2	7	1	0	3	5	0	0	3	3	20	59	0
4:15 PM	1	11	3	4	0	0	6	1	0	2	6	1	0	1	4	16	56	0
4:30 PM	**1**	**11**	**2**	**6**	**0**	**3**	**5**	**1**	**0**	**9**	**17**	**2**	**0**	**2**	**5**	**33**	**97**	0
4:45 PM	**1**	**14**	**1**	**3**	**0**	**0**	**6**	**3**	**0**	**7**	**23**	**2**	**0**	**1**	**2**	**29**	**92**	304
5:00 PM	**0**	**12**	**5**	**2**	**0**	**0**	**5**	**1**	**0**	**12**	**18**	**1**	**0**	**1**	**8**	**44**	**109**	354
5:15 PM	**0**	**18**	**4**	**3**	**0**	**0**	**4**	**1**	**0**	**7**	**26**	**1**	**0**	**1**	**5**	**37**	**107**	**405**
5:30 PM	0	15	2	4	0	0	5	0	0	6	13	0	0	2	3	31	81	389
5:45 PM	0	10	7	3	0	0	6	4	0	2	6	0	0	2	3	18	61	358
Count Total	3	101	27	27	0	5	44	12	0	48	114	7	0	13	33	228	662	0
Peak Hour	**2**	**55**	**12**	**14**	**0**	**3**	**20**	**6**	**0**	**35**	**84**	**6**	**0**	**5**	**20**	**143**	**405**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

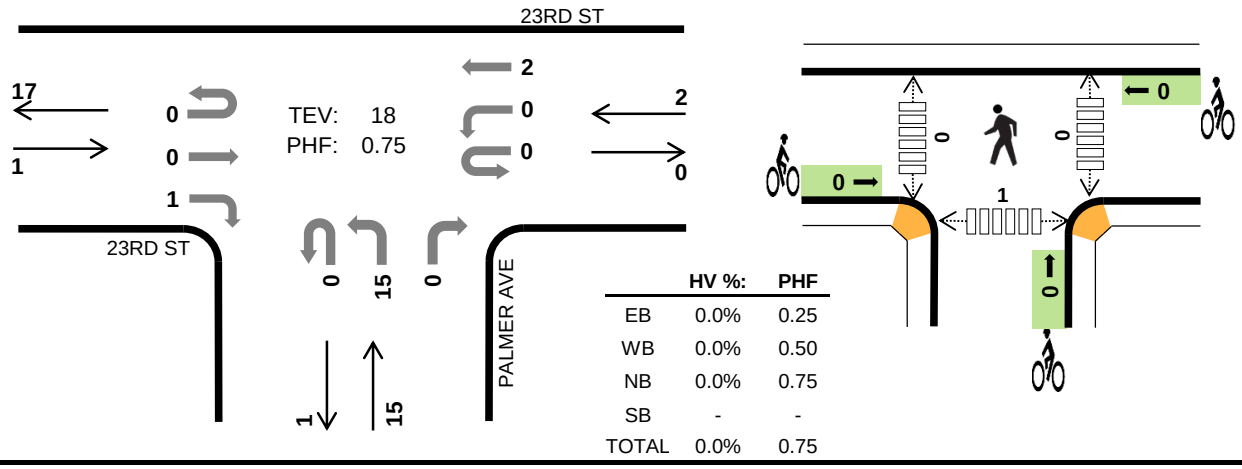
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	1	0	1	*2*
4:15 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	1	0	0	*1*
4:30 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**2**	**0**	*2*
4:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:30 PM	1	0	0	0	*1*	0	0	0	0	*0*	0	1	0	0	*1*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	1	0	0	0	*1*	0	0	0	0	*0*	0	3	2	1	*6*
Peak Hour	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**2**	**0**	***2***

PALMER AVE
23RD ST

N

Peak Hour

Date: Thu, Jan 17, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM



Two-Hour Count Summaries

Interval Start	23RD ST Eastbound				23RD ST Westbound				PALMER AVE Northbound				0 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	3	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	0
7:30 AM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	17
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**18**
8:15 AM	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	2	14
8:30 AM	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2	11
8:45 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3	11
Count Total	0	0	0	3	0	0	5	0	0	20	0	0	0	0	0	0	28	0
Peak Hour	**0**	**0**	**0**	**1**	**0**	**0**	**2**	**0**	**0**	**15**	**0**	**0**	**0**	**0**	**0**	**0**	**18**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	1	*1*
7:15 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	*1*
7:30 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**1**	***2***
8:15 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	0	0	0	*0*	0	0	0	0	*0*	0	0	2	2	*4*
Peak Hr	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**2**	**1**	***3***

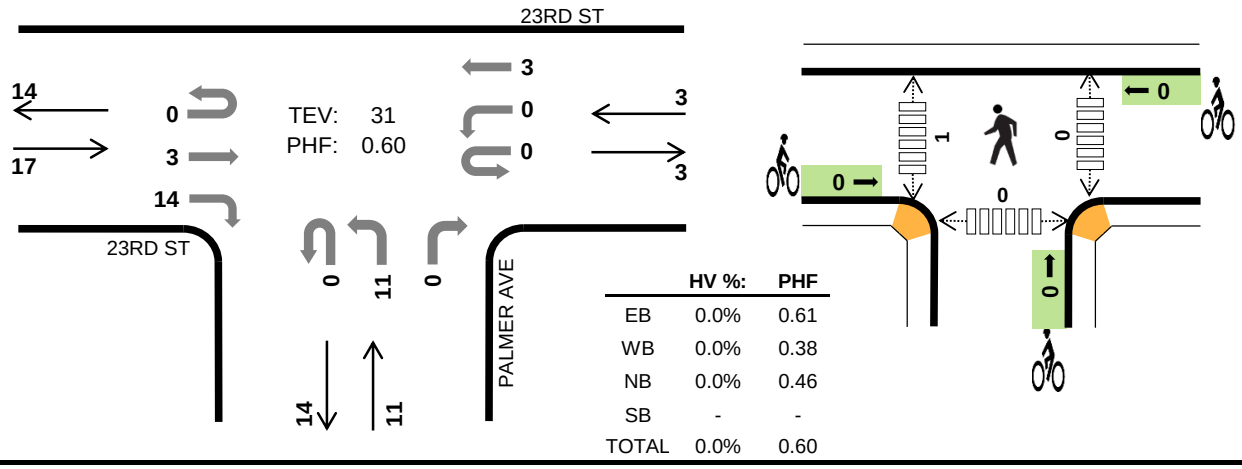
Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

PALMER AVE
23RD ST

N

Peak Hour

Date: Wed, Jan 16, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM



	HV %:	PHF
EB	0.0%	0.61
WB	0.0%	0.38
NB	0.0%	0.46
SB	-	-
TOTAL	0.0%	0.60

Two-Hour Count Summaries

Interval Start	23RD ST Eastbound				23RD ST Westbound				PALMER AVE Northbound				0 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	1	4	0	0	0	0	0	3	0	0	0	0	0	0	8	0
4:15 PM	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	3	0
4:30 PM	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	3	0
4:45 PM	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	3	17
5:00 PM	**0**	**0**	**1**	**6**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**13**	22
5:15 PM	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	23
5:30 PM	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	24
5:45 PM	**0**	**0**	**1**	**5**	**0**	**0**	**2**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**31**
Count Total	0	0	5	22	0	0	3	0	0	18	0	0	0	0	0	0	48	0
Peak Hour	**0**	**0**	**3**	**14**	**0**	**0**	**3**	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**0**	**0**	**31**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	0	0	0	*0*	0	0	0	0	*0*	1	0	0	0	*1*
4:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	1	0	0	0	*1*
4:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	*1*
5:30 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	***1***
Count Total	0	0	0	0	*0*	0	0	0	0	*0*	2	1	1	0	*4*
Peak Hr	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**1**	**0**	***2***

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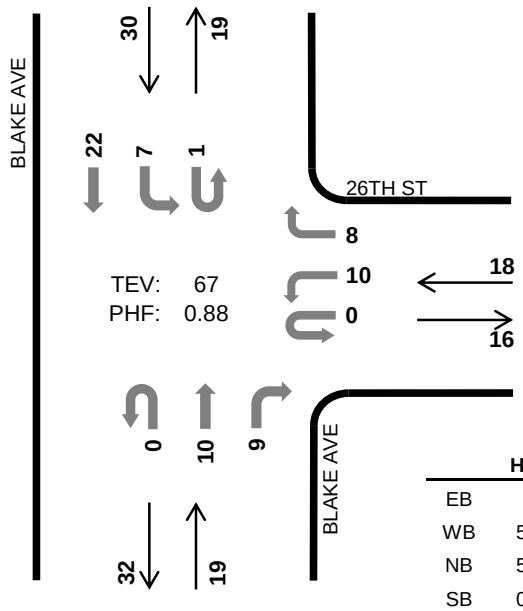
BLAKE AVE
26TH ST

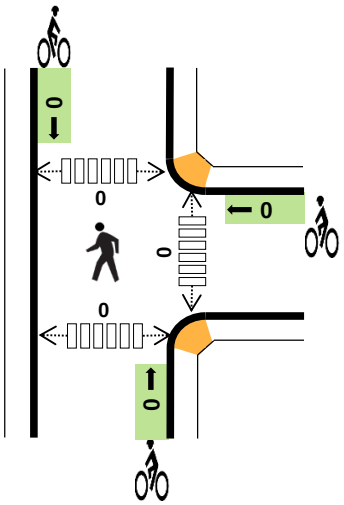
N

Peak Hour



	HV %:	PHF
EB	-	-
WB	5.6%	0.56
NB	5.3%	0.95
SB	0.0%	0.68
TOTAL	3.0%	0.88

Date: Thu, Jan 17, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



Two-Hour Count Summaries

Interval Start	0				26TH ST				BLAKE AVE				BLAKE AVE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	4	0	0	0	0	0	1	0	1	4	0	10	0
7:15 AM	0	0	0	0	0	0	0	3	0	0	0	2	0	1	1	0	7	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	**3**	**0**	**1**	**6**	**0**	**14**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**5**	**0**	**0**	**4**	**1**	**0**	**0**	**3**	**0**	**16**	47
8:00 AM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**0**	**3**	**2**	**1**	**3**	**5**	**0**	**18**	55
8:15 AM	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**1**	**0**	**0**	**1**	**3**	**0**	**3**	**8**	**0**	**19**	**67**
8:30 AM	0	0	0	0	0	2	0	1	0	0	0	1	0	0	2	0	6	59
8:45 AM	0	0	0	0	0	2	0	2	0	0	2	1	0	0	3	0	10	53
Count Total	0	0	0	0	0	18	0	14	0	0	12	14	1	9	32	0	100	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**8**	**0**	**0**	**10**	**9**	**1**	**7**	**22**	**0**	**67**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
7:30 AM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
7:45 AM	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
8:00 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
8:15 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:30 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	1	1	0	*2*	0	0	0	0	*0*	0	3	0	0	*3*
Peak Hr	**0**	**1**	**1**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**3**	**0**	**0**	***3***

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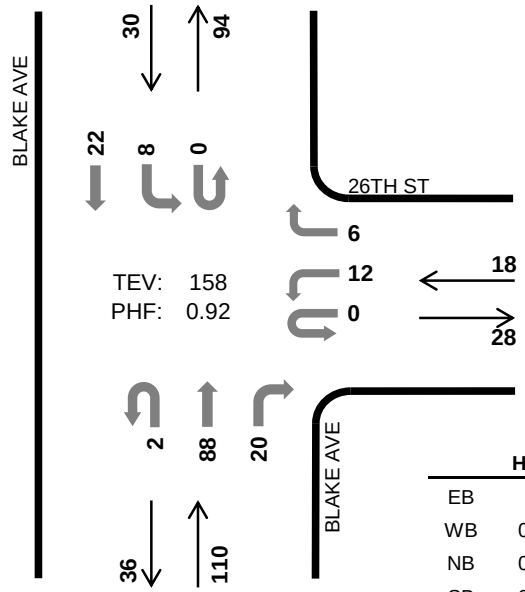
BLAKE AVE
26TH ST

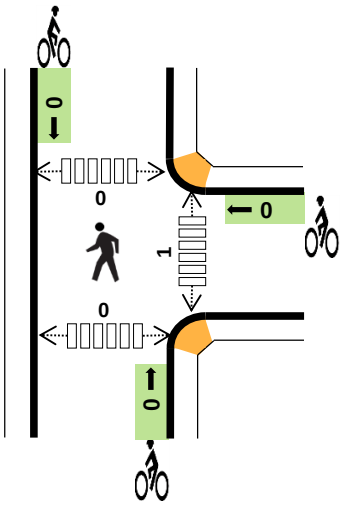
Date: Wed, Jan 16, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM

N

Peak Hour



	HV %:	PHF
EB	-	-
WB	0.0%	0.56
NB	0.0%	0.89
SB	0.0%	0.83
TOTAL	0.0%	0.92



Two-Hour Count Summaries

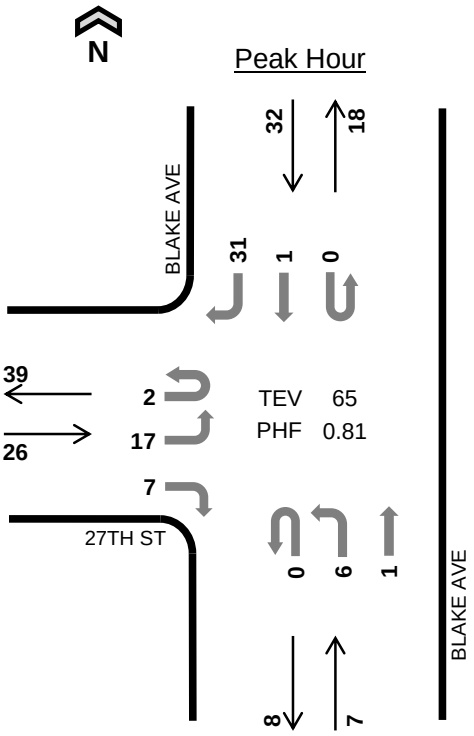
Interval Start	0				26TH ST				BLAKE AVE				BLAKE AVE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	4	0	1	0	0	4	3	0	0	2	0	14	0
4:15 PM	0	0	0	0	0	2	0	1	0	0	7	7	0	1	3	0	21	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**0**	**21**	**3**	**0**	**1**	**6**	**0**	**35**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**1**	**0**	**0**	**26**	**5**	**0**	**1**	**8**	**0**	**43**	113
5:00 PM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**1**	**0**	**0**	**18**	**9**	**0**	**4**	**5**	**0**	**39**	138
5:15 PM	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**2**	**2**	**0**	**23**	**3**	**0**	**2**	**3**	**0**	**41**	**158**
5:30 PM	0	0	0	0	0	1	0	1	0	0	16	4	0	1	6	0	29	152
5:45 PM	0	0	0	0	0	4	0	2	1	0	3	3	0	3	0	0	16	125
Count Total	0	0	0	0	0	23	0	11	3	0	118	37	0	13	33	0	238	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**6**	**2**	**0**	**88**	**20**	**0**	**8**	**22**	**0**	**158**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

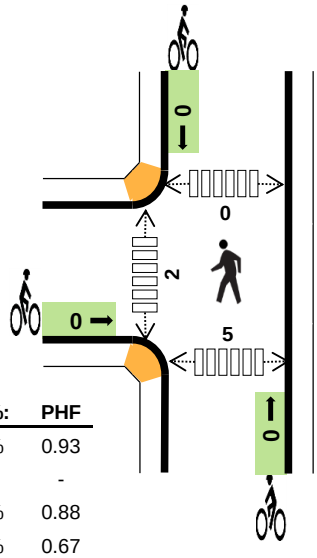
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	0	0	*0*	0	0	0	0	*0*	1	0	1	0	*2*
4:15 PM	0	0	0	0	*0*	0	0	0	0	*0*	1	7	0	0	*8*
4:30 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
4:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	*1*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**0**	**0**	***2***
5:30 PM	0	0	0	1	*1*	0	0	0	0	*0*	1	0	1	0	*2*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	1	*1*
Count Total	0	0	0	1	*1*	0	0	0	0	*0*	4	10	2	1	*17*
Peak Hr	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**1**	**3**	**0**	**0**	***4***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

BLAKE AVE
27TH ST



Date: Thu, Jan 17, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	3.8%	0.93
WB	-	-
NB	0.0%	0.88
SB	0.0%	0.67
TOTAL	1.5%	0.81

Two-Hour Count Summaries

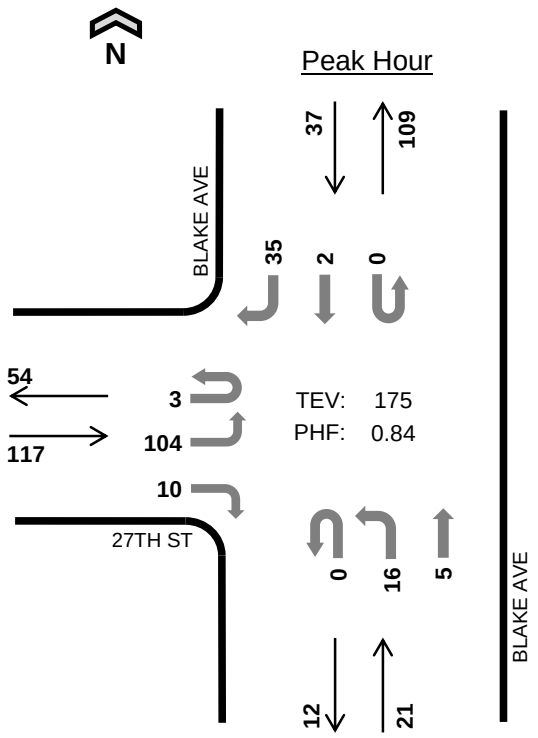
Interval Start	27TH ST Eastbound				0 Westbound				BLAKE AVE Northbound				BLAKE AVE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	1	2	0	4	0	0	0	0	0	5	0	0	0	0	2	7	21	0
7:15 AM	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	1	4	0
7:30 AM	**1**	**5**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**7**	**16**	0
7:45 AM	**1**	**3**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**6**	**15**	56
8:00 AM	**0**	**5**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**6**	**14**	49
8:15 AM	**0**	**4**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**12**	**20**	**65**
8:30 AM	0	1	0	3	0	0	0	0	0	3	1	0	0	0	0	4	12	61
8:45 AM	1	3	0	2	0	0	0	0	0	3	0	0	0	0	0	4	13	59
Count Total	4	23	0	17	0	0	0	0	0	19	2	0	0	0	3	47	115	0
Peak Hour	**2**	**17**	**0**	**7**	**0**	**0**	**0**	**0**	**0**	**6**	**1**	**0**	**0**	**0**	**1**	**31**	**65**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

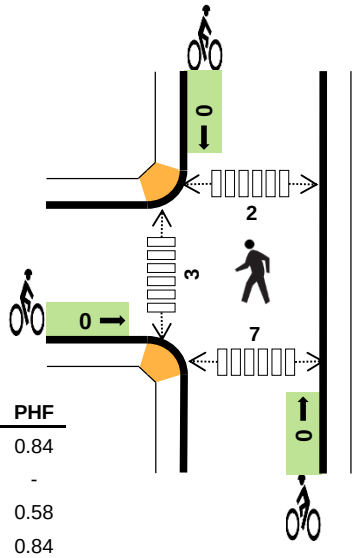
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	0	0	*0*	0	0	0	0	*0*	1	0	0	2	*3*
7:15 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	4	4	0	*8*
7:30 AM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**1**	**1**	**0**	**1**	*3*
7:45 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**3**	**0**	**0**	**3**	*6*
8:00 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**1**	**1**	**0**	**0**	*2*
8:15 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**1**	***2***
8:30 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	1	1	0	*2*
8:45 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	1	0	0	0	*1*	0	0	0	0	*0*	7	7	5	7	*26*
Peak Hr	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**6**	**2**	**0**	**5**	***13***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

BLAKE AVE
27TH ST



Date: Wed, Jan 16, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	0.0%	0.84
WB	-	-
NB	0.0%	0.58
SB	0.0%	0.84
TOTAL	0.0%	0.84

Two-Hour Count Summaries

Interval Start	27TH ST Eastbound				0 Westbound				BLAKE AVE Northbound				BLAKE AVE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	7	0	2	0	0	0	0	0	8	0	0	0	0	0	6	23	0
4:15 PM	1	13	0	5	0	0	0	0	0	6	1	0	0	0	1	4	31	0
4:30 PM	**0**	**24**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**8**	**33**	0
4:45 PM	**1**	**30**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**5**	**1**	**0**	**0**	**0**	**1**	**10**	**52**	139
5:00 PM	**1**	**26**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**4**	**1**	**0**	**0**	**0**	**0**	**7**	**43**	159
5:15 PM	**1**	**24**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**6**	**3**	**0**	**0**	**0**	**1**	**10**	**47**	**175**
5:30 PM	1	18	0	3	0	0	0	0	0	3	1	0	0	0	1	6	33	175
5:45 PM	2	5	0	4	0	0	0	0	0	5	0	0	2	0	0	3	21	144
Count Total	7	147	0	24	0	0	0	0	0	38	7	0	2	0	4	54	283	0
Peak Hour	**3**	**104**	**0**	**10**	**0**	**0**	**0**	**0**	**0**	**16**	**5**	**0**	**0**	**0**	**2**	**35**	**175**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	1	0	*1*	0	0	0	0	*0*	4	0	1	2	*7*
4:15 PM	0	0	0	0	*0*	0	0	0	0	*0*	3	7	0	3	*13*
4:30 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**1**	**0**	*3*
4:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	*1*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**1**	**1**	**0**	**1**	*3*
5:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**5**	**0**	**1**	**5**	***11***
5:30 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	2	0	0	*2*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	1	3	0	1	*5*
Count Total	0	0	1	1	*2*	0	0	0	0	*0*	14	15	3	13	*45*
Peak Hr	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**6**	**3**	**2**	**7**	***18***

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Seasonal Adjustment Factor Calculation 4/9/2019
CDOT Continuous Counter Data on SH 82 at Station 214, south of Blake Ave. KJS
Glenwood Springs, CO

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	22045	22387										
2018	23365	23237	24444	24974	25824	26106	25420	25235	24793	23781	22025	21717
2017	22576	23590	24797	25270	25389	27223	27128	23295	21072	21144	22774	23736
2016	22629	22949	23948	24786	25563	27086	27406	27089	27051	25737	23475	23145
2015	22134	22151	23508	23842	24174	26460	27049	26201	26455	25224	22799	22782
2014	20312	20646	21761	22204	22727	24366	25318	24725	24859	23947	20843	21677
Yr 2014 - 2019 Daily Average per Month	22177	22493	23692	24215	24735	26248	26464	25309	24846	23967	22383	22611
Yr 2014 - 2019 Seasonal Adjustment Factor	1.19	1.18	1.12	1.09	1.07	1.01	1.00	1.05	1.07	1.10	1.18	1.17

Summary of Traffic Volumes
Gate Closed

Palmer Avenue (N of 26th)

Existing AM Peak Hour:	22 vph
Existing PM Peak Hour:	25vph
Project AM Peak Hour:	6vph
Project PM Peak Hour:	7vph
Total AM Peak Hour:	28vph
Total PM Peak Hour:	32vph

26th Street (W of Palmer)

Existing AM Peak Hour:	23vph
Existing PM Peak Hour:	26vph
Project AM Peak Hour:	14vph
Project PM Peak Hour:	19vph
Total AM Peak Hour:	37vph
Total PM Peak Hour:	45vph

Blake Avenue (North of P&R)

Existing AM Peak Hour:	15vph
Existing PM Peak Hour:	92vph
Project AM Peak Hour:	24vph
Project PM Peak Hour:	31vph
Total AM Peak Hour:	39vph
Total PM Peak Hour:	124vph

Blake Avenue

Existing AM Peak Hour:	0vph
Existing PM Peak Hour:	0vph
Project AM Peak Hour:	0vph
Project PM Peak Hour:	0vph
Total AM Peak Hour:	0vph
Total PM Peak Hour:	0vph

Palmer Avenue (North Access)

Existing AM Peak Hour:	0vph
Existing PM Peak Hour:	0vph
Project AM Peak Hour:	20vph
Project PM Peak Hour:	26vph
Total AM Peak Hour:	20vph
Total PM Peak Hour:	26vph

Palmer Avenue (South Access)

Existing AM Peak Hour:	0vph
Existing PM Peak Hour:	0vph
Project AM Peak Hour:	25vph
Project PM Peak Hour:	31vph
Total AM Peak Hour:	25vph
Total PM Peak Hour:	31vph

Gate Closed

Notes:

1. Existing traffic volumes are Year 2018
2. Traffic volumes are in Vehicles per Hour (vph)

Project: M1247
Name: Glenwood Multifamily
Date: January 31, 2018

McDowell Engineering LLC
Transportation Engineering Consultants

Summary of Traffic Volumes
Gate Open

Palmer Avenue (N of 26th)

Existing AM Peak Hour:	68vph
Existing PM Peak Hour:	134vph
Project AM Peak Hour:	6vph
Project PM Peak Hour:	7vph
Total AM Peak Hour:	74vph
Total PM Peak Hour:	141vph

26th Street (W of Palmer)

Existing AM Peak Hour:	23vph
Existing PM Peak Hour:	26vph
Project AM Peak Hour:	14vph
Project PM Peak Hour:	19vph
Total AM Peak Hour:	37vph
Total PM Peak Hour:	66vph

Blake Avenue (North of P&R)

Background AM Peak Hour:	90vph
Background PM Peak Hour:	212vph
Project AM Peak Hour:	16vph
Project PM Peak Hour:	20vph
Total AM Peak Hour:	106vph
Total PM Peak Hour:	232vph

Blake Avenue

Background AM Peak Hour:	75vph
Background PM Peak Hour:	120vph
Project AM Peak Hour:	9vph
Project PM Peak Hour:	11vph
Total AM Peak Hour:	84vph
Total PM Peak Hour:	131vph

Palmer Avenue (North Access)

Existing AM Peak Hour:	0vph
Existing PM Peak Hour:	0vph
Project AM Peak Hour:	20vph
Project PM Peak Hour:	27vph
Total AM Peak Hour:	20vph
Total PM Peak Hour:	27vph

Palmer Avenue (South Access)

Existing AM Peak Hour:	0vph
Existing PM Peak Hour:	0vph
Project AM Peak Hour:	25vph
Project PM Peak Hour:	31vph
Total AM Peak Hour:	25vph
Total PM Peak Hour:	31vph

Notes:

1. Existing traffic volumes are Year 2018
2. Traffic volumes are in Vehicles per Hour (vph)

Project: M1247
Name: Glenwood Multifamily
Date: January 31, 2018

McDowell Engineering LLC
Transportation Engineering Consultants

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	97	65	888	82	103	1631
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Ped Bike Factor				0.98		
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.264	
Satd. Flow (perm)	1770	1583	3539	1547	492	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		71		89		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Confl. Peds. (#/hr)				1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	105	71	965	89	112	1773
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	20.0	26.0
Total Split (s)	29.5	29.5	95.5	95.5	35.0	130.5
Total Split (%)	18.4%	18.4%	59.7%	59.7%	21.9%	81.6%
Maximum Green (s)	24.0	24.0	91.0	91.0	31.0	124.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	1	1	0	0		
Act Effct Green (s)	15.3	15.3	123.1	123.1	135.2	133.2
Actuated g/C Ratio	0.10	0.10	0.77	0.77	0.84	0.83
v/c Ratio	0.62	0.33	0.35	0.07	0.24	0.60
Control Delay	84.4	16.6	6.7	1.2	5.1	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.4	16.6	6.7	1.2	5.1	12.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	F	B	A	A	A	B
Approach Delay	57.0		6.2			11.6
Approach LOS	E		A			B
90th %ile Green (s)	23.0	23.0	114.0	114.0	9.0	125.5
90th %ile Term Code	Ped	Ped	Coord	Coord	Gap	Coord
70th %ile Green (s)	17.1	17.1	121.2	121.2	7.7	131.4
70th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
50th %ile Green (s)	14.8	14.8	124.1	124.1	7.1	133.7
50th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
30th %ile Green (s)	12.5	12.5	126.5	126.5	7.0	136.0
30th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
10th %ile Green (s)	9.3	9.3	129.7	129.7	7.0	139.2
10th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
Queue Length 50th (ft)	108	0	145	0	33	474
Queue Length 95th (ft)	168	49	229	17	m47	m664
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	265	297	2722	1210	662	2945
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.24	0.35	0.07	0.17	0.60

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 12.4		Intersection LOS: B	
Intersection Capacity Utilization 60.5%		ICU Level of Service B	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	98	167	1780	175	146	941
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Ped Bike Factor	1.00	0.99		0.98		
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.082	
Satd. Flow (perm)	1768	1563	3539	1547	153	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		182		190		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Confl. Peds. (#/hr)	1	1		2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	107	182	1935	190	159	1023
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	11.0	26.0
Total Split (s)	28.5	28.5	40.5	40.5	11.0	51.5
Total Split (%)	35.6%	35.6%	50.6%	50.6%	13.8%	64.4%
Maximum Green (s)	23.0	23.0	36.0	36.0	7.0	45.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	3	3	1	1		
Act Effct Green (s)	12.1	12.1	46.4	46.4	58.4	56.4
Actuated g/C Ratio	0.15	0.15	0.58	0.58	0.73	0.70
v/c Ratio	0.40	0.47	0.94	0.19	0.61	0.41
Control Delay	33.2	8.4	28.7	2.5	27.0	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	8.4	28.7	2.5	27.0	14.5

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	C	A	C	A	C	B
Approach Delay	17.6		26.3			16.2
Approach LOS	B		C			B
90th %ile Green (s)	23.0	23.0	36.0	36.0	7.0	45.5
90th %ile Term Code	Ped	Ped	Coord	Coord	Max	Coord
70th %ile Green (s)	11.8	11.8	45.5	45.5	8.7	56.7
70th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
50th %ile Green (s)	10.2	10.2	48.2	48.2	7.6	58.3
50th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
30th %ile Green (s)	8.6	8.6	50.4	50.4	7.0	59.9
30th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
10th %ile Green (s)	7.0	7.0	52.0	52.0	7.0	61.5
10th %ile Term Code	Min	Min	Coord	Coord	Min	Coord
Queue Length 50th (ft)	50	0	402	0	65	207
Queue Length 95th (ft)	80	44	#767	34	m#118	281
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	508	579	2053	977	262	2494
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.31	0.94	0.19	0.61	0.41

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 22.3 Intersection LOS: C
Intersection Capacity Utilization 75.2% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	97	15	888	82	53	1631
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Ped Bike Factor				0.98		
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.266	
Satd. Flow (perm)	1770	1583	3539	1547	495	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		16		89		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Confl. Peds. (#/hr)				1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	105	16	965	89	58	1773
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	20.0	26.0
Total Split (s)	29.5	29.5	95.5	95.5	35.0	130.5
Total Split (%)	18.4%	18.4%	59.7%	59.7%	21.9%	81.6%
Maximum Green (s)	24.0	24.0	91.0	91.0	31.0	124.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	1	1	0	0		
Act Effct Green (s)	15.3	15.3	125.8	125.8	135.2	133.2
Actuated g/C Ratio	0.10	0.10	0.79	0.79	0.84	0.83
v/c Ratio	0.62	0.10	0.35	0.07	0.12	0.60
Control Delay	84.4	24.7	6.1	1.2	4.9	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.4	24.7	6.1	1.2	4.9	12.5

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	F	C	A	A	A	B
Approach Delay	76.5		5.7			12.3
Approach LOS	E		A			B
90th %ile Green (s)	23.0	23.0	115.5	115.5	7.5	125.5
90th %ile Term Code	Ped	Ped	Coord	Coord	Gap	Coord
70th %ile Green (s)	17.1	17.1	121.9	121.9	7.0	131.4
70th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
50th %ile Green (s)	14.8	14.8	124.2	124.2	7.0	133.7
50th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
30th %ile Green (s)	12.5	12.5	126.5	126.5	7.0	136.0
30th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
10th %ile Green (s)	9.3	9.3	140.7	140.7	0.0	139.2
10th %ile Term Code	Gap	Gap	Coord	Coord	Skip	Coord
Queue Length 50th (ft)	108	0	144	0	16	474
Queue Length 95th (ft)	168	24	221	16	m24	m651
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	265	251	2781	1234	664	2945
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.06	0.35	0.07	0.09	0.60

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 12.6		Intersection LOS: B	
Intersection Capacity Utilization 60.5%		ICU Level of Service B	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	98	87	1780	175	66	941
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Ped Bike Factor	1.00	0.99		0.98		
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.077	
Satd. Flow (perm)	1768	1563	3539	1547	143	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		95		190		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Confl. Peds. (#/hr)	1	1		2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	107	95	1935	190	72	1023
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	11.0	26.0
Total Split (s)	28.5	28.5	40.5	40.5	11.0	51.5
Total Split (%)	35.6%	35.6%	50.6%	50.6%	13.8%	64.4%
Maximum Green (s)	23.0	23.0	36.0	36.0	7.0	45.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	3	3	1	1		
Act Effct Green (s)	12.1	12.1	52.5	52.5	60.9	60.1
Actuated g/C Ratio	0.15	0.15	0.66	0.66	0.76	0.75
v/c Ratio	0.40	0.30	0.83	0.18	0.29	0.39
Control Delay	33.2	8.3	20.0	2.4	15.5	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	8.3	20.0	2.4	15.5	13.6

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	C	A	C	A	B	B
Approach Delay	21.5		18.5			13.7
Approach LOS	C		B			B
90th %ile Green (s)	23.0	23.0	36.0	36.0	7.0	45.5
90th %ile Term Code	Ped	Ped	Coord	Coord	Max	Coord
70th %ile Green (s)	11.8	11.8	47.2	47.2	7.0	56.7
70th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
50th %ile Green (s)	10.2	10.2	48.8	48.8	7.0	58.3
50th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
30th %ile Green (s)	8.6	8.6	50.4	50.4	7.0	59.9
30th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
10th %ile Green (s)	0.0	0.0	75.5	75.5	0.0	74.0
10th %ile Term Code	Skip	Skip	Coord	Coord	Skip	Coord
Queue Length 50th (ft)	50	0	393	0	25	204
Queue Length 95th (ft)	80	33	#767	34	m40	m286
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	508	517	2321	1080	251	2657
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.18	0.83	0.18	0.29	0.39

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 17.1	Intersection LOS: B
Intersection Capacity Utilization 70.7%	ICU Level of Service C
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	97	65	896	82	103	1649
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Ped Bike Factor				0.98		
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.261	
Satd. Flow (perm)	1770	1583	3539	1547	486	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		71		89		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Confl. Peds. (#/hr)				1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	105	71	974	89	112	1792
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	20.0	26.0
Total Split (s)	29.5	29.5	95.5	95.5	35.0	130.5
Total Split (%)	18.4%	18.4%	59.7%	59.7%	21.9%	81.6%
Maximum Green (s)	24.0	24.0	91.0	91.0	31.0	124.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	1	1	0	0		
Act Effct Green (s)	15.3	15.3	123.1	123.1	135.2	133.2
Actuated g/C Ratio	0.10	0.10	0.77	0.77	0.84	0.83
v/c Ratio	0.62	0.33	0.36	0.07	0.24	0.61
Control Delay	84.4	16.6	6.7	1.2	5.5	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.4	16.6	6.7	1.2	5.5	14.3

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	F	B	A	A	A	B
Approach Delay	57.0		6.3			13.8
Approach LOS	E		A			B
90th %ile Green (s)	23.0	23.0	114.0	114.0	9.0	125.5
90th %ile Term Code	Ped	Ped	Coord	Coord	Gap	Coord
70th %ile Green (s)	17.1	17.1	121.2	121.2	7.7	131.4
70th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
50th %ile Green (s)	14.8	14.8	124.1	124.1	7.1	133.7
50th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
30th %ile Green (s)	12.5	12.5	126.5	126.5	7.0	136.0
30th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
10th %ile Green (s)	9.3	9.3	129.7	129.7	7.0	139.2
10th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
Queue Length 50th (ft)	108	0	146	0	33	527
Queue Length 95th (ft)	168	49	232	17	m48	m722
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	265	297	2722	1210	659	2945
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.24	0.36	0.07	0.17	0.61

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 13.7		Intersection LOS: B	
Intersection Capacity Utilization 61.0%		ICU Level of Service B	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	98	167	1801	175	146	954
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Ped Bike Factor	1.00	0.99		0.98		
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.082	
Satd. Flow (perm)	1768	1563	3539	1547	153	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		182		190		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Confl. Peds. (#/hr)	1	1		2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	107	182	1958	190	159	1037
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	11.0	26.0
Total Split (s)	28.5	28.5	40.5	40.5	11.0	51.5
Total Split (%)	35.6%	35.6%	50.6%	50.6%	13.8%	64.4%
Maximum Green (s)	23.0	23.0	36.0	36.0	7.0	45.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	3	3	1	1		
Act Effct Green (s)	12.1	12.1	46.4	46.4	58.4	56.4
Actuated g/C Ratio	0.15	0.15	0.58	0.58	0.73	0.70
v/c Ratio	0.40	0.47	0.95	0.19	0.61	0.42
Control Delay	33.2	8.4	30.2	2.5	22.9	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	8.4	30.2	2.5	22.9	15.2

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	C	A	C	A	C	B
Approach Delay	17.6		27.8			16.2
Approach LOS	B		C			B
90th %ile Green (s)	23.0	23.0	36.0	36.0	7.0	45.5
90th %ile Term Code	Ped	Ped	Coord	Coord	Max	Coord
70th %ile Green (s)	11.8	11.8	45.5	45.5	8.7	56.7
70th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
50th %ile Green (s)	10.2	10.2	48.2	48.2	7.6	58.3
50th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
30th %ile Green (s)	8.6	8.6	50.4	50.4	7.0	59.9
30th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
10th %ile Green (s)	7.0	7.0	52.0	52.0	7.0	61.5
10th %ile Term Code	Min	Min	Coord	Coord	Min	Coord
Queue Length 50th (ft)	50	0	414	0	60	203
Queue Length 95th (ft)	80	44	#781	34	m86	m281
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	508	579	2053	977	262	2494
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.31	0.95	0.19	0.61	0.42

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 23.2	Intersection LOS: C
Intersection Capacity Utilization 75.8%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave

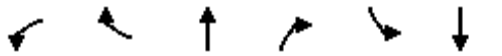
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	106	15	892	86	53	1640
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Ped Bike Factor				0.98		
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.264	
Satd. Flow (perm)	1770	1583	3539	1547	492	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		16		93		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Confl. Peds. (#/hr)				1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	115	16	970	93	58	1783
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	20.0	26.0
Total Split (s)	29.5	29.5	95.5	95.5	35.0	130.5
Total Split (%)	18.4%	18.4%	59.7%	59.7%	21.9%	81.6%
Maximum Green (s)	24.0	24.0	91.0	91.0	31.0	124.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	1	1	0	0		
Act Effct Green (s)	16.0	16.0	125.1	125.1	134.5	132.5
Actuated g/C Ratio	0.10	0.10	0.78	0.78	0.84	0.83
v/c Ratio	0.65	0.09	0.35	0.08	0.12	0.61
Control Delay	85.5	24.5	6.3	1.2	5.1	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.5	24.5	6.3	1.2	5.1	13.0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	F	C	A	A	A	B
Approach Delay	78.1		5.9			12.8
Approach LOS	E		A			B
90th %ile Green (s)	23.0	23.0	115.5	115.5	7.5	125.5
90th %ile Term Code	Ped	Ped	Coord	Coord	Gap	Coord
70th %ile Green (s)	18.1	18.1	120.9	120.9	7.0	130.4
70th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
50th %ile Green (s)	15.7	15.7	123.3	123.3	7.0	132.8
50th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
30th %ile Green (s)	13.3	13.3	125.7	125.7	7.0	135.2
30th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
10th %ile Green (s)	9.9	9.9	140.1	140.1	0.0	138.6
10th %ile Term Code	Gap	Gap	Coord	Coord	Skip	Coord
Queue Length 50th (ft)	118	0	150	0	17	485
Queue Length 95th (ft)	181	24	222	16	m24	m653
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	265	251	2767	1229	661	2930
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.06	0.35	0.08	0.09	0.61

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 13.2		Intersection LOS: B	
Intersection Capacity Utilization 60.8%		ICU Level of Service B	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	105	87	1791	186	66	948
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Ped Bike Factor	1.00	0.99		0.98		
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.077	
Satd. Flow (perm)	1768	1563	3539	1547	143	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		95		202		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Confl. Peds. (#/hr)	1	1		2	2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	114	95	1947	202	72	1030
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	11.0	26.0
Total Split (s)	28.5	28.5	40.5	40.5	11.0	51.5
Total Split (%)	35.6%	35.6%	50.6%	50.6%	13.8%	64.4%
Maximum Green (s)	23.0	23.0	36.0	36.0	7.0	45.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	3	3	1	1		
Act Effct Green (s)	12.3	12.3	52.3	52.3	60.7	59.9
Actuated g/C Ratio	0.15	0.15	0.65	0.65	0.76	0.75
v/c Ratio	0.42	0.30	0.84	0.19	0.29	0.39
Control Delay	33.6	8.3	20.6	2.3	15.6	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	8.3	20.6	2.3	15.6	13.7

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	C	A	C	A	B	B
Approach Delay	22.1		18.9			13.8
Approach LOS	C		B			B
90th %ile Green (s)	23.0	23.0	36.0	36.0	7.0	45.5
90th %ile Term Code	Ped	Ped	Coord	Coord	Max	Coord
70th %ile Green (s)	12.2	12.2	46.8	46.8	7.0	56.3
70th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
50th %ile Green (s)	10.5	10.5	48.5	48.5	7.0	58.0
50th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
30th %ile Green (s)	8.8	8.8	50.2	50.2	7.0	59.7
30th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
10th %ile Green (s)	0.0	0.0	75.5	75.5	0.0	74.0
10th %ile Term Code	Skip	Skip	Coord	Coord	Skip	Coord
Queue Length 50th (ft)	54	0	404	0	25	206
Queue Length 95th (ft)	84	33	#775	35	m40	m288
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	508	517	2313	1081	250	2649
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.18	0.84	0.19	0.29	0.39

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 17.5		Intersection LOS: B	
Intersection Capacity Utilization 70.7%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	147	98	1346	124	156	2472
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.130	
Satd. Flow (perm)	1770	1583	3539	1583	242	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		107		121		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	160	107	1463	135	170	2687
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	20.0	26.0
Total Split (s)	29.5	29.5	95.5	95.5	35.0	130.5
Total Split (%)	18.4%	18.4%	59.7%	59.7%	21.9%	81.6%
Maximum Green (s)	24.0	24.0	91.0	91.0	31.0	124.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	0	0	0	0		
Act Effct Green (s)	19.2	19.2	115.7	115.7	131.3	129.3
Actuated g/C Ratio	0.12	0.12	0.72	0.72	0.82	0.81
v/c Ratio	0.76	0.38	0.57	0.11	0.56	0.94
Control Delay	89.8	13.8	12.6	2.1	17.7	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.8	13.8	12.6	2.1	17.7	16.9
LOS	F	B	B	A	B	B
Approach Delay	59.3		11.7			17.0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	E		B			B
90th %ile Green (s)	24.0	24.0	104.0	104.0	18.0	124.5
90th %ile Term Code	Max	Max	Coord	Coord	Gap	Coord
70th %ile Green (s)	22.4	22.4	110.4	110.4	13.2	126.1
70th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
50th %ile Green (s)	19.7	19.7	116.4	116.4	9.9	128.8
50th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
30th %ile Green (s)	16.9	16.9	121.4	121.4	7.7	131.6
30th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
10th %ile Green (s)	12.8	12.8	126.2	126.2	7.0	135.7
10th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
Queue Length 50th (ft)	164	0	343	4	18	722
Queue Length 95th (ft)	242	58	525	30	m72	#738
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	265	328	2558	1178	494	2860
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.33	0.57	0.11	0.34	0.94

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green			
Natural Cycle: 135			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 17.6		Intersection LOS: B	
Intersection Capacity Utilization 86.1%		ICU Level of Service E	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	149	253	2697	266	222	1426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.092	
Satd. Flow (perm)	1770	1583	3539	1583	171	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		184		203		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	162	275	2932	289	241	1550
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	11.0	26.0
Total Split (s)	28.5	28.5	40.5	40.5	11.0	51.5
Total Split (%)	35.6%	35.6%	50.6%	50.6%	13.8%	64.4%
Maximum Green (s)	23.0	23.0	36.0	36.0	7.0	45.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	0	0	0	0		
Act Effct Green (s)	12.8	12.8	40.8	40.8	57.7	55.7
Actuated g/C Ratio	0.16	0.16	0.51	0.51	0.72	0.70
v/c Ratio	0.57	0.67	1.63	0.32	0.65	0.63
Control Delay	38.3	19.4	305.6	5.4	18.1	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	19.4	305.6	5.4	18.1	21.1
LOS	D	B	F	A	B	C
Approach Delay	26.4		278.7			20.7

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	C		F			C
90th %ile Green (s)	18.5	18.5	36.0	36.0	11.5	50.0
90th %ile Term Code	Gap	Gap	Coord	Coord	Max	Coord
70th %ile Green (s)	14.6	14.6	36.5	36.5	14.9	53.9
70th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
50th %ile Green (s)	12.6	12.6	40.2	40.2	13.2	55.9
50th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
30th %ile Green (s)	10.6	10.6	43.7	43.7	11.7	57.9
30th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
10th %ile Green (s)	7.8	7.8	47.5	47.5	10.7	60.7
10th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
Queue Length 50th (ft)	76	41	~1135	21	99	371
Queue Length 95th (ft)	124	108	#1323	70	m92	m319
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	508	586	1804	906	371	2463
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.47	1.63	0.32	0.65	0.63

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.63			
Intersection Signal Delay: 173.7		Intersection LOS: F	
Intersection Capacity Utilization 106.8%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	147	48	1346	124	106	2472
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.135	
Satd. Flow (perm)	1770	1583	3539	1583	251	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		52		121		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	160	52	1463	135	115	2687
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	20.0	26.0
Total Split (s)	29.5	29.5	95.5	95.5	35.0	130.5
Total Split (%)	18.4%	18.4%	59.7%	59.7%	21.9%	81.6%
Maximum Green (s)	24.0	24.0	91.0	91.0	31.0	124.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	0	0	0	0		
Act Effct Green (s)	19.2	19.2	118.7	118.7	131.3	129.3
Actuated g/C Ratio	0.12	0.12	0.74	0.74	0.82	0.81
v/c Ratio	0.76	0.22	0.56	0.11	0.41	0.94
Control Delay	89.8	16.4	10.7	1.7	6.5	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.8	16.4	10.7	1.7	6.5	17.4
LOS	F	B	B	A	A	B
Approach Delay	71.8		9.9			16.9

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	E		A			B
90th %ile Green (s)	24.0	24.0	110.8	110.8	11.2	124.5
90th %ile Term Code	Max	Max	Coord	Coord	Gap	Coord
70th %ile Green (s)	22.4	22.4	115.4	115.4	8.2	126.1
70th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
50th %ile Green (s)	19.7	19.7	118.8	118.8	7.5	128.8
50th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
30th %ile Green (s)	16.9	16.9	122.1	122.1	7.0	131.6
30th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
10th %ile Green (s)	12.8	12.8	126.2	126.2	7.0	135.7
10th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
Queue Length 50th (ft)	164	0	321	3	12	718
Queue Length 95th (ft)	242	42	453	26	m20	#707
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	265	281	2624	1205	500	2860
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.19	0.56	0.11	0.23	0.94

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green			
Natural Cycle: 135			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 17.0		Intersection LOS: B	
Intersection Capacity Utilization 86.1%		ICU Level of Service E	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	149	173	2697	266	142	1426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.084	
Satd. Flow (perm)	1770	1583	3539	1583	156	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		184		203		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	162	188	2932	289	154	1550
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	11.0	26.0
Total Split (s)	28.5	28.5	40.5	40.5	11.0	51.5
Total Split (%)	35.6%	35.6%	50.6%	50.6%	13.8%	64.4%
Maximum Green (s)	23.0	23.0	36.0	36.0	7.0	45.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	0	0	0	0		
Act Effct Green (s)	12.6	12.6	44.9	44.9	57.9	55.9
Actuated g/C Ratio	0.16	0.16	0.56	0.56	0.72	0.70
v/c Ratio	0.58	0.47	1.48	0.30	0.54	0.63
Control Delay	39.1	9.0	237.9	4.6	16.7	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	9.0	237.9	4.6	16.7	7.9
LOS	D	A	F	A	B	A
Approach Delay	22.9		217.0			8.7

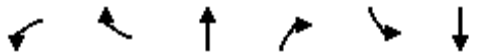
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	C		F			A
90th %ile Green (s)	17.4	17.4	36.6	36.6	12.0	51.1
90th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
70th %ile Green (s)	14.6	14.6	42.7	42.7	8.7	53.9
70th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
50th %ile Green (s)	12.6	12.6	45.7	45.7	7.7	55.9
50th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
30th %ile Green (s)	10.6	10.6	48.4	48.4	7.0	57.9
30th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
10th %ile Green (s)	7.8	7.8	51.2	51.2	7.0	60.7
10th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
Queue Length 50th (ft)	76	2	~1067	18	21	166
Queue Length 95th (ft)	126	52	#1316	69	77	292
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	508	586	1987	977	284	2472
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.32	1.48	0.30	0.54	0.63

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.48			
Intersection Signal Delay: 136.8		Intersection LOS: F	
Intersection Capacity Utilization 102.3%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: SH 82 & Blake Ave



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	147	98	1354	124	156	2490
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.128	
Satd. Flow (perm)	1770	1583	3539	1583	238	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		107		120		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	160	107	1472	135	170	2707
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	20.0	26.0
Total Split (s)	29.5	29.5	95.5	95.5	35.0	130.5
Total Split (%)	18.4%	18.4%	59.7%	59.7%	21.9%	81.6%
Maximum Green (s)	24.0	24.0	91.0	91.0	31.0	124.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	0	0	0	0		
Act Effct Green (s)	19.2	19.2	115.5	115.5	131.3	129.3
Actuated g/C Ratio	0.12	0.12	0.72	0.72	0.82	0.81
v/c Ratio	0.76	0.38	0.58	0.11	0.56	0.95
Control Delay	89.8	13.8	12.8	2.2	18.4	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.8	13.8	12.8	2.2	18.4	18.6
LOS	F	B	B	A	B	B
Approach Delay	59.3		11.9			18.6
Approach LOS	E		B			B
90th %ile Green (s)	24.0	24.0	103.7	103.7	18.3	124.5
90th %ile Term Code	Max	Max	Coord	Coord	Gap	Coord
70th %ile Green (s)	22.4	22.4	110.1	110.1	13.5	126.1
70th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
50th %ile Green (s)	19.7	19.7	116.1	116.1	10.2	128.8
50th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
30th %ile Green (s)	16.9	16.9	121.4	121.4	7.7	131.6
30th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
10th %ile Green (s)	12.8	12.8	126.2	126.2	7.0	135.7
10th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
Queue Length 50th (ft)	164	0	349	4	18	727
Queue Length 95th (ft)	242	58	533	31	m75	#672
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	265	328	2554	1176	492	2860
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.33	0.58	0.11	0.35	0.95

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 18.6 Intersection LOS: B
Intersection Capacity Utilization 86.6% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	149	253	2718	266	222	1439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.092	
Satd. Flow (perm)	1770	1583	3539	1583	171	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		184		201		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	162	275	2954	289	241	1564
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	11.0	26.0
Total Split (s)	28.5	28.5	40.5	40.5	11.0	51.5
Total Split (%)	35.6%	35.6%	50.6%	50.6%	13.8%	64.4%
Maximum Green (s)	23.0	23.0	36.0	36.0	7.0	45.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	0	0	0	0		
Act Effct Green (s)	12.8	12.8	40.8	40.8	57.7	55.7
Actuated g/C Ratio	0.16	0.16	0.51	0.51	0.72	0.70
v/c Ratio	0.57	0.67	1.64	0.32	0.65	0.63
Control Delay	38.3	19.4	311.0	5.4	23.5	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	19.4	311.0	5.4	23.5	8.2
LOS	D	B	F	A	C	A
Approach Delay	26.4		283.8			10.2
Approach LOS	C		F			B
90th %ile Green (s)	18.5	18.5	36.0	36.0	11.5	50.0
90th %ile Term Code	Gap	Gap	Coord	Coord	Max	Coord
70th %ile Green (s)	14.6	14.6	36.5	36.5	14.9	53.9
70th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
50th %ile Green (s)	12.6	12.6	40.2	40.2	13.2	55.9
50th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
30th %ile Green (s)	10.6	10.6	43.7	43.7	11.7	57.9
30th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
10th %ile Green (s)	7.8	7.8	47.5	47.5	10.7	60.7
10th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
Queue Length 50th (ft)	76	41	~1147	22	60	160
Queue Length 95th (ft)	124	108	#1335	71	m#163	297
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	508	586	1804	905	371	2463
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.47	1.64	0.32	0.65	0.63

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.64
Intersection Signal Delay: 173.3 Intersection LOS: F
Intersection Capacity Utilization 107.4% ICU Level of Service G
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave

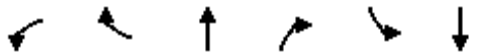
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	156	48	1350	128	106	2481
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.133	
Satd. Flow (perm)	1770	1583	3539	1583	248	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		52		124		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	170	52	1467	139	115	2697
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	20.0	26.0
Total Split (s)	29.5	29.5	95.5	95.5	35.0	130.5
Total Split (%)	18.4%	18.4%	59.7%	59.7%	21.9%	81.6%
Maximum Green (s)	24.0	24.0	91.0	91.0	31.0	124.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	0	0	0	0		
Act Effct Green (s)	19.9	19.9	117.9	117.9	130.6	128.6
Actuated g/C Ratio	0.12	0.12	0.74	0.74	0.82	0.80
v/c Ratio	0.78	0.21	0.56	0.12	0.41	0.95
Control Delay	90.6	16.2	11.1	1.8	6.8	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.6	16.2	11.1	1.8	6.8	18.2
LOS	F	B	B	A	A	B
Approach Delay	73.2		10.3			17.7
Approach LOS	E		B			B
90th %ile Green (s)	24.0	24.0	110.6	110.6	11.4	124.5
90th %ile Term Code	Max	Max	Coord	Coord	Gap	Coord
70th %ile Green (s)	23.4	23.4	114.3	114.3	8.3	125.1
70th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
50th %ile Green (s)	20.6	20.6	117.9	117.9	7.5	127.9
50th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
30th %ile Green (s)	17.7	17.7	121.3	121.3	7.0	130.8
30th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
10th %ile Green (s)	13.6	13.6	125.4	125.4	7.0	134.9
10th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
Queue Length 50th (ft)	174	0	331	4	13	724
Queue Length 95th (ft)	257	42	457	27	m20	#724
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	265	281	2607	1199	497	2845
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.19	0.56	0.12	0.23	0.95

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 17.8		Intersection LOS: B	
Intersection Capacity Utilization 86.8%		ICU Level of Service E	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: SH 82 & Blake Ave



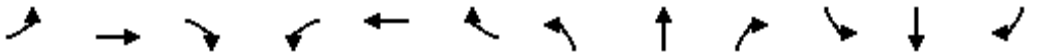
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	156	173	2708	277	142	1433
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		306	230	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.950				0.085	
Satd. Flow (perm)	1770	1583	3539	1583	158	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		184		211		
Link Speed (mph)	25		35			35
Link Distance (ft)	268		311			2160
Travel Time (s)	7.3		6.1			42.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	170	188	2943	301	154	1558
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	20.0	20.0	7.0	20.0
Minimum Split (s)	28.5	28.5	32.5	32.5	11.0	26.0
Total Split (s)	28.5	28.5	40.5	40.5	11.0	51.5
Total Split (%)	35.6%	35.6%	50.6%	50.6%	13.8%	64.4%
Maximum Green (s)	23.0	23.0	36.0	36.0	7.0	45.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	4.5	4.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	0.2	0.2	3.0	0.2
Recall Mode	None	None	Min	Min	None	C-Min
Walk Time (s)	4.0	4.0	14.0	14.0		
Flash Dont Walk (s)	19.0	19.0	14.0	14.0		
Pedestrian Calls (#/hr)	0	0	0	0		
Act Effct Green (s)	13.0	13.0	44.5	44.5	57.5	55.5
Actuated g/C Ratio	0.16	0.16	0.56	0.56	0.72	0.69
v/c Ratio	0.59	0.46	1.49	0.31	0.54	0.63
Control Delay	39.1	8.7	246.5	4.8	16.5	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	8.7	246.5	4.8	16.5	8.2
LOS	D	A	F	A	B	A
Approach Delay	23.1		224.1			9.0
Approach LOS	C		F			A
90th %ile Green (s)	17.9	17.9	36.0	36.0	12.1	50.6
90th %ile Term Code	Gap	Gap	Coord	Coord	Max	Coord
70th %ile Green (s)	15.0	15.0	42.2	42.2	8.8	53.5
70th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
50th %ile Green (s)	13.0	13.0	45.3	45.3	7.7	55.5
50th %ile Term Code	Gap	Gap	Coord	Coord	Gap	Coord
30th %ile Green (s)	10.9	10.9	48.1	48.1	7.0	57.6
30th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
10th %ile Green (s)	8.0	8.0	51.0	51.0	7.0	60.5
10th %ile Term Code	Gap	Gap	Coord	Coord	Min	Coord
Queue Length 50th (ft)	80	2	~1078	19	21	171
Queue Length 95th (ft)	131	51	#1329	73	77	300
Internal Link Dist (ft)	188		231			2080
Turn Bay Length (ft)				306	230	
Base Capacity (vph)	508	586	1969	974	285	2457
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.32	1.49	0.31	0.54	0.63

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.49
Intersection Signal Delay: 141.2 Intersection LOS: F
Intersection Capacity Utilization 103.0% ICU Level of Service G
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: SH 82 & Blake Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	361	14	443	48	6	11	131	838	12	13	1344	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98	0.99	0.99				0.97	1.00		0.97
Frt			0.850		0.905				0.850			0.850
Flt Protected	0.950	0.956		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1692	1583	1770	1667	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.114	0.110		0.624			0.053			0.280		
Satd. Flow (perm)	202	195	1554	1150	1667	0	99	3539	1534	519	3539	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			342		12				109			82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Confl. Peds. (#/hr)	6		3	6		3	6		3	6		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	48%											
Lane Group Flow (vph)	204	203	482	52	19	0	142	911	13	14	1461	59
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	27.0	27.0	27.0	21.5	21.5		11.0	33.5	26.5	9.0	26.5	33.5
Total Split (s)	28.0	28.0	28.0	32.5	32.5		24.5	89.0	75.0	10.5	75.0	89.0
Total Split (%)	17.5%	17.5%	17.5%	20.3%	20.3%		15.3%	55.6%	46.9%	6.6%	46.9%	55.6%
Maximum Green (s)	22.5	22.5	22.5	27.0	27.0		20.5	83.5	69.5	6.5	69.5	83.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	4	4	4					2	2		2	2
Act Effct Green (s)	35.1	35.1	35.1	12.7	12.7		99.7	94.1	80.3	87.7	80.3	94.1
Actuated g/C Ratio	0.22	0.22	0.22	0.08	0.08		0.62	0.59	0.50	0.55	0.50	0.59
v/c Ratio	4.64	4.83	0.79	0.57	0.13		0.69	0.44	0.02	0.04	0.82	0.06
Control Delay	1709.6	1779.4	28.2	93.7	39.2		72.5	15.2	0.0	9.3	32.7	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1709.6	1779.4	28.2	93.7	39.2		72.5	15.2	0.0	9.3	32.7	0.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	F	F	C	F	D		E	B	A	A	C	A
Approach Delay		813.9			79.1			22.7			31.2	
Approach LOS		F			E			C			C	
90th %ile Green (s)	22.5	22.5	22.5	18.6	18.6		19.6	91.8	78.8	6.6	78.8	91.8
90th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
70th %ile Green (s)	25.3	25.3	25.3	15.1	15.1		16.1	92.9	83.0	6.2	83.0	92.9
70th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
50th %ile Green (s)	33.6	33.6	33.6	12.6	12.6		13.9	97.3	79.4	0.0	79.4	97.3
50th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
30th %ile Green (s)	41.2	41.2	41.2	10.1	10.1		11.7	92.2	76.5	0.0	76.5	92.2
30th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	52.8	52.8	52.8	0.0	0.0		8.6	96.2	83.6	0.0	83.6	96.2
10th %ile Term Code	Max	Max	Max	Skip	Skip		Gap	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	~377	~378	149	53	7		101	160	0	3	698	1
Queue Length 95th (ft)	#595	#595	#395	100	35		182	174	m0	m8	284	4
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	44	42	607	194	291		275	2080	823	337	1775	938
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	4.64	4.83	0.79	0.27	0.07		0.52	0.44	0.02	0.04	0.82	0.06

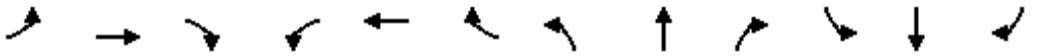
Intersection Summary	
Area Type:	Other
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 4.83	
Intersection Signal Delay: 225.1	Intersection LOS: F
Intersection Capacity Utilization 84.5%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	20	256	48	30	13	440	1570	119	18	876	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00	0.99	1.00	1.00		1.00		0.98	1.00		0.98
Frt			0.850		0.955				0.850			0.850
Flt Protected	0.950	0.968		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1713	1583	1770	1771	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.214	0.177		0.714			0.146			0.171		
Satd. Flow (perm)	378	313	1563	1329	1771	0	272	3539	1546	318	3539	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			257		14				164			164
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Confl. Peds. (#/hr)	1		1	1		1	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	40%											
Lane Group Flow (vph)	62	64	278	52	47	0	478	1707	129	20	952	79
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	26.5	9.0	26.5	32.0
Total Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	30.0	9.0	30.0	32.0
Total Split (%)	33.1%	33.1%	33.1%	15.6%	15.6%		13.8%	40.0%	37.5%	11.3%	37.5%	40.0%
Maximum Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	6	6	6					1	1		1	1
Act Effct Green (s)	18.7	18.7	18.7	7.0	7.0		41.0	36.7	24.5	31.2	24.5	36.7
Actuated g/C Ratio	0.23	0.23	0.23	0.09	0.09		0.51	0.46	0.31	0.39	0.31	0.46
v/c Ratio	0.70	0.88	0.49	0.45	0.28		1.33	1.05	0.22	0.09	0.88	0.10
Control Delay	68.7	109.1	7.7	47.5	30.9		183.8	55.1	3.4	13.8	36.5	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.7	109.1	7.7	47.5	30.9		183.8	55.1	3.4	13.8	36.5	3.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	F	A	D	C		F	E	A	B	D	A
Approach Delay		33.1			39.7			78.8			33.6	
Approach LOS		C			D			E			C	
90th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
90th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
70th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
70th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
50th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	35.5	24.5	0.0	24.5	35.5
50th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Skip	Coord	Coord
30th %ile Green (s)	19.8	19.8	19.8	7.0	7.0		8.2	36.7	24.5	0.0	24.5	36.7
30th %ile Term Code	Gap	Gap	Gap	Min	Min		Max	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	10.9	10.9	10.9	0.0	0.0		29.6	58.1	24.5	0.0	24.5	58.1
10th %ile Term Code	Gap	Gap	Gap	Skip	Skip		Max	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	28	31	8	25	16		~311	~534	10	6	258	2
Queue Length 95th (ft)	#93	#106	65	#62	48		m#369	m#716	m15	m18	#347	m12
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	99	82	599	116	167		359	1621	587	218	1083	797
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.78	0.46	0.45	0.28		1.33	1.05	0.22	0.09	0.88	0.10

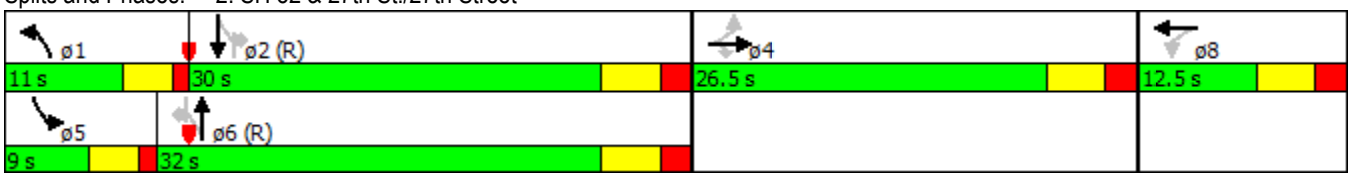
Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.33	
Intersection Signal Delay: 60.7	Intersection LOS: E
Intersection Capacity Utilization 71.2%	ICU Level of Service C
Analysis Period (min) 15	

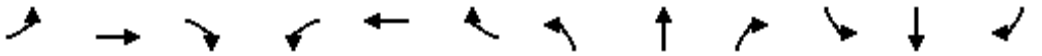
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	361	14	443	38	6	11	131	798	2	13	1304	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98	0.99	0.99				0.97	1.00		0.97
Frt			0.850		0.905				0.850			0.850
Flt Protected	0.950	0.956		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1692	1583	1770	1667	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.106	0.102		0.624			0.057			0.298		
Satd. Flow (perm)	188	180	1554	1150	1667	0	106	3539	1534	553	3539	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			358		12				109			82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Confl. Peds. (#/hr)	6		3	6		3	6		3	6		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	48%											
Lane Group Flow (vph)	204	203	482	41	19	0	142	867	2	14	1417	59
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	27.0	27.0	27.0	21.5	21.5		11.0	33.5	26.5	9.0	26.5	33.5
Total Split (s)	28.0	28.0	28.0	32.5	32.5		24.5	89.0	75.0	10.5	75.0	89.0
Total Split (%)	17.5%	17.5%	17.5%	20.3%	20.3%		15.3%	55.6%	46.9%	6.6%	46.9%	55.6%
Maximum Green (s)	22.5	22.5	22.5	27.0	27.0		20.5	83.5	69.5	6.5	69.5	83.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	4	4	4					2	2		2	2
Act Effct Green (s)	37.9	37.9	37.9	11.3	11.3		98.2	92.6	78.6	86.1	78.6	92.6
Actuated g/C Ratio	0.24	0.24	0.24	0.07	0.07		0.61	0.58	0.49	0.54	0.49	0.58
v/c Ratio	4.64	4.83	0.75	0.51	0.15		0.67	0.42	0.00	0.04	0.82	0.06
Control Delay	1699.9	1779.4	23.5	91.6	40.7		70.3	15.8	0.0	9.6	32.5	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1699.9	1779.4	23.5	91.6	40.7		70.3	15.8	0.0	9.6	32.5	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	F	F	C	F	D		E	B	A	A	C	A
Approach Delay		809.1			75.5			23.4			31.0	
Approach LOS		F			E			C			C	
90th %ile Green (s)	22.5	22.5	22.5	16.4	16.4		19.6	94.0	81.0	6.6	81.0	94.0
90th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
70th %ile Green (s)	30.5	30.5	30.5	13.3	13.3		16.4	89.5	79.3	6.2	79.3	89.5
70th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
50th %ile Green (s)	39.3	39.3	39.3	11.1	11.1		14.3	93.1	74.8	0.0	74.8	93.1
50th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
30th %ile Green (s)	43.2	43.2	43.2	8.9	8.9		11.8	91.4	75.6	0.0	75.6	91.4
30th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	54.1	54.1	54.1	0.0	0.0		8.7	94.9	82.2	0.0	82.2	94.9
10th %ile Term Code	Max	Max	Max	Skip	Skip		Gap	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	~368	~370	122	42	7		102	166	0	4	697	1
Queue Length 95th (ft)	#600	#600	#364	84	35		177	155	m0	m7	259	4
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	44	42	641	194	291		278	2047	809	349	1738	924
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	4.64	4.83	0.75	0.21	0.07		0.51	0.42	0.00	0.04	0.82	0.06

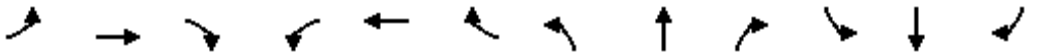
Intersection Summary	
Area Type:	Other
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 4.83	
Intersection Signal Delay: 230.1	Intersection LOS: F
Intersection Capacity Utilization 83.4%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street



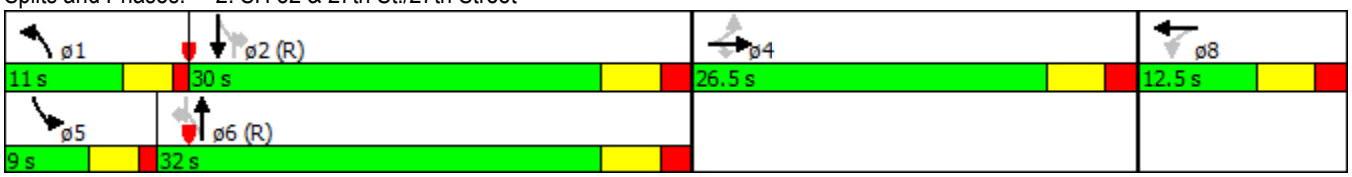
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	20	256	33	30	13	440	1505	104	18	811	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00	0.99	1.00	1.00		1.00		0.98	1.00		0.98
Frt			0.850		0.955				0.850			0.850
Flt Protected	0.950	0.968		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1713	1583	1770	1771	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.214	0.177		0.714			0.146			0.171		
Satd. Flow (perm)	378	313	1563	1329	1771	0	272	3539	1546	318	3539	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			278		14				164			164
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Confl. Peds. (#/hr)	1		1	1		1	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	40%											
Lane Group Flow (vph)	62	64	278	36	47	0	478	1636	113	20	882	79
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	26.5	9.0	26.5	32.0
Total Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	30.0	9.0	30.0	32.0
Total Split (%)	33.1%	33.1%	33.1%	15.6%	15.6%		13.8%	40.0%	37.5%	11.3%	37.5%	40.0%
Maximum Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	6	6	6					1	1		1	1
Act Effct Green (s)	18.7	18.7	18.7	7.0	7.0		41.0	36.7	24.5	31.2	24.5	36.7
Actuated g/C Ratio	0.23	0.23	0.23	0.09	0.09		0.51	0.46	0.31	0.39	0.31	0.46
v/c Ratio	0.70	0.88	0.48	0.31	0.28		1.33	1.01	0.19	0.09	0.81	0.10
Control Delay	68.7	109.1	6.3	41.8	30.9		185.9	43.4	3.1	14.3	33.5	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.7	109.1	6.3	41.8	30.9		185.9	43.4	3.1	14.3	33.5	4.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	F	A	D	C		F	D	A	B	C	A
Approach Delay		32.2			35.7			72.0			30.7	
Approach LOS		C			D			E			C	
90th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
90th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
70th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
70th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
50th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	35.5	24.5	0.0	24.5	35.5
50th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Skip	Coord	Coord
30th %ile Green (s)	19.8	19.8	19.8	7.0	7.0		8.2	36.7	24.5	0.0	24.5	36.7
30th %ile Term Code	Gap	Gap	Gap	Min	Min		Max	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	10.9	10.9	10.9	0.0	0.0		29.6	58.1	24.5	0.0	24.5	58.1
10th %ile Term Code	Gap	Gap	Gap	Skip	Skip		Max	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	28	31	0	17	16		~309	~494	6	7	251	2
Queue Length 95th (ft)	#93	#106	56	46	48		m#424	#742	m14	m18	#284	m12
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	99	82	615	116	167		359	1621	587	218	1083	797
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.78	0.45	0.31	0.28		1.33	1.01	0.19	0.09	0.81	0.10

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.33
Intersection Signal Delay: 55.9 Intersection LOS: E
Intersection Capacity Utilization 69.4% ICU Level of Service C
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	361	15	443	66	9	16	131	838	20	15	1344	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98	0.99	0.99				0.97	1.00		0.97
Frt			0.850		0.906				0.850			0.850
Flt Protected	0.950	0.956		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1692	1583	1770	1669	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.123	0.118		0.624			0.049			0.277		
Satd. Flow (perm)	218	209	1554	1150	1669	0	91	3539	1534	514	3539	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			317		17				109			82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Confl. Peds. (#/hr)	6		3	6		3	6		3	6		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	48%											
Lane Group Flow (vph)	204	204	482	72	27	0	142	911	22	16	1461	59
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	27.0	27.0	27.0	21.5	21.5		11.0	33.5	26.5	9.0	26.5	33.5
Total Split (s)	28.0	28.0	28.0	32.5	32.5		24.5	89.0	75.0	10.5	75.0	89.0
Total Split (%)	17.5%	17.5%	17.5%	20.3%	20.3%		15.3%	55.6%	46.9%	6.6%	46.9%	55.6%
Maximum Green (s)	22.5	22.5	22.5	27.0	27.0		20.5	83.5	69.5	6.5	69.5	83.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	4	4	4					2	2		2	2
Act Effct Green (s)	32.5	32.5	32.5	15.3	15.3		97.2	91.5	77.8	85.4	77.8	91.5
Actuated g/C Ratio	0.20	0.20	0.20	0.10	0.10		0.61	0.57	0.49	0.53	0.49	0.57
v/c Ratio	4.64	4.86	0.85	0.66	0.15		0.71	0.45	0.03	0.05	0.85	0.06
Control Delay	1709.6	1800.5	35.7	95.5	35.2		79.4	16.0	0.1	9.9	35.3	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1709.6	1800.5	35.7	95.5	35.2		79.4	16.0	0.1	9.9	35.3	0.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	F	F	D	F	D		E	B	A	A	D	A
Approach Delay		823.9			79.1			24.0			33.8	
Approach LOS		F			E			C			C	
90th %ile Green (s)	22.5	22.5	22.5	22.5	22.5		19.7	87.7	74.8	6.8	74.8	87.7
90th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
70th %ile Green (s)	22.8	22.8	22.8	18.2	18.2		15.9	92.2	82.6	6.3	82.6	92.2
70th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
50th %ile Green (s)	31.8	31.8	31.8	15.3	15.3		13.8	96.4	78.6	0.0	78.6	96.4
50th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
30th %ile Green (s)	39.9	39.9	39.9	12.4	12.4		11.6	91.2	75.6	0.0	75.6	91.2
30th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	45.5	45.5	45.5	8.2	8.2		8.3	89.8	77.5	0.0	77.5	89.8
10th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	~415	~417	184	74	10		105	154	0	4	706	2
Queue Length 95th (ft)	#590	#593	#442	127	41		187	176	0	m9	289	5
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	44	42	568	194	295		270	2023	802	327	1721	914
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	4.64	4.86	0.85	0.37	0.09		0.53	0.45	0.03	0.05	0.85	0.06

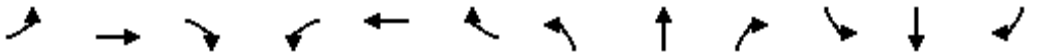
Intersection Summary	
Area Type:	Other
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 4.86	
Intersection Signal Delay: 227.4	Intersection LOS: F
Intersection Capacity Utilization 84.5%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street



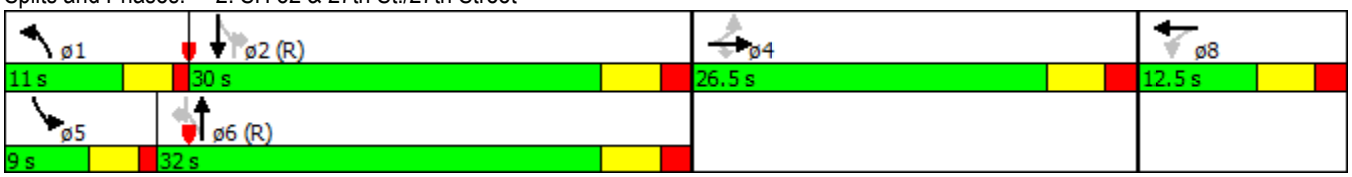
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	24	256	61	32	16	440	1570	140	23	876	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00	0.99	1.00	0.99		1.00		0.98	1.00		0.98
Frt			0.850		0.951				0.850			0.850
Flt Protected	0.950	0.970		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1717	1583	1770	1763	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.211	0.170		0.711			0.146			0.171		
Satd. Flow (perm)	373	301	1563	1323	1763	0	272	3539	1546	318	3539	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			238		17				164			164
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Confl. Peds. (#/hr)	1		1	1		1	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	39%											
Lane Group Flow (vph)	63	67	278	66	52	0	478	1707	152	25	952	79
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	26.5	9.0	26.5	32.0
Total Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	30.0	9.0	30.0	32.0
Total Split (%)	33.1%	33.1%	33.1%	15.6%	15.6%		13.8%	40.0%	37.5%	11.3%	37.5%	40.0%
Maximum Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	6	6	6					1	1		1	1
Act Effct Green (s)	19.0	19.0	19.0	7.1	7.1		40.6	36.3	24.5	31.1	24.5	36.3
Actuated g/C Ratio	0.24	0.24	0.24	0.09	0.09		0.51	0.45	0.31	0.39	0.31	0.45
v/c Ratio	0.72	0.94	0.50	0.56	0.30		1.36	1.06	0.26	0.12	0.88	0.10
Control Delay	71.0	126.5	8.9	55.5	30.5		196.0	58.5	4.5	13.9	36.4	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.0	126.5	8.9	55.5	30.5		196.0	58.5	4.5	13.9	36.4	3.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	F	A	E	C		F	E	A	B	D	A
Approach Delay		37.8			44.5			83.1			33.4	
Approach LOS		D			D			F			C	
90th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
90th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
70th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
70th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
50th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	35.5	24.5	0.0	24.5	35.5
50th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Skip	Coord	Coord
30th %ile Green (s)	20.5	20.5	20.5	7.5	7.5		7.0	35.5	24.5	0.0	24.5	35.5
30th %ile Term Code	Gap	Gap	Gap	Max	Max		Max	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	11.4	11.4	11.4	0.0	0.0		29.1	57.6	24.5	0.0	24.5	57.6
10th %ile Term Code	Gap	Gap	Gap	Skip	Skip		Max	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	29	33	15	32	17		~310	~535	18	8	255	2
Queue Length 95th (ft)	#96	#112	76	#87	50		m#363	m#706	m21	m21	#348	m12
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	97	79	585	117	171		351	1606	587	215	1083	791
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.85	0.48	0.56	0.30		1.36	1.06	0.26	0.12	0.88	0.10

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.36
Intersection Signal Delay: 63.8 Intersection LOS: E
Intersection Capacity Utilization 71.3% ICU Level of Service C
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	361	15	443	47	9	16	131	798	6	15	1304	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98	0.99	0.99				0.97	1.00		0.97
Frt			0.850		0.906				0.850			0.850
Flt Protected	0.950	0.956		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1692	1583	1770	1669	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.107	0.103		0.624			0.055			0.296		
Satd. Flow (perm)	189	182	1554	1150	1669	0	102	3539	1534	549	3539	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			344		17				109			82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Confl. Peds. (#/hr)	6		3	6		3	6		3	6		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	48%											
Lane Group Flow (vph)	204	204	482	51	27	0	142	867	7	16	1417	59
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	27.0	27.0	27.0	21.5	21.5		11.0	33.5	26.5	9.0	26.5	33.5
Total Split (s)	28.0	28.0	28.0	32.5	32.5		24.5	89.0	75.0	10.5	75.0	89.0
Total Split (%)	17.5%	17.5%	17.5%	20.3%	20.3%		15.3%	55.6%	46.9%	6.6%	46.9%	55.6%
Maximum Green (s)	22.5	22.5	22.5	27.0	27.0		20.5	83.5	69.5	6.5	69.5	83.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	4	4	4					2	2		2	2
Act Effct Green (s)	37.4	37.4	37.4	12.5	12.5		97.5	91.8	77.9	85.5	77.9	91.8
Actuated g/C Ratio	0.23	0.23	0.23	0.08	0.08		0.61	0.57	0.49	0.53	0.49	0.57
v/c Ratio	4.64	4.86	0.77	0.57	0.18		0.68	0.43	0.01	0.05	0.82	0.06
Control Delay	1719.2	1800.4	25.9	93.5	37.9		73.3	15.9	0.0	9.9	33.3	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1719.2	1800.4	25.9	93.5	37.9		73.3	15.9	0.0	9.9	33.3	0.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	F	F	C	F	D		E	B	A	A	C	A
Approach Delay		820.8			74.3			23.8			31.8	
Approach LOS		F			E			C			C	
90th %ile Green (s)	22.5	22.5	22.5	18.4	18.4		19.6	91.9	79.0	6.7	79.0	91.9
90th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
70th %ile Green (s)	29.3	29.3	29.3	14.9	14.9		16.3	89.0	79.0	6.3	79.0	89.0
70th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
50th %ile Green (s)	38.5	38.5	38.5	12.4	12.4		14.2	92.6	74.4	0.0	74.4	92.6
50th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
30th %ile Green (s)	42.7	42.7	42.7	10.0	10.0		11.8	90.8	75.0	0.0	75.0	90.8
30th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	54.1	54.1	54.1	0.0	0.0		8.7	94.9	82.2	0.0	82.2	94.9
10th %ile Term Code	Max	Max	Max	Skip	Skip		Gap	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	~370	~373	140	53	10		104	164	0	4	701	2
Queue Length 95th (ft)	#598	#601	#391	99	43		179	155	m0	m9	260	4
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	44	42	627	194	295		275	2031	802	345	1723	917
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	4.64	4.86	0.77	0.26	0.09		0.52	0.43	0.01	0.05	0.82	0.06

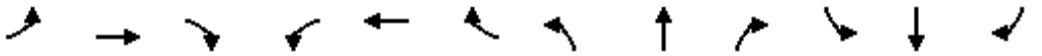
Intersection Summary	
Area Type:	Other
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 4.86	
Intersection Signal Delay: 232.4	Intersection LOS: F
Intersection Capacity Utilization 83.4%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street



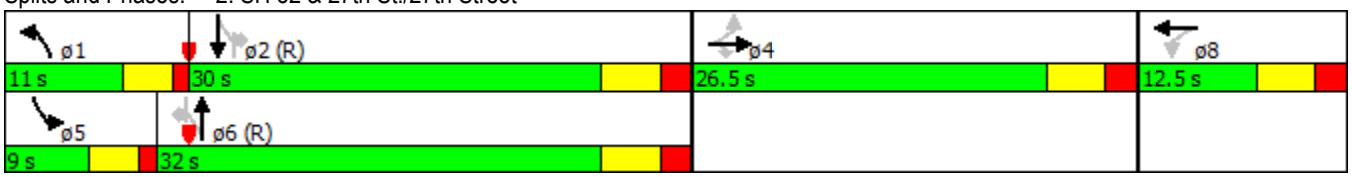
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	24	256	40	32	16	440	1505	115	23	811	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00	0.99	1.00	0.99		1.00		0.98	1.00		0.98
Frt			0.850		0.951				0.850			0.850
Flt Protected	0.950	0.970		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1717	1583	1770	1763	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.211	0.170		0.714			0.146			0.171		
Satd. Flow (perm)	373	301	1563	1329	1763	0	272	3539	1546	318	3539	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			275		17				164			164
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Confl. Peds. (#/hr)	1		1	1		1	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	39%											
Lane Group Flow (vph)	63	67	278	43	52	0	478	1636	125	25	882	79
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	26.5	9.0	26.5	32.0
Total Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	30.0	9.0	30.0	32.0
Total Split (%)	33.1%	33.1%	33.1%	15.6%	15.6%		13.8%	40.0%	37.5%	11.3%	37.5%	40.0%
Maximum Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	6	6	6					1	1		1	1
Act Effct Green (s)	19.0	19.0	19.0	7.0	7.0		40.7	36.4	24.5	31.2	24.5	36.4
Actuated g/C Ratio	0.24	0.24	0.24	0.09	0.09		0.51	0.46	0.31	0.39	0.31	0.46
v/c Ratio	0.72	0.94	0.48	0.37	0.31		1.35	1.02	0.21	0.11	0.81	0.10
Control Delay	71.0	126.5	6.5	44.1	30.6		194.5	45.0	3.5	14.4	33.5	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.0	126.5	6.5	44.1	30.6		194.5	45.0	3.5	14.4	33.5	4.0

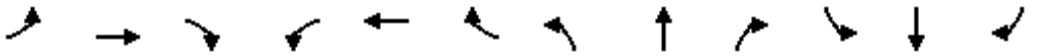
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	F	A	D	C		F	D	A	B	C	A
Approach Delay		36.1			36.7			74.6			30.7	
Approach LOS		D			D			E			C	
90th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
90th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
70th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
70th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
50th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	35.5	24.5	0.0	24.5	35.5
50th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Skip	Coord	Coord
30th %ile Green (s)	20.5	20.5	20.5	7.0	7.0		7.5	36.0	24.5	0.0	24.5	36.0
30th %ile Term Code	Gap	Gap	Gap	Min	Min		Max	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	11.4	11.4	11.4	0.0	0.0		29.1	57.6	24.5	0.0	24.5	57.6
10th %ile Term Code	Gap	Gap	Gap	Skip	Skip		Max	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	29	33	1	21	17		~309	~494	10	9	251	2
Queue Length 95th (ft)	#96	#112	57	52	50		m#418	#742	m17	m21	#284	m12
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	97	79	613	116	169		354	1611	587	218	1083	793
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.85	0.45	0.37	0.31		1.35	1.02	0.21	0.11	0.81	0.10

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.35
Intersection Signal Delay: 57.8 Intersection LOS: E
Intersection Capacity Utilization 69.5% ICU Level of Service C
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	547	22	671	73	9	16	198	1270	18	20	2037	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.906				0.850			0.850
Flt Protected	0.950	0.956		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1692	1583	1770	1688	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.178	0.171		0.563			0.047			0.140		
Satd. Flow (perm)	315	303	1583	1049	1688	0	88	3539	1583	261	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			303		17				109			82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	48%											
Lane Group Flow (vph)	309	310	729	79	27	0	215	1380	20	22	2214	89
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	27.0	27.0	27.0	21.5	21.5		11.0	33.5	26.5	9.0	26.5	33.5
Total Split (s)	28.0	28.0	28.0	32.5	32.5		24.5	89.0	75.0	10.5	75.0	89.0
Total Split (%)	17.5%	17.5%	17.5%	20.3%	20.3%		15.3%	55.6%	46.9%	6.6%	46.9%	55.6%
Maximum Green (s)	22.5	22.5	22.5	27.0	27.0		20.5	83.5	69.5	6.5	69.5	83.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	0	0	0					0	0		0	0
Act Effct Green (s)	22.5	22.5	22.5	17.3	17.3		105.2	97.3	80.5	88.2	80.5	97.3
Actuated g/C Ratio	0.14	0.14	0.14	0.11	0.11		0.66	0.61	0.50	0.55	0.50	0.61
v/c Ratio	7.02	7.38	1.51	0.70	0.14		0.83	0.64	0.02	0.11	1.24	0.09
Control Delay	2765.8	2928.5	264.4	97.8	33.5		58.9	40.4	0.1	14.9	142.6	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2765.8	2928.5	264.4	97.8	33.5		58.9	40.4	0.1	14.9	142.6	6.1
LOS	F	F	F	F	C		E	D	A	B	F	A
Approach Delay		1450.5			81.4			42.3			136.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			D			F	
90th %ile Green (s)	22.5	22.5	22.5	25.4	25.4		22.1	84.3	69.5	7.3	69.5	84.3
90th %ile Term Code	Max	Max	Max	Gap	Gap		Max	Coord	Coord	Gap	Coord	Coord
70th %ile Green (s)	22.5	22.5	22.5	20.6	20.6		23.9	89.8	72.5	6.6	72.5	89.8
70th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
50th %ile Green (s)	22.5	22.5	22.5	17.3	17.3		20.4	93.6	79.3	6.1	79.3	93.6
50th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
30th %ile Green (s)	22.5	22.5	22.5	14.0	14.0		17.1	107.0	85.9	0.0	85.9	107.0
30th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	22.5	22.5	22.5	9.2	9.2		12.5	111.8	95.3	0.0	95.3	111.8
10th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	~654	~625	~774	81	10		168	665	0	7	~1504	3
Queue Length 95th (ft)	#831	#837	#1031	136	40		#286	870	m0	m20	#1763	m38
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	44	42	483	177	298		283	2152	850	207	1780	994
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	7.02	7.38	1.51	0.45	0.09		0.76	0.64	0.02	0.11	1.24	0.09

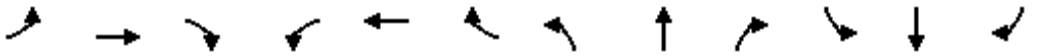
Intersection Summary	
Area Type:	Other
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 7.38	
Intersection Signal Delay: 435.5	Intersection LOS: F
Intersection Capacity Utilization 117.4%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street



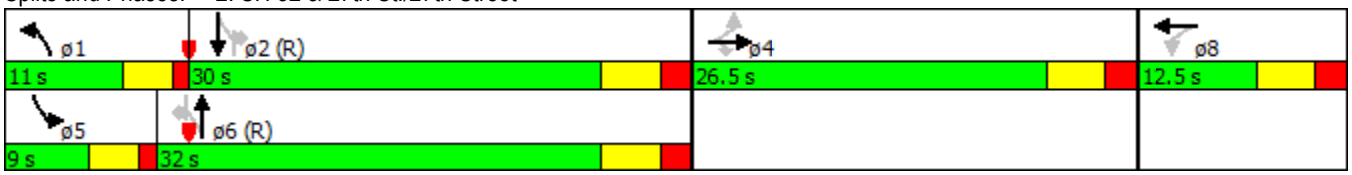
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	146	31	387	73	45	20	667	2379	180	27	1328	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.954				0.850			0.850
Flt Protected	0.950	0.968		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1713	1583	1770	1777	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.190	0.157		0.714			0.146			0.171		
Satd. Flow (perm)	336	278	1583	1330	1777	0	272	3539	1583	319	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			215		22				164			164
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	40%											
Lane Group Flow (vph)	95	98	421	79	71	0	725	2586	196	29	1443	121
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	26.5	9.0	26.5	32.0
Total Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	30.0	9.0	30.0	32.0
Total Split (%)	33.1%	33.1%	33.1%	15.6%	15.6%		13.8%	40.0%	37.5%	11.3%	37.5%	40.0%
Maximum Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	0	0	0					0	0		0	0
Act Effct Green (s)	21.0	21.0	21.0	7.0	7.0		38.7	34.4	24.5	31.1	24.5	34.4
Actuated g/C Ratio	0.26	0.26	0.26	0.09	0.09		0.48	0.43	0.31	0.39	0.31	0.43
v/c Ratio	1.08	1.36	0.73	0.68	0.41		2.35	1.70	0.33	0.13	1.33	0.16
Control Delay	154.3	259.7	21.7	66.0	33.2		624.3	334.1	4.2	12.3	182.9	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	154.3	259.7	21.7	66.0	33.2		624.3	334.1	4.2	12.3	182.9	5.3
LOS	F	F	C	E	C		F	F	A	B	F	A
Approach Delay		80.2			50.5			375.7			166.3	

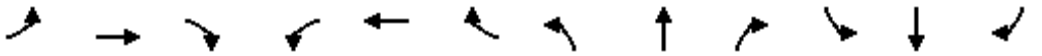
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			D			F			F	
90th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
90th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
70th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
70th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
50th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	35.5	24.5	0.0	24.5	35.5
50th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Skip	Coord	Coord
30th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	35.5	24.5	0.0	24.5	35.5
30th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	21.0	21.0	21.0	0.0	0.0		19.5	48.0	24.5	0.0	24.5	48.0
10th %ile Term Code	Max	Max	Max	Skip	Skip		Max	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	~56	~68	91	39	23		~570	~1033	27	9	~501	6
Queue Length 95th (ft)	#154	#166	#207	#107	63		m#362	m#696	m15	m15	#647	m41
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	88	72	574	116	175		309	1521	598	216	1083	774
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.08	1.36	0.73	0.68	0.41		2.35	1.70	0.33	0.13	1.33	0.16

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 2.35
Intersection Signal Delay: 279.5 Intersection LOS: F
Intersection Capacity Utilization 97.7% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	547	22	671	63	9	16	198	1230	8	20	1997	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.906				0.850			0.850
Flt Protected	0.950	0.956		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1692	1583	1770	1688	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.178	0.171		0.563			0.047			0.157		
Satd. Flow (perm)	315	303	1583	1049	1688	0	88	3539	1583	292	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			316		17				109			82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	48%											
Lane Group Flow (vph)	309	310	729	68	27	0	215	1337	9	22	2171	89
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	27.0	27.0	27.0	21.5	21.5		11.0	33.5	26.5	9.0	26.5	33.5
Total Split (s)	28.0	28.0	28.0	32.5	32.5		24.5	89.0	75.0	10.5	75.0	89.0
Total Split (%)	17.5%	17.5%	17.5%	20.3%	20.3%		15.3%	55.6%	46.9%	6.6%	46.9%	55.6%
Maximum Green (s)	22.5	22.5	22.5	27.0	27.0		20.5	83.5	69.5	6.5	69.5	83.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	0	0	0					0	0		0	0
Act Effct Green (s)	22.5	22.5	22.5	15.7	15.7		106.8	98.9	81.7	89.5	81.7	98.9
Actuated g/C Ratio	0.14	0.14	0.14	0.10	0.10		0.67	0.62	0.51	0.56	0.51	0.62
v/c Ratio	7.02	7.38	1.48	0.67	0.15		0.81	0.61	0.01	0.10	1.20	0.09
Control Delay	2765.8	2928.5	249.3	97.6	34.8		57.8	35.5	0.0	14.3	124.5	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2765.8	2928.5	249.3	97.6	34.8		57.8	35.5	0.0	14.3	124.5	6.1
LOS	F	F	F	F	C		E	D	A	B	F	A
Approach Delay		1442.3			79.8			38.4			118.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			E			D			F	
90th %ile Green (s)	22.5	22.5	22.5	23.2	23.2		24.3	86.5	69.5	7.3	69.5	86.5
90th %ile Term Code	Max	Max	Max	Gap	Gap		Max	Coord	Coord	Gap	Coord	Coord
70th %ile Green (s)	22.5	22.5	22.5	18.8	18.8		23.7	91.6	74.5	6.6	74.5	91.6
70th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
50th %ile Green (s)	22.5	22.5	22.5	15.7	15.7		20.4	95.2	80.9	6.1	80.9	95.2
50th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
30th %ile Green (s)	22.5	22.5	22.5	12.5	12.5		17.1	108.5	87.4	0.0	87.4	108.5
30th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	22.5	22.5	22.5	8.2	8.2		12.5	112.8	96.3	0.0	96.3	112.8
10th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	~654	~625	~749	70	10		167	619	0	7	~1434	3
Queue Length 95th (ft)	#831	#837	#1006	122	41		266	791	m0	m21	#1714	m39
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	44	42	494	177	298		289	2187	862	225	1807	1010
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	7.02	7.38	1.48	0.38	0.09		0.74	0.61	0.01	0.10	1.20	0.09

Intersection Summary

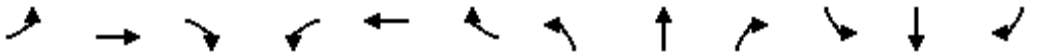
Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 7.38
Intersection Signal Delay: 431.9 Intersection LOS: F
Intersection Capacity Utilization 116.3% ICU Level of Service H
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	146	31	387	58	45	20	667	2314	165	27	1263	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.954				0.850			0.850
Flt Protected	0.950	0.968		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1713	1583	1770	1777	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.190	0.157		0.714			0.146			0.171		
Satd. Flow (perm)	336	278	1583	1330	1777	0	272	3539	1583	319	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			233		22				164			164
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	40%											
Lane Group Flow (vph)	95	98	421	63	71	0	725	2515	179	29	1373	121
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	26.5	9.0	26.5	32.0
Total Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	30.0	9.0	30.0	32.0
Total Split (%)	33.1%	33.1%	33.1%	15.6%	15.6%		13.8%	40.0%	37.5%	11.3%	37.5%	40.0%
Maximum Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	0	0	0					0	0		0	0
Act Effct Green (s)	21.0	21.0	21.0	7.0	7.0		38.7	34.4	24.5	31.1	24.5	34.4
Actuated g/C Ratio	0.26	0.26	0.26	0.09	0.09		0.48	0.43	0.31	0.39	0.31	0.43
v/c Ratio	1.08	1.36	0.72	0.54	0.41		2.35	1.65	0.30	0.13	1.27	0.16
Control Delay	154.3	259.7	19.6	53.8	33.2		624.0	313.8	4.4	12.4	155.1	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	154.3	259.7	19.6	53.8	33.2		624.0	313.8	4.4	12.4	155.1	5.6
LOS	F	F	B	D	C		F	F	A	B	F	A
Approach Delay		78.8			42.9			363.4			140.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			D			F			F	
90th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
90th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
70th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
70th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
50th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	35.5	24.5	0.0	24.5	35.5
50th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Skip	Coord	Coord
30th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	35.5	24.5	0.0	24.5	35.5
30th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	21.0	21.0	21.0	0.0	0.0		19.5	48.0	24.5	0.0	24.5	48.0
10th %ile Term Code	Max	Max	Max	Skip	Skip		Max	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	~56	~68	81	31	23		~573	~1006	23	9	~461	6
Queue Length 95th (ft)	#154	#166	188	#82	63		m#392	m#732	m14	m17	#605	m43
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	88	72	587	116	175		309	1521	598	216	1083	774
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.08	1.36	0.72	0.54	0.41		2.35	1.65	0.30	0.13	1.27	0.16

Intersection Summary

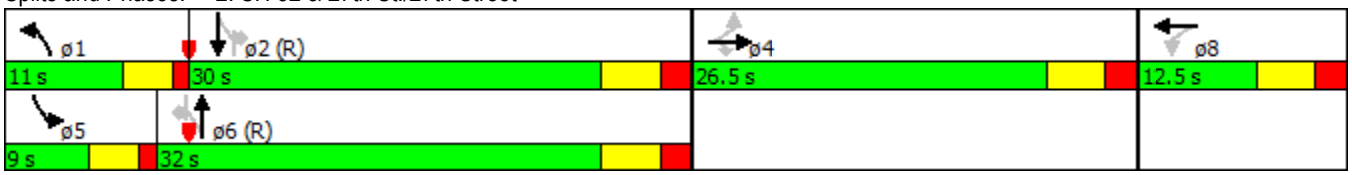
Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 2.35
Intersection Signal Delay: 265.5 Intersection LOS: F
Intersection Capacity Utilization 95.9% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	547	23	671	91	12	21	198	1270	26	22	2037	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.904				0.850			0.850
Flt Protected	0.950	0.956		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1692	1583	1770	1684	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.178	0.171		0.563			0.049			0.134		
Satd. Flow (perm)	315	303	1583	1049	1684	0	91	3539	1583	250	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			282		23				109			82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	48%											
Lane Group Flow (vph)	309	311	729	99	36	0	215	1380	28	24	2214	89
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	27.0	27.0	27.0	21.5	21.5		11.0	33.5	26.5	9.0	26.5	33.5
Total Split (s)	28.0	28.0	28.0	32.5	32.5		24.5	89.0	75.0	10.5	75.0	89.0
Total Split (%)	17.5%	17.5%	17.5%	20.3%	20.3%		15.3%	55.6%	46.9%	6.6%	46.9%	55.6%
Maximum Green (s)	22.5	22.5	22.5	27.0	27.0		20.5	83.5	69.5	6.5	69.5	83.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	0	0	0					0	0		0	0
Act Effct Green (s)	22.5	22.5	22.5	19.8	19.8		102.7	94.9	78.4	86.0	78.4	94.9
Actuated g/C Ratio	0.14	0.14	0.14	0.12	0.12		0.64	0.59	0.49	0.54	0.49	0.59
v/c Ratio	7.02	7.40	1.57	0.76	0.16		0.84	0.66	0.03	0.12	1.28	0.09
Control Delay	2765.8	2939.1	292.1	100.6	30.5		60.3	42.5	0.7	16.2	157.7	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2765.8	2939.1	292.1	100.6	30.5		60.3	42.5	0.7	16.2	157.7	6.4
LOS	F	F	F	F	C		E	D	A	B	F	A
Approach Delay		1469.0			81.9			44.2			150.5	
Approach LOS		F			F			D			F	
90th %ile Green (s)	22.5	22.5	22.5	27.0	27.0		20.5	83.5	69.5	6.5	69.5	83.5
90th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
70th %ile Green (s)	22.5	22.5	22.5	24.1	24.1		23.4	86.2	69.5	6.7	69.5	86.2
70th %ile Term Code	Max	Max	Max	Gap	Gap		Max	Coord	Coord	Gap	Coord	Coord

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
50th %ile Green (s)	22.5	22.5	22.5	20.3	20.3		20.4	90.5	76.3	6.2	76.3	90.5
50th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
30th %ile Green (s)	22.5	22.5	22.5	16.6	16.6		17.1	104.4	83.3	0.0	83.3	104.4
30th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	22.5	22.5	22.5	11.2	11.2		12.5	109.8	93.3	0.0	93.3	109.8
10th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	~654	~627	~814	102	12		168	670	0	8	~1543	3
Queue Length 95th (ft)	#831	#842	#1071	165	47		#303	871	m0	m22	#1764	m38
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	44	42	464	177	303		279	2098	831	197	1733	972
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	7.02	7.40	1.57	0.56	0.12		0.77	0.66	0.03	0.12	1.28	0.09

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 7.40
Intersection Signal Delay: 444.3 Intersection LOS: F
Intersection Capacity Utilization 117.4% ICU Level of Service H
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street

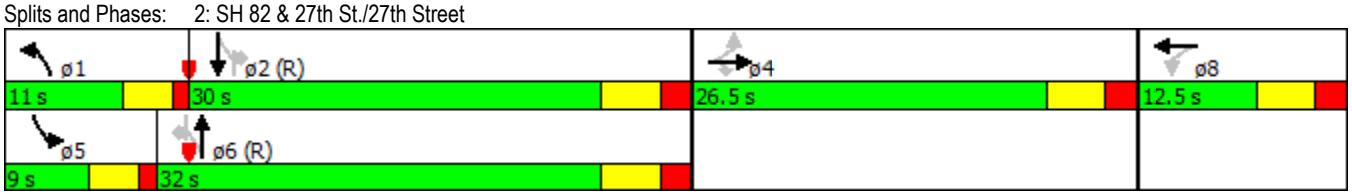
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	146	35	387	86	47	23	667	2379	201	32	1328	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.951				0.850			0.850
Flt Protected	0.950	0.970		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1717	1583	1770	1771	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.190	0.154		0.689			0.140			0.163		
Satd. Flow (perm)	336	273	1583	1283	1771	0	261	3539	1583	304	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			203		24				164			164
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	39%											
Lane Group Flow (vph)	97	100	421	93	76	0	725	2586	218	35	1443	121
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	26.5	9.0	26.5	32.0
Total Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	30.0	9.0	30.0	32.0
Total Split (%)	33.1%	33.1%	33.1%	15.6%	15.6%		13.8%	40.0%	37.5%	11.3%	37.5%	40.0%
Maximum Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	0	0	0					0	0		0	0
Act Effct Green (s)	21.0	21.0	21.0	7.0	7.0		35.8	30.1	24.5	31.0	24.5	30.1
Actuated g/C Ratio	0.26	0.26	0.26	0.09	0.09		0.45	0.38	0.31	0.39	0.31	0.38
v/c Ratio	1.10	1.41	0.75	0.83	0.43		2.92	1.94	0.36	0.17	1.33	0.17
Control Delay	161.0	278.2	23.2	88.3	33.7		879.5	443.5	4.7	12.8	182.5	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	161.0	278.2	23.2	88.3	33.7		879.5	443.5	4.7	12.8	182.5	5.4
LOS	F	F	C	F	C		F	F	A	B	F	A
Approach Delay		86.1			63.8			506.0			165.3	
Approach LOS		F			E			F			F	
90th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
90th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
70th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
70th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
50th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
50th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
30th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	35.5	24.5	0.0	24.5	35.5
30th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	35.5	24.5	0.0	24.5	35.5
10th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	~58	~71	98	47	25		~582	~1150	34	11	~502	6
Queue Length 95th (ft)	#156	#170	#234	#130	66		m#363	m#691	m18	m19	#646	m40
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	88	71	565	112	176		248	1331	598	209	1083	698
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.10	1.41	0.75	0.83	0.43		2.92	1.94	0.36	0.17	1.33	0.17

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 2.92
Intersection Signal Delay: 357.4 Intersection LOS: F
Intersection Capacity Utilization 97.8% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	547	23	671	72	12	21	198	1230	12	22	1997	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.904				0.850			0.850
Flt Protected	0.950	0.956		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1692	1583	1770	1684	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.178	0.171		0.563			0.047			0.152		
Satd. Flow (perm)	315	303	1583	1049	1684	0	88	3539	1583	283	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			304		23				109			82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	48%											
Lane Group Flow (vph)	309	311	729	78	36	0	215	1337	13	24	2171	89
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	27.0	27.0	27.0	21.5	21.5		11.0	33.5	26.5	9.0	26.5	33.5
Total Split (s)	28.0	28.0	28.0	32.5	32.5		24.5	89.0	75.0	10.5	75.0	89.0
Total Split (%)	17.5%	17.5%	17.5%	20.3%	20.3%		15.3%	55.6%	46.9%	6.6%	46.9%	55.6%
Maximum Green (s)	22.5	22.5	22.5	27.0	27.0		20.5	83.5	69.5	6.5	69.5	83.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	0	0	0					0	0		0	0
Act Effct Green (s)	22.5	22.5	22.5	17.2	17.2		105.3	97.4	80.6	88.4	80.6	97.4
Actuated g/C Ratio	0.14	0.14	0.14	0.11	0.11		0.66	0.61	0.50	0.55	0.50	0.61
v/c Ratio	7.02	7.40	1.51	0.70	0.18		0.83	0.62	0.02	0.11	1.22	0.09
Control Delay	2765.8	2939.1	264.3	97.6	32.1		59.7	37.7	0.0	14.9	132.0	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2765.8	2939.1	264.3	97.6	32.1		59.7	37.7	0.0	14.9	132.0	6.3
LOS	F	F	F	F	C		E	D	A	B	F	A
Approach Delay		1454.0			76.9			40.4			125.8	
Approach LOS		F			E			D			F	
90th %ile Green (s)	22.5	22.5	22.5	25.2	25.2		22.3	84.4	69.5	7.4	69.5	84.4
90th %ile Term Code	Max	Max	Max	Gap	Gap		Max	Coord	Coord	Gap	Coord	Coord
70th %ile Green (s)	22.5	22.5	22.5	20.5	20.5		23.9	89.8	72.6	6.7	72.6	89.8
70th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
50th %ile Green (s)	22.5	22.5	22.5	17.2	17.2		20.4	93.6	79.4	6.2	79.4	93.6
50th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Gap	Coord	Coord
30th %ile Green (s)	22.5	22.5	22.5	13.9	13.9		17.1	107.1	86.0	0.0	86.0	107.1
30th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	22.5	22.5	22.5	9.1	9.1		12.5	111.9	95.4	0.0	95.4	111.9
10th %ile Term Code	Max	Max	Max	Gap	Gap		Gap	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	~654	~627	~772	80	12		168	630	0	7	~1453	3
Queue Length 95th (ft)	#831	#842	#1029	135	48		#285	794	m0	m23	#1714	m39
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	44	42	483	177	303		284	2153	851	219	1782	995
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	7.02	7.40	1.51	0.44	0.12		0.76	0.62	0.02	0.11	1.22	0.09

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 7.40
Intersection Signal Delay: 436.9 Intersection LOS: F
Intersection Capacity Utilization 116.3% ICU Level of Service H
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street

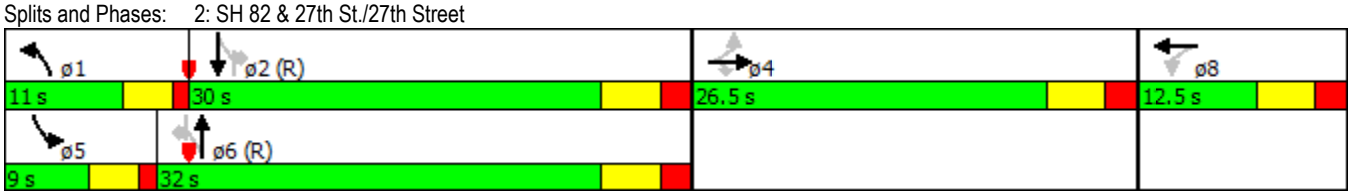
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	146	35	387	65	47	23	667	2314	176	32	1263	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	110		0	300		264	416		280
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.951				0.850			0.850
Flt Protected	0.950	0.970		0.950			0.950			0.950		
Satd. Flow (prot)	1681	1717	1583	1770	1771	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.190	0.154		0.714			0.146			0.171		
Satd. Flow (perm)	336	273	1583	1330	1771	0	272	3539	1583	319	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			224		24				164			164
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		714			252			2160			1652	
Travel Time (s)		16.2			5.7			49.1			37.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	39%											
Lane Group Flow (vph)	97	100	421	71	76	0	725	2515	191	35	1373	121
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8			6		2	2		6
Detector Phase	4	4	4	8	8		1	6	2	5	2	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	26.5	9.0	26.5	32.0
Total Split (s)	26.5	26.5	26.5	12.5	12.5		11.0	32.0	30.0	9.0	30.0	32.0
Total Split (%)	33.1%	33.1%	33.1%	15.6%	15.6%		13.8%	40.0%	37.5%	11.3%	37.5%	40.0%
Maximum Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.0	3.5	3.5	3.0	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		4.0	5.5	5.5	4.0	5.5	5.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Walk Time (s)	4.0	4.0	4.0					14.0	4.0		4.0	14.0
Flash Dont Walk (s)	17.0	17.0	17.0					14.0	17.0		17.0	14.0
Pedestrian Calls (#/hr)	0	0	0					0	0		0	0
Act Effct Green (s)	21.0	21.0	21.0	7.0	7.0		38.3	32.6	24.5	31.1	24.5	32.6
Actuated g/C Ratio	0.26	0.26	0.26	0.09	0.09		0.48	0.41	0.31	0.39	0.31	0.41
v/c Ratio	1.10	1.41	0.73	0.61	0.43		2.35	1.74	0.32	0.16	1.27	0.16
Control Delay	161.0	278.2	20.7	59.4	33.7		628.2	354.9	4.7	12.8	155.1	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	161.0	278.2	20.7	59.4	33.7		628.2	354.9	4.7	12.8	155.1	5.7
LOS	F	F	C	E	C		F	F	A	B	F	A
Approach Delay		84.4			46.1			393.1			140.0	
Approach LOS		F			D			F			F	
90th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
90th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
70th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
70th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
50th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	26.5	24.5	5.0	24.5	26.5
50th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Max	Coord	Coord
30th %ile Green (s)	21.0	21.0	21.0	7.0	7.0		7.0	35.5	24.5	0.0	24.5	35.5
30th %ile Term Code	Max	Max	Max	Max	Max		Max	Coord	Coord	Skip	Coord	Coord
10th %ile Green (s)	21.0	21.0	21.0	0.0	0.0		19.5	48.0	24.5	0.0	24.5	48.0
10th %ile Term Code	Max	Max	Max	Skip	Skip		Max	Coord	Coord	Skip	Coord	Coord
Queue Length 50th (ft)	~58	~71	86	35	25		~581	~1123	27	11	~460	6
Queue Length 95th (ft)	#156	#170	#195	#95	66		m#385	m#721	m16	m20	#606	m43
Internal Link Dist (ft)		634			172			2080			1572	
Turn Bay Length (ft)	110			110			300		264	416		280
Base Capacity (vph)	88	71	580	116	176		308	1442	598	216	1083	742
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.10	1.41	0.73	0.61	0.43		2.35	1.74	0.32	0.16	1.27	0.16

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 2.35
Intersection Signal Delay: 283.3 Intersection LOS: F
Intersection Capacity Utilization 96.0% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: SH 82 & 27th St./27th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	8	5	84	25	40	12	1123	76	48	1369	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		1.00	0.99			1.00				0.98
Frt		0.946			0.908			0.990				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1753	0	1770	1677	0	1770	3498	0	1770	3539	1583
Flt Permitted	0.711			0.601			0.130			0.157		
Satd. Flow (perm)	1322	1753	0	1117	1677	0	242	3498	0	292	3539	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			41			8				88
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Confl. Peds. (#/hr)	1		1	1		1	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	14	0	91	70	0	13	1304	0	52	1488	208
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	25.0		9.0	25.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	19.0	25.0		19.0	25.0		14.0	102.0		14.0	102.0	102.0
Total Split (%)	11.9%	15.6%		11.9%	15.6%		8.8%	63.8%		8.8%	63.8%	63.8%
Maximum Green (s)	15.0	21.0		15.0	21.0		10.0	97.5		10.0	97.5	97.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		2			1			1			2	1
Act Effct Green (s)	25.2	12.6		25.8	10.7		117.7	112.5		120.9	117.3	112.5
Actuated g/C Ratio	0.16	0.08		0.16	0.07		0.74	0.70		0.76	0.73	0.70
v/c Ratio	0.49	0.10		0.36	0.47		0.06	0.53		0.18	0.57	0.19
Control Delay	64.1	48.5		57.5	42.7		5.2	9.2		7.5	12.8	6.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	64.1	48.5		57.5	42.7		5.2	9.2		7.5	12.8	6.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	D		E	D		A	A		A	B	A
Approach Delay		62.5			51.1			9.1			11.9	
Approach LOS		E			D			A			B	
90th %ile Green (s)	19.4	24.3		16.1	21.0		6.5	94.6		8.5	96.6	94.6
90th %ile Term Code	Gap	Hold		Gap	Ped		Gap	Coord		Gap	Coord	Coord
70th %ile Green (s)	16.5	12.4		14.4	10.3		5.9	109.7		7.0	110.8	109.7
70th %ile Term Code	Gap	Hold		Gap	Gap		Gap	Coord		Gap	Coord	Coord
50th %ile Green (s)	16.8	12.4		12.6	8.2		0.0	111.9		6.6	122.5	111.9
50th %ile Term Code	Gap	Hold		Gap	Gap		Skip	Coord		Gap	Coord	Coord
30th %ile Green (s)	14.1	0.0		25.1	7.0		0.0	116.3		6.1	126.4	116.3
30th %ile Term Code	Gap	Skip		Hold	Min		Skip	Coord		Gap	Coord	Coord
10th %ile Green (s)	10.5	0.0		21.5	7.0		0.0	130.0		0.0	130.0	130.0
10th %ile Term Code	Gap	Skip		Hold	Min		Skip	Coord		Skip	Coord	Coord
Queue Length 50th (ft)	115	9		83	30		2	172		12	295	38
Queue Length 95th (ft)	161	31		124	79		m7	m276		33	620	97
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	263	241		260	255		278	2474		314	2597	1118
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.47	0.06		0.35	0.27		0.05	0.53		0.17	0.57	0.19

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 14 (9%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 14.8 Intersection LOS: B
Intersection Capacity Utilization 60.0% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	18	2	151	89	44	7	1524	46	50	802	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	1.00				0.98
Frt		0.986			0.950			0.996				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1834	0	1770	1761	0	1770	3523	0	1770	3539	1583
Flt Permitted				0.588			0.282			0.090		
Satd. Flow (perm)	1859	1834	0	1093	1761	0	525	3523	0	168	3539	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			24			6				299
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	182	22	0	164	145	0	8	1707	0	54	872	299
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	11.0		9.0	11.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	9.0	11.0		9.0	11.0		9.0	51.0		9.0	51.0	51.0
Total Split (%)	11.3%	13.8%		11.3%	13.8%		11.3%	63.8%		11.3%	63.8%	63.8%
Maximum Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		6			1			1			3	1
Act Effct Green (s)	10.7	7.0		17.9	7.5		50.1	46.6		51.7	50.2	46.6
Actuated g/C Ratio	0.13	0.09		0.22	0.09		0.63	0.58		0.65	0.63	0.58
v/c Ratio	0.76	0.14		0.44	0.78		0.02	0.83		0.26	0.39	0.29
Control Delay	54.7	33.8		34.3	59.1		4.7	17.8		7.3	8.1	1.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	54.7	33.8		34.3	59.1		4.7	17.8		7.3	8.1	1.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		C	E		A	B		A	A	A
Approach Delay		52.4			45.9			17.7			6.5	
Approach LOS		D			D			B			A	
90th %ile Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
90th %ile Term Code	Max	Ped		Max	Ped		Max	Coord		Max	Coord	Coord
70th %ile Green (s)	5.0	7.0		5.0	7.0		0.0	46.5		5.0	55.5	46.5
70th %ile Term Code	Max	Max		Max	Max		Skip	Coord		Max	Coord	Coord
50th %ile Green (s)	5.4	0.0		16.4	7.0		0.0	46.1		5.0	55.1	46.1
50th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Max	Coord	Coord
30th %ile Green (s)	13.7	0.0		26.9	9.2		0.0	44.6		0.0	44.6	44.6
30th %ile Term Code	Gap	Skip		Hold	Max		Skip	Coord		Skip	Coord	Coord
10th %ile Green (s)	10.6	0.0		22.1	7.5		0.0	49.4		0.0	49.4	49.4
10th %ile Term Code	Gap	Skip		Hold	Gap		Skip	Coord		Skip	Coord	Coord
Queue Length 50th (ft)	~129	9		72	60		1	130		7	80	0
Queue Length 95th (ft)	#158	31		#130	#161		m1	m222		16	155	30
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	240	162		371	187		408	2075		210	2238	1032
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.76	0.14		0.44	0.78		0.02	0.82		0.26	0.39	0.29

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 9 (11%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 18.3 Intersection LOS: B
Intersection Capacity Utilization 71.4% ICU Level of Service C
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	8	5	64	25	40	12	1103	56	48	1349	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		1.00	0.99			1.00				0.98
Frt		0.946			0.908			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1753	0	1770	1677	0	1770	3510	0	1770	3539	1583
Flt Permitted	0.661			0.675			0.135			0.167		
Satd. Flow (perm)	1229	1753	0	1255	1677	0	251	3510	0	311	3539	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			41			6				89
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Confl. Peds. (#/hr)	1		1	1		1	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	14	0	70	70	0	13	1260	0	52	1466	208
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	25.0		9.0	25.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	19.0	25.0		19.0	25.0		14.0	102.0		14.0	102.0	102.0
Total Split (%)	11.9%	15.6%		11.9%	15.6%		8.8%	63.8%		8.8%	63.8%	63.8%
Maximum Green (s)	15.0	21.0		15.0	21.0		10.0	97.5		10.0	97.5	97.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		2			1			1			2	1
Act Effct Green (s)	25.8	13.8		24.6	10.7		117.7	112.5		120.9	117.2	112.5
Actuated g/C Ratio	0.16	0.09		0.15	0.07		0.74	0.70		0.76	0.73	0.70
v/c Ratio	0.49	0.09		0.28	0.47		0.05	0.51		0.18	0.57	0.19
Control Delay	64.2	46.9		55.5	42.7		5.2	9.1		7.4	12.7	6.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	64.2	46.9		55.5	42.7		5.2	9.1		7.4	12.7	6.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	D		E	D		A	A		A	B	A
Approach Delay		62.4			49.1			9.1			11.8	
Approach LOS		E			D			A			B	
90th %ile Green (s)	19.4	26.5		13.9	21.0		6.5	94.6		8.5	96.6	94.6
90th %ile Term Code	Gap	Hold		Gap	Ped		Gap	Coord		Gap	Coord	Coord
70th %ile Green (s)	16.6	14.5		12.4	10.3		5.9	109.5		7.1	110.7	109.5
70th %ile Term Code	Gap	Hold		Gap	Gap		Gap	Coord		Gap	Coord	Coord
50th %ile Green (s)	16.8	14.2		10.8	8.2		0.0	111.9		6.6	122.5	111.9
50th %ile Term Code	Gap	Hold		Gap	Gap		Skip	Coord		Gap	Coord	Coord
30th %ile Green (s)	14.1	0.0		25.1	7.0		0.0	116.3		6.1	126.4	116.3
30th %ile Term Code	Gap	Skip		Hold	Min		Skip	Coord		Gap	Coord	Coord
10th %ile Green (s)	10.5	0.0		21.5	7.0		0.0	130.0		0.0	130.0	130.0
10th %ile Term Code	Gap	Skip		Hold	Min		Skip	Coord		Skip	Coord	Coord
Queue Length 50th (ft)	115	9		63	30		2	161		12	288	38
Queue Length 95th (ft)	161	31		100	79		m7	m277		33	604	97
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	262	246		264	255		284	2481		327	2597	1118
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.47	0.06		0.27	0.27		0.05	0.51		0.16	0.56	0.19

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 14 (9%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.57			
Intersection Signal Delay: 14.4		Intersection LOS: B	
Intersection Capacity Utilization 60.0%		ICU Level of Service B	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	18	2	121	89	44	7	1489	16	50	767	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	1.00				0.98
Frt		0.986			0.950			0.998				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1834	0	1770	1761	0	1770	3531	0	1770	3539	1583
Flt Permitted	0.665			0.524			0.297			0.090		
Satd. Flow (perm)	1237	1834	0	974	1761	0	553	3531	0	168	3539	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			24			2				299
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	182	22	0	132	145	0	8	1635	0	54	834	299
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	11.0		9.0	11.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	9.0	11.0		9.0	11.0		9.0	51.0		9.0	51.0	51.0
Total Split (%)	11.3%	13.8%		11.3%	13.8%		11.3%	63.8%		11.3%	63.8%	63.8%
Maximum Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		6			1			1			3	1
Act Effct Green (s)	13.2	10.0		16.7	7.8		49.7	46.2		51.3	49.8	46.2
Actuated g/C Ratio	0.16	0.12		0.21	0.10		0.62	0.58		0.64	0.62	0.58
v/c Ratio	0.71	0.10		0.40	0.76		0.02	0.80		0.25	0.38	0.29
Control Delay	50.4	32.8		32.7	56.5		4.7	18.5		7.3	8.2	1.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	50.4	32.8		32.7	56.5		4.7	18.5		7.3	8.2	1.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		C	E		A	B		A	A	A
Approach Delay		48.5			45.2			18.4			6.5	
Approach LOS		D			D			B			A	
90th %ile Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
90th %ile Term Code	Max	Ped		Max	Ped		Max	Coord		Max	Coord	Coord
70th %ile Green (s)	5.0	7.0		5.0	7.0		0.0	46.5		5.0	55.5	46.5
70th %ile Term Code	Max	Max		Max	Max		Skip	Coord		Max	Coord	Coord
50th %ile Green (s)	6.4	0.0		17.4	7.0		0.0	45.1		5.0	54.1	45.1
50th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Max	Coord	Coord
30th %ile Green (s)	13.7	0.0		28.0	10.3		0.0	43.5		0.0	43.5	43.5
30th %ile Term Code	Gap	Skip		Hold	Gap		Skip	Coord		Skip	Coord	Coord
10th %ile Green (s)	10.6	22.1		0.0	7.5		0.0	49.4		0.0	49.4	49.4
10th %ile Term Code	Gap	Hold		Skip	Gap		Skip	Coord		Skip	Coord	Coord
Queue Length 50th (ft)	~118	9		56	60		1	128		7	79	0
Queue Length 95th (ft)	#141	31		#130	#161		m1	m220		16	147	30
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	258	231		326	192		422	2079		213	2229	1032
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.71	0.10		0.40	0.76		0.02	0.79		0.25	0.37	0.29

Intersection Summary

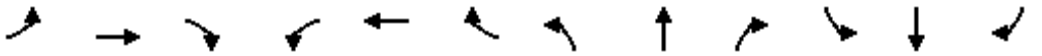
Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 9 (11%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 18.2 Intersection LOS: B
Intersection Capacity Utilization 69.4% ICU Level of Service C
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	8	5	84	25	45	12	1128	76	50	1371	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		1.00	0.99			1.00				0.98
Frt		0.946			0.903			0.990				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1753	0	1770	1667	0	1770	3498	0	1770	3539	1583
Flt Permitted	0.700			0.602			0.130			0.155		
Satd. Flow (perm)	1301	1753	0	1119	1667	0	242	3498	0	289	3539	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			47			8				88
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Confl. Peds. (#/hr)	1		1	1		1	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	14	0	91	76	0	13	1309	0	54	1490	208
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	25.0		9.0	25.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	19.0	25.0		19.0	25.0		14.0	102.0		14.0	102.0	102.0
Total Split (%)	11.9%	15.6%		11.9%	15.6%		8.8%	63.8%		8.8%	63.8%	63.8%
Maximum Green (s)	15.0	21.0		15.0	21.0		10.0	97.5		10.0	97.5	97.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		2			1			1			2	1
Act Effct Green (s)	25.3	12.7		25.9	10.7		117.6	112.4		120.9	117.2	112.4
Actuated g/C Ratio	0.16	0.08		0.16	0.07		0.74	0.70		0.76	0.73	0.70
v/c Ratio	0.49	0.10		0.36	0.49		0.06	0.53		0.19	0.57	0.19
Control Delay	64.1	48.5		57.5	41.0		5.2	9.2		7.6	12.9	6.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	64.1	48.5		57.5	41.0		5.2	9.2		7.6	12.9	6.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	D		E	D		A	A		A	B	A
Approach Delay		62.5			50.0			9.1			11.9	
Approach LOS		E			D			A			B	
90th %ile Green (s)	19.4	24.3		16.1	21.0		6.5	94.5		8.6	96.6	94.5
90th %ile Term Code	Gap	Hold		Gap	Ped		Gap	Coord		Gap	Coord	Coord
70th %ile Green (s)	16.5	12.5		14.4	10.4		5.9	109.5		7.1	110.7	109.5
70th %ile Term Code	Gap	Hold		Gap	Gap		Gap	Coord		Gap	Coord	Coord
50th %ile Green (s)	16.8	12.6		12.5	8.3		0.0	111.8		6.6	122.4	111.8
50th %ile Term Code	Gap	Hold		Gap	Gap		Skip	Coord		Gap	Coord	Coord
30th %ile Green (s)	14.1	0.0		25.1	7.0		0.0	116.3		6.1	126.4	116.3
30th %ile Term Code	Gap	Skip		Hold	Min		Skip	Coord		Gap	Coord	Coord
10th %ile Green (s)	10.5	0.0		21.5	7.0		0.0	130.0		0.0	130.0	130.0
10th %ile Term Code	Gap	Skip		Hold	Min		Skip	Coord		Skip	Coord	Coord
Queue Length 50th (ft)	115	9		83	30		2	176		12	297	38
Queue Length 95th (ft)	161	31		124	81		m6	m277		34	621	98
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	262	241		260	259		278	2473		312	2596	1117
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.47	0.06		0.35	0.29		0.05	0.53		0.17	0.57	0.19

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 14 (9%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 14.8 Intersection LOS: B
Intersection Capacity Utilization 61.7% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.

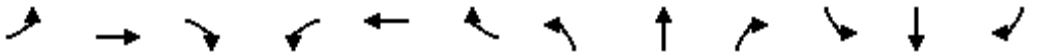
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	18	2	151	89	47	7	1527	46	55	807	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	1.00				0.98
Frt		0.986			0.948			0.996				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1834	0	1770	1757	0	1770	3523	0	1770	3539	1583
Flt Permitted				0.588			0.286			0.087		
Satd. Flow (perm)	1859	1834	0	1093	1757	0	532	3523	0	162	3539	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			26			6				299
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	182	22	0	164	148	0	8	1710	0	60	877	299
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	11.0		9.0	11.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	9.0	11.0		9.0	11.0		9.0	51.0		9.0	51.0	51.0
Total Split (%)	11.3%	13.8%		11.3%	13.8%		11.3%	63.8%		11.3%	63.8%	63.8%
Maximum Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		6			1			1			3	1
Act Effct Green (s)	9.6	7.0		16.3	7.1		51.7	48.2		53.3	51.8	48.2
Actuated g/C Ratio	0.12	0.09		0.20	0.09		0.65	0.60		0.67	0.65	0.60
v/c Ratio	0.85	0.14		0.49	0.82		0.02	0.80		0.29	0.38	0.28
Control Delay	67.9	33.8		36.5	65.7		4.7	16.2		7.5	7.4	1.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	67.9	33.8		36.5	65.7		4.7	16.2		7.5	7.4	1.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	C		D	E		A	B		A	A	A
Approach Delay		64.2			50.3			16.1			6.0	
Approach LOS		E			D			B			A	
90th %ile Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
90th %ile Term Code	Max	Ped		Max	Ped		Max	Coord		Max	Coord	Coord
70th %ile Green (s)	5.0	7.0		5.0	7.0		0.0	46.5		5.0	55.5	46.5
70th %ile Term Code	Max	Max		Max	Max		Skip	Coord		Max	Coord	Coord
50th %ile Green (s)	5.4	0.0		16.4	7.0		0.0	46.1		5.0	55.1	46.1
50th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Max	Coord	Coord
30th %ile Green (s)	7.8	0.0		18.8	7.0		0.0	52.7		0.0	52.7	52.7
30th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Skip	Coord	Coord
10th %ile Green (s)	10.6	0.0		22.2	7.6		0.0	49.3		0.0	49.3	49.3
10th %ile Term Code	Gap	Skip		Hold	Gap		Skip	Coord		Skip	Coord	Coord
Queue Length 50th (ft)	~129	9		72	61		1	130		8	81	0
Queue Length 95th (ft)	#158	31		#130	#164		m1	m218		18	157	30
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	214	162		336	180		423	2129		210	2292	1051
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.85	0.14		0.49	0.82		0.02	0.80		0.29	0.38	0.28

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 9 (11%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 18.4 Intersection LOS: B
Intersection Capacity Utilization 73.6% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	8	5	64	25	45	12	1108	56	50	1351	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		1.00	0.99			1.00				0.98
Frt		0.946			0.903			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1753	0	1770	1667	0	1770	3510	0	1770	3539	1583
Flt Permitted	0.624			0.675			0.134			0.165		
Satd. Flow (perm)	1160	1753	0	1255	1667	0	250	3510	0	307	3539	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			47			6				89
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Confl. Peds. (#/hr)	1		1	1		1	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	14	0	70	76	0	13	1265	0	54	1468	208
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	25.0		9.0	25.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	19.0	25.0		19.0	25.0		14.0	102.0		14.0	102.0	102.0
Total Split (%)	11.9%	15.6%		11.9%	15.6%		8.8%	63.8%		8.8%	63.8%	63.8%
Maximum Green (s)	15.0	21.0		15.0	21.0		10.0	97.5		10.0	97.5	97.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		2			1			1			2	1
Act Effct Green (s)	25.8	13.9		24.7	10.7		117.6	112.4		120.8	117.2	112.4
Actuated g/C Ratio	0.16	0.09		0.15	0.07		0.74	0.70		0.76	0.73	0.70
v/c Ratio	0.50	0.09		0.28	0.49		0.05	0.51		0.18	0.57	0.19
Control Delay	64.4	46.9		55.4	41.0		5.1	9.1		7.5	12.7	6.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	64.4	46.9		55.4	41.0		5.1	9.1		7.5	12.7	6.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	D		E	D		A	A		A	B	A
Approach Delay		62.7			47.9			9.0			11.8	
Approach LOS		E			D			A			B	
90th %ile Green (s)	19.4	26.5		13.9	21.0		6.5	94.5		8.6	96.6	94.5
90th %ile Term Code	Gap	Hold		Gap	Ped		Gap	Coord		Gap	Coord	Coord
70th %ile Green (s)	16.6	14.6		12.4	10.4		5.9	109.4		7.1	110.6	109.4
70th %ile Term Code	Gap	Hold		Gap	Gap		Gap	Coord		Gap	Coord	Coord
50th %ile Green (s)	16.8	14.3		10.8	8.3		0.0	111.8		6.6	122.4	111.8
50th %ile Term Code	Gap	Hold		Gap	Gap		Skip	Coord		Gap	Coord	Coord
30th %ile Green (s)	14.1	0.0		25.1	7.0		0.0	116.3		6.1	126.4	116.3
30th %ile Term Code	Gap	Skip		Hold	Min		Skip	Coord		Gap	Coord	Coord
10th %ile Green (s)	10.5	0.0		21.5	7.0		0.0	130.0		0.0	130.0	130.0
10th %ile Term Code	Gap	Skip		Hold	Min		Skip	Coord		Skip	Coord	Coord
Queue Length 50th (ft)	115	9		63	30		2	160		12	290	38
Queue Length 95th (ft)	161	31		100	81		m6	m277		34	605	97
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	258	246		264	259		284	2480		324	2596	1118
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.48	0.06		0.27	0.29		0.05	0.51		0.17	0.57	0.19

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 14 (9%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 14.4 Intersection LOS: B
Intersection Capacity Utilization 61.7% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	18	2	121	89	47	7	1492	16	55	772	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	1.00				0.98
Frt		0.986			0.948			0.998				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1834	0	1770	1757	0	1770	3531	0	1770	3539	1583
Flt Permitted	0.661			0.563			0.299			0.088		
Satd. Flow (perm)	1229	1834	0	1046	1757	0	556	3531	0	164	3539	1546
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			26			2				299
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	182	22	0	132	148	0	8	1639	0	60	839	299
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	11.0		9.0	11.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	9.0	11.0		9.0	11.0		9.0	51.0		9.0	51.0	51.0
Total Split (%)	11.3%	13.8%		11.3%	13.8%		11.3%	63.8%		11.3%	63.8%	63.8%
Maximum Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		6			1			1			3	1
Act Effct Green (s)	12.9	10.0		15.7	7.1		50.7	47.2		52.3	50.8	47.2
Actuated g/C Ratio	0.16	0.12		0.20	0.09		0.63	0.59		0.65	0.64	0.59
v/c Ratio	0.73	0.09		0.43	0.82		0.02	0.79		0.29	0.37	0.29
Control Delay	52.3	32.8		33.5	65.7		4.9	16.8		7.8	7.7	1.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	52.3	32.8		33.5	65.7		4.9	16.8		7.8	7.7	1.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		C	E		A	B		A	A	A
Approach Delay		50.2			50.5			16.7			6.2	
Approach LOS		D			D			B			A	
90th %ile Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
90th %ile Term Code	Max	Ped		Max	Ped		Max	Coord		Max	Coord	Coord
70th %ile Green (s)	5.0	7.0		5.0	7.0		0.0	46.5		5.0	55.5	46.5
70th %ile Term Code	Max	Max		Max	Max		Skip	Coord		Max	Coord	Coord
50th %ile Green (s)	6.3	0.0		17.3	7.0		0.0	45.2		5.0	54.2	45.2
50th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Max	Coord	Coord
30th %ile Green (s)	12.2	0.0		23.2	7.0		0.0	48.3		0.0	48.3	48.3
30th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Skip	Coord	Coord
10th %ile Green (s)	10.6	22.2		0.0	7.6		0.0	49.3		0.0	49.3	49.3
10th %ile Term Code	Gap	Hold		Skip	Gap		Skip	Coord		Skip	Coord	Coord
Queue Length 50th (ft)	~119	9		56	61		1	127		8	80	0
Queue Length 95th (ft)	#142	31		#126	#164		m1	m217		18	148	30
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	251	232		308	180		429	2093		209	2245	1037
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.73	0.09		0.43	0.82		0.02	0.78		0.29	0.37	0.29

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 9 (11%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 17.9 Intersection LOS: B
Intersection Capacity Utilization 73.6% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	13	7	127	38	60	18	1702	115	73	2075	289
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.945			0.908			0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1760	0	1770	1691	0	1770	3507	0	1770	3539	1583
Flt Permitted	0.668			0.509			0.038			0.037		
Satd. Flow (perm)	1244	1760	0	948	1691	0	71	3507	0	69	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			41			8				88
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	22	0	138	106	0	20	1975	0	79	2255	314
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	25.0		9.0	25.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	19.0	25.0		19.0	25.0		14.0	102.0		14.0	102.0	102.0
Total Split (%)	11.9%	15.6%		11.9%	15.6%		8.8%	63.8%		8.8%	63.8%	63.8%
Maximum Green (s)	15.0	21.0		15.0	21.0		10.0	97.5		10.0	97.5	97.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	23.6	11.5		28.5	11.9		114.6	108.1		120.6	114.5	108.1
Actuated g/C Ratio	0.15	0.07		0.18	0.07		0.72	0.68		0.75	0.72	0.68
v/c Ratio	0.80	0.17		0.51	0.65		0.18	0.83		0.56	0.89	0.29
Control Delay	86.2	51.0		62.9	61.2		9.9	27.9		38.5	25.2	8.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	86.2	51.0		62.9	61.2		9.9	27.9		38.5	25.2	8.7
LOS	F	D		E	E		A	C		D	C	A
Approach Delay		82.5			62.1			27.7			23.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			E			C			C	
90th %ile Green (s)	15.0	17.7		15.0	17.7		6.7	98.1		12.7	104.1	98.1
90th %ile Term Code	Max	Hold		Max	Gap		Gap	Coord		Gap	Coord	Coord
70th %ile Green (s)	15.0	14.1		15.0	14.1		6.2	104.7		9.7	108.2	104.7
70th %ile Term Code	Max	Hold		Max	Gap		Gap	Coord		Gap	Coord	Coord
50th %ile Green (s)	15.0	11.7		15.0	11.7		5.9	109.1		7.7	110.9	109.1
50th %ile Term Code	Max	Hold		Max	Gap		Gap	Coord		Gap	Coord	Coord
30th %ile Green (s)	15.0	0.0		28.2	9.2		0.0	112.6		6.7	123.3	112.6
30th %ile Term Code	Max	Skip		Hold	Gap		Skip	Coord		Gap	Coord	Coord
10th %ile Green (s)	14.7	0.0		25.7	7.0		0.0	115.9		5.9	125.8	115.9
10th %ile Term Code	Gap	Skip		Hold	Min		Skip	Coord		Gap	Coord	Coord
Queue Length 50th (ft)	178	14		128	67		7	1025		28	979	83
Queue Length 95th (ft)	252	44		191	130		m8	m451		88	#1382	162
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	233	237		270	257		158	2371		164	2531	1097
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.80	0.09		0.51	0.41		0.13	0.83		0.48	0.89	0.29

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 14 (9%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 29.5 Intersection LOS: C
Intersection Capacity Utilization 83.9% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	253	27	4	229	135	67	11	2310	69	76	1215	417
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.982			0.950			0.996				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1829	0	1770	1770	0	1770	3525	0	1770	3539	1583
Flt Permitted	0.952			0.488			0.153			0.082		
Satd. Flow (perm)	1773	1829	0	909	1770	0	285	3525	0	153	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			24			6				403
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	275	33	0	249	220	0	12	2586	0	83	1321	453
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	11.0		9.0	11.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	9.0	11.0		9.0	11.0		9.0	51.0		9.0	51.0	51.0
Total Split (%)	11.3%	13.8%		11.3%	13.8%		11.3%	63.8%		11.3%	63.8%	63.8%
Maximum Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	9.2	7.0		13.6	7.0		52.8	48.3		55.2	53.7	48.3
Actuated g/C Ratio	0.12	0.09		0.17	0.09		0.66	0.60		0.69	0.67	0.60
v/c Ratio	1.35	0.20		0.97	1.25		0.04	1.21		0.40	0.56	0.41
Control Delay	218.1	34.1		88.8	181.9		4.7	118.4		11.6	8.6	2.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	218.1	34.1		88.8	181.9		4.7	118.4		11.6	8.6	2.6
LOS	F	C		F	F		A	F		B	A	A
Approach Delay		198.4			132.5			117.9			7.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			F			A	
90th %ile Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
90th %ile Term Code	Max	Max		Max	Max		Max	Coord		Max	Coord	Coord
70th %ile Green (s)	5.0	7.0		5.0	7.0		0.0	46.5		5.0	55.5	46.5
70th %ile Term Code	Max	Max		Max	Max		Skip	Coord		Max	Coord	Coord
50th %ile Green (s)	5.0	7.0		5.0	7.0		0.0	46.5		5.0	55.5	46.5
50th %ile Term Code	Max	Max		Max	Max		Skip	Coord		Max	Coord	Coord
30th %ile Green (s)	5.0	0.0		16.0	7.0		0.0	46.5		5.0	55.5	46.5
30th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Max	Coord	Coord
10th %ile Green (s)	5.0	0.0		16.0	7.0		0.0	55.5		0.0	55.5	55.5
10th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Skip	Coord	Coord
Queue Length 50th (ft)	~137	14		~120	~128		1	~834		11	142	10
Queue Length 95th (ft)	#295	40		#258	#265		m1	m201		33	277	48
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	203	163		256	176		281	2130		206	2375	1115
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.35	0.20		0.97	1.25		0.04	1.21		0.40	0.56	0.41

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 9 (11%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.35	
Intersection Signal Delay: 84.7	Intersection LOS: F
Intersection Capacity Utilization 101.7%	ICU Level of Service G
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	13	7	107	38	60	18	1682	95	73	2055	289
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.945			0.908			0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1760	0	1770	1691	0	1770	3511	0	1770	3539	1583
Flt Permitted	0.660			0.511			0.038			0.042		
Satd. Flow (perm)	1229	1760	0	952	1691	0	71	3511	0	78	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			41			6				89
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	22	0	116	106	0	20	1931	0	79	2234	314
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	25.0		9.0	25.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	19.0	25.0		19.0	25.0		14.0	102.0		14.0	102.0	102.0
Total Split (%)	11.9%	15.6%		11.9%	15.6%		8.8%	63.8%		8.8%	63.8%	63.8%
Maximum Green (s)	15.0	21.0		15.0	21.0		10.0	97.5		10.0	97.5	97.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	23.7	11.6		28.4	11.9		114.6	108.1		120.6	114.5	108.1
Actuated g/C Ratio	0.15	0.07		0.18	0.07		0.72	0.68		0.75	0.72	0.68
v/c Ratio	0.80	0.16		0.43	0.65		0.18	0.81		0.53	0.88	0.29
Control Delay	86.2	50.9		60.1	61.2		10.4	28.6		32.1	24.6	8.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	86.2	50.9		60.1	61.2		10.4	28.6		32.1	24.6	8.7
LOS	F	D		E	E		B	C		C	C	A
Approach Delay		82.5			60.6			28.4			22.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			E			C			C	
90th %ile Green (s)	15.0	17.7		15.0	17.7		6.7	98.1		12.7	104.1	98.1
90th %ile Term Code	Max	Hold		Max	Gap		Gap	Coord		Gap	Coord	Coord
70th %ile Green (s)	15.0	14.1		15.0	14.1		6.2	104.7		9.7	108.2	104.7
70th %ile Term Code	Max	Hold		Max	Gap		Gap	Coord		Gap	Coord	Coord
50th %ile Green (s)	15.0	12.2		14.5	11.7		5.9	109.1		7.7	110.9	109.1
50th %ile Term Code	Max	Hold		Gap	Gap		Gap	Coord		Gap	Coord	Coord
30th %ile Green (s)	15.0	0.0		28.2	9.2		0.0	112.6		6.7	123.3	112.6
30th %ile Term Code	Max	Skip		Hold	Gap		Skip	Coord		Gap	Coord	Coord
10th %ile Green (s)	14.7	0.0		25.7	7.0		0.0	115.9		5.9	125.8	115.9
10th %ile Term Code	Gap	Skip		Hold	Min		Skip	Coord		Gap	Coord	Coord
Queue Length 50th (ft)	178	14		106	67		7	976		21	954	83
Queue Length 95th (ft)	252	44		163	130		m8	m497		81	#1359	161
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	233	237		270	257		158	2373		170	2531	1098
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.80	0.09		0.43	0.41		0.13	0.81		0.46	0.88	0.29

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 14 (9%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green			
Natural Cycle: 130			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 29.2		Intersection LOS: C	
Intersection Capacity Utilization 83.9%		ICU Level of Service E	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	253	27	4	199	135	67	11	2275	39	76	1180	417
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.982			0.950			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1829	0	1770	1770	0	1770	3529	0	1770	3539	1583
Flt Permitted	0.952			0.488			0.163			0.082		
Satd. Flow (perm)	1773	1829	0	909	1770	0	304	3529	0	153	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			24			4				415
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	275	33	0	216	220	0	12	2515	0	83	1283	453
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	11.0		9.0	11.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	9.0	11.0		9.0	11.0		9.0	51.0		9.0	51.0	51.0
Total Split (%)	11.3%	13.8%		11.3%	13.8%		11.3%	63.8%		11.3%	63.8%	63.8%
Maximum Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	9.2	7.0		13.6	7.0		52.8	48.3		55.2	53.7	48.3
Actuated g/C Ratio	0.12	0.09		0.17	0.09		0.66	0.60		0.69	0.67	0.60
v/c Ratio	1.35	0.20		0.84	1.25		0.04	1.18		0.40	0.54	0.40
Control Delay	218.1	34.1		64.5	181.9		4.7	103.2		11.6	8.4	2.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	218.1	34.1		64.5	181.9		4.7	103.2		11.6	8.4	2.4
LOS	F	C		E	F		A	F		B	A	A
Approach Delay		198.4			123.7			102.7			7.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			F			A	
90th %ile Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
90th %ile Term Code	Max	Max		Max	Max		Max	Coord		Max	Coord	Coord
70th %ile Green (s)	5.0	7.0		5.0	7.0		0.0	46.5		5.0	55.5	46.5
70th %ile Term Code	Max	Max		Max	Max		Skip	Coord		Max	Coord	Coord
50th %ile Green (s)	5.0	7.0		5.0	7.0		0.0	46.5		5.0	55.5	46.5
50th %ile Term Code	Max	Max		Max	Max		Skip	Coord		Max	Coord	Coord
30th %ile Green (s)	5.0	0.0		16.0	7.0		0.0	46.5		5.0	55.5	46.5
30th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Max	Coord	Coord
10th %ile Green (s)	5.0	0.0		16.0	7.0		0.0	55.5		0.0	55.5	55.5
10th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Skip	Coord	Coord
Queue Length 50th (ft)	~137	14		~114	~128		1	~795		11	136	8
Queue Length 95th (ft)	#295	40		#215	#265		m1	m200		33	265	45
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	203	163		256	176		292	2131		206	2375	1119
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.35	0.20		0.84	1.25		0.04	1.18		0.40	0.54	0.40

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 9 (11%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 140	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.35	
Intersection Signal Delay: 76.1	Intersection LOS: E
Intersection Capacity Utilization 99.7%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.

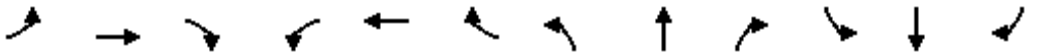
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	13	7	127	38	65	18	1707	115	75	2077	289
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.945			0.905			0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1760	0	1770	1686	0	1770	3507	0	1770	3539	1583
Flt Permitted	0.623			0.513			0.038			0.036		
Satd. Flow (perm)	1160	1760	0	956	1686	0	71	3507	0	67	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			45			8				88
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	22	0	138	112	0	20	1980	0	82	2258	314
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	25.0		9.0	25.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	19.0	25.0		19.0	25.0		14.0	102.0		14.0	102.0	102.0
Total Split (%)	11.9%	15.6%		11.9%	15.6%		8.8%	63.8%		8.8%	63.8%	63.8%
Maximum Green (s)	15.0	21.0		15.0	21.0		10.0	97.5		10.0	97.5	97.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	23.8	11.7		28.7	12.1		114.2	107.7		120.5	114.3	107.7
Actuated g/C Ratio	0.15	0.07		0.18	0.08		0.71	0.67		0.75	0.71	0.67
v/c Ratio	0.81	0.16		0.51	0.66		0.18	0.84		0.57	0.89	0.29
Control Delay	87.6	50.8		62.5	60.6		10.2	27.3		41.4	25.5	8.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	87.6	50.8		62.5	60.6		10.2	27.3		41.4	25.5	8.9
LOS	F	D		E	E		B	C		D	C	A
Approach Delay		83.7			61.6			27.2			24.1	
Approach LOS		F			E			C			C	
90th %ile Green (s)	15.0	18.0		15.0	18.0		6.7	97.5		13.0	103.8	97.5
90th %ile Term Code	Max	Hold		Max	Gap		Gap	Coord		Max	Coord	Coord
70th %ile Green (s)	15.0	14.4		15.0	14.4		6.2	104.0		10.1	107.9	104.0
70th %ile Term Code	Max	Hold		Max	Gap		Gap	Coord		Gap	Coord	Coord

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
50th %ile Green (s)	15.0	11.9		15.0	11.9		5.9	108.7		7.9	110.7	108.7
50th %ile Term Code	Max	Hold		Max	Gap		Gap	Coord		Gap	Coord	Coord
30th %ile Green (s)	15.0	0.0		28.4	9.4		0.0	112.4		6.7	123.1	112.4
30th %ile Term Code	Max	Skip		Hold	Gap		Skip	Coord		Gap	Coord	Coord
10th %ile Green (s)	14.7	0.0		25.7	7.0		0.0	115.8		6.0	125.8	115.8
10th %ile Term Code	Gap	Skip		Hold	Min		Skip	Coord		Gap	Coord	Coord
Queue Length 50th (ft)	178	14		128	69		7	1033		33	988	84
Queue Length 95th (ft)	251	44		191	136		m8	m460		95	#1389	164
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	230	237		272	260		158	2363		163	2527	1094
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.81	0.09		0.51	0.43		0.13	0.84		0.50	0.89	0.29

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 14 (9%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 29.5 Intersection LOS: C
Intersection Capacity Utilization 85.6% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	253	27	4	229	135	70	11	2313	69	81	1220	417
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.982			0.949			0.996				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1829	0	1770	1768	0	1770	3525	0	1770	3539	1583
Flt Permitted	0.952			0.488			0.152			0.082		
Satd. Flow (perm)	1773	1829	0	909	1768	0	283	3525	0	153	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			25			6				402
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	275	33	0	249	223	0	12	2589	0	88	1326	453
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	11.0		9.0	11.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	9.0	11.0		9.0	11.0		9.0	51.0		9.0	51.0	51.0
Total Split (%)	11.3%	13.8%		11.3%	13.8%		11.3%	63.8%		11.3%	63.8%	63.8%
Maximum Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	9.2	7.0		13.6	7.0		52.8	48.3		55.2	53.7	48.3
Actuated g/C Ratio	0.12	0.09		0.17	0.09		0.66	0.60		0.69	0.67	0.60
v/c Ratio	1.35	0.20		0.97	1.26		0.04	1.22		0.43	0.56	0.41
Control Delay	218.1	34.1		88.8	185.2		4.8	122.0		12.7	8.6	2.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	218.1	34.1		88.8	185.2		4.8	122.0		12.7	8.6	2.6
LOS	F	C		F	F		A	F		B	A	A
Approach Delay		198.4			134.4			121.5			7.3	
Approach LOS		F			F			F			A	
90th %ile Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
90th %ile Term Code	Max	Max		Max	Max		Max	Coord		Max	Coord	Coord
70th %ile Green (s)	5.0	7.0		5.0	7.0		0.0	46.5		5.0	55.5	46.5
70th %ile Term Code	Max	Max		Max	Max		Skip	Coord		Max	Coord	Coord

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
50th %ile Green (s)	5.0	7.0		5.0	7.0		0.0	46.5		5.0	55.5	46.5
50th %ile Term Code	Max	Max		Max	Max		Skip	Coord		Max	Coord	Coord
30th %ile Green (s)	5.0	0.0		16.0	7.0		0.0	46.5		5.0	55.5	46.5
30th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Max	Coord	Coord
10th %ile Green (s)	5.0	0.0		16.0	7.0		0.0	55.5		0.0	55.5	55.5
10th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Skip	Coord	Coord
Queue Length 50th (ft)	~137	14		~120	~130		2	~808		12	143	10
Queue Length 95th (ft)	#295	40		#258	#267		m1	m148		37	279	48
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	203	163		256	177		279	2130		206	2375	1115
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.35	0.20		0.97	1.26		0.04	1.22		0.43	0.56	0.41

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 9 (11%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 140	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.35	
Intersection Signal Delay: 86.5	Intersection LOS: F
Intersection Capacity Utilization 103.1%	ICU Level of Service G
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	13	7	107	38	65	18	1687	95	75	2057	289
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.945			0.905			0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1760	0	1770	1686	0	1770	3511	0	1770	3539	1583
Flt Permitted	0.616			0.514			0.038			0.040		
Satd. Flow (perm)	1147	1760	0	957	1686	0	71	3511	0	75	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			45			6				89
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	22	0	116	112	0	20	1937	0	82	2236	314
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	25.0		9.0	25.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	19.0	25.0		19.0	25.0		14.0	102.0		14.0	102.0	102.0
Total Split (%)	11.9%	15.6%		11.9%	15.6%		8.8%	63.8%		8.8%	63.8%	63.8%
Maximum Green (s)	15.0	21.0		15.0	21.0		10.0	97.5		10.0	97.5	97.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	23.9	11.8		28.6	12.1		114.2	107.7		120.5	114.3	107.7
Actuated g/C Ratio	0.15	0.07		0.18	0.08		0.71	0.67		0.75	0.71	0.67
v/c Ratio	0.81	0.16		0.43	0.66		0.18	0.82		0.55	0.88	0.29
Control Delay	87.7	50.6		59.8	60.6		10.4	28.5		35.9	24.9	8.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	87.7	50.6		59.8	60.6		10.4	28.5		35.9	24.9	8.8
LOS	F	D		E	E		B	C		D	C	A
Approach Delay		83.8			60.2			28.4			23.3	
Approach LOS		F			E			C			C	
90th %ile Green (s)	15.0	18.0		15.0	18.0		6.7	97.5		13.0	103.8	97.5
90th %ile Term Code	Max	Hold		Max	Gap		Gap	Coord		Max	Coord	Coord
70th %ile Green (s)	15.0	14.4		15.0	14.4		6.2	104.0		10.1	107.9	104.0
70th %ile Term Code	Max	Hold		Max	Gap		Gap	Coord		Gap	Coord	Coord

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
50th %ile Green (s)	15.0	12.4		14.5	11.9		5.9	108.7		7.9	110.7	108.7
50th %ile Term Code	Max	Hold		Gap	Gap		Gap	Coord		Gap	Coord	Coord
30th %ile Green (s)	15.0	0.0		28.4	9.4		0.0	112.4		6.7	123.1	112.4
30th %ile Term Code	Max	Skip		Hold	Gap		Skip	Coord		Gap	Coord	Coord
10th %ile Green (s)	14.7	0.0		25.7	7.0		0.0	115.8		6.0	125.8	115.8
10th %ile Term Code	Gap	Skip		Hold	Min		Skip	Coord		Gap	Coord	Coord
Queue Length 50th (ft)	178	14		106	69		7	991		27	962	84
Queue Length 95th (ft)	251	44		163	136		m8	m472		89	#1365	163
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	229	237		272	260		158	2364		169	2527	1094
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.81	0.09		0.43	0.43		0.13	0.82		0.49	0.88	0.29

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 14 (9%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 29.4 Intersection LOS: C
Intersection Capacity Utilization 85.6% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SH 82 & 23rd St.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	253	27	4	199	135	70	11	2278	39	81	1185	417
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	24		0	41		0	108		300	106		119
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.982			0.949			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1829	0	1770	1768	0	1770	3529	0	1770	3539	1583
Flt Permitted	0.952			0.488			0.162			0.082		
Satd. Flow (perm)	1773	1829	0	909	1768	0	302	3529	0	153	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			25			4				414
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			596			1652			518	
Travel Time (s)		5.7			13.5			37.5			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	275	33	0	216	223	0	12	2518	0	88	1288	453
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	custom
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		6
Detector Phase	3	8		7	4		1	6		5	2	6
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	20.0		5.0	20.0	20.0
Minimum Split (s)	9.0	11.0		9.0	11.0		9.0	27.5		9.0	27.5	27.5
Total Split (s)	9.0	11.0		9.0	11.0		9.0	51.0		9.0	51.0	51.0
Total Split (%)	11.3%	13.8%		11.3%	13.8%		11.3%	63.8%		11.3%	63.8%	63.8%
Maximum Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Walk Time (s)		4.0			4.0			9.0			9.0	9.0
Flash Dont Walk (s)		17.0			17.0			14.0			14.0	14.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	9.2	7.0		13.6	7.0		52.8	48.3		55.2	53.7	48.3
Actuated g/C Ratio	0.12	0.09		0.17	0.09		0.66	0.60		0.69	0.67	0.60
v/c Ratio	1.35	0.20		0.84	1.26		0.04	1.18		0.43	0.54	0.40
Control Delay	218.1	34.1		64.5	185.2		4.9	105.3		12.7	8.4	2.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	218.1	34.1		64.5	185.2		4.9	105.3		12.7	8.4	2.5
LOS	F	C		E	F		A	F		B	A	A
Approach Delay		198.4			125.8			104.8			7.1	
Approach LOS		F			F			F			A	
90th %ile Green (s)	5.0	7.0		5.0	7.0		5.0	46.5		5.0	46.5	46.5
90th %ile Term Code	Max	Max		Max	Max		Max	Coord		Max	Coord	Coord
70th %ile Green (s)	5.0	7.0		5.0	7.0		0.0	46.5		5.0	55.5	46.5
70th %ile Term Code	Max	Max		Max	Max		Skip	Coord		Max	Coord	Coord

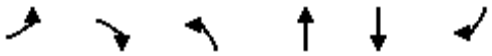
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
50th %ile Green (s)	5.0	7.0		5.0	7.0		0.0	46.5		5.0	55.5	46.5
50th %ile Term Code	Max	Max		Max	Max		Skip	Coord		Max	Coord	Coord
30th %ile Green (s)	5.0	0.0		16.0	7.0		0.0	46.5		5.0	55.5	46.5
30th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Max	Coord	Coord
10th %ile Green (s)	5.0	0.0		16.0	7.0		0.0	55.5		0.0	55.5	55.5
10th %ile Term Code	Max	Skip		Hold	Max		Skip	Coord		Skip	Coord	Coord
Queue Length 50th (ft)	~137	14		~114	~130		2	~770		12	137	8
Queue Length 95th (ft)	#295	40		#215	#267		m1	m177		37	266	45
Internal Link Dist (ft)		171			516			1572			438	
Turn Bay Length (ft)	24			41			108			106		119
Base Capacity (vph)	203	163		256	177		291	2131		206	2375	1119
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.35	0.20		0.84	1.26		0.04	1.18		0.43	0.54	0.40

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 9 (11%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.35
Intersection Signal Delay: 77.3 Intersection LOS: E
Intersection Capacity Utilization 103.1% ICU Level of Service G
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

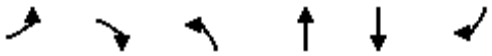
Splits and Phases: 3: SH 82 & 23rd St.



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	13	8	7	51	51	27
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	9	8	55	55	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		90	33	37	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		90	33	37	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	99		99	93	93	97
cM capacity (veh/h)	1623		822	853	848	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	23	63	85
Volume Left	14	8	0
Volume Right	9	0	29
cSH	1623	849	917
Volume to Capacity	0.01	0.07	0.09
Queue Length 95th (ft)	1	6	8
Control Delay (s)	4.5	9.6	9.3
Lane LOS	A	A	A
Approach Delay (s)	4.5	9.6	9.3
Approach LOS		A	A

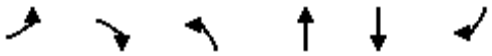
Intersection Summary			
Average Delay	8.8		
Intersection Capacity Utilization	18.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	113	12	19	86	82	27
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	123	13	21	93	89	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		326	252	259	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		326	252	259	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	92		96	84	85	97
cM capacity (veh/h)	1623		510	602	597	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	136	114	118
Volume Left	123	21	0
Volume Right	13	0	29
cSH	1623	583	672
Volume to Capacity	0.08	0.20	0.18
Queue Length 95th (ft)	6	18	16
Control Delay (s)	6.7	12.7	11.5
Lane LOS	A	B	B
Approach Delay (s)	6.7	12.7	11.5
Approach LOS		B	B

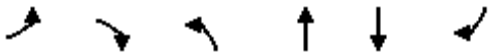
Intersection Summary			
Average Delay	10.1		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	23	8	7	1	1	37
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	9	8	1	1	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		95	54	59	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		95	54	59	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	98		99	100	100	96
cM capacity (veh/h)	1623		844	824	819	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	34	9	41
Volume Left	25	8	0
Volume Right	9	0	40
cSH	1623	841	1076
Volume to Capacity	0.02	0.01	0.04
Queue Length 95th (ft)	1	1	3
Control Delay (s)	5.4	9.3	8.5
Lane LOS	A	A	A
Approach Delay (s)	5.4	9.3	8.5
Approach LOS		A	A

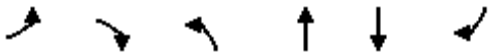
Intersection Summary			
Average Delay	7.3		
Intersection Capacity Utilization	16.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	128	12	19	6	2	42
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	139	13	21	7	2	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		332	285	291	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		332	285	291	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	91		96	99	100	96
cM capacity (veh/h)	1623		555	571	566	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	152	27	48
Volume Left	139	21	0
Volume Right	13	0	46
cSH	1623	559	1042
Volume to Capacity	0.09	0.05	0.05
Queue Length 95th (ft)	7	4	4
Control Delay (s)	6.8	11.8	8.6
Lane LOS	A	B	A
Approach Delay (s)	6.8	11.8	8.6
Approach LOS		B	A

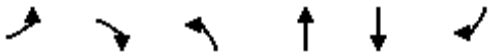
Intersection Summary			
Average Delay	7.8		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	27	15	24	1	1	46
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	16	26	1	1	50
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		117	67	75	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		117	67	75	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	98		97	100	100	95
cM capacity (veh/h)	1623		807	809	801	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	46	27	51
Volume Left	29	26	0
Volume Right	16	0	50
cSH	1623	807	1077
Volume to Capacity	0.02	0.03	0.05
Queue Length 95th (ft)	1	3	4
Control Delay (s)	4.7	9.6	8.5
Lane LOS	A	A	A
Approach Delay (s)	4.7	9.6	8.5
Approach LOS		A	A

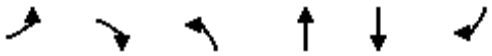
Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	18.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	139	31	31	6	2	49
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	151	34	34	7	2	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		373	319	336	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		373	319	336	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	91		93	99	100	95
cM capacity (veh/h)	1623		514	542	530	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	185	40	55
Volume Left	151	34	0
Volume Right	34	0	53
cSH	1623	518	1042
Volume to Capacity	0.09	0.08	0.05
Queue Length 95th (ft)	8	6	4
Control Delay (s)	6.2	12.5	8.6
Lane LOS	A	B	A
Approach Delay (s)	6.2	12.5	8.6
Approach LOS		B	A

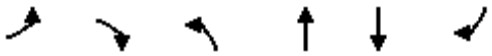
Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	15	13	19	51	51	32
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	14	21	55	55	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		102	40	47	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		102	40	47	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	99		97	93	93	97
cM capacity (veh/h)	1623		801	844	836	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	30	76	90
Volume Left	16	21	0
Volume Right	14	0	35
cSH	1623	832	917
Volume to Capacity	0.01	0.09	0.10
Queue Length 95th (ft)	1	8	8
Control Delay (s)	3.9	9.8	9.4
Lane LOS	A	A	A
Approach Delay (s)	3.9	9.8	9.4
Approach LOS		A	A

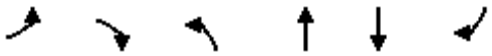
Intersection Summary			
Average Delay	8.7		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	118	26	28	86	82	30
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	128	28	30	93	89	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		348	271	285	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		348	271	285	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	92		94	84	85	97
cM capacity (veh/h)	1623		488	586	575	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	157	124	122
Volume Left	128	30	0
Volume Right	28	0	33
cSH	1623	558	658
Volume to Capacity	0.08	0.22	0.19
Queue Length 95th (ft)	6	21	17
Control Delay (s)	6.2	13.3	11.7
Lane LOS	A	B	B
Approach Delay (s)	6.2	13.3	11.7
Approach LOS		B	B

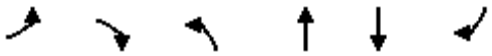
Intersection Summary			
Average Delay	10.0		
Intersection Capacity Utilization	27.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	195	18	29	9	4	64
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	212	20	32	10	4	70
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		505	434	443	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		505	434	443	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	87		92	98	99	94
cM capacity (veh/h)	1623		399	448	442	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	232	41	74
Volume Left	212	32	0
Volume Right	20	0	70
cSH	1623	410	1000
Volume to Capacity	0.13	0.10	0.07
Queue Length 95th (ft)	11	8	6
Control Delay (s)	7.0	14.8	8.9
Lane LOS	A	B	A
Approach Delay (s)	7.0	14.8	8.9
Approach LOS		B	A

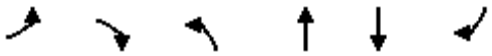
Intersection Summary			
Average Delay	8.3		
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	25	13	11	52	52	46
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	14	12	57	57	50
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		140	61	68	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		140	61	68	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	98		98	93	93	95
cM capacity (veh/h)	1623		740	816	808	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	41	68	107
Volume Left	27	12	0
Volume Right	14	0	50
cSH	1623	801	918
Volume to Capacity	0.02	0.09	0.12
Queue Length 95th (ft)	1	7	10
Control Delay (s)	4.8	9.9	9.4
Lane LOS	A	A	A
Approach Delay (s)	4.8	9.9	9.4
Approach LOS		A	A

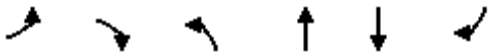
Intersection Summary			
Average Delay	8.7		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	180	18	29	89	84	49
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	196	20	32	97	91	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		500	401	411	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		500	401	411	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	88		91	80	80	95
cM capacity (veh/h)	1623		354	473	467	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	215	128	145
Volume Left	196	32	0
Volume Right	20	0	53
cSH	1623	437	591
Volume to Capacity	0.12	0.29	0.24
Queue Length 95th (ft)	10	30	24
Control Delay (s)	6.9	16.6	13.1
Lane LOS	A	C	B
Approach Delay (s)	6.9	16.6	13.1
Approach LOS		C	B

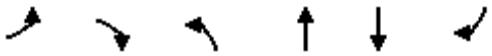
Intersection Summary			
Average Delay	11.3		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	35	13	11	2	2	56
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	14	12	2	2	61
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		145	83	90	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		145	83	90	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	98		98	100	100	94
cM capacity (veh/h)	1623		762	788	781	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	52	14	63
Volume Left	38	12	0
Volume Right	14	0	61
cSH	1623	766	1071
Volume to Capacity	0.02	0.02	0.06
Queue Length 95th (ft)	2	1	5
Control Delay (s)	5.3	9.8	8.6
Lane LOS	A	A	A
Approach Delay (s)	5.3	9.8	8.6
Approach LOS		A	A

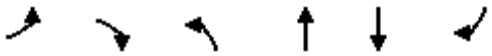
Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	17.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	39	20	28	2	2	65
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	22	30	2	2	71
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		167	96	107	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		167	96	107	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	97		96	100	100	93
cM capacity (veh/h)	1623		728	774	763	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	64	33	73
Volume Left	42	30	0
Volume Right	22	0	71
cSH	1623	731	1071
Volume to Capacity	0.03	0.04	0.07
Queue Length 95th (ft)	2	3	5
Control Delay (s)	4.9	10.2	8.6
Lane LOS	A	B	A
Approach Delay (s)	4.9	10.2	8.6
Approach LOS		B	A

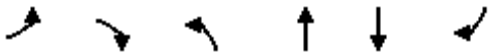
Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	18.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	206	37	41	9	4	71
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	224	40	45	10	4	77
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		547	468	488	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		547	468	488	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	86		88	98	99	93
cM capacity (veh/h)	1623		369	425	414	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	264	54	82
Volume Left	224	45	0
Volume Right	40	0	77
cSH	1623	378	999
Volume to Capacity	0.14	0.14	0.08
Queue Length 95th (ft)	12	12	7
Control Delay (s)	6.6	16.1	8.9
Lane LOS	A	C	A
Approach Delay (s)	6.6	16.1	8.9
Approach LOS		C	A

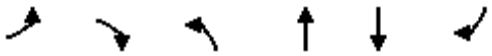
Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	27	18	23	52	52	51
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	20	25	57	57	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		152	68	78	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		152	68	78	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	98		97	93	93	95
cM capacity (veh/h)	1623		722	807	797	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	49	82	112
Volume Left	29	25	0
Volume Right	20	0	55
cSH	1623	779	918
Volume to Capacity	0.02	0.10	0.12
Queue Length 95th (ft)	1	9	10
Control Delay (s)	4.4	10.2	9.5
Lane LOS	A	B	A
Approach Delay (s)	4.4	10.2	9.5
Approach LOS		B	A

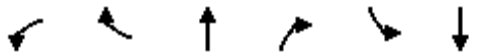
Intersection Summary			
Average Delay	8.7		
Intersection Capacity Utilization	20.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	185	32	38	89	84	52
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	201	35	41	97	91	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		522	420	437	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		522	420	437	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	88		88	79	80	95
cM capacity (veh/h)	1623		338	460	450	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	236	138	148
Volume Left	201	41	0
Volume Right	35	0	57
cSH	1623	415	579
Volume to Capacity	0.12	0.33	0.26
Queue Length 95th (ft)	11	36	25
Control Delay (s)	6.6	17.9	13.3
Lane LOS	A	C	B
Approach Delay (s)	6.6	17.9	13.3
Approach LOS		C	B

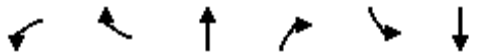
Intersection Summary			
Average Delay	11.5		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	12	10	62	11	10	76
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	11	67	12	11	83
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	178	73			79	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	178	73			79	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			99	
cM capacity (veh/h)	806	988			1519	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	24	79	93
Volume Left	13	0	11
Volume Right	11	12	0
cSH	880	1700	1519
Volume to Capacity	0.03	0.05	0.01
Queue Length 95th (ft)	2	0	1
Control Delay (s)	9.2	0.0	0.9
Lane LOS	A		A
Approach Delay (s)	9.2	0.0	0.9
Approach LOS	A		

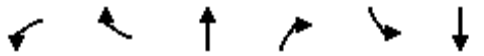
Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	21.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	7	188	24	10	106
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	8	204	26	11	115
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	354	217			230	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354	217			230	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			99	
cM capacity (veh/h)	638	822			1337	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	23	230	126
Volume Left	15	0	11
Volume Right	8	26	0
cSH	690	1700	1337
Volume to Capacity	0.03	0.14	0.01
Queue Length 95th (ft)	3	0	1
Control Delay (s)	10.4	0.0	0.7
Lane LOS	B		A
Approach Delay (s)	10.4	0.0	0.7
Approach LOS	B		

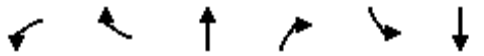
Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		23.9%	ICU Level of Service A
Analysis Period (min)		15	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	12	10	12	11	10	26
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	11	13	12	11	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	69	19			25	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	69	19			25	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			99	
cM capacity (veh/h)	929	1059			1589	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	24	25	39
Volume Left	13	0	11
Volume Right	11	12	0
cSH	984	1700	1589
Volume to Capacity	0.02	0.01	0.01
Queue Length 95th (ft)	2	0	1
Control Delay (s)	8.7	0.0	2.1
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	2.1
Approach LOS	A		

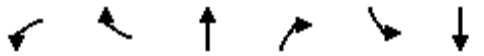
Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	18.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	7	108	24	10	26
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	8	117	26	11	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	180	130			143	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	180	130			143	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			99	
cM capacity (veh/h)	803	919			1439	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	23	143	39
Volume Left	15	0	11
Volume Right	8	26	0
cSH	838	1700	1439
Volume to Capacity	0.03	0.08	0.01
Queue Length 95th (ft)	2	0	1
Control Delay (s)	9.4	0.0	2.1
Lane LOS	A		A
Approach Delay (s)	9.4	0.0	2.1
Approach LOS	A		

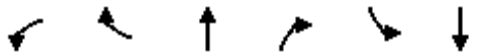
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	21	12	12	15	11	26
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	13	13	16	12	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	73	21			29	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	73	21			29	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			99	
cM capacity (veh/h)	923	1056			1584	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	36	29	40
Volume Left	23	0	12
Volume Right	13	16	0
cSH	968	1700	1584
Volume to Capacity	0.04	0.02	0.01
Queue Length 95th (ft)	3	0	1
Control Delay (s)	8.9	0.0	2.2
Lane LOS	A		A
Approach Delay (s)	8.9	0.0	2.2
Approach LOS	A		

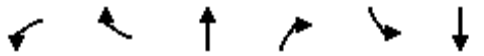
Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	18.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	21	8	108	35	12	26
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	9	117	38	13	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	191	136			155	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	191	136			155	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	99			99	
cM capacity (veh/h)	791	912			1425	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	32	155	41
Volume Left	23	0	13
Volume Right	9	38	0
cSH	821	1700	1425
Volume to Capacity	0.04	0.09	0.01
Queue Length 95th (ft)	3	0	1
Control Delay (s)	9.6	0.0	2.4
Lane LOS	A		A
Approach Delay (s)	9.6	0.0	2.4
Approach LOS	A		

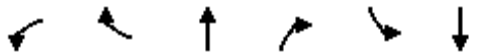
Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	22.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	17	12	62	13	11	76
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	13	67	14	12	83
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	181	74			82	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	181	74			82	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			99	
cM capacity (veh/h)	802	987			1516	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	32	82	95
Volume Left	18	0	12
Volume Right	13	14	0
cSH	870	1700	1516
Volume to Capacity	0.04	0.05	0.01
Queue Length 95th (ft)	3	0	1
Control Delay (s)	9.3	0.0	1.0
Lane LOS	A		A
Approach Delay (s)	9.3	0.0	1.0
Approach LOS	A		

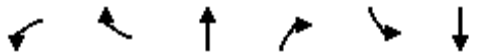
Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	21.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	17	8	188	29	12	106
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	9	204	32	13	115
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	361	220			236	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	361	220			236	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	99			99	
cM capacity (veh/h)	631	820			1331	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	27	236	128
Volume Left	18	0	13
Volume Right	9	32	0
cSH	681	1700	1331
Volume to Capacity	0.04	0.14	0.01
Queue Length 95th (ft)	3	0	1
Control Delay (s)	10.5	0.0	0.9
Lane LOS	B		A
Approach Delay (s)	10.5	0.0	0.9
Approach LOS	B		

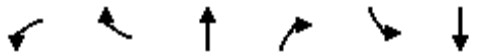
Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	22	11	164	36	15	40
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	12	178	39	16	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	274	198			217	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	274	198			217	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	99			99	
cM capacity (veh/h)	707	843			1352	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	36	217	60
Volume Left	24	0	16
Volume Right	12	39	0
cSH	747	1700	1352
Volume to Capacity	0.05	0.13	0.01
Queue Length 95th (ft)	4	0	1
Control Delay (s)	10.1	0.0	2.2
Lane LOS	B		A
Approach Delay (s)	10.1	0.0	2.2
Approach LOS	B		

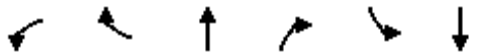
Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	18	15	68	16	15	90
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	16	74	17	16	98
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	213	83			91	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	213	83			91	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			99	
cM capacity (veh/h)	767	977			1504	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	36	91	114
Volume Left	20	0	16
Volume Right	16	17	0
cSH	850	1700	1504
Volume to Capacity	0.04	0.05	0.01
Queue Length 95th (ft)	3	0	1
Control Delay (s)	9.4	0.0	1.1
Lane LOS	A		A
Approach Delay (s)	9.4	0.0	1.1
Approach LOS	A		

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	22	11	244	36	15	120
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	12	265	39	16	130
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	448	285			304	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	448	285			304	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	98			99	
cM capacity (veh/h)	561	754			1256	

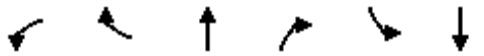
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	36	304	147
Volume Left	24	0	16
Volume Right	12	39	0
cSH	613	1700	1256
Volume to Capacity	0.06	0.18	0.01
Queue Length 95th (ft)	5	0	1
Control Delay (s)	11.2	0.0	1.0
Lane LOS	B		A
Approach Delay (s)	11.2	0.0	1.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	28.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	18	15	18	16	15	40
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	16	20	17	16	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	104	28			37	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	104	28			37	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			99	
cM capacity (veh/h)	884	1047			1574	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	36	37	60
Volume Left	20	0	16
Volume Right	16	17	0
cSH	951	1700	1574
Volume to Capacity	0.04	0.02	0.01
Queue Length 95th (ft)	3	0	1
Control Delay (s)	8.9	0.0	2.1
Lane LOS	A		A
Approach Delay (s)	8.9	0.0	2.1
Approach LOS	A		

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	19.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	27	17	18	20	16	40
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	18	20	22	17	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	109	30			41	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	109	30			41	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			99	
cM capacity (veh/h)	879	1044			1568	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	48	41	61
Volume Left	29	0	17
Volume Right	18	22	0
cSH	936	1700	1568
Volume to Capacity	0.05	0.02	0.01
Queue Length 95th (ft)	4	0	1
Control Delay (s)	9.1	0.0	2.2
Lane LOS	A		A
Approach Delay (s)	9.1	0.0	2.2
Approach LOS	A		

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	19.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	29	12	164	47	17	40
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	13	178	51	18	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	284	204			229	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	284	204			229	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			99	
cM capacity (veh/h)	696	837			1339	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	45	229	62
Volume Left	32	0	18
Volume Right	13	51	0
cSH	732	1700	1339
Volume to Capacity	0.06	0.13	0.01
Queue Length 95th (ft)	5	0	1
Control Delay (s)	10.2	0.0	2.4
Lane LOS	B		A
Approach Delay (s)	10.2	0.0	2.4
Approach LOS	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	23	17	68	18	16	90
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	18	74	20	17	98
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	216	84			93	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	216	84			93	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			99	
cM capacity (veh/h)	763	976			1501	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	43	93	115
Volume Left	25	0	17
Volume Right	18	20	0
cSH	841	1700	1501
Volume to Capacity	0.05	0.05	0.01
Queue Length 95th (ft)	4	0	1
Control Delay (s)	9.5	0.0	1.2
Lane LOS	A		A
Approach Delay (s)	9.5	0.0	1.2
Approach LOS	A		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	25	12	244	41	17	120
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	13	265	45	18	130
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	455	288			310	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	455	288			310	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			99	
cM capacity (veh/h)	555	752			1251	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	40	310	149
Volume Left	27	0	18
Volume Right	13	45	0
cSH	606	1700	1251
Volume to Capacity	0.07	0.18	0.01
Queue Length 95th (ft)	5	0	1
Control Delay (s)	11.4	0.0	1.1
Lane LOS	B		A
Approach Delay (s)	11.4	0.0	1.1
Approach LOS	B		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	59	24	72	84	24	67
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	26	78	91	26	73
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			90		325	77
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			90		325	77
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		96	93
cM capacity (veh/h)			1505		634	984

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	90	170	99
Volume Left	0	78	26
Volume Right	26	0	73
cSH	1700	1505	859
Volume to Capacity	0.05	0.05	0.12
Queue Length 95th (ft)	0	4	10
Control Delay (s)	0.0	3.7	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	3.7	9.7
Approach LOS			A

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	27.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	53	17	108	166	42	188
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	18	117	180	46	204
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			76		482	67
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			76		482	67
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		91	79
cM capacity (veh/h)			1523		501	997

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	76	298	250
Volume Left	0	117	46
Volume Right	18	0	204
cSH	1700	1523	844
Volume to Capacity	0.04	0.08	0.30
Queue Length 95th (ft)	0	6	31
Control Delay (s)	0.0	3.4	11.0
Lane LOS		A	B
Approach Delay (s)	0.0	3.4	11.0
Approach LOS			B

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	83	17	28	196	42	108
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	90	18	30	213	46	117
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			109		373	99
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			109		373	99
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		93	88
cM capacity (veh/h)			1482		615	956

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	109	243	163
Volume Left	0	30	46
Volume Right	18	0	117
cSH	1700	1482	827
Volume to Capacity	0.06	0.02	0.20
Queue Length 95th (ft)	0	2	18
Control Delay (s)	0.0	1.1	10.4
Lane LOS		A	B
Approach Delay (s)	0.0	1.1	10.4
Approach LOS			B

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	34.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	79	24	22	104	24	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	86	26	24	113	26	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			112		260	99
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			112		260	99
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		96	98
cM capacity (veh/h)			1478		717	957

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	112	137	45
Volume Left	0	24	26
Volume Right	26	0	18
cSH	1700	1478	800
Volume to Capacity	0.07	0.02	0.06
Queue Length 95th (ft)	0	1	4
Control Delay (s)	0.0	1.4	9.8
Lane LOS		A	A
Approach Delay (s)	0.0	1.4	9.8
Approach LOS			A

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	80	25	22	107	26	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	27	24	116	28	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			114		265	101
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			114		265	101
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		96	98
cM capacity (veh/h)			1475		713	955

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	114	140	47
Volume Left	0	24	28
Volume Right	27	0	18
cSH	1700	1475	792
Volume to Capacity	0.07	0.02	0.06
Queue Length 95th (ft)	0	1	5
Control Delay (s)	0.0	1.4	9.8
Lane LOS		A	A
Approach Delay (s)	0.0	1.4	9.8
Approach LOS			A

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	23.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	87	19	28	198	43	108
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	95	21	30	215	47	117
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			115		381	105
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			115		381	105
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		92	88
cM capacity (veh/h)			1474		608	950

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	115	246	164
Volume Left	0	30	47
Volume Right	21	0	117
cSH	1700	1474	819
Volume to Capacity	0.07	0.02	0.20
Queue Length 95th (ft)	0	2	19
Control Delay (s)	0.0	1.1	10.5
Lane LOS		A	B
Approach Delay (s)	0.0	1.1	10.5
Approach LOS			B

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	60	25	72	87	26	67
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	27	78	95	28	73
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			92		330	79
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		330	79
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		96	93
cM capacity (veh/h)			1502		630	982

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	173	101
Volume Left	0	78	28
Volume Right	27	0	73
cSH	1700	1502	849
Volume to Capacity	0.05	0.05	0.12
Queue Length 95th (ft)	0	4	10
Control Delay (s)	0.0	3.6	9.8
Lane LOS		A	A
Approach Delay (s)	0.0	3.6	9.8
Approach LOS			A

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	27.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	57	19	108	168	43	188
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	21	117	183	47	204
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			83		490	72
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			83		490	72
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		91	79
cM capacity (veh/h)			1515		496	990

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	83	300	251
Volume Left	0	117	47
Volume Right	21	0	204
cSH	1700	1515	835
Volume to Capacity	0.05	0.08	0.30
Queue Length 95th (ft)	0	6	32
Control Delay (s)	0.0	3.4	11.2
Lane LOS		A	B
Approach Delay (s)	0.0	3.4	11.2
Approach LOS			B

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	42.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	125	25	42	296	64	164
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	136	27	46	322	70	178
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			163		562	149
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			163		562	149
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		85	80
cM capacity (veh/h)			1416		472	897

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	163	367	248
Volume Left	0	46	70
Volume Right	27	0	178
cSH	1700	1416	716
Volume to Capacity	0.10	0.03	0.35
Queue Length 95th (ft)	0	2	39
Control Delay (s)	0.0	1.2	12.7
Lane LOS		A	B
Approach Delay (s)	0.0	1.2	12.7
Approach LOS			B

Intersection Summary			
Average Delay		4.6	
Intersection Capacity Utilization		49.6%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	100	36	83	138	36	75
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	39	90	150	39	82
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			148		459	128
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			148		459	128
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		93	91
cM capacity (veh/h)			1434		525	922

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	148	240	121
Volume Left	0	90	39
Volume Right	39	0	82
cSH	1700	1434	740
Volume to Capacity	0.09	0.06	0.16
Queue Length 95th (ft)	0	5	14
Control Delay (s)	0.0	3.2	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	3.2	10.8
Approach LOS			B

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	35.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	95	25	122	266	64	244
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	27	133	289	70	265
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			130		671	117
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			130		671	117
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		82	72
cM capacity (veh/h)			1455		383	935

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	130	422	335
Volume Left	0	133	70
Volume Right	27	0	265
cSH	1700	1455	720
Volume to Capacity	0.08	0.09	0.47
Queue Length 95th (ft)	0	8	62
Control Delay (s)	0.0	3.0	14.3
Lane LOS		A	B
Approach Delay (s)	0.0	3.0	14.3
Approach LOS			B

Intersection Summary			
Average Delay		6.8	
Intersection Capacity Utilization		52.7%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	120	36	33	158	36	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	130	39	36	172	39	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			170		393	150
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			170		393	150
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		93	97
cM capacity (veh/h)			1408		595	896

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	170	208	66
Volume Left	0	36	39
Volume Right	39	0	27
cSH	1700	1408	691
Volume to Capacity	0.10	0.03	0.10
Queue Length 95th (ft)	0	2	8
Control Delay (s)	0.0	1.5	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	1.5	10.8
Approach LOS			B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	121	37	33	161	38	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	132	40	36	175	41	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			172		398	152
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			172		398	152
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		93	97
cM capacity (veh/h)			1405		592	895

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	172	211	68
Volume Left	0	36	41
Volume Right	40	0	27
cSH	1700	1405	683
Volume to Capacity	0.10	0.03	0.10
Queue Length 95th (ft)	0	2	8
Control Delay (s)	0.0	1.5	10.9
Lane LOS		A	B
Approach Delay (s)	0.0	1.5	10.9
Approach LOS			B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	129	27	42	298	65	164
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	140	29	46	324	71	178
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			170		570	155
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			170		570	155
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		85	80
cM capacity (veh/h)			1408		467	891

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	170	370	249
Volume Left	0	46	71
Volume Right	29	0	178
cSH	1700	1408	709
Volume to Capacity	0.10	0.03	0.35
Queue Length 95th (ft)	0	3	40
Control Delay (s)	0.0	1.2	12.8
Lane LOS		A	B
Approach Delay (s)	0.0	1.2	12.8
Approach LOS			B

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	101	37	83	141	38	75
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	110	40	90	153	41	82
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			150		464	130
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			150		464	130
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		92	91
cM capacity (veh/h)			1431		522	920

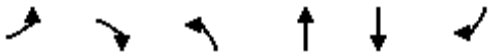
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	150	243	123
Volume Left	0	90	41
Volume Right	40	0	82
cSH	1700	1431	732
Volume to Capacity	0.09	0.06	0.17
Queue Length 95th (ft)	0	5	15
Control Delay (s)	0.0	3.2	10.9
Lane LOS		A	B
Approach Delay (s)	0.0	3.2	10.9
Approach LOS			B

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	99	27	122	268	65	244
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	29	133	291	71	265
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			137		679	122
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			137		679	122
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		81	71
cM capacity (veh/h)			1447		379	929

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	137	424	336
Volume Left	0	133	71
Volume Right	29	0	265
cSH	1700	1447	712
Volume to Capacity	0.08	0.09	0.47
Queue Length 95th (ft)	0	8	64
Control Delay (s)	0.0	3.0	14.5
Lane LOS		A	B
Approach Delay (s)	0.0	3.0	14.5
Approach LOS			B

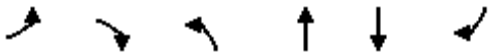
Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	2	13	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2	14	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		1	1	2	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1	1	2	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		99	100	100	100
cM capacity (veh/h)	1623		1022	895	894	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	2	14	0
Volume Left	0	14	0
Volume Right	2	0	0
cSH	1623	1022	1700
Volume to Capacity	0.00	0.01	0.00
Queue Length 95th (ft)	0	1	0
Control Delay (s)	0.0	8.6	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	8.6	0.0
Approach LOS		A	A

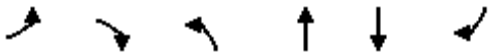
Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	2	13	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2	14	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		1	1	2	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1	1	2	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		99	100	100	100
cM capacity (veh/h)	1623		1022	895	894	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	2	14	0
Volume Left	0	14	0
Volume Right	2	0	0
cSH	1623	1022	1700
Volume to Capacity	0.00	0.01	0.00
Queue Length 95th (ft)	0	1	0
Control Delay (s)	0.0	8.6	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	8.6	0.0
Approach LOS		A	A

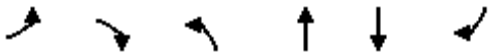
Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	11	13	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	12	14	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		15	15	21	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		15	15	21	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		99	100	100	100
cM capacity (veh/h)	1623		999	877	871	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	14	0
Volume Left	4	14	0
Volume Right	12	0	0
cSH	1623	999	1700
Volume to Capacity	0.00	0.01	0.00
Queue Length 95th (ft)	0	1	0
Control Delay (s)	1.9	8.7	0.0
Lane LOS	A	A	A
Approach Delay (s)	1.9	8.7	0.0
Approach LOS		A	A

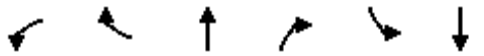
Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	23	8	7	1	1	37
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	9	8	1	1	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)	252					
pX, platoon unblocked						
vC, conflicting volume	0		95	54	59	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		95	54	59	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	98		99	100	100	96
cM capacity (veh/h)	1623		844	824	819	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	34	9	41
Volume Left	25	8	0
Volume Right	9	0	40
cSH	1623	841	1076
Volume to Capacity	0.02	0.01	0.04
Queue Length 95th (ft)	1	1	3
Control Delay (s)	5.4	9.3	8.5
Lane LOS	A	A	A
Approach Delay (s)	5.4	9.3	8.5
Approach LOS		A	A

Intersection Summary			
Average Delay	7.3		
Intersection Capacity Utilization	16.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	12	10	12	11	10	26
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	11	13	12	11	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	69	19			25	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	69	19			25	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			99	
cM capacity (veh/h)	929	1059			1589	

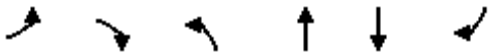
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	24	25	39
Volume Left	13	0	11
Volume Right	11	12	0
cSH	984	1700	1589
Volume to Capacity	0.02	0.01	0.01
Queue Length 95th (ft)	2	0	1
Control Delay (s)	8.7	0.0	2.1
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	2.1
Approach LOS	A		

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	18.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	83	12	23	98	14	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	90	13	25	107	15	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	596					
pX, platoon unblocked						
vC, conflicting volume			103		253	97
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			103		253	97
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		98	99
cM capacity (veh/h)			1489		723	960

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	103	132	27
Volume Left	0	25	15
Volume Right	13	0	12
cSH	1700	1489	811
Volume to Capacity	0.06	0.02	0.03
Queue Length 95th (ft)	0	1	3
Control Delay (s)	0.0	1.5	9.6
Lane LOS		A	A
Approach Delay (s)	0.0	1.5	9.6
Approach LOS			A

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	23.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	2	13	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2	14	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		1	1	2	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1	1	2	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		99	100	100	100
cM capacity (veh/h)	1623		1022	895	894	1085

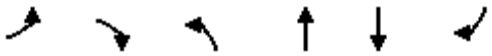
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	2	14	0
Volume Left	0	14	0
Volume Right	2	0	0
cSH	1623	1022	1700
Volume to Capacity	0.00	0.01	0.00
Queue Length 95th (ft)	0	1	0
Control Delay (s)	0.0	8.6	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	8.6	0.0
Approach LOS		A	A

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1023	1085			1623	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

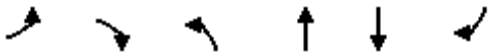
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	11	13	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	12	14	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		15	15	21	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		15	15	21	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		99	100	100	100
cM capacity (veh/h)	1623		999	877	871	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	14	0
Volume Left	4	14	0
Volume Right	12	0	0
cSH	1623	999	1700
Volume to Capacity	0.00	0.01	0.00
Queue Length 95th (ft)	0	1	0
Control Delay (s)	1.9	8.7	0.0
Lane LOS	A	A	A
Approach Delay (s)	1.9	8.7	0.0
Approach LOS		A	A

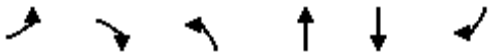
Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	3	16	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	3	17	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		2	2	3	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		2	2	3	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		98	100	100	100
cM capacity (veh/h)	1623		1021	894	892	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	3	17	0
Volume Left	0	17	0
Volume Right	3	0	0
cSH	1623	1021	1700
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	1	0
Control Delay (s)	0.0	8.6	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	8.6	0.0
Approach LOS		A	A

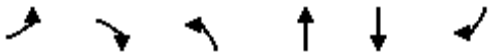
Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	15	15	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	16	16	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		17	17	25	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		17	17	25	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		98	100	100	100
cM capacity (veh/h)	1623		996	875	866	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	21	16	0
Volume Left	4	16	0
Volume Right	16	0	0
cSH	1623	996	1700
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	1	0
Control Delay (s)	1.5	8.7	0.0
Lane LOS	A	A	A
Approach Delay (s)	1.5	8.7	0.0
Approach LOS		A	A

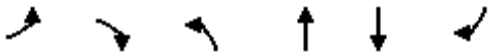
Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	3	16	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	3	17	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		2	2	3	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		2	2	3	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		98	100	100	100
cM capacity (veh/h)	1623		1021	894	892	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	3	17	0
Volume Left	0	17	0
Volume Right	3	0	0
cSH	1623	1021	1700
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	1	0
Control Delay (s)	0.0	8.6	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	8.6	0.0
Approach LOS		A	A

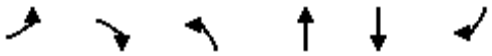
Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	15	15	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	16	16	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		17	17	25	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		17	17	25	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		98	100	100	100
cM capacity (veh/h)	1623		996	875	866	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	21	16	0
Volume Left	4	16	0
Volume Right	16	0	0
cSH	1623	996	1700
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	1	0
Control Delay (s)	1.5	8.7	0.0
Lane LOS	A	A	A
Approach Delay (s)	1.5	8.7	0.0
Approach LOS		A	A

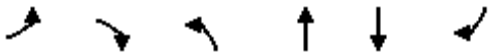
Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	4	20	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	4	22	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		2	2	4	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		2	2	4	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		98	100	100	100
cM capacity (veh/h)	1623		1020	894	891	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	4	22	0
Volume Left	0	22	0
Volume Right	4	0	0
cSH	1623	1020	1700
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	2	0
Control Delay (s)	0.0	8.6	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	8.6	0.0
Approach LOS		A	A

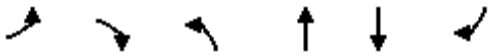
Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	16	20	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	17	22	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		20	20	28	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		20	20	28	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		98	100	100	100
cM capacity (veh/h)	1623		991	871	862	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	23	22	0
Volume Left	5	22	0
Volume Right	17	0	0
cSH	1623	991	1700
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	2	0
Control Delay (s)	1.7	8.7	0.0
Lane LOS	A	A	A
Approach Delay (s)	1.7	8.7	0.0
Approach LOS		A	A

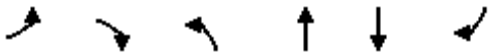
Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	4	20	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	4	22	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		2	2	4	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		2	2	4	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		98	100	100	100
cM capacity (veh/h)	1623		1020	894	891	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	4	22	0
Volume Left	0	22	0
Volume Right	4	0	0
cSH	1623	1020	1700
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	2	0
Control Delay (s)	0.0	8.6	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	8.6	0.0
Approach LOS		A	A

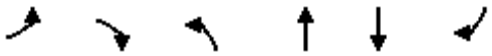
Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	16	20	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	17	22	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		20	20	28	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		20	20	28	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		98	100	100	100
cM capacity (veh/h)	1623		991	871	862	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	23	22	0
Volume Left	5	22	0
Volume Right	17	0	0
cSH	1623	991	1700
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	2	0
Control Delay (s)	1.7	8.7	0.0
Lane LOS	A	A	A
Approach Delay (s)	1.7	8.7	0.0
Approach LOS		A	A

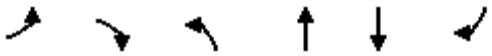
Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	5	23	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	25	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		3	3	5	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		3	3	5	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		98	100	100	100
cM capacity (veh/h)	1623		1019	893	890	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	5	25	0
Volume Left	0	25	0
Volume Right	5	0	0
cSH	1623	1019	1700
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	2	0
Control Delay (s)	0.0	8.6	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	8.6	0.0
Approach LOS		A	A

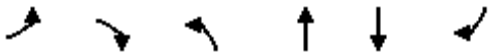
Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	20	22	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	22	24	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		22	22	33	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		22	22	33	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		98	100	100	100
cM capacity (veh/h)	1623		988	869	857	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	24	0
Volume Left	5	24	0
Volume Right	22	0	0
cSH	1623	988	1700
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	2	0
Control Delay (s)	1.5	8.7	0.0
Lane LOS	A	A	A
Approach Delay (s)	1.5	8.7	0.0
Approach LOS		A	A

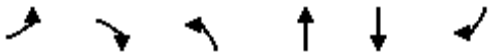
Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	5	23	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	25	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		3	3	5	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		3	3	5	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		98	100	100	100
cM capacity (veh/h)	1623		1019	893	890	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	5	25	0
Volume Left	0	25	0
Volume Right	5	0	0
cSH	1623	1019	1700
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	2	0
Control Delay (s)	0.0	8.6	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	8.6	0.0
Approach LOS		A	A

Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	20	22	0	0	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	22	24	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		22	22	33	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		22	22	33	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	100		98	100	100	100
cM capacity (veh/h)	1623		988	869	857	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	24	0
Volume Left	5	24	0
Volume Right	22	0	0
cSH	1623	988	1700
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	2	0
Control Delay (s)	1.5	8.7	0.0
Lane LOS	A	A	A
Approach Delay (s)	1.5	8.7	0.0
Approach LOS		A	A

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Phone 970.255.8005

Huddleston-Berry
Engineering & Testing, LLC

FINAL GEOTECHNICAL AND GEOLOGIC HAZARDS INVESTIGATION GLENWOOD MULTIFAMILY GLENWOOD SPRINGS, COLORADO PROJECT#01402-0002

FORENZA CONTRACTING
PO BOX 2882
EDWARDS, COLORADO 81632

DECEMBER 2, 2017

Huddleston-Berry Engineering and Testing, LLC
640 White Avenue
Grand Junction, Colorado 81501

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Referenced Documents 1
1.2 Scope 1
1.3 Site Location and Description 1
1.4 Proposed Construction 2
2.0 GEOLOGIC SETTING 2
2.1 Soils 2
2.2 Geology 2
2.3 Groundwater 2
2.4 Seismicity 2
2.5 Radioactivity 3
3.0 FIELD INVESTIGATION 3
3.1 Subsurface Investigation 3
3.2 Field Reconnaissance 3
4.0 LABORATORY TESTING 3
5.0 GEOLOGIC INTERPRETATION 4
5.1 Geologic Hazards 4
5.2 Geologic Constraints 4
5.3 Water Resources 4
5.4 Mineral Resources 4
6.0 CONCLUSIONS 4
7.0 RECOMMENDATIONS 4
7.1 Foundations 4
7.2 Corrosion of Concrete 6
7.3 Flooring Systems and Exterior Flatwork 6
7.4 Lateral Earth Pressures 6
7.5 Drainage 6
7.6 Excavations and Earthwork 7
7.7 Pavements 7
8.0 GENERAL 8

FIGURES

Figure 1 – Site Location Map
Figure 2 – Site Plan

APPENDICES

Appendix A – UDSA NRCS Soil Survey Data
Appendix B – Boring and Test Pit Logs from Previous Investigation
Appendix C – Boring Logs from Current Investigation
Appendix D – Laboratory Testing Results from Previous Investigation
Appendix E – Laboratory Testing Results from Current Investigation

1.0 INTRODUCTION

As part of extensive development in Western Colorado, a new multi-family residential project is proposed in Glenwood Springs. As part of the development process, Huddleston-Berry Engineering and Testing, LLC (HBET) was retained by Forenza Contracting to conduct a final geotechnical investigation at the site.

1.1 Referenced Documents

Previous geotechnical investigation for the project was completed by CTL Thompson (CTL). The previous work is summarized in the following document:

- *Soils and Foundation Investigation, Oakhurst Subdivision, Palmer Avenue and Blake Street, Glenwood Springs, Colorado* by CTL Thompson for Archdiocesan Housing, Inc., July 1, 2010.

1.2 Scope

As discussed above, a geologic hazards and geotechnical investigation was conducted for the Glenwood Multifamily project in Glenwood Springs, Colorado. The scope of the investigation included the following components:

- Conducting a subsurface investigation to supplement the information in the referenced report.
- Providing recommendations for foundation type and subgrade preparation.
- Providing recommendations for bearing capacity.
- Providing recommendations for lateral earth pressure.
- Providing recommendations for pavements.
- Providing recommendations for drainage, grading, and general earthwork.
- Evaluating potential geologic hazards at the site.

The investigation and report were completed by a Colorado registered professional engineer in accordance with generally accepted geotechnical and geological engineering practices. This report has been prepared for the exclusive use of Forenza Contracting.

1.3 Site Location and Description

The site is located along Palmer Avenue between Blake Street and 26th Street and comprises approximately 6.4 acres. The project location is shown on Figure 1 – Site Location Map.

At the time of the investigation, the site was open with a slight to moderate general slope down to the west. However, steeper slopes were present east of the site rising to the east. Vegetation consisted primarily of grasses, weeds, and brush. The site was bordered to the north by existing residences and 26th Street, to the south by a Wal-Mart store, to the west by existing residences and Blake Street, and to the east by open land.

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1.4 Proposed Construction

The proposed construction is anticipated to include ten multi story structures, utility installation, and paved parking areas. Improvements to Palmer Avenue will also be included in the construction.

2.0 GEOLOGIC SETTING

2.1 Soils

Soils data was obtained from the USDA Natural Resource Conservation Service Web Soil Survey. The data indicates that the soils at the site include Atencio-Azeltine complex, 1 to 3 percent slopes and Torrithorents-Rock outcrop complex, steep. Soil survey data is included in Appendix A.

Structure construction in the site soils is described as ranging from somewhat limited to very limited due to large stones, slope, and/or depth to hard bedrock. Road construction in the site soils is indicated to range from not limited to very limited due to large stones, slope, and/or depth to hard bedrock. Excavation in the site soils is indicated to range from somewhat limited to very limited due to unstable excavation walls, dust, large stones, depth to hard bedrock, and/or slope. The site soils are indicated to have a low potential for frost action, moderate to high risk of corrosion of steel, and low risk of corrosion of concrete.

2.2 Geology

According to the *Geologic Map of the Glenwood Springs Quadrangle, Garfield County, Colorado* (2008), the site is underlain by Quaternary debris flow deposits and colluvium. As indicated in the referenced report, the surface deposits may be underlain by Eagle Valley Evaporite bedrock. Also as indicated in the referenced report, the Eagle Valley Evaporite is succeptible to dissolution and this can result in sinkholes. However, the previous and current investigations did not indicate any evidence of sinkholes or other subsidence at the site. In addition, HBET is unaware of subsidence related damage to any structures in the immediate vicinity of the project site.

2.3 Groundwater

Groundwater was not encountered during the previous or current subsurface investigations.

2.4 Seismicity

As indicated in the referenced report, the site lies in area of generally low to moderate seismic risk. Based upon the results of the previous and current subsurface investigations, the site generally classifies as Site Class D in accordance with the International Building Code (IBC).

2.5 Radioactivity

As discussed in the referenced report, Radon gas may be present at the site due to the natural decal of elements in the subsurface. However, Radon gas detection and/or testing were beyond the scope of the previous or current investigations.

3.0 FIELD INVESTIGATION

3.1 Subsurface Investigation

The original subsurface investigation included two borings and five test pits and the current investigation included six borings. The locations of the borings and test pits are shown on Figure 2. Copies of the boring and test pit logs from the referenced report are included in Appendix B. Copies of the boring logs from the current investigation are included in Appendix C.

As indicated on the logs, the subsurface conditions at the site were slightly variable. However, the borings and test pits generally encountered red, moist, dense to very dense silty to clayey gravel soils with cobbles and boulders. The boring logs from the referenced report indicate that sandstone bedrock was encountered at depths of between 16.0 and 26.0 feet. However, HBET did not encounter any sandstone bedrock to the depth explored of 33.5 feet. As discussed previously, groundwater was not encountered in the subsurface during the previous or current investigations.

The frequency and size of boulders increase in the current borings below 18.0 to 21.0 feet. In general, HBET believes that the sandstone bedrock reported on the logs from the referenced report actually represents large boulders. HBET does not believe that sandstone bedrock is preset at this site to the depth explored.

3.2 Field Reconnaissance

The field reconnaissance included walking the site during the subsurface investigation. In general, the site was gently to moderately sloping. However, steeper slopes were present above the site to the east. At the time of the investigation, HBET did not observe any evidence of recent or active landslides, debris flows, rockfalls, sinkholes, etc.

4.0 LABORATORY TESTING

As indicated in the referenced report, laboratory testing was conducted on the soils at the site. Laboratory testing results from the referenced report are included in Appendix D.

In addition to the laboratory testing conducted as part of the preliminary geotechnical investigation, HBET conducted laboratory testing as part of the current investigation. The laboratory testing results from the current investigation are included in Appendix E.

The laboratory testing results indicate that the native soils are slightly plastic. In addition, the native soils were shown to be slightly to moderately collapsible with up to 5.3% collapse measured in the laboratory.

5.0 GEOLOGIC INTERPRETATION

5.1 Geologic Hazards

The primary geologic hazard identified on the site is the presence of moisture sensitive soils.

5.2 Geologic Constraints

In general, the primary geologic constraint to construction at the site is the presence of moisture sensitive soils.

5.3 Water Resources

No water supply wells were observed on the property. In general, with proper design and construction, the proposed construction is not anticipated to adversely impact surface water or groundwater.

5.4 Mineral Resources

Potential mineral resources in Western Colorado generally include gravel, uranium ore, and commercial rock products such as flagstone. As discussed previously, gravels were encountered at the site. However, based upon the size of the site and surrounding land use, HBET does not believe that the gravels at the site represent an economically recoverable resource.

6.0 CONCLUSIONS

Based upon the available data sources, field investigation, and nature of the proposed construction, HBET does not believe that there are any geologic conditions which should preclude construction at the site. However, foundations, pavements, and earthwork will have to consider the impacts of the moisture sensitive soils and at the site.

7.0 RECOMMENDATIONS

7.1 Foundations

Based upon the subsurface conditions and nature of the proposed construction, shallow and deep foundations may both be appropriate. Shallow foundations such as mat or ribbed slabs and deep foundations such as micro piles are both appropriate. The foundation alternatives are discussed in the following sections.

Shallow Foundations

In general, properly designed structural mat or ribbed slabs will provide some protection against differential movements. However, due to the stiffening effect of the ribs, ribbed slab foundations will provide more resistance to slab bending where differential soil settlement occurs below the foundations. For both shallow foundation alternatives, HBET concurs with the recommendation in the referenced report for 6 feet of structural fill below the foundations.

As indicated in the referenced report, the native soils, exclusive of topsoil, are generally suitable for reuse as structural fill. However, the soils should be screened to approximately 5-inch minus. Imported structural fill should consist of a granular, non-expansive, non-free draining material such as crusher fines or CDOT Class 6 base course. Unless it can be demonstrated that they are not free-draining, pit-run materials should not be used as structural fill.

Prior to placement of structural fill, it is recommended that the bottoms of the foundation excavations be scarified to a depth of 6 to 9-inches, moisture conditioned, and re-compacted to a minimum of 95% of the standard Proctor maximum dry density, within ±2% of the optimum moisture content as determined in accordance with ASTM D698. Structural fill should extend laterally beyond the edges of the foundations a distance equal to the thickness of structural fill. Structural fill should be moisture conditioned, placed in maximum 8-inch loose lifts, and compacted to a minimum of 100% of the standard Proctor maximum dry density for fine grained soils or modified Proctor maximum dry density for coarse grained soils, within ±2% of the optimum moisture content as determined in accordance with ASTM D698 or D1557, respectively.

For foundation building pads prepared as recommended with structural fill consisting of suitable native soils or imported granular materials, a maximum allowable bearing capacity of 2,000 psf is recommended. In addition, a modulus of subgrade reaction of 110 pci may be used for structural fill consisting of native soils and a modulus of 200 pci may be used for structural fill consisting of crusher fines or base course. It is recommended that the bottoms of exterior foundations be at least 36-inches below the final grade for frost protection

Micro Piles

For a micro pile foundation, it is generally recommended that micro piles have a minimum length of 35 feet. An allowable skin friction value of 1,000 psf may be used for the native gravel soils. However, skin friction should be disregarded along the upper 10 feet of the piles. To ensure friction capacity, pile load testing is strongly recommended. Grout used in the bond zone of the micro piles should have a minimum 28 day compressive strength of 3,000 psi.

In general, micro piles should be installed with a center-to-center spacing of greater than 3 feet. However, to the extent practical, smaller numbers of longer micro piles should be used in lieu of larger numbers of shorter piles. The longer the piles and larger the loads on the piles, the lower the risk of movement. The bottoms of grade beams should extend a minimum of 36-inches below the finished grade for frost protection.

7.2 Corrosion of Concrete

As indicated in the referenced report, water soluble sulfates were detected in the native soils in concentrations as high as 0.02%. This concentration of sulfates represents a negligible degree of potential sulfate attack. Therefore, sulfate resistant cement may not be required for construction at this site.

7.3 Flooring Systems and Exterior Flatwork

As discussed previously, collapsible soils are present at the site. Therefore, where micro-pile foundations are utilized, HBET recommends that framed floors or fully voided concrete slabs supported by micro-piles be utilized.

As outlined in the referenced report, it is recommended that exterior flatwork be constructed above 2 to 3 feet of structural fill with subgrade preparation, structural fill materials, and structural fill placement in accordance with the *Shallow Foundations* section of this report. Slabs-on-grade should not be tied-into or otherwise connected to the foundations in any manner.

7.4 Lateral Earth Pressures

Stemwalls or retaining walls should be designed to resist lateral earth pressures. For backfill consisting of screened native soils or imported granular, non-free draining, non-expansive material, we recommend that the walls be designed for an active equivalent fluid unit weight of 40 pcf in areas where no surcharge loads are present. An at-rest equivalent fluid unit weight of 50 pcf is recommended for braced walls. Lateral earth pressures should be increased as necessary to reflect any surcharge loading behind the walls.

7.5 Drainage

Site grading and drainage are critical to the performance of the foundations and slabs-on-grade. Grading around the structures should be designed to carry precipitation and runoff away from the structures. It is recommended that the finished ground surface drop at least twelve inches within the first ten feet away from the structures. However, where impermeable surfaces (i.e. pavements, sidewalks, etc.) are adjacent to the structures, the grade can be reduced to approximately 2.5-inches (ADA grade) within the first ten feet away from the structures. It is recommended that landscaping within ten feet of the structures include primarily desert plants with low water requirements. In addition, it is recommended that no automatic irrigation, including drip lines, be used within ten feet of foundations.

HBET recommends that surface downspout extensions be used which discharge a minimum of 10 feet from the structures or beyond the backfill zone, whichever is greater. However, if subsurface downspout drains are utilized, they should be carefully constructed of solid-wall PVC and should daylight at least 15 feet from the structures. In addition, an impermeable membrane is recommended below subsurface downspout drain lines to limit the potential for leaks in the subsurface drains to impact the structures. Dry wells should not be used.

In order to reduce the potential for surface moisture to impact the structures, perimeter foundation drains are recommended. In general, the perimeter foundation drains should consist of prefabricated drain materials or perforated pipe and gravel systems with the flowlines of the drains at the bottoms of the foundations (at the highest point). The perimeter drains should slope at a minimum of 1.0% to daylight or to sumps with pumps. The drains should also include an impermeable membrane at the base to limit the potential for moisture to infiltrate vertically down below the foundations.

7.6 Excavations and Earthwork

Excavations in the soils at the site may stand for short periods of time but should not be considered to be stable. Therefore, trenching and excavations should be sloped back, shored, or shielded for worker protection in accordance with applicable OSHA standards. The native soils at the site generally classify as Type C soil with regard to OSHA's *Construction Standards for Excavations*. For Type C soils, the maximum allowable slope in temporary cuts is 1.5H:1V.

7.7 Pavements

The proposed construction is anticipated to include paved parking areas and improvements to Palmer Avenue. As indicated in the referenced report, the site soils classify as A-4 with regard to the American Association of State Highway and Transportation Officials (AASHTO). However, the native soils are collapsible. Therefore, the minimum recommended Resilient Modulus of 3,000 psi was used for the pavement design.

Automobile Parking Areas
EDLA = 5, Structural Number = 2.75

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 3 Subbase Course	Concrete Pavement	TOTAL
A	3.0	9.0			12.0
B	4.0	7.0			11.0
C	3.0	6.0	6.0		15.0
Rigid Pavement		6.0		6.0	12.0

Palmer Avenue
EDLA = 30, Structural Number = 3.61

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 3 Subbase Course	Rigid Pavement	TOTAL
A	3.0	17.0			20.0
B	4.0	14.0			18.0
C	3.0	6.0	15.0		24.0
Full Depth RP		6.0		6.0	12.0

Prior to roadway construction, the roadway prism should be stripped of all topsoil, fill, or other unsuitable materials. It is recommended that the subgrade soils be scarified to a depth of 12-inches; moisture conditioned, and recompacted to a minimum of 95% of the standard Proctor maximum dry density, within ±2% of optimum moisture as determined by AASHTO T-99.

Aggregate base course and subbase course should be placed in maximum 9-inch loose lifts, moisture conditioned, and compacted to a minimum of 95% and 93% of the maximum dry density, respectively, at -2% to +3% of optimum moisture content as determined by AASHTO T-180. In addition to density testing, base course should be proofrolled to verify subgrade stability.

It is recommended that Hot-Mix Asphaltic (HMA) pavement conform to CDOT grading SX or S specifications and consist of an approved 75 gyration Superpave method mix design. HMA pavement should be compacted to between 92% and 96% of the maximum theoretical density. An end point stress of 50 psi should be used. In addition, pavements should conform to local specifications.

The long-term performance of the pavements is dependent on positive drainage away from the pavements. Ditches, culverts, and inlet structures in the vicinity of paved areas must be maintained to prevent ponding of water on the pavement.

8.0 GENERAL

The recommendations included above are based upon the results of the subsurface investigation and on our local experience. These conclusions and recommendations are valid only for the proposed construction.

As discussed previously, the subsurface conditions at the site were slightly variable. However, the precise nature and extent of any subsurface variability may not become evident until construction. ***The recommendations contained herein are designed to reduce the risk and magnitude of movements and it is extremely critical that ALL of the recommendations herein be applied to the design and construction. However, HBET cannot predict long-term changes in subsurface moisture conditions and/or the precise magnitude or extent of volume change in the native soils. Where significant increases in subsurface moisture occur due to poor grading, improper stormwater management, utility line failure, excess irrigation, or other cause, during or after construction, significant movements are possible***.

In addition, the success of the pavements, structure foundations, slabs, etc. is critically dependent upon proper construction. Therefore, HBET should be retained to provide materials testing and engineering oversight during ***ALL*** phases of the construction to ensure conformance with the recommendations herein.

Huddleston-Berry Engineering and Testing, LLC is pleased to be of service to your project. Please contact us if you have any questions or comments regarding the contents of this report.

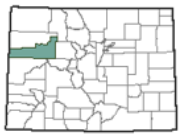
Respectfully Submitted:
Huddleston-Berry Engineering and Testing, LLC

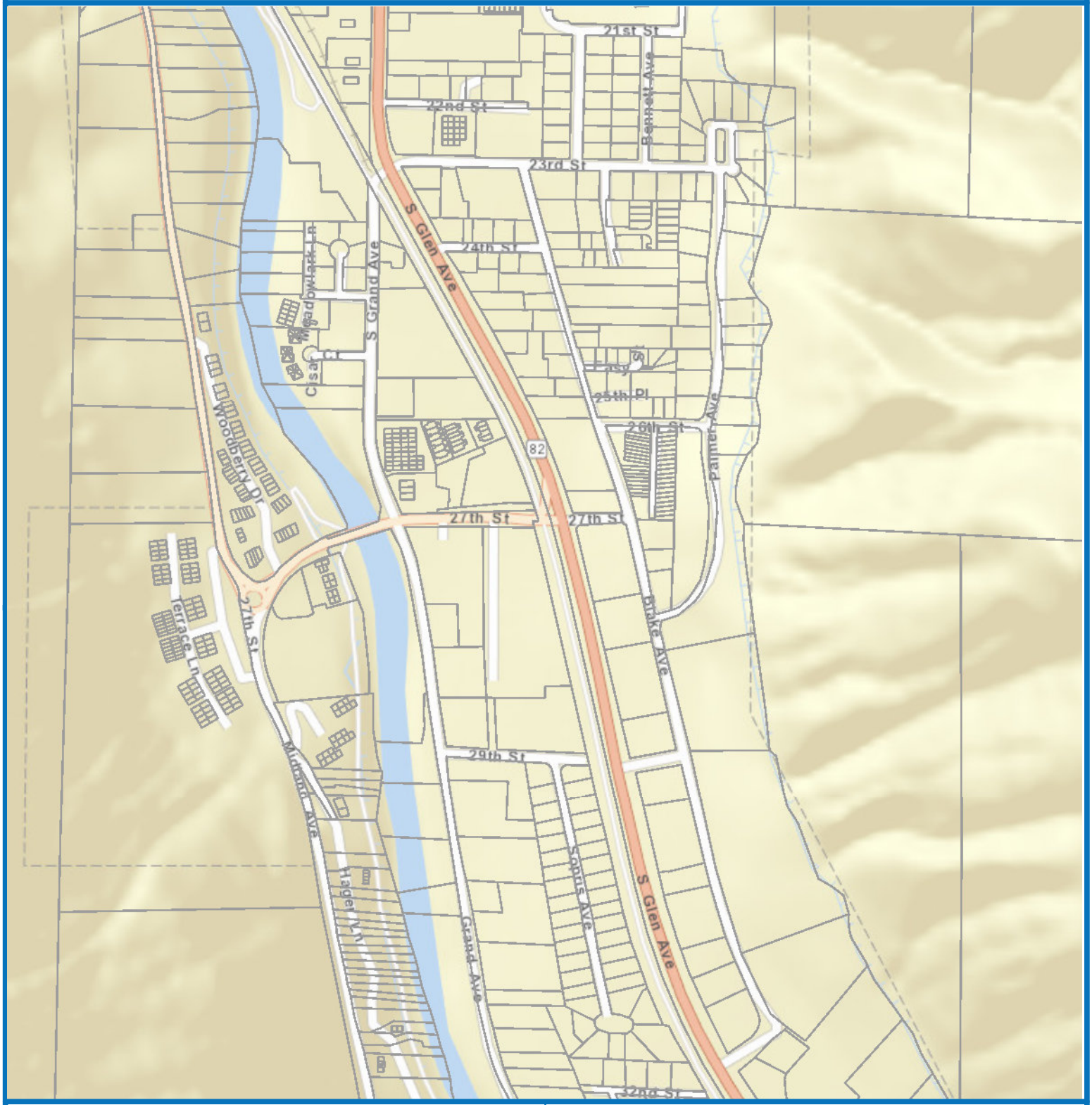
Michael A. Berry, P.E.
Vice President of Engineering

FIGURES

Garfield County Land Explorer

Garfield County, Colorado





Garfield County Land Explorer

Printed by Web User

1 inch = 752 feet

1 inch = 0.14 miles

0 0.1 0.2 0.4 Miles

N W E S

Garfield County Colorado

Garfield County www.garfield-county.com Colorado

Disclaimer

This is a compilation of records as they appear in the Garfield County Offices affecting the area shown. This drawing is to be used only for reference purposes and the County is not responsible for any inaccuracies herein contained.

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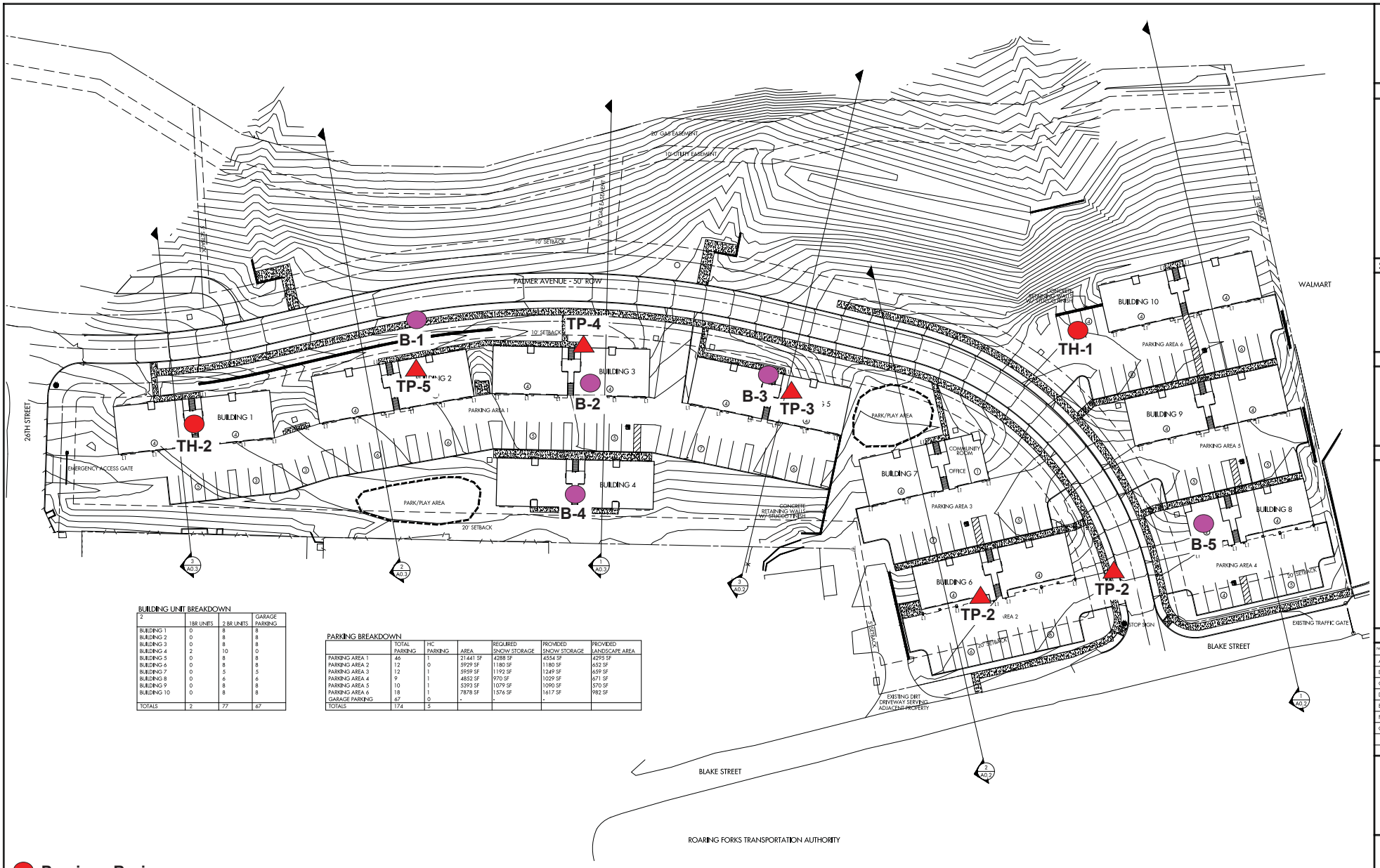
Printed: 12/1/2017 at 9:32:19 AM



BUILDING UNIT BREAKDOWN

2	1BR UNITS	2 BR UNITS	GARAGE PARKING
BUILDING 1	0	8	8
BUILDING 2	0	8	8
BUILDING 3	0	8	8
BUILDING 4	2	10	0
BUILDING 5	0	8	8
BUILDING 6	0	8	8
BUILDING 7	0	5	5
BUILDING 8	0	6	6
BUILDING 9	0	8	8
BUILDING 10	0	8	8
TOTALS	2	77	67

PARKING BREAKDOWN

	TOTAL PARKING	HC PARKING	AREA	REQUIRED SNOW STORAGE	PROVIDED SNOW STORAGE	PROVIDED LANDSCAPE AREA
PARKING AREA 1	46	1	21441 SF	4288 SF	4554 SF	4295 SF
PARKING AREA 2	12	0	5929 SF	1180 SF	1180 SF	652 SF
PARKING AREA 3	12	1	5959 SF	1192 SF	1249 SF	659 SF
PARKING AREA 4	9	1	4852 SF	970 SF	1029 SF	671 SF
PARKING AREA 5	10	1	5393 SF	1079 SF	1090 SF	570 SF
PARKING AREA 6	18	1	7878 SF	1576 SF	1617 SF	982 SF
GARAGE PARKING	67	0	-	-	-	
TOTALS	174	5				

- Previous Boring
- Previous Test Pit
- Current Boring

FIGURE 2
Site Plan

ARCHITECT

RA Architects, Inc
Architecture • Planning • Interior Design
P.O. Box 1805
Edwards, Colorado 81632
Phone – 970.376.4227
email – bobby@raiarch.com

STRUCTURAL

LANDSCAPE

NOTES

ISSUES

NO.	DESCRIPTION	DATE
A	Preliminary Bid	05.02.16
B	Conceptual Review	02.21.17
C	Planning Submittal	02.27.17
D	Planning Revisions	03.10.17
E	Planning Revisions	03.16.17
F	Planning Revisions	04.11.17
G	Revised Submittal	06.19.17

Glenwood Multifamily LLC Apartments

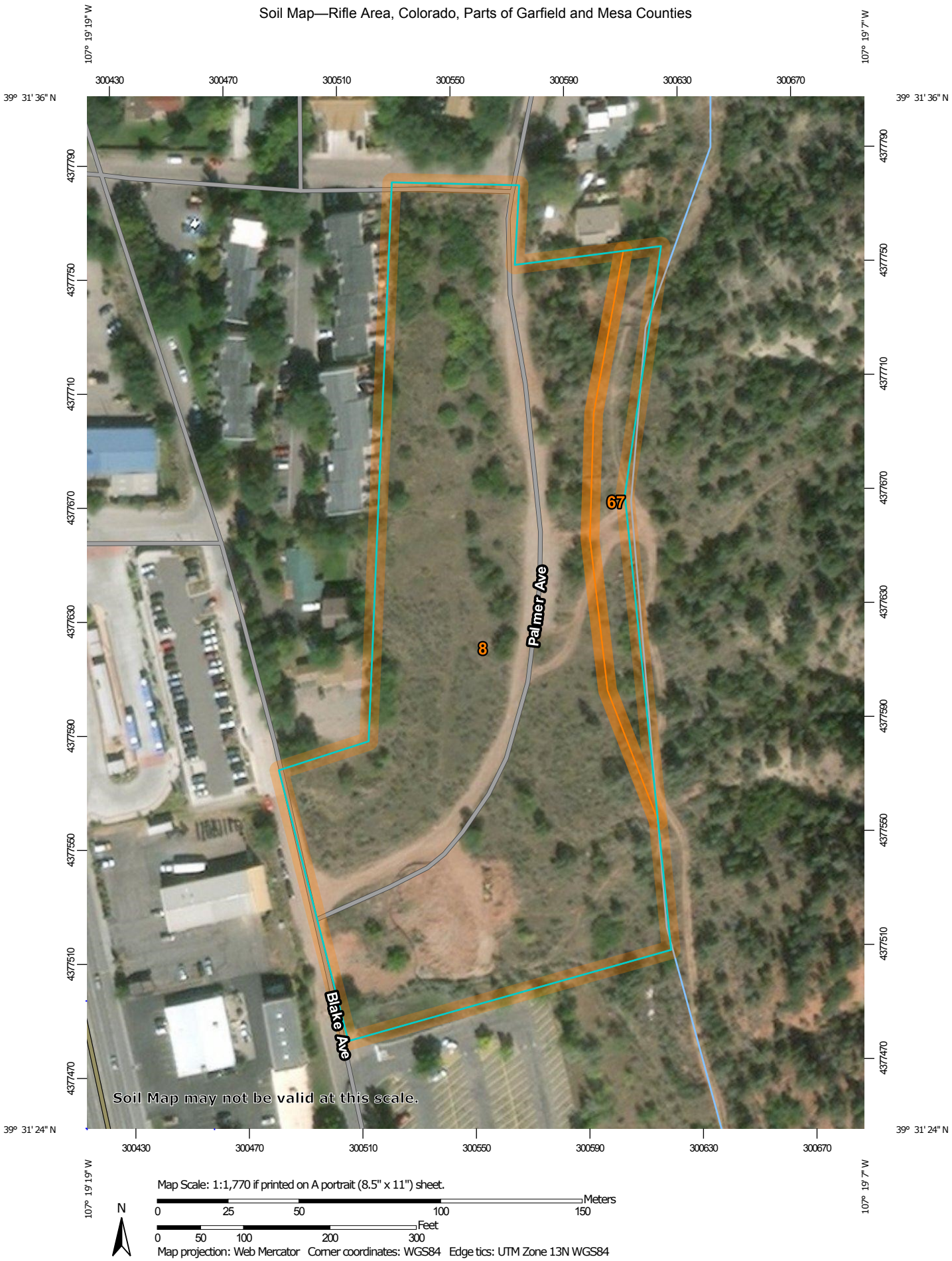
Palmer Ave and Blake Street
Glenwood Springs, CO

Architectural Site Plan

PROJECT NO: 15-217
DATE: June 19, 2017
DRAWN BY: rd
CHKD: -
SHEET NO: A0.1

APPENDIX A
Soil Survey Data

Soil Map—Rifle Area, Colorado, Parts of Garfield and Mesa Counties



Map Scale: 1:1,770 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 10, Oct 12, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 14, 2010—Mar 2, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8	Atencio-Azeltine complex, 1 to 3 percent slopes	6.3	91.3%
67	Torriorthents-Rock outcrop complex, steep	0.6	8.7%
Totals for Area of Interest		**6.9**	**100.0%**

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

8—Atencio-Azeltine complex, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: jnzd

Elevation: 5,000 to 7,000 feet
Farmland classification: Farmland of statewide importance

Map Unit Composition

Atencio and similar soils: 45 percent
Azeltine and similar soils: 45 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Atencio

Setting

Landform: Alluvial fans, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 11 inches: sandy loam
H2 - 11 to 23 inches: gravelly sandy clay loam
H3 - 23 to 28 inches: gravelly sandy loam
H4 - 28 to 60 inches: extremely cobbly sand

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: Rolling Loam (R048AY298CO)
Hydric soil rating: No

Description of Azeltine

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear

Parent material: Mixed alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 18 inches: gravelly sandy loam
H2 - 18 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: Rolling Loam (R048AY298CO)
Hydric soil rating: No

Minor Components

Gravel pits

Percent of map unit: 10 percent
Landform: Alluvial fans, terraces
Landform position (three-dimensional): Tread
Hydric soil rating: No

67—Torriorthents-Rock outcrop complex, steep

Map Unit Setting

National map unit symbol: jnz5
Elevation: 5,800 to 8,500 feet
Mean annual precipitation: 10 to 15 inches
Mean annual air temperature: 39 to 46 degrees F
Frost-free period: 80 to 105 days
Farmland classification: Not prime farmland

Map Unit Composition

Torriorthents, steep, and similar soils: 60 percent
Rock outcrop, steep: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Torriorthents, Steep

Setting

Landform: Mountainsides
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainflank, base slope
Down-slope shape: Concave, convex
Across-slope shape: Concave, convex
Parent material: Stony, basaltic alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 4 inches: variable
H2 - 4 to 30 inches: fine sandy loam
H3 - 30 to 34 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 70 percent
Depth to restrictive feature: 4 to 30 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Rock Outcrop, Steep

Setting

Landform: Mountainsides
Landform position (three-dimensional): Free face
Down-slope shape: Convex
Across-slope shape: Convex

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 70 percent
Depth to restrictive feature: 0 inches to paralithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)

Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 10, Oct 12, 2017

Dwellings and Small Commercial Buildings

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. This table shows the degree and kind of soil limitations that affect dwellings and small commercial buildings.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Report—Dwellings and Small Commercial Buildings

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Dwellings and Small Commercial Buildings–Rifle Area, Colorado, Parts of Garfield and Mesa Counties							
Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
8—Atencio-Azeltine complex, 1 to 3 percent slopes							
Atencio	45	Somewhat limited		Somewhat limited		Somewhat limited	
		Large stones	0.01	Large stones	0.01	Large stones	0.01
Azeltine	45	Not limited		Not limited		Not limited	

Dwellings and Small Commercial Buildings–Rifle Area, Colorado, Parts of Garfield and Mesa Counties							
Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
67—Torriorthents-Rock outcrop complex, steep							
Torriorthents, steep	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Rock outcrop, steep	25	Not rated		Not rated		Not rated	

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 10, Oct 12, 2017

Roads and Streets, Shallow Excavations, and Lawns and Landscaping

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. This table shows the degree and kind of soil limitations that affect local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Report—Roads and Streets, Shallow Excavations, and Lawns and Landscaping

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Roads and Streets, Shallow Excavations, and Lawns and Landscaping–Rifle Area, Colorado, Parts of Garfield and Mesa Counties							
Map symbol and soil name	Pct. of map unit	Lawns and landscaping		Local roads and streets		Shallow excavations	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
8—Atencio-Azeltine complex, 1 to 3 percent slopes							
Atencio	45	Somewhat limited		Somewhat limited		Somewhat limited	
		Droughty	0.15	Large stones	0.01	Unstable excavation walls	0.12
		Dusty	0.07			Dusty	0.07
						Large stones	0.01
Azeltine	45	Somewhat limited		Not limited		Very limited	
		Droughty	0.99			Unstable excavation walls	1.00
		Low exchange capacity	0.50			Dusty	0.02
		Large stones content	0.20				
		Gravel content	0.10				
		Dusty	0.02				
67—Torriorthents-Rock outcrop complex, steep							
Torriorthents, steep	60	Not rated		Very limited		Very limited	
				Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
				Slope	1.00	Slope	1.00
						Dusty	0.05
						Unstable excavation walls	0.01
Rock outcrop, steep	25	Not rated		Not rated		Not rated	

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 10, Oct 12, 2017

Soil Features

This table gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage, or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (Ksat), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

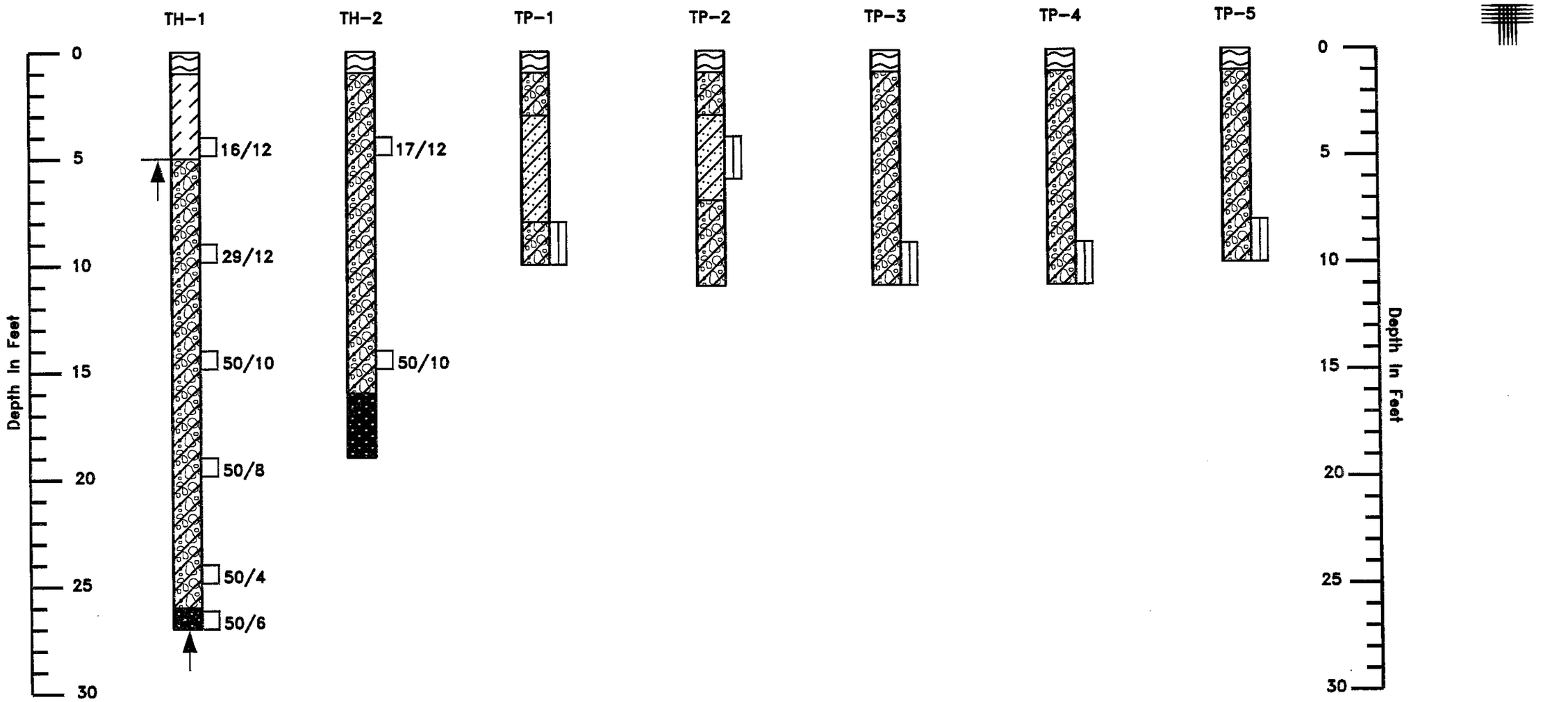
Report—Soil Features

Soil Features–Rifle Area, Colorado, Parts of Garfield and Mesa Counties									
Map symbol and soil name	**Restrictive Layer**				**Subsidence**		**Potential for frost action**	**Risk of corrosion**	
	Kind	**Depth to top**	**Thickness**	**Hardness**	**Initial**	**Total**		**Uncoated steel**	**Concrete**
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
		In	*In*		*In*	*In*			
8—Atencio-Azeltine complex, 1 to 3 percent slopes									
Atencio		—	—		0	—	Low	High	Low
Azeltine		—	—		0	—	Low	High	Low
67—Torriorthents-Rock outcrop complex, steep									
Torriorthents, steep	Lithic bedrock	4- 17-30	—	Indurated	0	—	Low	Moderate	Low
Rock outcrop, steep	Paralithic bedrock	0	—	Moderately cemented	0	—	None		

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 10, Oct 12, 2017

APPENDIX B
Boring and Test Pit Logs from Previous Investigation



SUMMARY LOGS OF EXPLORATORY BORINGS AND PITS

Project No. GS05471-120

Fig. 3

LEGEND:

Sandy clay "topsoil", organics, moist, brown.

Clay, sandy, occasional gravel, stiff, moist, rust. (CL)

Gravel, silty to clayey, cobbles and boulders, dense to very dense, slightly moist to moist, rust. (GM, GC)

Sand, silty to clayey, dense, slightly moist to moist, rust. (SM, SC)

Sandstone bedrock, very hard, moist, rust.

Drive sample. The symbol 16/12 indicates that 16 blows of a 140 pound hammer falling 30 inches were required to drive a 2.5 inch O.D. California sampler 12 inches.

Indicates bulk sample.

Indicates practical auger refusal.

NOTES:

1. Exploratory borings were drilled on June 4, 2010 with 4–inch diameter, solid–stem auger and a track–mounted drill rig. Exploratory pits were excavated with a backhoe on June 4, 2010. Borings and pits were backfilled immediately after drilling and excavation operations were completed.
2. Locations of exploratory borings and pits are approximate.
3. No free ground water was found in our exploratory borings or pits at the time of drilling or excavation
4. These exploratory borings and pits are subject to the explanations, limitations and conclusions as contained in this report.

SUMMARY LOGS OF EXPLORATORY BORINGS AND PITS

Project No. GS05471–120

Fig. 4

APPENDIX C
Boring Logs from Current Investigation

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-1

CLIENT Forenza Contracting
PROJECT NAME Glenwood Multifamily
PROJECT NUMBER 01402-0002
PROJECT LOCATION Glenwood Springs, CO
DATE STARTED 11/16/17 **COMPLETED** 11/17/17
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Truck Rig
AT TIME OF DRILLING dry
LOGGED BY CM **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty to Clayey GRAVEL with Cobbles and Boulders (gm-gc), red, moist, dense to very dense										
5			SS 1	83	26-28							
10			SS 2	67	17-17							
15			SS 3	67	12-17							
20		***More Dense Below 18 Ft										
25												
30			RC 1	17 (8)								
		Bottom of hole at 33.5 feet.										

GEOTECH BH COLUMNS 01402-0002 GLENWOOD MULTIFAMILY.GPJ GINT US LAB.GDT 12/2/17

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-2

CLIENT Forenza Contracting
PROJECT NAME Glenwood Multifamily
PROJECT NUMBER 01402-0002
PROJECT LOCATION Glenwood Springs, CO
DATE STARTED 11/16/17 **COMPLETED** 11/17/17
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Truck Rig
AT TIME OF DRILLING dry
LOGGED BY CM **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty to Clayey GRAVEL with Cobbles and Boulders (gm-gc), red, moist, dense to very dense										
5												
10												
15												
20		***Less Dense Below 21 Ft										
25												
30		Bottom of hole at 31.5 feet.										

GEOTECH BH COLUMNS 01402-0002 GLENWOOD MULTIFAMILY.GPJ GINT US LAB.GDT 12/2/17

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-3

CLIENT Forenza Contracting
PROJECT NAME Glenwood Multifamily
PROJECT NUMBER 01402-0002
PROJECT LOCATION Glenwood Springs, CO
DATE STARTED 11/16/17 **COMPLETED** 11/17/17
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Truck Rig
AT TIME OF DRILLING dry
LOGGED BY CM **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty to Clayey GRAVEL with Cobbles and Boulders (gm-gc), red, moist, dense to very dense										
			SS 1	75	14-16							
5												
10												
15												
		***More Dense Below 18 Ft	SS 2	0	50/1"							
20												
25												
30												
		Bottom of hole at 31.5 feet.										

GEOTECH BH COLUMNS 01402-0002 GLENWOOD MULTIFAMILY.GPJ GINT US LAB.GDT 12/2/17

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-4

CLIENT Forenza Contracting
PROJECT NAME Glenwood Multifamily
PROJECT NUMBER 01402-0002
PROJECT LOCATION Glenwood Springs, CO
DATE STARTED 11/16/17 **COMPLETED** 11/17/17
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Truck Rig
AT TIME OF DRILLING dry
LOGGED BY CM **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty to Clayey GRAVEL with Cobbles and Boulders (gm-gc), red, moist, dense to very dense										
			SS 1	67	28-23							
5												
10												
15			SS 2	50	28-32							
		***More Dense Below 18 Ft										
20												
25												
30												
		Bottom of hole at 31.5 feet.										

GEOTECH BH COLUMNS 01402-0002 GLENWOOD MULTIFAMILY.GPJ GINT US LAB.GDT 12/2/17

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

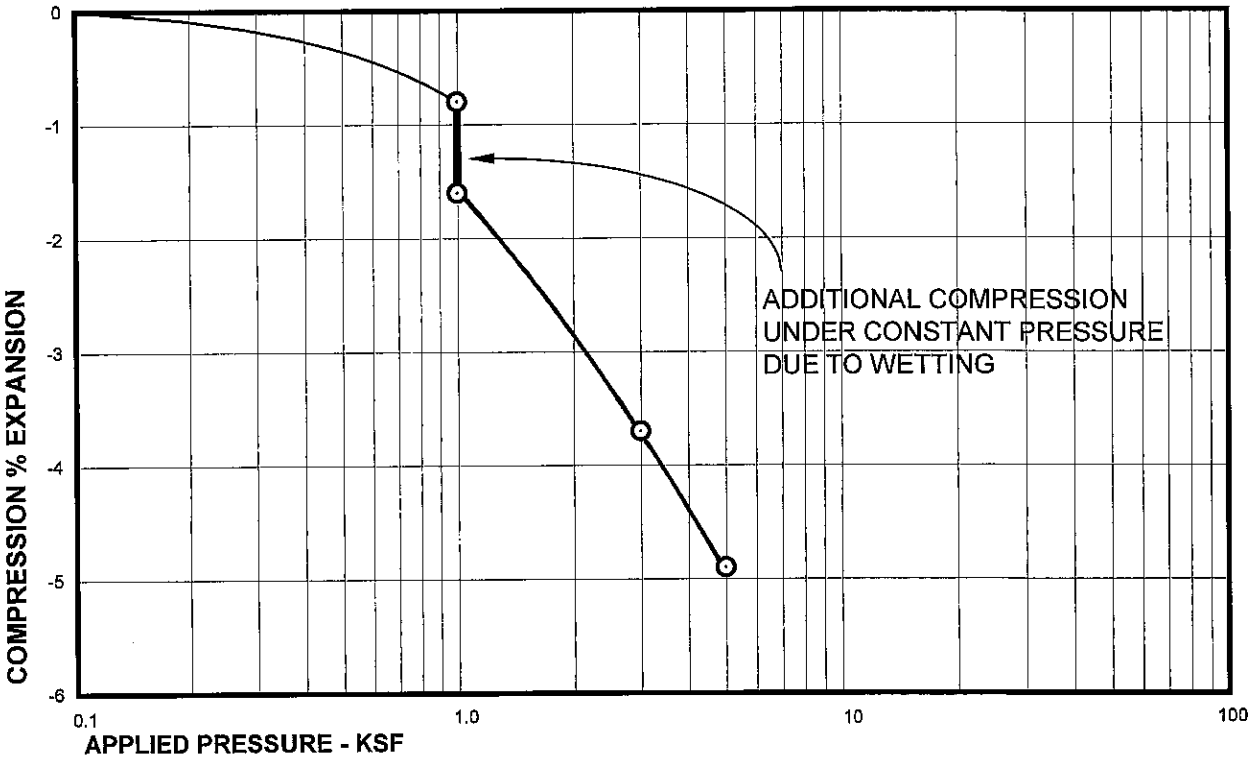
BORING NUMBER B-5

CLIENT Forenza Contracting
PROJECT NAME Glenwood Multifamily
PROJECT NUMBER 01402-0002
PROJECT LOCATION Glenwood Springs, CO
DATE STARTED 11/16/17 **COMPLETED** 11/17/17
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Truck Rig
AT TIME OF DRILLING dry
LOGGED BY CM **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty to Clayey GRAVEL with Cobbles and Boulders (gm-gc), red, moist, medium dense to dense										
			SS 1	89	15-9-18 (27)							
		Bottom of hole at 32.0 feet.										

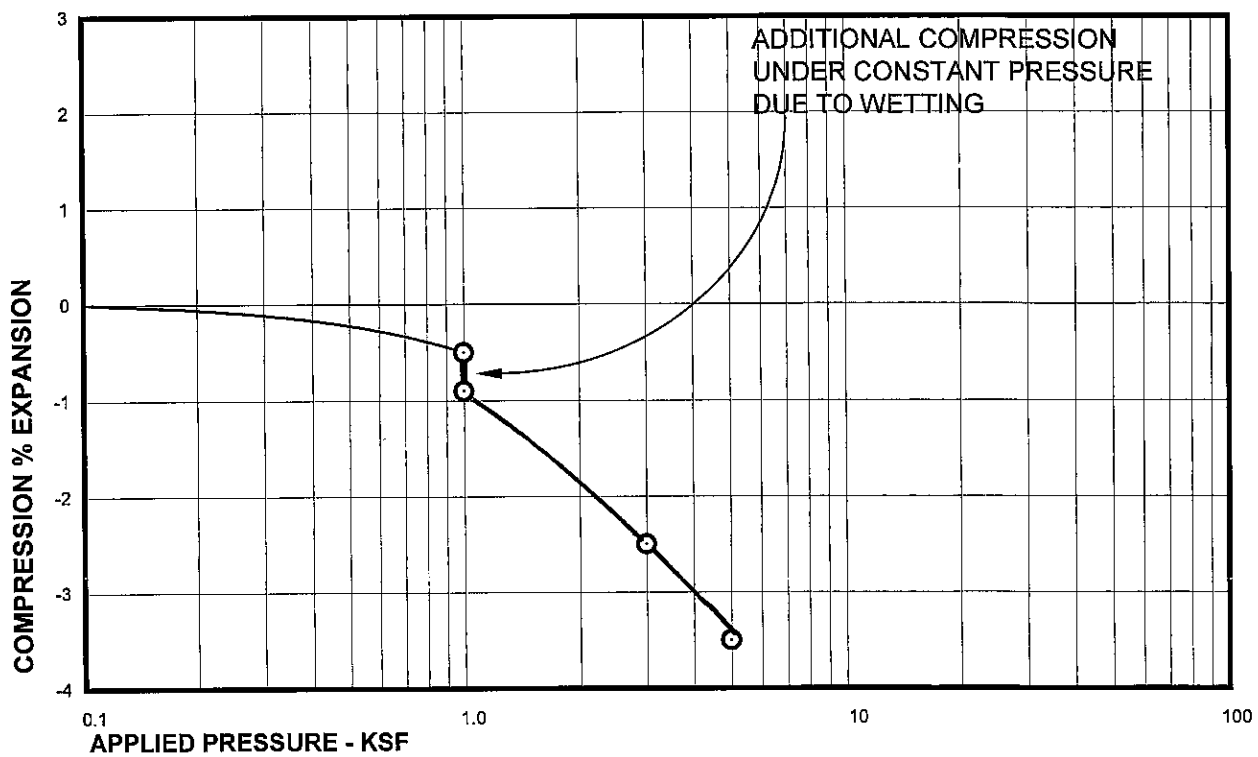
GEOTECH BH COLUMNS 01402-0002 GLENWOOD MULTIFAMILY.GPJ GINT US LAB.GDT 12/2/17

APPENDIX D
Laboratory Testing Results from Previous Investigation



Sample of SAND, CLAYEY (SC)
From TH-1 AT 14 FEET

DRY UNIT WEIGHT= 114 PCF
MOISTURE CONTENT= 3.1 %



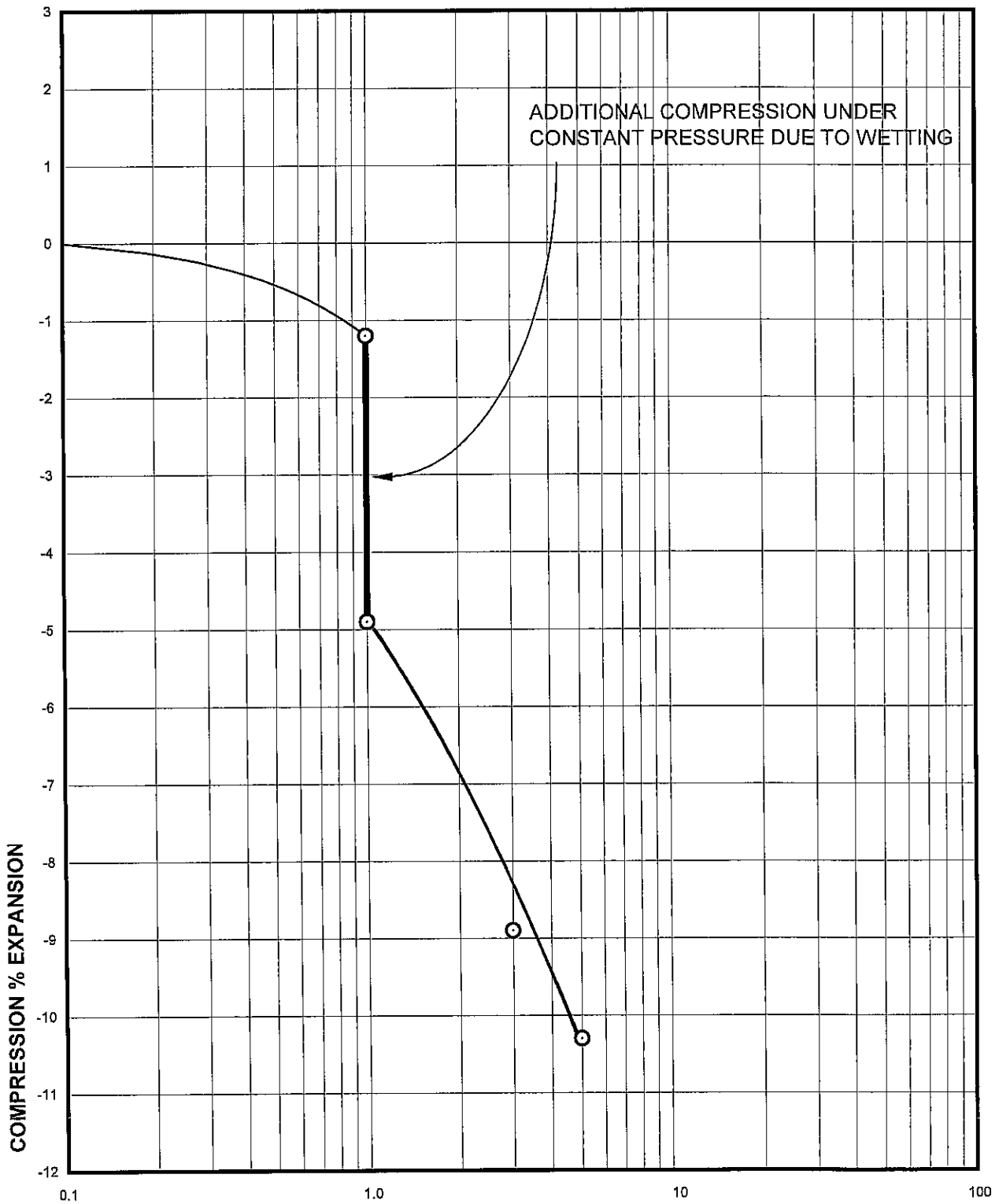
Sample of SAND, CLAYEY (SC)
From TH-1 AT 19 FEET

DRY UNIT WEIGHT= 127 PCF
MOISTURE CONTENT= 2.5 %

ARCHDIOCESAN HOUSING, INC.
OAKHURST SUBDIVISION
PROJECT NO. GS05471-120
S:\GS05471.000\120\6. Calcs\2010 swell

Swell Consolidation Test Results

FIG. A-1



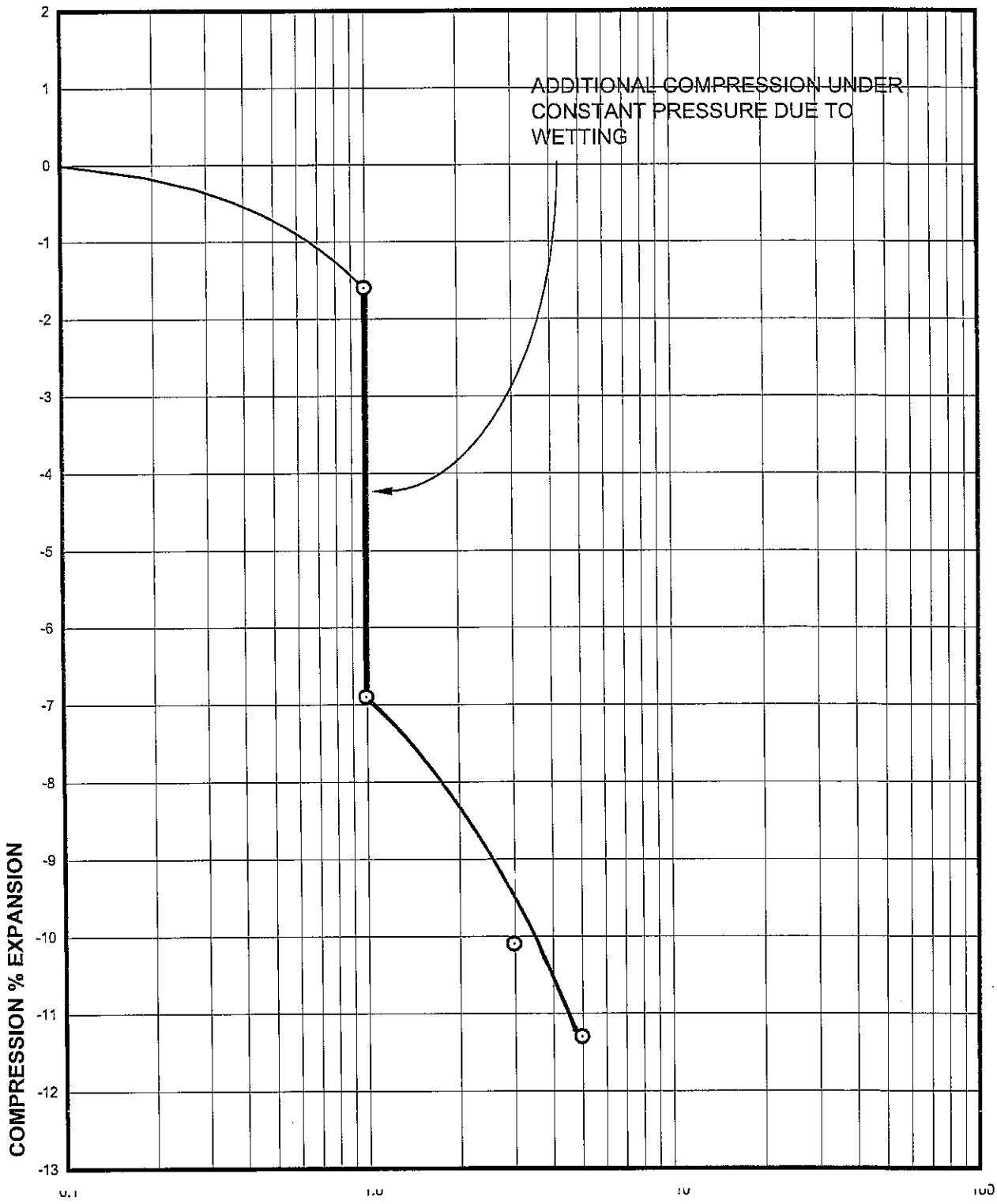
Sample of SAND, SILTY (SM)
From TH-1 AT 24 FEET

DRY UNIT WEIGHT= 123 PCF
MOISTURE CONTENT= 1.8 %

ARCHDIOCESAN HOUSING, INC.
OAKHURST SUBDIVISION
PROJECT NO. GS05471-120
S:\GS05471.000\120\6. Calcs\2010 swell

Swell Consolidation Test Results

FIG. A-2



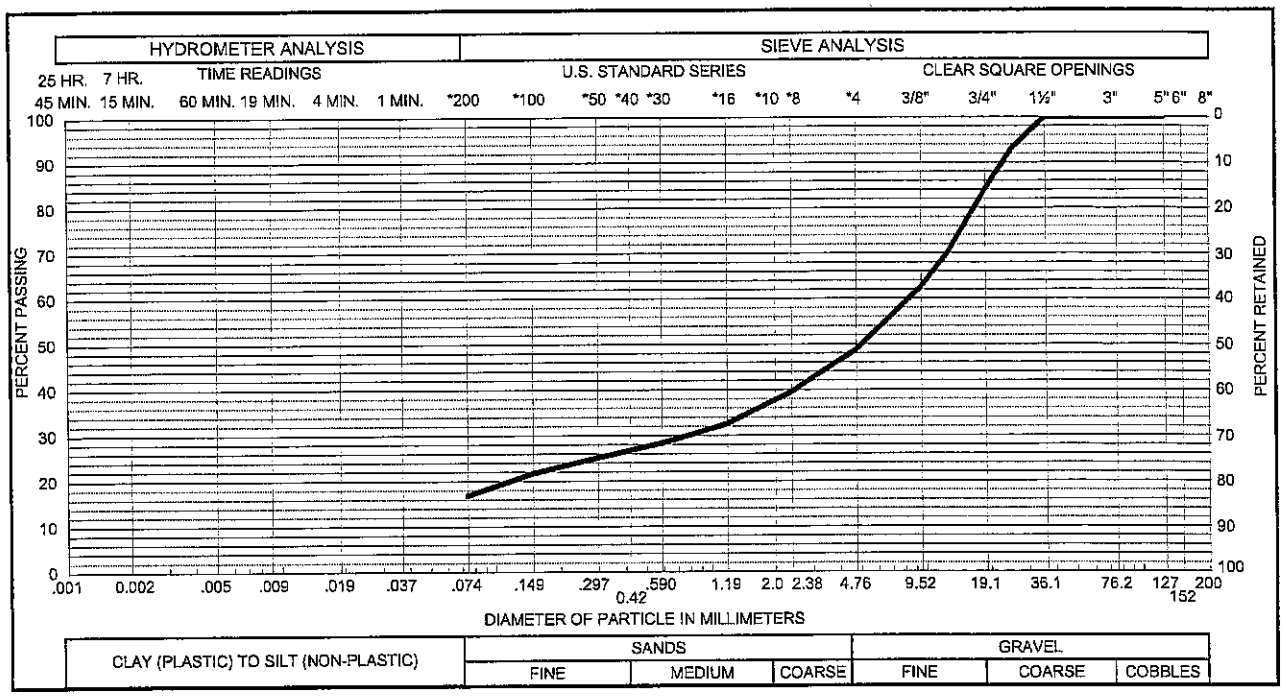
Sample of SAND, SILTY (SM)
From TH-1 AT 26 FEET

DRY UNIT WEIGHT= 109 PCF
MOISTURE CONTENT= 0.9 %

Swell Consolidation Test Results

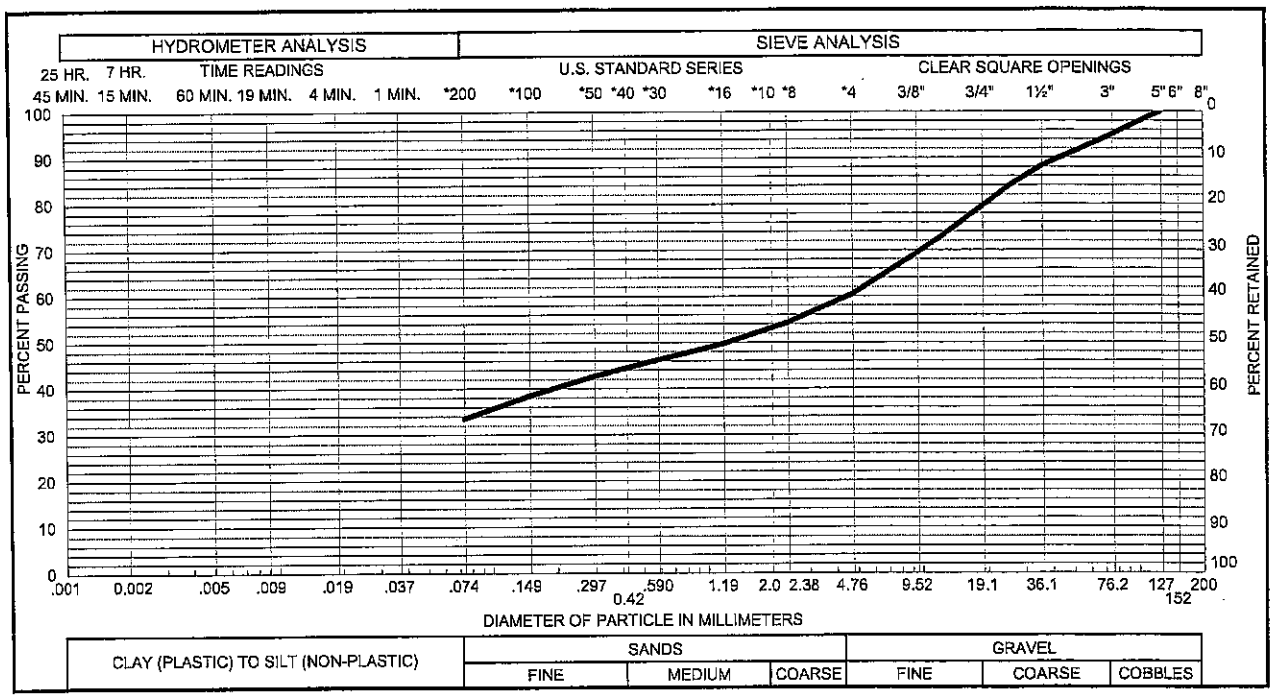
FIG. A-3

ARCHDIOCESAN HOUSING, INC.
OAKHURST SUBDIVISION
PROJECT NO. GS05471-120
S:\GS05471.000\120\6. Calcs\GS05471-120.Swell



Sample of GRAVEL, SILTY (GM)
From TH - 2 AT 4 FEET

GRAVEL 51 % SAND 32 %
SILT & CLAY 17 % LIQUID LIMIT %
PLASTICITY INDEX %



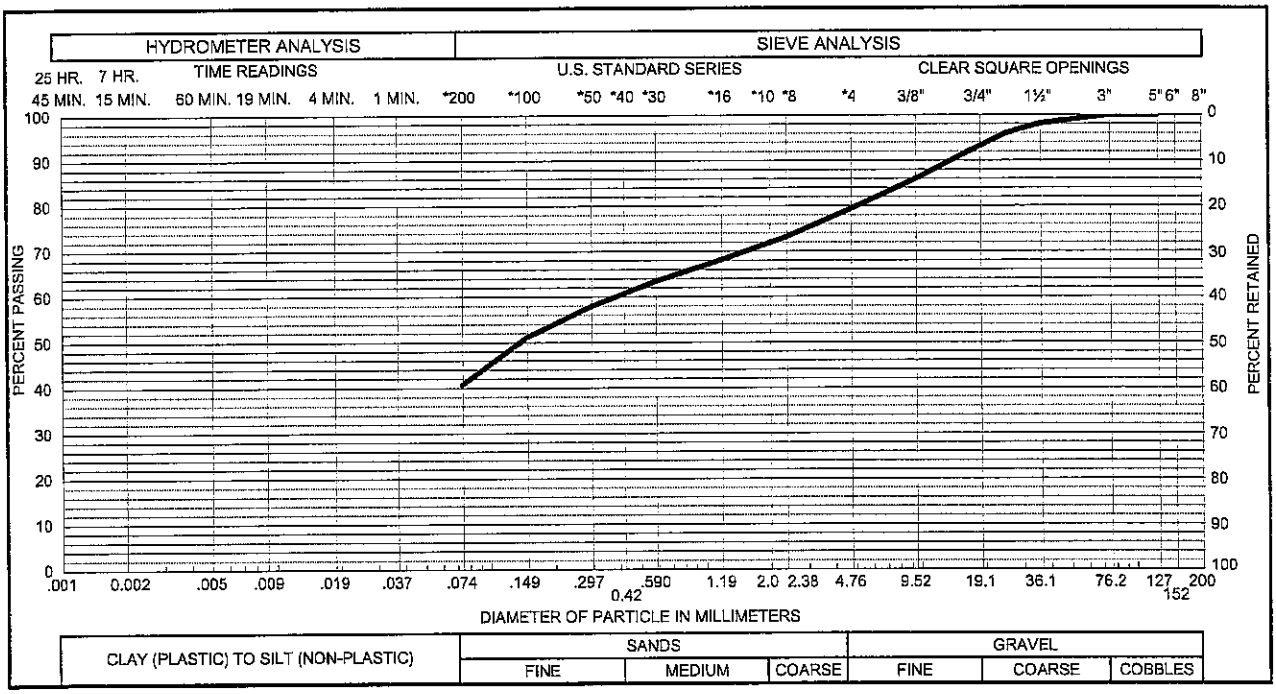
Sample of SILT, GRAVELLY (ML)
From TP - 1 AT 8-10 FEET

GRAVEL 40 % SAND 26 %
SILT & CLAY 34 % LIQUID LIMIT %
PLASTICITY INDEX %

ARCHDIOCESAN HOUSING, INC.
OAKHURST SUBDIVISION
PROJECT NO. GS05471-120
S:\GS05471.000\120\6. Calcs\GS05471-120.Gradation.xls

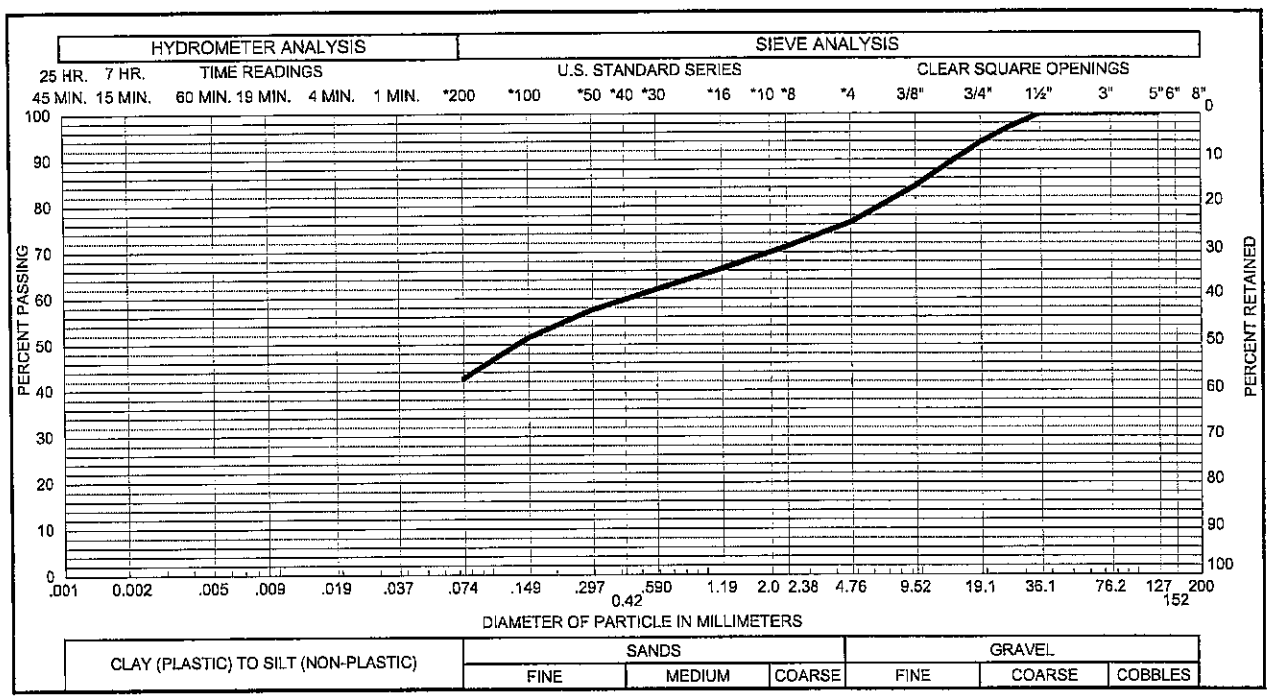
Gradation Test Results

FIG. A-4



Sample of SILT, GRAVELLY (ML)
From TP - 2 AT 4-6 FEET

GRAVEL 21 % SAND 38 %
SILT & CLAY 41 % LIQUID LIMIT %
PLASTICITY INDEX %



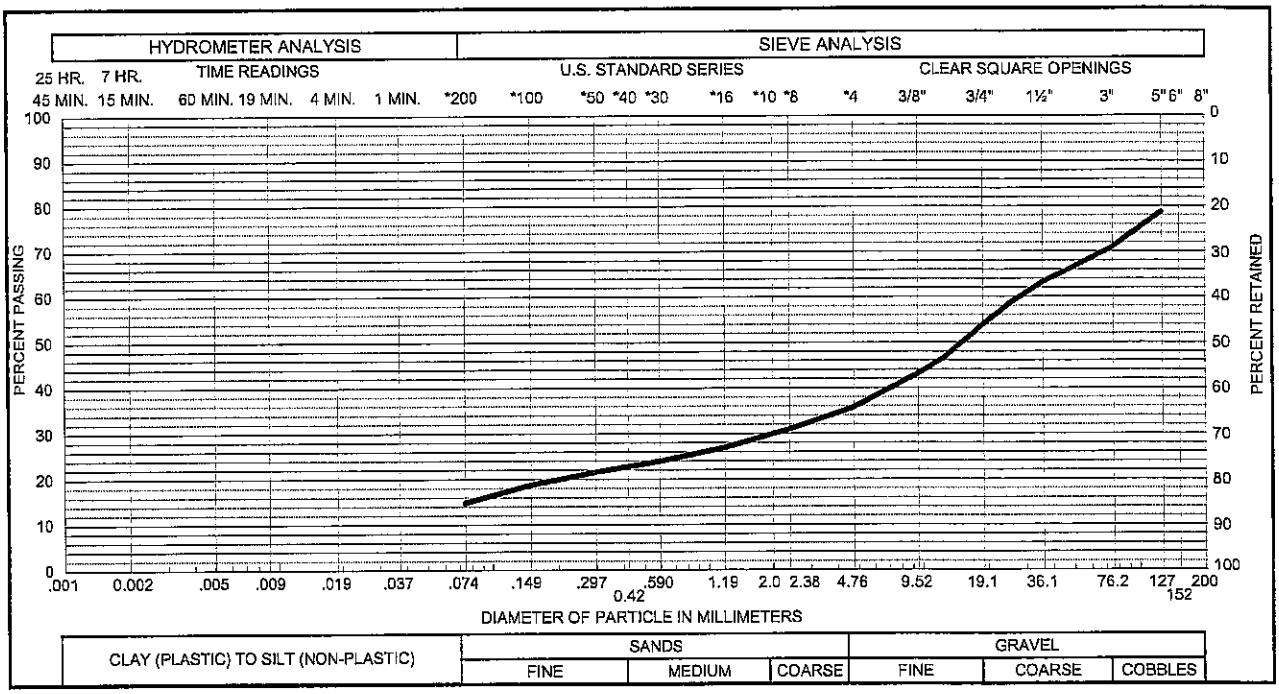
Sample of SILT, GRAVELLY (ML)
From TP - 3 AT 9-11 FEET

GRAVEL 24 % SAND 33 %
SILT & CLAY 43 % LIQUID LIMIT %
PLASTICITY INDEX %

ARCHDIOCESAN HOUSING, INC.
OAKHURST SUBDIVISION
PROJECT NO. GS05471-120
S:\GS05471.000\120\6. Calcs\GS05471-120.Gradation.xls

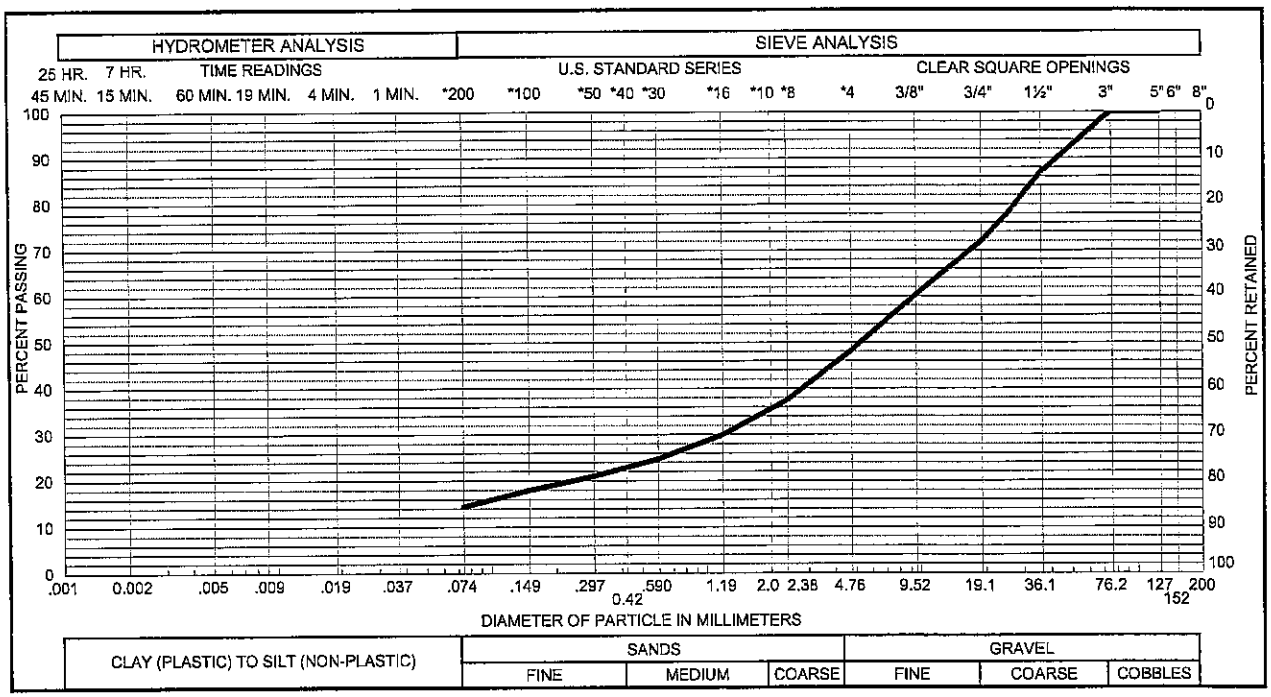
Gradation Test Results

FIG. A-5



Sample of SILT, GRAVELLY (ML)
From TP - 4 AT 9-11 FEET

GRAVEL 64 % SAND 21 %
SILT & CLAY 15 % LIQUID LIMIT %
PLASTICITY INDEX %



Sample of SILT, GRAVELLY (ML)
From TP - 5 AT 8-10 FEET

GRAVEL 52 % SAND 34 %
SILT & CLAY 14 % LIQUID LIMIT %
PLASTICITY INDEX %

ARCHDIOCESAN HOUSING, INC.
OAKHURST SUBDIVISION
PROJECT NO. GS05471-120
S:\GS05471.000\120\6. Calcs\GS05471-120.Gradation.xls

Gradation Test Results

FIG. A-6

TABLE A-I

SUMMARY OF LABORATORY TESTING
PROJECT NO. GS05471-120

LOT	DEPTH (FEET)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	ATTERBERG LIMITS		SWELL TEST RESULTS*	SOLUBLE SULFATES (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PASSING NO. 200 SIEVE (%)	DESCRIPTION
				LIQUID LIMIT (%)	PLASTICITY INDEX (%)	SWELL (%)					
TH-1	4	3.4		NL	NP					21	SAND, CLAYEY (SC)
TH-1	14	3.1	114			-0.8					SAND, CLAYEY (SC)
TH-1	19	2.5	127			-0.4					SAND, CLAYEY (SC)
TH-1	24	1.8	123			-3.7					SAND, SILTY (SM)
TH-1	26	0.9	109			-5.3					SAND, SILTY (SM)
TH-2	4	3.7						51	32	17	GRAVEL, SILTY (GM)
TH-2	14	3.1	124	22	6		0.020			45	GRAVEL, SILTY (GM)
TP-1	8-10			23	4		0.000	40	26	34	SILT, GRAVELLY (ML)
TP-2	4-6			23	2		0.000	21	38	41	SILT, GRAVELLY (ML)
TP-3	9-11			24	3		0.000	24	33	43	SILT, GRAVELLY (ML)
TP-4	9-11			23	3		0.000	64	21	15	SILT, GRAVELLY (ML)
TP-5	8-10			22	1		0.000	52	34	14	SILT, GRAVELLY (ML)

* SWELL MEASURED WITH 1000 PSF APPLIED PRESSURE, OR ESTIMATED IN-SITU OVERBURDEN PRESSURE. NEGATIVE VALUE INDICATES COMPRESSION.

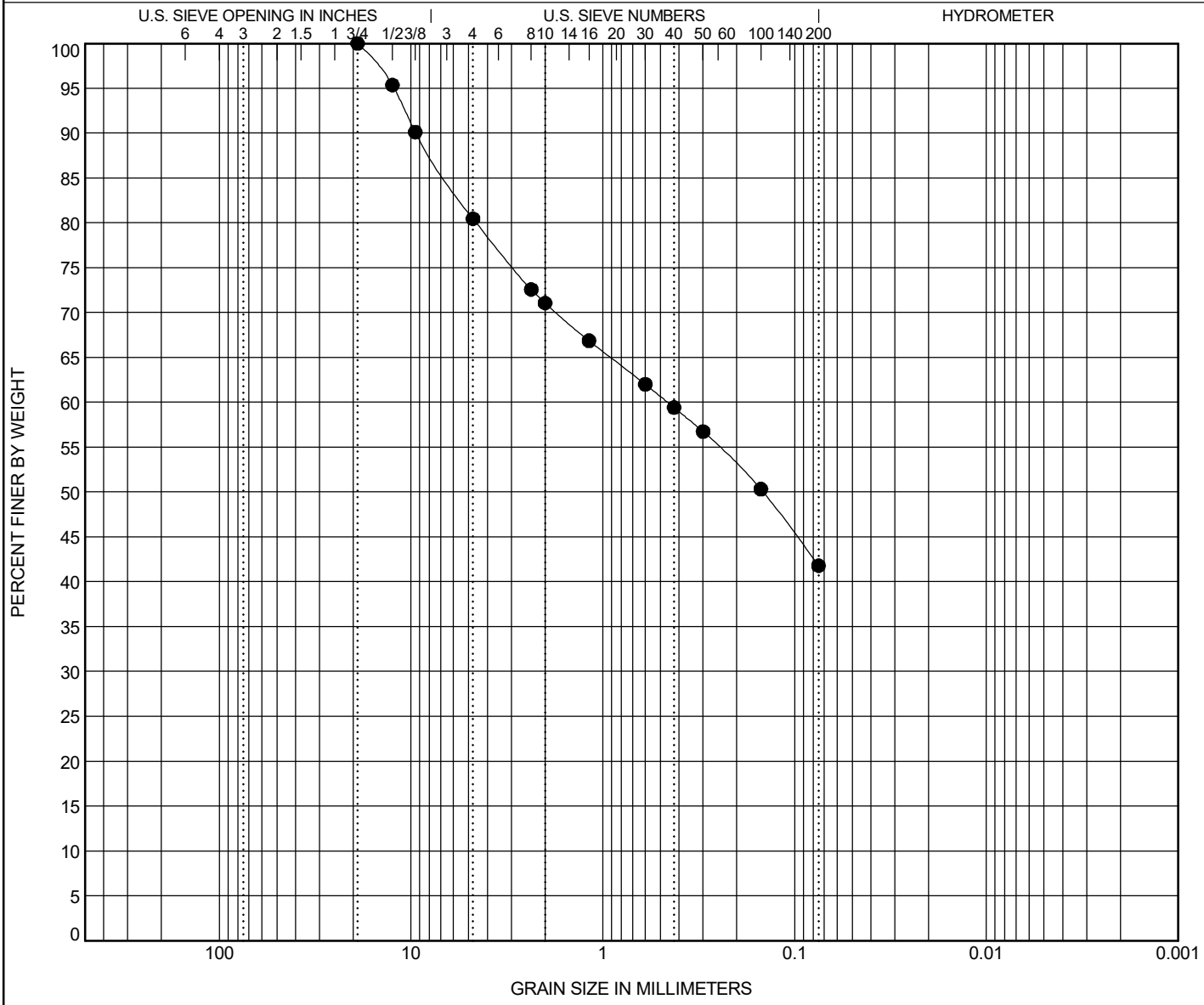
APPENDIX E
Laboratory Testing Results from Current Investigation

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

GRAIN SIZE DISTRIBUTION

CLIENT Forenza Contracting **PROJECT NAME** Glenwood Multifamily

PROJECT NUMBER 01402-0002 **PROJECT LOCATION** Glenwood Springs, CO



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● **Cuttings**	**SILTY SAND with GRAVEL(SM)**	**26**	**23**	**3**		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **Cuttings**	**19**	**0.459**			**19.5**	**38.7**	**41.8**	

GRAIN SIZE 01402-0002 GLENWOOD MULTIFAMILY.GPJ GINT US LAB.GDT 12/2/17

November 21, 2017

City of Glenwood Springs
Attn: Terri Partch, City Engineer
101 West 8th Street
Glenwood Springs, CO 81601

RE: Glenwood Multifamily
Traffic Impacts of One-Way Blake Avenue from 23rd Street to 26th Street
Glenwood Springs, Colorado

Dear Terri:

In response to your inquiry regarding developing a comprehensive traffic solution for the neighborhood near Blake and Palmer Avenues between 23rd and 26th Streets, McDowell Engineering has prepared this letter to provide you with additional information on revised options and strategies.

Blake Avenue One-Way Configuration

Blake Avenue between 23rd and 26th Street is proposed to be reconfigured as southbound one way from 23rd to 26th Street. Traffic that previously used Blake Avenue northbound would now be routed to either Palmer Avenue to the east or SH 82 to the west to continue northbound. This configuration would also keep the majority of northbound commercial traffic off of Blake Avenue, and would primarily use SH 82, and to a lesser extent, Palmer Avenue. Based upon the circuitous re-routing to Palmer Avenue and the current traffic distribution, it was assumed that seventy percent of the re-directed traffic will utilize the SH 82 route.

RFTA Park and Ride Effects

The RFTA Park and Ride is adding a significant amount of the current traffic volume on Blake Avenue. This traffic is anticipated to be re-routed via SH 82 and Palmer Avenue in a similar distribution to the overall area traffic, as described above.

Gate Closure Options

Option A –Gate Closed (Existing Condition)

This option would keep the existing gate closed, replicating existing conditions. This option will not allow any of the commercial traffic to access Blake Street and will keep the distribution of this commercial traffic at its present locations, mainly at the Blake Avenue/SH 82 signal near the McDonald's entrance and 29th Street/SH 82.

Option B –Gate Open

This option would open the existing gate and would reconnect Blake Street to the south SH 82 connection near the McDonald's entrance. This option would support parallel routes through the south side of Glenwood Springs and would provide additional traffic flow and emergency access for the community. Local residential neighborhoods can better access the commercial areas without accessing SH 82. Opening the Blake Avenue gate will provide another parallel option for traffic, allowing for the completion of the gridded street network and dispersing traffic access to SH 82.

The gate configuration (open or closed) is not significantly impacted by the Glenwood Multifamily project traffic. The site generated traffic addition ranges from 2% to 14% of the anticipated Year 2040 total traffic on the adjacent street network.

Traffic Calming Options

A number of traffic calming options can be proposed to help manage traffic, speeds, and driver route choices. Curb extensions can be installed on 26th Street and/or Palmer Avenue to create a narrowing effect and visually differentiate smaller neighborhood streets. In addition, improved pedestrian crossings can create awareness of the multimodal nature of the neighborhood.

Speed bumps or humps are not recommended as they can impact emergency response times, cause street maintenance concerns, and cause driver aggravation. A series of speed humps or bumps is typically required to make a significant impact and for the installation to perform successfully.

The creation of these traffic calming options will create slower speeds and increase travel time throughout the area, which will deter drivers from cutting through the neighborhood and will promote using the SH 82 corridor.

Traffic Impacts

The anticipated traffic volumes on Blake Avenue, Palmer Avenue, 26th Street, and 23rd Street are depicted in the attached Figure 11A and Figure 12A and summarized in the table below.

Year 2040 Traffic Volumes (vph)	Blake Avenue One-Way Southbound from 23rd Street to 26th Street (Blake Avenue Gate CLOSED)			
	Blake Avenue SB One-Way (South of 23rd Street)	**Palmer Avenue (South of 23rd Street)**	**26th Street (East of Blake Ave.)**	**23rd Street (East of SH 82)**
Background Traffic	74	105	122	668
Site Traffic	2	7	20	12
Total Traffic	76	112	142	680
Year 2040 Traffic Volumes (vph)	**Blake Avenue One-Way Southbound from 23rd Street to 26th Street (Blake Avenue Gate OPEN)**			
	Blake Avenue SB One-Way (South of 23rd Street)	**Palmer Avenue (South of 23rd Street)**	**26th Street (East of Blake Ave.)**	**23rd Street (East of SH 82)**
Background Traffic	154	118	135	661
Site Traffic	2	7	20	12
Total Traffic	156	125	155	673

The above table shows that the site generated traffic adds a very small percentage of the overall traffic. With the southbound one-way configuration of Blake Avenue, opening the gate is anticipated to have little impact upon the neighborhood traffic volumes. Blake Avenue currently has 191 vph south of 23rd Street in its presently configured two-way street. Both proposed scenarios listed above result in less traffic on Blake Avenue.

State Highway Access Permit

With the proposed configurations (one-way Blake Street and opening the Blake Street gate), a new State Highway Access Permit will be required at the intersection of SH 82 and 27th Street. The anticipated total traffic volumes on the east leg of 27th Street exceed a twenty percent increase in the current State Highway Access Permit volume of 163dhv. With the gate closed, the site-generated traffic is anticipated to be 19.8% of the total Year 2040 traffic volume on the east leg of this intersection. With the gate open, the site-generated traffic is 10.5%.

The following table summarizes the percent increase of traffic from the current access permit volumes, the gate configuration, Blake Avenue lane configuration, and development impacts:

Condition	Gate	Development Traffic (dhv)	Total Year 2040 Traffic at SH 82 and 27th Street (dhv)	% Increase from Access Permit
Baseline Traffic (Two-way Blake), No Development Impacts	Closed	N/A	191	17.2%
One-way Blake, No Development Impacts	Closed	N/A	195	19.6%
One-way Blake, No Development Impacts	Open	N/A	272	66.8%
One-way Blake w/ Development	Closed	48	243	49.1%
One-way Blake w/ Development	Open	32	304	86.5%

Conclusions

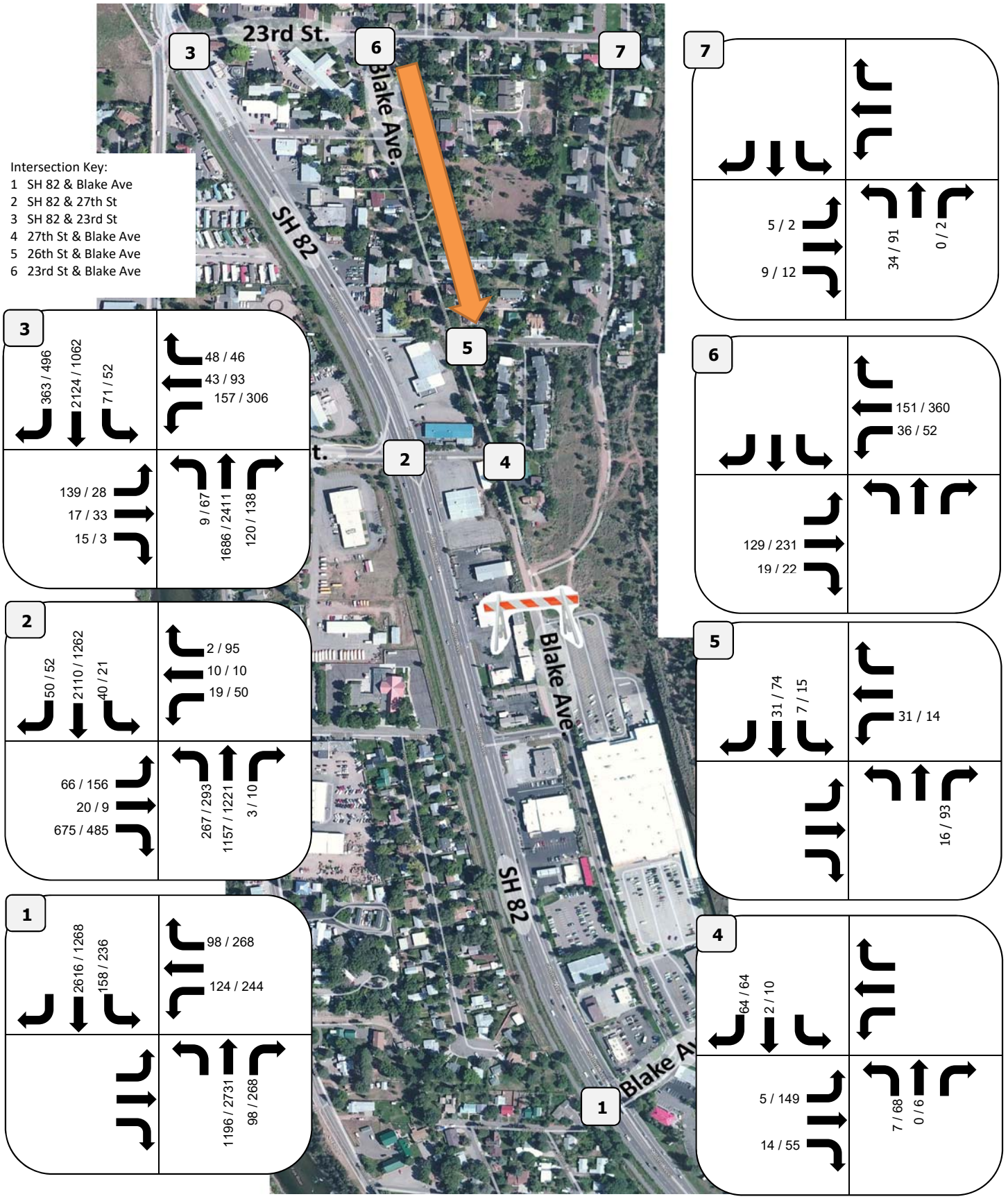
The proposed traffic volumes from the Glenwood Multifamily are not substantial compared to the background traffic volumes that presently exist. The creation of the one-way Blake Avenue configuration is not significantly impacted by the site traffic. Opening the Blake Avenue gate will provide another parallel option for traffic, allowing for the completion of the gridded street network and dispersing traffic access to SH 82.

Sincerely,
McDowell Engineering

Kari McDowell Schroeder, PE, PTOE
Traffic/Transportation Engineer

Encl: Figure 4A – Year 2040 Background Traffic – Blake Ave. Gate is Closed and Blake is One-Way SB Street from 23rd to 26th.
Figure 5A – Year 2040 Background Traffic – Blake Ave. Gate is Open and Blake is One-Way SB Street from 23rd to 26th.
Figure 7 – Project-Generated Traffic Assignment – Bake Ave. Gate Remains Closed
Figure 8 – Project-Generated Traffic Assignment – Bake Ave. Gate is Open
Figure 11 – Year 2040 Total Traffic – Blake Ave. Gate Remains Closed, Blake is Two-Way
Figure 11A - Year 2040 Total Traffic – Blake Ave. Gate is Closed and Blake is One-Way SB Street from 23rd to 26th.
Figure 12A – Year 2040 Total Traffic – Blake Ave. Gate is Open and Blake is One-Way SB Street from 23rd to 26th.

Figure 4A: Year 2040 Background Traffic - Blake Ave. Gate is Closed and Blake is One-Way Southbound Street from 23rd to 26th



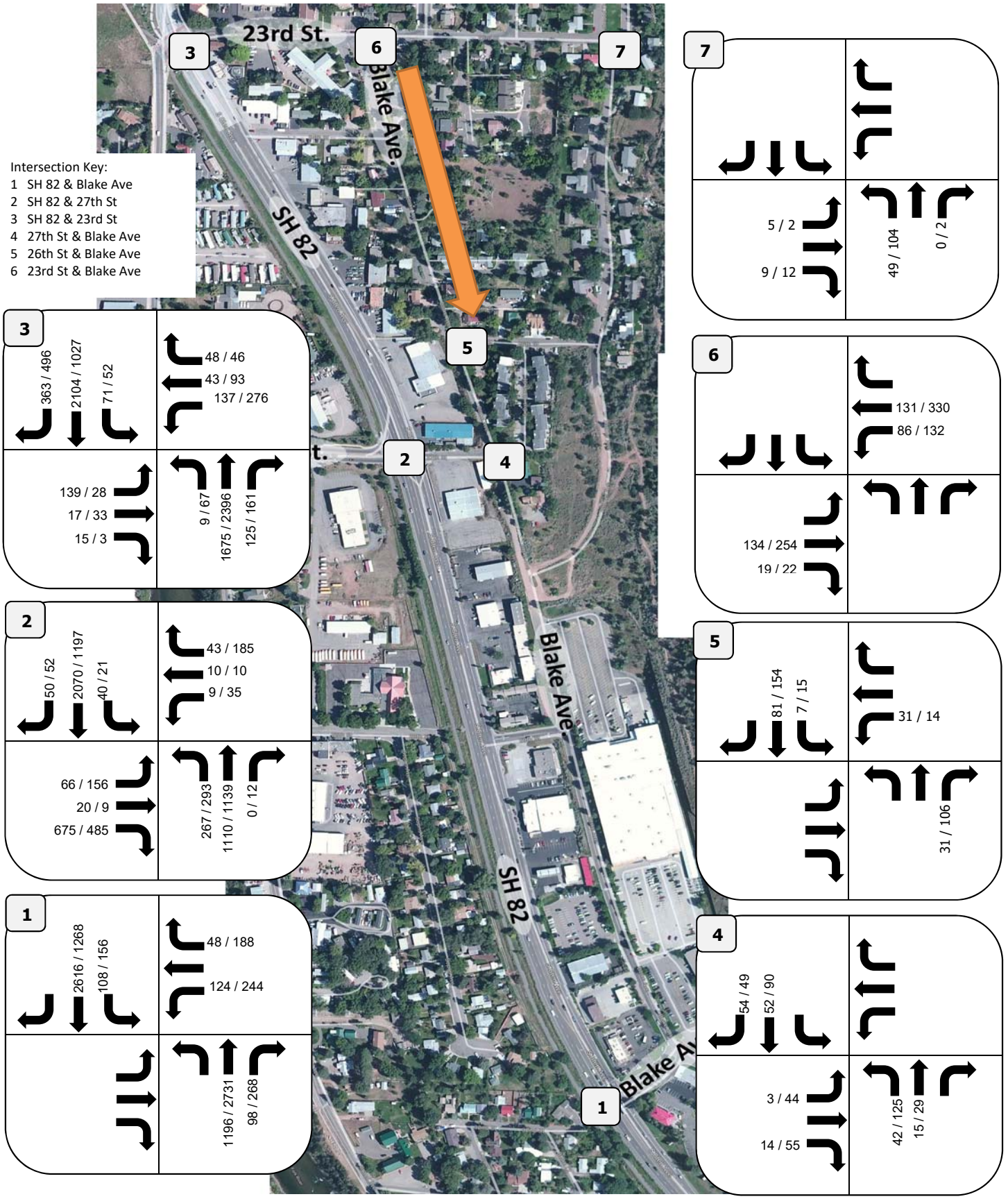
Project Number: 1247
Prepared By: KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX vph

October 30, 2017

Figure 5A: Year 2040 Background Traffic - Blake Ave. Gate is Open and Blake is One-Way Southbound Street from 23rd to 26th



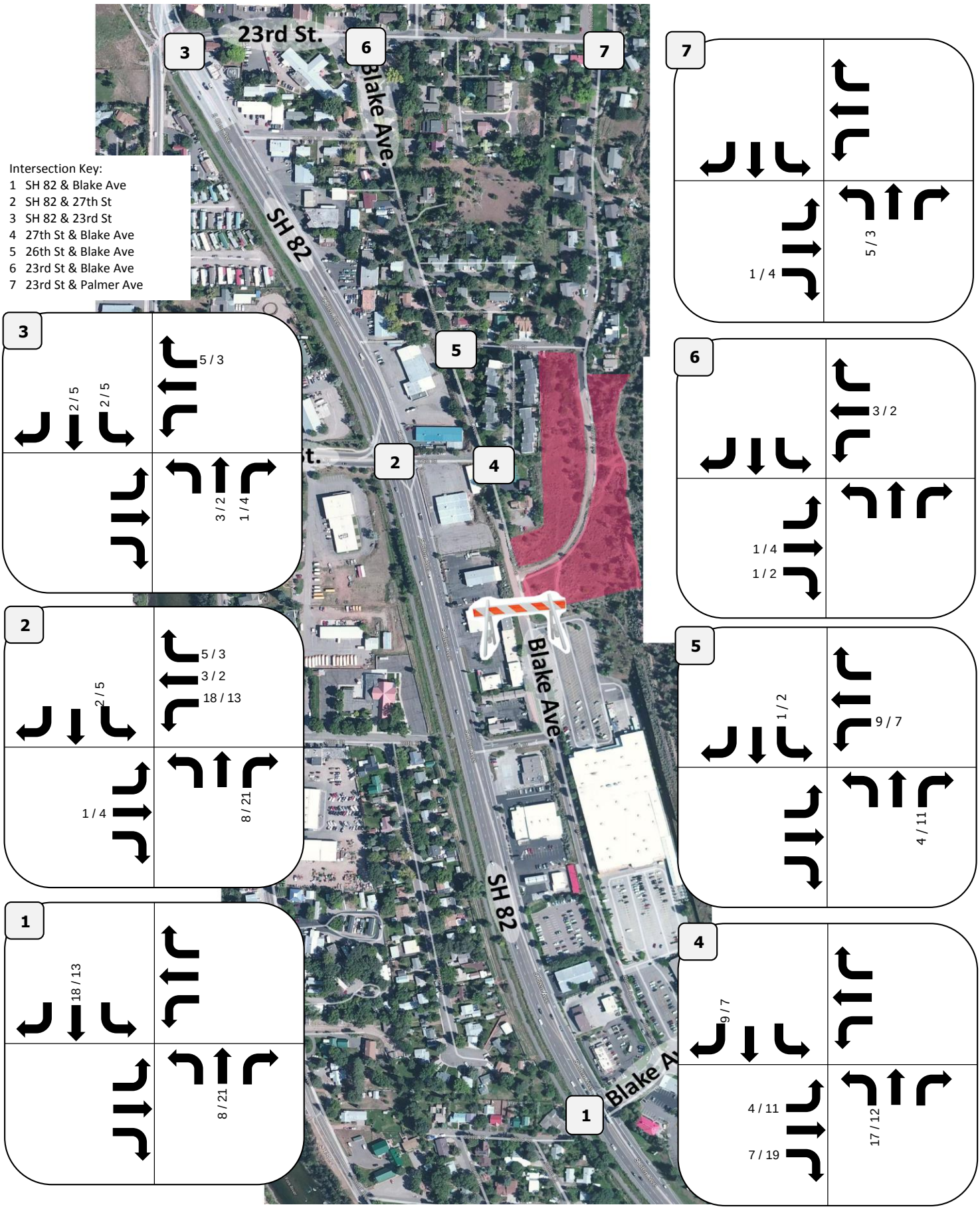
Project Number: 1247
Prepared By: KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX vph

October 30, 2017

Figure 7: Project-Generated Traffic Assignment - Blake Ave. Gate Remains Closed



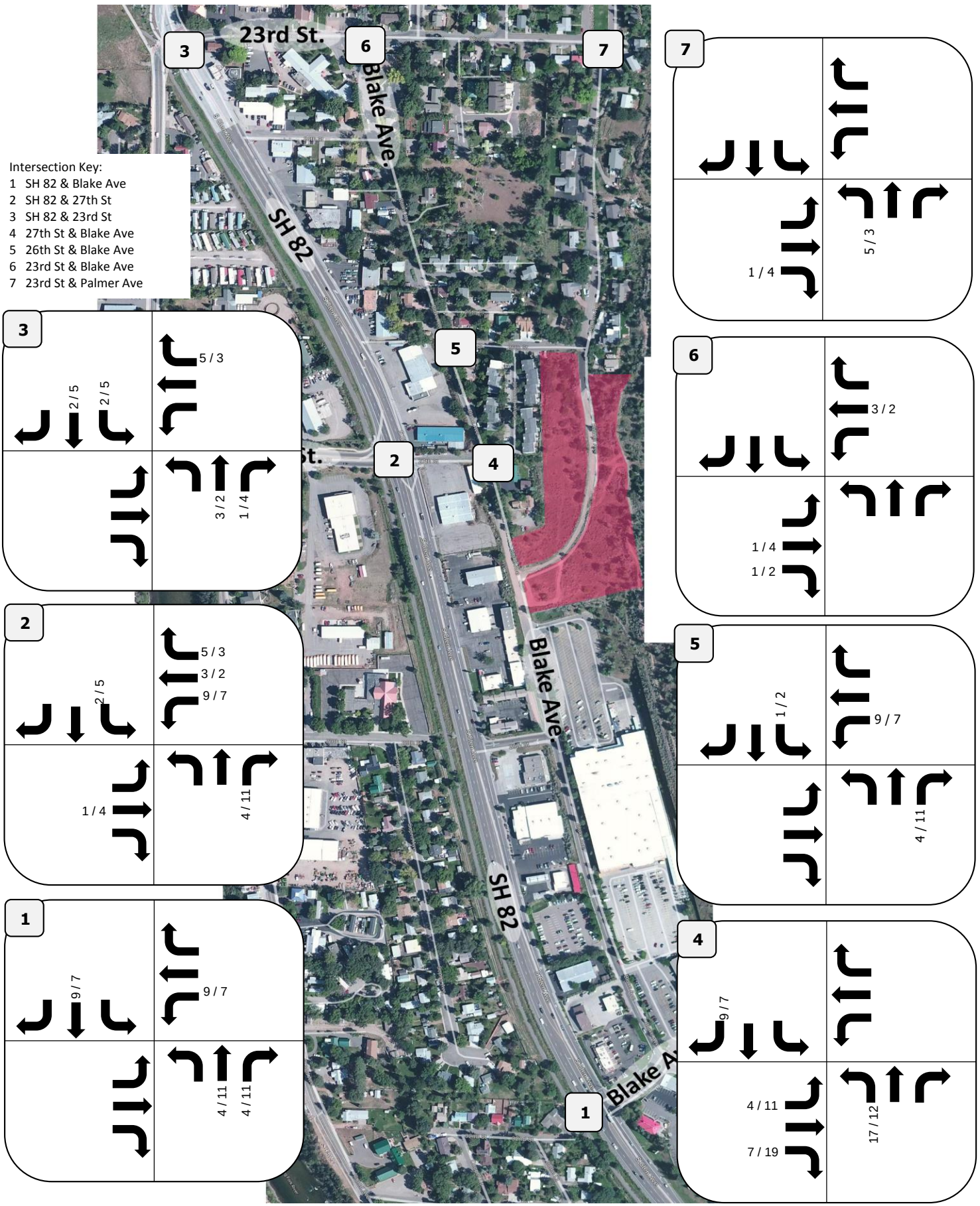
Project Number: 1247
Prepared By: BBG
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX vph

March 9, 2017

Figure 8: Project-Generated Traffic Assignment - Blake Ave. Gate is Opened



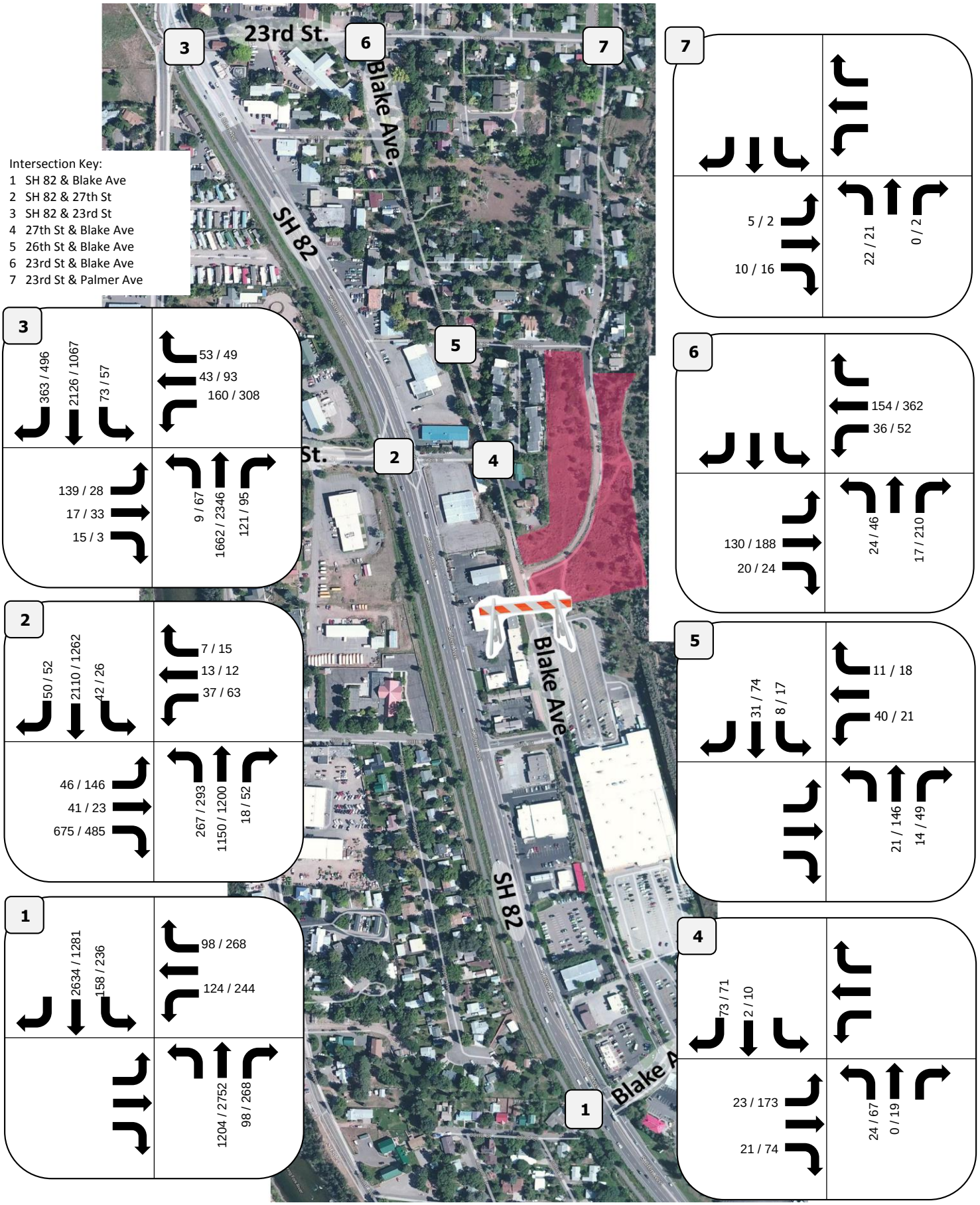
Project Number: 1247
Prepared By: BBG
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX vph

March 9, 2017

Figure 11: Year 2040 Total Traffic - Blake Ave. Gate Remains Closed, Blake is Two-Way



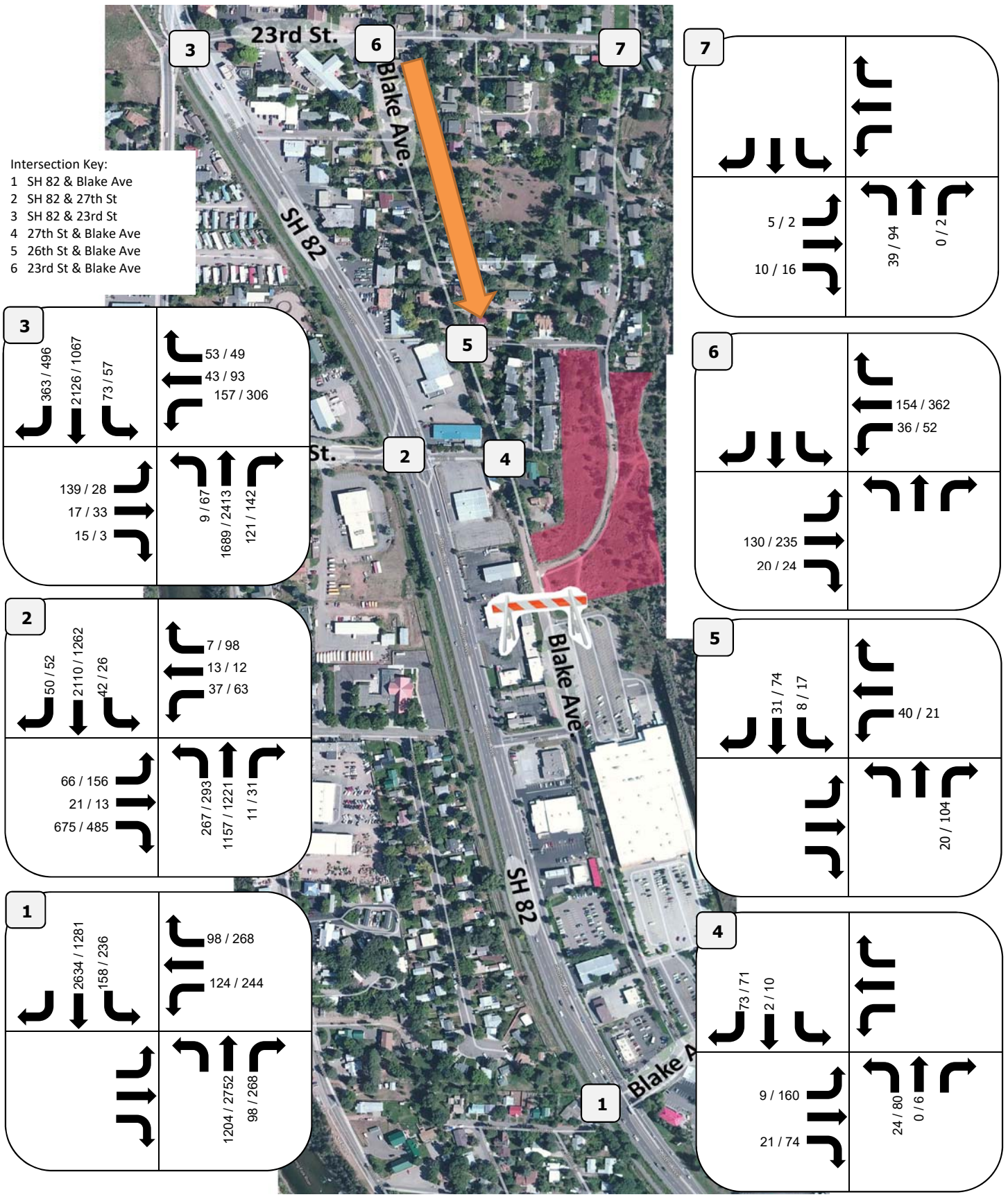
Project Number: 1247
Prepared By: BBG
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX vph

March 9, 2017

Figure 11A: Year 2040 Total Traffic - Blake Ave. Gate Remains Closed and Blake is One-Way Southbound Street from 23rd to 26th



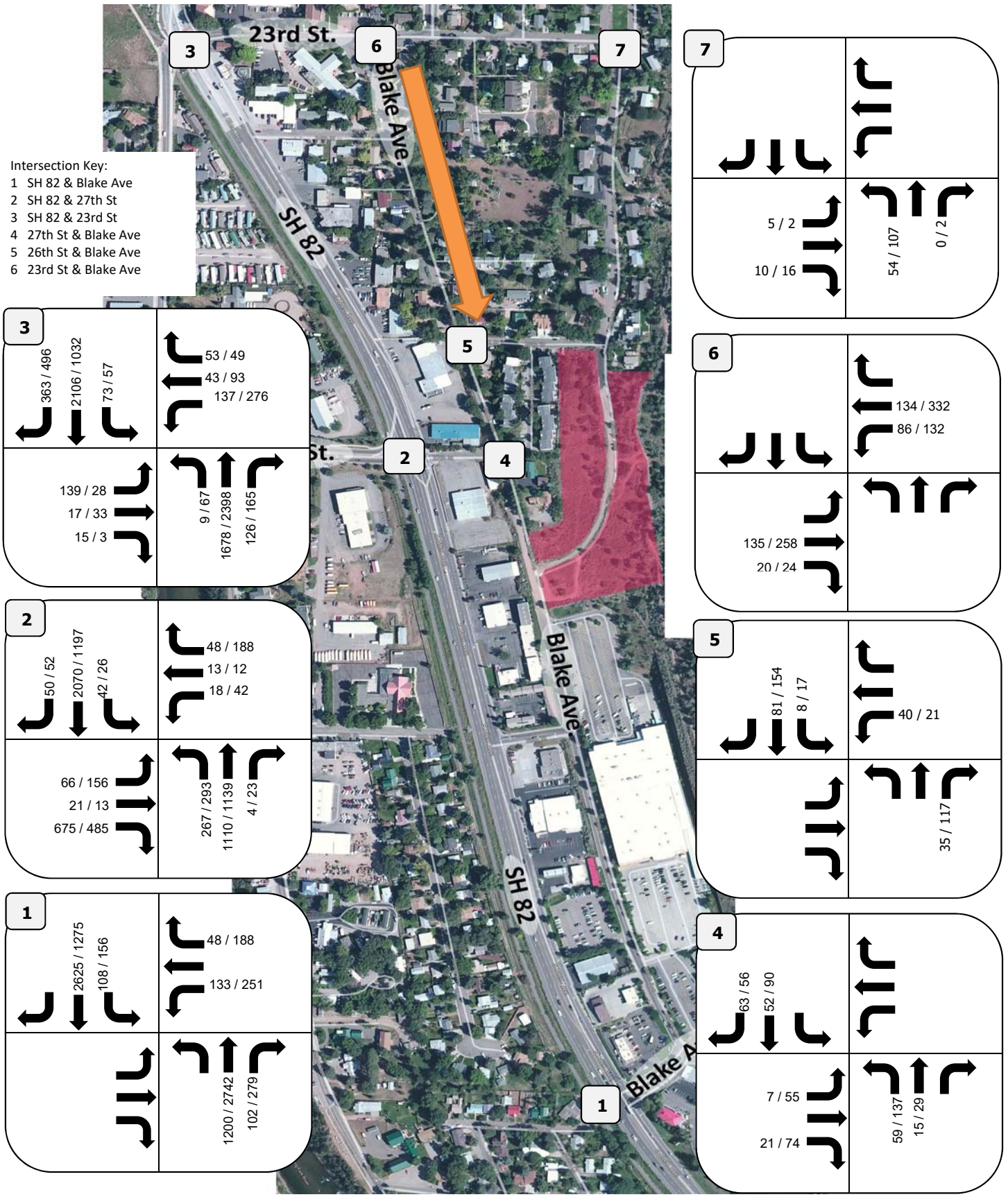
Project Number: 1247
Prepared By: KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX vph

October 30, 2017

Figure 12A: Year 2040 Total Traffic - Blake Ave. Gate is Opened and Blake is One-Way Southbound Street from 23rd to 26th



Project Number: 1247
Prepared By: McDowell Engineering, KJS
Bell Rippy, Glenwood Springs, Colorado

LEGEND :

LEGEND :
AM/PM Volumes = XX / XX vph

October 30, 2017

City Council
STAFF REPORT
City of Glenwood Springs
July 16, 2020

Agenda Item: Ordinance No. 20, Series of 2020; An Ordinance of the City Council of the City of Glenwood Springs, Colorado, Rezoning Property Owned by Bell Rippy Glenwood, LLC Known as 2710 Blake Avenue, Glenwood Springs Colorado, from Residential High-Density(RH) to Residential Transitional (RT) Zoning (FIRST READING)

Action Requested: See attached staff report for Planning Item 04-20

Department: Economic and Community Development

Presented By: Trent Hyatt, Senior Planner

Background Info:

Issues:

Staff Recommendation:

ORDINANCE NO. 20

Series of 2020

AN ORDINANCE OF THE CITY OF GLENWOOD SPRINGS, COLORADO, REZONING PROPERTY OWNED BY BELL RIPPY GLENWOOD, LLC KNOWN AS 2710 BLAKE AVENUE, GLENWOOD SPRINGS, COLORADO, FROM RESIDENTIAL HIGH DENSITY (RH) TO RESIDENTIAL TRANSITIONAL (RT) ZONING.

WHEREAS, Triumph Development West, LLC (the "Applicant") filed with the City of Glenwood Springs ("Glenwood Springs" or the "City") on behalf of Bell Rippy Glenwood, LLC (the "Owner"), a request to rezone from RH-Residential High Density to RT-Residential Transitional real property known as 2710 Blake Avenue, Glenwood Springs, CO 81601, also known as parcel 218521100002 in the real property records of Garfield County, Colorado (the "Property"); and

WHEREAS, the Planning and Zoning Commission considered the requested rezoning at a public hearing on May 26, 2020 and recommended approval of the rezoning based on its consideration of the rezoning approval criteria set forth in Section 070.060.040(a)(3)f.3 of the Municipal Code and its findings that the rezoning is consistent with the Comprehensive Plan and the purpose of the Municipal Code; the rezoning is consistent with the Residential Transitional zone district's purpose statement; substantial changes in the area warrant a zoning change; and the intensity in the new zoning district is not expected to create significantly adverse impacts to surrounding properties or the neighborhood; and

WHEREAS, City Council, following notice required by law, held a public hearing at a regular meeting on July 16, 2020 to consider the rezoning request for the property in light of the approval criteria set forth in Section 070.060.040(a)(3)f.3 of the Municipal Code and found that rezoning the property to Residential Transitional (RT) is an appropriate designation for the Property pursuant to Section 070.060.040(a)(3)f.3; and

WHEREAS, City Council wishes to rezone the property from Residential High Density (RH) to Residential Transitional (RT).

NOW, THEREFORE, IT IS ORDAINED BY THE CITY COUNCIL OF THE CITY OF GLENWOOD SPRINGS THAT:

Section 1: The recitals above are hereby adopted as findings.

Section 2: The Property is hereby zoned Residential Transitional (RT).

Section 3: Pursuant to Section 070.060.040(a)(3)g. of the Municipal Code, the Community Development Director shall prepare a revision to the Official Zoning Map of the City of Glenwood Springs to reflect the rezoning approval herein and shall record the amended map and this Ordinance with the Garfield County Clerk and Recorder.

Section 4: Any ordinances or resolutions or parts thereof, which are in conflict with this ordinance, are hereby repealed to the extent of such conflict only.

INTRODUCED READ ON FIRST READING, PASSED, AND ORDERED PUBLISHED BY TITLE ONLY THIS 16TH DAY OF JULY 2020.

CITY OF GLENWOOD SPRINGS, COLORADO

_____
Jonathan Godes, Mayor

ATTEST:

_____
Catherine Fletcher, City Clerk

INTRODUCED, READ ON SECOND READING, PASSED AND ORDERED PUBLISHED BY TITLE ONLY TO BE EFFECTIVE TEN DAYS FOLLOWING THE DATE OF SECOND PUBLICATION THIS _____ DAY OF _____, 2020.

CITY OF GLENWOOD SPRINGS, COLORADO

_____
Jonathan Godes, Mayor

ATTEST:

_____
Catherine Fletcher, City Clerk

City Council
STAFF REPORT
City of Glenwood Springs
July 16, 2020

Agenda Item: Ordinance No 21, Series of 2020; An Ordinance of the City Council of the City of Glenwood Springs, Colorado, Amending Section 070.010.070 of the Glenwood Springs Municipal Code Regarding Nonconforming Use Regulations and Section 070.040.020(d)(24) of the Municipal Code Relating to Riparian Setbacks (FIRS READING)

Action Requested: **Action Item 1** - Code Amendment to revise Section 070.010.070 and Section 070.040.020(d)(24) of the *Glenwood Springs Municipal Code* regarding riparian setbacks and related nonconforming use regulations.

Department: Economic and Community Development

Presented By: Trent Hyatt, Senior Planner

Background Info: On October 4, 2018, City Council held a work session with the River Commission and Planning and Zoning Commission (Commission) to facilitate a discussion regarding riparian setbacks. The work session followed a previous City Council discussion regarding the matter on April 26, 2018 that occurred in conjunction with a progress update on the development code re-draft which was ongoing at the time.

Prior to the development code re-draft discussion in April 2018, City Council received a recommendation from the River Commission (following a unanimous vote on February 7, 2018) for the inclusion of a 50-foot riparian setback from ordinary high water mark (OHWM), allowing for 10 percent disturbance therein, in the re-drafting of the development code to replace the existing 30 foot setback from high water mark (please refer to the attached staff reports for an explanation of these terms). Instead of additional work session on the matter, it was determined the proposal would be brought forth via the applicable process for a Code Amendment, review and recommendation by the Commission prior to consideration by City Council.

The Commission first considered a text amendment to revise the City's current riparian setbacks, Section 070.040.020(d)(24) of the Code, at their July 23, 2019 regular meeting. After lengthy public comment and discussion regarding the proposal, consideration was continued to September 24, 2019. At said meeting, the Commission took additional public comment and discussed various issues related to the impacts of the increased setback on the developability of applicable parcels as well as to existing nonconformities. Thereafter, consideration of the proposal was continued on a monthly basis while staff collected additional mapping and surveying information to depict the impacts on various City owned properties as requested by the Commission.

On February 25, 2020, the Commission reviewed mapping prepared by High Country Engineering and SGM comparing the proposed setback from OHWM to the existing 30 foot setback from high water mark and once again took public comment on the proposed Code Amendment.

While the maps prepared by HCE and SGM showed differing areas/impacts subject to the existing/proposed setbacks (varying approximately 5-10 feet) related to the proposal, both made it clear that the 50-foot setback was an increase to the existing 30-foot setback. An increase in the area subject to the riparian setback was never staff's nor the River Commission's intent, which is to prevent the loss/removal of riparian vegetation and improve water quality by eliminating the application of hazardous chemicals in the related riparian zone. As a result, staff revised our recommendation to 35-feet from the OHWM instead. A 35-foot riparian setback from OHWM is also outlined in Garfield

County's development regulations and would allow for consistent outreach, messaging, and enforcement across both jurisdictions.

The Commission voted unanimously 6-0 to recommend approval of the proposed 35 foot setback with an allowed area of disturbance therein of 50 percent (instead of 10). Additionally, the Commission recommended a revision to the nonconforming use regulations, Section 070.010.070, to acknowledge temporary earth disturbing activities/grading occurring within the area subject to the setback to repair existing legal nonconforming structures. After receiving the Commission's recommendation, staff determined that an amendment to the nonconforming use regulations of Section 070.010.070 would require an additional, separate Code Amendment because the original public notice only included a revision to Section 070.040.020(d) Development in Waterways and Areas of Special Flood Hazard, specifically subsection (24) where riparian setbacks are addressed. A copy of the draft recommended language is attached. All information provided to and reviewed by the Commission (i.e. staff reports, supporting documentation/attachments, meeting minutes, mapping, comments from property owners and organizations, etc.) is also included which provides additional detail related to various issues addressed during the process.

Issues:

Addressed above and in various staff reports and letters attached hereto. However, one additional concern raised is whether or not the trimming of existing riparian vegetation or planted grass/landscaped areas would be a violation of the proposed regulation or if an engineering evaluation is required in order for a property owner to do so. As outlined in the various attached staff reports and addressed by staff numerous times during the Commission's review of the proposal, the answer is no as long as the trimming does not damage the riparian vegetation (i.e. trimming for to maintain a view or for wildfire hazard mitigation that does not result in the death of the vegetation) or is not otherwise exempt from the regulation. Additionally, any future aggrieved party will always have the ability to request a variance from the proposed regulation or request a review of staff's interpretation thereof by the Commission as outlined in Code.

Planning and Zoning Commission Recommendation

As outlined above, the Commission voted to recommended approval of the revised setback.

Staff Recommendation:

Staff Recommendation

The attached draft ordinance includes a slight modification of the nonconforming language recommended by the Commission to make it more clear. Staff recommends **approval** of the Code Amendment with the findings below:

Recommended Findings

1. The proposed amendment is consistent with the Comprehensive Plan and other City policies;
2. The proposed amendment does not conflict with other provisions of this Code or other provisions in the Glenwood Springs Municipal Code;
3. The proposed amendment is necessary to address a demonstrated community need;
4. The proposed amendment is necessary to respond to substantial changes in conditions; and
5. The proposed amendment is consistent with the general purpose and intent of the Municipal Code.

Ordinance No. 21

Series of 2020

AN ORDINANCE OF THE CITY OF GLENWOOD SPRINGS, COLORADO, AMENDING SECTION 070.010.070 OF THE GLENWOOD SPRINGS MUNICIPAL CODE REGARDING NONCONFORMING USE REGULATIONS AND SECTION 070.040.020(d)(24) OF THE MUNICIPAL CODE RELATING TO RIPARIAN SETBACKS.

WHEREAS, the City of Glenwood Springs (the "City") is a Colorado home rule municipality organized pursuant to Article XX of the Colorado Constitution and with the authority of the Glenwood Springs Home Rule Charter; and

WHEREAS, Section 070.040.020(d)(24) of the Glenwood Springs Development Code regulates development in waterways and areas of special flood hazard and prohibits development and construction within a 30-foot setback area from the high water mark of any river or live stream, subject to certain exceptions such as bridges, irrigation structures, paths for non-motorized use, and erosion protection devices; and

WHEREAS, the River Commission has recommended that the Development Code be revised to require a 50-foot setback from the ordinary high water mark of a river or stream with a provision for a 10% disturbance area within the setback; and

WHEREAS, the Planning and Zoning Commission considered text amendments to Section 070.040.020(d)(24) at its regular meetings on July 23, 2019 and September 24, 2019 and, after receiving extensive public comments from the River Commission, conservation groups, and property owners, the Commission directed staff to collect additional mapping and surveying information to analyze the impacts of increased riparian setbacks on various properties within the City; and

WHEREAS, the Planning and Zoning Commission considered the data collected by staff as well as additional comments from the public at its regular meeting on February 25, 2020; and

WHEREAS, the Planning and Zoning Commission recommended amending Section 070.040.020(d)(24) to require a 35-foot setback from the ordinary high water mark with a permitted disturbance area therein of 50% and to clarify the types of construction activities and improvements that are permitted within the setback; and

WHEREAS, at its regular meeting on May 26, 2020, the Planning and Zoning Commission also recommended amending Section 070.010.070(b)(3)b (requiring that repairs and maintenance within a waterway or areas of special flood hazard comply with Section 070.040.020(d)), to specifically address temporary disturbances created by minor repairs to a nonconforming structure located within a riparian setback; and

WHEREAS, the Planning and Zoning Commission found that the recommended amendments satisfy the Code Amendment Approval Criteria set forth in Section 070.060.040(c)(3)d.3.; and

WHEREAS, City Council desires to adopt the amendments to Sections 070.010.070(b)(3)b and 070.040.020(d)(24) of the Development Code recommended by the Planning and Zoning Commission and finds and declares that the amendments satisfy the Code amendment approval criteria set forth in Section 070.060.040(c)(3)d.3. in that the amendments are consistent with the Comprehensive Plan and other City policies; do not conflict with other provisions of the Municipal Code; are necessary to address a demonstrated community need; are necessary to respond to substantial changes in conditions and/or policy; and are consistent with the general purpose and intent of the Municipal Code.

NOW THEREFORE, IT IS ORDAINED BY THE CITY COUNCIL OF THE CITY OF GLENWOOD SPRINGS, COLORADO, THAT:

Section 1. The recitals hereinabove are hereby adopted as findings and incorporated herein.

Section 2. Section 070.010.070(b)(3)b of the Glenwood Springs Municipal Code is hereby amended as follows, with double underlined text added and ~~strike-through language deleted~~:

Section 070.010.070 - Nonconformities

b. Repairs and maintenance within a waterway or area of special food hazard shall comply with Subsection 070.040.020(d). Temporary disturbance to make minor repairs of a nonconforming structure within the riparian setback required by 070.040.020(d)(24) shall be limited to fifteen feet around the structure. The temporary disturbed area shall be returned to the previous vegetation or with appropriate riparian plant species. However, vegetation listed on the Garfield County noxious weed list shall not be replanted.

Section 3. Section 070.040.020(d)(24) is hereby repealed and replaced entirely with the following:

Section 070.040.020 – Sensitive Area Protection.

(24) *Conservation of Waterways.* It is the purpose of this subsection to conserve and promote the health of the City's riparian ecosystems, water quality, and protect human drinking water by maintaining a functional natural buffer adjacent to waterways.

a. *Applicability*. All new improvements, buildings, additions, structures, excavations, grading, dumping, clearing of native vegetation, or backfill shall be subject to the requirements of 070.040.020(d)(24)b. *Standards* unless the applicant demonstrates to the City Engineer and the Director by clear and convincing evidence that one or more of the following conditions is met:

1. The removal of native vegetation, not to exceed 50 percent of the setback area defined below, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be

interpreted to allow for permanent structures of any kind within said area.

2. The construction of bridges, public utilities, public paths for non-motorized use, public open space areas and boat ramps, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices that do not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

3. Removal of vegetation listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm in compliance with applicable regulations. Vegetation shall be replaced with appropriate riparian plant species to limit erosion.

4. Applicant demonstrates one or more of the following:

   i. The area does not contain significant riparian plant species or functions;

   ii. The area is impacted by previous earth disturbing activities; and/or

   iii. The proposed improvement (including but not limited to the trimming of vegetation, construction of access path or steps, hot springs pools) does not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

b. Standards.

1. No improvement, building, structure, excavation, grading, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within thirty-five feet of the ordinary high-water mark (as defined by the US Army Corp of Engineers), measured horizontally, of any river or live perennial stream.

2. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted within said thirty-five-foot setback area.

INTRODUCED, READ ON FIRST READING, PASSED AND ORDERED PUBLISHED BY TITLE ONLY THIS 16TH DAY OF JULY 2020.

CITY OF GLENWOOD SPRINGS, COLORADO

_____
Jonathan Godes, Mayor

ATTEST:

_____
Catherine Mythen Fletcher, City Clerk

INTRODUCED, READ ON SECOND READING, PASSED AND ORDERED PUBLISHED BY TITLE ONLY TO BE EFFECTIVE TEN DAYS FOLLOWING THE DATE OF SECOND PUBLICATION THIS ____ DAY OF _____, 2020.

CITY OF GLENWOOD SPRINGS, COLORADO

ATTEST:

_____
Jonathan Godes, Mayor

_____
Catherine Mythen Fletcher, City Clerk

Add:

Section 070.010.070(b)(3)b Nonconforming Use Regulations

Temporary disturbance to make minor repairs of a nonconforming structure within the riparian setback required by 070.040.020(d)(24) shall be limited to fifteen feet around the structure. The temporary disturbed area shall be returned to the previous vegetation or with appropriate riparian plant species. However, vegetation listed on the Garfield County noxious weed list shall not be replanted.

Remove:

Section 070.040.020(d)(24) Development in Waterways and Areas of Special Flood Hazard

~~No improvement, building, structure, excavation, dumping or backfill shall be placed, built, undertaken or approved within a 30-foot setback area horizontally from the high-water mark of any river or live stream, except for bridges, paths for non-motorized use, irrigation structures or flood control and erosion protection devices.~~

Replace with:

(24) Conservation of Waterways

It is the purpose of this Subsection 070.040.020(d)(24) to conserve and promote the health of the City's riparian ecosystems, ~~and~~ water quality, and protect human drinking water by maintaining a functional natural buffer adjacent to waterways.

a. **Applicability**

All new improvements, buildings, additions, structures, excavations, grading, dumping, clearing of native vegetation, or backfill shall be subject to the requirements of 070.040.020(d)(24)b *Standards* unless the applicant demonstrates to the City Engineer and the Director by clear and convincing evidence that one or more of the following conditions is met:

1. The removal of native vegetation, not to exceed ~~10~~50 percent of the setback area defined below, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be interpreted to allow for permanent structures of any kind within said area.
2. The construction of bridges, public utilities, public paths for non-motorized use, public open space areas and boat ramps, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices that do not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

DRAFT

3. Removal of vegetation listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm in compliance with applicable regulations. Vegetation shall be replaced with appropriate riparian plant species to limit erosion.
4. Applicant demonstrates one or more of the following:
   i. ~~t~~The area does not contain significant riparian plant species or functions: ~~or~~
   ii. The area is impacted by previous earth disturbing activities: ~~and~~or
   iii. The proposed ~~activity~~ improvement (including but not limited to the trimming of vegetation, construction of access path or steps, hot springs pools) ~~improves water quality, limits erosion, and promotes riparian or wetland restoration~~ does not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

b. **Standards**
1. No improvement, building, structure, excavation, grading, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within ~~fifty~~ thirty-five feet of the ordinary high-water mark (as defined by the US Army Corp of Engineers), measured horizontally, of any river or live perennial stream.
2. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted within said ~~fifty foot~~thirty-five-foot setback area.

DRAFT

From:	Gary Vick
To:	Trent Hyatt; Jennifer Ooton
Subject:	Gary Vick/Friends of the Roaring Fork City Council Presentation July 16,...
Date:	Tuesday, July 7, 2020 2:01:16 AM

Please include this email and the attached YouTube link in Council's packets for the July 16, 2020 meeting.

The video presents our arguments in an organized presentation in addition to the 3 minute sound bite format that we will likely be allowed at the council meeting itself.

We ask that all council members watch this video prior to the meeting so as to save time at the meeting itself.

Thank you so much. Regards,

https://youtu.be/zKOlF61JLr8

Gary W. Vick
(720) 548-0962 (cell)

Glenwood Springs Office
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Glenwood Springs, Colorado 81601
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GARFIELD & HECHT, P.C.

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Since 1975

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Christopher D. Bryan
cbryan@garfieldhecht.com

July 6, 2020

Trent Hyatt, Senior Planner
City of Glenwood Springs
101 West 8th Street
Glenwood Springs, Colorado 81601
E-mail: trent.hyatt@cogs.us

Re: Proposed Riparian Setback Code Amendment

Mr. Hyatt:

As you know, our law firm represents a group of Glenwood Springs residents known as the Friends of the Roaring Fork ("Friends"). Friends has engaged us to review and analyze the changes being proposed to Section 070.040.020(d)(24) of the Glenwood Springs Municipal Code ("Code") set forth in Exhibit A (hereinafter, the "Amendment"),[1] which reflects the changes recommended by the Planning and Zoning Commission ("Commission") at its February 25, 2020 meeting. City Council will be considering the Amendment along with changes to Section 070.010.070(b)(3), which are related to the Amendment on July 16, 2020. While the Amendment, as revised by the Commission, addresses some of Friends' concerns with the original version of the Amendment, there is still room for improvement of the language of the Amendment to avoid unintended interpretations and consequences of the Amendment if it is ultimately adopted. Moreover, Friends still believes that the Amendment is, in the first instance, unnecessary and unjustified because it does not satisfy the Code amendment approval criteria set forth in the Code. Friends therefore asks that City Council direct staff to rework the Amendment with stakeholder input, tabled it indefinitely, or deny the Amendment altogether.

The Code identifies five criteria that must be met in order to amend a section of the Code. *See* Code Section 070.060.040(c)(3)(d)(3). Those criteria include (i) consistency with the City's Comprehensive Plan and other City policies; (ii) no conflict with other provisions of the Code; (iii) necessity to address a demonstrated community need; (iv) necessity to respond to substantial changes in conditions and/or policy; and (v) consistency with the general purpose and intent of the Code. The Amendment, at a minimum, does not satisfy the third or fourth approval criteria,

[1] The text of the proposed Amendment in Exhibit A is based on the language included in the staff report for the February 25, 2020, Commission meeting, as revised to include the changes recommended by the Commission. Neither the ordinance to be presented to Council regarding the Amendment nor the staff report regarding the same have been provided as of the date of this letter. Friends may therefore supplement this letter to respond to new information presented in the forthcoming staff report that is anticipated for the July 16th Council meeting.

meaning there is no legal basis for the Amendment and that the Amendment is invalid, arbitrary, and capricious.

As an initial matter, there is no demonstrated community need for the Amendment. Prior staff reports cited other jurisdictions' riparian setback requirements to show that there is a need in Glenwood Springs for a larger and more restrictive setback. But what is happening in other communities cannot be the basis for finding that there is a need in *this* community for the Amendment. And even if it could, none of the municipalities in closest proximity to Glenwood Springs with development along waterways—namely, the Town of Carbondale, the Town of Gypsum, and the Town of New Castle—impose any specific riparian setback at all. With that in mind, the existing riparian setback currently imposed by the Code puts the City well ahead of its neighbors when it comes to riparian protections when no need for anything further in this City has been demonstrated. To claim that other communities' water resource protections demonstrate a need for the Amendment in Glenwood Springs is disingenuous at best. It doesn't make sense.

The fact that there has been no evidence or information presented to date to indicate that the existing 30-foot setback is insufficient further supports the lack of community need for the Amendment. While the Roaring Fork Conservancy ("RFC") states in the written materials submitted to the Commission that a more aggressive setback is desirable, nowhere does the RFC claim that the existing setback has caused degradation to or impairment of the City's waterways. Indeed, the riparian health study discussed by RFC and the River Commission during the February 25th hearing concerned a water body in Steamboat Springs, not here, and there was no mention during that discussion of whether or to what extent setbacks impacted water quality. It is also important to highlight that the River Commission did not identify the City's existing 30-foot riparian setback as the cause of the algae bloom and increased river temperatures that allegedly ignited interest in this topic several years ago. Moreover, the informal, qualitative Glenwood Springs Riparian Assessment[2] that was included with the February 25th staff report was not overly critical of the condition of the majority of riparian areas in Glenwood Springs, which comports with the former River Commission chairman's comment at a prior public meeting that "the Roaring Fork is actually in pretty good shape." Note too that the Assessment identifies public education and implementation of best practices as ways to improve riparian health, not increasing the size of and restrictions within the riparian setback. Finally, the City's existing riparian setback is within the riparian buffer widths recommended for erosion control, water quality, and aquatic habitat protection in the 2005 Haws and Smith study that was submitted with the Commission staff report. As such, the Amendment is unnecessary in the first instance.

Second, the Amendment is not necessary to respond to substantial changes in conditions and/or policy. Again, the justification cited in prior staff reports for compliance with this criterion is misguided. They state (with little explanation) that the Amendment would "help in the City's future compliance with EPA Municipal Separate Storm Sewer System ("MS4") permit requirements if/when the City's population exceeds 10,000." Seeing as the census has not yet been completed and the City has not yet changed—and, indeed, may not change—its policies or

[2] This Assessment only evaluated the Roaring Fork and Colorado Rivers. But the proposed Amendment, as written, would apply to properties along other waterways in the City. No information has been provided regarding the state of those waterways.

practices as a result of any new MS4 requirements, there is no change to which the Amendment provides a necessary response.

Moreover, it is unclear how changes in setbacks would affect the City's MS4 polices or future compliance because the MS4 program deals with point source discharges—i.e., the culverts and pipes that release untreated storm water runoff directly in into waterways—not disbursed, non-point source runoff. The amount of storm water runoff that enters the City's waterways through riparian habitat is a small fraction of the storm water collected and discharged by the City through its storm water collection system. Even assuming an increased riparian setback would improve the quality of that comparatively minimal, non-point source runoff, it would have no impact on the quality of the water discharged from the City's storm drains, which is the focus of the MS4 program. The Amendment therefore has no rational relation to and is not justified by the City's non-existent and uncertain storm water mitigation policies and practices. Arguing otherwise is without merit.

Aside from the fact that the Amendment does not meet the Code amendment approval criteria, Friends is concerned about the substance of the Amendment. While the existing Code places some limits on the extent to which owners may utilize the setback area, they are not as restrictive as those proposed in the Amendment. For one, the existing language of Section 070.040.020(d)(24) does not prohibit vegetation removal or place any limits on the creation of private pathways for river access. In contrast, the Amendment only allows an owner to remove vegetation from up to 50% of the setback area for the purpose of private access to and enjoyment of the waterway. That 50% allowance may be enough for some owners, but it may be insufficient for other waterfront owners whose lots are small, overgrown and heavily vegetated.

Additionally, if an owner wants to utilize more than 50% of the setback area, build stairs in any portion of the setback area to safely access to the river, or simply trim vegetation or mow, he or she will be required to show, by "clear and convincing evidence" that the proposed activity "does not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland." To make such a showing, the owner would likely need to hire an engineer because how else does one show that trimming a bush or grass will not harm the riparian environment? The fact that trimming and step construction are referred to as "proposed activities" also suggests that such activities must be proposed to and approved by City Staff before they may occur, which further complicates an owner's ability to conduct what should be simple maintenance activities. The no-degradation requirement for basic property maintenance or crucial fire mitigation work is unduly burdensome and adds to the cost of compliance with an already unnecessary regulation. It is unfair and unrealistic to place such a burden on landowners who are doing no harm to the river or riparian habitat.

Staff has indicated to Friends that they will issue a Letter of Interpretation along with the Amendment. This interpretation has not been reviewed by the Commission or Friends and is just as important as the Amendment language itself. In addition, such a Letter of Interpretation can be changed at any time without Commission or Council approval. More important, absent clarification, Council may end up approving a code change understanding that it means one thing

only to have staff interpret and enforce it differently. If staff feels that a Letter of Interpretation is necessary, why not just clarify the language in the Amendment instead?

While Friends appreciates the change made by the Commission to allow clearing of up to 50% of the setback area, the fact remains that the Amendment effectively sterilizes 50% of the 35-foot setback area of each parcel adjacent to a waterway. That area is naturally the area owners would seek to use to realize the benefits of living near the water. If they or subsequent owners are unable to do so because of the Amendment, property values are sure to go down. Current owners did not sign up for the heightened restrictions proposed in the Amendment when they purchased their properties. What's worse, those restrictions may reduce the pool of future buyers for their properties.

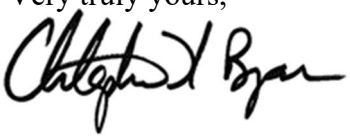
General and conclusory statements aside, the City has failed to quantify what benefits, if any, will be realized if the Amendment is passed. In contrast, this letter clearly identifies the harms that will ensue. While the Amendment may be well-intentioned, those intentions are not a substitute for need or legal justification. They are also overshadowed by the negative impacts the Amendment will have on numerous landowners even though those owners are not harming the river or the riparian environment to any demonstrated, meaningful, or measurable degree. Friends does not dispute the need for all riparian landowners—including and especially the City—to be good stewards of the City's waterways; they simply contend that the existing Code provides sufficient safeguards and that the prohibitions proposed in the Amendment are unnecessary and unjustified.

It is clear from the content of the Amendment that it was drafted without broad stakeholder input. That may not have been the case had the Amendment had a more collaborative beginning. Nonetheless, Friends remains ready and willing to work with City staff to develop a more balanced approach to the setback issue that takes all stakeholders' input into account or to simply revise the Amendment to avoid unintended consequences. Indeed, both before and after the February 25th Commission hearing, Friends and their attorneys have attempted to work with staff to clarify the language of the Amendment to address the concerns set forth above. Those efforts were met with a resounding "no" because, apparently, staff cannot make any changes to the Amendment without specific direction from the Commission or Council. This is despite the fact that staff authored the Amendment originally and has made changes to some sections of the Amendment between Commission reviews on their own initiative. To give Council a sense of the reasonable changes Friends has requested, enclosed as Exhibit B is one of several redlined versions of the Amendment previously supplied to staff, as well as some proposed changes to Section 070.010.070(b)(3) . Exhibit B would go a long way towards clarifying the requirements and intent of the Amendment without altering its substance in any material way. If Council is inclined to approve the Amendment, Friends urges City Council to do so subject to the changes suggested by Friends in Exhibit B.

Ordinances enacted by municipalities such as the City must not be unreasonable, arbitrary, or capricious. Approving the Amendment, which does not satisfy even the City's own criteria for approving such amendments, renders it a textbook example of an arbitrary and

capricious legislative act. The unreasonableness of the Amendment is exacerbated by the fact that it restricts the existing and future use of private and public property unnecessarily, to the detriment of current and future owners, and with little public benefit, if any, beyond what is already provided by the existing Code. None of the purported benefits have been quantified or adequately demonstrated. Indeed, seeing as the public would receive the purported benefit from the Amendment while private landowners are forced to bear the cost in the form of reduced property values and unusable property, the City may be exposed to takings claims if the Amendment passes. Friends therefore respectfully requests that City Council deny the Amendment. Thank you.

Very truly yours,



Christopher D. Bryan

cc: City Attorney (kjh@mountainlawfirm.com)

EXHIBIT A

Proposed amendment to Code Section 070.040.020(d)(24)

070.040.020(d) Development in Waterways and Areas of Special Flood Hazard

(24) Conservation of Waterways

It is the purpose of this Subsection 070.040.020(d)(24) to conserve and promote the health of the City's riparian ecosystems, water quality and protect human drinking water by maintaining a functional natural buffer adjacent to waterways.

a. **Applicability:** All new improvements, buildings, additions, structures, excavations, grading, dumping, clearing of native vegetation, or backfill shall be subject to the requirements of 070.040.020(d)(24)b *Standards* unless the applicant demonstrates to the City Engineer and the Director by clear and convincing evidence that one or more of the following conditions is met:
   1. The removal of native vegetation, not to exceed 50 percent of the setback area defined below, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be interpreted to allow for permanent structures of any kind within said area.
   2. The construction of bridges, public utilities, public paths for non-motorized use, public open space areas and boat ramps, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices that do not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.
   3. Removal of vegetation listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm in compliance with applicable regulations. Vegetation shall be replaced with appropriate riparian plant species to limit erosion.
   4. Applicant demonstrates one or more of the following:
      i. The area does not contain significant riparian plant species or functions;
      ii. The area is impacted by previous earth disturbing activities; or
      iii. The proposed improvement (including but not limited to the trimming of vegetation, construction of access path or steps, or hot springs pools) does not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

b. **Standards**
   1. No improvement, building, structure, excavation, grading, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within thirty-five feet of the ordinary high-water mark (as defined by the US Army Corp of Engineers), measured horizontally, of any river or live perennial stream.
   2. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted within said thirty-five-foot setback area.

EXHIBIT B

070.040.020(d) Development in Waterways and Areas of Special Flood Hazard

(24) Conservation of Waterways

It is the purpose of this Subsection 070.040.020(d)(24) to conserve and promote the health of the City's riparian ecosystems, water quality and protect human drinking water by maintaining a functional natural buffer adjacent to waterways.

a. Applicability. All new improvements, buildings, additions, structures, excavations, grading, dumping, clearing of native vegetation, or backfill shall be subject to the requirements of 070.040.020(d)(24)b *Standards* unless, upon request from the Director, the applicant demonstrates to the City Engineer and the Director by ~~clear and convincing~~ objectively reasonable evidence that one or more of the ~~following~~ conditions listed below is met.~~:~~ For the avoidance of doubt, no approval, permit, engineering study, or other study will be required with respect to 070.040.020(d)(24)a.1 or 070.040.020(d)(24)a.2.

1. The removal of native vegetation, not to exceed 50 percent of the setback area defined below, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be interpreted to allow for permanent structures of any kind within said area other than access paths or steps needed to safely access to the setback area.
2. The trimming (including mowing) of native vegetation for view, fire mitigation, maintenance or repair activities, or other life/safety purposes so long as the vegetation is not removed in its entirety from the ground and that the heath and integrity of the vegetation root system is not materially impacted as a result of the trimming.
3. The construction of bridges, public utilities, public paths for non-motorized use, public open space areas and boat ramps, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices that do not result in a material increase~~d~~ in water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.
4. Removal of vegetation listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm in compliance with applicable regulations. Vegetation shall be replaced with appropriate riparian plant species to limit erosion.
5. Applicant demonstrates one or more of the following:
   i. The area does not contain significant riparian plant species or functions;
   ii. The area is impacted by previous earth disturbing activities; or
   iii. ~~The~~ Any proposed improvement (including but not limited to the ~~trimming of vegetation,~~ construction of ~~access paths or steps or~~ hot springs pools) does not result in a material increase~~d~~ in water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

b. **Standards**

1. No improvement, building, structure, excavation, grading, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within thirty-five feet of the ordinary high-water mark (as defined by the US Army Corp of Engineers), measured horizontally, of any river or live perennial stream.
2. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted within said thirty-five-foot setback area.

Section 070.010.070(b)(3)b

Temporary disturbance to maintain, make minor repairs of, or replace pursuant to Section 070.010.070(d)(3) a nonconforming structure within or immediately adjacent to the riparian setback required by 070.040.020(d)(24) shall be limited to an area up to fifteen feet around each side of the structure and vegetation shall be ~~returned~~ replaced or replanted ~~to the previous vegetation or~~ with appropriate plant species.

From:	Teri W
To:	Trent Hyatt
Subject:	re: Riparian Ordinance
Date:	Friday, July 3, 2020 8:46:23 AM

The City of Glenwood Springs
101 West 8th Street
Glenwood Springs, CO 81601

Mr. Trent Hyatt,

I am writing in regards to the Riparian Ordinance that will be voted on July 6th. I own property along the river at 2906 Hager Lane. I purposely bought this property because of its location and proximity to the river. One of the magical things about Glenwood is being able to enjoy this beautiful river. I also paid a premium to own such property. With that being said, I am a steward of the river and care for the health of it. We have had numerous discussions with council and I believe have come up with a compromise that will benefit the property owners, city and the health of the river.

I am writing to make sure all that was discussed in the previous meetings will be presented accurately. For those of us that live along the river, we cherish the fact that we can enjoy it every day. I know the city of Glenwood feels the same as they have improved Two Rivers Park and also make improvements of the shoreline of the 27st bridge area. In all fairness the city should be addressing its reconstruction of riverfront property as well.

Thank you for your time,

Teresa Weinstein
2906 Hager Lane
Glenwood Springs, CO 81601

From:	Michael Palmer
To:	Trent Hyatt
Subject:	FW: Submission for Packet for Riparian Ordinance 070.040.020(d)(24) Conservation of Waterways for Roaring Fork River
Date:	Friday, July 3, 2020 2:46:21 PM

Trent, please make the following email a part of the submission for the above referenced Ordinance. Please forward this to ALL parties involved. Thank you,

Honorable Mayor, City Council, and Planning and Zoning Commissioners:

As long time owners and occupants of a home on a 1 acre parcel on the Roaring Fork River we are very concerned with the proposed Ordinance referenced above and it's short term and long term negative and over bearing impacts on the river front property owners. We feel that government intervention and control in and of our property ownership rights is completely unwarranted and unnecessary.
Having been stewards of the river and raised a family of avid kayakers and fly fisherman for over 20 years, we are floating and enjoying the river systems virtually on a daily basis. We have observed few, if any, poor examples of existing river owners destroying or abusing the riparian river belt that the ordinance is claiming it wants to protect. In fact, the largest ownership that exists on the river is the City of Glenwood Springs itself. It is our observation that the City is the biggest contributor to the pollution of the river through the existing storm water drainage system which consists of metal pipes that drain all runoff from the polluted street systems directly into the river system. In fact, one of those pipes lies on our southern lot border and we see both the pollution and erosion impacts firsthand weekly from rain or snow runoff. Additionally, the new Two Rivers Park is an egregious example of riparian destruction to the river bank. It is obviously hypocritical to have the City of Glenwood Springs, as well as the River Conservancy, attempting to dictate laws and ordinances on the riverfront owners when they themselves continue to violate the river system. I think the Ordinance needs to be imposed on the City of Glenwood Springs rather than the river front owners that are acting as responsible stewards of the river. Bottom line, we are not the issue.

We also believe it is very important that the existing rights of the riverfront owners be kept in place and not be inappropriately burdened by local government. Through this proposed Ordinance which restricts the rights of property owners to enjoy their property as they see fit, comes a reduction of quality of life, a reduction of property values and another imposition of government intervention into the rights of the citizens of Glenwood Springs. The river is part of our yard just as the land outside your homes is part of your yard. Government does not have the right to place restrictions on the yards of select groups of its citizens, especially if these citizens are acting responsibly. There are plenty of issues that need to be addressed within the City other than governing and burdening a group of responsible property owners.

If the City should decide to pursue this restrictive ordinance then we the river owners will pursue all channels available both through further legal representation and public outcry.

We respectfully request that this proposed Ordinance be defeated entirely. We trust you will do the right thing and respect your citizens' property rights.

Thank you for your consideration,

Michael & Pamela Palmer
2264 Midland Avenue
Glenwood Springs, CO 80906
C- 719-332-0044
.

City Council of Glenwood Springs Colorado:

Regarding the request for increased restriction on the riparian area of the Roaring Forks River, I oppose any additional restriction to private property rights along the river. However, in the unlikely event it can be proved there are specific restrictions that will demonstratively improve the quality of the river for the general public (not a specific lobbying group or governmental agency), without sacrificing or at least balancing private property rights then some changes to the ordinance may be considered.

This is clearly a government take, not of land ownership, but of land rights and the rights of citizens who are doing no harm to the river. Make no mistake: There is a high bar that has to be met for a government take. There should be a high burden of proof on the city prior to making a change in the ordinance to the satisfaction of the effected property owners.

No adverse condition exists that requires owners of 50 small properties along the 70 mile Roaring Fork River to give up their use of, access to, view of, and enjoyment of their riverfront property. The proposed ordinance is egregious and completely unwarranted.

Do not allow this restriction to pass.

Thank you,

Jon Dickens

7/6/2020

Gary Vick

614 Cowdin Drive
Glenwood Springs, Co
(303) 548-0962 (cell)
garywvick@icloud.com

July 6, 2020

The City of Glenwood Springs
101 West 8th Street
Glenwood Springs, CO 81601
Attention: Mr. Trent Hyatt, Senior Planner, Community Development

RE: Proposed revision to Ordinance 070.040.020(d)(24) Conservation of Waterways

Honorable Mayor and Members of City Council:

Purpose

This letter is written on behalf of myself and a group of Glenwood Springs Residents known as the Friends of the Roaring Fork ("Friends") in regards to proposed changes to Section 070.040.020(d)(24) of the Glenwood Springs Municipal Code ("Code") (the "Amendment").

Friends requests that City Council ("Council") direct city staff ("Staff") to rework the Amendment with stakeholder input or deny it altogether. Friends does not support, and you must reject, the Amendment in its current form. Council should consider an education program in lieu of the Amendment to address any concerns it has regarding riparian habitat.

Summary

The Amendment is an answer to a question no one has asked. It puts severe limitations on the use of our properties in exchange for no quantifiable, demonstrated gain. There is no outcry for this revision by anyone other than those proposing it, and it is not required at this time. It is a bridge too far.

It will result in devaluation of the property values of homeowners along the Roaring Fork River. It seriously impinges on the rights of homeowners, who are causing no harm to the rivers in Glenwood Springs, to use and enjoy their land. It forwards the goals of well intentioned but minority environmental proponents including the Roaring Fork Conservancy ("RFC"), the Glenwood Springs River Commission (the "River Commission") (collectively the "Proponents), and Staff.

The revision has not been subject to even a cursory cost/benefit analysis by the Proponents or Staff who seek to usurp the rights of property owners along our rivers for no demonstrated, meaningful, or quantified gain in order to forward the Proponent's narrow goals.

Proponents and Staff have worked on this Amendment for roughly two years, yet there has been no meaningful outreach on the part of the City, Staff, or Proponents to solicit stakeholder input or work with citizens to craft an ordinance that could garner widespread stakeholder support. Limited changes to the Amendment have been effected by Friends only by appealing directly to the Glenwood Springs Planning and Zoning Commission (the "Commission") who then instructed Staff to make specific changes. On at least one occasion Staff refused to make specific changes as instructed by the Commission. Staff was re-instructed by the Commission at a subsequent meeting, after the urging of Friend's, to incorporate the Commission's requested changes to the Amendment. Only then were they incorporated.

As shown by our legal counsel, the Amendment does not meet the City's threshold for ordinance change and has no legal basis, with or without further changes. It is a legal mine field for the City.

These arguments, and rebuttal to arguments presented by Proponents and Staff, are developed in the *Discussion* section below.

Why we care

As residents living along the Roaring Fork in Glenwood Springs, we are lucky. It's a magical experience. Most of us purchased our properties for the express purpose of viewing, using, accessing, and enjoying the river. We listen to the river every day. We sleep to it every night. We watch it at breakfast and dinner. We fish in our own back yards. We watch families of fox, deer, bear, raccoon, mink, geese, ducks, hawks, and bald eagles feed and play in the river behind our homes. We watch the stars by it, picnic by it, and camp by it. We kayak and raft to our own back door. Many of us share this environment with others who have no path to access the fisherman's easement other than by crossing our lands. Many of us welcome boaters to pull up and have lunch. We live on the river responsibly, caring for the environment that we live in. We are stewards of the river, literally a stone's throw from City Hall.

Indeed we are lucky. But its not like we won the lottery or someone gave it to us. Make no mistake: most of us paid a substantial premium for our properties so that we could use, view, access, enjoy, and share the river.

If you think about it, we use our backyards much as you do. Only there is no proposed Amendment that could sterilize and make unusable and unmaintainable up to 50% (it started out at 90% if you can believe that) of

your backyard's most attractive features without meaningful stakeholder input and without the City demonstrating any quantifiable need for, or benefit from, this sterilization. You are not facing an ordinance that would limit your ability to use and enjoy your property while simultaneously negatively impacting its value.

That's why we care.

Requested Stakeholder Input

As established herein, the Amendment is not required and is unnecessary. Friends strictly requests that the setback not be increased from 35 feet to a higher higher value and that homeowners retain control of the habitat within at least 50% of the setback area. Some Friends feel we should retain 100% control of the setback area, and this should be considered. Current language may prevent the trimming of existing vegetation in the setback area or the construction of access paths or steps absent a demonstration study of some sort (or an engineering study) and, possibly, a permit. These restrictions to trim vegetation and construct steps and paths are extreme and currently do not exist. We insist that that they be removed. Residents of River Meadows, who must vacate their lots every 6 months, are asking for language clarifying that they will be allowed to continue to occupy lots within the setback area.

Council needs to be able to read the Amendment and understand what they are approving, without extensive explanation, caveat, and interpretation from Staff. Good luck with that when you read the Amendment in its current form. An Interpretation Memorandum, proposed by Staff, is insufficient to meet these objectives. Such a Memorandum can be changed in the future without Council's approval. There can be no question as to what you are voting on. Language in the Amendment must be clear, absent an Interpretation Memorandum.

Based on reasons herein, Council should seriously consider denying the Amendment altogether and instructing staff to propose a comprehensive education program for Council's approval. The RFC states that education is key to achieving objectives, but no such program has been proposed. Such a program has been used successfully in Vail where the city subsidizes the design of riparian landscaping (not the landscaping itself, just the design) for homeowners that wish to replant habitat on their properties. Friends is more than happy to work with and learn from the Proponents. But we will not be dictated by them through ordinances which are not needed, for which no need has been demonstrated, and for which no outreach has occurred.

DISCUSSION OF CLAIMS MADE BY PROPONENTS

Proponents have made numerous claims as to why the Amendment is needed. The underlying premise is that there is something wrong with the river system in Glenwood Springs that the Amendment will rectify. This is just not the case. Claims by Proponents are shown and rebutted below.

1. **Proponents want to prevent destruction of habitat within Glenwood Springs.**

   So do we. There are no better stewards of the river than those who live on it. We have more vested interest in keeping the river healthy and clean than most. There is no meaningful destruction of riparian habitat by homeowners within the city limits of Glenwood Springs.

   Proponents fear that unscrupulous developers will raze wide swaths of riparian habitat as they have done upstream from Glenwood Springs, but there is virtually no undeveloped riverfront left in Glenwood. Only the City of late seems to destroy riparian habitat: the recent 27th street bridge project, an egregious cut all the way down to the river under power lines, and the recent redevelopment of Two Rivers Park.

   Look up Glenwood Springs on Google Earth and observe what the shoreline at Two river Park looked like before redevelopment (the old satellite photos are still there). Do it right now. Tomorrow, walk down the new trail by the Colorado and see how much of the original riparian habitat is left. I'll save you a trip: most of it is gone. As stewards of the river, Friends is outraged at this and bristles at the proposed legislation against homeowners and our lands. Friends are stewards of the river while the City acts like Attila the Hun.

2. **Proponents wish to prevent redevelopment of existing homes from destroying riparian habitat in the future, as occurred on a property just south of the City limits on the east bank of the Roaring Fork.**

   So do we. I walked by the property in question. No one condones what was done there. Vegetation was cut from the road to the river's edge. It was egregious. But here's the rub: That property owner was likely in violation of the Garfield County setback ordinance, and would certainly be in violation of Glenwood Springs' *existing* setback ordinance if the existing Glenwood ordinance applied at that site.

   So, what did the Proponents do? Did they urge Garfield County to enforce their Ordinance? Not effectively, if at all. Rather, they decided

to go after homeowners along the river in Glenwood Springs who have done nothing wrong. They chose to seek passage of additional laws rather than encourage enforcement of existing laws. The RFC touts this crusade in their latest annual report. It's good for business. It helps donations more to unnecessarily impact an entire City than it does to discipline a single egregious property owner, even though homeowners in that City are doing nothing wrong. Such is the RFC.

Glenwood's existing setback ordinance is sufficient to protect against activities of this sort. The Amendment adds nothing to the City's ability to enforce against such actions.

3. **Proponents tout the benefits of a healthy riparian ecosystem and infer that the Amendment is needed to keep our ecosystem healthy.**

   Proponents were featured in a recent virtual "Lunch and Learn" hosted by the Mayor in which the benefits of a healthy riparian ecosystem were discussed. Friends was not offered a chance to present on this or a subsequent video but we agree that a healthy Riparian ecosystem is vital for maintenance of our river systems. We disagree that the Amendment is required to achieve this. Such an ecosystem already exists. Proponents have failed to show that a healthy riparian ecosystem does not exist in Glenwood Springs.

   The Roaring Fork River is roughly 70 miles long. Only the last 4 miles pass through Glenwood Springs. This does not include tributaries such as the Frying Pan and Crystal that increase this effective drainage length. Any problems with the river have much more to do with the first 66 miles upstream from Glenwood than they do with the last 4 miles through Glenwood.

   At a public meeting held by Friends on September 19, 2019 and attended by members of the River Commission (our outreach, not theirs), the former chairman of the River Commission stated "the Roaring Fork is actually in pretty good shape."

   Proponents have not identified meaningful problems with the river system in Glenwood that the Amendment would rectify.

4. **Proponents observe that the temperature of the Roaring Fork is rising and that algae plumes occur from time to time.**

   True. The Roaring Fork is on a state watch list for temperatures. But just barely. It and remains a Gold Medal stream and wildlife flourishes on it. I should know, I live on it. The problem is that the

Amendment will do nothing to lower water temperatures and prevent algae plumes in the river. Whatever is happening with water temps is dominated by the first 66 miles of the drainage, not the last 4. The snow is warmer, there is less of it, and the temperature of the planet is warming. Proponents have not demonstrated that the Amendment would materially address any of that.

5. **The secondary City water intake on the Roaring Fork needs to be protected (the primary is at No Name). Proponents infer the Amendment is needed to protect the intake and reduce costs if the secondary source is used.**

   This naked claim is not substantiated in any way. According to the City's most recent water reports, which I have read, the City's water supplies currently meet applicable specification, as does its drinking water. There are no notes regarding any inadequacy of the intake on the Roaring Fork. The Amendment will not fix a problem that does not exist, or fix an unidentified problem in the future. Unsupported, untrue arguments cannot be used as justification for the Amendment.

6. **The Proposed Ordinance is necessary to insure that the City meets more restrictive EPA storm water runoff provisions that may go into place when our population exceeds 10,000.**

   This is used as legal justification for the Amendment. It is a completely false argument. The Amendment will not materially affect the City's ability to meet any revised EPA requirements that may, or may not, go into effect. The Amendment has no legal basis as a result.

   Riparian habitat filters storm water runoff only when the storm water actually passes through it. Glenwood Springs encompasses 5.7 square miles and roughly 95%[1] of this area is drained by a sewer system that collects water from yards, driveways, roofs, parking lots, along with oil, debris, trash, and other unmentionables from the bowels of the City, deposits this effluent into streets, then sewers, then culverts, ditches and pipes, and finally unceremoniously dumps it – without any treatment or riparian filtration of any kind - directly into the river.

   Members of Council, unless you live on the river as Friends do, you pollute the river to a *much* greater extent than do any of us. It is completely disingenuous to state that further regulating 5% of the

[1] The 95% figure is arrived at by assuming that the riparian habitat directly filters a couple of hundred feet on either side of the river. It's less than this in my neighborhood, more in others, but generally when you get a couple of hundred feet from the river you are in an area drained by the City sewer system. It's a simple area calculation after that.

runoff that is already being filtered will have a meaningful impact on waste water quality when the City is ignoring 95% of the water which is completely unfiltered. For Staff and Proponents to use this as a justification for the Amendment is egregious and disingenuous.

7. **Proponents claim that grass is the worst habitat that you can have next to a river.**

The table below was reproduced from a 2005 study provided by the RFC entitled *Riparian Buffer Zones: Functions and Recommended Widths.* It suggests that grasses actually fare pretty well in comparison to other types of vegetation. When grass is compared to trees and shrubs against 5 benefits, grass has the best sediment trapping, the best filtration of pesticides, and the best flood conveyance. Grass ranks second with respect to soluble pesticides and stream bank erosion. In no case does grass come in last at anything. See below:

Function	Grass	Shrubs	Trees
Sediment trapping	High	Medium	Low
Filtration of Sediment born Nutrients, Microbe and Pesticides	High	Low	Low
Soluble forms of Nutrients and Pesticides	Medium	Low	Medium
Flood Conveyance	High	Low	Low
Reduction of Stream Bank Erosion	Medium	High	High

It is worth noting that the largest strip of grass recently planted along the river can be found at Two Rivers Park, courtesy of the City. Apparently even the City believes that grasses are not the worst thing you can plant along the river.

8. **Proponents state that Glenwood Springs is heavily dependent on tourism and river use and infer that the Amendment is needed to preserve this and improve aesthetics.**

On any given weekend hundreds of rafts and kayaks pass Friends' properties. Not one has ever, and I mean ever, said anything negative about the aesthetics of the river or my property. Other Friends report

similar experiences. To the contrary, several times a day people will offer "beautiful yard", or "I love your place." Most come by looking at my property and our Easter Island wood carving, not at the old sewage treatment plant across the river that is a riparian dream. Aesthetics are in the eye of the beholder. Friends do our part.

9. **Environmental groups support the Amendment.**

   Well, they would, wouldn't they? It's not their property values and property rights, and their use of the river that flows over their lands, that are being trifling with. It's ours. What are they getting from the Amendment? Nothing, actually. Homeowners along the river are doing nothing wrong, and the Amendment will not fix any of the Proponent's purported ills with the River.

   In a recent letter to the Commission, Trout Unlimited said that the Roaring Fork was in "really sorry shape" (or words to that effect). That was right before the author said that the Roaring Fork was one of the best fishing streams in the country (or words to that effect). So, which is it, exactly? Sorry, or the best? The author floats the river a few times a year and writes a letter. Members of Friends can be found on the river every week, some every day. We live on the river, protect it, and paid premiums to do so. I'll put our stewardship and our river premiums up against Trout Unlimited's stewardship and their 50 cent stamp any day of the week. They do not write our code.

10. **Proponents state that a healthy riparian habitat is necessary to support the extensive fishing industry in Glenwood Springs and infer that the Amendment is required to maintain it.**

    Fishing and tourism are industries we all applaud in Glenwood. Proponents, however, have not quantified the extent to which the Amendment will increase these industries, or the extent to which failing to pass the Amendment will degrade them. To the contrary, there is no degradation to the fishing industry caused by homeowners along the river. We are generally the best stewards the river could ever have. The statement is completely general and not analytically supported. It's nothing more than distractive arm waiving.

11. **Proponents state that a healthy riparian habitat reduces erosion.**

    Indeed it does, and most private property owners along the River have sought to mitigate erosion on their properties when and where it has occurred. Some erosion is natural and to be expected. Examination of the river from Google Earth, Red Mountain, or by floating the river reveals some areas, primarily on City lands, where

erosion has occurred. But these do not require the broad-brush Amendment to correct. Rather, specific actions can be taken in specific areas, such as the confluence at Three Mile Creek. The NFS does this by temporarily closing areas on a routine basis to allow for regrowth and erosion control. The River Commission is terrific at projects like that. They are really bad at writing ordinance code.

12. **Proponents have not yet, but I am sure they will, rail against the Amendment's provision sterilizing 50% of the habitat in the setback versus the 90% that they originally proposed.**

Several arguments here. First, residents have 100% control right now and will not go out and destroy 50% of their riparian habitat. They have not done so for decades, they won't now. A few people may want to enhance their access, view, use, and enjoyment of the river that they paid extra to be along side of, especially those buying properties that are completely overgrown. To deny them this right makes their property less valuable, while making properties like mine (which has a small clearing by the river) much more valuable. *How dare you transfer wealth from my neighbor to me*. It may be okay with some members of Council, but it is not okay with Friends. It's unfair. Raise you hand on this and you will loose your next election, guaranteed.

Second, the City lists only about 50 odd private residences along the Roaring Fork. If everyone cleared, say, an additional 30 foot strip by the river - which they won't - this would be an increase in cleared riverfront of 30 X 50 = 1,500 feet, or about ¼ of a mile. There are 8 miles of riverbank (4 miles through town, a bank on each side) along the Roaring Fork in Glenwood Springs, or about 42,240 feet. If 1,500 feet were cleared (which it won't be), that would leave 96½ % of the remaining riverbank sterilized. Do the math. That is enough for even the most overzealous environmentalists, even the Proponents.

The only place where 1,500 feet of riparian habitat has recently been destroyed is at Two River's Park, courtesy of the City.

As an aside, and to demonstrate how self centered and unreasonable the Proponents have been throughout this process, the original Amendment proposed to sterilize 90% of our backyards in the setback area, potentially blocking our view, use, access, and enjoyment of the river? *Excuse me?* How about we sterilize 90% of *your* backyard's best features for no demonstrated gain? Oh, you are not doing anything wrong to warrant that? Well, too bad. You might. How about I paint over 9 of the 10 windows in Counsel Chambers to obstruct your outside view? Or 90% of the windows of your house? Which one would you like to remain clear? On a 75 foot lot, leaving us

10% would not even allow enough area for more than two people to social distance. I'm sorry, but who do these people think they are?

Third, today Friends control 100% of our properties. Not 10%, not 50%, but 100%. Our legal counsel have assured us that the Amendment is without legal basis and as such the City is unwarranted in restricting one square inch of our riparian habitat. For Friends to even consider allowing the City to restrict 50% is a blessing you may not fully appreciate. But we are environmentalists too. And fifty percent has a ring to it – one for us, one for you. Not that we owe you one, and not that you can take it. So let's be perfectly, crystal clear: It's a gift. We will not tolerate restriction of one square inch more than 50%. Don't even think about it.

13. **Proponents say that other municipalities are adopting similar ordinances, so Glenwood must do so as well.**

This is simply untrue. Even if it were, such a childish argument cannot be used to justify the Amendment.

The RFC performed a spot comparison of ordinances found in nearby municipalities and counties. Results are taken from their documents and are shown below.

REGION	SETBACK	DETAILS
City of Aspen	100ft/100 year floodplain	Development is "subject to heightened review." (Ord. 26.435.040)
Town of Basalt	50ft	Prohibits development and cutting of riparian and wetland vegetation. (Ord. 16-464a)
Town of Carbondale	Unspecific	If new development is proposed adjacent to any river, all practical means should be used to preserve natural grade, drainage patterns, soil and vegetation. (Ord. 4-2007)
Eagle County	75ft/100 year floodplain	No development within 75ft of high water mark or 100 year floodplain (whichever is greater).
Garfield County	35ft	Prohibits removal of any existing native vegetation or conducting any activity which will cause any loss of riparian area unless it involves the approved removal of noxious weeds, nonnative species, or dead or diseased trees.
Pitkin County	100ft/100 year floodplain	100 foot buffer for all activity and development. Setback may be reduced to a minimum of 50 feet if reduction does not result in water quality degradation, stream bank erosion and/or a reduction in the quality of riparian or wetland habitat.

The RFC comparison did not include municipalities downstream from Glenwood Springs from whom no outcry regarding water quality has been heard. The RFC's inclusion of county ordinances for comparison is not appropriate insofar as municipalities generally have much greater density and diversity of land use than do counties which can

be much more rural, are more agricultural in nature, and require different land use criteria. One has only to compare a drive down Midland Avenue to a drive to Grand Junction to see this. Some individual landowners in nearby counties can easily have more river frontage than the 50 stakeholders addressed herein combined. Moreover, being agricultural in nature, widespread use of fertilizers and pesticides coupled with a lack of drainage systems dictate larger setbacks than are appropriate in urban settings. Counties need different setbacks than do municipalities, its just that simple.

Accordingly, I prepared a comparison of ordinances in neighboring municipalities in the table below. The comparison does not include counties. I spoke with planners in each municipality listed, all of whom indicated that their municipalities have some jurisdiction along or near waterways. Though my comparison does not capture every riverfront municipality in the state, it captures a much better picture of where Glenwood stands in comparison to its neighbors than does the RFC comparison, which appears to have cheery picked data.

Study the comparison below. Six of the 10 municipalities reviewed have no riparian setbacks of any kind, and only one, Basalt, applied vegetation limitations retroactively to existing homeowners. Those municipalities without setbacks see no need for them. Indeed, there is no demonstrated need for revised setbacks in Glenwood Springs.

The conclusion is that Glenwood Springs does not lag behind the majority of its neighboring municipalities in the protection of water resources. If enacted, the Amendment would be one of the most restrictive ordinances with respect to existing homeowners and their lands.

Even if none of this were the case, there is no need to "keep up with the Jones" simply to "keep up with the Jones". Such childish logic cannot be used to justify the Amendment. Does it work on you when you kids ask for a new bike? Friends' counsel have shown that the Amendment has no legal basis because this requirement, and other requirements for Ordinance Change, have not been met.

Municipality	Setback	Vegetation Restriction Retroactive to existing Properties	Summary of Ordinance
Aspen (from RFC)	100'/100 yr Flood-plain	No	Development subject to heightened review
Snowmass Village	25' from Riparian edge	No	New development only. Recreational access sites allowed. Vegetation loss to be minimized, replacement vegetation ratio may be less than 1:1 to facilitate a view of, and use of, the creek.
Basalt (from RFC)	50'	**Yes**	Apparently very restrictive, prohibits development and any cutting of riparian and wetland vegetation.
Carbondale	None	No	Developments shall minimize impacts to…wetlands, and…stands of trees. Such resources… shall be preserved where practicable…development shall be designed to preserve existing waterways…primary vegetation (trees)…and other features.
Vail	30' or 50' from stream CL	No	Decks may extend 10' into setback, no restrictions on vegetation. City historically has paid 75% of regrowth design costs for citizens, is considering more restrictive code *after outreach and stakeholder input* but staff expects "very serious pushback" from citizens.
Gypsum	None	No	Community Development Director states that nothing is driving the need for an ordinance. City adopted Eagle River Watershed Plan but specifically, and significantly, did not adopt the setbacks associated with the plan.
New Castle	None	No	Planning Department stated no specific restrictions exist
Silt	None	No	Nothing found in review of code, messages left for city staff
Rifle	None	No	Nothing found in review of code, messages left for city staff
Parachute	None	No	…subdivisions… shall preserve, insofar as possible, … drainage, …, lakes, rivers, streams and trees. Significant vegetation, including dominant or mature trees & shrubs shall be retained where possible.
Glenwood (existing)	30' from HWM ~ 8127 cfs	No	Entire Ordinance: No improvement, building, structure, excavation, dumping or backfill shall be placed, built, undertaken or approved within a thirty-foot setback area horizontally from the high water mark of any river or live stream, except for bridges, paths for non-motorized use, irrigation structures or flood control and erosion protection devices.
Glenwood (proposed)	50' from OHWM per USGS	**Yes**	See proposed ordinance and Proposed Changes in letter to Trent Hyatt 8-31-19

14. **Proponents have stated that the Amendment will increase property values along the river.**

I have so successfully rebutted this argument at Commission meetings that Proponents now seldom even bring it up. It is generally only the Mayor and Mayor Pro Tem that continue to espouse this result. So, for their benefit, I summarize my rebuttal below.[2]

Proponents based their statements largely on the results of a statistical study performed in 2006 by Dr. Brian a Mikelbank of Cleveland State University ("CSU") entitled *Hedonic Analysis of Riparian/Wetland Setbacks (the "Study").* It was performed for a fee on behalf of Chagrin River Watershed Partners. Inc. ("CRWP"), a watershed conservancy group similar to the RFC. The study claims that setbacks enhance property values. As a degreed engineer turned CFO that has taken both undergraduate and graduate statistics classes, this claim seemed counterintuitive to me.

I reviewed the study and found it to be seriously flawed. In a nutshell, Dr. Mikelbank compared homes in the Chagrin River Watershed with and without setbacks and found that homes with setbacks sold for higher prices than did homes without setbacks. The problem is that the vast majority of homes with setbacks were ones that were also on the water. Homes not on the water had no setbacks. As a result the waterfront and setback variables could not be separated.

Based on a survey of property owners, Dr. Mikelbank states that the homeowners on the water were generally unaware of the setbacks when they bought their properties, making it impossible for them to have paid more, or less, for homes with, or without setbacks, when they didn't even know that the setbacks existed. The reason that homes with setbacks cost more was because they were on the water. It's that simple. Think of it this way: Many people don't know that Ferraris have tool kits in the trunks. Cars with Ferrari tool kits in the trunk statistically cost more than cars without such kits. But that's not because of the tool kits. They cost more because they are Ferraris. Or because the homes are on the river.

<u>But don't take my word for it</u>. Read two inclusions in your packet: 1) the email exchange I had with Dr. Mikelbank in which I asked him about this and he admits to this flaw. He also talks about it on page 15 of his study. 2) A letter from Dr. Elizabeth Poulos, professor of statistics at

[2] A complete presentation of my analysis is presented in the materials submitted for the September 16, 2019 Commission meeting, included in Council's packet.

CMC is Summit County, who reviewed the study and concluded the same thing I did. She has more degrees than a thermometer.

Rather than increase our property values, the originally proposed 90% sterilization of our setback area would reduce property values due to the fact that we would loose most of our access, view, use, and enjoyment of the river. 50% sterilization will reduce it as well.

In my case, I paid a 28% premium for access, view, use, and enjoyment of the river. Today, that equates to over $100,000 on my modest property. With 50 odd private homes along the river, most more expensive than mine, the original setback would have cost homeowners over $5 million in reduced property values, perhaps double that. And yet Proponents can compute no offsetting benefits of comparable magnitude. What's worse is that they simply do not care.

15. In a document entitled *Glenwood Springs Riparian Assessment* dated February 26, 2018, Proponents make the following observations that I comment on below.

(Summarized) "Backyard development creep and riparian vegetation clearing are increasing…some (landowners) have cleared … access down the hill slope (that) may disrupt riparian function and if copied…could result in extensive loss of riparian habitat. Potential treatments include curtailing … development … to preserve riparian function while still allowing private landowner(s)…to enjoy riverside amenities. Public education is a key component for addressing these concerns."

A number of points are germane here.

The claims made by the author are anecdotal and not substantiated in the study. There is no pre and post analysis to support a claim that creep is significant or even detrimental. There is no objective science here. It is not clear that the author ever saw the restrictive nature of the original Amendment which made it virtually impossible for landowners to "enjoy riverside amenities". Such enjoyment remains severely limited under in the Amendment in its current form.

The author states that "*public education is a key component in addressing concerns*", but unlike programs in Vail and other river municipalities, no such education has been offered to residents by the City or the Proponents. The fact of the matter is that there is no overt destruction of habitat occurring along the banks of the Roaring Fork. Education should be tried to address any concerns. Friends is willing to learn from the Proponents, but will not be dictated by them.

Members of Council, an environmentalist working for the City of Vail told me that humans have impacted their environment as far back as our Native American ancestors. By default, tradeoffs are made between an ecosystem and a municipality. During discussions regarding the Amendment in 2019 (my outreach, not the City's), the Mayor Pro Tem (who is also the River Commission liaison to Council) told me that "*we must do everything possible to protect the river*." Really? Everything? At *an*y cost? Protect it from what, exactly, when nothing all that bad seems to be occurring? When homeowners are acting as good steward to the river. Pehaps protection from the City is necessary, as the City can destroy more riparian habitat with one project than homeowners ever will.

When I related my conversation with the liaison Council Member to Staff in a 2019 meeting (my outreach, not theirs) a planner literally burst out laughing. The planner stated "*well, in order to do that we might as well just go shoot ourselves right now, because we will always have some level of impact on the river*."

So there you have it. The question is: is the impact bad enough to require cutting edge yet vague, restrictive municipal legislation that has not been shown to be necessary, that reduces property values, that solves no identified problems, that other cities are not adopting, and that has no legal basis for implementation. Friends believes it is not.

Sincerely

/signed by Gary W. Vick/

Gary W. Vick

On behalf of myself and Friends of the Roaring Fork

Gary Vick

614 Cowdin Drive
Glenwood Springs, Co
(303) 548-0962 (cell)
garywvick@icloud.com

September 16, 2019

The City of Glenwood Springs
101 West 8th Street
Glenwood Springs, CO 81601
Attention: Mr. Trent Hyatt, Senior Planner, Community Development

RE: Proposed revision to Ordinance 070.040.020(d)(24) Conservation of Waterways

Honorable Mayor, City Council, and Planning and Zoning Commissioners:

I am grateful for and appreciate your taking the time to review the attached package that is submitted to facilitate your review of the subject revision. I look forward to discussing these items with you at scheduled P&Z and Council meetings.

I respectfully urge you to reject the proposed revision.

The proposed revision puts severe limitations on the use of our property in exchange for no quantifiable, demonstrated gain. There is no outcry for this revision, and it is not required at this time. It will result in potentially severe devaluation of the property values of homeowners along the Roaring Fork River. It ignores the rights of property owners to use and enjoy their land by forwarding the goals of well intentioned but minority environmental groups. The revision has not been subject to even a cursory cost/benefit analysis. The City has not determined how many properties would be made non-compliant by this revision, nor to what extent. There has been no meaningful outreach on the part of the City to solicit stakeholder input or work with citizens to craft an ordinance that can garner stakeholder support. The proposed ordinance does not meet the City's threshold for ordinance change. These arguments are substantiated in the attachments hereto.

Living on a river is magical. It is a truly wonderful experience. As residents living along the Roaring Fork in Glenwood Springs, we are lucky. Most of us purchased our properties for the express purpose of viewing, using, accessing, and enjoying the river. We listen to the river every day. We sleep to it every night. We watch it at breakfast and dinner every day. We fish in it. We watch families of fox, deer, bear, raccoon, mink, geese, ducks, hawks, and bald eagles feed and play in it. We watch the stars by it, picnic by it, and camp by it. We kayak and raft to our own back door. We do so responsibly, caring for the environment that we paid a premium to own.

We use our backyards much as you do, only there is no proposed ordinance revision

that could sterilize and make unusable up to 90% of your backyard's most attractive features without meaningful stakeholder input and without the City demonstrating any quantifiable need for, or quantifiable benefit from, this sterilization. You are not facing an ordinance that would limit your enjoyment and severely impact the value of your property.

I have provided City Staff ("Staff") with alternate language for the ordinance that mitigates many of these concerns (the "Proposed Changes"). I also provided thorough justification for the Proposed Changes. I have asked Staff to provide these documents in your packets.

Staff has reviewed the Proposed Changes and has stated to me that many of the changes are desirable. Perplexingly, none of the Proposed Changes have made it into the text of the code you will review tonight. You are reviewing something that, apparently, Staff might want to modify, that the City has not justified, that negatively impacts stakeholders along the river, and that has not had the benefit of meaningful outreach on the part of the City.

Accordingly, you have no choice other than to deny approval of the ordinance as presented. Alternatively, you could recommend that Council instruct Staff to i) engage stakeholders to solicit their input and concerns, ii) incorporate changes based on such input that Staff feels is appropriate, iii) fully justify the need for the ordinance with a proper cost/benefit analysis, and iv) resubmit the ordinance for approval.

Thank your for your efforts in the review of this material.

Best regards,

/signed by Gary W. Vick/

Gary W. Vick

Attachments

Discussion

The Proposed Ordinance does not appear to meet City Ordinance requirements for an Ordinance Change, section 070.060.040.(c)(3)d.3

ii. **Does not conflict with other provision of this Code or other provisions of the Glenwood Springs Municipal Code**.

Rebuilding of existing non-conforming structures (such as those in the proposed setback area) is contemplated in the Code, but the Proposed Code stipulates that no excavation may occur in the setback area. Such excavation may be required in order to rebuild a nonconforming structure, and could be a conflict in the code.

iii. **Is necessary to address a demonstrated community need**

The staff report states that the City lags behind neighboring communities in the protection of water resources.

This statement is not accurate.

The Roaring Fork Conservancy ("RFC") performed a spot comparison of ordinances found in nearby municipalities and counties. This is shown below.

REGION	SETBACK	DETAILS
City of Aspen	100ft/100 year floodplain	Development is "subject to heightened review." (Ord. 26.435.040)
Town of Basalt	50ft	Prohibits development and cutting of riparian and wetland vegetation. (Ord. 16-464a)
Town of Carbondale	Unspecific	If new development is proposed adjacent to any river, all practical means should be used to preserve natural grade, drainage patterns, soil and vegetation. (Ord. 4-2007)
Eagle County	75ft/100 year floodplain	No development within 75ft of high water mark or 100 year floodplain (whichever is greater).
Garfield County	35ft	Prohibits removal of any existing native vegetation or conducting any activity which will cause any loss of riparian area unless it involves the approved removal of noxious weeds, nonnative species, or dead or diseased trees.
Pitkin County	100ft/100 year floodplain	100 foot buffer for all activity and development. Setback may be reduced to a minimum of 50 feet if reduction does not result in water quality degradation, stream bank erosion and/or a reduction in the quality of riparian or wetland habitat.

The RFC comparison did not include municipalities downstream from Glenwood Springs from whom no outcry regarding water quality has been heard. The RFC's inclusion of county ordinances for comparison is not appropriate insofar as municipalities generally have much greater density

and diversity of land use than do counties which can be much more rural, are more agricultural in nature, and require different land use criteria. One has only to compare a drive down Midland Avenue to a drive to Grand Junction to see this. Some individual landowners in nearby counties, for example, can easily have more river frontage than the 50 stakeholders addressed in this letter combined.

Accordingly, I prepared a more thorough comparison of ordinances in neighboring municipalities in the table below. The comparison concentrates on municipalities and omits counties. Though it does not capture every riverfront municipality in the state, it is what could put together in the time available. It captures a much better picture of where Glenwood stands in comparison to its neighbors than does the RFC comparison.

Six of the 10 municipalities reviewed have no riparian setbacks of any kind, and only one, Basalt, applied vegetation limitations retroactively to existing homeowners. Those municipalities without setbacks see no need for them. There is no demonstrated need for revised setbacks in Glenwood Springs.

Glenwood Springs does not lag behind the majority of its neighboring municipalities in the protection of water sources. There is no need to "keep up with the Jones", and the Proposed Ordinance would be one of the most restrictive to existing homeowners in the comparison.

Municipality	Setback	Vegetation Restriction Retroactive to existing Properties	Summary of Ordinance
Aspen (from RFC)	100'/100 yr Flood-plain	No	Development subject to heightened review
Snowmass Village	25' from Riparian edge	No	New development only. Recreational access sites allowed. Vegetation loss to be minimized, replacement vegetation ratio may be less than 1:1 to facilitate a view of, and use of, the creek.
Basalt (from RFC)	50'	**Yes**	Apparently very restrictive, prohibits development and cutting of riparian and wetland vegetation.
Carbondale	None	No	Developments shall minimize impacts to…wetlands, and…stands of trees. Such resources… shall be preserved where practicable…development shall be designed to preserve existing waterways…primary vegetation (trees)…and other features.
Vail	30' or 50' from stream CL	No	Decks may extend 10' into setback, no restrictions on vegetation. City historically has paid 75% of regrowth design costs for citizens, is considering more restrictive code *after outreach and stakeholder input* but staff expects "very serious pushback" from citizens.
Gypsum	None	No	Community Development Director states that nothing is driving the need for an ordinance. City adopted Eagle River Watershed Plan but specifically, and significantly, did not adopt the setbacks associated with the plan.
New Castle	None	No	Planning Department stated no specific restrictions exist
Silt	None	No	Nothing found in review of code, messages left for city staff
Rifle	None	No	Nothing found in review of code, messages left for city staff
Parachute	None	No	…subdivisions… shall preserve, insofar as possible, … drainage, …, lakes, rivers, streams and trees. Significant vegetation, including dominant or mature trees & shrubs shall be retained where possible.
Glenwood (existing)	30' from HWM ~ 8127 cfs	No	Entire Ordinance: No improvement, building, structure, excavation, dumping or backfill shall be placed, built, undertaken or approved within a thirty-foot setback area horizontally from the high water mark of any river or live stream, except for bridges, paths for non-motorized use, irrigation structures or flood control and erosion protection devices.
Glenwood (proposed)	50' from OHWM per USGS	**Yes**	See proposed ordinance and Proposed Changes in letter to Trent Hyatt 8-31-19

You should instruct Staff to provide a more thorough comparison for review, inclusive of additional parameters and municipalities.

iv. Is necessary to respond to substantial changes in conditions and/or policy

Staff states that adoption of the proposed standards would help the City meet future compliance with EPA Municipal Separate Storm Sewer System (MS4) permit requirements if the population exceeds 10,000 in the 2020 census.

The Proposed Ordinance is premature, as is the perceived need to meet MS4 without knowing the results of the census.

If it is necessary to meet MS4, the Proposed Ordinance does not help to meet compliance in a substantial or meaningful way. The lands covered by the Proposed Ordinance represent less than 1% of the City's land area. The vast majority of the City's storm water disposal is untreated, running through yards, streets, and drainage systems directly into the river system. The vast majority of storm water does not go through any riparian environment of any kind. As such, improvement of the riparian environment, even by a substantial amount, would not materially affect overall storm water quality.

The bulk of the City's inability to comply with the MS4 permit, if any inability exists, has nothing to do with the areas addressed by the Proposed Amendment. The interior of the City, where most storm water is generated, should be the focus of this requirement, not the narrow riparian zones along the river.

To use this MS4 as a justification for the Proposed Ordinance is disingenuous and violates the requirements for ordinance change and its intent.

The Proposed Ordinance lacks balance between cost and benefit.

Many endeavors in life can be successful if one simply copies a similar, previously successful process. I didn't invent that phrase: Compaq, Dell, Microsoft, and other successful business did.

A relevant process to follow here is exemplified by the EPA under previous administrations. Prior to implementing clean water regulations the EPA gathers input from stakeholders from all sides the issue. Environmental groups, whom I generally support, are consulted. Industry, citizens, and municipalities are consulted. *Significantly, no one group writes the rules*. Rather, the EPA balances goals and needs, performs cost/benefit analyses, and writes regulations that generally garner the widest possible support.

Now lets compare this process to the derivation of the Proposed Ordinance that is before you today.

The Proposed Ordinance has been authored by Staff and the River Commission ("RC") with significant input from the RFC and certain members of City Council (collectively, the "Authors"). Staff states that the Proposed Ordinance has been in process for several years. Stakeholders have not been solicited or consulted to any meaningful degree during the drafting of the ordinance and were notified of the Proposed Ordinance through a single mailing approximately two weeks prior to a scheduled vote on the ordinance by the Planning and Zoning Commission ("P&Z"). The ordinance furthers the well intentioned goals of the Authors alone at the expense of reduced property values on the part of stakeholders.

The Authors have not performed any cost/benefit analysis, or even a cursory cost/benefit comparison, to justify the Proposed Ordinance. The Authors have not quantified the benefits of the Proposed Ordinance and have ignored the serious potential impact on the property values of stakeholders.

Significantly, they have not identified the number of properties that will be made non-compliant by the Proposed Ordinance and to what extent they will become non-compliant.

This is no way to run a railroad. Costs and benefits are properly discussed below.

Costs of the Proposed Ordinance

The costs of the Proposed Ordinance will be born by a small number of stakeholders and could be in the million of dollars.

The Proposed Ordinance restricts, or sterilizes, a portion of the land owned by homeowners. It limits a homeowner's use of his property, potentially limits his ability to clear or even trim vegetation so as to be able to see, use, access, and enjoy the river he paid dearly to be able to see, use, access, and enjoy. As proposed, it may limit the ability of a homeowner to rebuild a non-conforming structure or build a new structure at the 50' edge of the setback area due to lack of construction access.

The value of a less restricted property is more than the value of a more restricted property. The only question is to what degree. In my case, I paid a 28% premium for my property to be on the river and have a view of, use of, and access to the river. This premium is born out by square footage tax assessments of my property compared to other properties in my neighborhood.

If a homeowner's view, use, and access to the river are hindered and his ability to develop, redevelop, or rebuild his property is limited by the Proposed Ordinance, then the Proposed Ordinance will cause him to potentially loose the premium associated with his property.

There is no hard data as to how much more homeowners along the Roaring Fork paid to be able to see, use, and access the river, or how much the property value will be reduced by the Proposed Ordinance, but we can get a feel for the order of magnitude of this premium by making some reasonable assumptions. In my case the amount of market value that I will loose under the Proposed Ordinance is on the order of $100,000 ($450,000 market price X (1 – 1/1.28) ~ $100,000).

According to Staff, there are 50 odd private homes along the river that could be affected by the Proposed Ordinance. Though many of these homes are larger and more expensive than mine, if these homes incur a $100,000 devaluation per property, valuation losses of over $5 million could be incurred by the stakeholders.

As established in the next section, there is no corresponding benefit associated with this cost.

The Authors claim that there will be no impact on property valuation. None. They claim that property values may increase under the Proposed Ordinance. These claims defy common sense. The value of a less restricted property is more than the value of a more restricted property.

That said, I had the Chairman of the RC tell me that "C*ommon sense does not apply. We have a study showing that riparian setbacks have no effect on property values and may increase them*." Another member of the RC told me that resale prices would not be affected by the Proposed Ordinance because "*whoever can afford (this) property can afford to get any variance they need*". I had not realized variances were for sale.

The Chairman of the RC was kind enough to forward me a copy of the subject study performed in 2006 by Dr. Brian a Mikelbank of Cleveland State University ("CSU") entitled *Hedonic Analysis of Riparian/Wetland Setbacks.* It was performed on a fee basis on behalf of Chagrin River Watershed Partners. Inc. ("CRWP"), a watershed conservancy group similar to the RFC.

The study performed a regression analysis (a statistical analysis of outcomes with respect to multiple variables) on roughly 4,000 home sales over several years in the CRWP watershed area, roughly 400 of which bordered a stream or river. The overwhelming majority of properties bordering a stream or river had setbacks in place. The regression analysis took into account a multitude of variables that could influence transaction prices. The regression analysis did not show a correlation between setbacks and transaction prices.

As a degreed engineer turned CFO that has taken both graduate and post graduate statistics classes, this seemed a bit counterintuitive to me. As a numbers guy I read the study cover to cover, number for number. On page 15 of the study I found the reason why the regression analysis did not find a correlation between setbacks and transactions prices. Page 15 states (emphasis added):

> "While a homebuyer valuing the environmental protection the setback provides could explain this result, our focus group meeting indicated that this explanation is unlikely in this market.
>
> The consensus opinion expressed at that meeting was that potential homebuyers do not know about setback designations. Further, the consensus was that it was unlikely that realtors would even know whether or not a property had a designated setback. Thus, the focus group predicted that setback designation would not be an influence in the area housing market. That makes the results of the community specific model somewhat suspect".

Two things bothered me after I read the study.

First, the vast majority of homes with setbacks were the same homes that were on the river. The setback variable and the streamside variable were therefore coupled. If you get one, you generally get the other. Because the variables were coupled, the higher prices paid for homes with setbacks might be attributed to their being on a stream, a generally desirable trait. Absent common sense, there is no way to know.[1]

Second, it seems to me that a buyer would not be in a position to pay more, or less, for a property with, or without, a setback if he or she was unaware of the existence of the setback when the real estate transaction was made. It seems to me that statistically measuring if people will pay more, or less, for a property with, or without, a setback is impossible if the parties do not know about the setback and factor the setback into their pricing decision. [2]

The Author's contention that riparian setbacks do not influence real estate transaction prices is based on a study that has fatal flaws. Their conclusion is false. Setbacks will be widely known in Glenwood Springs and required to be disclosed at the time of sale. Setbacks will have a negative impact on transaction prices.

This conclusion is verified by attached emails from two statisticians. One reviewed the study at my request, and the other is Dr. Mickelbank, the author of the study.

---

[1] For an analogy, consider that Ferraris come with fancy tires not found on other cars. If you do a regression analysis on 1,000 various car sales and include car brand and tire type as variables, the analysis may not be able to distinguish between these two effects because they always come together. So common sense is used to determine whether the buyer paid $300,000 for the Ferrari, or for the tires.

[2] Staying with the car sales analogy, suppose that 500 of the 1,000 cars above had a handful of sand thrown into their engines prior to the sale and no one knew about it. The regression analysis would not detect any devaluation in price due to the sand in the engine because no one knew it was there and no one paid less for the car with sand in its engine. Can you conclude that sand in the engine, if known about, has no effect on the price? No.

Benefits of Proposed Ordinance

The Authors have not demonstrated a need for the Proposed Ordinance.

The benefits shown by the RFC have not been shown to be needs, are general in nature, none were quantified, and no credible argument was presented showing that implementation of the Proposed Ordinance would mitigate any of the concerns discussed in the proposed benefits to any meaningful, measureable degree.

The Roaring Fork River is over 70 miles in length. Only about 4 of those miles are in the city of Glenwood Springs. The fact of the matter is that there is no wholesale, overt destruction or degradation of riparian habitat along the banks of the Roaring Fork River through Glenwood Springs by homeowners who live along the river. To the contrary, most homeowners love the river more than the Authors do and are good environmental stewards of the lands they paid a premium to own and use.

In its July 19, 2019 letter to the Mayor, Council, and the P&Z the RFC infers that the Proposed Ordinance will have a positive economic impact because it will:

- *Reduce drinking water costs in the event that the City's secondary water source is required to be used*. This claim is not substantiated. The City's water supply currently meets applicable specification, as does its drinking water.
- *Reduce erosion*. This claim is not quantified, even on a cursory level. Examination of the river from Google Earth, Red Mountain, or by floating the river does reveal some areas of erosion within Glenwood Springs but it is impossible to tell over what time frame these occurred and they do not require a broad-brush ordinance to correct.
- *Increase property values*. This claim is false as shown in the previous section.
- *Support the local fishing economy.* Homeowners along the Roaring Fork generally love to fish. The RFC does not quantify this claim in any fashion whatsoever and there is no measureable degradation to the fishing industry by homeowners along the river or any measureable increase claimed if the Proposed Ordinance is adopted. The statement is completely general.
- *Tourism will be increased by improved aesthetics*. Aesthetics are in the eye of the beholder. Comments shouted to homeowners from passing commercial rafters are universally complimentary with respect to the aesthetics of individual properties. I hear such comments literally every day in the summer season. Not once in 21 years have I heard a derogatory comment relating to the aesthetics of my property or those of my neighbors.

People have impacted their environments as far back as our Native American ancestors. By default, tradeoffs are made between an ecosystem and a municipality. During discussions regarding the Proposed Ordinance, a liaison Council member told me that "*we must do everything possible to protect the river*." Really? Everything? At any cost? The EPA does not see it that way. Nor does Staff.

When I related this conversation to Staff, the planner literally burst out laughing. He stated "*well, in that case we might as well just go shoot ourselves right now, because we will always have some level of impact on the river*."

You may hear from the Authors that river temperatures are rising and that last summer there was an algae plume in the river. All true. Our environment is getting warmer, and last summer was particularly dry and hot. That is when algae plumes occur. But we are not burning the Amazon along the banks of the Roaring Fork River here in Glenwood Springs. You will not hear the Authors present any credible scientific evidence to support any claim that if the Proposed Ordinance had been in place last summer then these anomalies or any others would have been avoided.

In a document entitled *Glenwood Springs Riparian Assessment* dated February 26, 2018, members of the RC and RFC make the following observations that I comment on below.

- *The Banks at Threemile Creek are marginally vegetated and under erosion*.

  The National Forest Service ("NFS") routinely closes damaged areas to traffic to facilitate revegetation. This problem does not need a broad-brush ordinance to resolve.

- *(summarized) Backyard development creep and riparian vegetation clearing are increasing…some (landowners) have cleared … access down the hill slope (that) may disrupt riparian function and if copied…could result in extensive loss of riparian habitat. Potential treatments include curtailing … development … to preserve riparian function while still allowing private landowner(s)…to enjoy riverside amenities. Public education is a key component for addressing these concerns.*

  A number of points regarding vegetation are relevant here.

  1. The claim is anecdotal and unsubstantiated.
  2. There is no pre and post analysis over any defined time frame to justify a claim that creep is significant or detrimental. There is no objective science here. There is no wholesale or overt degradation of riparian habitat that warrants this broad brush approach.
  3. Staff has stated that there are roughly 50 private homes along the river in Glenwood. The extent of their riverfront is therefore limited, and the extent of any cleared or developed riverfront is even more limited. Staff has provided no hard data on this riverfront footage.
  4. Property owners have a right to use, enjoy, view, and access the river on the property they paid a premium to own.
  5. Efforts to discuss alternative usage scenarios have been rebuffed by the Authors. Property owners currently enjoy 100% use of their

property. The Proposed Ordinance's provision to allow property owners to use only 10% of their riparian area is unfair and insufficient by any standard. It is invasive and an affront to property owners rights. When you live on the river, you understand this.

6. The Assessment states that "*Public Education is a key… (see above).* So where, exactly, has been this public outreach and education? With the exception of Staff, the Authors have largely refused to engage well intensioned citizens in a constructive revision of the Proposed Ordinance. Instead, it is being considered with scant notice to stakeholders after years of work by the Authors to further their own environmental views.

The Assessment's claim seems rooted to some extent in the Authors' objection to non-native grasses in the riparian zone. The following table was reproduced from a 2005 study provided by the RFC entitled *Riparian Buffer Zones: Functions and Recommended Widths.* As shown below, it suggests that grasses actually fare pretty well in comparison to other types of vegetation.

Function	Grass	Shrubs	Trees
Sediment trapping	High	Medium	Low
Filtration of Sediment born Nutrients, Microbe and Pesticides	High	Low	Low
Soluble forms of Nutrients and Pesticides	Medium	Low	Medium
Flood Conveyance	High	Low	Low
Reduction of Stream Bank Erosion	Medium	High	High

The study goes on to say that the removal efficiency of grasses, compared to an ideal mix of grasses, shrubs, and trees, have a removal efficiency of 61% of nitrates, 72% of phosphorus, and 44% of orthophosphates. Grasses are therefore not completely inept at removal of pollutants. And remember, the existing and potential area of grasses along the riverbank is relatively small.

The takeaway here is that non native homeowner grasses comprise a very small percentage of the short Roaring Fork riverbank through Glenwood Springs, that there is no objective evidence to suggest that the amount of grass coverage is egregious, detrimental, or increasing, that grass is better than or equal to 4 of the 5 functions listed in the table above, that grass provides meaningful absorption of nitrates and phosphorous, and that the vast majority of storm water runoff does not flow through the riparian environment but drains through storm sewers directly into the river which makes concentrating on homeowner riverbanks somewhat of a fruitless exercise.

It cannot be concluded that the Proposed Ordinance would result in meaningful reduction in riparian function or increase water quality to any meaningful, demonstrable degree.

From: **Brian A Mikelbank** b.mikelbank@csuohio.edu
Subject: RE: Could you please answer a couple of quick questions on a 2006 study you performed?
Date: September 6, 2019 at 11:49 AM
To: Gary Vick garywvick@icloud.com

Hi Gary:

The city's statement is based in results also – there were a few instances of positive and significant findings. Definitely, though, the focus group real estate professionals thought that potential buyers did not know about setbacks. If that is the case, it wouldn't make sense that a positive or negative impact was present (unless perhaps it influenced the buyer setting the sale price).

I know that probably doesn't leave you with an easy answer or argument, but as you know having read through the study, there is nuance.

Brian.

Brian A. Mikelbank
Associate Professor of Urban Studies
Maxine Goodman Levin College of Urban Affairs
Cleveland State University

From: Gary Vick <garywvick@icloud.com>
Sent: Friday, September 6, 2019 9:39 AM
To: Brian A Mikelbank <b.mikelbank@csuohio.edu>
Subject: Re: Could you please answer a couple of quick questions on a 2006 study you performed?

Dr. Mickelbank,

Thanks so much for you response to my comments. I have one more question.

I believe the City is somewhat mischaracterizing the results of your study with a sound bite that says:

"We have a study that shows that there are no affects on property prices between properties with and without setbacks, and in fact setbacks may increase prices."

Given that you agree with my third observation and you indicate that the focus group probably had a good sense of the buying and selling public, is the following sound bite fair?

"The City's characterization of the study is misleading. We can not conclude that buyers paid more or less for properties with or without setbacks because buyers were generally unaware of the existence of the setbacks. It is therefore inappropriate to use the study to conclude that setbacks have no impact on property prices, and may increase them."

conclude that setbacks have no impact on property prices" and may increase them.

Thanks again for you time.

Gary W. Vick
(720) 548-0962

On Sep 3, 2019, at 3:12 PM, Brian A Mikelbank <b.mikelbank@csuohio.edu> wrote:

> Hi Gary:
>
> No imposition at all – it is good to know that this research is being discussed!
>
> I have inserted responses below your specific questions.

> **From:** Gary Vick [mailto:garywvick@icloud.com]
> **Sent:** Thursday, August 29, 2019 12:42 PM
> **To:** Brian A Mikelbank <b.mikelbank@csuohio.edu>
> **Subject:** Fwd: Could you please answer a couple of quick questions on a 2006 study you performed?
>
> Dr. Mikelbank,
>
> I am retired and live on the Roaring Fork River in Glenwood Springs, Colorado. The City is considering introducing a setback ordinance which limits property owners activities within 50 feet of the Roaring Fork river. There is currently a 30' setback covering structures, but the proposed ordinance increases the setback and restricts other activities in the setback area.
>
> While this may be generally desirable, my neighbors and I are concerned that the proposed ordinance could reduce property values by limiting their use and redevelopment potential in the future. A developer or builder, for example, could be further restricted by the proposed ordinance and therefore might pay less for a more restricted property than he would for a property that is less restricted. At least that's the theory.

Yes! This was exactly the perception CRWP was facing when we started talking about this project.

> The City provided me with a copy of your 2006 "Hedonic Analysis of Riparian/Wetland Setbacks". It is a thorough study and I enjoyed

reading it. As you know, it was commissioned by Chagrin River Watershed Partners, a watershed conservancy and reviewed roughly 4,000 home sales in the watershed area, roughly 400 of which bordered a stream or river. As you know, the study concludes that setbacks do not decrease property values and may increase them.

The conclusions seem counterintuitive to me. While I have a background in engineering and finance and have taken undergraduate and graduate statistics courses, I would welcome your comments regarding a couple of observations I have with the study.

1: First, the study was commissioned by a conservancy group (link here: https://crwp.org). I don't know that they had an agenda or were seeking a predetermined outcome, but setbacks generally help their cause, as would, by corollary, any data showing setbacks are good for property values. When they ask you to perform the study, were they seeking satisficing data to confirm a theory that setbacks have no impact on property values?

At our college's research centers it is an early conversation that we're being hired to answer a research question, whether or not that answer is what they might be looking for. I think organizations coming to a university know that, but we always review. Given their mission, they obviously thought setbacks were a good thing. And they heard from local realtors that prospective purchasers don't know if there is a setback or not. But when they went to communities to talk about implementing setbacks they were getting pushback exactly along the lines you mentioned earlier – that all else equal, we might reasonably expect deed restrictions to reduce property value. They wanted to know what the data had to say on the matter.

2: Second, the homes with setbacks are, by and large, the same ones that are on a stream or river. It seems to me these variables could be coupled. Any increase in prices for homes with setbacks may have been due to simply being on the stream or river, a generally desirable thing.

Agreed. That is why it was important to have a mix of stream front houses in the sample that did and did not have setback restrictions. Actually, I seem to recall that I should use "setback designation" not "setback restriction"!. This allows the regression model to distinguish between the separate effects of being stream front vs. being stream front with a setback designation.

> 3: Third, the second and third full paragraphs on page 15 of the study state that when properties were bought and sold, the consensus opinion was that neither homeowners nor realtors were aware of any setbacks. It seems to me that a buyer would therefore not be in a position to pay more, or less, for a property with, or without, a setback if he or she was unaware of the existence of the setback. It seems to me that statistically measuring if people paid more, or less, for a property with, or without, a setback is impossible if the buyers did not know about the setback and factor the setback into their pricing decision.

Again, agreed. The issue, though, was the degree to which the assembled focus group captured the entirety of the market reality. Certainly they were a valuable source of information, but they surely hadn't talked to all of the purchasers, sellers (and potential purchasers and sellers) throughout the market, throughout the years being covered in the study.

If designation doesn't impact house price, there are two options – buyers/sellers didn't know, or they knew and didn't care.

We did get a few blips of positive impacts, but it seemed that those weren't very robust.

But you're right, if people don't know, then a statistical finding of positive or negative price impact is really telling you about something else. In the case of Auburn and Bainbridge it seemed to be capturing some type of "late-in-the-study-period" effect as prices were ramping up (before the housing crisis!). We did have year indicator variables that should have accounted for this, but perhaps not in its entirety.

I think my take-away, looking back, is that the focus group probably had a good sense of the buying and selling public – that setback designations were not on their radar, and thus might not exhibit a strong price impact either way. But I think the experience of you and your neighbors is similar to what CRWP was trying to make sense of. That even though they were hearing from real estate professionals that buyers don't know of them, when they talked to homeowners about establishing designations in their communities there were concerns over the loss of value and loss of development/expansion potential.

I hope this is helpful and that you are satisfied with how your community moves forward.

Don't hesitate if you have additional questions,

Brian

I may have missed something and any comments or clarifications on these items would be greatly appreciated.

I apologize for the imposition but am grateful for your help. Thank you so much.

Regards,

Gary W. Vick
614 Cowdin Dr
Glenwood Springs, CO 81601
(720) 548-0962 (cell)

Link to study:

https://crwp.org/files/final_report_hedonic_analysis_riparian_wetland_setbacks.pdf

6 September 2019

This statement is provided at the request of Gary Vick and in review of the September 2006 study, “Hedonic Analysis of Riparian/ Wetland Setbacks”, prepared by Brian A. Mikelbank.

In statistics, there are three steps used to infer causality or cause-and-effect. The three steps simply put are (1) relationship, (2) temporal precedence, and (3) non-spuriousness. I was asked to review a study for these elements with regard to inferences on the causality between setback policies and real estate valuations. The study shows statistical significance for no effect on the principles of step (1) relationship. The study isolates for temporal precedence by selecting valuations that occurred after the setback policies were enacted, appeasing step (2). However, the most important and troublesome step of non-spuriousness was not able to be established. Non-spuriousness refers to showing that the relationship from step 1 is not false or potentially caused by a third extraneous variable. In the provided study, there are several factors that indicate the findings may be due to a spurious (false) relationship between setback policies and real estate prices. To name a couple of these factors, the valuation methods for the real estate did not include the knowledge of a setback policy by the transacting parties, and the resulting regression tools contain variables, such as location, that provide a stronger statistical relationship with real estate prices. So, while the study provides mathematical statistics for a no-effect or no-relation between setback policy and real estate prices, it does not provide causal statistical significance for the effects of consumer valuation through real estate prices from setback policies. [This is not a statement on the value of setback policies or a political opinion/recommendation of the reviewer on such matters.]

Elizabeth T Poulos, Ed.D.
SummitCOPrep@gmail.com

About the Author: Dr. Elizabeth Poulos is a statistics and economics instructor at Colorado Mountain College. In addition to a Doctor of Education, Dr. Poulos’ academic degrees include an MBA, a Master of Financial Analysis, a Master of Business in Financial Risk Management, and a Bachelor of Economics. She is an award-winning scholar with publications and presents on a variety of topics internationally.

From: **Gary Vick** garywvick@icloud.com
Subject: Clarification and Interpretation of Proposed Riparian Ordinance, Section 070.040.020 (d) (24)
Date: June 30, 2020 at 4:40 PM
To: Jennifer Ooton jenn.ooton@cogs.us, Gretchen E Ricehill gretchen.ricehill@cogs.us
Cc: Haley Carmer hcarmer@garfieldhecht.com, Trent Hyatt trent.hyatt@cogs.us

Jennifer and Gretchen,

On behalf of Friends of the Roaring Fork, I trust this email finds the two of you safe and well.

In anticipation of the presentation of the Riparian Setback Ordinance 070.040.020 (d) (24) (the "Ordinance") to City Council in July, I have three requests. I will call you tomorrow to discuss these item:

1. **Please provide the City's interpretation of the following items which remain unclear in the Ordinance.**

Trimming of vegetation and mowing. Conversations with Staff have consistently indicated that the City does not intend to prevent the reasonable trimming of vegetation or mowing in the riparian setback area. Unfortunately, the wording of the Ordinance underlined below seems to prevent, or make it unduly burdensome to perform, these two exact activities.

Applicability states that: *All new improvements, buildings, additions, structures, excavations, grading, dumping, clearing of native vegetation, or backfill shall be subject to the requirements of 070.040.020(d)(24)b Standards unless the applicant demonstrates to the City Engineer and the Director by clear and convincing evidence that one or more of the following conditions is met*:

Section a(4)iii states: *"The proposed activity (including but not limited to the trimming of vegetation, construction of access path or steps, hot springs pools) does not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland."*

It could be argued that mowing one blade of grass, or removing one leaf of a bush, would - by some small amount - result in water quality degradation. Staff have indicated to me that this is not their intent. Roger Neal of High Country Engineering has stated to me that to demonstrate otherwise "with clear and convincing evidence" would be impossible absent an engineering study which still might not show that section a(4)iii is met. Property owners should not have to provide an engineering study in order to mow and trim vegetation. An engineering study should not be required to construct paths or steps, items that are often required to safely access the river frontage. When we argued this at P&Z, Commissioners ask Mr. Hyatt specifically if citizens would be required to submit an engineering study to be able to mow or trim vegetation. He answered "no, that is not the intent". And yet the words remain confusing and do not reflect the intent.

Please clarify how the City intends to interpret and enforce this section and the yardstick it will use to determine if section a(4)iii is met.

2. **Better yet, clarify the wording of Section 070.040.020 (d) (24)**

As you know, Friends of the Roaring Fork have repeatedly provided the City with succinct language that would clarify these points. To date Staff have been unwilling to make any changes to the wording unless specifically instructed to do so by P&Z. But, at the end of the day, is this not Staff's language? Isn't it is up to Staff to make the language clear and have it reflect Staff's intent? Neither P&Z nor Council should have to micromanage clarifications and parse unclear language. Staff is within its authority and indeed is expected, in the routine execution of its duties, to 1) provide clear language and 2) clarify any unclear language necessary to reflect Staff's stated intent. The Ordinance as proposed does not meet that standard.

I have attached three proposed modifications to the wording which do not alter the substance of the Ordinance. Rather, they make it easier for citizens and future Staff to understand and enforce the Ordinance. We respectfully ask that you review the modifications and clarify the language to reflect your intent prior to presentation to Council.

3. **Section 070.010.070 (b) (3) b reads poorly, please correct**

Section 070.010.070(b)(3)b states that "*Temporary disturbance to make minor repairs of a nonconforming structure within the riparian setback required by 070.040.020(d)(24) shall be limited to fifteen feet around the structure and shall be returned to the previous vegetation or with appropriate riparian plant species."*

The following language is a bit cleaner from a grammatical point of view: "*Temporary disturbance to make minor repairs of a nonconforming structure within the riparian setback required by 070.040.020(d)(24) shall be limited to* ***an area within fifteen feet of the structure and vegetation shall be replaced or replanted with appropriate riparian plant species.***"

From: **Jennifer Ooton** jenn.ooton@cogs.us
Subject: Riparian setback
Date: July 2, 2020 at 1:32 PM
To: Gary Vick garywvick@icloud.com
Cc: Gretchen E Ricehill gretchen.ricehill@cogs.us

Gary,
Thanks for your phone call. My desk phone rings to my cell phone, so you don't need to leave more than one message. I am headed into a meeting right now, and have been extremely busy.

We will likely develop a staff interpretation memo related to your question about trimming (which we would like to include the in packet) – which isn't put together until next week.

Thanks,
Jenn

Jenn Ooton
Assistant City Manager, Economic and Community Development
City of Glenwood Springs
970-384-6404 (o)
970-471-8684 (m)

CITY OF GLENWOOD SPRINGS ADMINISTRATION

COVID-19 Awareness
Colorado's Safer at Home COVID-19 website: https://covid19.colorado.gov/safer-at-home
Please follow @GovofCO and @CDPHE on Twitter and Facebook for statewide updates

Stay informed on the latest City of Glenwood Springs news, cone zones, events, and more by signing up to receive email or text notifications at cogs.us/notifyme

Complete your census at www.Census2020.gov
For more information about local efforts visit www.A2PCensus2020.com

From:	Gary Vick
To:	Trent Hyatt
Cc:	Jennifer Ooton
Subject:	Items for July 16, 2020 Council Packet - please acknowledge receipt
Date:	Monday, July 6, 2020 2:43:16 PM
Attachments:	Letter to City 2020-07-16.pdf Raparian Letter to City and P&Z 2019-19-16.pdf Emails with Mikelbank 2019-09-06.pdf Letter from Poulos 2019-09-06.pdf Email to Ooton 2020-07-02.pdf Email from Ooton 2020-07-02.pdf IMG_0206.PNG
Importance:	High

Trent,

Please include these documents in Council's packet for July 16, 2020 regarding the riparian ordinance.

Thanks for all your work on this.

Feel free to call with any questions or concerns.

Gary Vick
720-548-0962

From:	Randy Rippy
To:	Trent Hyatt
Subject:	Proposed Riparian Ordinance 070.040.020(d)(24) Conservation of Waterways for Roaring Fork River
Date:	Monday, July 6, 2020 4:55:10 PM

Hi Trent. Please include this letter in your packet for council for their July 16th meeting regarding the above.

Thanks so much!
Randy Rippy

Honorable Mayor, City Council and City Staff,

This letter is in reference to the proposed Riparian Ordinance 070.040.020(d)(24) Conservation of Waterways for Roaring Fork River.

I am a Glenwood Springs native. I have *literally* grown up on the rivers here. I have fished them and floated them my entire life. They are a part of me and I want to protect them through approaches that make sense and actually make a difference.

The proposed riparian vegetation ordinance amendment does not make sense for the city of Glenwood Springs. It just appears to be a so-called solution (pushed by a special interest group) to a non-existent problem; the degradation of riparian vegetation along the Roaring Fork and Colorado rivers and filtration of stormwater. Don't get me wrong. I appreciate and support the River Commission and The Roaring Fork Conservancy in their efforts to protect our waters. I know they work very hard on our behalf and have good intentions. I just think that this particular ordinance amendment will not actually accomplish their intention; of improving the health of the river. The only thing this approach will do is greatly limit what private property owners can do legally and responsibly on their own property.

Let's face it. Floating through Glenwood Springs is not a true wilderness experience, nor should you intend it to be. We are an actual city with necessary development to function as such. A huge part of the Roaring Fork experience for tourists, fishermen and locals is a visual interaction - waving at folks sitting on their decks or on their private riverbanks, admiring the beautiful homes and grounds along the way, and feeling that human connection as part of the trip. Growing up here, I know many river guides and this has been the experience their clients want. This unique float is what keeps clients returning and contributing to our local economy. If clients wanted a true wilderness experience with only dense vegetation, they would choose another river somewhere else. This is the current beauty and balance of where we live. Why would you push to change it? There are already protections in place that are obviously working! Riparian vegetation is thriving along the riverbanks in Glenwood Springs. There is no scientific data from within our city limits to support this proposed drastic measure of restriction on responsible property owners.

Albeit not a true wilderness experience, people floating on the river currently experience a vast amount of natural, undisturbed riverbank. The land owners along the river have done an excellent job at maintaining a wonderful and healthy balance of natural riparian vegetation while responsibly implementing the use and enjoyability of their own property. When property owners are doing nothing to contribute to a negative impact on the river, why would you

penalize them by taking away a significant use of their property? And at what gain? There is no data, specific to Glenwood Springs, showing this particular ordinance would have any positive impact on the health of our rivers. A River Commission member stated in a P & Z hearing that there is no data to support the degradation of riparian vegetation in the City of Glenwood Springs. A River Commission member also has stated that the river is in pretty good shape. Yes, we are aware of past water temperature concerns and algae outbreaks OUTSIDE of the city. But this was during an extremely hot summer with very little rain and snow the winter before, so not due to the degradation of riparian zones downriver in Glenwood Springs.

This additional restriction of property would have no significant (if any) positive impact on the health of the river. Yet it would have a potentially negative impact on your citizens, their property values and their right to responsibly use their own property as they see fit. Local real estate professionals have stated the potential for loss of property value if this ordinance passes.

Instead of spending time and energy on this proposal, I implore you and staff to instead address the significant issue of the city's storm drainage system which is dumping pollution from all over town directly into the rivers. This accounts for approx. 95% of drainage flowing into the river that does not pass through riparian areas. The small riparian area being addressed in this ordinance does very little, if anything measurable, to filter said stormwater. Therefore, the need to change this ordinance does not exist. We already have a 30 ft. setback in place which is evidently being respected by property owners.

And the kicker to all of this is that the city proposes to greatly restrict what I can do on my property, yet the city, itself, just completed the massive, no-vegetation (sans a very few little plantings in boulders) riverfront project of Two Rivers park? Come on. Please lead by example. I'm not saying I didn't support this project, but you can't have it both ways. You, as a council, have already set the precedent for such projects, yet this proposal wants to restrict me from doing a way less impactful project on my own property?

In the spirit of working together on this, I will offer my support of the P & Z's recommendation, with their stated conditions, to this ordinance of a 35 ft. setback and 50% restriction of riverfront property, along with language clarification regarding trimming of vegetation, construction of small structures such as stairways with railings to the river or deck, and that no permit or studies are necessary for riverfront property owners to conduct these projects. I do not support any restriction greater than a 35 ft. set-back and 50% restriction on use of my riverfront property.

Thank you for your time and consideration.
Randy Rippy
2262 Midland Ave
Glenwood Springs, CO 81601
greenwhitelawns@gmail.com

From:	Julie Rippy
To:	Trent Hyatt
Cc:	Gretchen E Ricehill
Subject:	Proposed Riparian Ordinance 070.040.020(d)(24) Conservation of Waterways for Roaring Fork River
Date:	Monday, July 6, 2020 2:08:06 PM

Hi Trent. I hope you have been well through all the upheaval of 2020! It has thrown all of us for quite the loop!

Below is a letter I would like to request be included in the packet for council regarding the above ordinance proposal agenda topic schedule for the July16th meeting.

Thanks so much!
Julie Rippy

Dear Honorable Mayor, City Council and City Staff,

This letter is in reference to the proposed Riparian Ordinance 070.040.020(d)(24) Conservation of Waterways for Roaring Fork River.

Although I appreciate the spirit and intention of this ordinance amendment, there is no actual, demonstrated need. There is no data specific to Glenwood Springs showing that it will have any measurable positive impacts on the quality of our water. Yes, we've all heard about "the science," but all the science presented has been very generalized and not specific to what is actually happening in the city of Glenwood Springs, which, after all, should be our only focus. We already have a 30 ft. set-back in place which is obviously working as evident in the thriving riparian vegetation along our river fronts.

As stated by a River Commission member in a P & Z hearing, there is no data showing the degradation of riparian vegetation in Glenwood Springs. Also a River Commission member publicly stated that the river is in pretty good shape. I am an avid river user and float the Roaring Fork and the Colorado often. The riparian vegetation in the city of Glenwood Springs is growing abundantly throughout town. By far the largest disturbances over the past number of years have been those of city projects along the river, not those of private property owners. I am not saying we don't support those projects (the new Two Rivers boat put-in/take-out design is great), however, just look at the vastly cleared riverfront span at the Two Rivers Park project with only minimal replanting. The city has created an environment where folks can easily access and enjoy the spacious, unobstructed views of the river from water's edge. The same with the Veltus Park project. I get the point of these projects; to create a more enjoyable and functional experience for many. Yet, council is considering a highly restrictive ordinance that will greatly restrict how private property owners can view and enjoy the river from their own property? Seems what's good for the goose is not good for the gander!

We speak of storm water? The vast majority of storm water (90%+) from all over the city

flows into a storm water drainage system that flows DIRECTLY into the river via pipes, not through the riparian vegetation on private property, so there is no demonstrated value of filtration. This source of pollution and runoff flowing into our rivers should be where all city resources are focusing, not the benign and current responsible use of private property. And wildlife? Well, there's scat aplenty in our yard showing that wildlife is prospering along the river.

Property owners along the river are among the best stewards of the rivers this town has and we share in a concern for healthy waters. We not only have an environmental stake in these waters, but a financial stake. We want to protect our investment! Local Glenwood Springs real estate professionals have stated that this ordinance could have a negative impact on our property value as it would greatly restrict how a buyer could utilize the property. These local professionals certainly know this market much better than the author of some far-away study which, as he admitted to a local citizen, is flawed. So there is no evidence showing that this ordinance would raise property values, only local professional opinions stating quite the opposite. I understand it is the responsibility of the city to protect its rivers, but is also the responsibility of the city to first and foremost, protect its citizens, their quality of life and their legal rights.

And if you must compare Glenwood Springs to other communities, actually look beyond one or two other cities and their ordinances. Look at all the surrounding communities. With the exception of Basalt, (whose river flows mostly through town property, not private property) other area cities or towns do not have ordinances that are nearly as restrictive as this proposal. One size does not fit all and we should make decisions based only on our unique stretch of river.

During the initial two-year design of this ordinance, there was no transparency of process or outreach to citizens to include our voices in important decisions that directly affect us. This seems to be in direct conflict with the city's Strategic Vision which states that the city advances the interests of the community openly and transparently. It also states that the city council and city employees will ensure transparency in its operation while pursuing systematic citizen engagement. Not until Trent Hyatt sent a P & Z hearing notice, (approximately two years after the process began) did we know about this proposed ordinance change. We do appreciate Trent taking the initiative to send a notice which allowed us to finally have the opportunity to engage.

Although I do not feel that the city has actually demonstrated a need for this ordinance amendment, I will support the P & Z commission's recommendation "with conditions" of a 35 ft. setback with 50% riverfront restriction. I will not support any setback higher than 35 ft. or any restriction greater than 50%. I would also request the clarification of verbiage regarding small benign projects such as stairs with rails, small structures (such as a deck or tree house) and trimming of riparian vegetation to assure fire mitigation, access for home additions/renovations and riverfront access without any studies or permits, other than current permits for large projects. All we have asked for is a balanced and fair approach. The original 50 ft. setback and 90% riverfront restriction plan was extremely unbalanced. We understand the intention and all the work the River Commission puts in, but feel that it is not the appropriate approach to a greater good or a healthier river, just unjustified overreach.

Your service, time and consideration is greatly appreciated!
Regards,

Julie Rippy
2262 Midland Ave.
Glenwood Springs, CO 81601
jrwgraphics28@gmail.com

Re Proposed Revision to Ordinance 070.040.020(d)(24) Conservation of Waterways.

Trent,

By now you and the council will appreciate the passion with which the residents along the river wish to preserve and maintain their property, without detriment to the riparian habitat.

I for one will continue to keep my small river frontage free of garbage which regularly collects and accumulates amongst the river edge vegetation i.e. plastic bottles, flip flop sandals, plastic bags etc. etc.

Gary Vic has spent a considerable amount of time and research effort on order to compile the arguments posed by the various draft ordinances and the impact they might have on both the usability and values of the homes along the river. I therefore thank him for all his work and personal financial expenditure incurred.

Accordingly I request that the council approves the current draft ordinance so that home owners may cease worrying about the impact of the previously proposed drafts, in terms of the impact on their property values and usability.

I therefore support the draft ordinance before the council with the following caveats:-

1. That the set back of 35 feet is NOT increased.
2. That there is no alteration to section A2 of the proposed ordinance that allows home owner to remove up to 50% of the vegetation.
3. Provided that home owners may trim and keep tidy the native vegetation in order to continue to view the river. Provided that such trimming does not damage the root system or destroy the plants.

I therefore request that the proposed ordinance be approved subject to my points above. If these points are not included or are amended then I do not support the revised ordinance.

Regards Richard Todd

616 Cowdin Drive,

Glenwood Springs

CO 81601

Tel 970 366 2707 cell

Email richardtodd57@aol.com

From: Jennifer Angeloro
To: Trent Hyatt
Subject: Riparian
Date: Monday, July 6, 2020 8:04:43 AM

Hi Trent,
I hope this email finds you well during this uncertain time.

I would like my thoughts included in the Council packet for review by Council members please. As riverfront owner along Cowdin Dr., I will support the proposed ordinance only if:

1. The proposed setback is NOT increased from 35 feet (its most recent number), or
2. the amount of riparian habitat in the setback area that is restricted and cannot be cleared is NOT increased from 50% (its most recent number), and
3. the language governing trimming of vegetation and the construction of stairways and steps to the river is clarified so that it is clear that no permit, engineering study, or other study is necessary to undertake those tasks.

Thank you,
Jennifer Angeloro
(401)-741-8023

Sent from my iPhone

From: Daren Roberts
To: Trent Hyatt
Subject: Riparian Habitat Roaring Fork
Date: Monday, July 6, 2020 8:13:22 AM

Hello Trent,

I'm a property owner in Glenwood with river frontage at 710 Cowdin Drive. I've been following the ordinance proposals for setbacks and vegetation removal and I want to share my position with City Council before they make a final decision on creating a new ordinance.

Overall I am in support of some regulation regarding the preservation of our riverfront habitat. I purchased my property in Glenwood five years ago as a second home and paid a premium for the river frontage, view and water access. My family, friends and employees use the property often and we all love the river. I plan to build a new home on this site in the future.

I agree with the previously proposed 35 feet setbacks from the high watermark and 50% vegetation preservation. I support these restrictions, however, I'm against the city creating another permit or application process every time I want to trim back the overgrowth on my lot. Let's keep this simple. The less government the better.

I'm curious what prompted the need for this change? Frankly, I'm not aware of anyone making major modifications to the natural riverbank habitat OTHER THAN THE CITY itself. The city seems to be the biggest destroyer of natural river frontage habitat, in my opinion.

Thank you for taking my opinion into consideration.

J. Daren Roberts
President/Employing Broker
ERA New Age
Buy - Sell - Rent
Serving the Colorado Front Range
and Western Slope
Daren@NewAgeRE.com
P. 303.549.6179 | F. 866.310.2578
Main Office. 720.255.2162
www.NewAgeRE.com

From: Mark Cose
To: Trent Hyatt
Subject: Riparian Ordinance - Proposed Ordinance Roaring Fork River
Date: Monday, July 6, 2020 9:32:08 AM

Trent,

We are submitting our thoughts to be included in the packet for the upcoming City Council Meeting.

1) River residents are happy with their lots and the vegetation on it and want to preserve it. River residents trim and maintain the vegetation on their properties to keep it healthy and a well maintained area to enjoy the river.

2) River property owners have paid a premium to live on the river. **The proposed revision will severely limit the use of our property, which in turn also devalues our property.**

3) We have lived on the 'Roaring Fork River' for over 38 years, we enjoy and maintain our property, we feel it is imperative that we be allowed to cut and maintain a minimum of 50% of vegetation. **However, we would prefer the set back remain at the current 35 feet.**

4) We feel the property owners are prudent in keeping the waters along the river clean. They don't want trash and contaminates in the river.

5) Also, it is imperative that the language governing the trimming of vegetation and the construction of stairways and steps to the river is clarified, to make sure it is clear that no permit, engineering study, or other study is necessary to perform those tasks.

6) No need for this ordinance – the owners are prudent in caring for the river.

Respectfully,

Mark & Lexina Cose
2202 Midland Avenue
Glenwood Springs, CO 81601
(970) 945-6440
Email: malanc1955@gmail.com

From:	Mauriene Howey
To:	Trent Hyatt
Subject:	Riparian Ordinance 070.040.020 (24) Conservation of Waterways
Date:	Sunday, July 5, 2020 1:14:33 PM

I would appreciate a few minutes of your time to express my concern over the conservation of waterways ordinance. As an owner of property on the beautiful Roaring Fork River I appreciate every day its beauty as do my kids, grandkids and great grandkids when they visit. I personally enjoy the many fishing guides passing by with their enthusiastic fishermermen. One of my many grandsons could hardly wait to fish the Roaring Fork, he is in the fly business in Texas. All of the family are enjoying its many benefits. We would never consider endangering the river.

As a widow, I of course can't help but be concerned over the potential devaluation of my property. However, as I have always heard "Heaven seems a little closer in a house by the water". I want this haven unblemished for my family and I will keep it that way.

Please do not take away my property rights.

Mauriene Dickens Howey
2308 Midland Ave
Glenwood Springs
970-230-9496

From: Hollie Dickens
To: Trent Hyatt
Subject: Riparian vote
Date: Monday, July 6, 2020 2:50:58 PM

Dear Trent:

I am writing this email in strong opposition to the riparian ordinance and ask that it be completely rescinded. I am writing in support of my mother, Mauriene Howey who resides at 2308 Midland Avenue. I am a physician at Valley View, and have been in Glenwood for over 5 years. My mother is 83 years old and has recently been hospitalized and in rehab for spinal fractures associated with an autoinflammatory disorder and has limited mobility and hearing. It is my strong opinion that this ordinance disproportionately effects the elderly and those with medical conditions for the following reasons.

1. Although the city has tried to make the case that this ordinance would positively effect property values, common sense and case studies show otherwise. Any time a significant portion of ones property becomes unusable, it has the strong possibility of decreasing property value. This disproportionately effects those on fixed income including the elderly and infirm.
2. This ordinance will make it more difficult if not impossible for the elderly and those with special needs such as wheelchairs to access the river from their own property. The inability to clear out brush/trees to improve access, or build handrails or ramps on one's own property disproportionately effects the elderly and those with special needs.
3. The way this ordinance is written, it would require an engineer prior to any building or clearing of property, once again disproportionately effecting those on fixed incomes.
4. The elderly and infirm are unable to care for their property themselves, this ordinance would require them to hire companies with special skills to manage their property rather than their current lawn maintenance person. This will increase the cost to those on fixed incomes.
5. One of the joys of the elderly are to watch their grandchildren enjoy life. My mother enjoys sitting on the porch and watching the grandkids go down to the river and fish, throw rocks and swim. The inability to clear brush or trim trees on a significant portion of the river will make this joy impossible. Once again this disproportionately effects the elderly and those with limited mobility.
6. The way this ordinance was brought to the public has had a disproportionate effect on the elderly and infirm. I doubt my mother would have ever heard about this ordinance had not my brother been visiting and Mr Vick happen to inform him of this ordinance. Furthermore, with Covid 19, it has effected the elderly and infirm's ability to use their right to protest. My mother is unable to leave the house, her hearing difficulty makes it difficult to talk on the phone and she has limited computer and social media skills. How is she able to use her right to protest this ordinance and to visit with her neighbor's concerning this ordinance, or visit the mayor, city council and city planners when it is unsafe to leave the house because of the pandemic?

In summary, this ordinance will disproportionately effect the elderly, infirm, and those on fixed incomes. It is my opinion that the city planning office has ignored this fact. Furthermore, with Covid 19, the infirm and elderly have not been able to leave their houses to use their right to protest or talk to city officials concerning this ordinance. I would respectfully ask that because of the pandemic, that this ordinance be discarded and that the city officials concentrate on keeping the citizens of Glenwood safe from the pandemic. As we have just celebrated the freedoms we have over the fourth of July, it seems inconceivable that the City is considering taking away the elderly's right to use their private property as they see fit.

Trent, I would ask that you share this letter with the mayor, city council, city planning members and any other city official involved in this matter. Thank you for your cooperation and I hope you will do what is right for the vulnerable among us.

Sincerely,
Joel Dickens M.D. 388 Red Cliff Circle, Glenwood Springs, CO 81601 325-656-6174 c.

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Visit the Dickens' family blog
www.gowhereheleads.blogspot.com

From: Jay Dickens
To: Trent Hyatt
Subject: River Ordinance Proposal
Date: Monday, July 6, 2020 12:24:21 PM

To the City Council of Glenwood Springs,

My mother in law has a lovely home on the river. She asked me to attend the meeting last summer about the proposed changes to the river property. I was shocked to hear of the proposed changes. We own multiple ranches in Texas and Colorado. We are invested in carefully conserving and stewarding our properties. My mother in law has done a wonderful job caring for her property. Her responsible actions are apparently ignored by your Council. She is not the only responsible land owner on that river.

The COG's proposed setback increases are just silly. The increased restrictions on the riparian habitat smell of a land grab by people who seem to believe the land belongs to them and the owners are mere tenants. Furthermore the language on how the owners can construct stairways to access the river or trim vegetation is simply convoluted. Have they intentional made this difficult to understand so that they can make it mean anything they want it to mean for further land grabs?

Have you ever done an engineering study on this situation? I would highly suggest using an engineering firm that is not from this area whatsoever. There isn't a problem with the river. You haven't proven there is a problem on the river.

Your language in the proposal reeks of "we know better than you

about how to live on the river". Well, you don't. We actually DO live on the river and there are no better stewards of the river than the actual residents. The proposal is simply not satisfactory. That land is not owned by the Council. The Council does not pay taxes on the property. You do realize that you are forcing the owners to pay taxes on land that you seem to believe is not theirs? This proposed ordinance makes it quite plan that the land is owned by the COG and the folks in the houses are simply temporary. These pesky homeowners are apparently in your way. Is your next step to condemn the homes and bulldoze the houses?

In the meantime my elderly mother in law is thoughtfully watering the trees and bushes along the river when the drought conditions call for it. As this is tampering with the riparian habitat, perhaps she should stop. She keeps her property well maintained because it is hers. She loves the views along the river. She cares for her neighbors and wants them to enjoy the land as she does.

This proposal is simply not necessary or helpful to her, her neighbors, the general public or the river.

Sincerely,

Dana Dickens

KLM Properties, Inc
610 Cowdin Drive
Glenwood Springs, CO

July 5, 2020

City of Glenwood Springs
101 West 8th
Glenwood Springs, CO 81601
Attention: Mr. Trent, Senor Planner, Community Development

RE: Proposed revision to Ordinance 070.040.020(d)(24) Conservation of Waterways

Honorable Mayor, City Council, and Planning and Zoning Commissioners:

I own property at 610 Cowdin in Glenwood Springs.

I'm grateful for and appreciate you taking the time to listen to the property owners along the river.

I don't think we need to continue to make changes to ordinances just to make changes. We don't have a problem along the river. This new ordinance will devalue property. I agree with the points Gary Vick made. I don't think a long letter to repeat issues will change the results as you always have plenty to read. I don't want any new ordinance, but the reduced setback and 50% disturbance is workable. The City needs to look harder at their problems with stormwater runoff.

Thank you for your time,

Ken Melby II

From: Jay Dickens
To: Trent Hyatt
Subject: Upcoming River Riparian Rules
Date: Sunday, July 5, 2020 6:21:03 PM

Trent,

My name is Jay Dickens and my mom lives along the portion of the river where you are contemplating rule changes. As a former federal drug agent I have seen many government actions both good and bad on multiple continents. The current rule changes contemplated by Glenwood Springs along the river corridor strike me greatly as a government overreach into private property rights.

I understand that you and the current administration may not intend to micromanage people's river frontage, but the ability to do so rests strongly within the proposed new rules. The type rule changes contemplated give any future administrators the power to greatly restrict property owners actions if said future administrators desire to do so.

Please do not make the mistake that so many other governmental entities have made into reaching too far into private property interests. Maintaining the scenic nature of these particular properties, paying taxes, and ordinary life activities are plenty complex enough without further rules placed upon private property.

In addition, please realize Glenwood's proposed actions are a government taking without just compensation. Society needs less of said actions, not more. My mom's property will likely be in our family for generations, we need it to not be encumbered by government overreach. Please realize the citizens that have gone to the trouble of purchasing and maintaining these river properties are important to your city and treat them accordingly.

Sincerely,

Jay Dickens
(325)656-1203 cell

Sent from my iPad

From: Amanda Murray
To: Trent Hyatt
Subject: Letter for Riparian Zone Ordinance Packet
Date: Monday, July 6, 2020 9:31:18 PM

Hello Trent--- I am aware that I may be too late to make the packet, but wanted to try anyway. If I am, simply let me know and I will send this on to the council directly. Thank you for your time and assistance!

Kind Regards,
Mandy Murray

Dear City Council members---

I am writing to humbly ask that you NOT pass the proposed Riparian Ordinance that is put before you. As riverfront property owners, we feel like we are good stewards of the river corridor and to further regulate our use of the property that we own and care for is extremely unfair and unnecessary.

First of all, the properties that are affected by this ordinance are private properties and putting additional regulation on what people can and cannot do with their property diminishes property values and intrinsic value. Owning property and having the freedom to do what you want with the property is a fundamental part of the American Dream. Please don't saddle us with more do's and don'ts that diminish the quiet enjoyment of our most valuable possession that we have worked hard to attain and maintain.

The river frontage that we enjoy is essentially our backyard, and it feels unfair to me to be told what I can and cannot do in my own backyard when other property owners aren't being told the same. While I realize that my backyard is contiguous to a precious resource and there is speculation that how I handle my property might be affecting it, couldn't we say that anyone's managing of their property affects the environment in some way? If people choose to zeroscape and not have trees, then are they not contributing enough to the processing of carbon dioxide for the production of oxygen by limiting vegetation that feeds this process? This may sound ridiculous, but that is how I feel about the claims regarding the impact that my small property has on the entire Roaring Fork River. Additionally, we are regulating small private properties to try to protect the riparian zone; meanwhile, the public properties of Veltus Park and Two Rivers Park have just redeveloped massive areas of riparian zone leaving very little if any native vegetation to make those areas more user friendly. I did not, and do not, object to those improvements nor did the community. However, it is incredibly unfair for the city to regulate my management of the riparian zone when they are not held to the same standard.

Finally, I want to say that I am a little hurt by the fact that all of this seems to presume that we care so little for the river and the riverbank that we need to have a regulation in place to help us take better care of it. I think the riverbank owners along the Roaring Fork in Glenwood do a great job caring for the riparian zone. We don't leave trash on our banks. After we have spent time on our shore we clean it up. In fact, we pick up the trash that has washed ashore from the rafters and fishing boats that rely on this river including flip flops, cans, broken bottle pieces, fishing line, hooks, lures, canvas bags, plastic balls and even a bicycle.

I think that everyone's heart is in the right place of trying to do right by the river. However, instead of passing a law that diminishes property values and creates a necessity for monitoring and enforcement, which is another ball of wax entirely, perhaps the best first step is to encourage the non-profits that have become involved with this ordinance to spend time working with river owners and river users on a private basis to help us understand and implement practices that make the river corridor better for all. Rather than regulate, let's EDUCATE. Thank you for your time and your service to our city.

Sincerely,

Mandy Murray

--
Mandy Murray
1920 Midland Avenue
Glenwood Springs, CO 81601
c: 970-618-3444
f: 1-888-324-5647
mandycarlson@gmail.com

From:	Erik Rist
To:	Trent Hyatt; Jennifer Ooton
Subject:	Proposed Riparian Setback Amendment
Date:	Wednesday, July 8, 2020 4:42:46 PM

Hello Jen and Trent,

I was just made aware of the proposed riparian setback amendment being contemplated and would like to submit my comments and concerns.

I purchased my 4 unit residential property at 2920 Hager Ln., Glenwood Springs, CO in 2017. I work in real estate development and have a license to practice law in Colorado. I have also worked for over a decade as a professional river guide in Colorado and have been very active with multiple river conservation non-profits.

Upon reviewing the details of the proposed legislation, I must say that I am truly shocked the city would be contemplated such vague, overly broad, and ambiguous language when it relates to SO MUCH property devaluation and unnecessary potential confrontation.

I purchased my property specifically because it has great river access and a large riverside area for residents to enjoy the riverside. I lived at the property and know intimately how amazing and how valuable that full access is. There is NO way I would have paid the amount I did for my property if your proposed legislation was in effect. In the way that it is written, there is no way to be certain that I wouldn't loose access to a significant portion of the most valuable piece of my property since it is questionable at best if I would be able to cut back the invasive willows that grow rampantly on the CO river banks. Loosing access is tantamount to loosing an incredible view, even worse for me personally being a boater. It is difficult to calculate the substantial value having full access to a river provides to active minded people in a river community. I can provide lots of old rental listings on facebook and zillow where marketed the property heavily using the pictures of my table, chairs, and hammok overlooking the riverside. If I were to sell, I know the next person would perceive the value significantly diminished with such uncertainty hovering over the property.

What shocks me the most, in my opinion, is what a classic Law School case of 'takings' this appears to be. It sure seems obvious to me that the City of Glenwood Springs is opening itself up to a perfect class action lawsuit from a lot of property owners loosing an incalculable many millions of dollars in takings and harm. I am also shocked that there is not better and clearer grandfathering language at the very least! There are a great number of river property owners who are going to rightly claim many millions of dollars in property devaluation.

We all know that if the riverbanks are partially allowed to be choked with the invasive willows that are present everywhere along the CO riverbanks, there is no way that owners will have the same access they currently possess. Loosing that access is loosing property rights. With a little better consideration for the river property owners' current uses in the ordinance language, it seems like it would be very easy for the City to avoid giant legal liability.

I intend to speak at the next available meeting and become much more active in this process. I realize that this email is arriving past the deadline but I am just now being made aware of this incredibly significant action against my property and hope you will allow it to be included.

Thank you for your consideration,
Erik Rist

From:	Jennifer Ooton
To:	Trent Hyatt
Subject:	FW: Roaring fork river access at river meadows trailer park
Date:	Wednesday, July 8, 2020 10:38:42 AM

Trent,
Could you please add this email to the riparian setback item?
Thanks,
Jenn

From: Debra Figueroa <debra.figueroa@cogs.us>
Sent: Wednesday, July 8, 2020 10:22 AM
To: Catherine Fletcher <catherine.fletcher@cogs.us>
Cc: Jennifer Ooton <jenn.ooton@cogs.us>
Subject: Fwd: Roaring fork river access at river meadows trailer park

Catherine,

Can we please have this as part of the public record? Thank you

Begin forwarded message:

> **From:** Bill Bortz <bortzwm@gmail.com>
> **Date:** July 6, 2020 at 10:37:20 AM MDT
> **To:** Debra Figueroa <debra.figueroa@cogs.us>
> **Subject: Roaring fork river access at river meadows trailer park**
>
> To whom it may concern My name is Wilford Bortz I have a fifth wheel camper in river meadows trailer park and I have some concerns about the upcoming council vote on the setbacks for the river in Glenwood springs I primarily chose to live there because of the grass beach that leads down to the rivers edge that the park keeps mowed I am a disabled Veteran and a below the knee amputee and there are very few areas where I can access the rivers in Colorado this being one where I not only have access but it is very easy access and I can use the restroom facilities in my camper. I also work with Project Healing Waters Fly Fishing and use this area to bring other disabled vets to so that they can fish as well. It is the perfect area for this activity with steps or a gentle hill for them to get down and a clear area behind for their casting. Most of my participants are older Korean War and Vietnam vets in their 70s and 80s and are unable to access almost all river frontage please don't take this area from us my cell 970-390-0038 please call me thanks Wilford Bortz.
> Sent from my iPhone

MINUTES
City of Glenwood Springs
Planning and Zoning Commission
Regular Meeting
May 26, 2020
Zoom
6:00PM

1. **Roll Call**

Present at roll call were Commissioners:	George Shaver, Marco Dehm, Kathryn Grosscup, Amber Wissing, Carolyn Cipperly, Ingrid Wussow, Sumner Schachter
Absent at roll call were Commissioners:	None
Also present were:	Jenn Ooton, Asst. City Manager, Terri Partch, City Engineer, Gretchen Ricehill, Asst. Economic/Community Development Director, Trent Hyatt, Senior Planner Anna S. Itenberg, City Attorney's Office Catherine Fletcher, City Clerk Jessica Bowser, Asst. City Engineer, Alissa Owsley, IT Director

2. **Receipt of Minutes- Receipt of April 28, 2020 and May 5, 2020 minutes.**

   Commissioner Wussow made a motion to receive the minutes, seconded by Commissioner Shaver. Motion passed unanimously.

3. **Public Comments**
   Comments from citizens appearing for items not on the agenda. No citizens were present.

4. **Continued Items –**
   a. *04-20 Consideration of a Major Site/Architectural Plan Review, Rezoning from RH Residential High-Density to RT Residential Transitional and Variance applications for the construction of 100 Multifamily apartment units in 6 buildings on approximately 5.8 acres (PIN 2185-153-04-001, 2185-153-02-008, and 2185-211-00-002)*

Commissioner Dehm reviewed the status of the hearing since May 5, 2020. Dehm noted that the public comment section was closed prior to losing internet connection and that the Planning Commission members had started deliberations prior to losing connection.

Commissioner Schachter asked for clarification of the status of the Blake gate and Blake Avenue improvements. City Engineer Terri Partch explained that these Blake Avenue items were conditions of a previous approval. Jenn Ooton clarified that the gate direction came from Council and was subsequent to Council's consideration of this application. Jenn Ooton indicated that it would be ideal to hold a neighborhood meeting following this application to address Blake gate and other neighborhood traffic issues. Terri Partch confirmed that the traffic study model was created with the assumption that the Blake gate was open.

Commissioner Schachter asked staff when the Blake gate would be opened and asked about the possibility of changing direction, if at all, on Blake. Terri Partch explained that the one-way direction for Blake was determined due to the condition of the asphalt on Blake Avenue.

Commissioner Wissing asked how long the on-site manager would be in place on site. Michael O'Connor from Triumph Development, LLC clarified that that on-site manager was to be a permanent fixture on the site. Commissioner Shaver also asked to confirm the ownership of the property and Trent Hyatt confirmed that the owner of the property, Triumph Development LLC, was also the applicant. Commissioner Shaver also asked about the status of off-site drainage improvements and the parking management plan.

Michael O'Connor explained that part of the parking management plan will rely on the on-site manager and that part of the parking management would be restricting the number of residents per unit and that parking spaces would be numbered and assigned per each tenant's lease. Stephanie Copeland from Triumph confirmed that there would be restrictions for number of residents per unit.

Jenn Ooton clarified the timing of the opening of Blake gate and that it would be open only to construction traffic during building construction and officially opened following issuance of Certificate of Occupancy for the final building on the property.

Commissioner Cipperly asked for clarification of other improvements related to the former project approval. Cipperly specifically asked about sidewalk size and the lack of sidewalk on both sides of the street. Trent Hyatt explained that the new engineering standards were adopted after approval of last application which results in the new application having a different sidewalk width than in the previous project. Trent Hyatt also explained that City Engineer Terri Partch has ability to waive certain construction standards based on topography. Cipperly also expressed concern over the planned 9-foot tall, 400' long retaining wall and expressed concern about wildlife movement. Michael O'Connor confirmed that wildlife would not be able to move through the fence and would need to move around it. Trent Hyatt confirmed that pedestrian access was not required to the privately owned land bordering the site. Cipperly also expressed concern over mitigation of trespassing issues and homeless encampments on the nearby hillside and asked how the site will deter trespassing. O'Connor explained that there will likely be cameras in the parking lots as well as retaining walls and fencing that would also deter trespassing on the site. Cipperly also asked if it was possible to require tenants to list all vehicles registered to a tenant and Stephanie Copeland confirmed that they would require tenants to provide list of all registered vehicle as part of the residency application.

Commissioner Dehm asked if the proposed traffic flow was acceptable to the Engineering Department. City Engineer Terri Partch confirmed that the two way directional flow through gate on Blake Avenue was acceptable. Commissioner Dehm also asked Trent Hyatt to confirm that what the applicant was proposing was a use by right for the zoning district, which was confirmed by Trent Hyatt. Commissioner Dehm also asked the applicant if they had conducted a community meeting. O'Connor summarized that the community meeting was well attended and that the sentiments of the public meeting were similar to the public comments that had been submitted during past Planning & Zoning Commission meetings. The public comments at the meeting addresses scale of project, road conditions, and traffic. application conditions of approval- can these be referenced in the current conditions of approval. Commissioner Dehm also asked if the conditions of approval from previous projects could be referenced with this application and both City Attorney Anna Itenberg and Trent Hyatt both confirmed that Planning & Zoning Commission could include conditions from previous approvals to pass on with this new application as it moves to City Council.

Commissioner Dehm then moved to consider the variances.

Action 1: 04-20 Variance from Section 070.040.080(d)(2)a.2 of the Glenwood Springs Municipal Code which requires internalized parking to be located away from street frontages.

Commissioner Schachter had a question if the variances were not approved if that would prohibit the application from proceeding. City Attorney Anna Itenberg explained that each variance would need to be examined individually and that the applicant could either proceed with denied variances which would require to amend the site plan or appeal the denial. Schachter also asked for confirmation as to how the criteria for approval for each variance related to approval of the whole project. Trent Hyatt explained that many of the variances are closely related and although they are reviewed individually that denying one could substantially alter the entire development.

Commissioner Wussow asked to confirm that since Planning & Zoning is a recommending body that any variance denied by Planning & Zoning could still be approved by City Council. Hyatt explained that Planning & Zoning Commission is the deciding body for variances and the Planning & Zoning could deny a variance and that an appeal would then have to be made by the applicant to City Council.

Commissioner Grosscup made a motion to approve Action #1 with the seven recommended findings on page 12 of staff report. Commissioner Wussow seconded the motion

Commissioner Dehm opened the motion for discussion.

Commissioner Schachter expressed reservations about proceeding with the application without understanding the circulation plan and felt that there were too many unknowns. Schachter explained that he would like to see a circulation plan that had approval of the neighborhood before even considering application approval. Commissioner Wussow stated that it seemed that the variance would not be needed if the owner kept the density as originally approved. Commissioner Shaver found no issue with this specific variance and that he would reserve comments about the general development to the final action item. Commissioner Grosscup expressed no issues with this variance request and felt that this proposed variance allows the project to utilize the topography of the hillside and that this variance resulted in an improved site plan. Commissioner Wissing asked for clarification that the applicant did not create the hardship by their own actions and that the hardship was not related to

convenience. Trent Hyatt confirmed that analysis on page 10 of the staff report identified that the hardship is created by the topography shape and geologic conditions of the property.

Further discussion among Commission members included a general discussion about how the variances relate to the entire development and discussed the need to develop a circulation plan prior to proceeding with all actions.

Jenn Ooton explained that the Planning Commission per Code would be allowed to remand an application back to the Director for further consider and would need to tie the request to remand the application to a specific variance. Ooton explained that if the Commission wanted to see a circulation plan that this request would need to be added as a condition to an applicable variance.

Commissioner Grosscup added that a circulation plan was critical and that ultimately, this area is difficult from a transportation perspective and would like to see more engagement by the City and that the new site plan was an improvement over previous plans for the site.

City Engineer Terri Partch explained that there is an existing circulation plan which was indicated in the traffic study which was modeled with Blake Avenue as a two-way street. Partch explained that the applicant has provided information on circulation and what could be done is request the developer to assist by working with residents to develop a mitigation plan. Commissioner Schachter asked if there were ways to develop a plan that would direct traffic away from the neighborhood. Commissioner Shaver asked for clarification as to what a mitigation plan would involve and Terri Partch explained that a mitigation plan would involve both public input and the creation of solutions based on that public input which could slow, reduce, or redirect traffic through the neighborhood. Ooton mentioned that any sort of street solution such as a cul-de-sac or additional gates could be added as conditions and would need additional consideration for things such as fire access and snow plowing. Commissioner Dehm also mentioned the possibility of moving the gate to 26th Street or a bollard. Commissioner Cipperly expressed concern that the City has not adequately heard from the neighborhoods due to social distancing due to COVID-19. Cipperly also asked if there was a master circulation plan or sidewalk plan for the neighborhood. Commissioner Wussow expressed that it seemed that had the owners kept the original density, construction on the project would have already started. Wussow also stated that if the Commission wished to discuss the development as whole, that should be addressed in Action 4 and that this discussion should focus on Action Item 1.

Commissioner Dehm called for the question.

Commissioners Grosscup, Shaver, Wissing, Cipperly, and Dehm approved, Commissioners Schachter and Wussow denied the Action.

Motion passed 5-2.

Action #2: Variance from Section 070.040.080(e)(3) of the Glenwood Springs Municipal Code requiring developments encompassing three acres to provide at least two housing types.

Commissioner Grosscup made a motion to approve Action #2. Motion was seconded by Commissioner Shaver.

Commissioner Dehm then started discussion on the item.

Commissioner Dehm expressed the opinion that this variance request did not meet the seven criteria. Commissioner Wussow agreed that the hardship was created by increase in density and that this proposed project did not fit with the feel and character of the surrounding area. Commissioner Schachter cited that the singular use of the property does not fit with the goal of trying to provide for a diversity of housing within the city. Commissioner Dehm asked for staff to clarify if the developer could have started construction per prior approval. Trent Hyatt confirmed that the applicant could still start construction based on plans which received previous approval. Commissioner Grosscup stated that this application is an improvement compared to the previously approved application.

Dehm then called for the question to approve Action Item #2.

Commissioners Shaver and Grosscup approved, Commissioners Schachter, Wissing, Dehm, Cipperly, and Wussow denied the motion.

Motion failed 5-2.

Action #3: Rezoning of 2710 Blake Avenue (PIN: 2185-211-002) from RH Residential High Density to RT Residential Transitional.

Commissioner Wussow made a motion to approve the motion, Commissioner Wissing seconded the motion.

Motion passed unanimously.

Action 4: Major Site/Architectural Plan Review to allow for the construction of 100 multi-family apartment units in six buildings.

Commissioner Schachter made a motion to continue the item with the objective to gather more information based on collaborative neighborhood circulation plans with city. Commissioner Wussow seconded the motion. Commissioner Grosscup asked about the motion to continue and if the applicant would be able to create said circulation plan. Jenn Ooton asked to clarify what specifically would be included in the plan and what type of timeline would the plan require. Commissioner Schachter explained that it would be necessary to hold public meetings involving the neighborhood to find a solution for the traffic and transportation concerns. Jenn Ooton explained there would be a need to set a deadline for this process and Commissioner Dehm suggested a period of 60 days. Commissioner Wussow stated that this development that has been a long-term project and that there have been significant community concerns at every juncture. Wussow stated that the current plan, while better than previous plans, still lacks some items and believes that not rushing the project and working with the neighborhood might be the most prudent way to proceed. Commissioner Shaver expressed concern about the project, specifically Building F, and suggested to remove it allowing for more open space and to enlarge Building E to compensate for unit loss. Shaver also questioned if the City would have the resources to improve the streets in the neighborhood given the current economic situation.

Commissioner Schachter made a motion to amend the continuance to 60 days and Commissioner Wussow seconded the amended motion. Commissioner Dehm cautioned that the discussion with the neighborhood would need to focus specifically on traffic circulation and mitigation and trying to develop solutions. Trent Hyatt asked if a date could be chosen for the continuance such as July 28, 2020. Both Commissioner Schachter and Wussow agreed with the date.

The motion passed unanimously.

Following the vote, Stephanie Copeland, Triumph Development, LLC, asked to clarify specifically which items would be required for a circulation plan and if July 28th was the earliest or the latest the application could be heard. Commissioner Schachter explained that what would be satisfy the requirement is a solution-based proposal that better involves the neighborhood to create a circulation and/or mitigation plan that will go to the City for approval. Copeland asked for clarification as to what would constitute satisfaction of the neighbors. Commissioner Schachter indicated that it would be likely best for the City to run the meetings while involving the application. Jenn Ooton also explained that July 28th would likely be the soonest that this issue could be discussed.

Commissioner Wussow also asked if it would be possible to have more information about the possible financial ramifications of the project to the City as to better understand how involved the City would be with this project. Jen Ooton questioned how that directly related to this application.

Commissioner Dehm called for a 5-minute recess at 8:34 PM.

Commissioner Dehm called the meeting back to order following a 5-minute recess.

b. *06-20 Consideration of a Special Use Permit for a Retail Marijuana establishment at 2114 Grand Avenue (PIN 2185-164-00-095)*

At the previous meeting on 5/5/2020, this item had been in the middle of public input when the internet connection was lost. Commissioner Dehm continued the public input portion. City staff had received the following written comments which were read into the record.

- Joel Dembinsky, on April 17th, 2020 sent an e-mail stating that this location is not an appropriate location for a dispensary and believes it incompatible with surrounding residential and commercial uses. Requested denial of the application.
- Garfield & Hecht Law Firm, representing Cedar Lodge, Inc, provided written comment stating that it was their opinion that the proposed marijuana store at 2114 Grand Avenue did not meet the criteria for approval as the location did not seem appropriate given the nearby proximity of a gun store and residential units sharing walls with the proposed store. The letter also expressed concerns over the small size of the parking lot as well as concerns that overflow parking from the proposed store would end up in the Cedar Lodge lot. The letter also mentioned concerns over Kind Castle's ability to adequately manage the odor. Requested denial of the application.
- Michelle Keplinger expressed the opinion that Planning & Zoning Commission should deny the application as there are multiple existing dispensaries in Glenwood Springs. Requested denial of the application.
- Suzanne Stewart requested denial of the application based on the fact there are already eight existing dispensaries and concerns that the proximity of the gas station to the proposed store could lead to increased driving under the influence. Requested denial of the application.
- Cindy Svatos, expressed the opinion that there were already enough dispensaries in Glenwood Springs and stated displeasure over the displacement of the existing frame store. Requested denial of the application.

- Barbara Koziol, provided comments on behalf of the Cedar Lodge, and expressed concerns regarding the location of the proposed store, the proximity to the Cedar Lodge, ability of Kind Castle to adequately manage the odor, and the possibility of an increase in traffic and the possibility of overflow parking from Kind Castle spilling over onto Cedar Lodge's lot. Requested denial of the application.
- Sue Sharpe, provided comments which expressed concerns that there are already a sufficient number of dispensaries in Glenwood Springs, possible negative effects on tourism, proximity of the store to Cedar Lodge and the gun store, and the displacement of the existing frame store. Requested denial of the application.
- Lynette Marie Lacerda, 285 Michaela Lane, New Castle provided comments which expressed concerns over possible increased traffic and congestion on site and a perceived lack of parking. Requested denial of the application.
- Linda Drake, April 29th, provided comments which expressed displeasure over the displacement of the frame store and expressed the opinion that there were already enough dispensaries in Glenwood Springs. Requested denial of the application.
- Dendy Heisel, provided comments which expressed the opinion that there are enough dispensaries in Glenwood Springs and expressed concern over possible increased traffic on site. Requested denial of the application.
- Debbie Roof provided comments that expressed the opinion that there are enough dispensaries in Glenwood Springs and expressed concern over possible increased traffic on site and its proximity to the high school. Requested denial of the application.
- Katie Laven, provided comments that expressed the opinion that there are enough dispensaries in Glenwood Springs and expressed concern over possible increased traffic on site and its proximity to the high school. Requested denial of the application.
- Kristine Del Rio, 1009 Colorado Avenue provided comments that expressed the opinion that there are already enough dispensaries in Glenwood Springs and expressed concern over the proximity of the site to the high school.

Commissioner Dehm opened the public comment to any individuals in the Zoom meeting that wished to speak on the item that had already not submitted comment. No members of the public had comments.

Commissioner Dehm closed the public comment portion of the meeting.

John Dyet, applicant and owner of Kind Castle, provided a summary to the Commission how odor would be managed on site with details of the systems used and how its effects on nearby properties would be managed. Dyet also stated that other dispensaries in town operate with proximity to other businesses and residential areas and felt that their proposed plan made adequate measures to control odor. Dyet also stated that previous amendments to the code ordinance regarding dispensaries were created due to concern over dispensaries effects on tourism which resulted in dispensaries not being allowed in the downtown area and that the proposed location would not negatively affect tourism given the distance from downtown. Dyet also explained that the possible overflow parking into Cedar Lodge is something that Kind Castle could control and manage. Dyet explained that Kind Castle would be a good neighbor to Cedar Lodge and other nearby businesses.

Mark Mayasich, Kind Castle addressed some of the comments expressed during public comment portion of the meeting. Mayasich questioned why it was an issue for a dispensary to share a wall with a gun store when it also shares a wall with a pawn shop and why that would be different. Mayasich also

stated that the location of Kind Castle met the distance requirements of the ordinance and due to its distance from downtown, would not have a negative effect on tourism. Mayasich explained that the barbershop had closed which would free up additional parking spaces and that overflow parking is likely to happen with any business. Mayasich also explained that pre-packaged flower will be sold on site and explained that odor management plan would be more than adequate. Mayasich described how the Kind Castle Parachute location resulted in increased revenue for nearby businesses and believed that the Kind Castle location in Glenwood Springs would have a similar effect. Mayasich also described security measures such as video cameras and window tint that would be used on site.

Discussion among commission members.

Commissioner George Shaver requested staff to provide summary of Police Department and Fire Department comments on the project. Trent Hyatt explained that Police Chief Joe Deras had expressed general concerns over the proposed location and its proximity to residential areas and the general traffic and congestion of the area. Fire Department comments expressed concern over access and ability to maneuver on site.

Commissioner Wissing asked how many complaints the City has received in connection with the marijuana industry in Glenwood Springs. Gretchen Ricehill explained that the City had not received complaints on the retail establishments and has received complaints on the grow facilities on Devereux Road. Commissioner Grosscup asked when the new ordinances for marijuana establishments were established. Trent Hyatt mentioned that City Council has discussed a possible cap on limiting number of dispensaries in town and that no action towards that beyond discussion had occurred.

Commissioner Schachter asked questions regarding the access control plan to the property and how redevelopment would affect the site. Trent Hyatt explained that CDOT had recommended combining the access in the future if the site was redeveloped. Commissioner Dehm asked to confirm that there were two residential units connected to the proposed project space and Trent Hyatt confirmed this.

Commissioner Cipperly had questions regarding the CDOT access permit and if the possible sidewalk realignment would result in a loss of parking. Trent Hyatt explained that there are existing substandard conditions on site and that was unable to comment on possible number of parking spaces lost based on that CDOT access plan. Commissioner Grosscup asked for confirmation for the total number of marijuana applications in town and Trent Hyatt confirmed that there are nine approved applications with seven operating, which does include two cultivation facilities with retail.

Commissioner Wussow made the motion to deny the application. Wussow cited the comprehensive plan and stated reason for denial was that this business pulls business away from downtown. The motion was seconded by Commissioner Cipperly.

Commissioner Schachter mentioned that the application meets the SUP criteria and that the application did not fit the general purpose of the Comprehensive Plan. Schachter also voiced support for City Council to consider a cap on marijuana establishments within the City. Commissioner Cipperly stated that while the use of this property was appropriate, there are concerns over increase in traffic to an already congested area. Commissioner Wussow further explained that the Comprehensive Plan is clear on the importance on consolidating businesses in the downtown. Commissioner Dehm stated that it is not Planning & Zoning Commission's job to determine the appropriate number of marijuana establishments in the City. Dehm explained that the purpose of a Special Use Permit is to evaluate if a

proposed use fits with surrounding uses and cited the fact that no other marijuana establishments in town are in a mixed-use building. Dehm explained that because it was a mixed-use building with residential units, that this site was not the best place for the proposed project.

Vote taken. Motion to deny the application passed unanimously.

5. New Items

a. *20-19 Consideration of a Code Amendment to Section 070.010.070 of the Glenwood Springs Municipal Code regarding the City's nonconforming use regulations.*

Commissioner Shaver recused himself and left the meeting.

Trent Hyatt summarized the intent of the proposed code amendment as it related to legal non-conforming structures in riparian areas.

No public comments were received.

Commissioner Wussow asked if the City would provide additional information to the public that resides along the river. Trent Hyatt explained that additional outreach would be provided for the proposed riparian setback code amendment and not this specific amendment.

Commissioner Cipperly made a motion to approve the item with the findings as stated in the staff report. The motion was seconded by Commissioner Schachter.

The motion to approve the item passed unanimously. Commissioner Shaver had already recused himself from the meeting.

6. Commissioner Comments

Commissioner Wussow stated that this meeting illustrated two potential problems with code in the variance requirements and the number of marijuana establishments and that the City could explore further discussion on those items. Commissioner Schachter expressed a desire to be able to restart the conversation and discussion on housing with the Housing Commission. Commissioner Grosscup mirrored Schachter's statement on housing and asked if Midland Avenue improvement were still planned. Jenn Ooton confirmed that these improvements were still on schedule. Commissioner Cipperly stated would like to see a reconsideration of code regarding the parking requirement reduction in code based on proximity to transit. Commissioner Dehm asked if City Hall would be reopening to the public and Jenn Ooton explained that a press release would be issued explaining that staff would be allowed back in the office and not the public. Dehm also asked if there was a possibility of an in-person meeting in June and Jen Ooton could not confirm that and explained that the City was looking at option for an in person meeting. Commissioner Schachter also congratulated City Clerk Catherine Fletcher for her recent feature in the Post Independent.

7. Adjournment

Meeting was adjourned at 10:06 PM.

Planning and Zoning Commission Report

Date: May 26, 2020
To: Planning and Zoning Commission
From: Trent L. Hyatt, Senior Planner
Subject: #20-19 – Nonconforming Use/Riparian Setback Code Amendment

REQUEST	Consideration of a Code Amendment to Section 070.010.070 of the *Glenwood Springs Municipal Code* regarding the City's nonconforming use regulations as they relate to activities in riparian setbacks subject to Section 070.040.020(d)(24).
APPLICANT	City of Glenwood Springs
OWNER	Multiple public and private properties
ZONE	All zone districts City wide, where applicable

ACTION ITEM:

The Planning and Zoning Commission (Commission) is the recommending body to City Council on any and all revisions to the *Glenwood Springs Municipal Code* (Code).

Action 1 - Code Amendment – to revise the nonconforming use regulations in Section 070.010.070 of the *Glenwood Springs Municipal Code* as it relates to activities occurring in the riparian setback areas subject to Section 070.040.020(d)(24).

Staff recommendation: *Staff recommends **approval** of the Code Amendment with the findings on pages 4-5.*

BACKGROUND/ANALYSIS

History/Proposal

The Commission first considered a text amendment to revise the City's current riparian setbacks, Section 070.040.020(d)(24) of the Code, at the July 23, 2019 regular meeting. Discussion regarding the proposal was continued to September 24, 2019. At said meeting, the Commission took additional public comment and discussed various issues related to the impacts of the increased setback on the developability of applicable parcels and to existing nonconformities. Thereafter, consideration of the proposal was continued on a monthly basis while staff collected additional mapping and surveying information to depict the impacts on various City owned properties. On February 25, 2020, the Commission reviewed the mapping provided by staff and once again took public comment on the proposed Code Amendment. A recommendation for approval of the proposed setback revision was received with amendments to the language recommended by staff, mainly to revise the area of disturbance within the required setback from 10 to 50 percent. Additionally, the Commission recommended a revision to the nonconforming use regulations, Section 070.010.070, to acknowledge temporary earth disturbing activities/grading occurring

within the area subject to the setback to repair existing legal nonconforming structures. Staff reports, minutes, and other pertinent information from these meetings are attached for your review.

After receiving the Commission's recommendation, staff determined that an amendment to the nonconforming use regulations of Section 070.010.070 would require an additional, separate Code Amendment because the original public notice only included a revision to Section 070.040.020(d) Development in Waterways and Areas of Special Flood Hazard, specifically subsection (24) where riparian setbacks are addressed. Therefore, language which addresses the Commission's request as it relates to nonconforming use regulations is provided below. Notice related to the Code Amendment was published in the *Glenwood Springs Post Independent*.

Proposed Code Amendment

Section 070.010.070 of the Code provides guidance on various nonconformities (i.e. use, structures, lot, site features, etc.) that may exist on properties subject to both the existing and/or proposed riparian setback and all other applicable development regulations. Questions arose during the Commission's discussions as to how the City will address these legal nonconformities. Section 070.010.070, subsection (b)(3)a states, "*[M]inor repairs and maintenance of nonconformities are permitted and encouraged, provided that the repairs and maintenance do not increase the degree of nonconformity.*" Disturbance of riparian setback areas adjacent to said nonconformities is likely necessary to maintain/repair/replace a structure located therein (subject to existing floodplain regulations). However, the Commission desired language that specifically addresses these additional disturbances/grading activities. Based on the motion made by the Commission, staff recommends adding the language outlined in ***bold italics*** below to Section 070.010.070(b)(3)b of Code to address the matter.

> ***Section 070.010.070(b)(3)b***
>
> ***1. Temporary disturbance to make minor repairs of a nonconforming structure within the riparian setback required by 070.040.020(d)(24) shall be limited to fifteen feet around the structure and shall be returned to the previous vegetation or with appropriate riparian plant species. However, vegetation listed on the Garfield County noxious weed list shall not be replanted.***

Code Amendment Approval Criteria

Section 070.060.040(c)(3)d.3 of the Code outlines the approval criteria for revision thereto. Each of the criteria are listed in **bold** below along with comments from staff.

i. Is consistent with the Comprehensive Plan and other City policies;

As shown at right in blue hatching, the various *Future Land Use* maps of the *Glenwood Springs Comprehensive Plan* (Comp Plan) depict the *City's* rivers as Riverside Protection. According to the Comp Plan, the Riverside Protection designation states: "*Land and habitat along the Colorado and Roaring Fork rivers should be protected.*" The current proposal is related to riparian setback and is in compliance with the map designation and description.

"Preserve natural resources" is a community goal outlined in the Executive Summary and subsequent chapters of the Comp Plan. Specific objectives and strategies related to the goal are outlined in the table below.

Comprehensive Plan Goal	Objective and Strategy
-Preserve natural resources	-Promote water conservation (Chapter 7, Page 84) - Plan for the city-owned land adjacent to the river trail (Chapter 8, Page 91) -Enhance and promote world-class fishing (Chapter 8, Page 93) -Continue leadership in protecting the natural setting (Chapter 9, Page 98) -Preserve and enhance the river corridor environment (Chapter 9, Page 100) - Support efforts in protect the Roaring Fork River and Colorado River systems (Chapter 9, Page 100) - Minimize human/wildlife conflicts (Chapter 9, Page 102)
Staff Comment: The proposed text amendment relates to the previously considered riparian setback Code Amendment and directly addresses each of the objectives/strategies outlined above. Maintaining riparian zones allows for better storage of water in lands adjacent to the rivers supporting efforts outlined in City's Water Conservation Master Plan. The proposal preserves and protects the potential future use of City owned riverfront property for public access, wildlife/fishery habitat, bank health, and/or the health of the river as outlined in the Comp Plan. The proposal helps to maintain the health of our world class fisheries and the water we rely on for other recreational activities which drive our regional economy. An update of the regulation is necessary to continue our leadership in protecting and supporting our natural settings by preserving our attractive, and healthy Colorado River and Roaring Fork River ecosystems. The current Code Amendment also acknowledges a property owner's right to maintain/repair/replace a legal nonconforming structure in the future	

ii. Does not conflict with other provisions of this Code or other provisions in the Glenwood Springs Municipal Code;

It does not appear the proposal conflicts with other provisions of the Code. Instead, the proposed amendment clarifies the ability to disturb various areas within the riparian setback to maintain/repair/replace legal nonconforming structures.

iii. Is necessary to address a demonstrated community need;

As discussed with the riparian setback amendment discussion, the City lags behind neighboring communities in the protection of our water resources. Protection of riparian areas is essential to improve water quality as it limits the amount of nutrients and chemicals entering our rivers and streams via stormwater runoff. Eliminating the application of fertilizers and other chemicals in the riparian zone is necessary to protect human drinking water, for which the City's has an intake

on the Roaring Fork River. Additionally, the proposal is needed to achieve and support the numerous Comp Plan goals, strategies and objectives outlined above.

iv. Is necessary to respond to substantial changes in conditions and/or policy; and

Adoption of the proposed standard is related and in response to the riparian setback Code Amendment previously reviewed by the Commission and is intended as further clarification. The riparian setback standard is headway in the City's future compliance with EPA Municipal Separate Storm Sewer System (MS4) permit requirements anticipated when our population exceeds 10,000 persons with the forthcoming 2020 census. While the intent of the existing regulation is the same, an amendment is necessary to acknowledge the benefits riparian plant species provide to water quality and ensuring the protection of human drinking water. Additionally, the proposal is needed to achieve and support the numerous Comp Plan goals, strategies and objectives, outlined above, and adopted since the establishment of the existing regulation.

v. Is consistent with the general purpose and intent of this Code.

The proposal appears to be consistent with the general purpose and intent of the Code as an existing similar standard is located therein. More specifically, the proposed amendment supports "integrated development", "regulating the development of land upon impacts", and "guarding against natural hazards".

Reviewing Agency Comments
No comments related to the proposed amendment were received from City or local referral agencies.

Adjacent Property Owner Comments
As of the date of this staff report, no additional comments from applicable property owners have been received.

ACTION ALTERNATIVES AND STAFF RECOMMENDATION:

Section 070.060.040(c)(3)d.1 of the Code explains, "*The Planning Commission shall review the Code amendment application and recommend approval, approval with conditions, or denial of the amendment in accordance with 070.060.030(g) and the approval criteria in paragraph 3 below* [addressed by staff above]. The Planning Commission may also continue the hearing.

Action 1 – Code Amendment – to revise the nonconforming use regulations in Section 070.010.070 of the *Glenwood Springs Municipal Code* as it relates to activities occurring in the riparian setback areas subject to Section 070.040.020(d)(24).

Staff recommendation: Staff recommends **approval** of the Code Amendment with the **findings** below:

Recommended Findings:

1. The proposed amendment is consistent with the Comprehensive Plan and other City policies as outlined on pages 2-3 of the staff report;

2. The proposed amendment does not conflict with other provisions of this Code or other provisions in the Glenwood Springs Municipal Code as outlined on pages 3-4 of the staff report;
3. The proposed amendment is necessary to address a demonstrated community need as outlined on page 4 of the staff report;
4. The proposed amendment is necessary to respond to substantial changes in conditions and/or policy as outlined on page 4 of the staff report; and
5. The proposed amendment is consistent with the general purpose and intent of this Code as outlined on page 4 of the staff report.

Below is the proposed draft language recommended to City Council by the Planning and Zoning Commission (Commission). Said language has been revised from that which was originally proposed in order to address comments received by the Commission, public, and various property owners. Additions are underlined and deletions are ~~struck through~~.

Section 070.010.070(b)(3)b Nonconforming Use Regulations

Temporary disturbance to make minor repairs of a nonconforming structure within the riparian setback required by 070.040.020(d)(24) shall be limited to fifteen feet around the structure. The temporary disturbed area shall be returned to the previous vegetation or with appropriate riparian plant species.

070.040.020(d) Development in Waterways and Areas of Special Flood Hazard

(24) Conservation of Waterways

It is the purpose of this Subsection 070.040.020(d)(24) to conserve and promote the health of the City's riparian ecosystems, ~~and~~ water quality, and protect human drinking water by maintaining a functional natural buffer adjacent to waterways.

a. **Applicability**

All new improvements, buildings, additions, structures, excavations, grading, dumping, clearing of native vegetation, or backfill shall be subject to the requirements of 070.040.020(d)(24)b *Standards* unless the applicant demonstrates to the City Engineer and the Director by clear and convincing evidence that one or more of the following conditions is met:

1. The removal of native vegetation, not to exceed ~~10~~50 percent of the setback area defined below, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be interpreted to allow for permanent structures of any kind within said area.
2. The construction of bridges, public utilities, public paths for non-motorized use, public open space areas and boat ramps, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices that do not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.
3. Removal of vegetation listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm in compliance with applicable regulations. Vegetation shall be replaced with appropriate riparian plant species to limit erosion.
4. Applicant demonstrates one or more of the following:
   i. ~~t~~The area does not contain significant riparian plant species or functions: ~~or~~

DRAFT

ii. The area is impacted by previous earth disturbing activities: ~~and~~or
iii. The proposed ~~activity~~ improvement (including but not limited to the trimming of vegetation, construction of access path or steps, hot springs pools) ~~improves water quality, limits erosion, and promotes riparian or wetland restoration~~ does not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

b. **Standards**

1. No improvement, building, structure, excavation, grading, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within ~~fifty~~ thirty-five feet of the ordinary high-water mark (as defined by the US Army Corp of Engineers), measured horizontally, of any river or live perennial stream.
2. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted within said ~~fifty~~ ~~foot~~thirty-five-foot setback area.

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MINUTES
City of Glenwood Springs
Planning and Zoning Commission
Regular Meeting
February 25, 2020
Council Chambers, First Floor, City Hall
101 W. 8th Street
6:00PM

APPROVED

1. Roll Call

Present at roll call were Commissioners:	Amber Wissing, Marco Dehm, Kathryn Grosscup, Carolyn Cipperly, Dean Kinkel and Ben West
Absent:	Ingrid Wussow, George Shaver, and Sumner Schachter
Also present were:	Jenn Ooton, Asst. City Manager, Director Gretchen Ricehill, Assist. Director Hannah Klausman, AICP, Senior Planner Trent Hyatt, Senior Planner Anna S. Itenberg, City Attorney's Office Kathleen Michel, Admin. Assistant

2. Receipt of Minutes January 28, 2020

Motion: On motion of Commissioner Cipperly, seconded by Commissioner Wissing, the minutes were accepted as written. Motion carried by voice vote.

3. Comments from citizens appearing for items not on the agenda. No citizens were present.

4. Election of Chairman and Vice-chairman

Nomination: Commissioner Grosscup, seconded by Commissioner Cipperly, nominated Marco Dehm as chair and Sumner Schachter as vice chair. Carried by voice vote.

Continued Items

5. 20-19 – Consideration of a Code Amendment to Section 070.040.020(d)(24) of the Glenwood Springs Municipal Code regarding riparian setbacks.

Trent Hyatt presented the staff report;

- The proposal was previously considered in 2018 and 2019 by Planning & Zoning Commission and City Council.
- Following staff meeting September 2019, staff hired High Country Engineering to evaluate the peak flow of the rivers.
- Found that flow was greater than anticipated for several areas.
- Staff then hired SGM to study the actual flow rates at specific locations and prepare flood plain models.
- Impact was less than anticipated
- Nonconforming use regulations
- Flood plain regulations in Municipal Code apply
- Intent: added statement to include "protect human drinking water"
- Applicability was added for additional uses such as boat ramps as well as other public or private uses
- Standards definition of OHWM set using USACE definition
- Options: Further revise setback from OHWM, disturbance area allowed, additional non-conforming use regulation revisions
- New recommendations from the public acknowledged
- Staff recommends adoption of code amendment

Questions to staff
Commissioners discussed the proposed regulations and compared to surrounding jurisdictions including those of Garfield County; flood plain mapping, and funding of a riparian survey.

Commissioner Dehm asked about setback and application to three specific properties: the airport, former Raymond property which is currently city owned, and Two Rivers Park. Dehm asked for what the biggest change would be in the standards and Hyatt explained that new regulations would prevent removal of vegetation from protected area.

Comments from River Commission invited:
Ashley Moffatt, 509 Maple Street, chair, noted that the code does not provide any measurement for cooling river waters. High river temperatures and algae blooms have occurred with the rivers. Other jurisdictions are replanting riparian habitat areas to help cool waters. Also commented on how neighboring jurisdictions regulate setback of the riparian area.

Scott Schreiber, vice chair of the River Commission, spoke in favor of the passing the proposed amendment.

Chad Rudow, 1201 Mountain Drive, Glenwood Springs. Mr. Rudow was representing the Roaring Fork Conservancy which has served as a technical advisor. The Conservancy is a science-based organization that speaks about the health of rivers. Stated that scientific studies show that riparian setbacks help to preserve the health of watersheds. Referenced a study from 2014 that states that buffers of greater to or equal to 30 meters were the most

APPROVED

effective. Garfield County arrived at its 30-foot setback as a compromise between 50 feet and no setback. Voiced support for the passing of this amendment.

Laurie Rink from Middle Colorado Watershed Council spoke about flood damage in Colorado and programs to protect property from damage. The Council is currently working on an integrated watershed management program for the region, including a fluvial hazard delineation which will cover the Glenwood Springs area. The Middle Colorado Watershed Council voices their support for the passing of the proposed amendment.

6:43 p.m. Opened hearing to public comment.

Dan Angeloro, 612 Cowdin Drive expressed opposition to the proposed amendment on the grounds that the proposed amendment would severely impact how he uses his property and believes it would negatively affect his property value.

Dr. Paul Salmen, 1504 Midland Avenue spoke about the proposal as a reasonable measure to protect the rivers. Salmen expressed support of the amendment and believes protection of the river will enhance home values. However, he believed that the ordinance was not ready until some of the details of the proposed 35-foot setback were spelled out. There needs to be more robust provisions for grandfathering existing buildings and access paths; homeowners need the right to trim, but not remove vegetation; homeowners need a right to restore the riverbank; the 10% access is probably too restrictive – 30-foot or 15%, whichever is greater, is probably more reasonable but not to allow disturbance that adds to surface runoff. The ordinance is not ready until all stakeholders are heard from. He suggested that the Roaring Fork Conservancy be tasked with providing a monthly newsletter in best practices.

Michael Blair, 1204 Sprucewood Lane, was concerned about the proposal as property owners have the right to use their properties. Many chemicals in river come from anywhere upstream before it even reaches Glenwood Springs. Support more education on use of river properties, plantings, and how to provide access to the river without harming the riverbank rather than the proposed amendment which controls private use of property.

Hailey Carmer, 901 Grand Avenue, used combined time of four property owners to speak in opposition of amendment. Questioned whether these regulations are necessary, especially in prohibiting removal of riparian area plantings.

Gary Vick, 614 Cowdin Drive representing himself and the Friends of the Roaring Fork. Mr. Vick spoke representing himself and seven others. Spoke in opposition to the amendment and claimed devaluation of properties adjacent to the river. He presented two proposed motions for Commission consideration and requested to have a stakeholder meeting to redraft this ordinance.

7:26 p.m. closed public comment.

Commission Cipperly asked if an engineer was required to plan removal of any vegetation. Trent Hyatt confirmed that this was not the expectation of the amendment.

Trent Hyatt confirmed that non-conforming uses would be allowed to continue under the proposed amendment in recognition that property owners retain use of the river.

Ms. Ooton explained that this came from the development code revision. River Commission became involved through the review process.

Scott Schreiber addressed the restoration of riparian areas to reduce river temperatures in Steamboat Springs.

Ashley Moffatt also spoke about Steamboat Springs program.

Chairman Dehm questioned Mr. Hyatt about public outreach completed by the City. Commissioner Dehm asked how the proposed amendment would apply to current property owners. Mr. Hyatt explained that the amendment would only affect the use of chemicals and removal of additional plantings in the future. Hyatt also explained that there were exceptions included in the proposed amendment which include: proving that activity will not result in increased water quality degradation, stream bank erosion or a reduction of the function and quality of a riparian area or wetland.

Commissioner Grosscup asked about the language concerning proposed activity descriptions.

Discussion: Based on public input, Commissioner Grosscup recommended that the limit of 10% for removal of vegetation was too low. City should be held to its own regulations, as there have been projects that have not been great in terms of relationship with the river. Wanted greater distance for application of chemicals. Also, there was a request for a provision for revegetation of riparian area after construction work, and discussion regarding non-conformities.

Chad Rudow, Roaring Fork Conservancy, stated that they often receive calls from concerned citizens but knows who to contact with those concerns. River users are good stewards of the river. We receive information from rafters, fishing guides, other river users.

Commissioner Cipperly also mentioned that education for property owners would be necessary.

Motion: Item 20-19 to approve the proposed Amendment to Section 070.040.020(d)(24) of the Glenwood Springs Municipal Code regarding riparian with the following changes: the area of native vegetation removal be changed from "not to exceed 10%" to "not to exceed 50%"; change "activity" in Paragraph 4 (iii) to "improvements", and adding language to the non-conforming section of the Code to address existing nonconforming structures. Motion by Commissioner Grosscup, seconded by Commissioner Cipperly. Motion carried unanimously.

Break at 8:15 p.m. Resumed meeting at 8:20 p.m.

New Items

6. Item 02-20 – Consideration of a Variance request from a required 20-foot rear yard setback.

Applicant: Steven B. Pittman
Owner: Steven B. Pittman and Patricia J. Pittman
Address: 604 N. Traver Trail

APPROVED

Zone District: R/2-Multi-Family-Oasis Creek Planned Unit Development

Gretchen Ricehill presented the staff report.

- The proposed bedroom encroaches approximately 7 feet into the 20-foot setback
- Variance would allow wheelchair access to main floor bedroom
- A 2007 variance was allowed for a deck into east side setback
- In 2018, the property boundary line was adjusted to address deck encroachment
- Historical encroachments due to angled placement of home on the lot
- Complied with the variance criteria and staff recommended approval
- Reviewing agencies did not raise questions

Steve Pittman, 604 Traver Trail, spoke briefly regarding his application.

Public Comment: No one appeared.

Motion: Commissioner Cipperly moved to approve the item with findings and conditions on page 8 of the staff report. Commissioner Grosscup seconded. Motion carried unanimously.

7. Item 01-20: Amending ADU Standards 070.040.080

Hannah Klausman presented the staff report and summarized the proposed Code changes as follows:

- Increasing size of units from 850 to 1,000 square feet
- Allowing detached ADUs in front and at sides of primary dwelling
- Altering design standards
- Changing percentage from 49% to 55% of the principal dwelling and altering method of how ADU size is measured

Commissioners asked about implications for existing nonconforming structures and conversions to ADUs; proposed increase of maximum size; total lot coverage requirements; addition of design standards.

Motion: Commissioner Grosscup moved, seconded by Commissioner Cipperly, to approve the proposed Code changes with the addition of the requirement that ADUs provide two architectural features from the four-sided design requirement listed in Section 070.040.080 (e)-Residential Building Design and Character. The motion carried unanimously.

8. Item 48-19 – Location & Extent Review- construction of a 5-bay 2250 square foot garage/shop building; 3150 square foot covered storage building; 1140 square foot wash bay, fuel station with above ground storage tanks and 6-foot tall black chain link fence.

Applicant: City of Glenwood Springs
Owner: City of Glenwood Springs
Address: 2222 Devereux Road
Zone District: I2-River Industrial

APPROVED

Gretchen Ricehill presented the staff report.

Commissioners asked about visibility of structures from Highway 6 and I-70; and applicability of sidewalk requirements.

Motion: Commissioner Kinkel moved to approve Item 48-19; Commissioner Wissing seconded with conditions on page 5. Carried unanimously.

9. Extending Meeting Motion" Made to extend meeting to 11:00 p.m. by Commissioner Grosscup, seconded by Commissioner Wissing. Motion carried by voice vote.

10. Nomination for Chair and Vice-Chair of Planning & Zoning Commission. Commissioner Wussow nominated Commissioner Dehm as Chair and Commissioner Schachter as Vice Chair. Commissioner Cipperly seconded. Motion carried by voice vote.

11. Planning Commission work sessions – There has been a request for additional work sessions on items such as solar panels, housing, parking, comprehensive plan update, landscaping, and other items.

12. Commissioner Comments

Commissioner Kinkel felt the Commission made progress this evening.

Commissioner Cipperly was glad to have completed riparian amendment, would like to see more riparian vegetation installed by the City. Was also happy to have passed the new ADU requirements.

Commissioner Grosscup: Mentioned that the Housing Commission would be going on a tour of valley to see examples of affordable housing on March 11th.

Commissioner Wissing: Expressed thanks for former Commissioner Malloy's service.

Commissioner West: Thanked Commission for allowing opportunity to serve on the Commission.

13. Director Comments

14. Adjournment 10:22 PM

APPROVED

Planning and Zoning Commission Report

Date: February 25, 2020
To: Planning and Zoning Commission
From: Trent L. Hyatt, Senior Planner
Subject: #20-19 – Riparian Setback Text Amendment

REQUEST	Consideration of a Code Amendment to Section 070.040.020(d)(24) of the *Glenwood Springs Municipal Code* regarding riparian setbacks
APPLICANT	City of Glenwood Springs
OWNER	Multiple public and private properties
LOCATION	Applies to areas within 35 feet of the ordinary high-water mark of perineal water courses within the City
ZONE	All zone districts City wide, where applicable

ACTION ITEM:

The Planning and Zoning Commission (Commission) is the recommending body to City Council on any and all revisions to the *Glenwood Springs Municipal Code* (Code).

Action 1 - <u>Code Amendment</u> – to revise the riparian setback standards of Section 070.040.020(d)(24) of the *Glenwood Springs Municipal Code*.

<u>Staff recommendation</u>: *Staff recommends **approval** of the Code Amendment with the findings on page 10.*

BACKGROUND/ANALYSIS

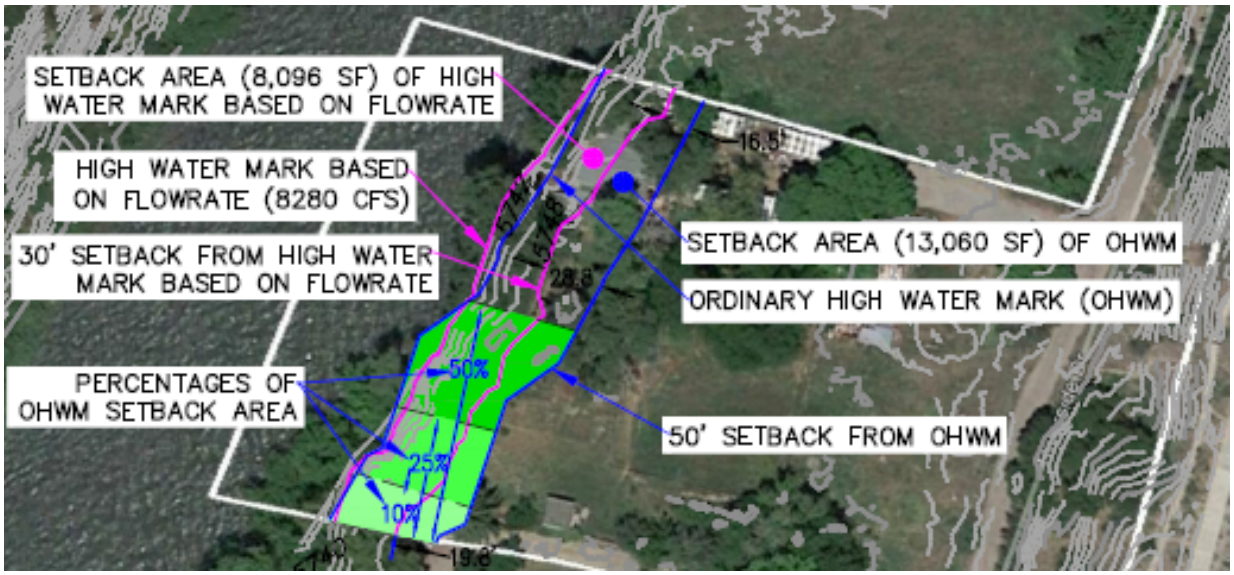
History/Proposal

The Commission first considered the proposed text amendment at the July 23, 2019 regular meeting. Discussion regarding the proposal was continued to September 24, 2019. At said meeting, the Commission took additional public comment and discussed various issues related to the impacts of the increased setback on the developability of applicable parcels and to existing nonconformities. Since then, consideration of the proposal has been continued on a monthly basis while staff was collecting the requested information. All information previously provided to the Commission (i.e. staff reports, supporting documentation, comments from various property owners and organizations, etc.) is attached for your review.

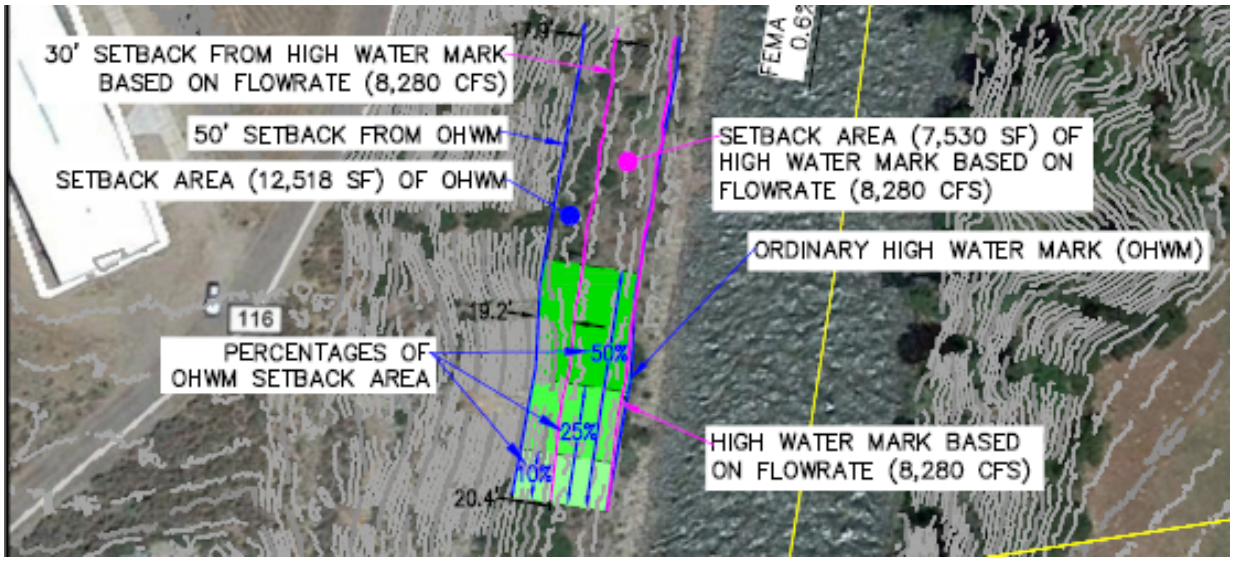
While the Commission continued consideration of the text amendment monthly as required, Staff decided to re-notice property owners along the City's applicable water courses that the text amendment would be up for discussion at the February 25, 2020 meeting. Notice was also published in the *Glenwood Springs Post Independent*.

Mapping Evaluation

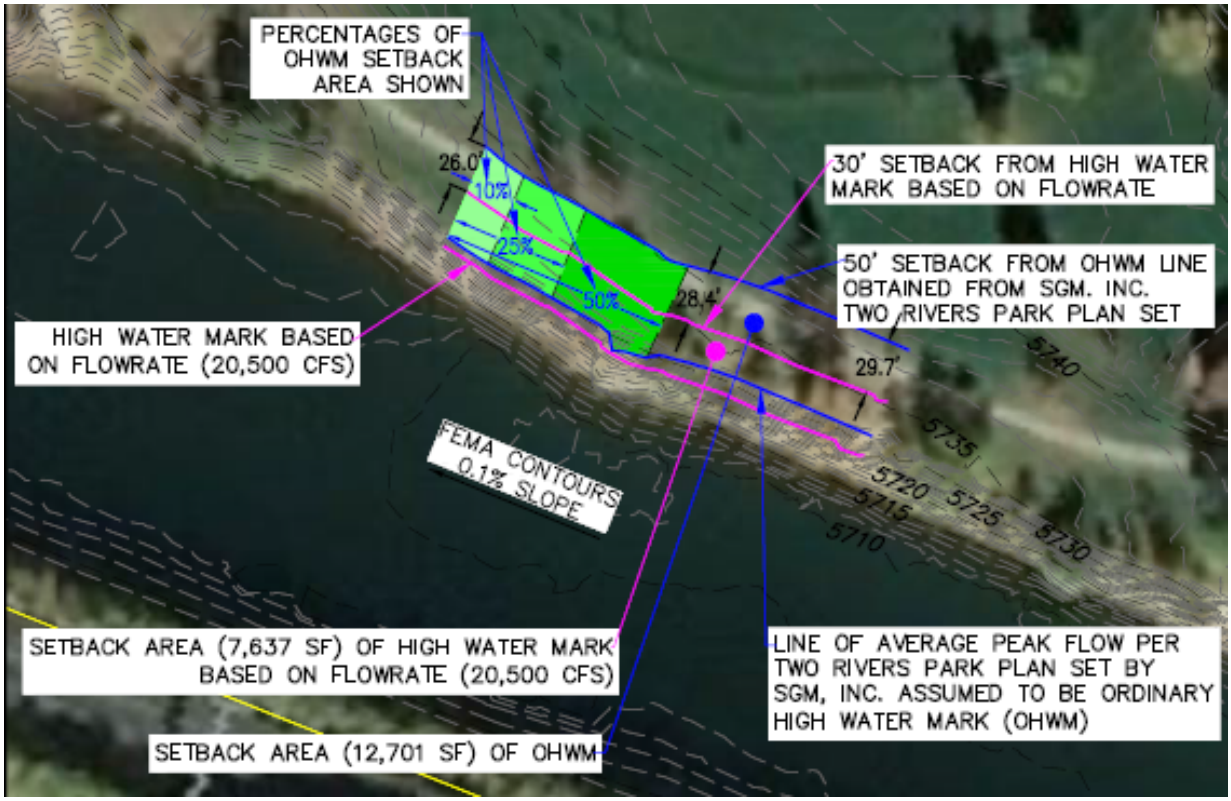
Much of Commission's discussion centered on how to better understand the impacts of the proposed 50-foot setback from the ordinary high water mark (OHWM) as compared to the existing 30-foot setback from the high water mark (defined as 20,500 cubic feet per second (cfs) for the Colorado River, 8,280 cfs for the Roaring Fork River, and the highest known water mark from other perennial streams (which is not widely known)). Staff was asked to provide graphic representations comparing the proposed and existing regulations. High Country Engineering (HCE) was contacted to help with the mapping evaluation and was tasked with determining the approximate flow rates above and the related 30-foot setback on various City owned properties. In contrast, HCE surveyed the OHWM (exclusive of one site provided by others) and depicted a 50-foot setback therefrom. Additionally, the Commission desired to make sense of the proposed 10 percent disturbance area within the area subject to the proposed 50-foot setback. HCE preformed three mapping exercises, two along the Roaring Fork River (adjacent to the former Raymond property and the Airport property) and one on the Colorado River at Two Rivers Park which are attached for your review. Portions of the maps are also depicted below.



Former Raymond property - HCE



Airport Property - HCE

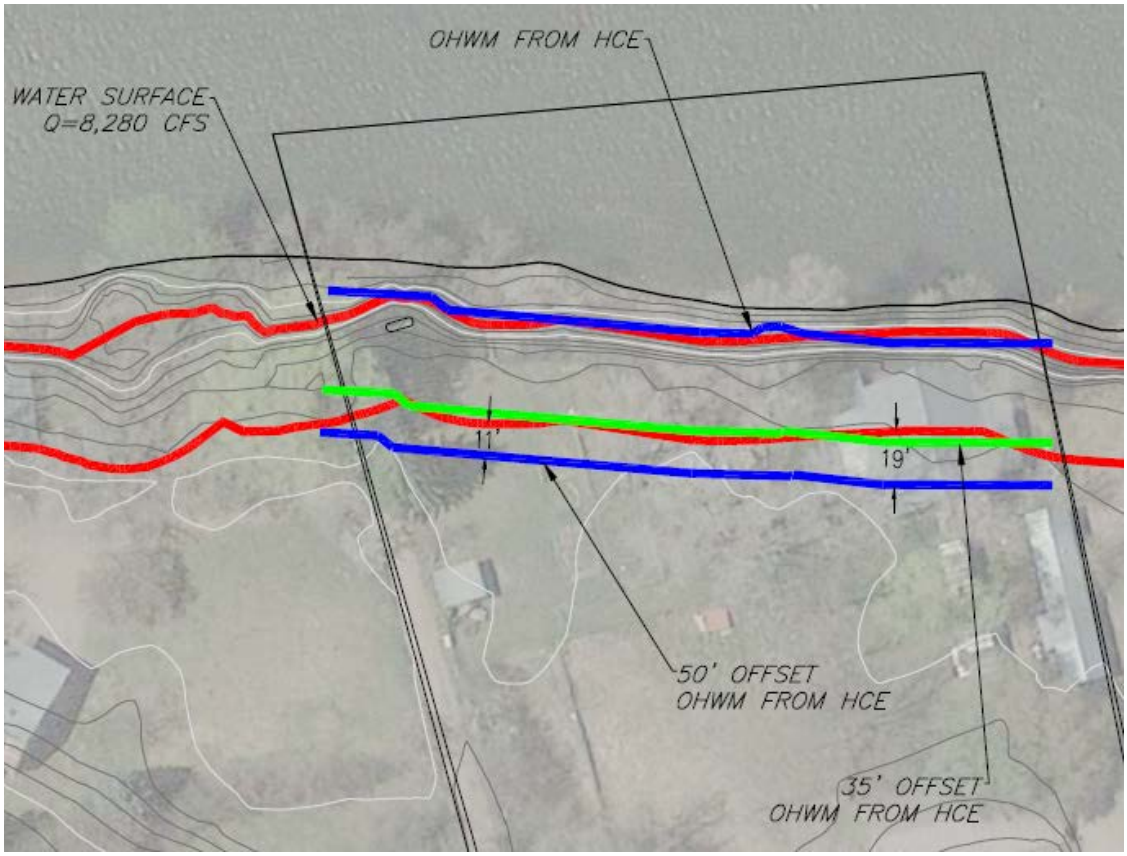


Two Rivers Park - HCE

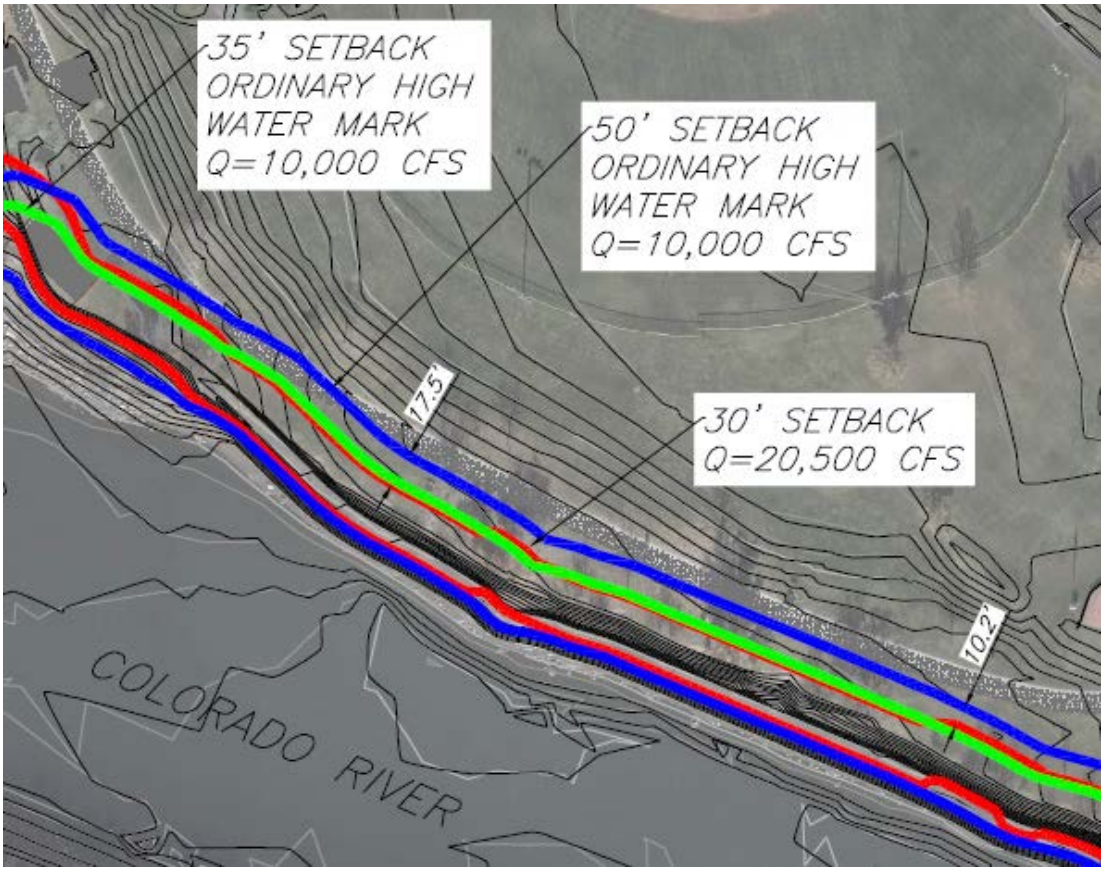
HCE's mapping depicts the high water mark and related existing 30-foot setback requirement in purple. The estimate of the high water mark was determined by using the flow rate of a 100 year storm event and calculating it down to the flows currently defined in the Code outlined above. The surveyed OHWM and proposed 50-foot setback are shown in blue. Various shades of green depict 10 (proposed), 20, and 50 percent of the proposed setback which could allow for disturbance by property owners. Staff also requested HCE call out the difference/distance between the existing and proposed setbacks.

Prior to HCE's mapping analysis, Staff anticipated that area impacted by the proposed 50-foot setback from the OHWM and existing 30-foot setback from high water mark would be similar due to the different points from which each is measured. However, HCE's found the high water mark and OHWM to be fairly similar resulting in an overall setback increase ranging from 17.9 feet (smallest difference found at the Airport) to 29.7 feet (largest difference found at Two Rivers Park) along the three City-owned properties studied.

HCE's findings alerted staff that additional, more detailed analysis was necessary. Therefore, SGM was contacted to review the data against existing hydrologic and hydraulic (floodplain) models previously prepared for the Red Mountain Passage (formerly referred to as the 14th Street) Pedestrian Bridge just upstream of the former Raymond property and the Two Rivers Park Shoreline Restoration Project. SGM was able to input the high water mark flow rates directly into the floodplain models prepared for each site to determined where the exiting 30-foot setback is located. SGM also determine the proposed 50-foot setback proposed from the surveyed OHWM for each site.



Former Raymond Property (orientation rotated) – SGM



Two Rivers Park – SGM

SGM's mapping (attached and shown above) depicts the high water mark and related existing 30-foot setback requirement in red. The surveyed OHWM and proposed 50-foot setback are shown in blue. Additionally, a 35-foot setback from the OHWM is depicted in green and further discussed below. Again, staff requested SGM call out the difference/distance between the existing and proposed setbacks similar to HCE.

Nonconformities

Section 070.010.070 of the Code provides guidance on various nonconformities (i.e. use, structures, lot, site features, etc.) that may exist on properties subject to both the existing and/or proposed riparian setback and all other applicable development regulations. Questions arose during the Commission's discussion as to how the City will address said legal nonconformities. Staff is of the opinion that Section 070.010.070 already addresses the matter. Subsection (b)(3)a states, "*[M]inor repairs and maintenance of nonconformities are permitted and encouraged, provided that the repairs and maintenance do not increase the degree of nonconformity.*" Further explanation for repairs is provided but it is understood that disturbance of the riparian setback area would likely be necessary to repair/replace (within 18 months as allowed) a nonconforming structure destroyed by flood (subject to existing floodplain regulations as is intended by the reference made in Section 070.010.070(b)(3)b) or fire for instance. Stabilization/revegetation of disturbed areas would be required for any construction site including those within a riparian setback area.

Subsection (f) addresses nonconforming/substandard site features such as parking, landscaping, and buffers and requires the upgrading of these areas when vehicular areas are enlarged, square footages are increased, building façades are changed substantially, or the expansion of outdoor uses (such as storage for contractors' yard) occur. This section of the Code is intended to minimize the impacts of proposed development on adjacent properties. Staff does not believe this section provides guidance for how to address nonconformities within a riparian setback (existing in the Code and/or currently proposed).

Proposed Revised Standard

While the maps prepared by HCE and SGM show differing impacts (varying approximately 5-10 feet) for the proposal, both make it clear that the 50-foot setback is an increase in the existing 30-foot setback regardless of the point from which the two are measured. A significant increase in the riparian setback was never staff's intent as the original proposal was instead meant to prevent the loss/removal of riparian vegetation and improve water quality by eliminating the application of hazardous chemicals in the related riparian zone. As a result, staff is now recommending a 35-foot setback from the OHWM instead. A 35-foot riparian setback from OHWM is also outlined in Garfield County's development regulations and would allow for consistent outreach, messaging, and enforcement across both jurisdictions. A copy of the draft language is attached and provided below which explains staff recommended revisions as compared to the language previously reviewed by the Commission. Additions are red underlined and deletions are ~~struck through.~~

070.040.020(d) Development in Waterways and Areas of Special Flood Hazard

(24) Conservation of Waterways

It is the purpose of this Subsection 070.040.020(d)(24) to conserve and promote the health of the City's riparian ecosystems, ~~and~~ water quality, and protect human drinking water by maintaining a functional natural buffer adjacent to waterways.

a. **Applicability**

All new improvements, buildings, additions, structures, excavations, grading, dumping, clearing of native vegetation, or backfill shall be subject to the requirements of 070.040.020(d)(24)b *Standards* unless the applicant demonstrates to the City Engineer and the Director by clear and convincing evidence that one or more of the following conditions is met:

1. The removal of native vegetation, not to exceed 10 percent of the setback area defined below, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be interpreted to allow for permanent structures of any kind within said area.
2. The construction of bridges, public utilities, public paths for non-motorized use, public open space areas and boat ramps, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices that do not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.
3. Removal of vegetation listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm in compliance with applicable regulations. Vegetation shall be replaced with appropriate riparian plant species to limit erosion.
4. Applicant demonstrates one or more of the following:
   i. ~~t~~The area does not contain significant riparian plant species or functions; ~~or~~
   ii. The area is impacted by previous earth disturbing activities; ~~and~~or
   iii. The proposed activity (including but not limited to the trimming of vegetation, construction of access path or steps, hot springs pools) ~~improves water quality, limits erosion, and promotes riparian or wetland restoration~~ does not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

b. **Standards**

1. No improvement, building, structure, excavation, grading, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within ~~fifty~~ thirty-five feet of the ordinary high-water mark (as defined by the US Army Corp of Engineers), measured horizontally, of any river or live perennial stream.
2. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted within said ~~fifty foot~~thirty-five-foot setback area.

As shown above, staff also proposes additional minor revisions to the language previously considered by the Commission. "Boat ramps" were added to the list of public related activities commonly found in riparian areas in subsection 2. Also, subsection 4 was revised to resemble subsection 2 and to remove any unintended higher standard of review for activities proposed on private property as opposed to public. Staff also identified some activities that commonly occur in riparian zones that we do not intend to limit when there is not a negative impact to water quality, erosion, or wetland functions such as the trimming of vegetation, access steps, or hot springs pools.

Other Considerations

While staff recommends the draft language presented above, there are certainly other options for the Commission to consider. These options include keeping the 50-foot setback from OHWM

originally proposed, further defining uses or activities that are exempt from the setback, revising the allowed disturbance area within the setback (0%, 25%, or 50%), and others. However, after thorough consideration and as explained herein, we have decided against these options.

Draft Riparian Guide
Education related to the importance of riparian zones and best practices for activities occurring therein is necessary alongside any regulation intended for the same purpose. With that said, staff has been in the process of developing a riparian zone planting guide to provide to property owners, landscapers, etc. in the future. A copy of the draft document is attached for your review. Said document will be finalized following consideration of the text amendment so that information related thereto can be included, if applicable.

OHWM Survey
In anticipation of the proposed setback, staff requested funding for a survey of the OHWM in the 2020 budget. If such a setback is adopted by City Council, staff would prepare a request for proposals for qualified firms to prepare said survey. Having this information will be beneficial in helping property owners and staff understand the location of the OHWM and the area subject to the proposed setback.

Code Amendment Approval Criteria
Section 070.060.040(c)(3)d.3 of the Code outlines the approval criteria for revision thereto. Each of the criteria are listed in **bold** below along with comments from staff.

i. Is consistent with the Comprehensive Plan and other City policies;

As shown at right in blue hatching, the *Future Land Use* maps of the *Glenwood Springs Comprehensive Plan* (Comp Plan) depict the *City's* rivers as Riverside Protection. According to the Comp Plan, the Riverside Protection designation states: "*Land and habitat along the Colorado and Roaring Fork rivers should be protected.*" The current proposal is in compliance with the map designation and description.

"Preserve natural resources" is a community goal outlined in the Executive Summary and subsequent chapters of the Comp Plan. Specific objectives and strategies related to the goal are outlined in the table below.

Comprehensive Plan Goal	Objective and Strategy
-Preserve natural resources	-Promote water conservation (Chapter 7, Page 84) - Plan for the city-owned land adjacent to

	the river trail (Chapter 8, Page 91) -Enhance and promote world-class fishing (Chapter 8, Page 93) -Continue leadership in protecting the natural setting (Chapter 9, Page 98) -Preserve and enhance the river corridor environment (Chapter 9, Page 100) - Support efforts in protect the Roaring Fork River and Colorado River systems (Chapter 9, Page 100) - Minimize human/wildlife conflicts (Chapter 9, Page 102)
Staff Comment: The proposed text amendment directly addresses each of the objective and strategies outlined above. Maintaining riparian zones allows for better storage of water in lands adjacent to the rivers supporting efforts outlined in City's Water Conservation Master Plan. The proposal preserves and protects the potential future use of City owned riverfront property for public access, wildlife/fishery habitat, bank health, and/or the health of the river as outlined in the Comp Plan. The proposal helps to maintain the health of our world class fisheries and the water we rely on for other recreational activities which drive our regional economy. An update of the regulation is necessary to continue our leadership in protecting and supporting our natural settings by preserving our attractive, and healthy Colorado River and Roaring Fork River ecosystems.	

ii. Does not conflict with other provisions of this Code or other provisions in the Glenwood Springs Municipal Code;

It does not appear the proposal conflicts with other provisions of the Code. Instead, the proposed amendment replaces and clarifies an existing riparian setback regulation making it easier for property owners and staff to understand and apply. The OHWM is easier to define without detailed, costly engineered hydrologic and hydraulic analysis required to determine the flow rate associated with high water mark. Potential issues related to existing legal nonconforming structures are addressed above.

iii. Is necessary to address a demonstrated community need;

The City lags behind neighboring communities in the protection of our water resources. Protection of riparian areas is essential to improved water quality as it limits the amount of nutrients and chemicals entering our rivers and streams via stormwater runoff. Eliminating the application of fertilizers and other chemical in the riparian zone is necessary to protect human drinking water, for which the City's has an intake on the Roaring Fork River. Additionally, the proposal is needed to achieve and support the numerous Comp Plan goals, strategies and objectives outlined above.

iv. Is necessary to respond to substantial changes in conditions and/or policy; and

Adoption of the proposed standards is headway in the City's future compliance with EPA Municipal Separate Storm Sewer System (MS4) permit requirements anticipated when our population exceeds 10,000 persons with the forthcoming 2020 census. While the intent of the existing regulation is the same, an amendment is necessary to acknowledge the benefits riparian

plants species provide to water quality and ensuring the protection of human drinking water. Additionally, the proposal is needed to achieve and support the numerous Comp Plan goals, strategies and objectives, outlined above, and adopted since the establishment of the existing regulation.

v. Is consistent with the general purpose and intent of this Code.

The proposal appears to be consistent with the general purpose and intent of the Code as an existing similar standard is located therein. More specifically, the proposed amendment supports "integrated development", "regulating the development of land upon impacts", and "guarding against natural hazards".

Reviewing Agency Comments
No comments related to the proposed amendment were received from City or local referral agencies.

Adjacent Property Owner Comments
As of the date of this staff report, no additional comments from applicable property owners have been received. That being said, previously received comments are attached.

Other Comments
Staff has received comments from various groups and organizations related to the proposal as outlined below. Said comments are attached for your review.

Comments in support of the proposed code amendment were received from the following:
1. Andrea Holland - Hydrologist and former River Commissioner;
2. American Rivers;
3. Trout Unlimited - Ferdinand Hayden Chapter;
4. Roaring Fork Conservancy; and
5. Roaring Fork Fishing Guide Alliance

Comments in opposition to proposed code amendment were received from the following:
1. Balcomb and Green on behalf of the Glenwood Hot Springs Lodge & Pool, Inc.
2. Garfield and Hecht on behalf of Friends of the Roaring Fork

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ACTION ALTERNATIVES AND STAFF RECOMMENDATION:

Section 070.060.040(c)(3)d.1 of the Code explains, "*The Planning Commission shall review the Code amendment application and recommend approval, approval with conditions, or denial of the amendment in accordance with 070.060.030(g) and the approval criteria in paragraph 3 below* [addressed by staff above]. The Planning Commission may also continue the hearing.

Action 1 – Code Amendment – to revise the riparian setback standards of Section 070.040.020(d)(24) of the *Glenwood Springs Municipal Code*.

Staff recommendation: Staff recommends **approval** of the Code Amendment with the **findings** below:

Recommended Findings:

1. The proposed amendment is consistent with the Comprehensive Plan and other City policies as outlined on pages 7-8 of the staff report;
2. The proposed amendment does not conflict with other provisions of this Code or other provisions in the Glenwood Springs Municipal Code as outlined on page 8 of the staff report;
3. The proposed amendment is necessary to address a demonstrated community need as outlined on page 8 of the staff report;
4. The proposed amendment is necessary to respond to substantial changes in conditions and/or policy as outlined on pages 8-9 of the staff report; and
5. The proposed amendment is consistent with the general purpose and intent of this Code as outlined on page 9 of the staff report.

CITY OF GLENWOOD SPRINGS
COMMUNITY DEVELOPMENT

PUBLIC NOTICE

Please take notice that the Glenwood Springs Planning and Zoning Commission (Commission) will continue discussion regarding an amendment to Section 070.040.020(d)24 *Development in Waterways and Areas of Special Flood Hazard* of the *Glenwood Springs Municipal Code* related to riparian setbacks in all zone districts of the City on **February 25, 2020 at 6:00PM** in the Council Chambers, Glenwood Springs City Hall, 101 W. 8th Street, Glenwood Springs, Colorado. The proposed regulation would apply to development and earth disturbing activities in areas adjacent to rivers/live perennial streams. The Commission previously conducted a public hearing on the matter and may or may not decide to take additional comment. Additional information related to the proposal is available for review in the Community Development Department at City Hall, 101 W. 8th Street, Glenwood Springs, Colorado 81601, or by calling (970) 384-6427.

Below is the proposed draft language subject to review and consideration by the Planning and Zoning Commission (Commission). Said language has been revised from that which was originally proposed in order to address comments received by the Commission, public, and various property owners. Additions are underlined and deletions are ~~struck through~~.

070.040.020(d) Development in Waterways and Areas of Special Flood Hazard

(24) Conservation of Waterways

It is the purpose of this Subsection 070.040.020(d)(24) to conserve and promote the health of the City's riparian ecosystems, ~~and~~ water quality, and protect human drinking water by maintaining a functional natural buffer adjacent to waterways.

a. **Applicability**

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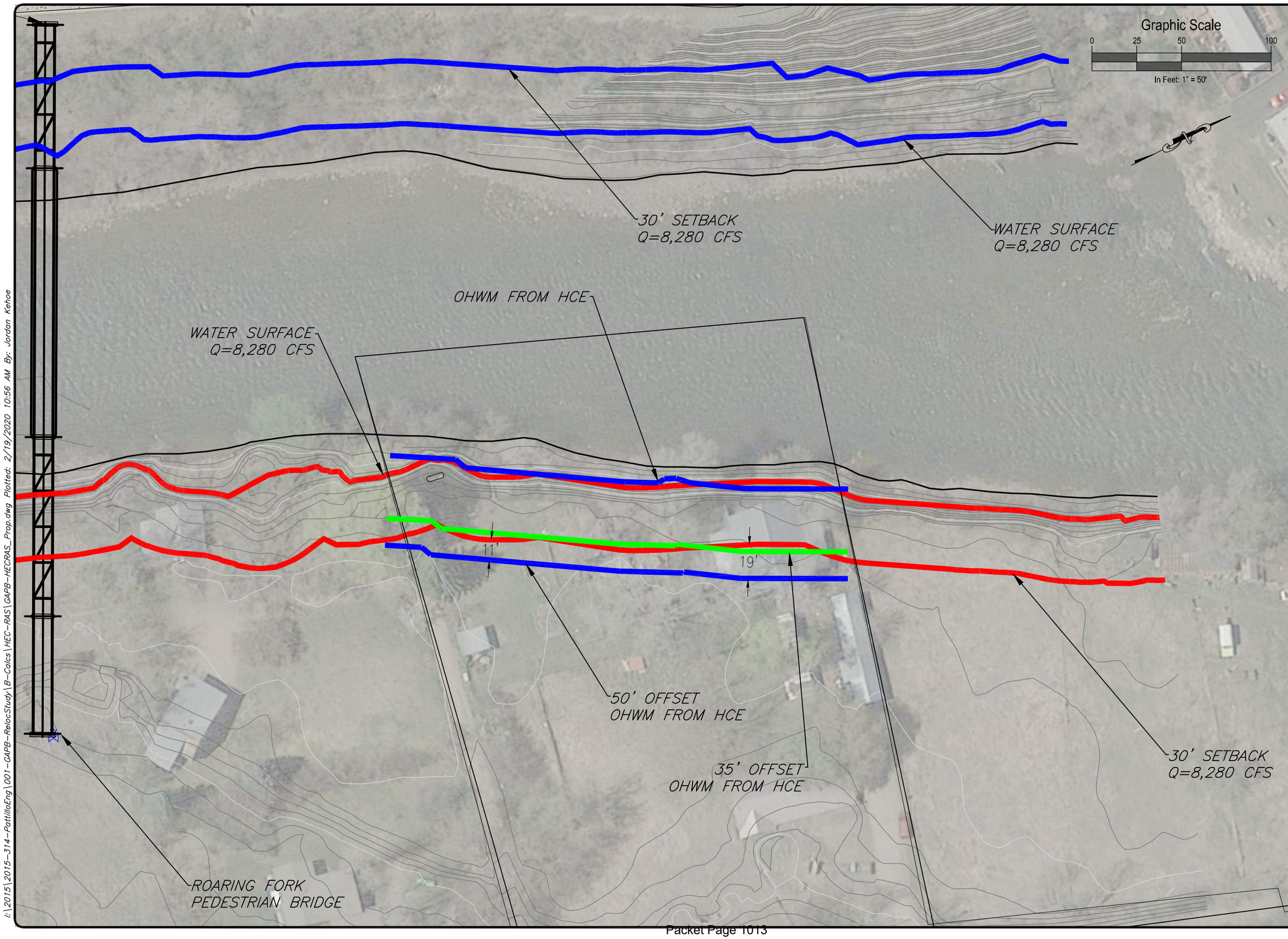
1. The removal of native vegetation, not to exceed 10 percent of the setback area defined below, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be interpreted to allow for permanent structures of any kind within said area.
2. The construction of bridges, public utilities, public paths for non-motorized use, public open space areas and boat ramps, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices that do not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.
3. Removal of vegetation listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm in compliance with applicable regulations. Vegetation shall be replaced with appropriate riparian plant species to limit erosion.
4. Applicant demonstrates one or more of the following:
   i. ~~t~~The area does not contain significant riparian plant species or functions; ~~or~~
   ii. The area is impacted by previous earth disturbing activities; ~~and~~or
   iii. The proposed activity (including but not limited to the trimming of vegetation, construction of access path or steps, hot springs pools) ~~improves water quality, limits erosion, and promotes riparian or wetland restoration~~ does not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

b. **Standards**

1. No improvement, building, structure, excavation, grading, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within ~~fifty~~ thirty-five feet of the ordinary high-water mark (as defined by the US Army Corp of Engineers), measured horizontally, of any river or live perennial stream.
2. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted within said ~~fifty foot~~thirty-five-foot setback area.

DRAFT



SGM
118 West Sixth Street, Suite 200
Glenwood Springs, CO 81601
970.945.1004 www.sgminc.com

Raymond Property
Garfield County, Colorado

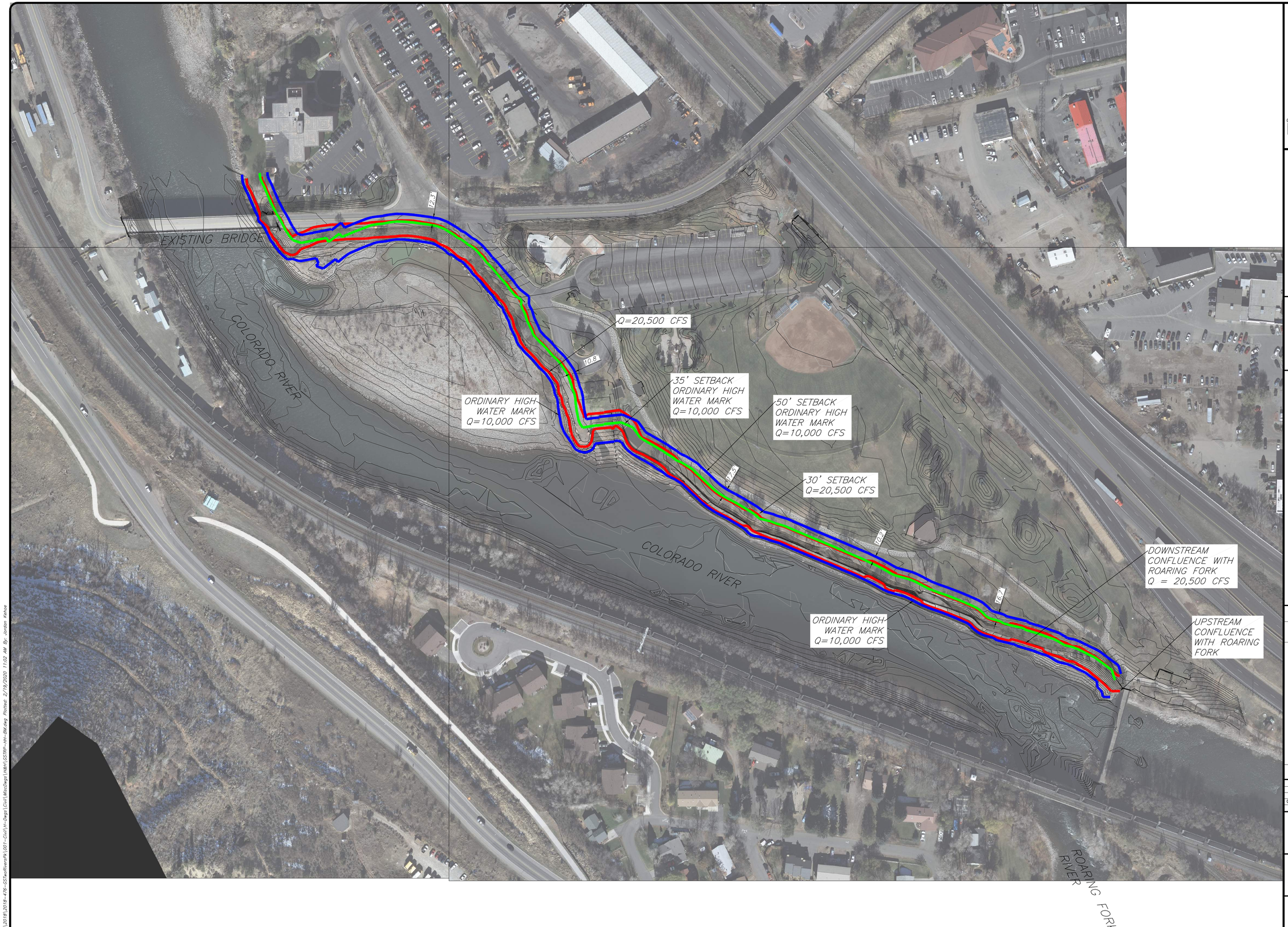
1	Preliminary Not For Construction
	Project Milestone:

	2020-130
	JAK
	02/19/2020
QC: RB	PE: RB
	GAPB-HECRAS_Prop

Roaring Fork Water Surfaces and Setbacks

Exhibit

I:\2015\2015-314-PattilloEng\001-GAPB-RelocStudy\B-Calcs\HEC-RAS\GAPB-HECRAS_Prop.dwg Plotted: 2/19/2020 10:56 AM By: Jordan Kehoe



Graphic Scale

0 40 80 160

In Feet: 1" = 80'

SGM
118 West Sixth Street, Suite 200
Glenwood Springs, CO 81601
970.945.1004 www.sgm-inc.com

Two Rivers Park
Glenwood Springs, CO

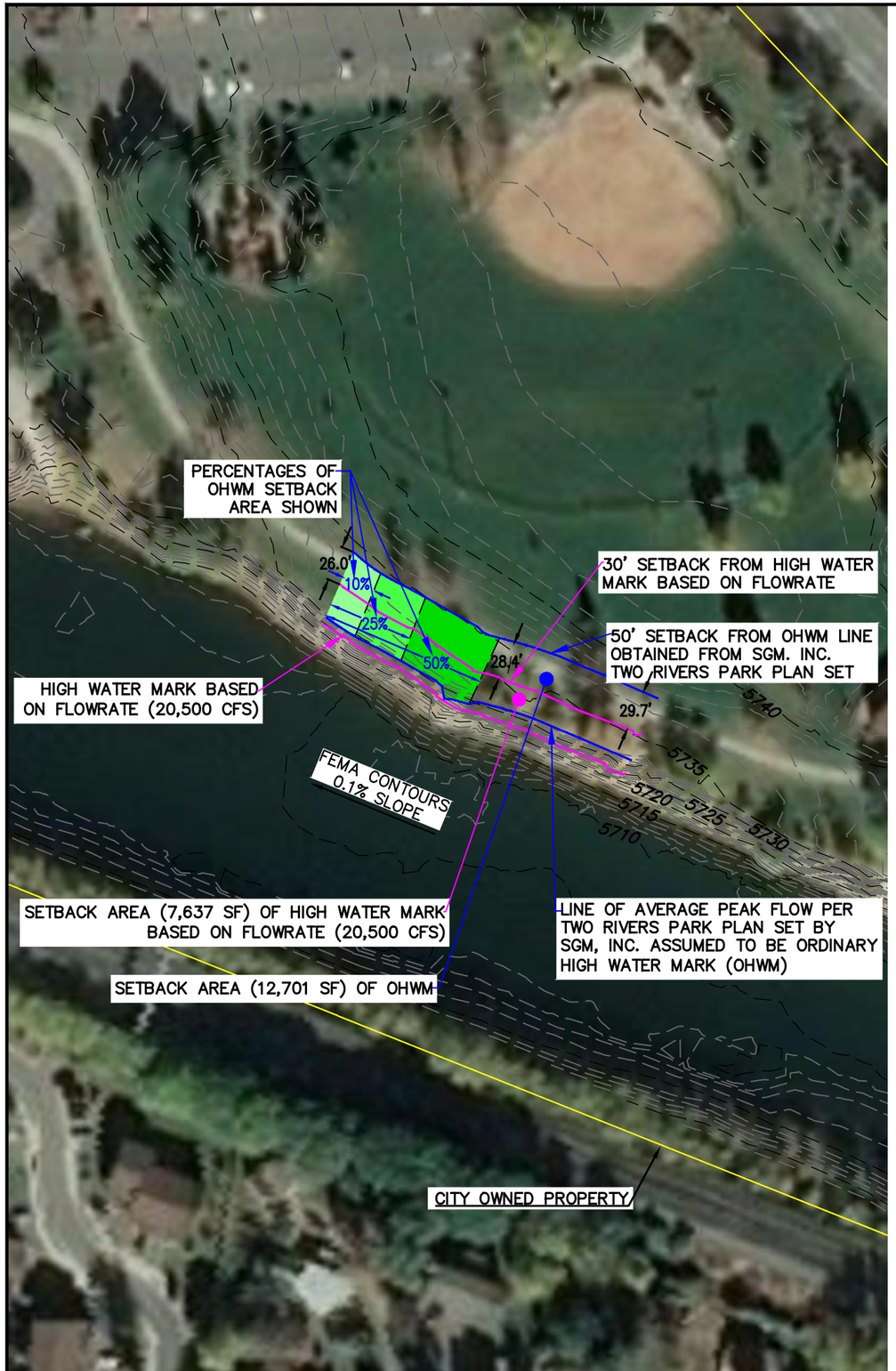
Project Milestone: Preliminary Not For Construction

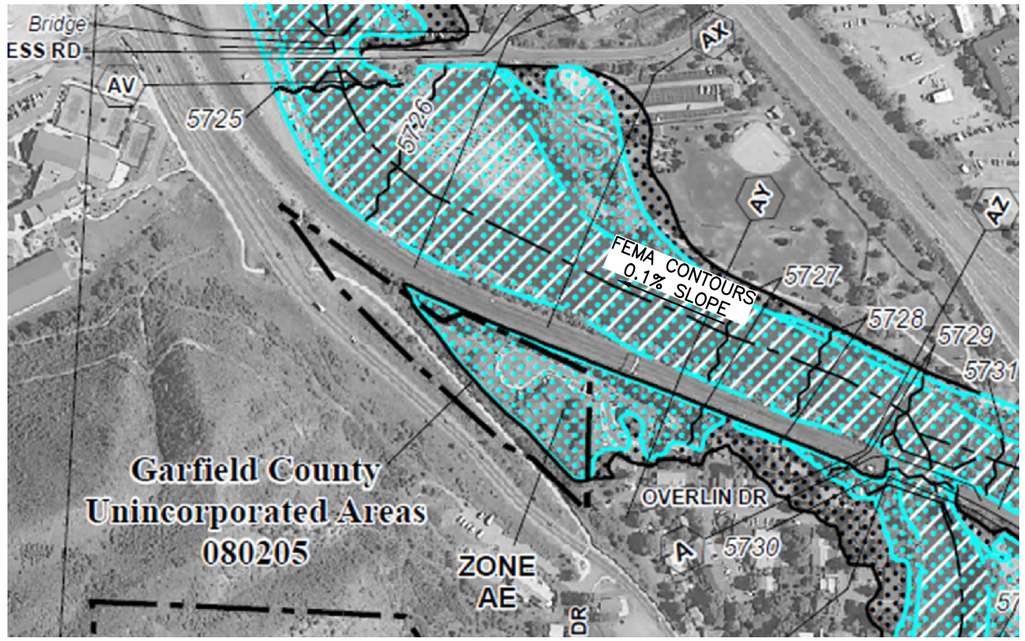
2018-476.001
JAK
02/19/2020
QC: RB PE: RB
GSTRP-HH-BM

Colorado River Water Surfaces and Setbacks

Exhibit

I:\2018\2018-476-GSTwoRiversPk\001-Civil\H-Dwgs\Civil\MiscDwgs\H&H\GSTRP-HH-BM.dwg Plotted: 2/19/2020 11:02 AM By: Jordan Kehoe





FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
COLORADO RIVER (AT GLENWOOD SPRINGS)								
AJ	14,102	302	3,889	10.3	5,699.5	5,699.5	5,699.5	0.0
AK	15,093	150	2,574	15.5	5,700.5	5,700.5	5,701.2	0.7
AL	16,085	262	4,704	8.5	5,704.7	5,704.7	5,705.7	1.0
AM	16,825	177	2,977	13.4	5,704.9	5,704.9	5,705.9	1.0
AN	17,627	178	3,176	12.6	5,707.3	5,707.3	5,708.1	0.8
AO	18,589	306	4,863	8.2	5,710.6	5,710.6	5,711.5	0.9
AP	19,617	230	2,975	13.4	5,711.8	5,711.8	5,712.5	0.7
AQ	20,654	198	2,914	13.7	5,715.1	5,715.1	5,715.8	0.7
AR	21,842	326	4,594	8.7	5,719.5	5,719.5	5,720.3	0.8
AS	23,027	354	2,743	14.6	5,721.1	5,721.1	5,721.6	0.5
AT	23,077	187	2,520	15.9	5,721.1	5,721.1	5,721.6	0.5
AU	23,166	187	2,682	14.9	5,722.1	5,722.1	5,722.5	0.4
AV	23,155	274	4,150	9.6	5,724.7	5,724.7	5,724.9	0.2
AW	23,620	517	7,214	5.5	5,726.4	5,726.4	5,726.5	0.1
AX	24,037	247	3,751	10.7	5,726.5	5,726.5	5,726.5	0.0
AY	24,369	248	3,178	12.6	5,726.7	5,726.7	5,727.1	0.4
AZ	24,910	206	2,875	13.9	5,728.9	5,728.9	5,729.1	0.2
BA	25,283	161	2,651	12.3	5,731.3	5,731.3	5,731.6	0.3

[1]Feet Above South Canyon Creek Road

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

GARFIELD COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

COLORADO RIVER

NOTES:

1. ORIGINAL CODE HIGH WATER MARK WAS DETERMINED UTILIZING DATA FROM SECTION AY OF THE FEMA FLOODWAY DATA FOR THE COLORADO RIVER. HCE INTERPOLATED THE HIGH WATER MARK UP AND DOWNSTREAM OF SECTION AY BASED ON THE CHANGE IN ELEVATION BETWEEN THE NEAREST FEMA 100-YR FLOOD PLAIN ELEVATIONS. AS THE ORIGINAL CODE HIGH WATER MARK EXTENDS DOWNSTREAM, THE CHANGE IN ELEVATION WAS INTERPOLATED USING THE APPROXIMATE SLOPE (0.1%) BETWEEN THE FEMA 100-YR FLOODPLAIN CONTOUR ELEVATIONS AND DECREASED APPROXIMATELY 0.3 FEET ALONG THE HIGH WATER MARK BASED ON FLOWRATE (20,500 CFS).

2. THE ORDINARY HIGH WATER MARK (OHWM) USED FOR EVALUATION WAS FROM THE TWO RIVERS PARK PLAN SET BY SGM, INC.

HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 FAX (970) 945-2555
WWW.HCENG.COM

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
OR 534-0700 IN METRO DENVER
CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

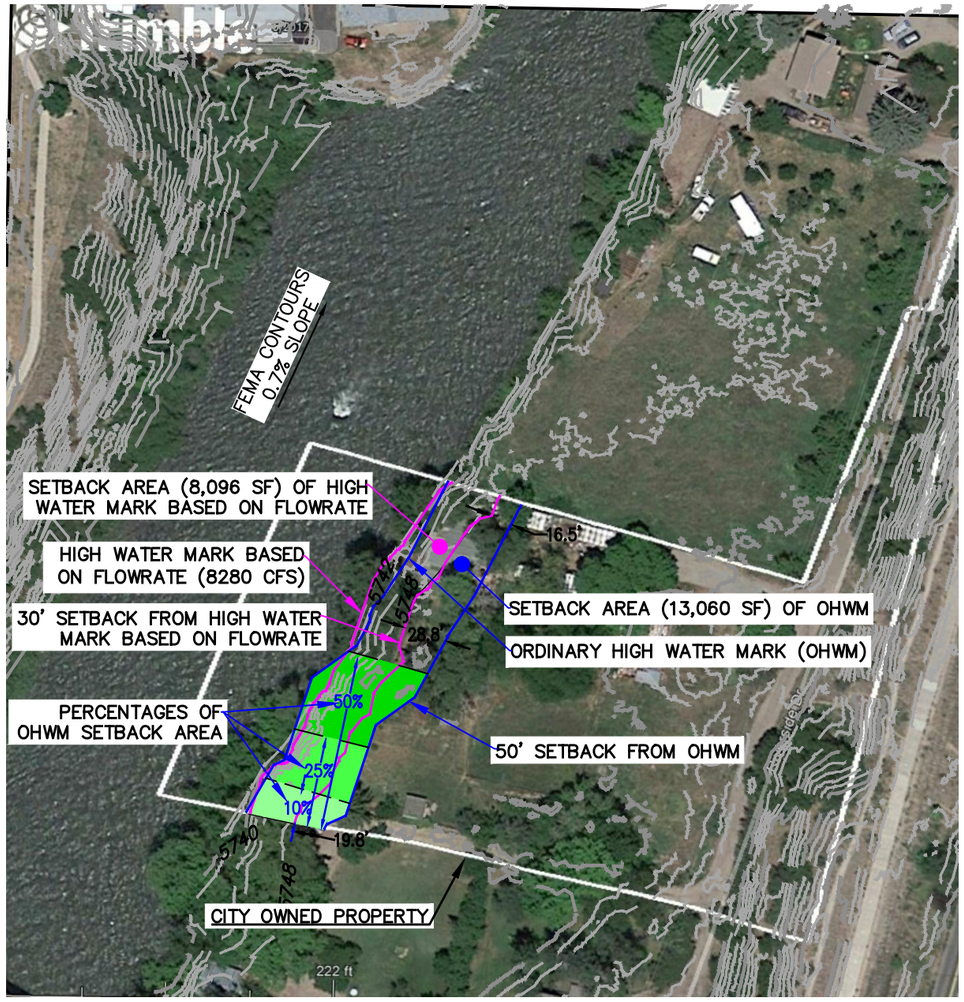
NO.	DATE	REVISION	BY

DRAWN BY: HCE
CHECKED BY: RDN
DATE: 12-03-19
FILE: RIPARIAN SETBACK.DWG

THE CITY OF GLENWOOD SPRINGS
GLENWOOD SPRINGS, COLORADO

COLORADO RIVER
BY TWO RIVERS PARK
RIPARIAN SETBACK EVALUATION

PROJECT NO.
2191038.00



FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
ROARING FORK RIVER								
A	145	216[2]	2,700	7.9	5,729.7	5,729.7	5,730.7	1.0
B	210	175	2,745	7.7	5,730.0	5,730.0	5,731.0	1.0
C	720	184	2,280	9.3	5,730.8	5,730.8	5,731.6	0.8
D	1,020	120	1,357	15.6	5,730.9	5,730.9	5,731.9	1.0
E	1,130	120	1,521	13.9	5,733.3	5,733.3	5,734.2	0.9
F	2,030	221	2,689	7.9	5,738.6	5,738.6	5,739.5	0.9
G	2,830	266	2,403	8.8	5,740.7	5,740.7	5,741.7	1.0
H	3,870	207	1,987	10.7	5,744.7	5,744.7	5,745.6	0.9
I	4,830	168	1,801	11.8	5,750.2	5,750.2	5,750.5	0.3
J	5,940	146	1,744	12.2	5,755.8	5,755.8	5,756.6	0.8
K	6,880	175	2,238	9.5	5,760.3	5,760.3	5,761.0	0.7
L	7,830	177	2,032	10.4	5,763.4	5,763.4	5,763.9	0.5
M	8,730	185	1,812	11.7	5,768.0	5,768.0	5,768.4	0.4
N	9,620	147	1,691	12.5	5,773.2	5,773.2	5,773.6	0.4
O	9,820	135	1,627	13.0	5,774.2	5,774.2	5,774.7	0.5
P	9,910	172	3,166	6.7	5,781.1	5,781.1	5,781.8	0.7
Q	10,870	210	3,069	6.9	5,782.2	5,782.2	5,782.8	0.6
R	11,610	190	2,549	8.3	5,783.2	5,783.2	5,783.8	0.6
S	12,450	160	1,919	11.0	5,785.3	5,785.3	5,785.9	0.6
T	13,208	192	2,071	9.9	5,791.3	5,791.3	5,791.3	0.0
U	13,273	183	2,212	9.3	5,791.4	5,791.4	5,791.4	0.0
V	14,038	173	1,845	11.1	5,793.0	5,793.0	5,793.1	0.1

[1]Feet Above Confluence with Colorado River [2]Floodway top width controlled by Colorado River

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

GARFIELD COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

ROARING FORK RIVER

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)

1 inch =100 ft.

NOTES:

1. ORIGINAL CODE HIGH WATER MARK WAS DETERMINED UTILIZING DATA FROM SECTION H OF THE FEMA FLOODWAY DATA FOR THE ROARING FORK RIVER. HCE INTERPOLATED THE HIGH WATER MARK UPSTREAM OF SECTION H BASED ON THE CHANGE IN ELEVATION BETWEEN THE NEAREST FEMA 100-YR FLOOD ELEVATIONS. AS THE ORIGINAL CODE HIGH WATER MARK EXTENDS UPSTREAM, THE CHANGE IN ELEVATION WAS INTERPOLATED USING THE APPROXIMATE SLOPE (0.7%) BETWEEN THE FEMA 100-YR FLOODPLAIN CONTOUR ELEVATIONS AND INCREASED APPROXIMATELY 1.8 FEET ALONG THE PROPERTY FROM SECTION H.

2. THE ORDINARY HIGH WATER MARK (OHWM) WAS SURVEYED ON NOVEMBER 8, 2019 BY HIGH COUNTRY ENGINEERING, INC.

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
OR 534-0700 IN METRO DENVER
CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

NO.	DATE	REVISION	BY

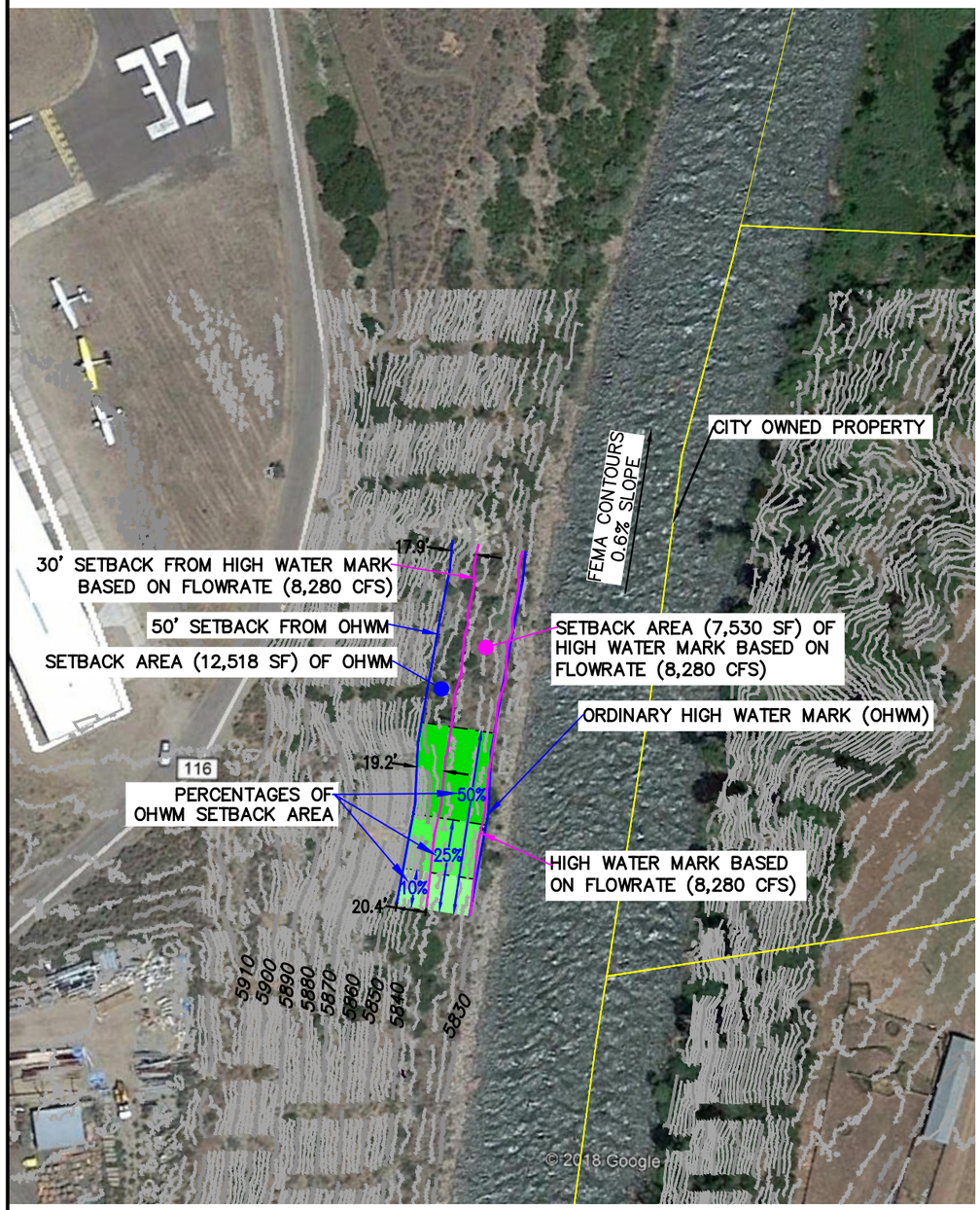
DRAWN BY: HCE
CHECKED BY: RDN
DATE: 12-03-19
FILE: RIPARIAN SETBACK.DWG

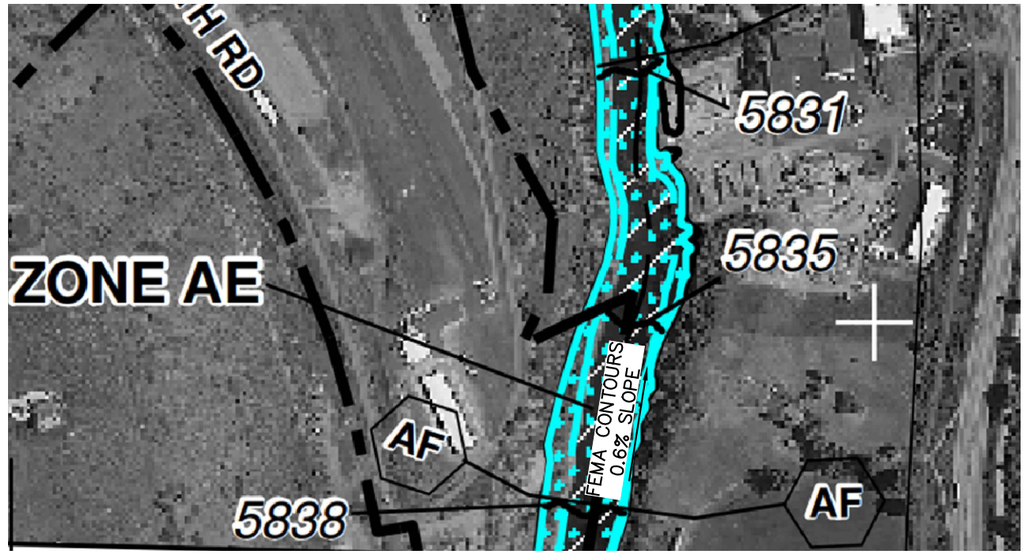
HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 • FAX (970) 945-2555
WWW.HCENG.COM

THE CITY OF GLENWOOD SPRINGS
GLENWOOD SPRINGS, COLORADO

ROARING FORK RIVER
BY GLENWOOD SPRINGS HIGH SCHOOL
RIPARIAN SETBACK EVALUATION

PROJECT NO.
2191038.00





FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
ROARING FORK RIVER (cont'd)								
W	14,878	225	2,062	9.8	5,795.8	5,795.8	5,796.2	0.4
X	15,258	222	1,919	10.6	5,797.0	5,797.0	5,797.4	0.4
Y	16,048	151	1,378	14.7	5,806.0	5,806.0	5,806.0	0.0
Z	16,663	156	1,533	13.2	5,810.6	5,810.6	5,810.6	0.0
AA	17,403	103	1,144	17.7	5,814.5	5,814.5	5,814.6	0.1
AB	18,343	127	1,596	12.7	5,821.4	5,821.4	5,822.3	0.9
AC	18,803	141	1,568	12.9	5,823.1	5,823.1	5,823.7	0.6
AD	19,698	122	1,478	13.7	5,828.0	5,828.0	5,828.4	0.4
AE	20,568	136	1,339	15.1	5,830.6	5,830.6	5,830.6	0.0
AF	21,823	170	2,003	10.1	5,837.7	5,837.7	5,837.7	0.0
AG	23,263	133	1,481	13.6	5,841.9	5,841.9	5,841.9	0.0
AH	23,663	222	2,743	7.3	5,845.4	5,845.4	5,846.0	0.6
AI	24,803	119	1,142	17.6	5,847.7	5,847.7	5,847.9	0.2
AJ	25,923	255	2,544	7.9	5,856.2	5,856.2	5,857.0	0.8
AK	26,603	373	3,309	6.1	5,858.4	5,858.4	5,859.3	0.9
AL	27,813	216	1,421	13.7	5,864.8	5,864.8	5,864.9	0.1
AM	28,798	199	1,878	10.3	5,871.9	5,871.9	5,872.8	0.9
AN	31,573	133	1,193	16.3	5,887.6	5,887.6	5,887.7	0.1
AO	32,433	159	1,707	11.4	5,893.5	5,893.5	5,894.5	1.0
AP	34,173	97	1,092	17.8	5,900.8	5,900.8	5,901.0	0.2
AQ	34,333	225	2,522	7.7	5,907.4	5,907.4	5,907.5	0.1
AR	36,093	317	1,840	10.5	5,910.5	5,910.5	5,910.5	0.0

[1]Feet Above Confluence with Colorado River

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

GARFIELD COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

ROARING FORK RIVER

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)

1 inch =100 ft.

NOTES:

1. ORIGINAL CODE HIGH WATER MARK WAS DETERMINED UTILIZING DATA FROM SECTION AF OF THE FEMA FLOODWAY DATA FOR THE ROARING FORK RIVER. HCE INTERPOLATED THE HIGH WATER MARK DOWNSTREAM OF SECTION AF BASED ON THE CHANGE IN ELEVATION BETWEEN THE NEAREST FEMA 100-YR FLOOD ELEVATIONS. AS THE ORIGINAL CODE HIGH WATER MARK EXTENDS DOWNSTREAM, THE CHANGE IN ELEVATION WAS INTERPOLATED USING THE APPROXIMATE SLOPE (0.6%) BETWEEN THE FEMA 100-YR FLOODPLAIN CONTOUR ELEVATIONS AND DECREASED APPROXIMATELY 1.4 FEET ALONG THE PROPERTY FROM SECTION AF.

2. THE ORDINARY HIGH WATER MARK (OHWM) WAS SURVEYED ON NOVEMBER 8, 2019 BY HIGH COUNTRY ENGINEERING, INC.

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
OR 534-0700 IN METRO DENVER
CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

NO.	DATE	REVISION	BY

DRAWN BY: HCE
CHECKED BY: RDN
DATE: 12-03-19
FILE: RIPARIAN SETBACK.DWG

HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101,
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 • FAX (970) 945-2555
WWW.HCENG.COM

THE CITY OF GLENWOOD SPRINGS
GLENWOOD SPRINGS, COLORADO

ROARING FORK RIVER
BY GLENWOOD SPRINGS AIRPORT
RIPARIAN SETBACK EVALUATION

PROJECT NO.
2191038.00

February 7, 2020

City of Glenwood Springs
101 W 8th Street
Glenwood Springs, CO 81601

Dear Planning and Zoning Commission and City Council;

American Rivers is a national river conservation organization with offices across the country, including Glenwood Springs, Colorado. Our mission is to promote and work for a nation of clean, healthy rivers that sustain and connect us. American Rivers protects wild rivers, restores damaged rivers, and conserves clean water for people and nature.

We ask that you support the proposed revisions to the City Development Code, **070.040.020(d)(24) Conservation of Waterways,** with one exception. We would prefer a 50' setback, rather than the proposed 35' setback. These revisions will greatly expand needed protections for the riparian zone along the Roaring Fork River and other streams in Glenwood Springs. These riparian areas are not just a strip of vegetation along the river bank, they are an integral part of the larger river ecosystem itself. Riparian areas and the vegetation they contain are absolutely critical to the overall health of ecosystem. They provide the organic food foundation for insects, which in turn support the world class fishery that draws both residents and tourists to Glenwood Springs. These same aquatic insects are also the major food source for many of the migratory and permanent bird species that we enjoy.

This code revision just makes good sense and is long overdue. Landowners adjacent to the river also need to learn more about the vital role of the riparian vegetation on their property for the health of the river that they enjoy.

Please do not hesitate to contact me if I can answer any questions or concerns you may have.

Thank you!

Ken Neubecker,
Colorado Projects Director
24 S Meadow View Ct.
Glenwood Springs, CO 81601
(970) 230-9300
Kneubecker@americanrivers.org

February 10, 2020

City of Glenwood Springs
101 W 8th Street
Glenwood Springs, CO 81601

Dear Planning and Zoning Commission and City Council Members,

RE: Development Code Revisions to 070.040.020(d)(24) Conservation of Waterways.

The Ferdinand Hayden Chapter of Trout Unlimited is the local TU Chapter representing members from Aspen to Rifle. FHTU is one of the oldest TU Chapters, being the 8th chapter created nationwide in the 1960's.

We are writing to strongly support the proposed revisions to the City Code regarding stream setbacks and protection of the adjacent riparian areas. The riparian zone adjacent to any stream or river is an integral and vitally important part of the larger stream ecosystem. Ninety percent of the base food material for all of the aquatic life comes from the vegetation growing in the riparian zone. The existing riparian area along the Roaring Fork from Carbondale to Glenwood Springs is in sorry shape, due largely to overzealous development and removal of vegetation by landowners. The one change we would recommend from the proposed revisions would be to make the setback 50' rather than 35'. A 50' setback is more protective and conforms better with the science and structure of riparian areas.

Both Glenwood Springs and the larger Roaring Fork Valley depend a great deal on the value and economic benefits that a healthy river ecosystem provide. This is a world class fishery, consistently named by magazines such as Outside and Sunset as one of the best places to be if you like to fish.

We think that this Code revision is a prudent and responsible step for the City to take in order to insure the continued health and vigor of the Roaring Fork River ecosystem through town. We strongly urge you to support and approve this code revision as well.

Sincerely,

Matt Kelsic

President
Ferdinand Hayden Chapter (008) of Trout Unlimited

February 15, 2020

City of Glenwood Springs
101 West 8th Street
Glenwood Springs, CO 81601
Attn: Trent Hyatt, Senior Planner/River Commission Staff Liaison

RE: Recommended city code revision for riparian setbacks

Honorable Mayor, City Council, and Planning and Zoning Commission

I urge you to adopt the originally proposed 50-foot setback in the City's riparian code revision. The modified setback of 35-feet is insufficient to maintain and protect our valued riparian system through the City of Glenwood Springs.

Research has shown that 50-feet is the minimum buffer for a viable riparian area and that 100-feet is preferable. Thus, a 50-foot setback to protect the riparian zone through the City is a compromise between the desires of development along our river ways and the basic needs for riparian protection.

Wildlife depends on the continuity, shade and protection of riparian vegetation. Stable stream banks and water quality also depend on this system, a safeguard from the adverse impacts of erosion.

Conserving this critical resource will help maintain the integrity of the rivers that flow through the City of Glenwood Springs and show our visitors that we take pride in caring for our riverine systems. Other communities such as Aspen and Basalt as well as Pitkin and Eagle Counties have recognized the importance of riparian areas by establishing setbacks of 75-feet or more. Let's join them and strive to maintain the ecosystems of our river ways.

Regards,
/s/Andrea Holland
Hydrologist and former member of GWS River Commission

ROARING FORK CONSERVANCY

Bringing People Together to Protect Our Rivers

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President
George Kelly
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Michelle Schindler
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Sheryl Sabandal
Development Director
Elliott Audette
Business Manager
Larry Gruel
Finance Director

February 13, 2020

City of Glenwood Springs
101 West 8th Street
Glenwood Springs, CO 81601
Attn: Trent Hyatt, Senior Planner/River Commission Staff Liaison

RE: Recommended City riparian setback amendment

Honorable Mayor, City Council, and Planning and Zoning Commission,

Roaring Fork Conservancy (RFC) wishes to express continued support for the proposed City of Glenwood Springs riparian setback amendment. RFC applauds Glenwood Springs' investment in the protection of its water resources and strongly supports the implementation of regulations to preserve this invaluable natural and community asset.

The collaborative effort between City staff, Glenwood Springs River Commission, and RFC has resulted in a well vetted code proposal which will conserve and promote the health of the City's riparian ecosystems and water quality into the future.

RFC worked diligently as a technical advisor to help develop the proposed setback amendment, applying the best available science to the specific attributes of local waterways and community character. For additional information regarding the science of setback regulations, please see RFC's comment letter dated July 19, 2019 or contact RFC staff directly. Based on these careful considerations, RFC continues to recommend adoption of a 50ft riparian setback, to ensure conservation of valuable waterways and irreplaceable wildlife for the present and future benefit of the City, its residents, and visitors. Similarly, in 2013, RFC served as a technical advisor to the Garfield County Board of County Commissioners and recommended adoption of 50ft riparian setback protections county-wide.

As a 501(c)(3) not-for-profit organization, RFC emphasizes the use of sound, defensible science to guide decisions regarding the health of local streams and rivers. Current research indicates that healthy wetlands and riparian areas are essential to healthy rivers, and vital to the character, economy and way of life in Glenwood Springs.

Thank you for your time and consideration.

Sincerely

Rick Lofaro
Executive Director

Chad Rudow
Water Quality Coordinator

P.O. Box 3349 Basalt, Colorado 81621 | 970.927.1290 | www.roaringfork.org

February 13, 2020

City of Glenwood Springs
101 W 8th Street
Glenwood Springs, CO 81601

RE: Development Code Revisions to 070.040.020(d)(24) Conservation of Waterways.

Dear Planning and Zoning Commission and City Council,

The Roaring Fork Fishing Guide Alliance (RFFGA) strongly encourages the City of Glenwood Springs to support and approve the proposed revisions to the City Development Code, **070.040.020(d)(24) Conservation of Waterways**. These revisions and adoption of a setback will greatly expand needed protections for the riparian zone along the Roaring Fork River and other tributary streams in Glenwood Springs. RFFGA regularly attended River Commission and City Planning and Zoning meetings to register support of the development of setbacks appropriate for the City. Based on careful consideration, RFFGA recommends adoption of a 50 foot riparian setback to ensure conservation of valuable waterways and irreplaceable wildlife for the present and future benefit of the City.

Riparian areas are more than simply a strip of vegetation along the river bank, they are an integral part of the larger river ecosystem itself. Riparian areas and the vegetation they contain are absolutely critical to the overall health of ecosystem. They provide the organic food foundation for insects, which in turn support the world class fishery that draws both residents and tourists to Glenwood Springs.

On behalf of the board of directors of RFFGA, we strongly urge your support and approval this code.

Sincerely,

Kyle Holt

Kyle Holt
President
Roaring Fork Fishing Guide Alliance

Scott Grosscup
Direct Dial (970) 928-3468
Receptionist (970) 945-6546
sgrosscup@balcombgreen.com

November 14, 2019

Via Electronic Mail

Mr. Trent Hyatt
Senior Planner
City of Glenwood Springs
Community Development Department

Re: #20-19 Riparian Setback Code Amendment

Dear Trent:

Thank you for taking the time to discuss the proposed Riparian Setback Code amendment a few weeks ago. You indicated that City staff is considering changes to the proposed ordinance and we would like to add some items for you to consider on behalf of the Glenwood Hot Springs Lodge & Pool, Inc.

The primary concern is that the term "ordinary high-water mark" is undefined. The course of the Colorado River as it flows through Glenwood Springs has been modified. Construction of I-70 moved the bank and in certain concentrated the channel. The proposed code amendment does not say if the ordinary high-water mark is based on existing conditions or on some previous condition.

The current standard of high water mark is a known commodity. It is also tied to flood plain mapping that limits where property owners can erect improvements on their property. Having two different standards and dealing with two separate entities (City of Glenwood Springs and Federal Emergency Management Agency) creates confusion for property owners and additional headache. What if construction would be ok under one standard but not the other?

Without a definition for determining the ordinary high-water mark, city staff is given great discretion to determine where that line exists, especially where flows vary significantly from year to year. As written, it appears that staff is allowed to determine that mark based on an inspection of the area. If the landowner disagrees, then it is up to the landowner to produce evidence, presumably through hiring of an engineer to rebut staff's visual interpretation. This could increase the costs and add delay to obtain any necessary permit.

Finally, we believe that there needs to be additional protection for those structures that may lie within the ordinary high-water mark. These structures should be allowed to be renovated or even expanded. Otherwise, these structures may fall into disrepair and become a nuisance or hazard.

Thank you for considering these thoughts. Please provide us with a draft of the revised ordinance when you are able.

Sincerely,

By: _____
Scott Grosscup

cc: Karl Hanlon, Esq.
Kjell Mitchell

Aspen Office
625 E. Hyman Avenue, Suite 201
Aspen, Colorado 81611
Telephone (970) 925-1936
Facsimile (970) 925-3008

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Christopher D. Bryan
cbryan@garfieldhecht.com

February 19, 2020

Trent Hyatt, Senior Planner
City of Glenwood Springs
101 West 8th Street
Glenwood Springs, Colorado 81601
E-mail: trent.hyatt@cogs.us

Re: Proposed Riparian Setback Code Amendment

Mr. Hyatt:

Our law firm represents a group of Glenwood Springs residents known as the Friends of the Roaring Fork ("Friends"). Friends has engaged us to review and analyze the changes being proposed to Section 070.040.020(d)(24) of the Glenwood Springs Municipal Code ("Code") set forth in Exhibit A (hereinafter, the "Amendment"). A continued public hearing before the City's Planning and Zoning Commission ("Commission") regarding the Amendment is scheduled for February 25, 2020. As explained below, Friends believes that the Amendment unnecessarily restricts the use of private and public property, will reduce property values, and, most important, does not satisfy the Code amendment approval criteria set forth in the Code. Friends therefore asks that the Amendment be reworked with stakeholder input, tabled indefinitely, or denied.

As noted in your July 23, 2019, staff report (the "Staff Report") regarding the Amendment,[1] a Code amendment may only be approved if it satisfies the criteria identified in Section 070.060.040(c)(3)(d)(3) of the Code. Those criteria include (i) consistency with the City's Comprehensive Plan and other City policies; (ii) no conflict with other provisions of the Code; (iii) necessity to address a demonstrated community need; (iv) necessity to respond to substantial changes in conditions and/or policy; and (v) consistency with the general purpose and intent of the Code. The Amendment, at a minimum, does not satisfy the second, third, or fourth approval criteria, meaning there is no legal basis for the Amendment.

First, the Amendment conflicts with other provisions of the Code. Specifically, even though maintenance and repair of nonconformities is generally allowed, Section 070.010.070(b)(3)(b) of the Code states that all such repairs and maintenance "shall comply with Subsection 070.040.020(d)." That reference to Subsection 070.040.020(d) (which includes its

[1] The text of the proposed Amendment has been revised since the Staff Report was issued. However, a new staff report addressing the current language of the Amendment has not been provided as of the date of this letter. Friends may supplement this letter to respond to new information presented in the forthcoming staff report that is anticipated for the February 25th Commission meeting.

subparts) means that property owners with improvements within the new 35-foot setback could not maintain or repair the existing improvements if doing so involved excavation, grading, dumping, clearing of native vegetation, or backfill. It also limits an owner's ability to continue to maintain areas around existing paths and landscaping in excess of the 10% of the setback area if doing so requires "clearing of native vegetation" or any of the other proscribed activities.

As the foregoing makes clear, the Amendment would create a conflict within the Code regarding what work is allowed in the setback area, which is contrary to criterion (ii) for approving a Code amendment. It also exemplifies need for more robust grandfathering provisions in the Amendment to protect current owners' investment-backed expectations and to provide clarity for landowners and City staff about how the Amendment will be administered if passed. Indeed, among the purposes of the Code is shielding citizens (and the City for that matter) from the arbitrary decisions that may result when the government is given unbridled discretion over matters affecting citizens and their property. Suggested grandfathering language was provided to the City staff and the Commission prior to the Commission's September 24, 2019, meeting. The Commission also requested further clarification of the grandfathering issue at that meeting. Such language has yet to be included in the Amendment.

Second, there is no demonstrated community need for the Amendment. The Staff Report cites other jurisdictions' riparian setback requirements to show that there is a need in Glenwood Springs for a larger and more restrictive setback. But what is happening in other communities cannot be the basis for finding that there is a need in *this* community for the Amendment. And even if it could, none of the municipalities in closest proximity to Glenwood Springs with development along waterways—namely, the Town of Carbondale, the Town of Gypsum, and the Town of New Castle—impose any specific riparian setback at all. With that in mind, the existing riparian setback currently imposed by the Code puts the City well ahead of its neighbors when it comes to riparian protections. To claim that other communities' water resource protections demonstrate a community need for the Amendment is overreaching and inaccurate.

The fact that there has been no evidence or information presented to date to indicate that the existing 30-foot setback is insufficient further supports the lack of community need for the Amendment. While the Roaring Fork Conservancy ("RFC") states in its written materials that a more aggressive setback is desirable, nowhere does the RFC claim that the existing setback has caused degradation to or impairment of the City's waterways. Indeed, the former chairman of the Glenwood Springs River Commission stated at public meeting on September 19, 2019, that "the Roaring Fork is actually in pretty good shape." That comports with the informal, qualitative Glenwood Springs Riparian Assessment[2] that was included with the Staff Report. Note too that the Assessment identifies public education and implementation of best practices as ways to improve riparian health, not increasing the size of and restrictions within the riparian setback. Finally, the City's existing riparian setback is within the riparian buffer widths recommended for erosion control, water quality, and aquatic habitat protection in the 2005 Haws and Smith study that was submitted with the Staff Report.

[2] Note, too, that this Assessment only evaluated the Roaring Fork and Colorado Rivers. But the proposed Amendment, as written, would apply to properties along other waterways in the City such as Three Mile Creek, Oasis Creek, and Mitchell Creek. No information has been provided regarding the state of those waterways.

Third, the Amendment is not necessary to respond to substantial changes in conditions and/or policy. Again, the justification cited in the Staff Report for compliance with this criterion is misguided. The Staff Report states (with little explanation) that the Amendment would "help in the City's future compliance with EPA Municipal Separate Storm Sewer System ("MS4") permit requirements if/when the City's population exceeds 10,000." Seeing as the census has not yet been conducted and the City has not yet changed—and, indeed, may not change—its policies or practices as a result of any new MS4 requirements, there is no change to which the Amendment provides a necessary response.

Moreover, it is unclear how changes in setbacks would affect the City's MS4 polices or future compliance because the MS4 program deals with point source discharges—i.e., the culverts and pipes that release untreated storm water runoff directly in into waterways—not disbursed, non-point source runoff. The amount of storm water runoff that enters the City's waterways through riparian habitat is a small fraction of the storm water collected and discharged by the City through its storm water collection system. Even assuming an increased riparian setback would improve the quality of that comparatively minimal, non-point source runoff, it would have no impact on the quality of the water discharged from the City's storm drains, which is the focus of the MS4 program. The Amendment therefore has no rational relation to and is not justified by the City's non-existent and uncertain storm water mitigation policies and practices. To argue otherwise is disingenuous and completely without merit.

Aside from the fact that the Amendment does not meet the Code amendment approval criteria, Friends is concerned about the substance of the Amendment. Most notably, Friends believes that the Amendment will negatively impact the use and enjoyment of river-front properties in the City, including the ability to repair, maintain, and rebuild existing improvements and to make new use of areas that would be within the 35-foot setback proposed in the Amendment. It should come as no surprise that many riverfront property owners bought their lots so that they could enjoy the river and its amenities. But to do so, owners must be able to access and make use of their river frontage.

While the existing Code places some limits on the extent to which owners may utilize the setback area, they are not as restrictive as those proposed in the Amendment. For one, the existing language of Section 070.040.020(d)(24) does not prohibit vegetation removal or place any limits on the creation of private pathways for river access. In contrast, the Amendment only allows an owner to remove vegetation from up to 10% of the setback area for the purpose of private access to and enjoyment of the waterway. The 10% figure is completely arbitrary and capricious and not based on any science or theory. It is also insufficient to allow owners of many overgrown, waterfront properties to gain access to or use and enjoy the adjacent river or stream.

Additionally, if an owner wants to utilize more than 10% of the setback area, build stairs within a pathway area to ensure safe access, or simply trim vegetation, he or she will be required to show that the proposed activity "does not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland." To make such a showing, the owner would likely need to hire an engineer, adding to the cost and burden

of the regulations. This is a completely unrealistic burden to place on landowners who are doing no harm to the river or riparian habitat.

The restrictions in the Amendment effectively sterilize at least 90% of the 35-foot setback area of each parcel adjacent to a waterway. That area is naturally the area owners would seek to use to realize the benefits of living near the water. If they or subsequent owners are unable to do so because of the Amendment, property values are sure to go down. Current owners did not sign up for the heightened restrictions proposed in the Amendment when they purchased their properties. What's worse, those restrictions may reduce the pool of future buyers for their properties.

Finally, the Amendment will render public and private properties nonconforming under the Code. Numerous citizens spoke to this issue at prior public hearings regarding the Amendment, but, to date, it does not appear that City staff has analyzed the number and extent of the nonconformities that would arise if the Amendment were passed. That fact alone indicates that the Amendment is, at a minimum, premature, especially because Chapter 070.010.070—the Code's "Nonconformities" chapter—does not ease the burden the Amendment would place on existing site conditions as explained above.

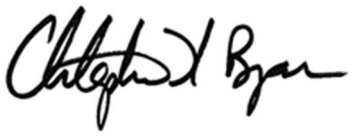
General and conclusory statements aside, the City has failed to quantify what benefits, if any, will be realized if the Amendment is passed. In contrast, this letter clearly identifies the harms that will ensue. While the Amendment may be well-intentioned, those intentions are not a substitute for need or legal justification. They are also overshadowed by the negative impacts the Amendment will have on numerous landowners even though those owners are not harming the river or the riparian environment to any meaningful, measurable degree. Friends does not dispute the need for all riparian landowners—including the City—to be good stewards of the City's waterways; they simply contend that the existing Code provides sufficient safeguards and that the prohibitions proposed in the Amendment are unnecessary and unjustified.

Ordinances enacted by municipalities such as the City must not be unreasonable, arbitrary, or capricious. Approving the Amendment, which does not satisfy even the City's own criteria for approving such amendments, renders it a textbook example of an arbitrary and capricious legislative act. The unreasonableness of the Amendment is exacerbated by the fact that it restricts the existing and future use of private and public property unnecessarily, to the detriment of current and future owners, and with little public benefit, if any, beyond what is already provided by the existing Code. Indeed, seeing as the public would receive the purported benefit from the Amendment while private landowners are forced to bear the cost in the form of reduced property values and unusable property, the City will be exposed to takings claims if the Amendment passes. Simply put, the Amendment goes too far and does so without justification.

It is clear from the content of the Amendment that it was drafted without broad stakeholder input. That may not have been the case had the Amendment had a more collaborative beginning similar to that of the City's vacation rental ordinance. Nonetheless, Friends remains ready and willing to work with City staff to develop a more balanced approach to the setback issue that takes all stakeholders' input into account. To that end, continuing consideration of the

Amendment to a later Commission meeting to allow stakeholders to workshop the text of the Amendment would be beneficial. But if the Amendment in its current form is presented, Friends will bring the full force of its opposition to bear. Please let us know if you would like to schedule a meeting to discuss changes to the Amendment. Thank you.

Very truly yours,



Christopher D. Bryan

cc: City Attorney (kjh@mountainlawfirm.com)

EXHIIBT A
Proposed amendment to Code Section 070.040.020(d)(24)

070.040.020(d) Development in Waterways and Areas of Special Flood Hazard

(24) Conservation of Waterways

It is the purpose of this Subsection 070.040.020(d)(24) to conserve and promote the health of the City's riparian ecosystems, water quality, and protect human drinking water by maintaining a functional natural buffer adjacent to waterways.

a. Applicability

All new improvements, buildings, additions, structures, excavations, grading, dumping, clearing of native vegetation, or backfill shall be subject to the requirements of 070.040.020(d)(24)b Standards unless the applicant demonstrates to the City Engineer and the Director by clear and convincing evidence that one or more of the following conditions is met:

1. The removal of native vegetation, not to exceed 10 percent of the setback area defined below, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be interpreted to allow for permanent structures of any kind within said area.

2. The construction of bridges, public utilities, public paths for non-motorized use, public open space areas and boat ramps, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices that do not result in water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

3. Removal of vegetation listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm in compliance with applicable regulations. Vegetation shall be replaced with appropriate riparian plant species to limit erosion.

4. Applicant demonstrates one or more of the following:

i. The area does not contain significant riparian plant species or functions;
ii. The area is impacted by previous earth disturbing activities; or
iii. The proposed activity (including, but not limited to the trimming of vegetation, construction of access path or steps, hot springs pools) does not result in increased water quality degradation, stream bank erosion, or a reduction in the function of and quality of a riparian area or wetland.

b. Standards

1. No improvement, building, structure, excavation, grading, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within thirty-five feet of the

ordinary high-water mark (as defined by the US Army Corp of Engineers), measured horizontally, of any river or live perennial stream.

2. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted with said thirty-five-foot setback area.

070.040.020(d) Development in Waterways and Areas of Special Flood Hazard

(24) Conservation of Waterways

It is the purpose of this Subsection 070.040.020(d)(24) to conserve and promote the health of the ~~City's~~ riparian ecosystems within the City ~~water quality~~ and to protect water quality and human drinking water by maintaining a functional natural buffer adjacent to waterways, while ensuring that private landowners and members of the public are able to access, use, and enjoy the waterways within the City in a manner that limits impacts to the natural environment.

a. **Applicability**

The placement, construction, building, undertaking, or approval of ~~A~~all new improvements, buildings, additions, structures, excavations, grading, dumping, clearing of native vegetation, or backfilling shall be subject to the requirements of 070.040.020(d)(24)~~b~~c *Standards*, except as provided in Subsection b.

b. **Exceptions**

~~Unless the applicant demonstrates to the City Engineer and the Director by clear and convincing evidence that one or more of the following conditions is met:~~ The following are not subject to the requirements of 070.040.020(d)(24)c:

1. The ~~removal~~ clearing of native vegetation, not to exceed ~~10~~ 50% percent of the setback area defined in Section 070.040.020(d)(24)c~~below~~, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be interpreted to allow for permanent structures of any kind within said area other than stairs and related improvements such as hand rails to provide safe access to the waterway.

~~1.~~2. The trimming of native vegetation for view, fire mitigation, maintenance or repair activities described in Section 070.040.020(d)(24)b.4, below, or other life/safety purposes so long as the vegetation is not removed in its entirety from the ground and that the heath and integrity of the vegetation is not negatively impacted as a result of the trimming.

3. The construction and installation of bridges, public utilities, public paths for non-motorized use, public open space areas and boat ramps, irrigation structures, or flood control and erosion protection devices or the performance of wildfire mitigation activities requiring the clearing of native vegetation, ~~irrigation structures, flood control and erosion protection devices~~ provided that the same ~~that~~ do not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

~~2.~~4. The (i) maintenance, repair, or replacement of existing improvements, buildings, additions, structures, landscaping, and cleared areas as provided in 070.010.070 *Nonconfomities*, or (ii) construction of new structures, buildings, or improvements outside the setback area defined in 070.040.020(d)(24)c.1, to the extent (i) or (ii) requires new excavation, grading, backfill, or clearing of native vegetation within the setback area. In that event, the owner shall make commercially reasonable efforts to replace any cleared vegetation with vegetation of similar type and function.

~~3.~~5. Removal of vegetation listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm in compliance with applicable regulations. ~~Vegetation shall be replaced with appropriate riparian plant species to limit erosion.~~

~~4.~~6. Any other activity proposed by an owner or a~~A~~pplicant that would otherwise be

prohibited by Section 070.040.020(d)(24)c, provided that the owner or applicant demonstrates through objectively reasonable evidence one or more of the following:

i. The affected area does not contain significant riparian plant species or functions;
ii. The affected area is impacted by previous earth disturbing or vegetation clearing activities; or
iii. The proposed activity ~~(including but not limited to the trimming of vegetation, construction of access path or steps, hot springs pools)~~ does not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

c. **Standards**

1. No improvement, building, structure, excavation, grading, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within thirty-five feet of the ordinary high-water mark (as defined by the US Army Corp of Engineers), measured horizontally, of any river or live perennial stream.
2. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted within said thirty-five-foot setback area.

070.040.020(d) Development in Waterways and Areas of Special Flood Hazard

(24) Conservation of Waterways

It is the purpose of this Subsection 070.040.020(d)(24) to conserve and promote the health of the City's riparian ecosystems and water quality and protect human drinking water by maintaining a functional natural buffer adjacent to waterways, while ensuring that private landowners and members of the public are able to access, use, and enjoy the City's waterways in a manner that limits impacts to the natural environment.

a. **Applicability**

The placement, construction, building, undertaking, or approval of ~~A~~all new improvements, buildings, additions, structures, excavations, grading, dumping, clearing of native vegetation, or backfilling shall be subject to the requirements of 070.040.020(d)(24)~~b~~c *Standards*, except as provided in Subsection b.

b. **Exceptions**

~~Unless the applicant demonstrates to the City Engineer and the Director by clear and convincing evidence that one or more of the following conditions is met:~~ The following are not subject to the requirements of 070.040.020(d)(24)c:

1. The ~~removal~~ clearing of native vegetation, not to exceed ~~10~~ 40% percent of the setback area defined in Section 070.040.020(d)(24)c~~below~~, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be interpreted to allow for permanent structures of any kind within said area other than stairs and related improvements such as hand rails to provide safe access to the waterway.

~~1.~~2. The trimming of native vegetation for view, fire mitigation, maintenance or repair activities described in Section 070.040.020(d)(24)b.4, below, or other life/safety purposes so long as the vegetation is not removed in its entirety from the ground and that the heath and integrity of the vegetation is not negatively impacted as a result of the trimming.

3. The construction and installation of bridges, public utilities, public paths for non-motorized use, public open space areas and boat ramps, irrigation structures, or flood control and erosion protection devices or the performance of wildfire mitigation activities requiring the clearing of native vegetation, ~~irrigation structures, flood control and erosion protection devices~~ provided that the same ~~that~~ do not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

~~2.~~4. The (i) maintenance, repair, or replacement of existing improvements, buildings, additions, structures, landscaping, and cleared areas as provided in 070.010.070 *Nonconfomities*, or (ii) construction of new structures, buildings, or improvements outside the setback area defined in 070.040.020(d)(24)c.1, to the extent (i) or (ii) requires new excavation, grading, backfill, or clearing of native vegetation within the setback area. In that event, the owner shall make commercially reasonable efforts to replace any cleared vegetation with vegetation of similar type and function.

~~3.~~5. Removal of vegetation listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm in compliance with applicable regulations. ~~Vegetation shall be replaced with appropriate riparian plant species to limit erosion.~~

~~4.~~6. Any other activity proposed by an owner or a~~A~~pplicant that would otherwise be prohibited by Section 070.040.020(d)(24)c, provided that the owner or applicant

demonstrates through objectively reasonable evidence one or more of the following:

i. The affected area does not contain significant riparian plant species or functions;
ii. The affected area is impacted by previous earth disturbing or vegetation clearing activities; or
iii. The proposed activity ~~(including but not limited to the trimming of vegetation, construction of access path or steps, hot springs pools)~~ does not result in increased water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

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1. No improvement, building, structure, excavation, grading, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within thirty-five feet of the ordinary high-water mark (as defined by the US Army Corp of Engineers), measured horizontally, of any river or live perennial stream.
2. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted within said thirty-five-foot setback area.

GLENWOOD SPRINGS COLORADO

RIVERFRONT PROPERTIES

RIPARIAN ZONE PLANTING GUIDE

How to plan and landscape to prevent runoff, erosion, and pollution; and preserve the ecology and natural beauty on the banks of our rivers.

DRAFT

LEAVE IT A LITTLE WILD

You can help preserve the streams, creeks and rivers around Glenwood Springs. **Here's how.**

Bringing native vegetation into your landscaping is a great way to beautify Glenwood Springs and to make homes and businesses more appealing and valuable. The Roaring Fork and Colorado Rivers—the main waterways through town—are suffering the impact of fertilizers, pesticides, and landscaping techniques that destroy native vegetation. Your landscaping choices can help alleviate this impact.

As rain or melting snow flows across our yards, rooftops, and paved areas, it picks up pollutants including sediment, organic matter, pesticides, and fertilizers. Polluted water then flows off these properties to roadways, ditches or through storm drains to our streams, creeks, and rivers, harming important aquatic insects, increasing algae blooms, and adding sediment. All of these things impact the food chain for our prized trout fishery. The cumulative impacts of urbanization can have a significant impact on the health of our watershed, including the insects, fish, birds and vegetation that depend on clean water.

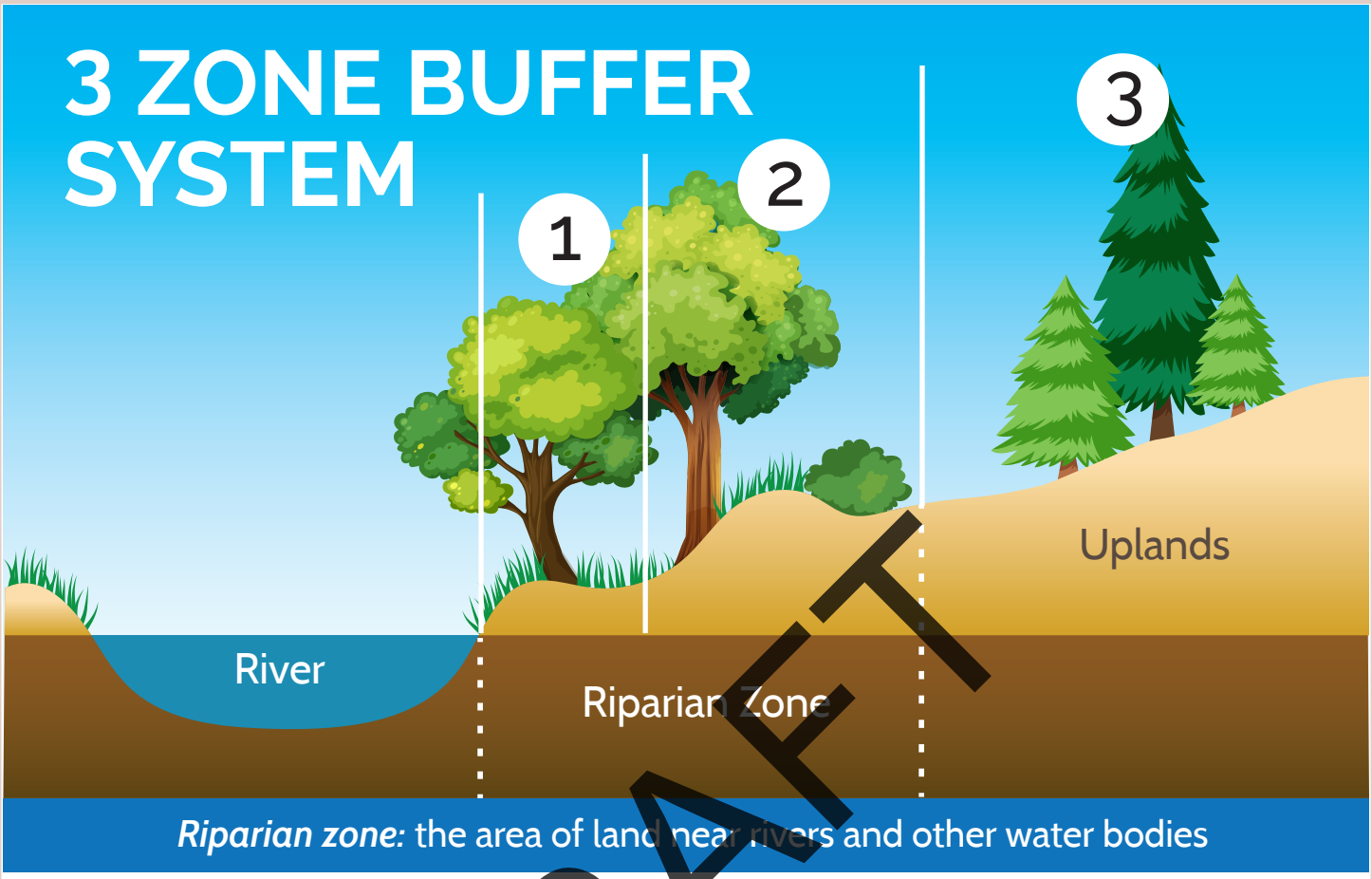
The good news is you can help by adopting a few simple practices that can dramatically improve the health of our streams and creeks:

- Add native trees and shrubs to your landscaping to capture, hold, and filter rainwater.
- Use up to three inches of mulch (like leaves, aged wood chips, compost or grass clippings), primarily in spring and fall. Mulch stabilizes soil temperature, prevents weeds, feeds the soil for healthier plants and helps to conserve water.
- Incorporate swales and berms into landscapes to contain runoff and prevent it from leaving your yard.
- Consider installing a rain garden and directing roof drains to it.
- Consider using porous pavements such as pavers, flagstone, and gravel instead of impervious surfaces such as asphalt for pathways, patios, and driveways.
- Observe city ordinances regarding riparian buffers and setbacks.
- Use the Three-Zone Buffer System (next page) for guidance on building and landscaping activities within 100 feet of any stream.
- Minimize the use of turf, which will in turn reduce fertilizer, pesticide, and water requirements.
- Plant a diverse landscape, which will naturally minimize pest problems.

DRAFT

Thank you for playing a critical role in preserving a special part of the Glenwood Springs community.
Learn more at ci.glenwood-springs.co.us

GLENWOOD SPRINGS COLORADO



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1 < 25 FEET OVERBANK ZONE

This area is important for bank stability, preventing erosion, filtering and absorbing pollutants, and providing habitat for terrestrial and aquatic wildlife. Contains wetland plants and mature riparian forest.

- Leave native vegetation undisturbed.
- Reintroduce native shrubs, grasses and forbs as a substitute for turf and other manmade improvements.
- Limit the use of pesticides to what is absolutely needed to control invasive weed species.

2 25 - 75 FEET TRANSITIONAL ZONE

This area lies between upland development and the overbank zone, and is important in filtering stormwater runoff and absorbing pollutants. Contains mature native forest and vegetation.

- Design low-impact landscaping, which reduces maintenance requirements and less need for pesticide and fertilizer.
- Reduce the use of turf and impervious surfaces such as concrete and asphalt paving.
- Create vegetative buffers to filter runoff from roofs, drives and roadways.

3 75 - 100 FEET UPLAND ZONE

This is an area for actively managed landscapes or natural conditions, which allows water to slowly filter into the ground.

- Lawn, garden, and compost wastes can be stored here, and stormwater BMPs may be installed, but this zone should be left as undisturbed as possible in order to optimize the value of the riparian buffer.
- Minimize turf areas to what is truly needed. If possible, avoid placing any impervious surfaces in this zone.

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Learn more at ci.glenwood-springs.co.us

GLENWOOD SPRINGS COLORADO

WHAT TO PLANT

The Rocky Mountains are home to numerous native plant species. These plants are adapted to the highly variable climate and micro-climates found in mountain habitats. This list offers recommendations for areas along our streams creeks and rivers, as well as upland and transitional zones away from the water's edge. These plants can be used in ornamental landscape plantings as buffers between landscaped and native areas or in native habitat restorations. Planting a variety of species provides biodiversity, which protects against pest outbreaks and provides important habitat for native fauna—all key components in improving water quality in Glenwood Springs.

Native Chokecherry

Freemont Cottonwood

Golden Currant

COMMON NAME	SCIENTIFIC NAME	HEIGHT	SPREAD
OVERBANK: **TREES/SHRUBS**			
Thin-leafed Alder	*Alnus incana*	15-30'	15-20'
Western River Birch	*Betula occidentalis*	3-6'	3-8'
Threeleaf Sumac	*Rhus trilobata*	6-8'	8-12'
Freemont Cottonwood	*Populus fremontii*	30-50'	20-30'
Colorado Blue Spruce	*Picea pungens*	40-60'	30-40'
Native Chokecherry	*Prunus virginiana melanocarpa*	8-20'	8-12'
Golden Currant	*Ribes cereum*	2-4'	2-4'
Woods Rose	*Rosa woodsii*	3-6'	3-6'

Harebells

Rocky Mountain Beeplant

Wild Strawberry

COMMON NAME	SCIENTIFIC NAME
OVERBANK: **FORBS**	
Nettleaf Giant Hyssop	*Agastache urticifolia*
Colorado Blue Columbine	*Aquilegia coerulea*
Harebells	*Campanula rotundifolia*
Rocky Mountain Beeplant	*Cleome serrulata*
Englemann's Fleabane	*Erigeron engelmannii*
Sulfur-Flowered Buckwheat	*Erigonum umbellatum*
Wild Strawberry	*Frageria virginiana*
Blanket Flower	*Gallardia aristata*
Sticky Geranium	*Geranium viscosissimum*
Largeleaf Avens	*Geum macrophyllum*
Showy Goldeneye	*Heliomeris multiflora*
Orange Sneezeweed	*Hymenoxys hoopesii*
Wild Bergamot	*Monarda fistulosa*
Small-Flowered Penstemon	*Penstemon procerus*
Rocky Mountain Penstemon	*Penstemon strictus*
Waving-Wand Penstemon	*Penstemon virgatus*
Canada Goldenrod	*Solidago canadensis*
Goldenbanner	*Thermopsis montana*

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GLENWOOD SPRINGS COLORADO

WHAT TO PLANT

Nebraska Sedge

Creeping Spikerush

Arrowgrass

COMMON NAME	SCIENTIFIC NAME
OVERBANK: **WETLAND PLUGS**	
Nebraska Sedge	*Carex nebrascensis*
Wooly Sedge	*Carex pellita*
Creeping Spikerush	*Eleocharis palustris*
Three-Stamen Rush	*Juncus ensifolius*
Torrey Rush	*Juncus torreyi*
Panicled Bulrush	*Scirpus microcarpus*
Arrowgrass	*Triglochin maritima*

Tufted Hairgrass

Streambank Wheatgrass

Mountain Rush

COMMON NAME	SCIENTIFIC NAME	DISTRIBUTION
OVERBANK: **NATIVE SEED MIX**		
Tufted Hairgrass	*Deschampsia caespitosa*	15%
Streambank Wheatgrass	*Elymus lanceolatus*	20%
Bluejoint Reedgrass	*Calamagrostis canadensis*	10%
Fowl Mannagrass	*Glyceria striata*	10%
Green Needlegrass	*Nassella viridula*	10%
Fowl Bluegrass	*Pos palustris*	20%
Mountain Rush	*Juncus arcticus ssp. littoralis*	5%
Threestem Rush	*Juncus ensifolius*	5%
Torrey Rush	*Juncus torreyi*	5%

DRAFT

Rocky Mountain Maple

COMMON NAME	SCIENTIFIC NAME	HEIGHT	SPREAD
UPLAND: **DECIDUOUS TREES/SHRUBS**			
Rocky Mountain Maple	*Acer glabrum*	20-30’	10-20’

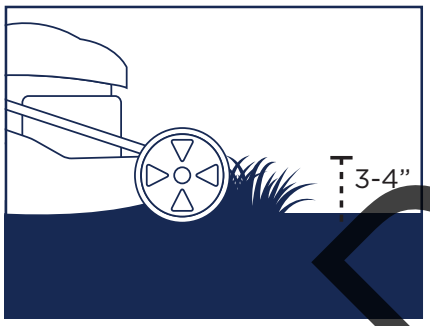
Thank you for playing a critical role in preserving a special part of the Glenwood Springs community.
Learn more at ci.glenwood-springs.co.us

GLENWOOD SPRINGS COLORADO

LAWN CARE & MAINTENANCE

As rain or melting snow flows across our yards, rooftops, and paved areas, it picks up pollutants including sediment, organic matter, pesticides and fertilizers. Polluted water then flows off these properties to roadways, ditches or through storm drains to our streams creeks and ultimately the Roaring Fork and Colorado Rivers, harming important aquatic insects, increasing algae blooms and adding sediment all of which impact the food chain for our prized trout fishery. The cumulative impacts of urbanization in the Roaring Fork Valley can have a significant impact on the health of our watershed, including the insects, fish, birds and vegetation that depend on clean water.

The good news is you can help. In fact, your daily work activities could be the key to restoring the health of our streams and creeks. Here are a few simple tips to keep in mind.



LAWNMOWING

- Maintain lawns at 3–4 inches, which will maximize the grass’s capacity to filter and absorb excess runoff and nutrients.
- Leave grass clippings on the lawn or compost them, as they can carry fertilizer and pesticide residue into the creek.
- Sweep clippings off of paved walks and roadways and back onto the lawn to prevent them from entering drainage ways. Compost yard waste or have your waste hauler remove it.

PESTICIDE USE

- Utilize Integrated Pest Management (IPM) techniques before deciding to use pesticides. IPM endorses multiple methods for managing pests including mechanical, cultural, biological and chemical means.
- ALWAYS read the product label before use. The label describes allowed uses, environmental hazards (including impacts to aquatic environments), and application rates. Using a pesticide outside the label is illegal. Remember: THE LABEL IS THE LAW.
- Spot-spray weeds rather than spraying an entire property.
- In early spring, wait to apply lawn-care chemicals until snow has melted.
- Avoid pyrethroid insecticides near streams and waterways. These products, which include bifenthrin, cypermethrin and permethrin, are among the most toxic to aquatic invertebrates.
- Be cautious and judicious with the use of “weed and feed” lawn care products. Many contain the herbicide 2,4-D as a weed killer, which is listed as toxic to aquatic invertebrates.
- Add a natural buffer around turf areas, which will help filter fertilizers and pesticides before they can enter drainage ways.
- Dispose of garden chemicals correctly. Never sweep, hose off or pour leftover chemicals into drains or gutters. Dispose of unused products at your local household hazardous waste site, such as the South Canyon landfill.

DRAFT

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GLENWOOD SPRINGS COLORADO

LAWN CARE & MAINTENANCE

FERTILIZER

- Fertilizer application differs with turf species, varying from 2 to 4 pounds of actual nitrogen/year per 1,000 square feet and usually divided into 3 to 4 applications per year; generally, no more than 1 pound of actual nitrogen per 1,000 square feet should be applied at one time.
- Fertilize only when necessary or not at all.
- Apply fertilizer in the fall for best results, or use a lesser amount in the spring to give lawns an extra burst of green.
- Deeply water lawns the day before you apply fertilizer.
- When purchasing fertilizer, look for a product that contains “natural organic” or “slow-release” ingredients, which feed plants slowly and evenly.
- Read labels carefully for application rates and recommendations.
- If fertilizing is appropriate, check the weather before applications; avoid the use of fertilizer if the forecast calls for rain in the next two days.

- Apply fertilizer when wind speed is between 3 and 10 mph.
- For ground boom applications, apply using a nozzle height of no more than 2 feet above the ground or crop canopy, unless a greater height is required for efficacy or safety. Use a low- pressure, large droplet sprayer, and spray close to the crop canopy or the ground.

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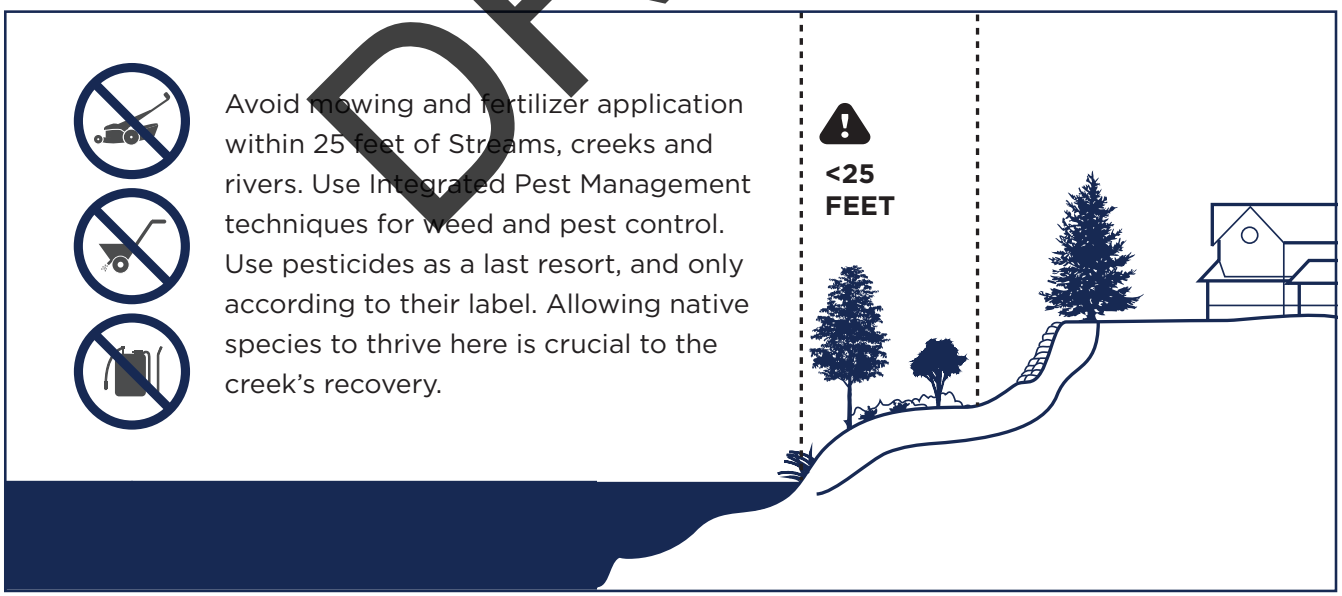

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ACKNOWLEDGEMENTS

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- Design of this document was inspired by the Love Vail Gore Creek campaign (lovevail.org). The City is grateful for Town of Vail's permission to use various design templetes for our riparian restroation efforts.

DRAFT

MINUTES
City of Glenwood Springs
Planning and Zoning Commission
Regular Meeting
September 24, 2019
Council Chambers, First Floor, City Hall
101 W. 8th Street
6:00PM

Chairman Dehm called the meeting to order at 5:58 p.m.

1. Roll Call

Present at roll call were Commissioners:	Amber Wissing, Ingrid Wussow, George Shaver, Marco Dehm, Carolyn Cipperly, Tim Malloy and Sumner Schachter
Absent:	Kathryn Grosscup and Dean Kinkel
Also present were:	Trent Hyatt, Senior Planner Jenn Ooton, Asst. City Manager, Director Gretchen Ricehill, Asst. Director Anna S. Itenberg, City Attorney's Office Kathleen Michel, Admin. Assistant

MOTION: Commissioner Malloy moved, seconded by Commissioner Schachter, to seat alternate Carolyn Cipperly for this meeting.

2. Receipt of minutes from the July 23, 2019 regular meeting. On motion of Commissioner Malloy, seconded by Commissioner Shaver, the minutes were approved as corrected by Commissioner Malloy on pages 6, 8 and 9. Motion carried by voice vote.

   Receipt of minutes from the August 24, 2019 regular meeting. On motion of Commissioner Malloy, seconded by Commissioner Wussow, the minutes were approved as written. Motion carried by voice vote, with Chairman Dehm and Commissioner Schachter abstaining.

3. Comments from citizens appearing for items not on the agenda. No one appeared.

APPROVED

Continued Items:

4. 11-19 – Consideration of a special use permit to allow for the construction of a 2,800 square foot convenience store and re-location of underground fuel storage tanks. **ITEM WILL BE CONTINUED TO OCTOBER 22, 2019.**

Commissioner Malloy moved, seconded by Commissioner Shaver, to continue the item to October 22, 2019. Motion carried unanimously.

5. 20-19 – Consideration of a Code Amendment to Section 070.040.020(d)(24) of the Glenwood Springs Municipal Code regarding riparian setback.

Applicant:	City of Glenwood Springs
Owner:	Multiple public and private properties
Location:	Applies to areas within 50 feet of the ordinary high-water mark of perennial water courses in the City
Zone:	All zone districts City-wide

George Shaver recused himself and left the meeting.

Trent Hyatt indicated that multiple persons wished to comment at this meeting. The Chairman indicated he would reopen the public comment and instructed those who wished to speak tonight to put their names on the sign-in sheet. The Chairman was advised that a number of people donated their three minutes of time to Mr. Vick to allow him to make his presentation.

The staff report was presented by Trent Hyatt. Mr. Hyatt distributed additional comment letters received today that were not in the packet. He indicated that the Commissioners could hear additional comments or begin deliberations on the matter.

Commissioner Malloy commented on new material received. Commissioner Malloy and Mr. Hyatt engaged in a discussion of:

- Vegetation and wildfire mitigation standards.
- Colorado State Forest Service standards.
- Permanent structures in river front areas.
- What qualifies as a permanent structure?
- Differences between ordinary high water mark and high water marks.

Commissioner Schachter wanted to clarify what they were being asked to approve to send to Council.

- The wording on page 4 of staff report. Mr. Hyatt replied that it is correct.
- Applicability to public utilities and public parks for non-motorized use and public open space.
- Does it apply equally to a private owner as well as a public owner?
- Mitigation, irrigation structures, flood control, erosion protection.
- Does that text apply to anybody who owns property on the river? Mr. Hyatt did not believe there was an intention to have a significant difference. If you look at the two exemptions, the wording is slightly different. The intent is to apply them equally to public and private projects.

APPROVED

- Stream bank erosion or irrigation structures. How would anyone know what they can do based on the conditions listed? Mr. Hyatt indicated that at some point some of those activities would have to occur in the riparian zone.
- High water mark and 50-foot buffer.
- Future study of red zone on properties in the city.
- Current code allows replacement or repair of an existing structure in riparian zone if damaged.
- Code would allow equipment in riparian zone to make repairs.
- Would code prevent development of property?

Mr. Hyatt pointed out that a number of lots on the riverfront may not qualify for development. Owners could still seek a variance and prove why they have a hardship.

Commissioner Wussow wondered how future property owners would know about these restrictions in the future. Would it then be done by the city through education and Previous HPOZ overlay is now gone. The difficulty of building on these lots still exists. Mr. Hyatt said that the audience members can go home to zero changes to their property. If a structure was destroyed by fire, per non-conforming use regulations they have 18 months to rebuild.

Commissioner Schachter wanted to know where the 10% number came from.

- Suggested staff provide existing properties information on how this percentage would apply. A visual representation of this would be helpful.
- Discussed maintenance of lawns with fertilizer and other chemicals. Mr. Hyatt replied that use of chemicals would be restricted.
- He suggested annual workshops for owners if this goes into effect. Mr. Hyatt replied that Roaring Fork Conservancy has provided workshops in the past.
- Notice to river front owners. Mr. Hyatt responded that river front owners were notified by mail of the original hearing.

Commissioner Wissing asked about enforcement on fertilization of lawns. Mr. Hyatt said that most reports of violations come from neighbors.

At 6:46 p.m. the Chair reopened public comment.

> Chris Lynch, 602 Cowdin Drive, was concerned about this proposal. Her property was first improved in 1884. She fears this is taking her property away. Very emotional about it. Asks for consideration of people who had been here for so long.
>
> Jaime Campa, 602 Cowdin Drive, multi-generational residence (four generations live there). Lived there 54 years. This is very stressful for the family. We have trees for birds; cool water for the trout where the rivers meet. We are a safe haven for animals, birds and fish.

Commissioner Wussow asked how this 20 foot difference would affect their family. She received a lengthy reply repeating what was said before.

> Jen Angeloro, 612 Cowdin Drive, said her family loves living by the water. She brought a petition from residents regarding this proposal. They are opposed to the amendment.

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Julie Rippy, 2262 Midland Ave., was opposed to the proposal. She felt that City projects were causing disturbances on the river. Asked for greater transparency in the process. Current 30 foot setback is adequate.

Bob Littler, 2280 Midland Ave., opposed to reduction of property rights. City's snow storage area drains into river with all the things picked up from the streets.

Amy Wray, 1042 Sprucewood Lane, lives in Spruce Meadows mobile home park. The residents are concerned about possible displacement of their units. Her unit is mobile and they could move out quickly but others are not as flexible.

Mike Blair 1204 Sprucewood Lane, disagrees with the proposed regulation for various reasons. Fifty feet is too large an area in the private property ownership. He suggests an education program rather than enforcement.

Bob Patillo, 3369 Grand Ave., lives next to the Old Cardiff Bridge. Spoke about storm water discharge and other public drainage. A drainage culvert from the Walmart parking lot empties into river by his home. Hillside is moving, needs a retaining wall to keep home in place.

The following all ceded their three minutes to Gary Vick, 614 Cowdin Dr. for a prepared presentation on behalf of riverfront property residents/owners: Maurine Howey, 2308 Midland Ave.; Joel Dickens, 388 Red Cliff; Mark A. Cose and Lexina Cose, 2202 Midland Ave.; Randy Rippy, 2262 Midland Ave.; Jim Waters and Veda Waters, 1205 Riverside Dr.; Roger Neal, 817 Traver Trail; Pat Hensley, 1776 Midland Dr.; and Maria Chansky, 2010 Midland Ave.

Gary Vick, 614 Cowdin Dr., presented prepared remarks (17 typewritten pages). Spoke against the proposed revision and urged the Commission to reject the revision as it disregards rights of property owners. Some of his points were:

- Property values
- Would lose the premium paid for the property
- Restriction of structures
- Use of herbicides, fertilizer

Commissioner Malloy engaged in a discussion with Mr. Vick regarding his summary of the effects of the proposed ordinance.

Commissioner Wussow requested a show of hands from the audience:

- How many are property owners?
- How many are property owners along the river?
- How many were aware of the 30 foot setback?
- How many saw the public notice?
- How many received the mailed notice?
- How many were made aware of the proposed change by Mr. Vick?

She wanted clarity of what brought the audience members to this meeting.

The Chair asked River Commissioners to speak.

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Ashley Moffatt, 509 Maple St., River Commission Chair, clarified her involvement in this proposal.

- She is a property owner and has some property to be developed.
- She is an owner of a VRBO and experienced recent changes to those regulations similar to this process.
- City Council requested the River Commission to be involved in the process.
- This is the City's code; it was set aside to be handled separately from the land use code.
- To define the base line, you must survey the river for ordinary high water mark.
- They were involved in replanting at Veltus Park after shoreline work.
- They will do the same at Two Rivers Park when its shoreline work is completed.
- There are other plantings on their schedule.
- Storm water is on the City's radar for future attention.
- Vegetation is the non-conforming element.

Chad Rudow, 1201 Mountain Drive, technical adviser to the River Commission, and an employee of Roaring Fork Conservancy. He explained his role in developing the ordinance with reliance on science to preserve and enhance the river:

- Low flows/warm waters stressed the fish.
- Algae bloom from warm water following winter with little moisture.
- Roaring Fork River listed as "impaired" due to warm water temperatures.
- Healthy riparian areas are important.
- Resiliency important to health of the rivers.

In response to questions from Commissioner Malloy; Mr. Rudow listed the following benefits of healthy riparian areas:

- Slowing river flow
- Preventing point source pollution
- Roots and growth in riparian area reduce erosion

Commissioner Malloy agreed that storm water entering rivers leads to lesser quality. Riparian setback does not address storm water intrusion.

Rick Lofaro, 105 Ptarmigan Court, Basalt, commented on sedimentation from non-point sources.

Commissioner Schachter asked if there is a figure of how much riparian area has been lost over the last decade. There was no answer.

Chad Rudow commented that Roaring Fork Conservancy received inquiries from many other entities about impact on riparian areas from clearing the areas. We pass the concerns on to the appropriate entities.

Rick Lofaro, Basalt, commented that these regulations are a river management tool, not a taking of property rights. The grandfather clause can help people continue to enjoy their river property. Goal is to help landowners put things together to protect the rivers for future generations.

Scott Schreiber, 1806 Ouray Road, River Commissioner, lives by the river. Paid high premium for river property. Joined the River Commission to help keep the river a magical place and to keep the river for the future. He is an engineer who goes around the state helping to repair damaged riparian areas. Wants to help Glenwood Springs avoid damage.

APPROVED

Erica Gibson, 2701 Midland Ave., River Commissioner, commented that this code was intended to be a proactive code, not reactive. Much of what people already have or have been doing will be fine. If someone develops in the future, this code will apply. The primary item of concern for the present owners is use of fertilizer. The River Commission is starting a public outreach program to provide information to property owners.

The Chair closed public comment at 8:37 p.m.

Commissioner Malloy asked about Gary Vick's proposed revisions as he did not see staff comments on them.

Mr. Hyatt said Mr. Vick presented his ideas after the last hearing and they were in this packet. The task for staff was to simplify code and not to add another 15 pages or more. Staff was not able to explain every possible interpretation of the code.

Commissioner Malloy stated his intent to direct staff for some tweaks to the current document based on information received during the public hearing.

Commission Schachter commented on the concept of public outreach. Notice of our meetings is not public outreach.

Jenn Ooton responded to the question of whether there was adequate public outreach. This piece was set aside separately by the City Council from the recent code revision. It was part of the meeting we held about code revision.

Commissioner Schachter said we are making a recommendation to Council. Jenn Ooton reminded the Commissioners that Code now requires a public hearing before the Planning Commission to amend Article 070.

Commissioner Wussow asked about what was done in the VRBO revision. Ms. Ooton responded with:

- the survey,
- meetings held with the public,
- hearing with P&Z,
- then to Council.

The Chairman called for a MOTION regarding riparian setbacks.

Commissioner Malloy moved to continue this item and to direct staff to make a few refinements. He moved:

- **To clarify language re non-conforming grandfathering. and how that would be managed;**
- **To clarify that steps (specifically) are permitted in the riparian area;**
- **To provide language regarding safe access to the river;**
- **To clarify difference between the private and public sections of restrictions.**

Commissioner Wussow seconded the motion and wished to add language regarding improving notice to the public or providing notice when property changes ownership.

APPROVED

A discussion with Commissioner Malloy followed. No changes made to motion.

Commissioner Schachter concerned about whether we need to make some amendments right now with recommendations to Council to change. Clear boundaries about the water mark issue. Wants to hear rationale for the 10%. The other thing is to be on record for river front or riparian owners' workshops and other educational opportunities.

Discussion involving all Commissioners continued. Commissioner Malloy repeated his motion. He believed that staff changes, if approved, could then go to Council.

Commissioner Schachter wanted to see educational materials and workshops in the future.

Ms. Ooton said that might not be something to include in land use code but perhaps there could be something included in the budget for education.

Commissioner Cipperly wants specificity regarding trimming growth, mowing lawns, etc.

Commissioner Malloy agreed to accept the friendly amendments from Commissioners Wussow and Schachter.

Chairman Dehm wants to see how the proposed lines affect the properties. He wants to see an illustration showing the lines along the river front. Select some representative properties and provide an illustration. He was not asking for a map, just an illustration of what it does to real properties.

The motion carried unanimously to continue the item with the friendly amendments. Commissioner Shaver absent.

The Chair called for a five minute recess.

Commissioner Wussow left the meeting at the break. Commissioner Shaver did not return.

New Items

6. 32-19 – Special Use Permit for a 66-space surface parking lot in the m1-Mixed Use Corridor Zoning District. The project includes a variance request from the requirement that no block of parking exceeds eight spaces without providing a landscape island.

Applicant:	Valley View Hospital
Owner:	FirstBank
Location:	2014 Grand Avenue (PIN#: 2185-164-00-004 and -005)
Zone:	M1-Mixed Use Corridor

Commissioner Schachter brought up a Commission request for a master plan for parking before we considered any more parking applications from this applicant. Ms. Ricehill asked for an overview of the request or just continue this item.

Brian Murphy, CEO of Valley View Hospital, stated:

- He is new to this job.
- They were working on a master plan.
- This proposal is to accommodate what we do now.

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Commissioner Schachter repeated that the Commission was concerned about the spread of asphalt without a master plan for parking.

Ms. Ooton checked minutes and pointed out that the request for the master plan could not be attached as a condition to a future item before the Commission.

Dr. Murphy questioned how this proposal got this far.

Robert Smith from Valley View said that there is new leadership locally,

- Parking impact is crucial.
- They need to put parking somewhere now.
- It takes time to develop a master plan.
- Even if they build the parking garage already approved, they will displace parking.

Chairman stated they should move forward with this hearing.

Commissioner Schachter said the City does not have change of plans due to change of personnel, need to work within the comp plan.

Gretchen Ricehill presented the staff report.

- Sixty-six parking spaces for employee only use
- Access from 20th Street
- Taco Bell and First Bank will not have access to new parking area
- 16.5 foot wide access
- Valley View owns property for access
- 4 inch roll over curb for emergency access only
- Lot will be similar to other Valley View lots
- A variance is required to eliminate 3 landscape islands
- 21.8% of total lot is landscaping; 20% required
- Minor subdivision process (administrative)
- Variance requires P&Z review
- Stand-alone parking lot requires Special Use Permit
- Seven variance criteria required
- 2011-12 lot was resurfaced; landscaping not required then
- Grade difference between two lots
- Six criteria for special use permit
- Hospital is a regional medical center
- Technical comments from Public Works and Engineering.
- Reoriented bank parking
- Direct access from 20th Street; traffic light at intersection with Grand
- Landlocked parcel did not impact other commercial uses
- Two action items: approve, deny or continue; staff recommends approval

Commissioner Malloy requested additional information about:

- Lot line adjustment by Planning Director will take place after SUP approved
- Will there be an easement for access?
- Access is very narrow; how many park there?
- Is there a traffic study for the movement of the 66 vehicles?

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Commissioners Cipperly and Schachter inquired about access from the condos through this property and cars queuing up to access the parking lot.
Reply: The applicant can provide additional information

Applicant presentation:

Robert Smith stated there is an access easement to the parking at the condos using the other driveway.

Yancy Nichol, engineer, preserve open space and landscaping;

- Access to Grand is subject to congestion.
- The employees who park here are already parking in the neighborhood.
- Hospital is staggering shift changes.
- Landscape islands would interfere with drainage flow and weaken asphalt.

Discussion between Mr. Nichol and Commissioner Malloy regarding drainage.

At 10:20 p.m. opened public comment. No one to speak. Closed public comment.

Ms. Ooton reported on the minutes from September 27, 2016, there was a question related to the master parking plan and putting a condition on future SUP for parking.

MOTION – Action Item 1: Commissioner Malloy moved for approval of item 1 as is; Commissioner Schachter seconded. No discussion. Carried unanimously.

MOTION – Action Item 2: Commissioner Malloy moved for approval of item 2 with findings and conditions 1-4 [~~with a condition 5 providing that no further land use applications be accepted without a master plan~~]**; seconded by Commissioner Schachter.**

Anna Itenberg, City Attorney's office, commented they could not attach a future action to this item by adding a 5th condition.

Commissioner Malloy removed fifth condition.

Motion carried unanimously.

7. Commissioner Comments

Commissioner Schachter questioned the all or nothing criteria for variances. Discussion followed involving staff and commissioners.

Commissioner Cipperly was in favor of providing incentives for conserving energy and resources as was done for this parking lot.

Commission Wissing thought we could have had a better public process. Discussion with staff followed.

Commission Schachter notified the Commission of an October 23 town meeting at 6:00 p.m. at the library. He is asking Council and Commissioners to be there.

APPROVED

Commissioner Schachter commented that a second monthly meeting to do the fun part of planning.

8. Director Comments

Ms. Ooton reminded Commission of October 16 joint meeting with Housing Commission and City Council in the Council Chambers.

Ms. Ooton said City Council would consider the Airport report at its next meeting.

9. Adjournment 10:34 p.m.

APPROVED

Agenda Item: 20-19 - Consideration of a Code Amendment to Section 070.040.020(d)(24) of the Glenwood Springs Municipal Code regarding riparian setbacks

Action Requested:

REQUEST	Consideration of a Code Amendment to Section 070.040.020(d)(24) of the *Glenwood Springs Municipal Code* regarding riparian setbacks
APPLICANT	City of Glenwood Springs
OWNER	Multiple public and private properties
LOCATION	Applies to areas within 50 feet of the ordinary high-water mark of perineal water courses within the City
ZONE	All zone districts City wide, where applicable

Department: Planning Department

Presented By: Trent Hyatt, Senior Planner

Background Info:

Issues: **Action 1 - Code Amendment** – to revise the riparian setback standards of Section 070.040.020(d)(24) of the Glenwood Springs Municipal Code.

Staff Recommendation: The Planning and Zoning Commission (Commission) first considered the proposed text amendment at the July 23, 2019 regular meeting. The staff report and related items from said meeting are attached for your review. Consideration of the proposal was continued to the August regular meeting and then again to the September regular meeting.

Staff has received various comments regarding the proposal since the first meeting which are attached. Comments from Gary Vick provide detailed recommendations and background information for potential alternate language while other comments object to the proposal. While a public hearing was held at the July 23 meeting, staff has received requests from numerous individuals requesting the ability to provide additional comments to the Commission.

MINUTES
City of Glenwood Springs
Planning and Zoning Commission
Regular Meeting
July 23, 2019
Council Chambers, First Floor, City Hall
101 W. 8th Street
6:00PM

APPROVED

1. Roll Call

Present at roll call were Commissioners:	Ingrid Wussow, George Shaver, Kathryn Grosscup, Sumner Schachter, Tim Malloy Marco Dehm, Amber Wissing
Absent:	Alternates Cipperly and Dean Kinkel
Also present were:	Trent Hyatt, Senior Planner Hannah Klausman, AICP, Senior Planner Jenn Ooton, Asst. City Manager, Director Anna S. Itenberg, City Attorney's Office Kathleen Michel, Admin. Assistant

2. Receipt of minutes from the June 25, 2019 regular meeting. On motion of Commissioner Grosscup, seconded by Commissioner Malloy, the minutes were approved with a correction on voice vote with Chairman Dehm abstaining.

3. Comments from citizens appearing for items not on the agenda. No one appeared.

New Items

4. 16-18 – Consideration of an amendment to a Major Development Permit to allow an extension to a deadline for parking lot paving.

Applicant:	Iron Mountain Hot Springs, LLC
Owner:	Iron Mountain Hot Springs, LLC
Location:	281 Centennial Street
Zone:	RE Resort District

Hannah Klausman presented the staff report. This is a continued item.

- Staff recommends denial.
- Design variance allowed unpaved parking lot for four years from approval or if a new application is made.
- New planning application in 2018.
- This item continued for more information.
- Most conditions satisfied.
- River trail is still being worked on.
- Major site architectural plan is consistent with purpose and intent of code
- Applicant has long-range plans that may change what was envisioned at the beginning
- Compromise is to pave the original 90 parking spaces leaving other areas unpaved.
- Colorado River District is concerned about volume of traffic generated.

Staff recommends denial, meaning that paving would happen now.

Questions to Staff

Commissioner Malloy had many questions about the parking expansion

- No approval was requested, and no approval was granted
- It seems the only argument being presented to not pay it currently is an economic one
- Asked numerous questions regarding redesign or expansion of the various parking areas

Hannah Klausman

- No development happened that would trigger a requirement to expand the parking lot
- Argument is relying heavily on the fact that a redesign of the parking lot would be difficult based on new development calling for it but no specific numbers
- Answered numerous questions regarding redesign of parking area
- Will let applicant present newly submitted design for parking area

Commissioner Grosscup

- Concerned about lighting requirements
- Concerned about the increase in impervious surfaces and when that will be triggered

Hannah Klausman responded

- Variances were granted regarding lighting
- 90 spaces were required per original permit. If any new development requiring more than the said amount of spaces, that would be a major trigger

Commissioner Schachter

- Verified that only original 90 parking spaces are involved and no bearing on future development.
- Does there come a point of violation from using the unpaved parking area?

Hannah Klausman

- There is an active application going on and there are some hang ups. After conversations with application things will be dealt with in a timely manner.

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Applicant presentation: Mogli Cooper presented a drawing of the current road and how the future roadway will change when they build employee housing and an office.

- CDOT plans to build new office building and employee housing
- Per applicant's development plan, paving parking lot would require redoing what has been paved
- City lift station is outdated and needs relocation.
- The developer must replace lift station before the housing is built
- Asking for extension of paving to November 2021.
- She circulated photos of buildings and of Centennial Street
- Access exists for emergency vehicles
- Pedestrian access exists in parking lot

Questions to Applicant

Commissioner Wussow stated the applicant answered all her questions, specifically the rationale for being noncompliant.

Commissioner Malloy and Ms. Cooper had a conversation about timeline of development and where the parking would be redesigned. There was also talk about the location of the sewer line and lift station.

Commissioner Schachter and Ms. Cooper discussed the date of extension, mid November 2021, and location of sewer line. Commissioner Schachter also asked when a new development application will be submitted.

Commissioner Shaver asked about the trail easement and City Attorney Anna Itenberg answered they are hashing out the agreements of the easement. Commissioner asked about how future development of rezoned parcel will affect paving.

Ms. Cooper, Ms. Itenberg, and Commissioners followed the approximate easement location on the map provided by Ms. Cooper.

Commissioner Grosscup wondered if Ms. Cooper would be interested in a partial paving. Also asked how certain she is about the impacts of the CDOT employee housing building will have.

Ms. Cooper responded saying the impacts are mostly infrastructure.

Commissioner Malloy made an argument that there should be parts of this parking lot that will be more and less impacted by future development. Also asked when certain material has been included in the packet.

Jenn Ooton explained that until a full application has been submitted it can be very difficult to include that in the packet.

Ms. Cooper explained this has been an ever-changing project and changing plans dealing with CDOT.

Opened public hearing 6:52. No one to speak. Closed.

MOTION: Commissioner Wussow moved to approve extension to November 14, 2021 with

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rationale that repaving multiple times does not support Comp Plan. Commissioner Shaver seconded the motion and discussion followed:

- Being asked to make decision with incomplete information.
- Asked for the specific information.
- Wanted to continue for full information.
- Question is whether to continue or grant a full approval
- Why not tie the extension to a more complete application and presentation.
- Allow a continuance for 60 days for better information.

Commissioner Wussow withdrew her motion. Commissioner Shaver withdrew second.

MOTION: Commissioner Malloy moved to continue application until an application for development of the adjacent CDOT parcel or December 31, 2019 whichever comes first. Commissioner Shaver seconded.

Discussion:

- Wanting as much information as possible in order to stop kicking the ball down the road
- Do not want an incomplete application; same issues will still be present
- Information that supports why the paving should not happen now

Ayes: Dehm, Shaver, Schachter, Malloy, Wussow, Wissing
Noes: Grosscup

Motion carried.

5. 10-19 – Consideration of a Site/Architectural Plan Review for the construction of a 9,428 square foot bank/office building.

Applicant: Brad VanArsdale
Owner: ANB Bank
Location: 910 Grand Avenue
Zone: M2 Mixed-Use Core District

Trent Hyatt presented the staff report

- Approval tonight means application still needs to go through approval from staff
- Demolition of two mixed-use commercial buildings
- 9428 square foot building will be built in place
- Use by right in this zone district
- 4000 square feet of landscaping being proposed
- Exempt from parking requirements because of its location in the GID
- Explanation of design standards
- Access permit from CDOT is required
- Historic preservation district had requests for documents and materials
- Presented materials board

Options: approve, approve with conditions, deny or continue for further information.

Questions to staff:

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Commissioner Malloy asked

- Difference between downtown designs standards versus the non-residential mixed-use design standards.
- If the parking lot to the north of real estate office is part of this project
- If there is a requirement for zero lot line setbacks
- If the building meets both downtown design standards and mixed-use nonresidential design standards

Trent Hyatt confirmed the zero lot line setback requirement and the difference in design standards

Commissioner Schachter asked

- What is the size of the parking lot existing compared to proposed?
- Is there justification for this project in the Comprehensive Plan?

Trent Hyatt explained the parking lot will be bigger in overall size and confirmed the justification in the Comprehensive Plan.

Commissioner Shaver asked questions about the entrance to the property meeting code.

Commissioner Grosscup asked further questions about the entrance meeting the code as well.

Commissioner Malloy asked how many tenants are being displaced and more questions regarding the entrance.

Commissioner Grosscup wondered if requests from DDA and Historic Preservation were met by applicant.

Trent Hyatt explained and answered the various entrance questions and said staff believes it meets code. Mr. Hyatt said design revisions were made after comments from DDA and Historic Preservation were received.

Bob Natucchi, Castle Rock, Colorado, who manages the real estate for ANB Bank spoke about design accommodations to the slope of the property.

- Colorado bank, not a national bank
- Location of entrance is based on grade change and to meet ADA requirements
- Community bank in Glenwood Springs for 29 years
- Goal is to be in the downtown area
- Brings business jobs into downtown
- Proto-typical design for ANB is red brick with a lot of windows
- Kept elements and comply with local design standards
- Seven tenants currently in the building;
- Every lease had termination clause;
- Twelve months' notice and twelve months of free rent

Questions to applicant:

Commissioner Malloy asked applicant to clarify the entrance and property slope

APPROVED

Bob Natucchi explained the property slope and where the building floor dips below grade

Commissioner Malloy does not believe the slope and building being below grade is a good reason to relocate the entrance away from Grand Avenue as is proposed.

Commissioner Malloy discussed the entrance location with the applicant and how the tenants feel about the lease termination terms. Applicants said they had amicable agreements with tenants to terminate leases.

Commissioner Wussow and applicant discussed the materials being used on the building. The materials are all modern rather than historic.

Commissioner Shaver asked where the materials will be located on the actual building.

Applicant went through showing where the materials will be located

Commissioner Schachter asked if the applicant considered offering space to the current displaced tenants and if they ever considered putting the bank on the second floor.

Response: Applicant has offered space and, no, the bank was not considering being on the second floor.

Commissioner Grosscup and applicant discussed ANB brand of building and colors, how many employees will fill the building, size of the parking, alley way access and where the employees will park.

Commissioner Wussow confirmed there will be no drive through provided and materials being used compared to other locations.

Commissioner Grosscup and applicant discussed the street trees and Trent Hyatt confirmed there will be 5 street trees

Commissioner Dehm confirmed the Planning & Zoning Commission has the final say on this project. Further discussion with Trent Hyatt about new and old code regarding parking location.

Commissioner Schachter asked about window percentage requirement and the potential reduction in the percentage of windows.

8:12 p.m. public hearing opened to speakers

Margie Crowe donated her time to Laura Speck, Silver Bead

- Variety of different business in town.
- Spoke about the decimation of this area.
- Wrong direction for Glenwood Springs
- Did not see this type of development coming
- No drive thru is concerning

Rachel Windh, 728 Bennett Avenue

- Opposed to the proposed change.
- Banks do not favor tourism

APPROVED

- Worried about more banks doing the same thing
- Hurting community

Ken Melby 250 Creekside Court
- Favored old style in downtown.
- Downtown is shrinking.
- Design does not fit

Cheryl Guay, 3106 Hager Lane
- Opposed to so many banks in downtown.
- Concerned about bank taking her next location.
- Happy with being able to stay until the end of May

Laura Kirk, 311 Main Street, Carbondale
- Design does not match the downtown character
- Entry takes away from vibrancy and access from the street
- Concerns are aligned with Historic Preservation Commission

Chrissy Lee-Manes 713 Cooper Avenue
- In favor of small businesses, against large corporate entities.
- Downtown is shrinking with less pedestrian traffic.
- Request new special zone district to protect businesses

Jim Pamnee 592 Evergreen Road, Silt
- Concerned about CDOT traffic counts
- Parking spaces cannot accommodate for this business

Laura Speck spoke a second time
- Business ownership and sales tax revenue
- Comparing marijuana laws and creating a dead zone in downtown
- Quote by Gandhi

Michael Blair, 1204 Sprucewood Lane
- Asked that the building reflect town's history.
- Small retail commercial business is what makes a town live.
- Other new buildings have followed historic design.

Chrissy Lee-Manes, 713 Cooper Avenue
- Talked about the effort required for an awning at her business.
- Concerned about the comparison between an awning and an entire bank

Barbara Ford, 502 Highland Park Drive
- Local business owner and soon to be homeowner

Dan Angeloro, 602 Cowdin Drive
- Moved here from East Coast.
- Brags to everyone about historic Glenwood Springs
- The bank is not the right move

APPROVED

Closed public portion at 8:40 p.m.

Commissioner Malloy clarified what they are reviewing which Trent Hyatt confirmed is 070.040, development standards.

Called for a motion:

MOTION: Commissioner Malloy moved to deny application on the grounds it is not consistent with the Comp Plan with findings based on the following standards: Section 070-040-090(d)(1)(b), section 070.040.090(d)(1)(c), section 070.040.090.(d)(1)(d), section 070.040.090.(d)(2)(c). The proposal is also inconsistent with the following policies in the Comp Plan: promote long term sustainable diverse economic development, maintain Glenwood Springs as the regional tourism retail center for Garfield County that attracts diverse businesses and industries, retain longstanding tourist market, preserve small town character while maintaining the livability of Glenwood Springs and increasing the vibrancy of commercial success of the downtown core, supports social diversity.

Commissioner Wussow seconded for purposes of discussion

Commissioner Wussow withdrew the second because Commissioner Malloy had not stated his findings yet

Commissioner Schachter seconded.

Discussion

- Bound by Code to act on an application
- Does not provide social diversity
- Understated ethical obligation to look after the community
- Architectural rendering and site use not compatible with Comp Plan
- Downtown specialty retail district focused on restaurants and small shops
- Existing banks in downtown comply with historical guidelines
- Pedestrian oriented goal is not met
- The old building will not stay
- Encourage people to come out and
- Encouraged discussion between the bank and tenants

Called for the question:

Carried unanimously to deny the application.

6. 16-19 – Consideration of a Special Use Permit to allow for a retail marijuana establishment.

Applicant:	Good People LLC dba Stash
Owner:	Don Garrett and Shawna Renee Patrick
Location:	2550 Highway CO Highway 82, Unit A112
Zone:	M1 Mixed Use Corridor District

Trent Hyatt presented the staff report.

- Current proposal to rehab a space into a retail marijuana outlet

APPROVED

- Retail marijuana is allowed per zone excluding cultivation
- This is half of the former liquor store space
- City and State licenses required per criteria
- Special use permit granted by P&Z and City Council required
- Asked permit holder on South Grand to relinquish his undeveloped SUP
- No comments were received from reviewing agencies or public

Options are approve, approve with conditions, deny or continue for more information.

Questions to Staff:

Commissioner Malloy
- Asked about the other special use permit holder on South Grand
- Concerned about left hand turn entering and exiting the property
- Significant uses in the Glenwood Commercial Center
- Comp Plan says retail that would compete with downtown retail is discouraged

Trent Hyatt
- Confirmed current permit holder would have prevented this store
- Discussed concerns about left turn but nothing planned to be done. CDOT did not want anything to be controlled
- Distance from downtown could preclude it from being considered competition

Commissioner Schachter asked what would happen if a school decided to go within 900 feet of this new marijuana shop and Mr. Hyatt explained the retail marijuana shop would be a legal non-conforming use.

Commissioner Shaver believes there may be need for a code revision on the different distinction of schools.

Commissioner Grosscup wonders why Glenwood is so unique in marijuana buffers from schools.

Shauna and Garrett Patrick spoke on behalf of their application.
- Began as a medical dispensary to help people
- Converted later to a retail shop as a business decision
- Employee and customer education
- Currently grow in Old Snowmass
- Had an offer on their business in downtown Aspen
- They are a mom and pop operation
- Focus on the quality of the product to differentiate themselves

Questions to Applicant

Commissioner Malloy wondered if there were any adverse effects that may negatively impact the community from this establishment and if anything, explaining those impacts were submitted with the application, as is required by section 070.060.050(e)(3)(e)(2)(vi) of the Code.

Shauna and Garrett explained edibles as depending on what chemicals have been used to extract, can cause stomach problems with the user and they did not include things explaining

APPROVED

impacts in the application.

Commissioner Dehm clarified they are not doing medical any more and the applicants confirmed that.

Commissioner Grosscup asked why only retail allows them to service and help more people when other applicants explained the opposite.

Applicant explained switching to retail has allowed more freedom to give discounts and help people.

Commissioner Wussow asked what they purchased in the building and the applicant responded with only one of the two previously occupied spots.

Open to public 9:30 p.m.

Michael Blair opposed to selling marijuana in our community. That location is very difficult for anyone making a turn there. There should be an effort to improve the access point at this location.

Barbara Ford, 502 Hyland Park Dr., owns a retail shop in Glenwood Commercial Center and fully supports this application. She is also concerned that the Commission's focus is only on downtown.

Chris Lynch, 602 Cowdin Drive, owns property at 2554 Hwy 82 in Garfield County. Turns into Glenwood Commercial Center are very dangerous. Parking has been added along the guard rail which should not be there. Concerned about homeless buying and using the product which could start fires. Too many pot shops are already in town and Glenwood does not need any more.

9:43 closed public comments.

MOTION: Commissioner Schachter moved to approve with findings on page 8 and conditions on page 9. Commissioner Grosscup seconded.

Discussion:

Commissioner Schachter
- Question of how many are too many shops
- Access is not applicant's responsibility
- Council makes the determination on that point
- Access to the property is not our jurisdiction, must deal with CDOT

Commissioner Malloy
- Location is remote from the rest of town
- Concerned about safety at this location

Commissioner Wussow
- Meets criteria of Code
- Annexation has been approved by the City and uses to be there
- Use by right

Commissioner Grosscup

APPROVED

- Concerned about how many shops are too many
- Not concerned on this specific application

Commissioner Dehm

- Was here for annexation and the result was deemed okay, regarding the access

Motion carried unanimously.

Motion to extend meeting past 10:00 p.m. Commissioner Malloy seconded by Commissioner Grosscup. Carried by voice vote.

7. 20-19 – Consideration of a Code Amendment to Section 070.040.020(d)(24) of the Glenwood Springs Municipal Code

Applicant:	City of Glenwood Springs
Owner:	Multiple public and private properties
Location:	Applies to areas within 50 feet of the ordinary high-water mark of perennial water courses in the City
Zone:	All zone districts City wide

Commissioner Shaver recused himself from this discussion and left the meeting.

Trent Hyatt presented the staff report.

- Instructed to look at river setback.
- 30-foot setback area from the high watermark of any river
- Staff proposes format change
- Prohibits clearing of native vegetation
- 10% exemption to allow property owner to enjoy the river
- 50-feet from ordinary high watermark
- Formal ecological survey but ordinary high-water mark is usually visible
- Examples of other communities and what they are doing for riparian areas
- List of concerns expressed at work session

Recommend approval, deny, approval with conditions

Questions to staff:

Commissioner Malloy

- Does this leave any property undevelopable?
- How is the 10% exemptions calculated?
- Are structures allowed?
- Questions about wildfire mitigation

Trent Hyatt Responded saying property can apply for a variance and the percentage is of the undevelopable square footage area. Structures are currently prohibited.

Commissioner Schacter asked about grandfathering existing structures and pathways. Can structures be improved without having to appear before Planning and Zoning Commission.

Trent Hyatt responded that those structures and pathways would be legal non-conforming and would follow that section of our code.

APPROVED

Trent Hyatt and Commissioner Schacter discussed the further restrictions of the proposed standard regarding replacement of vegetation and buildability on lots.

Commissioner Wussow was concerned about the timeline of replacement of vegetation. Also concerned about how property owners who are impacted were notified. Further discussion with Trent Hyatt about how the public will be notified and educated city-wide if this goes through.

Commissioner Grosscup wondered how the setback number was settled upon.

Trent Hyatt responded saying it had something to do with the current setback and the rivers CFS.

Commissioner Malloy and Trent Hyatt discussed the wildfire mitigation part of this code.

Brendan Langenhuizen, Chair of the River Commission, spoke about the role of the River Commission.

- Received input from many sources
- Too much clearing of vegetation without any regulations to stop it
- Roaring Fork Conservancy worked with them
- Work sessions with the City Council
- Intent is to maintain the majority of the river
- Beautiful lawns look great but don't protect the river banks

Chad Rudow, Roaring Fork Conservancy, serves as an advisor to the River Commission. Spoke of riparian areas and the health of rivers

- Riparian areas act as sponge
- Prevents erosion
- Act as filters of what goes into the rivers
- Provide habitat
- Act as highways by providing migration routes
- Speed bumps to dissipate energy of river during high flows
- Increase property values
- Replenish groundwater
- Plants less likely to burn during a fire

Ashley Moffat, 509 Maple Street, Vice Chairman of River Commission, provided a handout to the Commission.

- Glenwood Springs is only municipality not protecting their riparian areas
- The new way of determining where the setback will start is easier
- Wanted 100 feet but 50 feet is good compromise
- Similar to current code but restricting clear cutting and adding pesticides

Scott Shriver, Engineer, who repairs riparian areas. - Named three reports of interest.

- Keep riparian areas
- Source Water Protection Plan shows Grizzly Creek is our water source and Roaring Fork is alternate source.
- Best management practices
- Education outreach is necessary.

APPROVED

- 303D List: Roaring Fork River's temperature is the concern.
- Highest priority contaminants are urban contaminates.
- MS4 municipal separate sewer systems.
- Storm water is not treated currently.
- Will have to treat storm water as well.

Erica Gibson, 2701 Midland Avenue, River Commissioner,

- Spoke about economic driver associated with our rivers.
- Glenwood Springs tourism is based on water resources.
- Our local economy is based in part on our healthy rivers.
- 320 local jobs that rely on healthy rivers.

10:49 p.m. open to public comment.

Harry Vick

- Listed the wildlife found in his back yard.
- Breaks between river and willows.
- His yard is cleared to the river.
- This setback will prevent redevelopment of a property.
- Too broad of a brush stroke
- He is opposed to the 50-foot distance.
- Concerns about how restrictive this is

Jenn Ooton confirmed they could extend the meeting if the vote is unanimous.

MOTION: Commissioner Malloy moved to extend the meeting to 11:30 p.m. Commissioner Grosscup seconded.

Motion carried unanimously.

Michael Blair 1204 Sprucewood Lane.

- Agreed with Mr. Vick's comments.
- People own property adjacent to the river.
- People have the right to use and develop their property
- Fifty feet sounds arbitrary.

Ken Melby

- This setback will put you right in the middle of his home.
- This would be taking of property rights.
- Not all properties are the same

Chris Lynch, 602 Cowdin Drive

- Talked about her history living along the river.
- The effect of this ordinance would have on her ability to garden on her property.
- Her home was built in 1884. She is concerned that ordinance will prevent her from using her property.
- Value of home will be taken away

Dan Angelaro

APPROVED

- Lives on the river.
- He had plans to add to his home as his family has outgrown the space.
- This would affect his ability to plan for his family's future.

Rick Laffaro, Executive Director of Roaring Fork Conservancy,

- Encouraged the passing of this ordinance as it may not be as limiting as people have predicted.
- Tamarisk and Russian olive have intruded into the native habitat.
- He will work as advisor to City as he already does for Basalt and Garfield County.
- People can continue to enjoy quality of life on the river.
- There is room for variances.
- Provided letters from Roaring Fork Fishing Guide Alliance, Trout Unlimited, American Rivers

11:16 p.m. public comment portion closed.

Questions to staff:

Commissioner Wussow asked if the setback would be more or less in an ideal world.

Brendon Langenhuizen stated it would ideally be more than 50 feet especially in high sloped areas; he considered this a conservative recommendation. This will apply to new development and current development will be grandfathered.

Commissioner Schachter would like to see the distances on a map and are structures grandfathered in.

Commission and staff had discussion about grandfathered structures and nonconforming uses in the code. Ability to rebuild was discussed. Can build on same footprint following a catastrophic event, deterioration. Cannot increase degree of non-conformity.

Commissioner Malloy asked about mapping high water mark of property in riparian area throughout the city and what specifically is different from current and proposed code.

Staff stated that getting an entire survey of riparian area would be costly and timely. Trent Hyatt explained the difference of current code and proposed code.

Commissioner Grosscup and Trent Hyatt discussed about the protection of vegetation.

11:29 p.m.
MOTION: Commissioner Schachter moved to continue discussion of riparian setback, seconded by Commissioner Malloy.

Motion carried unanimously.

8. Commissioner Comments - none

9. Director Comments - none

APPROVED

10. Adjournment 11:30 p.m.

APPROVED

Planning and Zoning Commission Report

Date: July 23, 2019
To: Planning and Zoning Commission
From: Trent L. Hyatt, Senior Planner
Subject: #20-19 – Riparian Setback Code Amendment

REQUEST	Consideration of a Code Amendment to Section 070.040.020(d)(24) of the *Glenwood Springs Municipal Code* regarding riparian setbacks
APPLICANT	City of Glenwood Springs
OWNER	Multiple public and private properties
LOCATION	Applies to areas within 50 feet of the ordinary high-water mark of perineal water courses within the City
ZONE	All zone districts City wide, where applicable

ACTION ITEM:

The Planning and Zoning Commission (Commission) is the recommending body to City Council on any and all revisions to the *Glenwood Springs Municipal Code* (Code).

Action 1 - Code Amendment – to revise the riparian setback standards of Section 070.040.020(d)(24) of the *Glenwood Springs Municipal Code*.

Staff recommendation: *Staff recommends **approval** of the Code Amendment with the findings on page 8.*

BACKGROUND/ANALYSIS

History/Proposal

On October 4, 2018, City Council held a work session with the River Commission (RC) and Planning and Zoning Commission (Commission) to facilitate a discussion regarding riparian setbacks. The work session followed a previous City Council discussion regarding the matter on April 26, 2018 that occurred in conjunction with a progress update on the development code re-draft which was ongoing at the time. Prior to the development code re-draft discussion in April 2018, City Council received a recommendation from the RC (following a unanimous vote on February 7, 2018) for the inclusion of a 50-foot riparian setback in the re-drafting of the development code. Details and background information from the River Commission are outlined in an attached letter.

To date, no action has been taken on the riparian setback recommended by the RC. As requested by City Council, Community Development is now processing a Code Amendment to allow for review and consideration of the associated revision by the Commission and City Council. Draft standards as well as options to incentivize stewardship in riparian zones are addressed below.

Current Riparian Standard
Per Section 070.040.020(d)(24) of the Code, Development in Waterways and Areas of Special Flood Hazard, the City requires a 30-foot riparian setback as follows:

> *"No improvement, building, structure, excavation, dumping or backfill shall be placed, built, undertaken or approved within a 30-foot setback area horizontally from the high-water mark of any river or live stream, except for bridges, paths for non-motorized use, irrigation structures or flood control and erosion protection devices."*

Formerly, Section 070.010.010 of the Code stated, "high water mark means for the Roaring Fork River, the level of the 1973 peak flow measured at eight thousand two hundred eighty (8,280) cubic feet per second. For the Colorado River, the level of the 1973 peak flow measured at twenty thousand five hundred (20,500) cubic feet per second. For any other river or stream, its highest peak flow between October 1, 1956, and September 30, 1976." However, "high water mark" is no longer provided for in the definitions section. This appears to be an error in the adoption of the revised development code in August 2018.

River Commission Recommended Standard
Below is the language recommended by the River Commission in February 2018.

a. Purpose
The purpose of this Subsection 070.040.020(d)(24) is to conserve and promote the health of the City's riparian ecosystems and water quality by maintaining a functional natural buffer adjacent to waterways.

i. No improvement, building, structure, excavation, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within a fifty-foot setback area horizontally from the ordinary high-water mark of any river or live perennial stream.
ii. Within the fifty-foot setback, no live vegetation may be removed except for species listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm when replaced with appropriate plant species. The Director has discretion to permit the removal of native vegetation, not to exceed 10 percent of the area of the setback, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be interpreted to allow for permanent structures of any kind within the setback area. The Director may also reduce the setback for bridges, public paths for non-motorized use, public open space areas, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices, or upon demonstration by the applicant that such reduction shall not result in water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.
iii. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted with the fifty-foot setback area except for the removal of above listed noxious weeds in compliance with applicable regulations.

Discussion
The area of the proposed 50-foot setback as outlined by the RC above begins at "ordinary high water mark" (OHWH) as opposed to the current "high water mark" which is generally lower in elevation along the bank of any given water course. A simple definition of the OHWM is the *mark typically reached on an annual basis within a channel*. The term as defined by the Army Corp of Engineers is *"that line on the shore established by the fluctuations of water and indicated by*

physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas."

As a comparison, the highest mean daily discharge rate for the Roaring Fork River based on USGS data is 7,120 cubic feet per second (cfs) which is significantly higher than the average ordinary high-water discharge between 3,000-4,000 cfs since 1971. Generally, the OHWM is the lowland area of any stream or river that is regulated by the US Army Corp of Engineers, in addition to wetland areas. The diagrams at right and below provides a visual representation of the OHWM. Differing definitions of the OHWM exist based on ecological zone, stream type, flow rates/intervals, etc.

Photo credit: Water Environment Federation

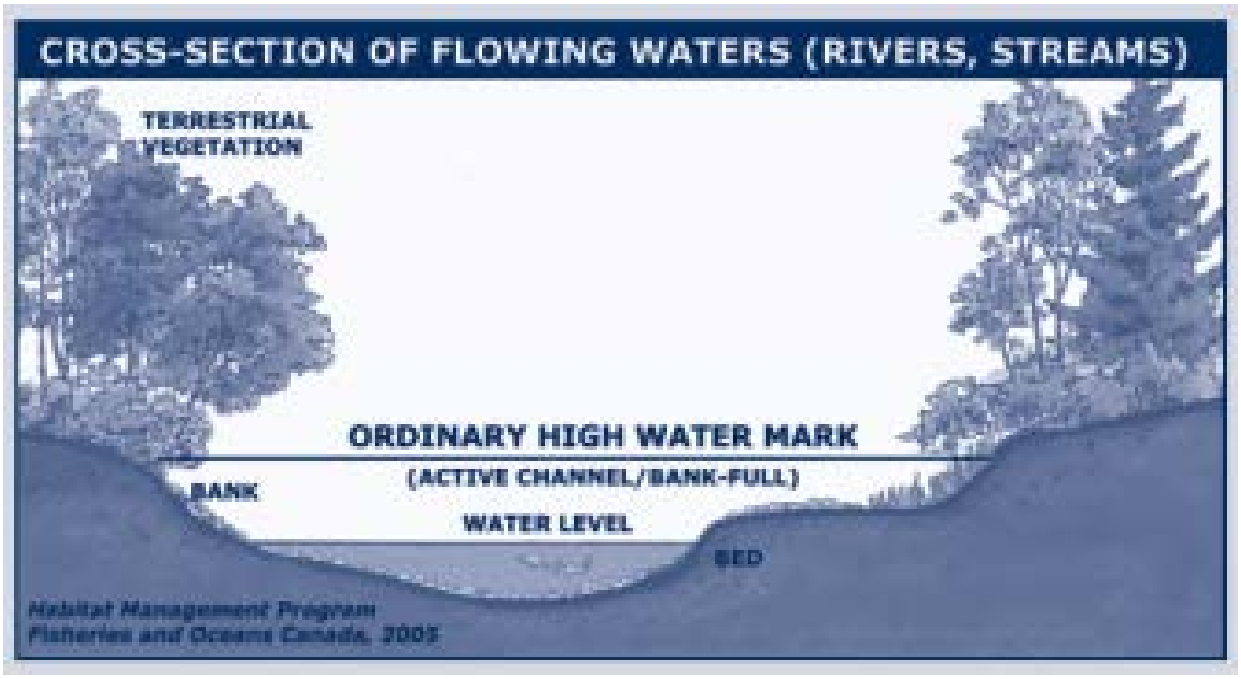

Photo credit: Habitat Management Program

A formal ecological survey can determine the exact location of the OHWM in the riverine areas of the City. A similar survey was recently conducted by the City of Aspen at a cost of approximately $50,000. Drone technology is sometimes used to help determine the boundary. A simple means of determining the OHWM could be a site visit by staff when if there is a question as to whether a development proposal is impacting the riparian zone.

Staff Riparian Setback Standard

Staff provides the language in *italics* below for consideration to replace the current standard in Section 070.040.020(d)(24) of the Code:

070.040.020(d) Development in Waterways and Areas of Special Flood Hazard

(24) Conservation of Waterways

It is the purpose of this Subsection 070.040.020(d)(24) to conserve and promote the health of the City's riparian ecosystems and water quality by maintaining a functional natural buffer adjacent to waterways.

a. ***Applicability***

All new improvements, buildings, additions, structures, excavations, grading, dumping, clearing of native vegetation, or backfill shall be subject to the requirements of 070.040.020(d)(24)b Standards unless the applicant demonstrates to the City Engineer and the Director by clear and convincing evidence that one or more of the following conditions is met:

1. *The removal of native vegetation, not to exceed 10 percent of the setback area defined below, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be interpreted to allow for permanent structures of any kind within said area.*
2. *The construction of bridges, public utilities, public paths for non-motorized use, public open space areas, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices that do not result in water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.*
3. *Removal of vegetation listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm in compliance with applicable regulations. Vegetation shall be replaced with appropriate riparian plant species to limit erosion.*
4. *Applicant demonstrates the area does not contain significant riparian plant species or functions or is impacted by previous earth disturbing activities and proposed activity improves water quality, limits erosion, and promotes riparian or wetland restoration.*

b. ***Standards***

1. *No improvement, building, structure, excavation, grading, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within fifty feet of the ordinary high-water mark, measured horizontally, of any river or live perennial stream.*
2. *No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted with said fifty-foot setback area.*

Differences in the standards recommended by the RC and staff are mostly related to formatting. However, staff does propose additional exception language, as outlined subsections 2 and 4 above, related to public utilities and areas previously disturbed.

Considerations

A major change in the proposed language from that which is codified today is that it limits the activities permitted in the setback area such as the clearing/removal of native vegetation (excluding invasive species) and the use of chemical treatments such as fertilizers. This may be the most difficult aspect of the regulation for in terms of enforcement by the City and would require some public outreach and education to implement. The letter and supporting information from the RC's February 2018 letter outlines the environmental and economic benefits of increase riparian protections. It also includes support for the proposal from the Roaring Fork Conservancy, the Ferdinand Hayden Chapter of Trout Unlimited, and American Rivers. The information provided by the River Commission also points out that the City is falling behind neighboring communities in terms of riparian protections as outlined in the table below.

REGION	SETBACK	DETAILS
City of Aspen	100ft/100 year floodplain	Development is "subject to heightened review." (Ord. 26.435.040)
Town of Basalt	50ft	Prohibits development and cutting of riparian and wetland vegetation. (Ord. 16-464a)
Town of Carbondale	Unspecific	If new development is proposed adjacent to any river, all practical means should be used to preserve natural grade, drainage patterns, soil and vegetation. (Ord. 4-2007)
Eagle County	75ft/100 year floodplain	No development within 75ft of high water mark or 100 year floodplain (whichever is greater).
Garfield County	35ft	Prohibits removal of any existing native vegetation or conducting any activity which will cause any loss of riparian area unless it involves the approved removal of noxious weeds, nonnative species, or dead or diseased trees.
Pitkin County	100ft/100 year floodplain	100 foot buffer for all activity and development. Setback may be reduced to a minimum of 50 feet if reduction does not result in water quality degradation, stream bank erosion and/or a reduction in the quality of riparian or wetland habitat.

During the April 2018 and October 2018 work sessions, there was a general concern expressed that such a riparian setback could impact development on both residential and commercial vacant lots or land where additional development might occur. Other Council and work session attendee considerations/concerns are outlined below.

-Interested in the proposal but unsure the appropriate setback distance.
-May need to raft/float the rivers to better understand the concepts.
-Need to recognize existing encroachments and use of riparian areas.
-Need to evaluate the impact to each lot.
-Avoid eliminating the ability to develop riverfront properties.
-Consider urban nature of the city and potential impacts to property values.
-Other current applicable regulatory standards yard setback, fire clearances, hillside protection, geologic hazards and floodplain regulations.
-Future redevelopment of properties may be difficult.
-Should guarantee amount of development on each property.
-Standards exist in all surrounding communities that exceed the City's.

-Explanation of the importance of riparian ecosystems was provided.
-Outlined the value of healthy rivers to our local economy.

The impact of the proposed regulation on the development and/or redevelopment of City owned properties such as the Confluence Area, the former Raymond Property, or Two Rivers Park is another consideration. Staff has created a few maps (attached), which depict the approximate limits of a 50-foot riparian setback on various properties within the City. The maps are simply an estimate of the area subject to the proposed setback and are not survey accurate.

Other Options

The Commission and City Council can also consider options in lieu of a specific regulation and/or to implement alongside a regulation to encourage/incentivize the conservation of existing riparian areas and/or the restoration of already disturbed riparian zones. A list of potential options is outlined below. Additionally, examples of incentive programs are attached.

-Grant program/annual funding for property owners to offset the purchase cost and/or installation of appropriate riparian plant species and other restoration projects.
-Education courses for homeowners and/or professional landscaping companies regarding the importance of healthy riparian ecosystems.
-Increased development thresholds/density bonuses for projects which conserve/do not disturb riparian areas.
-Example projects on City owned land similar to Veltus Park and former Raymond property.
-Sponsored riparian educational lunch series.

Code Amendment Approval Criteria

Section 070.060.040(c)(3)d.3 of the Code outlines the approval criteria for revision thereto. Each of the criteria are listed in **bold** below along with comments from staff.

i. Is consistent with the Comprehensive Plan and other City policies;

As shown at right in blue hatching, the *Future Land Use* maps of the *Glenwood Springs Comprehensive Plan* (Comp Plan) depict the *City's* rivers as Riverside Protection. According to the Comp Plan, the Riverside Protection designation states: "*Land and habitat along the Colorado and Roaring Fork rivers should be protected."* The current proposal is in compliance with the map designation and description.

"Preserve natural resources" is a community goal outlined in the Executive Summary and subsequent chapters of the Comp Plan. Specific objectives and strategies related to the goal are outlined in the table below.

Comprehensive Plan Goal	Objective and Strategy
-Preserve natural resources	-Promote water conservation (Chapter 7, Page 84) - Plan for the city-owned land adjacent to the river trail (Chapter 8, Page 91) -Enhance and promote world-class fishing (Chapter 8, Page 91) -Continue leadership in protecting the natural setting (Chapter 9, Page 98) -Preserve and enhance the river corridor environment (Chapter 9, Page 100) - Support efforts in protect the Roaring Fork River and Colorado River systems (Chapter 9, Page 100) - Minimize human/wildlife conflicts (Chapter 9, Page 102)

ii. Does not conflict with other provisions of this Code or other provisions in the Glenwood Springs Municipal Code;

It does not appear the proposal conflicts with other provisions of the Code.

iii. Is necessary to address a demonstrated community need;

As outlined above, the City lags behind neighboring communities in the protection of water resources. Protection of riparian areas is essential to improved water quality as it limits the amount of nutrients and chemicals entering our rivers and streams via stormwater runoff.

iv. Is necessary to respond to substantial changes in conditions and/or policy; and

Adoption of the proposed standards would help in the City's future compliance with EPA Municipal Separate Storm Sewer System (MS4) permit requirements anticipated if/when our population exceeding 10,000 with the forthcoming 2020 census.

Some form of amendment to the Code regarding riparian standards is necessary to ensure protection thereof, whether a revision or re-adoption of the former "high water mark" definition.

v. Is consistent with the general purpose and intent of this Code.

The proposal appears to be consistent with the general purpose and intent of the Code. More specifically, integrated development, regulating the development of land upon impacts, and guarding against natural hazards are supported aspects.

Reviewing Agency Comments
No comments related to the proposed were received.

Adjacent Property Owner Comments
No comments from adjacent property owners have been received to date.

ACTION ALTERNATIVES AND STAFF RECOMMENDATION:

Section 070.060.040(c)(3)d.1 of the Code explains, "*The Planning Commission shall review the Code amendment application and recommend approval, approval with conditions, or denial of the amendment in accordance with 070.060.030(g) and the approval criteria in paragraph 3 below* [addressed by staff above]. The Planning Commission may also continue the hearing.

Action 1 – Code Amendment – to revise the riparian setback standards of Section 070.040.020(d)(24) of the *Glenwood Springs Municipal Code*.

Staff recommendation: Staff recommends **approval** of the Code Amendment with the **findings** below:

Recommended Findings:

1. The proposed amendment is consistent with the Comprehensive Plan and other City policies;
2. The proposed amendment does not conflict with other provisions of this Code or other provisions in the Glenwood Springs Municipal Code;
3. The proposed amendment is necessary to address a demonstrated community need;
4. The proposed amendment is necessary to respond to substantial changes in conditions and/or policy; and
5. The proposed amendment is consistent with the general purpose and intent of this Code.

ROARING FORK CONSERVANCY
Bringing People Together to Protect Our Rivers

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July 19, 2019

City of Glenwood Springs
101 West 8th Street
Glenwood Springs, CO 81601
Attn: Trent Hyatt, Senior Planner/River Commission Staff Liaison

RE: Recommended city code revision for riparian setbacks

Honorable Mayor, City Council, and Planning and Zoning Commission,

Roaring Fork Conservancy (RFC) wishes to express support for the proposed City of Glenwood Springs riparian setback code revisions. RFC appreciates Glenwood Springs' investment in the continued protection of its water resources and strongly supports the implementation of regulations to preserve this invaluable natural and community asset.

RFC staff currently serves as a technical advisor for the Glenwood Springs River Commission, providing input, resources, and guidance on this and other projects. The collaborative effort between City staff, River Commission, and RFC has resulted in a well vetted code proposal which will conserve and promote the health of the City's riparian ecosystems and water quality into the future.

As a 501(c)(3) not-for-profit organization, RFC emphasizes the use of sound, defensible science to guide decisions regarding the health of local streams and rivers. Current research indicates that healthy wetlands and riparian areas are essential to healthy rivers. The natural functions of healthy riparian areas include:

- Dissipation of stream energy, which mitigates flooding, and reduces erosion and therefore mitigates property damage;
- Water storage during high flows, which return to the stream during late season low flows;
- Multi-storied habitat for wildlife and aquatic life;
- Integral wildlife migration routes;
- Rich and diverse food sources for wildlife and aquatic life;
- Increased shading which serves to lower river temperatures and slow evaporation;
- Buffer zones between the river and uplands, which mitigate sedimentation and erosion; and
- Natural bio-filters, which protect water quality by filtering pollutants.

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Riparian buffers provide essential wildlife habitat protection. The Colorado Department of Parks and Wildlife recommends a 300ft setback from rivers and waterways.[1] Additionally, studies show that as riparian buffer size increases, protections from potential physical and chemical damages including sedimentation, erosion, and runoff contaminants increase as well. "It appears that a 100ft buffer is sufficiently wide to trap sediments under most circumstances... An absolute minimum width would be 30ft. To reduce nitrate concentrations, buffers of 50ft are usually sufficient."[2] Importantly, when considering code changes such as the ones proposed here, water resource protection is far more cost effective and efficient than subsequent restoration often required when unanticipated events strike areas left vulnerable.

RFC worked diligently with the River Commission and City Staff to develop setbacks appropriate for the City, applying the best available science to the specific attributes of local waterways and unique community character. Based on these careful considerations, RFC recommends adoption of a 50ft riparian setback, as supported by the River Commission to ensure conservation of valuable waterways and irreplaceable wildlife for the present and future benefit of the City, its residents, and visitors. Similarly, in 2013, RFC served as a technical advisor to the Garfield County Board of County Commissioners and recommended adoption of 50ft riparian setback protections county-wide.

For your reference, Table 1 contains riparian protections retained in other Roaring Fork Watershed city and county land use codes. These adaptations are not intended to dictate the policy of the City, however awareness and consistency of policies adapted by others with similar resources could prove useful in the decision making process. Please note that all the setbacks in the table below include protections for riparian vegetation and the ability to make allowances for unique circumstances.

[1] Colorado Division of Wildlife, 2010. Actions to Minimize Adverse Impacts to Wildlife Resources, p.3

[2] Wegner, S., 1999. A review of the scientific literature of riparian buffer width, extent and vegetation, *http://researchweb8.wpengine.com/rivercenter/wp-content/uploads/sites/17/2015/03/A-Review-of-the-Literature-on-Riparian-Buffer-Width-Extent-and-Vegetation.pdf*

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Table 1

REGION	SETBACK	DETAILS
City of Aspen	100ft/100 year floodplain	Development is "subject to heightened review." (Ord. 26.435.040)
Town of Basalt	50ft	Prohibits development and cutting of riparian and wetland vegetation. (Ord. 16-464a)
Town of Carbondale	Unspecific	If new development is proposed adjacent to any river, all practical means should be used to preserve natural grade, drainage patterns, soil and vegetation. (Ord. 4-2007)
Eagle County	75ft/100 year floodplain	No development within 75ft of high water mark or 100 year floodplain (whichever is greater).
Garfield County	35ft	Prohibits removal of any existing native vegetation or conducting any activity which will cause any loss of riparian area unless it involves the approved removal of noxious weeds, nonnative species, or dead or diseased trees.
Pitkin County	100ft/100 year floodplain	100 foot buffer for all activity and development. Setback may be reduced to a minimum of 50 feet if reduction does not result in water quality degradation, stream bank erosion and/or a reduction in the quality of riparian or wetland habitat.

Implementation of riparian protections also hold significant economic value. Healthy riparian areas:

- Reduce the cost of drinking water treatment by filtering sediment and other pollutants. The City of Glenwood Springs currently has a secondary drinking water intake on the Roaring Fork River near Veltus Park.
- Prevent property damage by protecting against erosion and flooding. Erosive effects are nearly 5 times more likely on non-vegetated stream banks, and up to 30 times more likely on non-vegetated stream bends.[3]
- Increase property values by improving aesthetics. "Several studies have shown that people will pay a premium to live or work near greenways or other protected areas, and this allows the developer to recoup at least some of the costs of not developing up to the stream bank."[4]
- Support the local fishing economy by maintaining high water quality for the Roaring Fork River's Gold Medal fishery.
- Support local river recreation (i.e. rafting, kayaking, stand-up paddle boarding) economy by providing scenic areas and wildlife viewing opportunities along rivers.

[3] Chagrin Watershed Partners, Inc. 2006, Riparian Setbacks: Technical Information for Decision Makers. *www.crwp.org/files/riparian_setback_paper_jan_2006.pdf*
[4] Chagrin Watershed Partners, Inc. 2006, Riparian Setbacks: Technical Information for Decision Makers. *www.crwp.org/files/riparian_setback_paper_jan_2006.pdf*

- Enhance aesthetics in a tourist economy that is defined by its relationship to water. The Glenwood Springs Chamber of Commerce currently markets Glenwood Springs as "The Land of Water," a tourist destination based primarily on its water resources.

The adoption of the proposed code will help ensure the prosperity of human and natural communities in Glenwood Springs. Current research indicates "that the influence of riparian corridors on water quality is proportionately much greater than the relatively small area in the landscape they occupy."[5] Roaring Fork Conservancy strongly urges the Glenwood Springs Planning and Zoning Commission and City Council adopt the proposed riparian setback code revisions.

Thank you for your time and consideration.

Sincerely

Rick Lofaro
Executive Director

Chad Rudow
Water Quality Coordinator

Roaring Fork Conservancy has inspired people to explore, value, and protect the Roaring Fork Watershed since 1996. We bring people together to protect our rivers and work to keep water in the streams, monitor water quality, and preserve riparian habitat. As one of the largest watershed organizations in Colorado, Roaring Fork Conservancy serves residents and visitors throughout the Roaring Fork Valley through school and community-based Watershed Education programs and Watershed Action projects, including regional watershed planning, water resource

[5] Chagrin Watershed Partners, Inc. 2006, Riparian Setbacks: Technical Information for Decision Makers. www.crwp.org/files/riparian_setback_paper_jan_2006.pdf

City Council

STAFF REPORT

City of Glenwood Springs

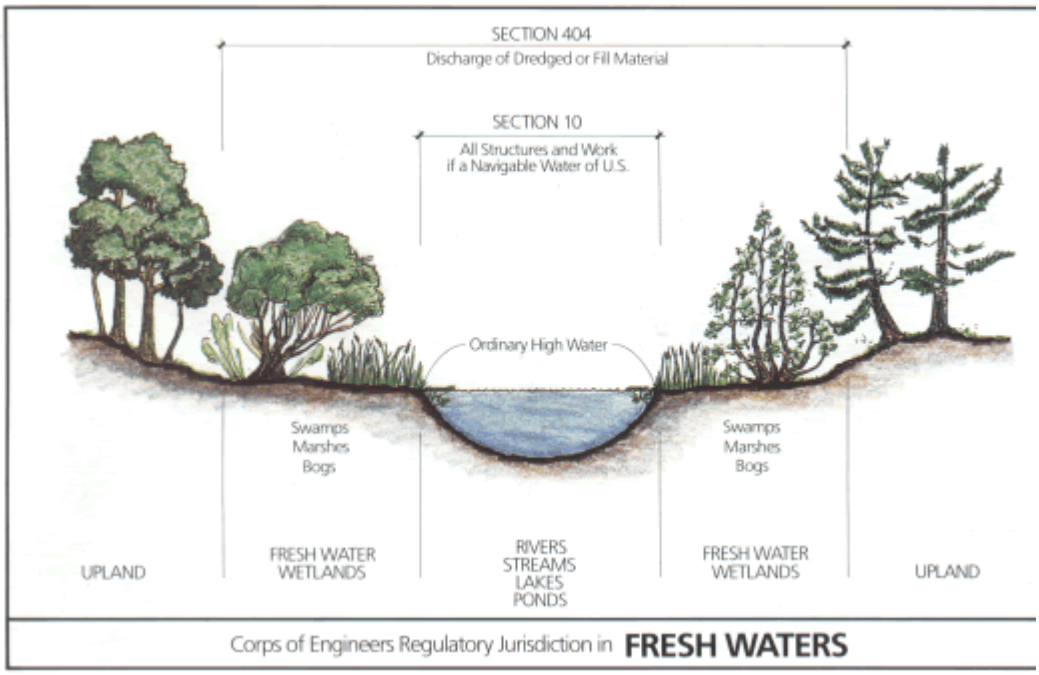
October 4, 2018

(date)

Agenda Item:	Work Session with the River Commission and Planning and Zoning Commission Regarding Riparian Setbacks
Action Requested:	No action is being requested at this time.
Presented By:	Trent L. Hyatt, Senior Planner/River Commission Staff Liaison, Community Development Department
Background Info:	On February 7th, 2018, the River Commission voted unanimously to recommend to City Council (as outlined in the attached letter) the adoption of a 50-foot riparian setback alongside the re-drafting of the land development code which was ongoing at that time. During a City Council work session regarding progress on the re-draft with the Planning and Zoning Commission on April 26, many in attendance expressed concerns that an increased riparian setback may potentially negatively impact development and/or the redevelopment of various properties. City Council ultimately decided to not include the recommended 50-foot riparian setback in the code re-draft and to instead discuss the matter further in conjunction with the River Commission. A date for the work session was set for October. Concerns raised by those in attendance on April 26 are addressed below. Per Section 070.040.020(d)(24) of the Municipal Code (Code), Development in Waterways and Areas of Special Flood Hazard, the City requires a 30-foot riparian setback: "No improvement, building, structure, excavation, dumping or backfill shall be placed, built, undertaken or approved within a 30-foot setback area horizontally from the high water mark of any river or live stream, except for bridges, paths for non-motorized use, irrigation structures or flood control and erosion protection devices." The River Commission is requesting to replace the current riparian setback standard with the language (outlined below), which increases the setback by 20 feet for a total of 50 feet. Conservation of Waterways a. Purpose

	The purpose of this Subsection 070.040.020(d)(24) is to conserve and promote the health of the City's riparian ecosystems and water quality by maintaining a functional natural buffer adjacent to waterways. i. No improvement, building, structure, excavation, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within a fifty foot setback area horizontally from the ordinary high water mark of any river or live perennial stream. ii. Within the fifty foot setback, no live vegetation may be removed except for species listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm when replaced with appropriate plant species. The Director has discretion to permit the removal of native vegetation, not to exceed 10 percent of the area of the setback, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be interpreted to allow for permanent structures of any kind within the setback area. The Director may also reduce the setback for bridges, public paths for non-motorized use, public open space areas, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices, or upon demonstration by the applicant that such reduction shall not result in water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland. iii. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted with the fifty foot setback area except for the removal of above listed noxious weeds in compliance with applicable regulations. The proposed language explains the intent of the regulation which also limits the activities permitted in the setback such as the clearing/removal of native vegetation (excluding invasive species) and the use of chemical treatments such as fertilizers. This may be the most difficult aspect of the regulation for in terms of enforcement by the City and would require some public outreach and education to implement. The letter and supporting information from the River Commission's February 2018 letter outlines the environmental and economic benefits of increase riparian protections. It also includes support for the proposal from the Roaring Fork Conservancy, the Ferdinand Hayden Chapter of Trout Unlimited, and American Rivers. The information provided by the River Commission also points out that the City is falling behind neighboring communities in terms of riparian protections as outlined in the table below. During the discussion in April, there was a general concern expressed that such a riparian setback could impact development on both residential and commercial vacant land or land where additional development might occur. For example, one question/concern raised at the work session was whether or not the improvements at Iron Mountain Hot Springs completed in 2015 would have been possible under such a regulation as proposed. Related to this, the City has received a request for an encroachment into the existing 30-foot riparian setback for the addition of new soaking pools and as other shoreline

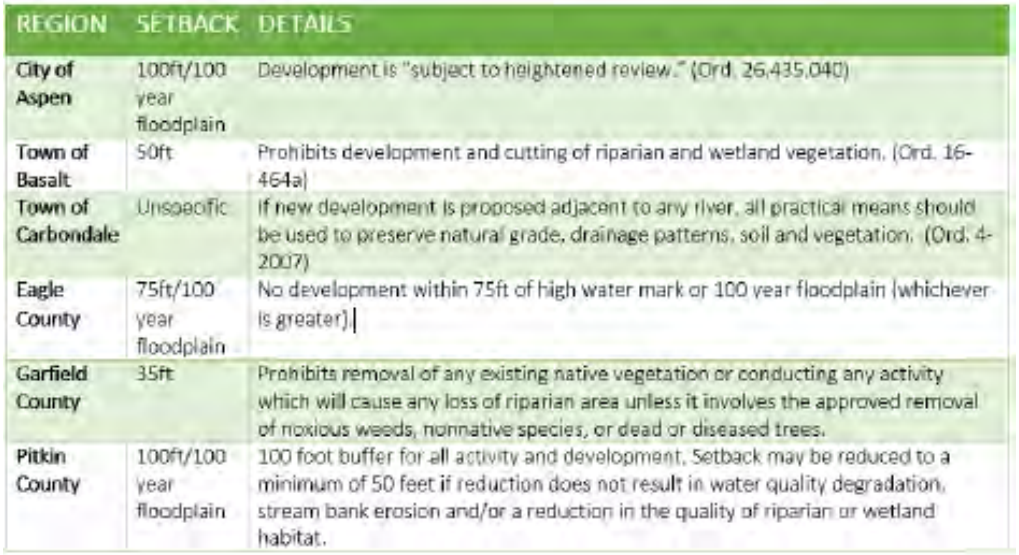
	improvements more recently proposed by the property owner. This is for informational purposes only and should not be discussed in detail at the work session since it is an active planning application. Another area of concern that was brought up during the discussion was related to river frontage lots along Midland Avenue, which is classified as an arterial roadway. Under the new development code, a 30-foot front yard setback is required for the majority of lots between 13th Street and the 27th Street bridge. This, combined with the required 30-foot riparian setback as well as other development constraints such as hillside/steep slope, geologic hazards and floodplain regulations may impact the development or redevelopment of roughly 26 riverfront properties. A significant investment was made by the owners in the purchase of these properties with likely intentions of building close to and enjoying the river. The impact of the proposed regulation on the development and/or redevelopment of City owned properties such as the Confluence Area, the former Raymond Property, or Two Rivers Park is another consideration. Staff has created a few maps (attached), which depict the approximate limits of a 50-foot riparian setback on various properties within the City. The maps are simply an estimate of the area subject to the proposed setback and are not survey accurate. Another important aspect of the proposed regulation is the feature by which to measure the setback, the "ordinary high water mark" (OHWM) as opposed to the "high water mark" as outlined in the current Code. A simple definition of the OHWM is the mark typically reached on an annual basis with a channel. As an a comparison, the highest mean daily discharge rate for the Roaring Fork River since 1906 is 19,800 cubic feet per second (cfs) which is significantly higher than the average ordinary high water discharge of 4,100 cfs per USGS since 1971. How exactly would the City define the OHWM? Generally, the OHWM is the lowland area of any stream or river that is regulated by the US Army Corp of Engineers, in addition to wetland areas. The diagram below provides a visual representation of the OHWM. Many differing definitions of the OHWM exist based on ecological zone, stream type, flow rates/intervals, etc.



Additionally, the City would need to address how the setback impacts smaller stream segments in the City such as Three Mile Creek or Mitchell Creek. Most of these tributaries are already developed and perhaps a reduced setback should be considered for these streams.

In an effort to allow for the enjoyment of a riverfront property by its owners, an exception for the disturbance of up to 10 percent of the setback area is identified. Additionally, bridges, public paths for non-motorized use, public open space areas, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices are necessary and/or required to occur within riparian areas and are identified as exceptions.

The letter and supporting information from the River Commission's February 2018 letter outlines the environmental and economic benefits of increase riparian protections. It also includes support for the proposal from the Roaring Fork Conservancy, the Ferdinand Hayden Chapter of Trout Unlimited, and American Rivers. The information provided by the River Commission also stresses that the City is falling behind neighboring communities in terms of riparian protections as outlined in the table below.

	
Action Alternatives:	No action being requested at this time. City Council can provide direction to or request additional information from staff if determined necessary.
Staff Recommendation:	No recommendation from staff is necessary at this time.

REGION	SETBACK	DETAILS
City of Aspen	100ft/100 year floodplain	Development is "subject to heightened review." (Ord. 26.435.040)
Town of Basalt	50ft	Prohibits development and cutting of riparian and wetland vegetation. (Ord. 16-464a)
Town of Carbondale	Unspecific	If new development is proposed adjacent to any river, all practical means should be used to preserve natural grade, drainage patterns, soil and vegetation. (Ord. 4-2007)
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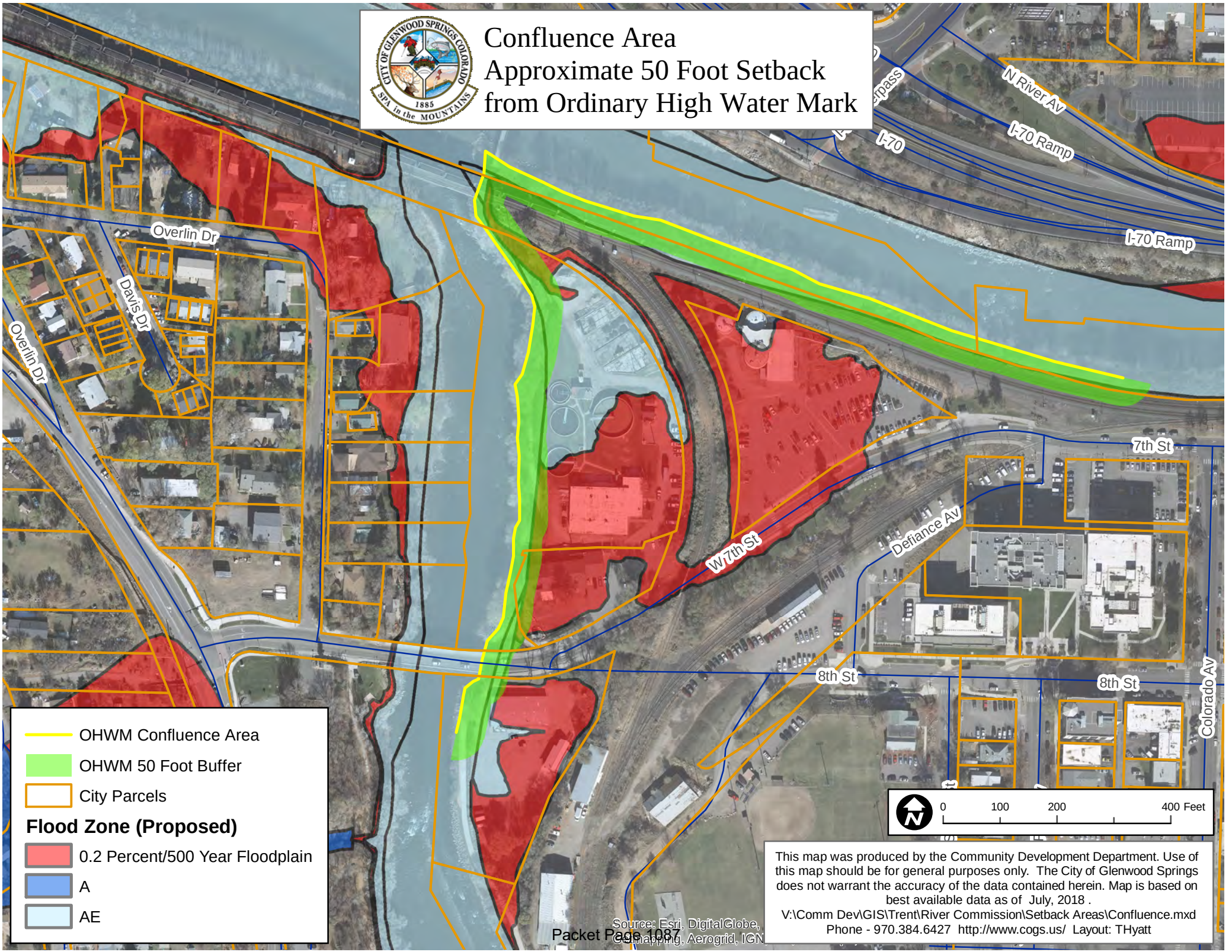
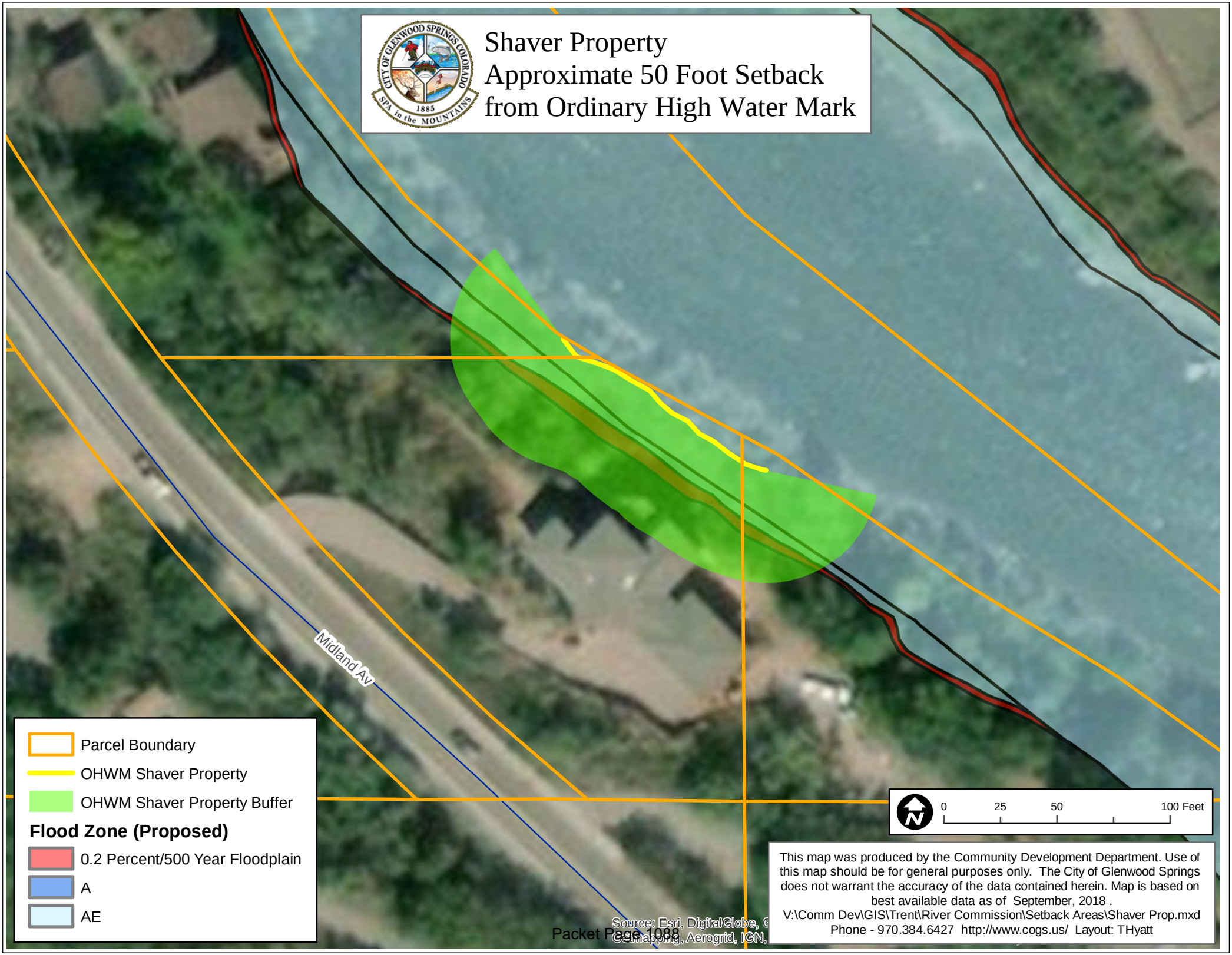
Pitkin County	100ft/100 year floodplain	100 foot buffer for all activity and development. Setback may be reduced to a minimum of 50 feet if reduction does not result in water quality degradation, stream bank erosion and/or a reduction in the quality of riparian or wetland habitat.


Confluence Area
Approximate 50 Foot Setback
from Ordinary High Water Mark
CITY OF GLENWOOD SPRINGS COLORADO
SPA In the MOUNTAINS
1885
N River Av
I-70
I-70 Ramp
I-70 Ramp
Overlin Dr
Davis Dr
Overlin Dr
7th St
W 7th St
Defiance Av
8th St
8th St
Colorado Av
OHWM Confluence Area
OHWM 50 Foot Buffer
City Parcels
Flood Zone (Proposed)
0.2 Percent/500 Year Floodplain
A
AE
0
100
200
400 Feet
This map was produced by the Community Development Department. Use of this map should be for general purposes only. The City of Glenwood Springs does not warrant the accuracy of the data contained herein. Map is based on best available data as of July, 2018 .
V:\Comm Dev\GIS\Trent\River Commission\Setback Areas\Confluence.mxd
Phone - 970.384.6427 http://www.cogs.us/ Layout: THyatt
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


Shaver Property
Approximate 50 Foot Setback
from Ordinary High Water Mark
Midland Av
Parcel Boundary
OHWM Shaver Property
OHWM Shaver Property Buffer
Flood Zone (Proposed)
0.2 Percent/500 Year Floodplain
A
AE
0
25
50
100 Feet
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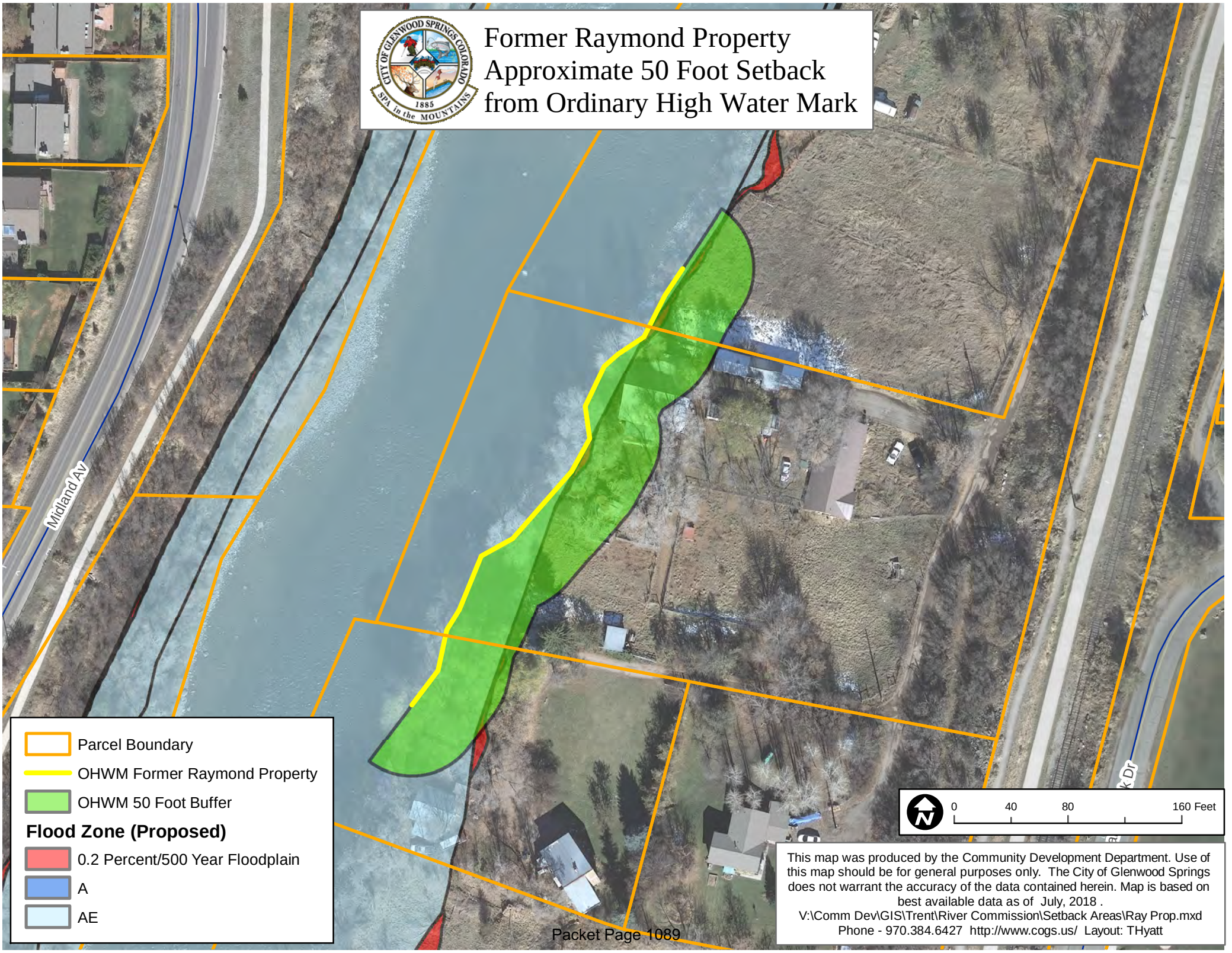
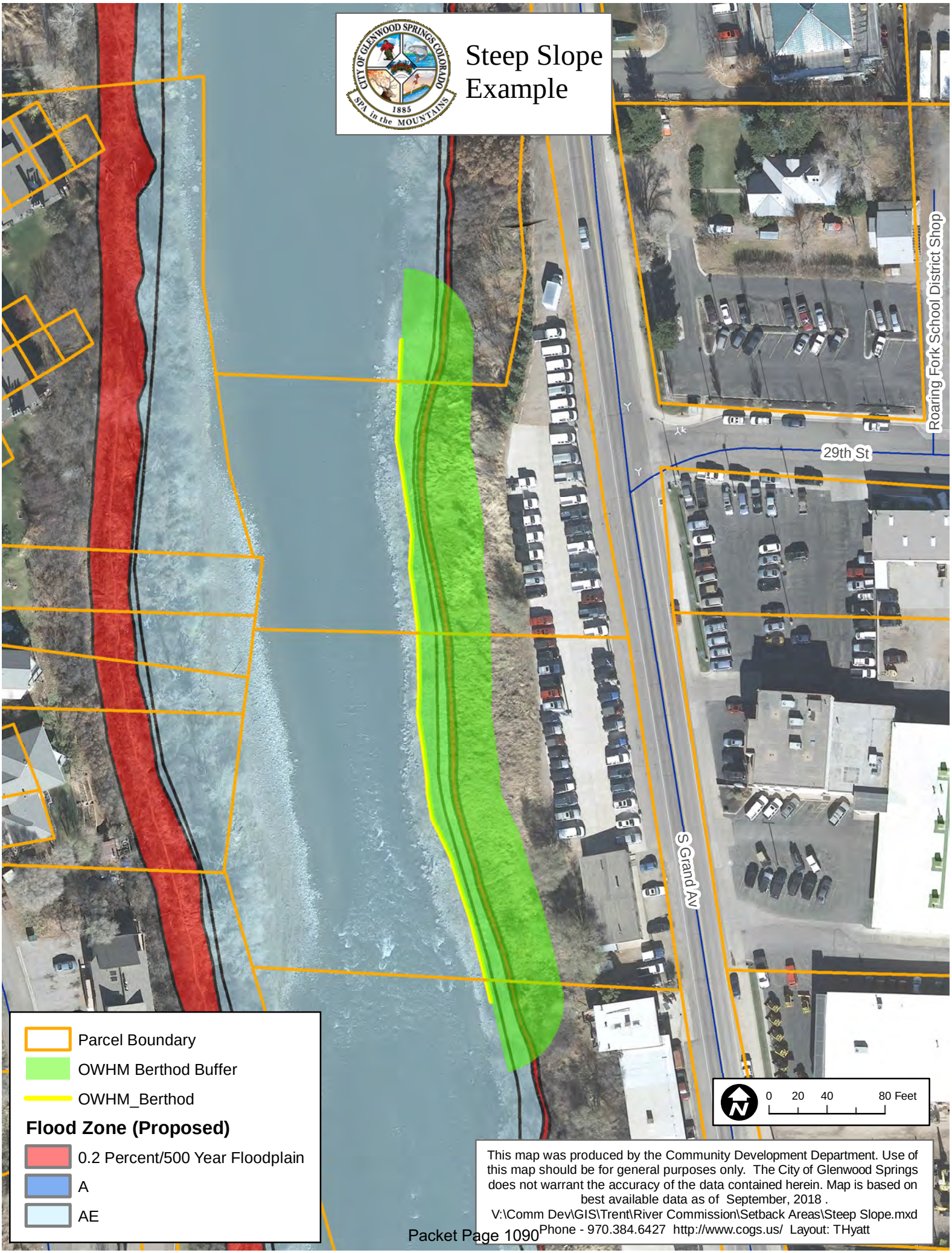
Phone - 970.384.6427 http://www.cogs.us/ Layout: THyatt
Source: Esri, DigitalGlobe, G
Geomapping, Aerogrid, IGN,


Former Raymond Property
Approximate 50 Foot Setback
from Ordinary High Water Mark
CITY OF GLENWOOD SPRINGS COLORADO
SPA In the MOUNTAINS
1885
Midland Av
Parcel Boundary
OHWM Former Raymond Property
OHWM 50 Foot Buffer
Flood Zone (Proposed)
0.2 Percent/500 Year Floodplain
A
AE
0
40
80
160 Feet
This map was produced by the Community Development Department. Use of this map should be for general purposes only. The City of Glenwood Springs does not warrant the accuracy of the data contained herein. Map is based on best available data as of July, 2018 .
V:\Comm Dev\GIS\Trent\River Commission\Setback Areas\Ray Prop.mxd
Phone - 970.384.6427 http://www.cogs.us/ Layout: THyatt


Steep Slope Example
CITY OF GLENWOOD SPRINGS COLORADO
1885
SPA in the MOUNTAINS
Roaring Fork School District Shop
29th St
S Grand Av
Parcel Boundary
OWHM Berthod Buffer
OWHM_Berthod
Flood Zone (Proposed)
0.2 Percent/500 Year Floodplain
A
AE
0 20 40 80 Feet
This map was produced by the Community Development Department. Use of this map should be for general purposes only. The City of Glenwood Springs does not warrant the accuracy of the data contained herein. Map is based on best available data as of September, 2018 .
V:\Comm Dev\GIS\Trent\River Commission\Setback Areas\Steep Slope.mxd
Phone - 970.384.6427 http://www.cogs.us/ Layout: THyatt

February 28, 2018

Mayor Gamba and City Council
101 West 8th Street
Glenwood Springs, CO 81601
Attn: Trent L. Hyatt, Senior Planner/River Commission Staff Liaison

RE: Recommended city code revision for riparian setbacks

Honorable Mayor and City Council,

At our February 7th, 2018 meeting, the River Commission **voted unanimously** to recommend City Council adopt a 50 foot riparian setback for incorporation into the re-draft of the land development code. The recommended language is attached for your review.

As you know, the streams that flow through our beautiful City significantly benefit our regional economy by supporting countless jobs and these areas provide immeasurable positive social impacts for our citizens and visitors alike. Each year, the River Commission, Roaring Fork Conservancy, and rafting/ fishing guides have observed new and continuous disturbances within the riparian zones adjacent to both the Roaring Fork and Colorado Rivers within the City (pictures attached). While the City has a 30 foot setback from ordinary high water mark requirement for structures and fill, this regulation does not limit the removal of riparian plant species which are vital to the ecosystem.

The River Commission has been discussing this topic for a couple years now and provide this recommendation after thorough review of industry best practices as well as regulations from numerous other neighboring municipalities and counties. We feel the recommended setback strikes a balance between the space/ area required for riparian zones to function efficiently while still providing private owners a means to enjoy their investment in riverfront property.

We respectfully request that you incorporate the new setback into the re-draft of the development code currently under consideration. Also, attached is a letter in support of the setback from Roaring Fork Conservancy. Please let us know if you would like additional information or a work session to discuss the matter further.

Regards,

Brendon Langenhuizen, Chairman
Glenwood Springs River Commission

February 7, 2018

River Commission

Recommendation for Adoption by City Council

070.040.020(d)(25) Conservation of Waterways

a. Purpose

The purpose of this Subsection 070.040.020(d)(25) is to conserve and promote the health of the City's riparian ecosystems and water quality by maintaining a functional natural buffer adjacent to waterways.

i. No improvement, building, structure, excavation, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within a fifty foot setback area horizontally from the ordinary high water mark of any river or live perennial stream.

ii. Within the fifty foot setback, no live vegetation may be removed except for species listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm when replaced with appropriate plant species. The Director has discretion to permit the removal of native vegetation, not to exceed 10 percent of the area of the setback, to allow a property owner private access to and personal enjoyment of the waterway. This shall not be interpreted to allow for permanent structures of any kind within the setback area. The Director may also reduce the setback for bridges, public paths for non-motorized use, public open space areas, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices, or upon demonstration by the applicant that such reduction shall not result in water quality degradation, stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

iii. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted with the fifty foot setback area except for the removal of above listed noxious weeds in compliance with applicable regulations.

February 7, 2018

River Commission

Recommendation for Adoption by City Council

070.040.020(d)(25) Conservation of Waterways

a. Purpose

The purpose of this Subsection 070.040.020(d)(25) is to conserve and promote the health of the City's riparian ecosystems and water quality by maintaining a functional natural buffer adjacent to waterways.

i. No improvement, building, structure, excavation, dumping, clearing of native vegetation, or backfill shall be placed, built, undertaken or approved within a fifty foot setback area horizontally from the ordinary high water mark of any river or live perennial stream.

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iii. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted with the fifty foot setback area except for the removal of above listed noxious weeds in compliance with applicable regulations.

Existing Regulation for Reference

070.030.030 - Suitability of Land for Development.

Land subject to natural hazards such as flooding, falling rock, landslides, mud flows or snowslides shall not be developed or approved for development until plans are submitted to the Director and approved by the City Engineer and the Planning Commission in order to prevent such conditions from endangering life, health or other property.

(1) Development in waterways and areas of special flood hazard.

a. No improvement, building, structure, excavation, dumping or backfill shall be placed, built, undertaken or approved within a thirty-foot setback area horizontally from the high water mark of any river or live stream except for bridges, paths for non-motorized use, irrigation structures or flood control and erosion protection devices.

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February 26, 2018

Glenwood Springs City Council
101 West 8th Street
Glenwood Springs, CO 81601
Attn: Trent Hyatt, Senior Planner/River Commission Staff Liaison

RE: Recommended city code revision for riparian setbacks

Honorable Mayor and City Council,

Roaring Fork Conservancy (RFC) wishes to express support for the City of Glenwood Springs riparian setback code revisions proposed by the Glenwood Springs River Commission. RFC appreciates Glenwood Springs' investment in the continued protection of its water resources and strongly supports the implementation of regulations to preserve this invaluable natural and community asset.

RFC staff currently serves as a technical advisor for the River Commission, providing input, resources, and guidance on this and other projects. The collaborative effort between City staff, River Commission, and RFC has resulted in a well vetted code proposal which will conserve and promote the health of the City's riparian ecosystems and water quality into the future.

As a 501(c)(3) not-for-profit organization, RFC emphasizes the use of sound, defensible science to guide decisions regarding the health of local streams and rivers. Current research indicates that healthy wetlands and riparian areas are essential to healthy rivers. The natural functions of healthy riparian areas include:

- Dissipation of stream energy, which mitigates flooding, and reduces erosion and therefore mitigates property damage;
- Water storage during high flows, which return to the stream during late season low flows;
- Multi-storied habitat for wildlife and aquatic life;
- Integral wildlife migration routes;
- Rich and diverse food sources for wildlife and aquatic life;
- Increased shading which serves to lower river temperatures and slow evaporation;
- Buffer zones between the river and uplands, which mitigate sedimentation and erosion; and
- Natural bio-filters, which protect water quality by filtering pollutants.

P.O. Box 3349 Basalt, Colorado 81621 | 970.927.1290 | www.roaringfork.org

ROARING FORK CONSERVANCY
Bringing People Together to Protect Our Rivers

Riparian buffers provide essential wildlife habitat protection. The Colorado Department of Parks and Wildlife recommends a 300ft setback from rivers and waterways.[1] Additionally, studies show that as riparian buffer size increases, protections from potential physical and chemical damages including sedimentation, erosion, and runoff contaminants increase as well. "It appears that a 100ft buffer is sufficiently wide to trap sediments under most circumstances... An absolute minimum width would be 30ft. To reduce nitrate concentrations, buffers of 50ft are usually sufficient."[2] Importantly, when considering code changes such as the ones proposed here, water resource protection is far more cost effective and efficient than subsequent restoration often required when unanticipated events strike areas left vulnerable.

RFC worked diligently with the River Commission to develop setbacks appropriate for the City, applying the best available science to the specific attributes of local waterways and unique community character. Based on these careful considerations, RFC recommends adoption of a 50ft riparian setback, as supported by the River Commission to ensure conservation of valuable waterways and irreplaceable wildlife for the present and future benefit of the City, its residents, and visitors. Similarly, in 2013, RFC served as a technical advisor to the Garfield County Board of County Commissioners and recommended adoption of 50ft riparian setback protections county-wide.

For your reference, Table 1 contains riparian protections retained in other Roaring Fork Watershed city and county land use codes. These adaptations are not intended to dictate the policy of the City, however awareness and consistency of policies adapted by others with similar resources could prove useful in the decision making process. Please note that all the setbacks in the table below include protections for riparian vegetation and the ability to make allowances for unique circumstances.

[1] Colorado Division of Wildlife, 2010. Actions to Minimize Adverse Impacts to Wildlife Resources, p.3

[2] Wegner, S., 1999. A review of the scientific literature of riparian buffer width, extent and vegetation, *http://researchweb8.wpengine.com/rivercenter/wp-content/uploads/sites/17/2015/03/A-Review-of-the-Literature-on-Riparian-Buffer-Width-Extent-and-Vegetation.pdf*

ROARING FORK CONSERVANCY
Bringing People Together to Protect Our Rivers

Table 1

REGION	SETBACK	DETAILS
City of Aspen	100ft/100 year floodplain	Development is "subject to heightened review." (Ord. 26.435.040)
Town of Basalt	50ft	Prohibits development and cutting of riparian and wetland vegetation. (Ord. 16-464a)
Town of Carbondale	Unspecific	If new development is proposed adjacent to any river, all practical means should be used to preserve natural grade, drainage patterns, soil and vegetation. (Ord. 4-2007)
Eagle County	75ft/100 year floodplain	No development within 75ft of high water mark or 100 year floodplain (whichever is greater).
Garfield County	35ft	Prohibits removal of any existing native vegetation or conducting any activity which will cause any loss of riparian area unless it involves the approved removal of noxious weeds, nonnative species, or dead or diseased trees.
Pitkin County	100ft/100 year floodplain	100 foot buffer for all activity and development. Setback may be reduced to a minimum of 50 feet if reduction does not result in water quality degradation, stream bank erosion and/or a reduction in the quality of riparian or wetland habitat.

Implementation of riparian protections also hold significant economic value. Healthy riparian areas:

- Reduce the cost of drinking water treatment by filtering sediment and other pollutants. The City of Glenwood Springs currently has a secondary drinking water intake on the Roaring Fork River near Veltus Park.
- Prevent property damage by protecting against erosion and flooding. Erosive effects are nearly 5 times more likely on non-vegetated stream banks, and up to 30 times more likely on non-vegetated stream bends.[3]
- Increase property values by improving aesthetics. "Several studies have shown that people will pay a premium to live or work near greenways or other protected areas, and this allows the developer to recoup at least some of the costs of not developing up to the stream bank."[4]
- Support the local fishing economy by maintaining high water quality for the Roaring Fork River's Gold Medal fishery.
- Support local river recreation (i.e. rafting, kayaking, stand-up paddle boarding) economy by providing scenic areas and wildlife viewing opportunities along rivers.

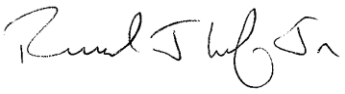
[3] Chagrin Watershed Partners, Inc. 2006, Riparian Setbacks: Technical Information for Decision Makers. *www.crwp.org/files/riparian_setback_paper_jan_2006.pdf*
[4] Chagrin Watershed Partners, Inc. 2006, Riparian Setbacks: Technical Information for Decision Makers. *www.crwp.org/files/riparian_setback_paper_jan_2006.pdf*

- Enhance aesthetics in a tourist economy that is defined by its relationship to water. The Glenwood Springs Chamber of Commerce currently markets Glenwood Springs as "The Land of Water," a tourist destination based primarily on its water resources.

The adoption of the proposed code will help ensure the prosperity of human and natural communities in Glenwood Springs. Current research indicates "that the influence of riparian corridors on water quality is proportionately much greater than the relatively small area in the landscape they occupy."[5] Roaring Fork Conservancy strongly urges the Glenwood Springs City Council adopt the Glenwood River Commission's proposed riparian setback code revisions.

Thank you for your time and consideration.

Sincerely



Rick Lofaro
Executive Director

Chad Rudow
Water Quality Coordinator

Roaring Fork Conservancy has inspired people to explore, value, and protect the Roaring Fork Watershed since 1996. We bring people together to protect our rivers and work to keep water in the streams, monitor water quality, and preserve riparian habitat. As one of the largest watershed organizations in Colorado, Roaring Fork Conservancy serves residents and visitors throughout the Roaring Fork Valley through school and community-based Watershed Education programs and Watershed Action projects, including regional watershed planning, water resource

[5] Chagrin Watershed Partners, Inc. 2006, Riparian Setbacks: Technical Information for Decision Makers. www.crwp.org/files/riparian_setback_paper_jan_2006.pdf

February 27, 2018

The City of Glenwood Springs City Council
101 W 8th Street
Glenwood Springs, CO 81601

Dear Council Members,

RE: Development Code Revisions to 070.040.020(d)(25) Conservation of Waterways.

The Ferdinand Hayden Chapter of Trout Unlimited is the local TU Chapter representing members from Aspen to Rifle. FHTU is one of the oldest TU Chapters, being the 8th chapter created nationwide in the 1960's.

We are writing to strongly support the proposed revisions to the City Code regarding stream setbacks and protection of the adjacent riparian areas. The riparian zone adjacent to any stream or river is an integral and vitally important part of the larger stream ecosystem. Ninety percent of the base food material for all of the aquatic life comes from the vegetation growing in the riparian zone. The existing riparian area along the Roaring Fork from Carbondale to Glenwood Springs is in sorry shape, due largely to overzealous development and removal of vegetation by landowners.

Both Glenwood Springs and the larger Roaring Fork Valley depend a great deal on the value and economic benefits that a healthy river ecosystem provide. This is a world class fishery, consistently named by magazines such as Outside and Sunset as one of the best places to be if you like to fish.

We think that this Code revision is a prudent and responsible step for the City to take in order to insure the continued health and vigor of the Roaring Fork River ecosystem through town. We strongly urge you to support and approve this code revision as well.

Sincerely,

Jason Groves
Jason Groves, President
Ferdinand Hayden Chapter (008) of Trout Unlimited

February 27, 2018

City of Glenwood Springs City Council
101 W 8th Street
Glenwood Springs, CO 81601

Dear Council;

American Rivers is a national river conservation organization with offices across the country, including Glenwood Springs, Colorado. Our mission is to promote and work for a nation of clean, healthy rivers that sustain and connect us. American Rivers protects wild rivers, restores damaged rivers, and conserves clean water for people and nature.

We ask that you support and approve the proposed revisions to the City Development Code, **070.040.020(d)(25) Conservation of Waterways**. These revisions will greatly expand needed protections for the riparian zone along the Roaring Fork River and other streams in Glenwood Springs. These riparian areas are not just a strip of vegetation along the river bank, they are an integral part of the larger river ecosystem itself. Riparian areas and the vegetation they contain are absolutely critical to the overall health of ecosystem. They provide the organic food foundation for insects, which in turn support the world class fishery that draws both residents and tourists to Glenwood Springs. These same aquatic insects are also the major food source for many of the migratory and permanent bird species that we enjoy.

This code revision just makes good sense and is long overdue. Landowners adjacent to the river also need to learn more about the vital role of the riparian vegetation on their property for the health of the river that they enjoy.

Please do not hesitate to contact me if I can answer any questions or concerns you may have.

Thank you!

Ken Neubecker, Director
American Rivers Upper Colorado Basin Program within Colorado
24 S Meadow View Ct.
Glenwood Springs, CO 81601
(970) 230-9300
Kneubecker@americanrivers.org

Glenwood Springs Riparian Assessment

Prepared by:
Chad Rudow, Roaring Fork Conservancy (biologist)
Andrea Holland, Glenwood Springs River Commission (retired hydrologist)
Submitted: 2/26/2018

Introduction

The City of Glenwood Springs (GWS) is essentially defined by the confluence of the Roaring Fork and Colorado Rivers. These two waterways provide significant recreation, aesthetic and economic benefits to the community. In addition the lower Roaring Fork is a sourcewater area, providing a backup drinking water supply for GWS. The riparian zone along these rivers is a key component that helps sustain water quality and quantity, as well as fish and wildlife habitat. As the city grows and development continues along these rivers, the potential for increasing impacts to both river and riparian health can be expected. The primary objective of this project is to assess the current condition of the riparian zone and consider ways to maintain or improve these critical components to watershed and river health.

Background

In 2007, the Stream Health Initiative (SHI) conducted by Emerick and Malone, surveyed the riparian and instream habitat of the lower Roaring Fork River. It noted historic impacts from agriculture and more recent residential and commercial impacts and having significantly modified riparian areas throughout the segment when compared to pre-development conditions. Such impacts include "reduced riparian zone width, vegetation quality, and ecosystem function on the majority of reaches"[1]. However, it also notes that "a few remnant predevelopment plant communities persist wherever human disturbances are minimized" and these communities are "characterized by a wide riparian zone, a diversity of native riparian plant species, structurally complex habitat, and a more even-age class distribution of trees and shrubs"[1]. More information from the SHI can be found in the State of the Roaring Fork Watershed Report 2008 found online at www.roaringfork.org/publications.

Methods

This report documents an informal assessment, conducted October 6, 2017, of riparian conditions along the Roaring Fork and Colorado Rivers within GWS city limits. The river-view assessment relied on qualitative observations and photo-documentation of the integrity of riparian condition and function. See photo location map on page six. Tributaries in GWS such as Threemile Creek, Oasis Creek, and Mitchell Creek also contain riparian areas but were not included in this assessment.

This assessment documented the existing riparian condition including presence and density of riparian vegetation, evidence of erosion, occurrence of development or structures within

[1] Emerick J.C. and Malone, D.G. 2007a. Catalog of stream and riparian habitat quality for the Roaring Fork River and tributaries, Central Colorado. Roaring Fork Stream Health Initiative.

the riparian zone, and human alteration to natural areas. Observations considered the natural functions of a healthy riparian area which provide:

- flood mitigation by dissipating stream energy and reducing erosion and property damage.
- water storage during high flow and releases during low flows.
- multi-storied habitat for wildlife and aquatic life.
- wildlife migration route between habitats.
- rich and diverse food source for wildlife and aquatic life.
- shading that lowers river temperatures and slows evaporation.
- buffers which mitigate sedimentation and prevent erosion.
- natural bio-filters which filter pollutants and protect water quality.

Observations

Roaring Fork River

Within city limits, the banks of the Roaring Fork River are generally high and steep. Nonetheless, areas with minimal development impact indicate the potential for narrow, healthy riparian areas. Occasional lower "benches" of level land exist along this reach, providing the primary opportunity for riparian habitat and related functions.

General observations:

- The west bank through GWS is primarily residential lots while the east bank tends to have more commercial development and mixed uses.
- Two bike paths run adjacent to the Roaring Fork River in Glenwood Spring, the Atkinson Canal Trail along the west bank in south GWS, and the Glenwood River Trail along the east bank through downtown GWS. While these paths provide an important amenity for transportation and river access, their proximity to the river and maintenance represent impacts to the respective riparian areas.
- Despite the steep terrain and density of development, numerous areas within GWS still exhibit robust riparian vegetation. The density of vegetation is typically greatest along a narrow strip next to the river while the upper gradient areas are generally more sparse. Densely vegetated riparian areas typically exhibit good multi-story habitat.
- The west bank of the Roaring Fork River between the Cardiff Bridge and 14th street pedestrian bridge exhibit the majority of recent riparian alterations by private landowners. A few alterations were also noted along the east bank in this reach.
- Riparian trees show a slightly unbalanced age class, with large numbers of tall, mature trees (particularly cottonwoods) and less young tree recruitment for recovery/maintenance of the species.
- Engineered or rip-rap banks exist at numerous locations along this reach. While this meets the initial goal of bank stabilization, it contributes to loss of vegetation, creates a challenging environment for regrowth, and increases channelization of the river and potential related impacts.
- Non-native riparian plant species were noted in riparian areas along this reach. Volunteer projects conducted jointly by City of GWS, Garfield County, Roaring Fork Outdoor Volunteers, and Roaring Fork Conservancy, have significantly reduced

Tamarisk and some Russian Olive near the Threemile Creek confluence and upstream of the municipal airport. Due to these efforts, minimal Tamarisk were noted during this assessment, however numerous Russian Olive still exist in riparian areas along this reach, particularly on private property.

Sections of concern and potential treatments:

- Stream banks at the outlet of Threemile Creek are marginally vegetated and actively eroding. Suggest bank stabilization with long term goal of revegetating slope to native density while still allowing some beach area for public access.
- Backyard development creep and riparian vegetation clearing are increasing. Numerous landowners with private access to the river have created sitting areas ranging from a few chairs tucked into the vegetation to more extensively cleared spaces with grills, tables and numerous chairs. Some have cleared and developed a wide access down the hill slope. The latter impacts may disrupt riparian function and, if copied by neighbors, could result in extensive loss of riparian habitat. Potential treatments include curtailing this kind of bank development in order to preserve riparian function while still allowing private landowner desire to enjoy riverside amenities. Public education is a key component for addressing these concerns.
- Various structures have been constructed within the riparian zone throughout this reach in GWS. They include trails and steps built to access the river, gazebos, boat ramps, and various platforms for chairs and tables. The structures vary in size and amount of disruption to riparian areas. Potential treatments are similar to those listed above regarding riparian vegetation clearing.
- Concrete slabs were deposited along parts of the river and now hinder vegetation growth. Potential treatments include removing engineered banks where feasible and replanting native riparian vegetation.
- The newly constructed 14th street pedestrian bridge resulted in widening and clearing of the river's banks at that location. Riprap was used as the primary bank stabilization feature. Treatments include replacing riprap with vegetation to restore this area to a healthy riparian habitat.
- Removal of critical riparian vegetation, especially cottonwood, along River Meadows Mobile Home Park. A few willow patches have returned but the stream bank consists primarily of open lawn. Trees line the upper terrace of the Park but little vegetation remains along the baseflow edge of the River. Treatments include education for private landowner(s) and possible joint efforts to re-establish vegetation diversity or pocket protection areas.
- Veltus Park contains riparian impacts including eroding banks and some instances of riparian vegetation clearing by city staff. GWS is currently pursuing a redevelopment and restoration plan for this area. It is recommended that this project prioritize the balance of public access to the river, erosion control, and re-establishment of healthy riparian system. Additional education of city staff regarding riparian best management practices to avoid adverse impacts to river health is also encouraged.

Colorado River

This reach has seen over a century of impacts from the construction of the railroad, I-70, Two Rivers Park, commercial development, and most recently a whitewater park. However, there remain localized stretches along the river that contain healthy riparian conditions.

General observations:

- Both banks represent mixed land use with primarily railroad right-of-way and commercial development along the south bank. The north bank combines large stretches of I-70, Two Rivers Park, and some commercial use.
- The railroad and I-70 run along opposite sides the Colorado River and represent existing impacts to riparian areas through impairment of habitat, loss of vegetation and hindrance to wildlife passage. Additionally, operation, maintenance and chemical treatments of these structures represent ongoing impacts. However, these land uses also restrict human access to portions of the remaining riparian areas, thereby limiting other human impacts.
- Riparian trees show unbalanced age class, with large numbers of tall, mature trees (particularly cottonwoods) and a lack of young tree recruitment for recovery and maintenance of the species.
- Engineered or riprap banks exist at numerous locations along this reach. While this meets the initial goal of bank stabilization, it contributes to loss of vegetation creates a challenging environment for regrowth, and increases channelization of the river and potential related impacts.
- Non-native riparian plant species were noted in riparian areas along this reach. Volunteer projects conducted jointly by City of GWS, Garfield County, Roaring Fork Outdoor Volunteers and Roaring Fork Conservancy, have significantly reduced Tamarisk and some Russian Olive near Two Rivers Park and along the river in West GWS. Although these efforts have removed many invasive plants, more of both species remain throughout this reach, particularly in areas which are difficult to access.

Sections of concern and proposed treatments:

- Two Rivers Park represents a significantly impacted riparian area. GWS is currently pursuing a redevelopment and restoration plan for this area, which will include addressing the current conditions. This project as planned should continue to prioritize the balance of public access to the river and re-establishment of healthy riparian system.
- Sections along Devereux Road show signs of impact and may benefit from riparian rehabilitation – further study recommended.
- Riparian vegetation between the river and Iron Mountain Hot Springs is scarce and may have been removed as part of this development. Potential treatments include working with landowner to provide views of the river from the facility balanced with replanting of riparian vegetation.
- Sections along I-70 need removal of non-native vegetation followed by revegetation of native species but may need to study potential impacts of Mag-Chloride and stormwater runoff related to vegetation health before attempting revegetation efforts.

- Some of the largest, most intact riparian areas on city property exist along the south bank of the Colorado River at the west end of GWS along the former Cardinell Homestead in the area of the new wastewater treatment facility. This area has healthy, diverse vegetation, minimal human impacts, and connection to good upland wildlife habitat. It is strongly recommended that this area be kept intact and natural with minimal development or mandated riparian buffers if development is necessary.

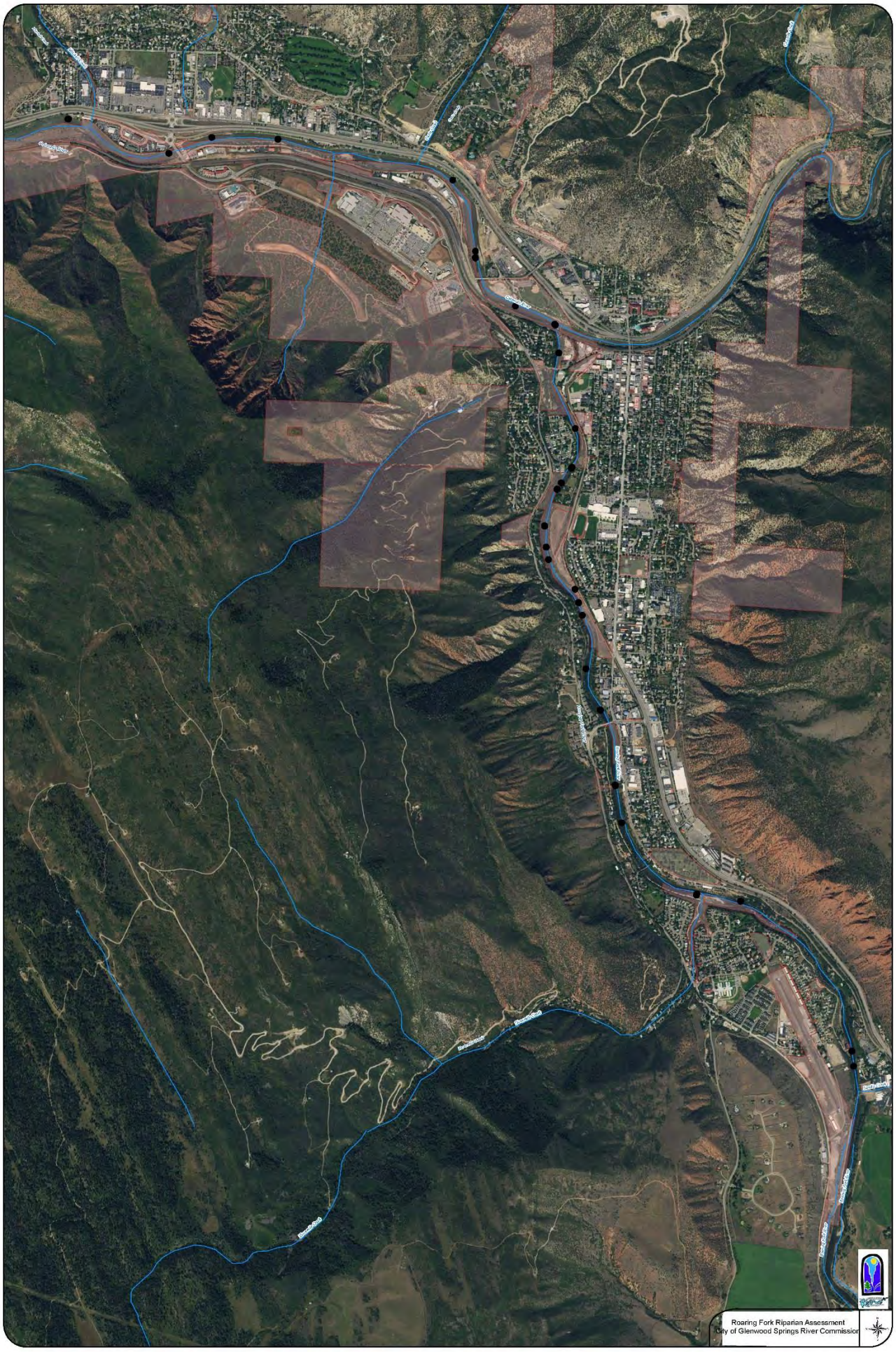
Summary

This assessment noted three general categories of riparian conditions within GWS:

- Minimally disturbed areas - exhibit fairly natural conditions and healthy riparian vegetation. These areas were noted throughout GWS although typically in localized pockets. Human impacts to these areas, particularly by private landowners, has been increasing in recent years.
- Partially disturbed areas – exhibit some human impacts and less healthy riparian vegetation. These areas, although exhibiting some disturbance, have the potential to revert to more healthy conditions given the application of best management practices or in many cases simply allowing the natural regrowth of riparian vegetation. These areas represent the largest portion of riparian land throughout GWS.
- Impacted areas – exhibit significant human impacts and alteration of riparian vegetation and conditions. These areas represent a fairly small portion of riparian land yet a fairly significant impact within that localized area. The presence of these areas emphasize the importance of maintaining riparian health in the less disturbed areas and improving riparian health in the partially disturbed areas.

This assessment indicates opportunities within Glenwood Springs where integrity and function of riparian areas can be maintained or improved. It also provides a basis for GWS to consider policy, regulations, public education or other means that recognize the value of riparian health and its associated impacts on river health.

Riparian Assessment Photo Location Map



Glenwood Springs Riparian Assessment

A cursory survey of riparian health along the Roaring Fork and Colorado Rivers

Primary Objectives

- Photo document the range of riparian area conditions within GWS (healthy, marginal or poor).
- Suggest actions that can improve riparian health where needed.
- Inspire dialogue on how best to maintain or improve riparian conditions within GWS.

Methods

- Qualitative observations and photo documentation from raft, October, 2018
- Past documentation of same area by Design Workshop* and Roaring Fork Conservancy
- Observers have professional backgrounds in assessing the health of physical and biological functions of riparian areas

*Riverside Stewardship Manual, prepared for the City of Glenwood Springs, March 1997.

Key Observations Considered

- Reproduction and vigor of riparian plants
- Presence of non-native noxious plant species
- Connectivity of wildlife migration routes between habitats
- Bank stability
- Extent of active erosion

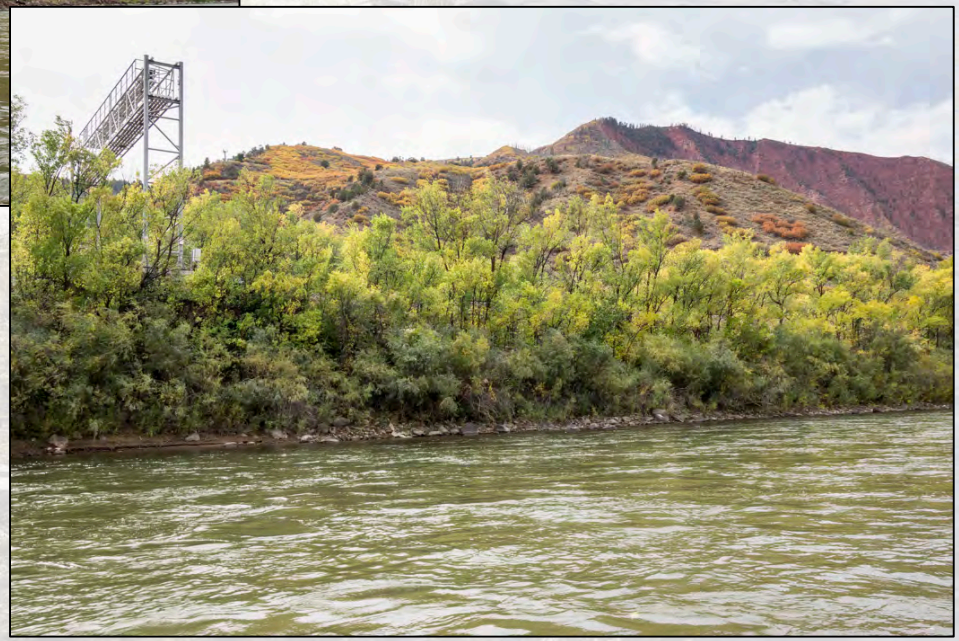
The Good News

Despite steep slopes and areas of dense development there are river segments within GWS that exhibit robust riparian health.

These images were taken from the Roaring Fork River

The Potential is There

Municipal development can occur without significantly degrading riparian health.



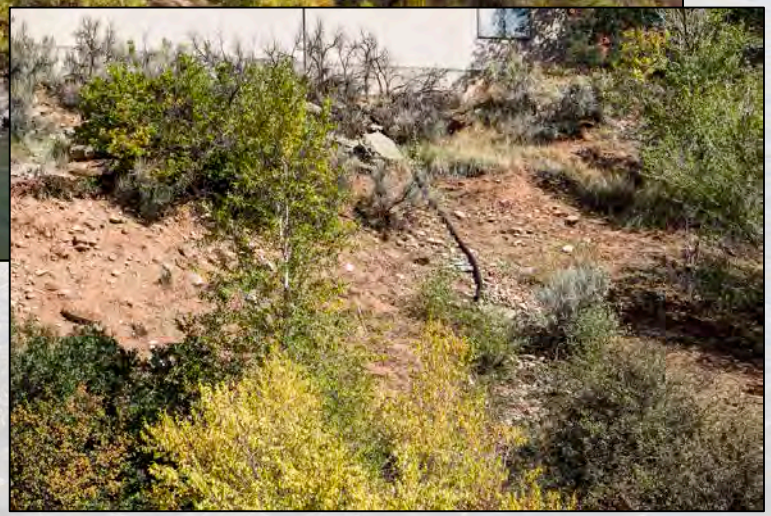
These images were taken from the Colorado River

Areas of Concern

Impacts to Riparian Areas

Roaring Fork and Colorado Rivers

Slope stability



Without sufficient vegetation steep slopes are susceptible to erosion which can impact water quality and property values.

Presence of Non-Native Plants

Minimal Tamarisk were noted likely due to active Tamarisk removal projects.

Russian Olive still occurs in dense stands both on the Roaring Fork and Colorado Rivers

Public Access – Three Mile

Popular site for neighborhood residents, anglers and rafters leaves river banks heavily impacted.

River flow pattern was significantly modified during construction of now abandoned ditch (adding to riparian impacts).

Public Access – Two Rivers Park

Heavy foot traffic can exasperate riparian health

Floodplain Clearing

Backyard clearing of riverside vegetation along private lots has been incrementally increasing over time. Impacts to riparian ecosystem vary in scope of removal.

Clearing can be extensive...

or minimal.

This practice appears to be growing as more homeowners seek the aesthetics of developing their riverside backyards.

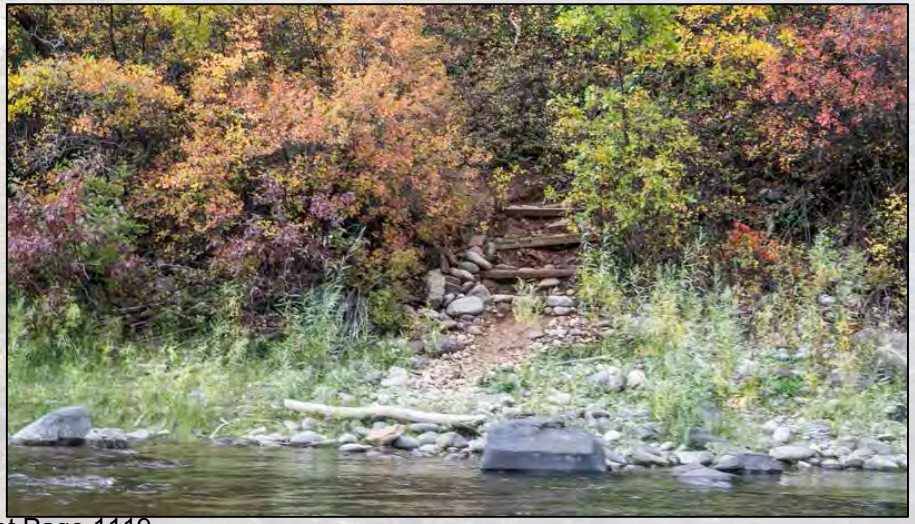
Private River Access Impacts

Access design should consider riparian and water quality protection

Top Left: Minimal impact to riparian vegetation and soil cover.

Top Right: Loss of riparian vegetation but decent soil cover.

Right: Improved design could reduce impacts of erosion into the river and protect trail's integrity.



Vegetation Loss in Other Areas

Loss of vegetation can lead to greater bank erosion, reduce river shading and bird habitat and limit its function to filter out sediments and excess nutrients

The Dark Side of Riprap

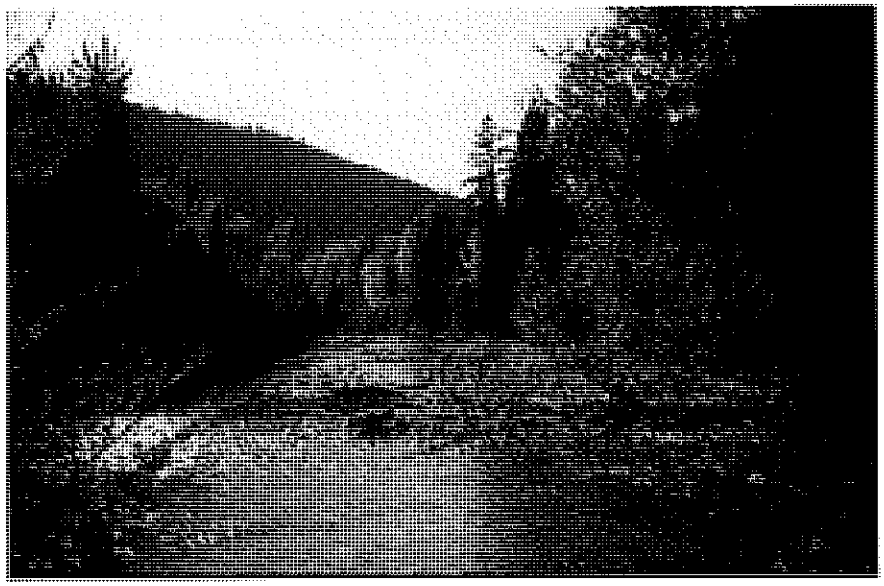
Riprap may effectively stabilize a river bank
but it also inhibits re-establishment of riparian vegetation.

Waste Material Side Cast

Like Riprap, asphalt and concrete tossed onto river banks inhibits vegetation re-growth, ultimately impairing riparian function. (And it's unattractive)

We All Benefit from Healthy Riparian Areas

Riparian Buffer Zones: Functions and Recommended Widths



Prepared by

Ellen Hawes and Markelle Smith
Yale School of Forestry and Environmental Studies

For the

Eightmile River Wild and Scenic Study Committee

April 2005

Table of Contents

1. Function of Riparian Buffers.....3

2. Recommended Buffer Widths.....4

    a. Erosion Control.....4
    b. Water Quality.....4
    c. Aquatic Habitat.....5
    d. Terrestrial Habitat.....5

3. Factors Influencing Buffer Widths.....6

    a. Slope.....6
    b. Soil Type.....6
    c. Vegetation Mix.....6

4. Buffer Types.....8

    a. Variable Width.....8
    b. Fixed Width.....9
    c. Three Zone.....9

5. What Order Streams to Protect.....11

6. Appendix 1: Summary of Effective Buffer Widths From Literature Review.....12

7. Appendix 2: Other Tables.....13

8. Appendix 3: References.....14

9. Appendix 4: Web Resources.....15

1. Functions of Riparian Buffers

Riparian buffers are vital elements of watersheds, primarily due to their protection of surface and ground water quality from impacts related to human land use. These vegetated buffers are complex ecosystems that provide food and habitat for unique plant and animal species, and are essential to the mitigation and control of nonpoint source pollution. In fact, the removal of streamside vegetation, primarily for development purposes, has resulted in degraded water resources and diminished value for human consumption, recreation, and industrial use.[1]

In the Eightmile River watershed, maintenance of riparian buffers in their natural condition has been identified as one of the most effective means of protecting multiple outstanding resource values (ORVs), including water quality, hydrology, unique species and natural communities, and watershed ecosystem function.

Sedimentation increases turbidity and contributes to rapid siltation of waterbodies, negatively impacting water quality. Increased sediment loads also narrow channel widths and provide substrate for colonization of invasive aquatic plant species. Intact riparian buffers ameliorate these negative impacts by stabilizing streambanks. Roots of riparian vegetation deflect wave action and hold bank soil together. The buffer vegetation also decreases erosional impacts during flood events and prevents undercutting of streambanks.

Excess nitrogen and phosphorous from fertilizers and animal waste, as well as other pollutants originating from pesticides and herbicides, often bond to soil particles. The nutrient-loaded sediment contained in surface runoff then flows to the nearest waterbody and is deposited. This process is the primary cause of accelerated eutrophication of lakes and rivers[2]. Streamside forests function as filters, transformers, and sinks for harmful nutrients and pollutants[3]. Buffer plants slow sediment-laden runoff and depending upon their width and vegetational complexity, may deposit or absorb 50 to 100% of sediments as well as the nutrients and pollutants attached to them[4]. When surface water runoff is filtered by the riparian buffer approximately 80 to 85% of phosphorous is captured[5]. Nitrogen and other pollutants can be transformed by chemical and biological soil activity into less harmful substances. In addition, riparian plants act as sinks, absorbing and storing excess water, nutrients, and pollutants that would otherwise flow into the river, reducing water quality.

One of the most important functions of riparian buffers is enhanced infiltration of surface runoff[6]. Riparian vegetation in the buffer surrounding a waterbody increases surface roughness and slows overland flows. Water is more easily absorbed and allows for groundwater recharge. These slower flows also regulate the volume of water entering rivers and streams, thereby minimizing flood events and scouring of the streambed.

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[1] Welsch 1991
[2] Jontos 2004
[3] Welsch 1991
[4] Connecticut River Joint Commission 2005
[5] Connecticut River Joint Commission 2005
[6] Dillaha et al. 1989

Many plant and animal species depend on the distinctive habitat of riparian buffers, which include elements of both terrestrial and aquatic ecosystems. Forested buffers improve habitat quality by providing shade that cools water temperatures, thereby elevating the dissolved oxygen content that is necessary for many species of fish and aquatic insects. Woody debris from shrubs and trees within the vegetated buffer provides food and cover for a multitude of aquatic species. If large enough, buffers also provide corridors essential for terrestrial wildlife movement.

Vegetated buffers may serve as screens along waterways, protecting the privacy of riverfront landowners and blocking views of any unsightly development. Hiking and camping opportunities are also facilitated by forested buffers, which if large enough, allow outdoor enthusiasts to enjoy the proximity of the water. The diversity of plant species provides visual interest and increases aesthetic appeal.

2. Recommended buffer widths

The width of a buffer depends greatly on what resource you are trying to protect. Scientific studies have shown that efficient buffer widths range from 10 feet for bank stabilization and stream shading, to over 300 feet for wildlife habitat. Furthermore, the necessary width for an individual site may be less or more than the average recommendations, depending on soil type, slope, land use and other factors. The ranges cited below come from four literature reviews by The U.S. Army Corps of Engineers New England Division, the University of Georgia's Institute of Ecology, the U.S. Army Engineer Research and Development Center, and researchers from the UK Forestry Commission.[7] Results from studies done in New England fall within the ranges cited below, and no evidence was found in the literature to suggest that buffers should be, on average, either wider or narrower.

a. Erosion control

Erodibility of soil type is a key factor when assessing adequate buffer widths. Widths for effective sediment removal vary from only a few feet in relatively well drained flat areas to as much as several hundred feet in steeper areas with more impermeable soils. In order to prevent most erosion, vegetated buffers of 30 feet to 98 feet have been shown to be effective.

b. Water quality

Nutrients - Nitrogen and phosphorous can be retained in buffers that range from 16 to 164 feet. The wider buffers will be able to provide longer-term storage. Nitrogen is more effectively removed than phosphorous. In 1995, a study conducted in Maine found that the effectiveness of buffers at removing phosphorous is variable but in most cases, a 49-foot natural, undisturbed buffer was effective at removing a majority of the nutrient from surface runoff. However, the U.S. Army Corps of Engineers concluded in their 1991 study that there was insufficient evidence

[7] U.S. Army Corps of Engineers 1991, Wenger 1999, Fischer and Fischenich 2000, Broadmeadow and Nisbet 2004, respectively.

to determine a necessary buffer width for phosphorous retention. It is important, therefore, to combine buffer zones with strategies to reduce phosphorous at its source.

Pesticides – Buffer widths for pesticide removal range from 49 feet to 328 feet. Pesticides that are applied manually require less of a buffer area than aerially-sprayed pesticides.

Biocontaminants – Buffer widths for biocontaminants, such as fecal coliform, were not reviewed in this study. The University of Georgia found that, in general, buffers should be 30 ft. or greater. However, buffers may not be able to adequately filter biocontaminants and it is also important to reduce these pollutants at the source.

c. Aquatic habitat

Wildlife – The minimum width of riparian buffers to protect aquatic wildlife, including trout and invertebrates, range from 33 feet to 164 feet.

Litter and debris input – Recommendations for buffer widths to provide an adequate amount of debris for stream habitat range from 10 feet to 328 feet, although most fall within 50 feet to 100 feet.

Stream temperature. Adequate shading can be provided by a 30-foot buffer, but buffers may need to be up to 230 feet to completely control stream temperature. The amount of shade required is related to the size of the channel. The type of vegetation in the buffer regulates the amount of sunlight reaching the stream channel. Generally, a buffer that maintains 50% of direct sunlight and the rest in dapple shade is considered preferable[8]

d. Terrestrial habitat

The Eightmile River watershed contains a large number of roadless, undeveloped forest blocks and is more than 80% forested in total. Furthermore, the riparian corridor within 300 ft. of the river and its tributaries has remained mostly intact, supporting a high level of biodiversity as well as protecting water quality. The Eightmile River is host to a number of important species, including native brook trout, freshwater mussels, blue back herring, bobcats, great horned owls and cerulean warblers.

The habitat requirements for birds, mammals, reptiles, amphibians and fish vary widely, and the necessary buffer width to protect each species varies widely as well. While trout and salmon can benefit greatly from the shading, habitat, food, and water quality protection that a 150-foot buffer provides, mammals such as the red fox and the bobcat require riparian corridors of approximately 330 feet. Furthermore, birds such as the cerulean warbler, which requires large areas of forest, may need a buffer that is much greater than 330 ft.[9] For this reason, we do not believe that it is feasible to capture all of the habitat needs of all species with a uniform buffer. More careful targeting of potential riparian habitat, work with landowners to create conservation

[8] Broadmeadow and Nisbet 2004
[9] Chase et al. 1995

easements, as well as the creation of protected areas by the town will aid in more specific approaches to habitat preservation for these species.

For a more detailed look at the range of recommended buffer widths, see Appendix 1.

3. Factors influencing buffer width

There are many factors that influence the effectiveness buffers. These include slope, rainfall, the rate at which water can be absorbed into the soil, type of vegetation in the buffer, the amount of impervious surfaces, and other characteristics specific to the site.

a. Slope

As slope increases, the speed at which water flows over and through the buffer increases. Therefore, the steeper the land within the buffer, the wider it needs to be to have time to slow the flow of water and absorb the pollutants and sediments within it. Many researchers suggest that especially steep slopes serve little value as a buffer, and recommend excluding areas of steep slope when calculating buffer width. The definition of "steep" varies from over 10% to over 40% slope[10].

b. Soil type

The type of soil affects how quickly water can be absorbed. Soils that are high in clay are less permeable and may have greater runoff. On the other hand, soils that are largely made up of sand may drain water so rapidly into the groundwater that roots are not able to effectively trap pollutants. Furthermore, soils that are moister and more acidic have a better capacity to take up nitrogen from the soil and release it to the atmosphere (through denitrification).

c. Vegetation mix

Structurally diverse riparian buffers, i.e. those that contain a mix of trees, shrubs and grasses, are much more effective at capturing a wide range of pollutants than a riparian buffer that is solely trees or grass. Removal efficiencies range from 61% of the nitrate, 72% of the total phosphorous and 44% of the orthophosphates from grass buffers to 92% of the nitrate 93% of the total phosphorous and 85% of the orthophosphates from combined grass and woody buffers. [11]

[10] Wenger 1999
[11] Jontos 2004

Table 1: Estimated reduction of nutrient loads from implementation of riparian buffers[12]

Buffer Type	Nitrogen	Phosphorus	Sediment
Forested	48-74%	36-70%	70-90%
Vegetated Filter Strips	4-70%	24-85%	53-97%
Forested and Vegetated Filter Strips	75-95%	73-79%	92-96%

Source: Delaware Department of Natural Resources and Environmental Control

Generally, the grass filter strip works best for sediment removal, while the forested buffer is better for nitrate removal from subsurface flows[13]. Grasses have a shallower and denser root mat that is more effective in slowing runoff and trapping sediments from the surface flow. Trees have a deeper root system that can trap and uptake nutrients from the groundwater, stabilize banks, and regulate the flow of water to the stream.

Forests provide certain functions that grasses cannot. Trees shade the river and provide an input of leaf litter and branches that are necessary for many aquatic species. In addition, a forested buffer provides important habitat for terrestrial wildlife. Native plants species are preferred to ornamentals or exotics due to the habitat advantage they provide for wildlife. Old trees are especially valuable for providing inputs of coarse woody debris.

The most effective riparian buffers should include a mix of trees, shrubs and herbaceous plants native to the region and appropriate to the environment in which they are to be planted. When planting buffers, it is best to use adjacent reference riparian buffers as the basis for selecting floral composition[14].

Table 2: Plant type vs. removal efficiency

Function	Grass	Shrubs	Trees
Sediment trapping	High	Medium	Low
Filtration of Sediment born Nutrients, Microbe and Pesticides	High	Low	Low
Soluble forms of Nutrients and Pesticides	Medium	Low	Medium
Flood Conveyance	High	Low	Low
Reduce Stream Bank Erosion	Medium	High	High

Source: Jontos 2004 (modified after Fisher and Fischenich 2000)

[12] (Palace, 1998; Lowrance et al., 1995; Franti, T.G., (1997); Parsons et al. (1994); Gilliam et al. (1997); Osmond et al., (2000)
[13] Triangle J. Council of Governments 1999
[14] Jontos 2004

4. Buffer types

a. Variable Width

Several models have been created to consider individual site factors in determining buffer width. These range from the complex to the relatively simple. The more complex models take into account multiple factors, such as slope, erodibility and infiltration rates[15]. Examples of such models include:

Brown et al. (1987):

$$\textit{Buffer width} = (\textit{average slope/erodibility factor})^{1/2}$$

Cook College Department of Environmental Resources:

$$\textit{Buffer width} = 2.5\ (\textit{time of travel of overland flow}) * (\textit{slope})^{0.5}$$

More simple models only take into account slope. A common formula is to set a fixed buffer width and apply 2 feet per percent slope. Many of these models recommend *not* including impervious surfaces or areas of steep slope in the buffer width (**Figure 1**). Cook College recommends excluding anything greater than 15% slope, while Wenger (1999) recommends excluding all slopes over 25%.

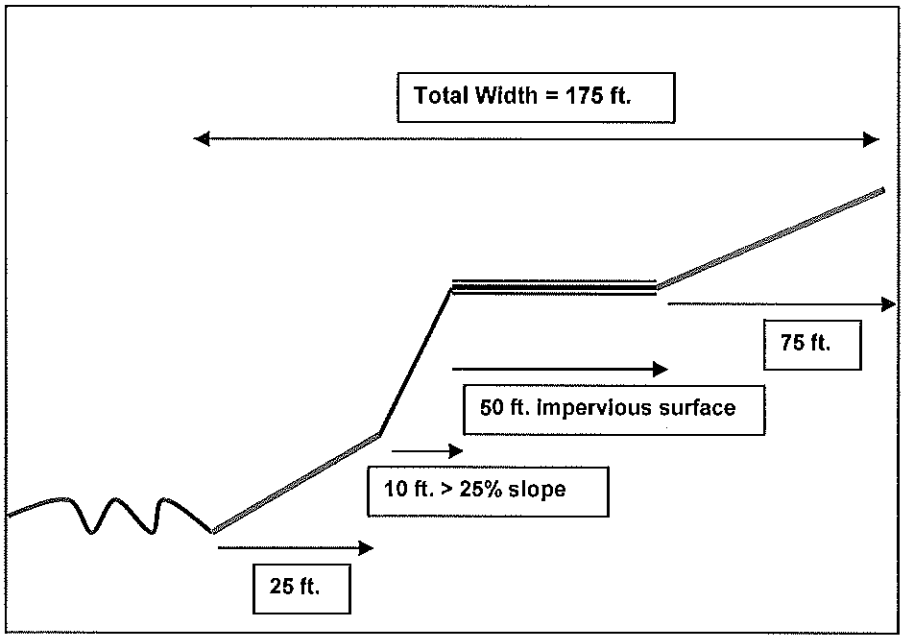
b. Fixed Width

A fixed buffer width is the easiest to administer. However, care must be taken to select the appropriate width for the resources you are targeting. Studies unanimously support the conclusion that buffer efficiency at filtering out pollutants increases with width. However, this does not increase infinitely, and the goal is to find the most efficient width. For example, a study in the Mid-Atlantic[16] found that 90% of sediments were removed by a 62 ft. riparian buffer, but only 94% were removed by more than doubling the buffer width to 164 ft

If a fixed buffer width is chosen, it should be on the conservative side to provide leeway for slope and soil type. Data for the Eightmile River watershed show that significant areas of the land bordering the river have slopes that are above 15%. Therefore, we believe it is necessary to make a fixed buffer width wider than the average minimum recommendation of 100 ft.

[15] Described in the US Army Corps of Engineers (1991) literature review.
[16] Peterjohn and Corell 1994.

Fig.1: Variable buffer width adjusted from 100 feet to 175 feet to account for effects of slope and impervious surface.



c. Three Zone

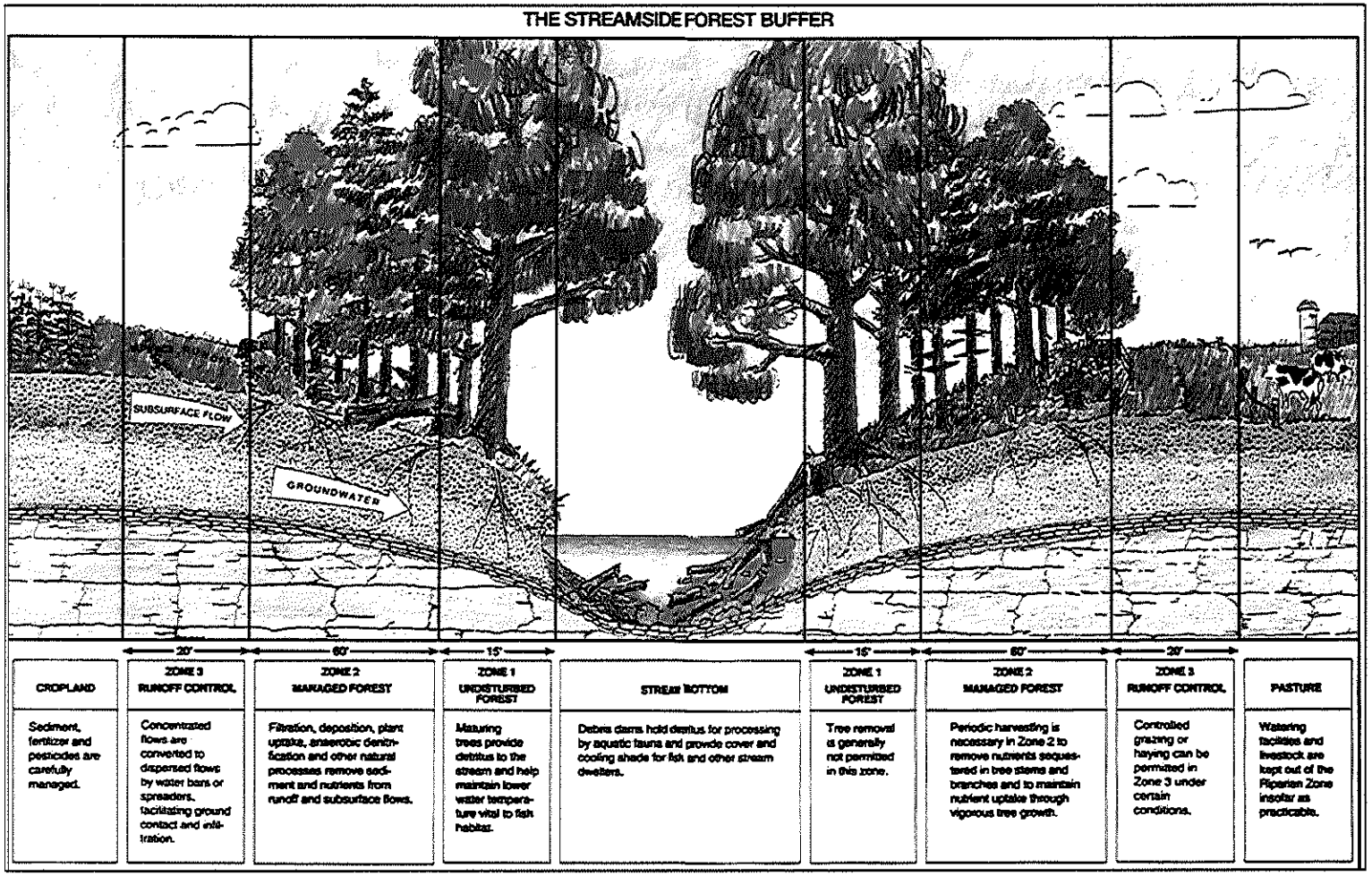
The Three Zone system was originally developed as part of an initiative to protect the Chesapeake Bay. The combination of vegetation types (trees, grass and shrubs) helps maximize the efficiency and diversity of benefits that the buffer provides (Figure 2).

Zone 1
Minimum Width: 15 ft.
Composition: Native trees and shrubs
Function: Bank stabilization, habitat, shade, flood prevention
Management: None allowed except bank stabilization and removal of problem vegetation.

Zone 2
Minimum Width: 60 ft.
Composition: Native trees and shrubs.
Function: Removal of nutrient, sediments and pollutants from surface and groundwater, habitat
Management: Some removal of trees to maintain vigorous growth.

Zone 3
Minimum Width: 30 ft.
Composition: Grasses and herbaceous plants
Function: Slow surface runoff, trap sediments and pesticides
Management: Mowing

Fig. 2: **Three-Zone System**



Source: Welsch 1991. Riparian Forest Buffers: Function and Design For Protection and Enhancement of Water Resources.

5. What order streams to protect

Buffers are most effective when they are contiguous. Guidelines for buffer widths recommend that long, continuous buffer strips should often be a higher priority than fragmented strips of greater width.[17] Small gaps in vegetation along the bank can channelize runoff into the river and effectively negate the effect of surrounding buffers. For this reason, landowners who currently have lawns that run to the edge of the river should be encouraged to replant trees and shrubs along the bank. In addition, footpaths cleared for river access should be winding, rather than straight, and as narrow as possible to minimize sedimentation.

Failure to extend protection to the smaller headwater streams in the river basin also ignores important sources of sedimentation and pollution. To preserve water quality in the Eightmile River, it is essential to protect all of its tributaries. In fact, smaller order streams often account for the greatest miles of watercourse in a basin. Buffering low order streams (1st, 2nd and 3rd) has greater positive influence on water quality than wider buffers on portions of larger order streams already carrying polluted water. While it may be politically infeasible to set wide buffer zones around intermittent and ephemeral streams, this omission is not justified by the science. A University of Georgia study of riparian buffers warns, "Governments that do not apply buffers to certain classes of streams should be aware that such exemptions reduce benefits substantially."[18] A review of buffers by the U.S. Army also notes that "even the best buffer strips along larger rivers and streams cannot significantly improve water that has been degraded by improper buffer practices higher in the watershed".[19]

Smaller headwater streams have the greatest area of land-water interaction, and have the greatest potential to accept and transport sediment. Ephemeral streams, which only exist during periods of high rain, can serve as important sources of sediment and pollutants to the river. It is important that they are maintained in a vegetated condition in order to help trap and slow the flow of pollutants. Furthermore, removing riparian vegetation from the banks of small, heavily shaded streams will have a much greater impact on stream temperature and aquatic habitat throughout the watershed than removing vegetation from larger rivers, where only a fraction of the water is shaded. Rather than ignoring these streams completely, a compromise would be to create a smaller setback. Clinnick et al (1985) advocate a minimum of a 20 m wide buffer for ephemeral streams, and where that is not possible, at least leaving the banks vegetated[20].

[17] Fisher and Fischenich 2000
[18] Wenger 1999
[19] Fisher and Fishenich 2000
[20] Wenger 1999

Appendix 1–Summary of Effective Buffer Widths from Literature Review

	Effective Width of Buffer (in feet)							
Author	**Aquatic Wildlife**	**Terrestrial Wildlife**	**Stream Temperature**	**Litter/Debris input**	**Nutrient Retention**	**Sediment Control**	**Bank Stabilization**	**Pesticide Retention**
Wenger 1999		220-574 ft.	33 – 98 ft.	50 ft.	50 – 100 ft.	82 – 328 ft.	–	> 49 ft.
Army Corps 1991	98 ft.	30 – 656 ft.	33 – 66 ft.	66-102 ft.	52 – 164 ft.	33 – 148 ft.	49 – 98 ft.	49 – 328 ft.
Fisher and Fischenich 2000	> 98 ft.	98-1,640 ft.	–	10 – 33 ft.	16.4-98 ft.	30-200 ft.	30 -66 ft.	–
Broadmeadow and Nisbet 2004	33 –164 ft.	–	49 – 230 ft.	82 – 328 ft.	16.4-98 ft.	49 – 213 ft.	–	–

Appendix 3

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Appendix 2 - General Recommended Widths of Buffer Zones

Source: Jontos 2004 (modified after Fisher and Fischenich 2000)

Function		**Recommended Width**
Water Quality Protection	Buffers, especially dense grassy or herbaceous buffers on gradual slopes, intercept overland runoff, trap sediments, remove pollutants, and promote ground water recharge. For low to moderate slopes, most filtering occurs within the first 10 m, but greater widths are necessary for steeper slopes, buffers comprised of mainly shrubs and trees, where soils have low permeability, or where NPS loads are particularly high.	5 to 30 m
Stream Stabilization	Buffers, particularly diverse stands of shrubs and trees, provide food and shelter for a wide variety of riparian and aquatic wildlife	10 to 20 m
Riparian Habitat	Riparian vegetation moderates soil moisture conditions in stream banks, and roots provide tensile strength to the soil matrix, enhancing bank stability. Good erosion control may only require that the width of the bank be protected, unless there is active bank erosion, which will require a wider buffer. Excessive bank erosion may require additional bioengineering techniques.	30 to 500 m +
Flood Attenuation	Riparian buffers promote floodplain storage due to backwater effects, they intercept overland flow and increase travel time, resulting in reduced flood peaks.	20 to 150 m
Detrital Input	Leaves, twigs and branches that fall from riparian forest canopies into the stream are an important source of nutrients and habitat.	3 to 10 m

Appendix 4 - Web Resources

Chesapeake Bay Committee. Cheasapeake Bay Riparian Handbook: A guide for establishing and maintaining riparian forest buffers.
http://www.chesapeakebay.net/pubs/subcommittee/nsc/forest/handbook.htm

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Wenger, S. 1999. A review of the scientific literature of riparian buffer width, extent and vegetation: http://outreach.ecology.uga.edu/tools/buffers/lit_review.pdf

WEDNESDAY, APRIL 25 | 12 PM

Lionshead Welcome Center
Lower level of Lionshead Parking Structure

A Complimentary Ecology Presentation

FREE

FREE LUNCH
for attendees

Come enjoy a complimentary lunch and listen to Pete Wadden, Town of Vail Watershed Education Coordinator, discuss the history and ongoing controversy surrounding the philosophies of Conservation and Preservation in the United States. Experts from the Town of Vail, Walking Mountains Science Center, and Eagle River Watershed Council will be on hand to answer questions about what residents can do to help Restore the Gore. There will also be stickers and informational brochures available to attendees.

Love Vail
Gore Creek

walking mountains science center

Eagle River Watershed Council

High Five Access Media

Eagle River Water & Sanitation District

TOWN OF VAIL

970.479.2144 | lovevail.org

Project Re-Wild

The Town of Vail will provide partial funding to riparian and stream bank restoration projects on private land that reduce sediment and pllution loads in Gore Creek and its tributaries by (1) establishing native vegetation buffers, (2) stabilizing stream banks or (3) reducing impervious surfaces. The town will provide up to 75% funding to projects that staff determine best serve each of the three aforementioned goals.

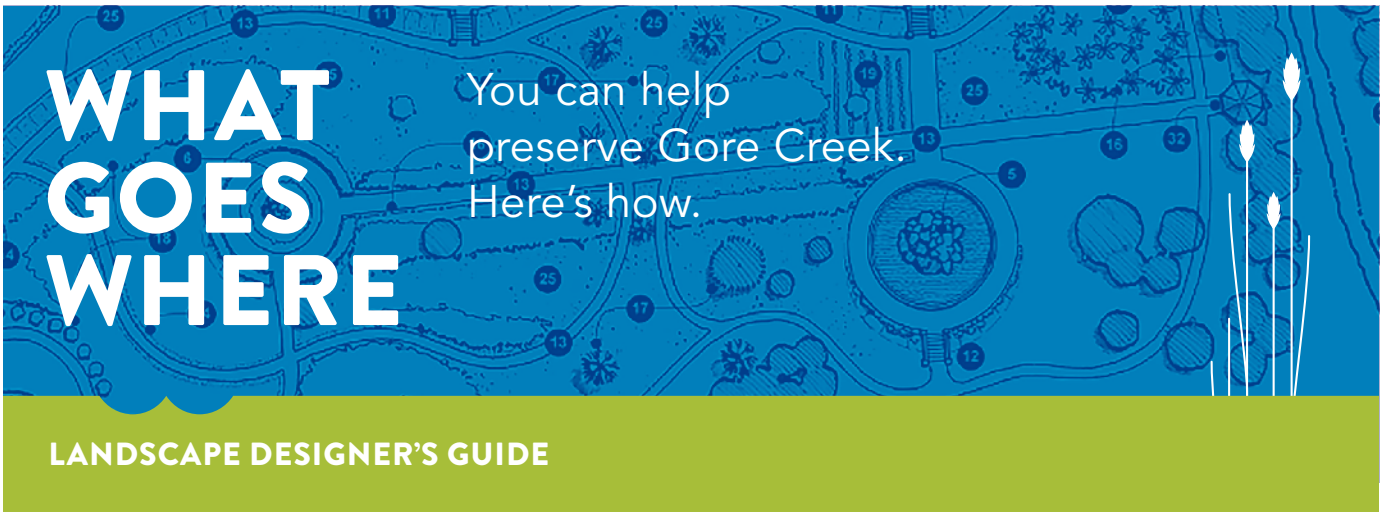
APPLICATION PROCESS

Homeowners or their agents who wish to apply for partial project funding from the Town of Vail must submit a completed application form in addition to all other local, state, and federal permit applications. Applicants will be asked to take time to provide detailed answers to the questions in the application packet and provide any additional information that is available such as architectural drawings and photos. Town staff will determine whether each proposed project meets the criteria listed below and will award funding to projects which best:

- Prevent erosion or reduce sediment loading in the creek
- Restore native riparian vegetation
- Remove impervious surfaces
- Rehabilitate or create wetlands or floodplains
- Incorporate BMPs in their design
- Improve in-stream habitat (pool/riffle complexes, meanders, etc.)
- Occur in high priority areas (areas of highest concern based on MMI scores)
- Provide detailed map and architectural plan of proposed project
- Have the greatest potential to add Value to the Environment

ELIGIBILITY

This fund will provide assistance to private homeowners in the Town of Vail who wish to restore stream bank on their property abutting Gore Creek or its tributaries. Funds may not be used for projects on Town of Vail stream tract property.



As a landscape architect or landscape designer in Vail, you do a lot to keep our town beautiful. But you may not realize that Gore Creek—the main waterway that meanders through town—is suffering the impact of fertilizers, pesticides, and landscaping techniques that destroy native vegetation.

As rain or melting snow flows across our yards, rooftops, and paved areas, it picks up pollutants including sediment, organic matter, pesticides and fertilizers. Polluted water then flows off these properties to roadways, ditches or through storm drains to Gore Creek, harming important aquatic insects, increasing algae blooms and adding sediment all of which impact the food chain for our prized trout fishery. The cumulative impacts of urbanization in the Gore Creek valley over the past half-century have had a significant impact on the health of Gore Creek, including the insects, fish, birds and vegetation that depend on clean water.

Because landscaping is so closely tied to natural processes, design and maintenance practices can have a significant effect on water quality in Gore Creek and beyond. The good news is you can improve the Creek's health by adopting a few simple practices.

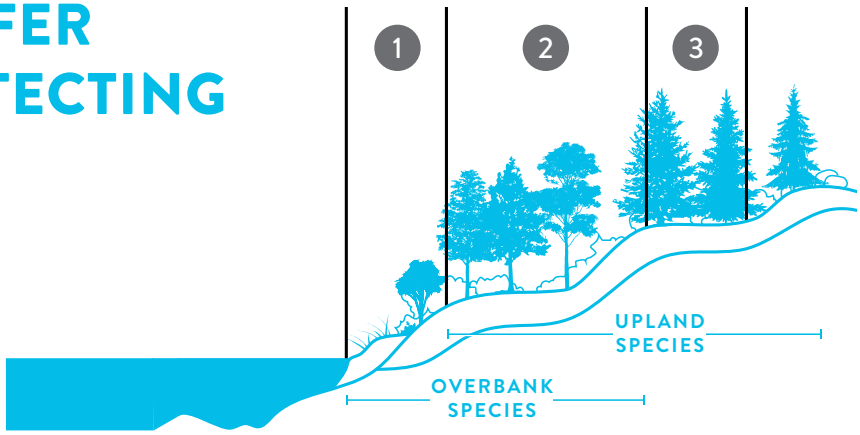
- Add trees and shrubs to your clients' yards to capture, hold and filter rainwater.
- Encourage your clients to use up to three inches of mulch (like leaves, aged wood chips, compost or grass clippings), primarily in spring and fall. Mulch stabilizes soil temperature, prevents weeds, feeds the soil for healthier plants and helps to conserve water.
- Incorporate swales and berms into landscapes to slow runoff and prevent it from leaving yards.
- Consider installing a rain garden and directing roof drains to it.
- Consider using porous pavements such as pavers, flagstone and gravel instead of impervious surfaces such as asphalt or concrete for sidewalks and driveways.
- Observe town ordinances regarding riparian buffers and setbacks.
- Use the Three-Zone Buffer System (next page) for guidance on building and landscaping activities within 100 feet of any stream.
- Minimize the use of turf where possible, which will in turn reduce fertilizer, pesticide and water requirements.
- Plant a diverse landscape, which will naturally minimize pest problems.

Thank you for playing a critical role in preserving a special part of Vail's community—Gore Creek.

LEARN MORE AT LOVEVAIL.ORG

Love VAIL GORE CREEK

THREE-ZONE BUFFER SYSTEM FOR PROTECTING GORE CREEK



1 < 25 FEET
OVERBANK ZONE

This area is important for bank stability, preventing erosion, filtering and absorbing pollutants, and providing habitat for terrestrial and aquatic wildlife. Contains wetland plants and mature riparian forest.

- Leave native vegetation undisturbed.
- Reintroduce native shrubs, grasses and forbs as a substitute for turf and other manmade improvements.
- Limit the use of pesticides to what is absolutely needed to control invasive weed species.

2 25–75 FEET
TRANSITIONAL ZONE

This area lies between upland development and the overbank zone, and is important in filtering stormwater runoff and absorbing pollutants. Contains mature native forest and vegetation.

- Design low-impact landscaping, which reduces maintenance requirements and less need for pesticide and fertilizer.
- Reduce the use of turf and impervious surfaces such as concrete and asphalt paving.
- Create vegetative buffers to filter runoff from roofs, drives and roadways.

3 75–100 FEET
UPLAND ZONE

This is an area for actively managed landscapes or natural conditions, which allows water to slowly filter into the ground.

- Lawn, garden, and compost wastes can be stored here, and stormwater BMPs may be installed, but this zone should be left as undisturbed as possible in order to optimize the value of the riparian buffer.
- Minimize turf areas to what is truly needed. Avoid siting any impervious surfaces in this zone.

Thank you for playing a critical role in preserving a special part of Vail's community—Gore Creek.

LEARN MORE AT LOVEVAIL.ORG

Love VAIL GORE CREEK

WHAT TO PLANT

The Rocky Mountains are home to numerous native plant species. These plants are adapted to the highly variable climate and micro-climates found in mountain habitats. This list offers recommendations for areas along Gore Creek, as well as upland and transitional zones away from the water's edge. These plants can be used in ornamental landscape plantings as buffers between landscaped and native areas or in native habitat restorations. Planting a variety of species provides biodiversity, which protects against pest outbreaks and provides important habitat for native fauna—all key components in improving water quality in Vail.

Thin-leafed Alder

Twinberry Honeysuckle

Bog Birch

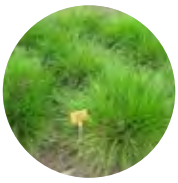
COMMON NAME	SCIENTIFIC NAME	HEIGHT	SPREAD
OVERBANK: **TREES/SHRUBS**			
Thin-leafed Alder	Alnus incana	15-30′	15-20′
Bog Birch	Betula grandulosa	3-6′	3-8′
Red-twig Dogwood	Cornus sericea	6-8′	8-12′
Twinberry Honeysuckle	Lonicera involucrate	3-5′	3-6′
Narrow-leafed Cottonwood	Populus angustifolia	30-50′	20-30′
Lance-leafed Cottonwood	Populus x acuminate	40-60′	30-40′
Drummond's Willow	Salix drummondiana	6-12′	6-12′
Coyote Willow	Salix exigua	6-12′	4-8′
Yellow Mountain Willow	Salix monticola	8-12′	6-8′

Harebells

Cow Parsnip

Western Blue Flag

COMMON NAME	SCIENTIFIC NAME
OVERBANK: **FORBS**	
Monkshood	Aconitum columbianum
Marsh Marigold	Caltha leptosepala
Harebells	Campanula rotundifolia
Chiming Bells	Mertensia ciliata
Cow Parsnip	Heracleum maximum
Western Blue Flag	Iris missouriensis


Tufted Hairgrass

Slender Wheatgrass

Baltic Rush

COMMON NAME	SCIENTIFIC NAME	DISTRIBUTION
OVERBANK: **NATIVE SEED MIX**		
Tufted Hairgrass	Deschampsia caespitosa	20%
Streambank Wheatgrass	Elymus lanceolatus	20%
Slender Wheatgrass	Elymus trachycaulus	15%
Big Bluegrass	Pos secundiflora	5%
Western Wheatgrass	Pascopyron s mithii	15%
Fowl Bluegrass	Pos palustris	20%
Baltic Rush	Juncus balticus	5%

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Rabbitbrush

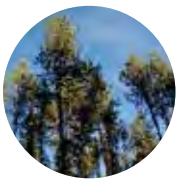
Quaking Aspen

Boulder Raspberry

COMMON NAME	SCIENTIFIC NAME	HEIGHT	SPREAD
UPLAND: DECIDUOUS TREES/SHRUBS			
Rocky Mountain Maple	Acer glabrum	20-30′	10-20′ *(smaller in Vail)*
Saskatoon Serviceberry	Amelanchier alnifolia	6-20′	6-12′
Rabbitbrush species	Chrysothamnus nauseosus	2-6′	2-6′
Potentilla or Cinquefoil	Pentaphylloides floribunda	2-3′	2-3′
Quaking Aspen	Populus tremuloides	20-50′	20-30′
Native Chokecherry	Prunus virginiana melanocarpa	8-20′	8-12′
Wax Currant	Ribes cereum	2-4′	2-4′
Woods Rose	Rosa woodsii	3-6′	3-6′
Boulder Raspberry	Rubus deliciosus	3-6′	3-6′
Thimbleberry	Rubus parviflorus	3-5′	4-6′
Red-berried Elder	Sambucus pubens	4-12′	4-12′
Snowberry	Symphoricarpos albus	3-5′	3-5′

Native White Fir

Rocky Mountain Juniper


Lodgepole Pine

COMMON NAME	SCIENTIFIC NAME	HEIGHT	SPREAD
UPLAND: EVERGREEN TREES			
Native White Fir	Abies concolor	40-60′	20-30′
Rocky Mountain Juniper	Juniperus scopulorum	20-30′	8-12′
Engelmann Spruce	Picea engelmannii	40-60′	
Colorado Blue Spruce	Picea pungens	40-60′	
Bristlecone pine	Pinus aristata	10-20′	
Lodgepole pine	Pinus contorta latifolia	50-70′	10-15′
Douglas-fir		50-80′	

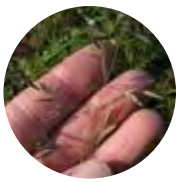
Rocky Mountain Columbine

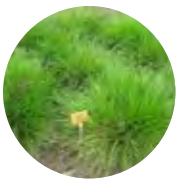
Silvery Lupine

Pussytoes

COMMON NAME	SCIENTIFIC NAME
UPLAND: FORBS	
Rocky Mountain Columbine	Aquilegia caerulea
Rocky Mountain Penstemon	Penstemon strictus
Richardson's Geranium	Geranium richardsonii
Silvery Lupine	Lupinus argenteus
Aspen Daisy	Erigeron speciosus
Sulphur Flower	Eriogonum umbellatum
Pussytoes	Antennaria rosea

Mountain Bromegrass


Sandberg Bluegrass


Tufted Hairgrass

COMMON NAME	SCIENTIFIC NAME	DISTRIBUTION
UPLAND: NATIVE SEED MIX		
Streambank Wheatgrass	Elymus lanceolatus	20%
Mountain Bromegrass	Bromus marginatus	20%
Slender Wheatgrass	Elymus trachycaulus	15%
Blue Wildrye	Elymus glaucus	5%
Big/Canby Bluegrass	Poa secunda	5%
Rocky Mountain Fescue	Festuca saximontana	5%
Sandberg Bluegrass	Poa secunda	5%
Prairie Junegrass	Koeleria cristata	5%
Tufted Hairgrass	Deschampsia caespitosa	5%

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Love VAIL GORE CREEK

Gary Vick

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September 16, 2019

The City of Glenwood Springs
101 West 8th Street
Glenwood Springs, CO 81601
Attention: Mr. Trent Hyatt, Senior Planner, Community Development

RE: Proposed revision to Ordinance 070.040.020(d)(24) Conservation of Waterways

Honorable Mayor, City Council, and Planning and Zoning Commissioners:

I am grateful for and appreciate your taking the time to review the attached package that is submitted to facilitate your review of the subject revision. I look forward to discussing these items with you at scheduled P&Z and Council meetings.

I respectfully urge you to reject the proposed revision.

The proposed revision puts severe limitations on the use of our property in exchange for no quantifiable, demonstrated gain. There is no outcry for this revision, and it is not required at this time. It will result in potentially severe devaluation of the property values of homeowners along the Roaring Fork River. It ignores the rights of property owners to use and enjoy their land by forwarding the goals of well intentioned but minority environmental groups. The revision has not been subject to even a cursory cost/benefit analysis. The City has not determined how many properties would be made non-compliant by this revision, nor to what extent. There has been no meaningful outreach on the part of the City to solicit stakeholder input or work with citizens to craft an ordinance that can garner stakeholder support. The proposed ordinance does not meet the City's threshold for ordinance change. These arguments are substantiated in the attachments hereto.

Living on a river is magical. It is a truly wonderful experience. As residents living along the Roaring Fork in Glenwood Springs, we are lucky. Most of us purchased our properties for the express purpose of viewing, using, accessing, and enjoying the river. We listen to the river every day. We sleep to it every night. We watch it at breakfast and dinner every day. We fish in it. We watch families of fox, deer, bear, raccoon, mink, geese, ducks, hawks, and bald eagles feed and play in it. We watch the stars by it, picnic by it, and camp by it. We kayak and raft to our own back door. We do so responsibly, caring for the environment that we paid a premium to own.

We use our backyards much as you do, only there is no proposed ordinance revision

that could sterilize and make unusable up to 90% of your backyard's most attractive features without meaningful stakeholder input and without the City demonstrating any quantifiable need for, or quantifiable benefit from, this sterilization. You are not facing an ordinance that would limit your enjoyment and severely impact the value of your property.

I have provided City Staff ("Staff") with alternate language for the ordinance that mitigates many of these concerns (the "Proposed Changes"). I also provided thorough justification for the Proposed Changes. I have asked Staff to provide these documents in your packets.

Staff has reviewed the Proposed Changes and has stated to me that many of the changes are desirable. Perplexingly, none of the Proposed Changes have made it into the text of the code you will review tonight. You are reviewing something that, apparently, Staff might want to modify, that the City has not justified, that negatively impacts stakeholders along the river, and that has not had the benefit of meaningful outreach on the part of the City.

Accordingly, you have no choice other than to deny approval of the ordinance as presented. Alternatively, you could recommend that Council instruct Staff to i) engage stakeholders to solicit their input and concerns, ii) incorporate changes based on such input that Staff feels is appropriate, iii) fully justify the need for the ordinance with a proper cost/benefit analysis, and iv) resubmit the ordinance for approval.

Thank your for your efforts in the review of this material.

Best regards,

/signed by Gary W. Vick/

Gary W. Vick

Attachments

Discussion

The Proposed Ordinance does not appear to meet City Ordinance requirements for an Ordinance Change, section 070.060.040.(c)(3)d.3

ii. **Does not conflict with other provision of this Code or other provisions of the Glenwood Springs Municipal Code**.

Rebuilding of existing non-conforming structures (such as those in the proposed setback area) is contemplated in the Code, but the Proposed Code stipulates that no excavation may occur in the setback area. Such excavation may be required in order to rebuild a nonconforming structure, and could be a conflict in the code.

iii. **Is necessary to address a demonstrated community need**

The staff report states that the City lags behind neighboring communities in the protection of water resources.

This statement is not accurate.

The Roaring Fork Conservancy ("RFC") performed a spot comparison of ordinances found in nearby municipalities and counties. This is shown below.

REGION	SETBACK	DETAILS
City of Aspen	100ft/100 year floodplain	Development is "subject to heightened review." (Ord. 26.435.040)
Town of Basalt	50ft	Prohibits development and cutting of riparian and wetland vegetation. (Ord. 16-464a)
Town of Carbondale	Unspecific	If new development is proposed adjacent to any river, all practical means should be used to preserve natural grade, drainage patterns, soil and vegetation. (Ord. 4-2007)
Eagle County	75ft/100 year floodplain	No development within 75ft of high water mark or 100 year floodplain (whichever is greater).
Garfield County	35ft	Prohibits removal of any existing native vegetation or conducting any activity which will cause any loss of riparian area unless it involves the approved removal of noxious weeds, nonnative species, or dead or diseased trees.
Pitkin County	100ft/100 year floodplain	100 foot buffer for all activity and development. Setback may be reduced to a minimum of 50 feet if reduction does not result in water quality degradation, stream bank erosion and/or a reduction in the quality of riparian or wetland habitat.

The RFC comparison did not include municipalities downstream from Glenwood Springs from whom no outcry regarding water quality has been heard. The RFC's inclusion of county ordinances for comparison is not appropriate insofar as municipalities generally have much greater density

and diversity of land use than do counties which can be much more rural, are more agricultural in nature, and require different land use criteria. One has only to compare a drive down Midland Avenue to a drive to Grand Junction to see this. Some individual landowners in nearby counties, for example, can easily have more river frontage than the 50 stakeholders addressed in this letter combined.

Accordingly, I prepared a more thorough comparison of ordinances in neighboring municipalities in the table below. The comparison concentrates on municipalities and omits counties. Though it does not capture every riverfront municipality in the state, it is what could put together in the time available. It captures a much better picture of where Glenwood stands in comparison to its neighbors than does the RFC comparison.

Six of the 10 municipalities reviewed have no riparian setbacks of any kind, and only one, Basalt, applied vegetation limitations retroactively to existing homeowners. Those municipalities without setbacks see no need for them. There is no demonstrated need for revised setbacks in Glenwood Springs.

Glenwood Springs does not lag behind the majority of its neighboring municipalities in the protection of water sources. There is no need to "keep up with the Jones", and the Proposed Ordinance would be one of the most restrictive to existing homeowners in the comparison.

Municipality	Setback	Vegetation Restriction Retroactive to existing Properties	Summary of Ordinance
Aspen (from RFC)	100'/100 yr Flood-plain	No	Development subject to heightened review
Snowmass Village	25' from Riparian edge	No	New development only. Recreational access sites allowed. Vegetation loss to be minimized, replacement vegetation ratio may be less than 1:1 to facilitate a view of, and use of, the creek.
Basalt (from RFC)	50'	**Yes**	Apparently very restrictive, prohibits development and cutting of riparian and wetland vegetation.
Carbondale	None	No	Developments shall minimize impacts to…wetlands, and…stands of trees. Such resources… shall be preserved where practicable…development shall be designed to preserve existing waterways…primary vegetation (trees)…and other features.
Vail	30' or 50' from stream CL	No	Decks may extend 10' into setback, no restrictions on vegetation. City historically has paid 75% of regrowth design costs for citizens, is considering more restrictive code *after outreach and stakeholder input* but staff expects "very serious pushback" from citizens.
Gypsum	None	No	Community Development Director states that nothing is driving the need for an ordinance. City adopted Eagle River Watershed Plan but specifically, and significantly, did not adopt the setbacks associated with the plan.
New Castle	None	No	Planning Department stated no specific restrictions exist
Silt	None	No	Nothing found in review of code, messages left for city staff
Rifle	None	No	Nothing found in review of code, messages left for city staff
Parachute	None	No	…subdivisions… shall preserve, insofar as possible, … drainage, …, lakes, rivers, streams and trees. Significant vegetation, including dominant or mature trees & shrubs shall be retained where possible.
Glenwood (existing)	30' from HWM ~ 8127 cfs	No	Entire Ordinance: No improvement, building, structure, excavation, dumping or backfill shall be placed, built, undertaken or approved within a thirty-foot setback area horizontally from the high water mark of any river or live stream, except for bridges, paths for non-motorized use, irrigation structures or flood control and erosion protection devices.
Glenwood (proposed)	50' from OHWM per USGS	**Yes**	See proposed ordinance and Proposed Changes in letter to Trent Hyatt 8-31-19

You should instruct Staff to provide a more thorough comparison for review, inclusive of additional parameters and municipalities.

iv. Is necessary to respond to substantial changes in conditions and/or policy

Staff states that adoption of the proposed standards would help the City meet future compliance with EPA Municipal Separate Storm Sewer System (MS4) permit requirements if the population exceeds 10,000 in the 2020 census.

The Proposed Ordinance is premature, as is the perceived need to meet MS4 without knowing the results of the census.

If it is necessary to meet MS4, the Proposed Ordinance does not help to meet compliance in a substantial or meaningful way. The lands covered by the Proposed Ordinance represent less than 1% of the City's land area. The vast majority of the City's storm water disposal is untreated, running through yards, streets, and drainage systems directly into the river system. The vast majority of storm water does not go through any riparian environment of any kind. As such, improvement of the riparian environment, even by a substantial amount, would not materially affect overall storm water quality.

The bulk of the City's inability to comply with the MS4 permit, if any inability exists, has nothing to do with the areas addressed by the Proposed Amendment. The interior of the City, where most storm water is generated, should be the focus of this requirement, not the narrow riparian zones along the river.

To use this MS4 as a justification for the Proposed Ordinance is disingenuous and violates the requirements for ordinance change and its intent.

The Proposed Ordinance lacks balance between cost and benefit.

Many endeavors in life can be successful if one simply copies a similar, previously successful process. I didn't invent that phrase: Compaq, Dell, Microsoft, and other successful business did.

A relevant process to follow here is exemplified by the EPA under previous administrations. Prior to implementing clean water regulations the EPA gathers input from stakeholders from all sides the issue. Environmental groups, whom I generally support, are consulted. Industry, citizens, and municipalities are consulted. *Significantly, no one group writes the rules*. Rather, the EPA balances goals and needs, performs cost/benefit analyses, and writes regulations that generally garner the widest possible support.

Now lets compare this process to the derivation of the Proposed Ordinance that is before you today.

The Proposed Ordinance has been authored by Staff and the River Commission ("RC") with significant input from the RFC and certain members of City Council (collectively, the "Authors"). Staff states that the Proposed Ordinance has been in process for several years. Stakeholders have not been solicited or consulted to any meaningful degree during the drafting of the ordinance and were notified of the Proposed Ordinance through a single mailing approximately two weeks prior to a scheduled vote on the ordinance by the Planning and Zoning Commission ("P&Z"). The ordinance furthers the well intentioned goals of the Authors alone at the expense of reduced property values on the part of stakeholders.

The Authors have not performed any cost/benefit analysis, or even a cursory cost/benefit comparison, to justify the Proposed Ordinance. The Authors have not quantified the benefits of the Proposed Ordinance and have ignored the serious potential impact on the property values of stakeholders.

Significantly, they have not identified the number of properties that will be made non-compliant by the Proposed Ordinance and to what extent they will become non-compliant.

This is no way to run a railroad. Costs and benefits are properly discussed below.

Costs of the Proposed Ordinance

The costs of the Proposed Ordinance will be born by a small number of stakeholders and could be in the million of dollars.

The Proposed Ordinance restricts, or sterilizes, a portion of the land owned by homeowners. It limits a homeowner's use of his property, potentially limits his ability to clear or even trim vegetation so as to be able to see, use, access, and enjoy the river he paid dearly to be able to see, use, access, and enjoy. As proposed, it may limit the ability of a homeowner to rebuild a non-conforming structure or build a new structure at the 50' edge of the setback area due to lack of construction access.

The value of a less restricted property is more than the value of a more restricted property. The only question is to what degree. In my case, I paid a 28% premium for my property to be on the river and have a view of, use of, and access to the river. This premium is born out by square footage tax assessments of my property compared to other properties in my neighborhood.

If a homeowner's view, use, and access to the river are hindered and his ability to develop, redevelop, or rebuild his property is limited by the Proposed Ordinance, then the Proposed Ordinance will cause him to potentially loose the premium associated with his property.

There is no hard data as to how much more homeowners along the Roaring Fork paid to be able to see, use, and access the river, or how much the property value will be reduced by the Proposed Ordinance, but we can get a feel for the order of magnitude of this premium by making some reasonable assumptions. In my case the amount of market value that I will loose under the Proposed Ordinance is on the order of $100,000 ($450,000 market price X (1 – 1/1.28) ~ $100,000).

According to Staff, there are 50 odd private homes along the river that could be affected by the Proposed Ordinance. Though many of these homes are larger and more expensive than mine, if these homes incur a $100,000 devaluation per property, valuation losses of over $5 million could be incurred by the stakeholders.

As established in the next section, there is no corresponding benefit associated with this cost.

The Authors claim that there will be no impact on property valuation. None. They claim that property values may increase under the Proposed Ordinance. These claims defy common sense. The value of a less restricted property is more than the value of a more restricted property.

That said, I had the Chairman of the RC tell me that "C*ommon sense does not apply. We have a study showing that riparian setbacks have no effect on property values and may increase them*." Another member of the RC told me that resale prices would not be affected by the Proposed Ordinance because "*whoever can afford (this) property can afford to get any variance they need*". I had not realized variances were for sale.

The Chairman of the RC was kind enough to forward me a copy of the subject study performed in 2006 by Dr. Brian a Mikelbank of Cleveland State University ("CSU") entitled *Hedonic Analysis of Riparian/Wetland Setbacks.* It was performed on a fee basis on behalf of Chagrin River Watershed Partners. Inc. ("CRWP"), a watershed conservancy group similar to the RFC.

The study performed a regression analysis (a statistical analysis of outcomes with respect to multiple variables) on roughly 4,000 home sales over several years in the CRWP watershed area, roughly 400 of which bordered a stream or river. The overwhelming majority of properties bordering a stream or river had setbacks in place. The regression analysis took into account a multitude of variables that could influence transaction prices. The regression analysis did not show a correlation between setbacks and transaction prices.

As a degreed engineer turned CFO that has taken both graduate and post graduate statistics classes, this seemed a bit counterintuitive to me. As a numbers guy I read the study cover to cover, number for number. On page 15 of the study I found the reason why the regression analysis did not find a correlation between setbacks and transactions prices. Page 15 states (emphasis added):

> "While a homebuyer valuing the environmental protection the setback provides could explain this result, our focus group meeting indicated that this explanation is unlikely in this market.
>
> The consensus opinion expressed at that meeting was that potential homebuyers do not know about setback designations. Further, the consensus was that it was unlikely that realtors would even know whether or not a property had a designated setback. Thus, the focus group predicted that setback designation would not be an influence in the area housing market. That makes the results of the community specific model somewhat suspect".

Two things bothered me after I read the study.

First, the vast majority of homes with setbacks were the same homes that were on the river. The setback variable and the streamside variable were therefore coupled. If you get one, you generally get the other. Because the variables were coupled, the higher prices paid for homes with setbacks might be attributed to their being on a stream, a generally desirable trait. Absent common sense, there is no way to know.[1]

Second, it seems to me that a buyer would not be in a position to pay more, or less, for a property with, or without, a setback if he or she was unaware of the existence of the setback when the real estate transaction was made. It seems to me that statistically measuring if people will pay more, or less, for a property with, or without, a setback is impossible if the parties do not know about the setback and factor the setback into their pricing decision. [2]

The Author's contention that riparian setbacks do not influence real estate transaction prices is based on a study that has fatal flaws. Their conclusion is false. Setbacks will be widely known in Glenwood Springs and required to be disclosed at the time of sale. Setbacks will have a negative impact on transaction prices.

This conclusion is verified by attached emails from two statisticians. One reviewed the study at my request, and the other is Dr. Mickelbank, the author of the study.

---

[1] For an analogy, consider that Ferraris come with fancy tires not found on other cars. If you do a regression analysis on 1,000 various car sales and include car brand and tire type as variables, the analysis may not be able to distinguish between these two effects because they always come together. So common sense is used to determine whether the buyer paid $300,000 for the Ferrari, or for the tires.

[2] Staying with the car sales analogy, suppose that 500 of the 1,000 cars above had a handful of sand thrown into their engines prior to the sale and no one knew about it. The regression analysis would not detect any devaluation in price due to the sand in the engine because no one knew it was there and no one paid less for the car with sand in its engine. Can you conclude that sand in the engine, if known about, has no effect on the price? No.

Benefits of Proposed Ordinance

The Authors have not demonstrated a need for the Proposed Ordinance.

The benefits shown by the RFC have not been shown to be needs, are general in nature, none were quantified, and no credible argument was presented showing that implementation of the Proposed Ordinance would mitigate any of the concerns discussed in the proposed benefits to any meaningful, measureable degree.

The Roaring Fork River is over 70 miles in length. Only about 4 of those miles are in the city of Glenwood Springs. The fact of the matter is that there is no wholesale, overt destruction or degradation of riparian habitat along the banks of the Roaring Fork River through Glenwood Springs by homeowners who live along the river. To the contrary, most homeowners love the river more than the Authors do and are good environmental stewards of the lands they paid a premium to own and use.

In its July 19, 2019 letter to the Mayor, Council, and the P&Z the RFC infers that the Proposed Ordinance will have a positive economic impact because it will:

- *Reduce drinking water costs in the event that the City's secondary water source is required to be used*. This claim is not substantiated. The City's water supply currently meets applicable specification, as does its drinking water.
- *Reduce erosion*. This claim is not quantified, even on a cursory level. Examination of the river from Google Earth, Red Mountain, or by floating the river does reveal some areas of erosion within Glenwood Springs but it is impossible to tell over what time frame these occurred and they do not require a broad-brush ordinance to correct.
- *Increase property values*. This claim is false as shown in the previous section.
- *Support the local fishing economy.* Homeowners along the Roaring Fork generally love to fish. The RFC does not quantify this claim in any fashion whatsoever and there is no measureable degradation to the fishing industry by homeowners along the river or any measureable increase claimed if the Proposed Ordinance is adopted. The statement is completely general.
- *Tourism will be increased by improved aesthetics*. Aesthetics are in the eye of the beholder. Comments shouted to homeowners from passing commercial rafters are universally complimentary with respect to the aesthetics of individual properties. I hear such comments literally every day in the summer season. Not once in 21 years have I heard a derogatory comment relating to the aesthetics of my property or those of my neighbors.

People have impacted their environments as far back as our Native American ancestors. By default, tradeoffs are made between an ecosystem and a municipality. During discussions regarding the Proposed Ordinance, a liaison Council member told me that "*we must do everything possible to protect the river*." Really? Everything? At any cost? The EPA does not see it that way. Nor does Staff.

When I related this conversation to Staff, the planner literally burst out laughing. He stated "*well, in that case we might as well just go shoot ourselves right now, because we will always have some level of impact on the river*."

You may hear from the Authors that river temperatures are rising and that last summer there was an algae plume in the river. All true. Our environment is getting warmer, and last summer was particularly dry and hot. That is when algae plumes occur. But we are not burning the Amazon along the banks of the Roaring Fork River here in Glenwood Springs. You will not hear the Authors present any credible scientific evidence to support any claim that if the Proposed Ordinance had been in place last summer then these anomalies or any others would have been avoided.

In a document entitled *Glenwood Springs Riparian Assessment* dated February 26, 2018, members of the RC and RFC make the following observations that I comment on below.

- *The Banks at Threemile Creek are marginally vegetated and under erosion*.

  The National Forest Service ("NFS") routinely closes damaged areas to traffic to facilitate revegetation. This problem does not need a broad-brush ordinance to resolve.

- *(summarized) Backyard development creep and riparian vegetation clearing are increasing…some (landowners) have cleared … access down the hill slope (that) may disrupt riparian function and if copied…could result in extensive loss of riparian habitat. Potential treatments include curtailing … development … to preserve riparian function while still allowing private landowner(s)…to enjoy riverside amenities. Public education is a key component for addressing these concerns.*

  A number of points regarding vegetation are relevant here.

  1. The claim is anecdotal and unsubstantiated.
  2. There is no pre and post analysis over any defined time frame to justify a claim that creep is significant or detrimental. There is no objective science here. There is no wholesale or overt degradation of riparian habitat that warrants this broad brush approach.
  3. Staff has stated that there are roughly 50 private homes along the river in Glenwood. The extent of their riverfront is therefore limited, and the extent of any cleared or developed riverfront is even more limited. Staff has provided no hard data on this riverfront footage.
  4. Property owners have a right to use, enjoy, view, and access the river on the property they paid a premium to own.
  5. Efforts to discuss alternative usage scenarios have been rebuffed by the Authors. Property owners currently enjoy 100% use of their

property. The Proposed Ordinance's provision to allow property owners to use only 10% of their riparian area is unfair and insufficient by any standard. It is invasive and an affront to property owners rights. When you live on the river, you understand this.

6. The Assessment states that "*Public Education is a key… (see above).* So where, exactly, has been this public outreach and education? With the exception of Staff, the Authors have largely refused to engage well intensioned citizens in a constructive revision of the Proposed Ordinance. Instead, it is being considered with scant notice to stakeholders after years of work by the Authors to further their own environmental views.

The Assessment's claim seems rooted to some extent in the Authors' objection to non-native grasses in the riparian zone. The following table was reproduced from a 2005 study provided by the RFC entitled *Riparian Buffer Zones: Functions and Recommended Widths.* As shown below, it suggests that grasses actually fare pretty well in comparison to other types of vegetation.

Function	Grass	Shrubs	Trees
Sediment trapping	High	Medium	Low
Filtration of Sediment born Nutrients, Microbe and Pesticides	High	Low	Low
Soluble forms of Nutrients and Pesticides	Medium	Low	Medium
Flood Conveyance	High	Low	Low
Reduction of Stream Bank Erosion	Medium	High	High

The study goes on to say that the removal efficiency of grasses, compared to an ideal mix of grasses, shrubs, and trees, have a removal efficiency of 61% of nitrates, 72% of phosphorus, and 44% of orthophosphates. Grasses are therefore not completely inept at removal of pollutants. And remember, the existing and potential area of grasses along the riverbank is relatively small.

The takeaway here is that non native homeowner grasses comprise a very small percentage of the short Roaring Fork riverbank through Glenwood Springs, that there is no objective evidence to suggest that the amount of grass coverage is egregious, detrimental, or increasing, that grass is better than or equal to 4 of the 5 functions listed in the table above, that grass provides meaningful absorption of nitrates and phosphorous, and that the vast majority of storm water runoff does not flow through the riparian environment but drains through storm sewers directly into the river which makes concentrating on homeowner riverbanks somewhat of a fruitless exercise.

It cannot be concluded that the Proposed Ordinance would result in meaningful reduction in riparian function or increase water quality to any meaningful, demonstrable degree.

Gary W. Vick

614 Cowdin Drive
Glenwood Springs, CO 81601
(303) 548-0962

August 31, 2019

Mr. Trent Hyatt
Senior Planner, Community Development
The City Glenwood Springs
101 West 8th Street
Glenwood Springs, CO 81601

RE: Basis of changes to proposed Riparian Setback Ordinance

Trent,

I appreciate your meeting with me last Monday to review changes to the proposed ordinance regarding riparian setbacks (the "Proposed Changes"). As we discussed, the vast majority of your original language has been retained and most of the Proposed Changes are expansions and clarifications. Based on our conversations it appears you are in agreement with many of the Proposed Changes.

I recommend that you incorporate these changes prior to the next P & Z meeting and notify affected stakeholders of the changes so that their comments may be considered by P & Z.

The proposed ordinance is somewhat cavalier with respect to the rights of property owners. What follows is a summary of the reasoning for the Proposed Changes and is provided to facilitate discussion among your staff and your advisors.

Purpose

The purpose of the ordinance has been expanded in the Proposed Changes based on consultations with you, members of the River Commission, and members of Council. It now fully reflects the intent of the ordinance as represented to me by these parties. This section is self explanatory.

Definitions

Definitions are added for clarity and will of course need to be relocated to the definitions section of the Code.

Standards

Generally, the standards have been expanded to reflect the consultations mentioned above. Proposed Changes focus on three main areas:

1. **Improvements have been segregated into two separate sections: new and existing to adequately provide for "grandfathering".**

   Section 070.010.070 (Nonconformities) was not designed to, nor does it, address riparian areas. Section 070.10.070 (f) (3) is the closest applicable section and addresses landscaping. It states that the nonconforming features must be upgraded if, among other things, *any* changes are made to parking areas and *certain* changes are made to structures outside of the riparian area. Simply put, an insignificant change to something not impacting the riparian area could result in a loss of grandfathering. This is not the intent of the grandfathering discussed with members of Council and the River Commission. Section 070.10.070 is inappropriate for this particular purpose.

   Accordingly, separate sections covering new and existing improvements were added in the Proposed Changes.

2. **Trimming of vegetation is allowed in the Proposed Changes.** Consultations with you and Council Members affiliated with the River Commission indicate that it is not the intent of the ordinance to restrict a private owner's view and use of the waterway by restricting his ability to trim vegetation. The term "clearing" in the proposed ordinance is vague.

   Accordingly, Clearing of Native Vegetation has been added to the definitions and trimming is specifically allowed in the Proposed Changes provided that root systems are not damaged or destroyed.

3. **A 15 foot work zone has been added to facilitate construction, rebuilding, and repair of new and existing structures**. The provision provides that any vegetation disturbed in this process will be reasonably replaced.

It is the intent of the proposed ordinance to allow structures to be built within 50 feet of the OHWM and for existing structures within the setback to be rebuilt or repaired. Unfortunately, the proposed ordinance does not account for the need to have space around a new or existing structure for crews or equipment. The unintended consequence of the proposed ordinance is to increase the setback by the distance required to work around the structure. This is not the intent of the proposed ordinance as presented to me in the consultations reference above.

This is remedied simply by inclusion of a 15 foot perimeter work zone in the Proposed Ordinance, provided that commercially reasonable efforts are made to substantially replace any disturbed vegetation within the 15 foot perimeter. This retains the intent of the riparian setback.

Applicability

Proposed Changes to Applicability relate to two main areas, river access and consistency between subparagraphs 2 ands 4.

1. **Consistent threshold for Paragraph 2 and 4**. Paragraphs 2 and 4 have different thresholds of performance and remedy. As currently proposed, City activities are not as limited as homeowner activities. The Proposed Changes correct this and a "do no harm" standard is used for both paragraphs.

2. **Stairs**. Many homeowners have a need for stairs on steeper parts of the banks along the river. Whether stairs do or do not now exist, this is a safety issue and homeowners have a right to safe river access. Stairs are provided for in the Proposed Changes.

3. **River Access**. The Proposed Changes allow for increased access and use of the river vis-à-vis the proposed ordinance. The proposed ordinance allows clearing 10% of the vegetation in the setback area, whereas the Proposed Changes increase this to the greater of 25% or that required to allow for an Access Corridor 30 feet wide through the setback area.

   Many homeowners purchased their properties on the Roaring Fork expressly for the purpose of viewing, using, accessing, and generally enjoying the river. Most paid a premium to do so. Living on the river is magical. Take it from someone who does it everyday: the river and its wildlife are healthy. One

only has to float the river or view the river from Red Mountain to confirm that no wholesale, overt destruction of riparian environment is occurring along the banks of the Roaring Fork through Glenwood Spring.

Rather than use local solutions to address local areas of habitat loss, the proposed ordinance would sterilize and makes unusable up to 90% of a homeowners river frontage without meaningful stakeholder input and without the City demonstrating any quantifiable need for, or quantifiable benefit from, this sterilization.

That said, in an attempt to strike a balance between homeowners who own and use the river frontage every day and those who will incur no quantified benefit or any personal cost associated with its sterilization, the Proposed Changes includes an expansion of the usable riparian area that many homeowners may find acceptable.

There is a minimum amount of access a homeowner requires to view, access, use, and enjoy the river, regardless of the size of his lot or the length of his stream frontage.

Different homeowners may have different thoughts, but I recommend 30 feet for the Corridor Width because this allows a small lot owner to have adequate access to the river. I have a 30 foot corridor on my 75 foot lot and in my personal experience this is the minimum you need to get two or three rafts, some kayaks, lawn chairs, coolers, friends, family, and a couple of dogs together along the river bank for a get together. It is also the minimum I need for fishing, relaxing, and viewing. Keep in mind it is my land, not yours. I currently have 75 feet I can use; limiting my unrestricted use to 30 feet is a generous offer on my part.

I recommend 25% as the area parameter because, by any objective measure, telling any home owner that he can only use 10% of what he already owns and can currently use without restriction is authoritarian, heavy handed, one sided, and an affront to the rights of property owners rights. This may not have been the intent, but it is the result. The 10% figure was arrived at by and large by people who don't live on the river and have 100% use of their own back yards to use as they see fit. I might have authored such a 10% proposal myself if I did not live on the river. But I do.

So, how do these Proposed Changes compare to the proposed ordinance? The following calculation is pertinent: There are roughly 4 miles of river through Glenwood Springs. That's about 8 miles of riverbank, or about 42,000 feet of riverbank in aggregate along both sides of the river. The Proposed Changes would allow 50 homeowners to clear 30 feet of vegetation along the riverbank. Not all homeowners would take advantage of this. Some might not want to, and others might not be able to due to topography, and some may have already done so and are grandfathered. Some might put the corridor in areas of no riparian habitat.

But let's make an extremely onerous assumption and say that all 50 homeowners clear a new 30 foot Access Corridor to the riverbank through virgin riparian habitat. That means that 1,500 feet of river front could be cleared. Under this extreme scenario, 1,500 feet out of 42,000 feet, or 3.6% of the riverfront, would not remain sterilized by the Proposed Changes. Said another way, 96.4% would remain sterilized. If one takes into account that grasses could be planted in the Access Corridor, and that these grasses have, according to data provided by the Roaring Fork Conservancy, between 70% and 90% (depending on the pollutant) of the filtering capacity of a mixed riparian habitat, then less than 1% of the filtering capacity of the stream bank would be affected. That's not much. The proposed Changes give you between 96% and 99% of what you are asking for. And frankly that's on the low side, because not everyone will construct such a corridor.

I am not trying to be melodramatic, but homeowners along the Roaring Fork cannot accept the proposed ordinance in its current form. We have the motivation, resources, expertise, and remedies available to successfully contest this issue.

You love the river as much as I do, and I know trampling on property owner rights was not your intent. But the proposed ordinance does exactly that as an unintended consequence. The Proposed Changes are more than reasonable, mitigate many concerns, should be incorporated in their entirety, presented to stakeholders for comment, and subsequently reviewed by P & Z and Council.

Regards,

/ signed by Gary W. Vick/

Gary W. Vick

(24) **Conservation of Waterways**

It is the purpose of the Subsection 070.040.020 (d) (24) to: 1) conserve and promote the health of the City's riparian ecosystems and water quality by maintaining a functional natural buffer adjacent to waterways, 2) allow owners of properties affected by this ordinance to access, use, view, and personally enjoy the river ecosystem and waterway, 3) not materially degrade the underlying value of any property affected by this ordinance, and 4) not impede development or redevelopment of any property affected by this ordinance except as set forth below.

For the purposes of this Subsection 070.040.020 (d) (24):

- **Clearing of Native Vegetation** shall be defined as complete removal of vegetation and the removal or destruction of the root systems associated with that vegetation.
- **Ordinary High Water Mark** ("**OHWM**") shall be defined /*USGS definition to be inserted here*/.
- **Riparian Setback Area** shall be defined as the area within 50 feet of the OHWM measured perpendicular to the OHWM that contains Riparian habitat.
- **Access Corridor** shall be defined as a continuous corridor not to exceed 30 feet in width measured collinear with the OHWM through the Riparian Setback Area.

a. Applicability

All new improvements, buildings, additions, structures, excavations, grading, dumping, clearing of native vegetation, or backfill shall be subject to the requirements of 070.040.020 (d) (24) b *Standards* unless the applicant demonstrates to the City Engineer and the Director by the preponderance of the evidence that one or more of the following conditions is met:

1. The removal of native vegetation, not to exceed the greater of 25% of the Riparian Setback Area or area of the Access Corridor, to allow a property owner private access to, use of, view of, and personal enjoyment of the

river ecosystem and waterway. This shall not be interpreted to allow for permanent structures of any kind within said area (except for access steps no more than 4 feet in width and no more than 18 inches high), nor shall it be interpreted to prevent trimming of native vegetation outside of the Access Corridor or 25% of the Riparian Setback Area so long as that vegetation has historically been trimmed and so long as the root systems of the vegetation are not removed or destroyed.

2. The construction of bridges, public utilities, public paths for non-motorized use, public open spaces, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices that to not result in water quality. degradation, increased stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.
3. Removal of vegetation listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm in compliance with applicable regulations.
4. Applicant demonstrates that the area does not contain significant riparian plant species or functions or is impacted by previous earth disturbance activities and proposed activity does not result in water quality degradation, increased stream bank erosion, or a reduction in the function and quality of a riparian area or wetlands.

b. **Standards**

1. No new improvement, building, structure, excavation, grading, dumping, Clearing of Native Vegetation, or backfill shall be placed, built, undertaken or approved within the Riparian Setback Area associated with any river or live perennial stream, provided that: i) trimming of any native vegetation is permitted in the Riparian Setback Area so long as the root systems of the vegetation are not removed or destroyed, and ii) the Riparian Setback Area may be disturbed within the footprint of any new improvement, building structure, or excavation within a 15 foot perimeter of any new improvement, building, structure, or excavation to facilitate construction provided that commercially reasonable efforts are made to substantially replace any disturbed riparian vegetation within the 15 foot perimeter with vegetation of similar type and function.

2. No existing improvement, building, structure, or excavation may be repaired, maintained, rebuilt, or redeveloped within the Riparian Setback Area or any river or live perennial stream, provided that: i) trimming of native vegetation in the Riparian Setback Area is permitted to any extent so long as that vegetation has historically been trimmed and so long as the root systems of the vegetation are not removed or destroyed, and ii) the Riparian Setback Area may be disturbed within the footprint of any existing improvement, building structure, or excavation and within a 15 foot perimeter of any existing improvement, building, structure, or excavation to enable repair, maintenance, rebuilding, or redevelopment of such improvement, building, structure, or excavation provided that commercially reasonable efforts are made to substantially replace any disturbed riparian vegetation within the 15 foot perimeter with vegetation of similar type and function.

3. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted within the Riparian Setback Area.

(24) **Conservation of Waterways**

~~1.~~ It is the purpose of the Subsection 070.040.020 (d) (24) to: 1) conserve and promote the health of the City's riparian ecosystems and water quality by maintaining a functional natural buffer adjacent to waterways, 2) allow owners of properties affected by this ordinance to access, use, view, and personally enjoy the river ecosystem and waterway, 3) not materially degrade the underlying value of any property affected by this ordinance, and 4) not impede development or redevelopment of any property affected by this ordinance except as set forth below.~~.~~

For the purposes of this Subsection 070.040.020 (d) (24):

- **Clearing of Native Vegetation** shall be defined as complete removal of vegetation and the removal or destruction of the root systems associated with that vegetation.
- **Ordinary High Water Mark** ("**OHWM**") shall be defined /*USGS definition to be inserted here*/.
- **Riparian Setback Area** shall be defined as the area within 50 feet of the OHWM measured perpendicular to the OHWM that contains Riparian habitat.
- **Access Corridor** shall be defined as a continuous corridor not to exceed 30 feet in width measured collinear with the OHWM through the Riparian Setback Area.

a. Applicability

~~a.~~

All new improvements, buildings, additions, structures, excavations, grading, dumping, clearing of native vegetation, or backfill shall be subject to the requirements of 070.040.020 (d) (24) b *Standards* unless the applicant demonstrates to the City Engineer and the Director by ~~clear and convincing~~the preponderance of the evidence that one or more of the following conditions is met:

2.1. The removal of native vegetation, not to exceed the greater of 1025% of the setback areaRiparian Setback Area, or area of the Access Corridor, to allow a property owner private private access to, use of, view of, and and personal enjoyment of the river ecosystem and waterway. This shall not be interpreted to allow for permanent structures of any kind within said area (except for access steps no more than 4 feet in width and no more than 18 inches high), nor shall it be interpreted to prevent trimming of native vegetation outside of the Access Corridor or 25% of the Riparian Setback Area so long as that vegetation has historically been trimmed and so long as the root systems of the vegetation are not removed or destroyed.

3.2. The construction of bridges, public utilities, public paths for non-motorized use, public open spaces, wildfire mitigation activities, irrigation structures, flood control and erosion protection devices that to not result in water quality. degradation, increased stream bank erosion, or a reduction in the function and quality of a riparian area or wetland.

4.3. Removal of vegetation listed on the Garfield County noxious weed list, Chinese Elm, or Siberian Elm in compliance with applicable regulations. Vegetation shall be replaced with appropriate riparian plant species to limit erosion.

5.4. Applicant demonstrates that the area does not contain ssignificant riparian plant species or functions or is impacted by previous earth disturbance activities and proposed activity does not result in water quality degradation, increased stream bank erosion, or a reduction in the function and quality of a riparian area or wetlandsimproves water quality, limits erosion, and promotes riparian or wetland restoration.

b. **Standards**

1. No new improvement, building, structure, excavation, grading, dumping, cClearing of nNative vVegetation, or backfill shall be placed, built, undertaken or approved within fifty feet of the ordinary high water mark,

~~measured horizontally,~~the Riparian Setback Area ~~of~~ associated with any river or live perennial stream, provided that: i) trimming of any native vegetation is permitted in the Riparian Setback Area so long as the root systems of the vegetation are not removed or destroyed, and ii) the Riparian Setback Area may be disturbed within the footprint of any new improvement, building structure, or excavation within a 15 foot perimeter of any new improvement, building, structure, or excavation to facilitate construction provided that commercially reasonable efforts are made to substantially replace any disturbed riparian vegetation within the 15 foot perimeter with vegetation of similar type and function.

2. No existing improvement, building, structure, or excavation may be repaired, maintained, rebuilt, or redeveloped within the Riparian Setback Area or any river or live perennial stream, provided that: i) trimming of native vegetation in the Riparian Setback Area is permitted to any extent so long as that vegetation has historically been trimmed and so long as the root systems of the vegetation are not removed or destroyed, and ii) the Riparian Setback Area may be disturbed within the footprint of any existing improvement, building structure, or excavation and within a 15 foot perimeter of any existing improvement, building, structure, or excavation to enable repair, maintenance, rebuilding, or redevelopment of such improvement, building, structure, or excavation provided that commercially reasonable efforts are made to substantially replace any disturbed riparian vegetation within the 15 foot perimeter with vegetation of similar type and function.

~~1.~~3. No chemical treatments, including but not limited to fertilizers, pesticides, and/or herbicides, are permitted within ~~said fifty foot~~the ~~Setback Area~~Riparian Setback Area.

From: **Brian A Mikelbank** b.mikelbank@csuohio.edu
Subject: RE: Could you please answer a couple of quick questions on a 2006 study you performed?
Date: September 3, 2019 at 3:12 PM
To: Gary Vick garywvick@icloud.com

Hi Gary:

No imposition at all – it is good to know that this research is being discussed!

I have inserted responses below your specific questions.

From: Gary Vick [mailto:garywvick@icloud.com]
Sent: Thursday, August 29, 2019 12:42 PM
To: Brian A Mikelbank <b.mikelbank@csuohio.edu>
Subject: Fwd: Could you please answer a couple of quick questions on a 2006 study you performed?

Dr. Mikelbank,

I am retired and live on the Roaring Fork River in Glenwood Springs, Colorado. The City is considering introducing a setback ordinance which limits property owners activities within 50 feet of the Roaring Fork river. There is currently a 30' setback covering structures, but the proposed ordinance increases the setback and restricts other activities in the setback area.

While this may be generally desirable, my neighbors and I are concerned that the proposed ordinance could reduce property values by limiting their use and redevelopment potential in the future. A developer or builder, for example, could be further restricted by the proposed ordinance and therefore might pay less for a more restricted property than he would for a property that is less restricted. At least that's the theory.

Yes! This was exactly the perception CRWP was facing when we started talking about this project.

The City provided me with a copy of your 2006 "Hedonic Analysis of Riparian/Wetland Setbacks". It is a thorough study and I enjoyed reading it. As you know, it was commissioned by Chagrin River Watershed Partners, a watershed conservancy and reviewed roughly 4,000 home sales in the watershed area, roughly 400 of which bordered a stream or river. As you know, the study concludes that setbacks do not decrease property values and may increase them.

The conclusions seem counterintuitive to me. While I have a background in engineering and finance and have taken undergraduate and graduate statistics courses, I would welcome your comments regarding a couple of observations I have with the study.

1: First, the study was commissioned by a conservancy group (link

1: First, the study was commissioned by a conservancy group (link here: https://crwp.org). I don't know that they had an agenda or were seeking a predetermined outcome, but setbacks generally help their cause, as would, by corollary, any data showing setbacks are good for property values. When they ask you to perform the study, were they seeking satisficing data to confirm a theory that setbacks have no impact on property values?

At our college's research centers it is an early conversation that we're being hired to answer a research question, whether or not that answer is what they might be looking for. I think organizations coming to a university know that, but we always review. Given their mission, they obviously thought setbacks were a good thing. And they heard from local realtors that prospective purchasers don't know if there is a setback or not. But when they went to communities to talk about implementing setbacks they were getting pushback exactly along the lines you mentioned earlier – that all else equal, we might reasonably expect deed restrictions to reduce property value. They wanted to know what the data had to say on the matter.

2: Second, the homes with setbacks are, by and large, the same ones that are on a stream or river. It seems to me these variables could be coupled. Any increase in prices for homes with setbacks may have been due to simply being on the stream or river, a generally desirable thing.

Agreed. That is why it was important to have a mix of stream front houses in the sample that did and did not have setback restrictions. Actually, I seem to recall that I should use "setback designation" not "setback restriction"!. This allows the regression model to distinguish between the separate effects of being stream front vs. being stream front with a setback designation.

3: Third, the second and third full paragraphs on page 15 of the study state that when properties were bought and sold, the consensus opinion was that neither homeowners nor realtors were aware of any setbacks. It seems to me that a buyer would therefore not be in a position to pay more, or less, for a property with, or without, a setback if he or she was unaware of the existence of the setback. It seems to me that statistically measuring if people paid more, or less, for a property with, or without, a setback is impossible if the buyers did not know about the setback and factor the setback into their pricing decision.

Again, agreed. The issue, though, was the degree to which the assembled focus group captured the entirety of the market reality. Certainly they were a valuable source of information, but they surely hadn't talked to all of the purchasers, sellers (and potential purchasers and sellers) throughout the market, throughout the years being covered in the study.

If designation doesn't impact house price, there are two options – buyers/sellers didn't know, or they knew and didn't care.

We did get a few blips of positive impacts, but it seemed that those weren't very robust.

But you're right, if people don't know, then a statistical finding of positive or negative price impact is really telling you about something else. In the case of Auburn and Bainbridge it seemed to be

capturing some type of “late-in-the-study-period” effect as prices were ramping up (before the housing crisis!). We did have year indicator variables that should have accounted for this, but perhaps not in its entirety.

I think my take-away, looking back, is that the focus group probably had a good sense of the buying and selling public – that setback designations were not on their radar, and thus might not exhibit a strong price impact either way. But I think the experience of you and your neighbors is similar to what CRWP was trying to make sense of. That even though they were hearing from real estate professionals that buyers don’t know of them, when they talked to homeowners about establishing designations in their communities there were concerns over the loss of value and loss of development/expansion potential.

I hope this is helpful and that you are satisfied with how your community moves forward.

Don’t hesitate if you have additional questions,

Brian.

I may have missed something and any comments or clarifications on these items would be greatly appreciated.

I apologize for the imposition but am grateful for your help. Thank you so much.

Regards,

Gary W. Vick
614 Cowdin Dr
Glenwood Springs, CO 81601
(720) 548-0962 (cell)

Link to study:

https://crwp.org/files/final_report_hedonic_analysis_riparian_wetland_setbacks.pdf

6 September 2019

This statement is provided at the request of Gary Vick and in review of the September 2006 study, "Hedonic Analysis of Riparian/ Wetland Setbacks", prepared by Brian A. Mikelbank.

In statistics, there are three steps used to infer causality or cause-and-effect. The three steps simply put are (1) relationship, (2) temporal precedence, and (3) non-spuriousness. I was asked to review a study for these elements with regard to inferences on the causality between setback policies and real estate valuations. The study shows statistical significance for no effect on the principles of step (1) relationship. The study isolates for temporal precedence by selecting valuations that occurred after the setback policies were enacted, appeasing step (2). However, the most important and troublesome step of non-spuriousness was not able to be established. Non-spuriousness refers to showing that the relationship from step 1 is not false or potentially caused by a third extraneous variable. In the provided study, there are several factors that indicate the findings may be due to a spurious (false) relationship between setback policies and real estate prices. To name a couple of these factors, the valuation methods for the real estate did not include the knowledge of a setback policy by the transacting parties, and the resulting regression tools contain variables, such as location, that provide a stronger statistical relationship with real estate prices. So, while the study provides mathematical statistics for a no-effect or no-relation between setback policy and real estate prices, it does not provide causal statistical significance for the effects of consumer valuation through real estate prices from setback policies. [This is not a statement on the value of setback policies or a political opinion/recommendation of the reviewer on such matters.]

Elizabeth T Poulos, Ed.D.
SummitCOPrep@gmail.com

About the Author: Dr. Elizabeth Poulos is a statistics and economics instructor at Colorado Mountain College. In addition to a Doctor of Education, Dr. Poulos' academic degrees include an MBA, a Master of Financial Analysis, a Master of Business in Financial Risk Management, and a Bachelor of Economics. She is an award-winning scholar with publications and presents on a variety of topics internationally.

From:	Julie Rippy
To:	Trent Hyatt
Subject:	Letter sent to P & Z - Consideration of a Code Amendment to Section 070.040.020(d)(24)
Date:	Tuesday, September 17, 2019 12:17:58 PM

Hi Trent. Hope you are well! I am not sure if this came across your desk, but below is a letter Randy and I sent to Gretchen requesting she forward it on to the P & Z Commissioners prior to the meeting in July. We also copied council on this letter. I wanted to make sure to send it on to you since you are the Senior Planner on this code amendment proposal

Since the meeting ran so late with the ANB agenda item, many folks who may have wanted to speak on this agenda item did not get the opportunity, as they had to leave. We would like to formally request to you and P & Z Commissioners that the item be opened to public comment at the Sept. 24th meeting.

As always, thank you!

Julie Rippy

Dear Planning & Zoning Commissioners,

Because we are unable to attend the public hearing this evening, we feel compelled to express our views via email on the proposed waterways code amendment topic.

Although we certainly appreciate the spirit of the proposed amendment to the Development in Waterways and Areas of Special Flood Hazard of the municipal code, we do not support the proposed amendment standards and/or the proposed applicability of those standards. We believe this proposal, as is, oversteps the city's authority as to what property owners and tax payers should be able to *responsibly and legally* do on their own property. Plus this would render some existing homes on narrow lots worthless if homeowners chose to remodel their existing homes.

We live on the Roaring Fork River and believe we are good stewards of the river. We agree with the idea of protecting our waterways and currently do so with how we manage our property. However, we feel this proposal is the wrong plan, is far too aggressive and intrusive, and that it impedes upon our rights as property owners to conduct small, benign projects. We are not saying that property owners along the river should clear-cut vegetation or build a full-size home along the river's edge. But we should be allowed, within reason and current code standards, to utilize our property as we see fit. Barring any structure, regardless of size, or barring any removal of native vegetation, regardless of project scope, is not fair to property owners, nor would it necessarily protect the waterways.

For example, if we want to build for a small deck, patio or tree house and clear out some vegetation within 50 feet of the riverbank to allow a line-of-sight of the river, we should have the right to do so... all WITHOUT being subjected to jumping through numerous hoops and navigating through red tape, only with the potential of a negative outcome. We pay extremely high property taxes due to the ever-increasing tax evaluations of property along the river and

this plan inhibits us from being able to enjoy our property how we legally choose.

Also, please consider that this plan does greatly curb a homeowner's ability to freely exercise wildfire mitigation, which could create a vulnerable situation for the homeowner and a liability for the city.

We request that this unreasonable amendment proposal not be considered, as-is, and that planners go back to the drawing board and design a much more balanced and fair amendment proposal while taking the rights of responsible homeowners along the river into consideration.

We appreciate your time and attention to our comments!

Sincerely,

Randy and Julie Rippy
2262 Midland Ave.
Glenwood Springs

Mauriene Howey
2308 Midland Avenue
Glenwood Springs, CO 81601
970-230-9496

To: The Members of the Planning & Zoning Committee
Our Honorable Mayor
City Council Members

,

My name is Mauriene Howey and I live at 2308 Midland Avenue. The back part of my property fronts on a beautiful stretch of the Roaring Fork River.

I have heard that there is a proposed new code amendment that stands to greatly affect my riverfront.

Please consider the following:

My property is steep along the edge of the river. To access the river safely requires steps. The steps I have now are fairly minimal and will periodically need to be improved. The steps also require a minimal amount of brush trimming to be used safely .

My family respects and appreciates the river and they hope to inherit and use my property for decades to come.

If a rule was passed prohibiting me from maintaining and improving my steps, that rule would basically make the river inaccessible from my own property as the river cannot be accessed safely without the steps.

I am concerned about any rule that would inhibit the use of the river by my grandkids, great grandkids, and guests.

I also have outstanding views of the river **and Mount Sopris**. I am concerned about any rule that would limit my ability to trim brush and maintain trees on my own property. Even if such a rule is loosely enforced, I am concerned that if the rule is written to enable restrictions on brush and tree trimming that such a rule could be more strictly enforced in the future by authorities.

I paid a premium for my property because of the ability to access the river and for the views. My tax values reflect such amenities and I pay a significant amount of taxes based on the physical amenities of the property. Any rules that negate these amenities in any way seem both unfair for the property owner and unwise for the tax values of the city.

If my rights to use the river and maintain the vegetation adjoining such were to be infringed upon in any way, such actions would be an unreasonable taking of private property rights. In this case it would be a significant taking of valuable property rights. This amendment would lower the value of my property because it would limit my access to the river.

I have great concerns that the proposed new code as written infringes on my ability to fully utilize my property as outlined above.

I am 82 years old and admittedly have limited resources to fight this battle if one arises. I would greatly appreciate the city and the planning commission looking after my rights without such a battle. Thank you for your consideration and assistance with the above concerns.

Sincerely,

Mauriene Dickens Howey

970-230-9496

City Council
STAFF REPORT
City of Glenwood Springs
July 16, 2020

Agenda Item: Electric Building Design Contracts

Action Requested: Approval of Design Contracts for Neuman, SGM and Land Studio to move the Electric Building Design on City Owned Lands on Devereux Road forward in 2020.

Department: Public Works

Presented By: Matthew Langhorst, Public Works Director

Background Info: With the sale of the MOC property to RFTA the departments that lived within that facility are looking for or have procured new locations and facilities to move their operations too. The Electric Department currently is spread out across several locations for materials storage, equipment storage and employee offices. The employee offices and partial material storage location is currently a rental unit that is smaller than what the department really requires, but is what was available in the departure time frame put forward by the Structural Engineer reviewing the MOC facitlity. The Electric Department in 2014 designed two buildings on a City owner property on Devereux Road to include a large parking lot area to house the Electric and Broadband Departments. As the design progressed the cost of the buildings and site plan increased from a $4 million dollar project to an $8 million dollar project, which put the cost outside what the departments could afford. The Public Works department believes that the site designs and building designs could have been greatly simplified to make this project affordable and the inclusion of two buildings instead of one slightly expanded single building also caused some of the cost overruns seen within the budget overruns.

The City would like to hire three independent consultants to cover the design needs for revising the site and building designs to produce a project that is feasible for the Electric and Broadband Departments to utilize. SGM was the original site, structural and mechanical designer on the project and the City would like to retain them for the revisions being proposed to the site due to their background knowledge and ability to work with what the City is proposing for the new building and site plan. Neuman Construction has an in house architect and the ability to complete accurate design pricing for such a project as this. They have significant background in designing and pricing projects that the City would like to take advantage of in this process. The third consultant on the team is Land Studios, Doug and Julie Pratte, they are land planners, landscape designers and have the ability to help coordinate the project team, walk the plans through the development/permitting process and help with the minimal landscaping scope that we have on the project. All three of these consultants come with the ability to work with the City staff and help put together a solid set of plans an estimated pricing for the project.

This project will take input from not only Public Works and the Electrical Department, but input will be needed from Community Development, Engineering, Broadband and the Building Department. Staff feels that with the team assembled and with all departments participating we can bring this project forward and have a new and permanent facility built to house Electric and Broadband in an effective but aesthetically pleasing manner. Staff had budgeted $100,000 for 2020 to complete this work. Proposed scope of work from the three consultants is just under $180,000. Staff had eliminated a significant amount of Electric Department project work this year due to COVID reductions and the overall Electric Department budget can handle the additional $80,000 without issue. Staff had looked at hiring a local architect to design and run this project for us, that proposal was just over $300,000, so by completing the project more "in house" the Electrical Department will be saving over $130,000. Also to note, Broadband and Electric are both currently renting space to house materials and

employees, which if they moved into an owned location would save around $5,500 a month in rent.

Issues: None

Staff Recommendation: Staff is recommending approval of Design Contracts for Neuman, SGM and Land Studio for $180,000 to move the Electric Building Design on City Owned Lands on Devereux Road forward in 2020.

Consultant	Description of Work	Cost of Services
Neuman Construction	Design and Costing of Proposed Building	$ 67,793.00
SGM Engineering	Design and Costing of Proposed Building and Site Plan	$ 99,430.00
Land Studio	Development Permit and Landscape Design/Cost	$ 12,600.00
Total Consultant Budget		$ 179,823.00

City Council
STAFF REPORT
City of Glenwood Springs
July 16, 2020

Agenda Item: Infrastructure Discussion

Action Requested: None

Department: Public Works

Presented By: Matthew Langhorst, Public Works Director

Background Info: The City of Glenwood Springs is in a infrastructure transition time. The City has ground quite rapidly in the past 36 years, more than doubling in size and population. Being a older city, incorporated in 1885, and being a City that was ahead of its time with water, waste water and electrical infrastructure we in some cases have systems that date back farther than we would like them too. Currently the City maintains miles of water, sewer, a raw water collection system, waste water treatment plant, water treatment plant, back up water supply pump station, 8 lift stations, 9 water tanks holding near to 5 million gallons of water, 3 substations with a 4th coming on line in 2020/2021, overhead power lines, underground power lines and all kinds of other miscellaneous pieces of the infrastructure puzzle. These systems have been added too and maintained over the years, but not at a fast enough rate to keep up with demand on the system.

The population of the city will be above 10,000 once the 2020 census is complete. But you then have to consider that the City Chamber and Tourism offices calculated that the City sees around 1.2 million people come to our town per year as visitors and tourists. If you think about that it means that on average we have 3,300 more tourists in town each day of the year across a 365 day year.

The point to ponder is that we are not a town of 10,000 people, we are town of almost 14,000 people and sometimes a town of 20,000-30,000 people. Our infrastructure can handle this, but it takes a toll on things like roads, power supply, water capacity, sewer capacity and even trash capacities. We hold the City together with such a fine balance of operations due some of our non-redundant systems that if anything goes wrong, like a raw water supply line ruptures, we have to scramble to keep the City up and running to meet the demand that is always there. Council has seen what happens when the Canyon closes, we shut down Midland or Highway 82 for a day, the system stops functioning because as with some of our other systems, they are basically running at their maximum capacities at all times.

During the council meeting we can discuss in more detail infrastructure needs and costs for the next 5-10 years. We will also need to discuss that the Street Tax that is in place runs out in 2026, thus projects may have to shift to Capital Funds if this is not replaced.

For the fun and the history of it all, i have included three attachments. The original town-site map from 1913, the revised map from 1974 and an updated city map from 2017 which has not changed much since then. You will be able to see how much the City has grown in that time frame.

Issues:

Staff Recommendation: Funding Source Discussions

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MAP OF THE C
GLENWOOD S
COLO

Drawn from Official Records.
K.D.R. 3 & 4 = 1913

200 100

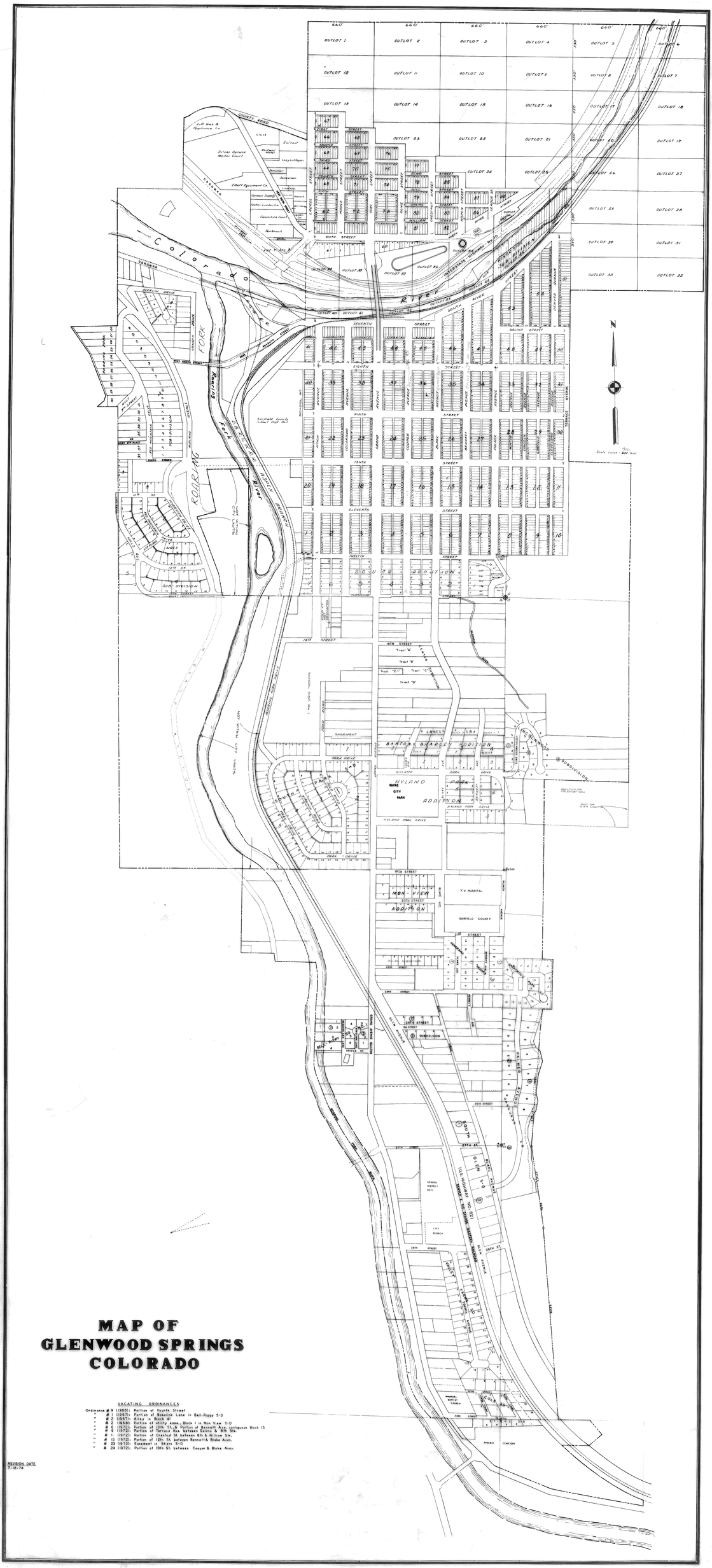
It is the Sponsor's intention
the work on this project con
least one block at a time, an
the work by blocks as units
continuation of the project w

MA

T. 6 S. R. 89 W. 6th P.M.

Glenwood Springs South
to 12th Street

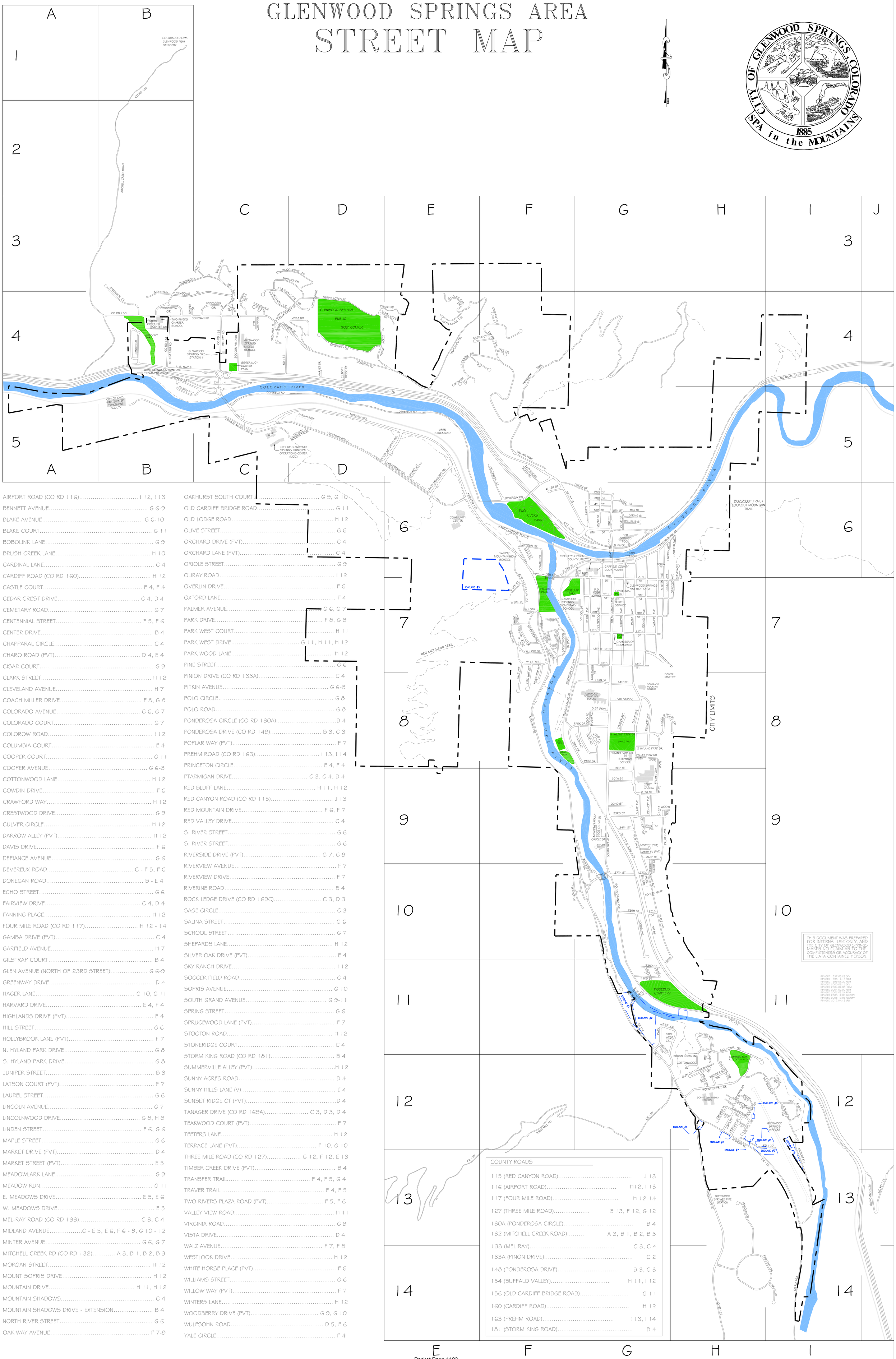
2-C


Colorado River
Roaring Fork River
Roaring Fork
SOUTH GLENWOOD SPRINGS
MAP OF
GLENWOOD SPRINGS
COLORADO
VACATING ORDINANCES
Ordinance # 9 (1966): Portion of Fourth Street
" # 1 (1967): Portion of Bobolink Lane in Bell-Rippy S-D
" # 2 (1967): Alley in Block 41
" # 2 (1968): Portion of vacty. exss., Block 1 in Mon View S-D
" # 6 (1972): Portion of 12th St., & Portion of Bennett Ave. contiguous Block 15
" # 9 (1972): Portion of Terrace Ave. between Salina & 8th Sts.
" # 11 (1972): Portion of Chestnut St. between 6th & Willow Sts.
" # 15 (1972): Portion of 12th St. between Bennett& Blake Aves.
" # 23 (1972): Easement in Stars S-D
" # 24 (1972): Portion of 10th St. between Cooper & Blake Aves.
REVISION DATE
7-18-74

GLENWOOD SPRINGS AREA
STREET MAP

TRUE

CITY OF GLENWOOD SPRINGS, COLORADO
1885
SPA in the MOUNTAINS



AIRPORT ROAD (CO RD 116)	I 12, I 13
BENNETT AVENUE	G 6-9
BLAKE AVENUE	G 6-10
BLAKE COURT	G I I
BOBOLINK LANE	G 9
BRUSH CREEK LANE	H I 0
CARDINAL LANE	C 4
CARDIFF ROAD (CO RD 160)	H I 2
CASTLE COURT	E 4, F 4
CEDAR CREST DRIVE	C 4, D 4
CEMETARY ROAD	G 7
CENTENNIAL STREET	F 5, F 6
CENTER DRIVE	B 4
CHAPPARAL CIRCLE	C 4
CHARO ROAD (PVT)	D 4, E 4
CISAR COURT	G 9
CLARK STREET	H I 2
CLEVELAND AVENUE	H 7
COACH MILLER DRIVE	F 8, G 8
COLORADO AVENUE	G 6, G 7
COLORADO COURT	G 7
COLOROW ROAD	I 12
COLUMBIA COURT	E 4
COOPER COURT	G I I
COOPER AVENUE	G 6-8
COTTONWOOD LANE	H I 2
COWDIN DRIVE	F 6
CRAWFORD WAY	H I 2
CRESTWOOD DRIVE	G 9
CULVER CIRCLE	H I 2
DARROW ALLEY (PVT)	H I 2
DAVIS DRIVE	F 6
DEFIANCE AVENUE	G 6
DEVEREUX ROAD	C - F 5, F 6
DONEGAN ROAD	B - E 4
ECHO STREET	G 6
FAIRVIEW DRIVE	C 4, D 4
FANNING PLACE	H I 2
FOUR MILE ROAD (CO RD 117)	H I 2 - I 4
GAMBA DRIVE (PVT)	C 4
GARFIELD AVENUE	H 7
GILSTRAP COURT	B 4
GLEN AVENUE (NORTH OF 23RD STREET)	G 6-9
GREENWAY DRIVE	D 4
HAGER LANE	G I 0, G I I
HARVARD DRIVE	E 4, F 4
HIGHLANDS DRIVE (PVT)	E 4
HILL STREET	G 6
HOLLYBROOK LANE (PVT)	F 7
N. HYLAND PARK DRIVE	G 8
S. HYLAND PARK DRIVE	G 8
JUNIPER STREET	B 3
LATSON COURT (PVT)	F 7
LAUREL STREET	G 6
LINCOLN AVENUE	G 7
LINCOLNWOOD DRIVE	G 8, H 8
LINDEN STREET	F 6, G 6
MAPLE STREET	G 6
MARKET DRIVE (PVT)	D 4
MARKET STREET (PVT)	E 5
MEADOWLARK LANE	G 9
MEADOW RUN	G I I
E. MEADOWS DRIVE	E 5, E 6
W. MEADOWS DRIVE	E 5
MEL-RAY ROAD (CO RD 133)	C 3, C 4
MIDLAND AVENUE	C - E 5, E 6, F 6 - 9, G I0 - I2
MINTER AVENUE	G 6, G 7
MITCHELL CREEK RD (CO RD 132)	A 3, B I, B 2, B 3
MORGAN STREET	H I 2
MOUNT SOPRIS DRIVE	H I 2
MOUNTAIN DRIVE	H I I, H I 2
MOUNTAIN SHADOWS	C 4
MOUNTAIN SHADOWS DRIVE - EXTENSION	B 4
NORTH RIVER STREET	G 6
OAK WAY AVENUE	F 7-8
OAKHURST SOUTH COURT	G 9, G I0
OLD CARDIFF BRIDGE ROAD	G I I
OLD LODGE ROAD	H I 2
OLIVE STREET	G 6
ORCHARD DRIVE (PVT)	C 4
ORCHARD LANE (PVT)	C 4
ORIOLE STREET	G 9
OURAY ROAD	I 12
OVERLIN DRIVE	F 6
OXFORD LANE	F 4
PALMER AVENUE	G 6, G 7
PARK DRIVE	F 8, G 8
PARK WEST COURT	H I I
PARK WEST DRIVE	G I I, H I I, H I 2
PARK WOOD LANE	H I 2
PINE STREET	G 6
PINION DRIVE (CO RD 133A)	C 4
PITKIN AVENUE	G 6-8
POLO CIRCLE	G 8
POLO ROAD	G 8
PONDEROSA CIRCLE (CO RD 130A)	B 4
PONDEROSA DRIVE (CO RD 148)	B 3, C 3
POPLAR WAY (PVT)	F 7
PREHM ROAD (CO RD 163)	I 13, I 14
PRINCETON CIRCLE	E 4, F 4
PTARMIGAN DRIVE	C 3, C 4, D 4
RED BLUFF LANE	H I I, H I 2
RED CANYON ROAD (CO RD 115)	J I 3
RED MOUNTAIN DRIVE	F 6, F 7
RED VALLEY DRIVE	C 4
S. RIVER STREET	G 6
S. RIVER STREET	G 6
RIVERSIDE DRIVE (PVT)	G 7, G 8
RIVERVIEW AVENUE	F 7
RIVERVIEW DRIVE	F 7
RIVERINE ROAD	B 4
ROCK LEDGE DRIVE (CO RD 169C)	C 3, D 3
SAGE CIRCLE	C 3
SALINA STREET	G 6
SCHOOL STREET	G 7
SHEPARDS LANE	H I 2
SILVER OAK DRIVE (PVT)	E 4
SKY RANCH DRIVE	I 12
SOCCER FIELD ROAD	C 4
SOPRIS AVENUE	G I 0
SOUTH GRAND AVENUE	G 9-I I
SPRING STREET	G 6
SPRUCEWOOD LANE (PVT)	F 7
STOCTON ROAD	H I 2
STONERIDGE COURT	C 4
STORM KING ROAD (CO RD 181)	B 4
SUMMERVILLE ALLEY (PVT)	H I 2
SUNNY ACRES ROAD	D 4
SUNNY HILLS LANE (V)	E 4
SUNSET RIDGE CT (PVT)	D 4
TANAGER DRIVE (CO RD 169A)	C 3, D 3, D 4
TEAKWOOD COURT (PVT)	F 7
TEETERS LANE	H I 2
TERRACE LANE (PVT)	F I0, G I0
THREE MILE ROAD (CO RD 127)	G I2, F I2, E I3
TIMBER CREEK DRIVE (PVT)	B 4
TRANSFER TRAIL	F 4, F 5, G 4
TRAVER TRAIL	F 4, F 5
TWO RIVERS PLAZA ROAD (PVT)	F 5, F 6
VALLEY VIEW ROAD	H I I
VIRGINIA ROAD	G 8
VISTA DRIVE	D 4
WALZ AVENUE	F 7, F 8
WESTLOOK DRIVE	H I 2
WHITE HORSE PLACE (PVT)	F 6
WILLIAMS STREET	G 6
WILLOW WAY (PVT)	F 7
WINTERS LANE	H I 2
WOODBERRY DRIVE (PVT)	G 9, G I0
WULFSOHN ROAD	D 5, E 6
YALE CIRCLE	F 4

COUNTY ROADS

I 15 (RED CANYON ROAD)	J I 3
I 16 (AIRPORT ROAD)	H I2, I I3
I 17 (FOUR MILE ROAD)	H I 2-I4
127 (THREE MILE ROAD)	E I3, F I2, G I2
130A (PONDEROSA CIRCLE)	B 4
132 (MITCHELL CREEK ROAD)	A 3, B I, B 2, B 3
133 (MEL RAY)	C 3, C 4
133A (PINON DRIVE)	C 2
148 (PONDEROSA DRIVE)	B 3, C 3
154 (BUFFALO VALLEY)	H I I, I I2
156 (OLD CARDIFF BRIDGE ROAD)	G I I
160 (CARDIFF ROAD)	H I 2
163 (PREHM ROAD)	I I3, I I4
181 (STORM KING ROAD)	B 4

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REVISED 2006.02.21 RRM
REVISED 2008.12.05 ASMSFV
REVISED 2008.12.05 ASJSFV
REVISED 2017.04.13 JKB

City Council
STAFF REPORT
City of Glenwood Springs
July 16, 2020

Agenda Item: CARES Funding Options

Action Requested: Provide general direction on how to use CARES funding.

Department: City Administration

Presented By: Debra Figueroa, City Manager

Background Info: The State of Colorado has allocated up to $275 million in Coronavirus Relief Funds (CVRF) for counties and local governments from its federal allocation of funds under the CARES Act. The Colorado Department of Local Affairs (DOLA) will distribute these funds. Garfield County and its municipalities will receive $5,152,459 in these funds for COVID-19 related expenses.

The County and its municipalities agreed to allocate the CARES Act funds based on the percentage of the County population residing in its cities and towns, as well as in the unincorporated portions of the County. Under this scenario, the City of Glenwood Springs will receive $863,509.81 in funding.

These funds can only be spent on Eligible CARES Act expenses as determined by the U.S. Treasury. This guidance is included as Attachment A.

The CARES Act provides that payments may only be used to cover costs that:

1. Are necessary expenditures incurred due to the public health emergency with respect to the Coronavirus Disease 2019 (COVID–19);
2. Were not accounted for in the budget most recently approved as of March 27, 2020 (the date of enactment of the CARES Act) for the State or local government; and
3. Were incurred during the period that begins on March 1, 2020 and ends on December 30, 2020.

The City cannot use these funds for lost revenue due to COVID-19. However, additional guidance (included as Attachment B) does allow more flexibility is staff costs involved in responding to COVID - 19. Expenses must be used for actions taken to respond to the public health emergency. These expenses include items such as:

1. Addressing medical or public health needs, such as Personal Protection Equipment (PPE); sanitation supplies and emergency transport;
2. Expenses of actions to facilitate compliance with COVID-19 related public health measure such as expenses for food delivery, costs to facilitate telework for employees, paid and family medical leave for public employees, and expenses for homeless assistance.
3. Providing economic support to those suffering from employment or business interruptions due to COVID-19-related business closures such as the Get Glenwood Going Grant.
4. Providing economic support for those suffering from employment interruptions due to Covid-19.

To date, the City has spent almost $100,000 on response to COVID-19, $200,000 on grants to help businesses and $20,000 on food assistance through Lift Up for a total of $320,000.

Attachment C is a spreadsheet that includes these expenses, but also provides additional ideas for how the remaining funds can be spent.

Issues: Since it is difficult to know how our COVID -19 response may change over the next five months, it is important to retain flexibility as we move forward. In addition, staff recommends that City Council select spending options that continue to help our residents and businesses, but that also allow the General Fund to be reimbursed for expenses.

Staff Recommendation: Provide general direction on how to expend Cares Act Funding.

Coronavirus Relief Fund
Guidance for State, Territorial, Local, and Tribal Governments
Updated June 30, 2020[1]

The purpose of this document is to provide guidance to recipients of the funding available under section 601(a) of the Social Security Act, as added by section 5001 of the Coronavirus Aid, Relief, and Economic Security Act ("CARES Act"). The CARES Act established the Coronavirus Relief Fund (the "Fund") and appropriated $150 billion to the Fund. Under the CARES Act, the Fund is to be used to make payments for specified uses to States and certain local governments; the District of Columbia and U.S. Territories (consisting of the Commonwealth of Puerto Rico, the United States Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands); and Tribal governments.

The CARES Act provides that payments from the Fund may only be used to cover costs that—

1. are necessary expenditures incurred due to the public health emergency with respect to the Coronavirus Disease 2019 (COVID–19);
2. were not accounted for in the budget most recently approved as of March 27, 2020 (the date of enactment of the CARES Act) for the State or government; and
3. were incurred during the period that begins on March 1, 2020, and ends on December 30, 2020.[2]

The guidance that follows sets forth the Department of the Treasury's interpretation of these limitations on the permissible use of Fund payments.

Necessary expenditures incurred due to the public health emergency

The requirement that expenditures be incurred "due to" the public health emergency means that expenditures must be used for actions taken to respond to the public health emergency. These may include expenditures incurred to allow the State, territorial, local, or Tribal government to respond directly to the emergency, such as by addressing medical or public health needs, as well as expenditures incurred to respond to second-order effects of the emergency, such as by providing economic support to those suffering from employment or business interruptions due to COVID-19-related business closures.

Funds may not be used to fill shortfalls in government revenue to cover expenditures that would not otherwise qualify under the statute. Although a broad range of uses is allowed, revenue replacement is not a permissible use of Fund payments.

The statute also specifies that expenditures using Fund payments must be "necessary." The Department of the Treasury understands this term broadly to mean that the expenditure is reasonably necessary for its intended use in the reasonable judgment of the government officials responsible for spending Fund payments.

Costs not accounted for in the budget most recently approved as of March 27, 2020

The CARES Act also requires that payments be used only to cover costs that were not accounted for in the budget most recently approved as of March 27, 2020. A cost meets this requirement if either (a) the

[1] This version updates the guidance provided under "Costs incurred during the period that begins on March 1, 2020, and ends on December 30, 2020".
[2] *See* Section 601(d) of the Social Security Act, as added by section 5001 of the CARES Act.

cost cannot lawfully be funded using a line item, allotment, or allocation within that budget *or* (b) the cost is for a substantially different use from any expected use of funds in such a line item, allotment, or allocation.

The "most recently approved" budget refers to the enacted budget for the relevant fiscal period for the particular government, without taking into account subsequent supplemental appropriations enacted or other budgetary adjustments made by that government in response to the COVID-19 public health emergency. A cost is not considered to have been accounted for in a budget merely because it could be met using a budgetary stabilization fund, rainy day fund, or similar reserve account.

Costs incurred during the period that begins on March 1, 2020, and ends on December 30, 2020

Finally, the CARES Act provides that payments from the Fund may only be used to cover costs that were incurred during the period that begins on March 1, 2020, and ends on December 30, 2020 (the "covered period"). Putting this requirement together with the other provisions discussed above, section 601(d) may be summarized as providing that a State, local, or tribal government may use payments from the Fund only to cover previously unbudgeted costs of necessary expenditures incurred due to the COVID–19 public health emergency during the covered period.

Initial guidance released on April 22, 2020, provided that the cost of an expenditure is incurred when the recipient has expended funds to cover the cost. Upon further consideration and informed by an understanding of State, local, and tribal government practices, Treasury is clarifying that for a cost to be considered to have been incurred, performance or delivery must occur during the covered period but payment of funds need not be made during that time (though it is generally expected that this will take place within 90 days of a cost being incurred). For instance, in the case of a lease of equipment or other property, irrespective of when payment occurs, the cost of a lease payment shall be considered to have been incurred for the period of the lease that is within the covered period, but not otherwise. Furthermore, in all cases it must be necessary that performance or delivery take place during the covered period. Thus the cost of a good or service received during the covered period will not be considered eligible under section 601(d) if there is no need for receipt until after the covered period has expired.

Goods delivered in the covered period need not be used during the covered period in all cases. For example, the cost of a good that must be delivered in December in order to be available for use in January could be covered using payments from the Fund. Additionally, the cost of goods purchased in bulk and delivered during the covered period may be covered using payments from the Fund if a portion of the goods is ordered for use in the covered period, the bulk purchase is consistent with the recipient's usual procurement policies and practices, and it is impractical to track and record when the items were used. A recipient may use payments from the Fund to purchase a durable good that is to be used during the current period and in subsequent periods if the acquisition in the covered period was necessary due to the public health emergency.

Given that it is not always possible to estimate with precision when a good or service will be needed, the touchstone in assessing the determination of need for a good or service during the covered period will be reasonableness at the time delivery or performance was sought, *e.g.*, the time of entry into a procurement contract specifying a time for delivery. Similarly, in recognition of the likelihood of supply chain disruptions and increased demand for certain goods and services during the COVID-19 public health emergency, if a recipient enters into a contract requiring the delivery of goods or performance of services by December 30, 2020, the failure of a vendor to complete delivery or services by December 30, 2020, will not affect the ability of the recipient to use payments from the Fund to cover the cost of such goods or services if the delay is due to circumstances beyond the recipient's control.

This guidance applies in a like manner to costs of subrecipients. Thus, a grant or loan, for example, provided by a recipient using payments from the Fund must be used by the subrecipient only to purchase (or reimburse a purchase of) goods or services for which receipt both is needed within the covered period and occurs within the covered period. The direct recipient of payments from the Fund is ultimately responsible for compliance with this limitation on use of payments from the Fund.

Nonexclusive examples of eligible expenditures

Eligible expenditures include, but are not limited to, payment for:

1. Medical expenses such as:
    - COVID-19-related expenses of public hospitals, clinics, and similar facilities.
    - Expenses of establishing temporary public medical facilities and other measures to increase COVID-19 treatment capacity, including related construction costs.
    - Costs of providing COVID-19 testing, including serological testing.
    - Emergency medical response expenses, including emergency medical transportation, related to COVID-19.
    - Expenses for establishing and operating public telemedicine capabilities for COVID-19-related treatment.
2. Public health expenses such as:
    - Expenses for communication and enforcement by State, territorial, local, and Tribal governments of public health orders related to COVID-19.
    - Expenses for acquisition and distribution of medical and protective supplies, including sanitizing products and personal protective equipment, for medical personnel, police officers, social workers, child protection services, and child welfare officers, direct service providers for older adults and individuals with disabilities in community settings, and other public health or safety workers in connection with the COVID-19 public health emergency.
    - Expenses for disinfection of public areas and other facilities, *e.g.*, nursing homes, in response to the COVID-19 public health emergency.
    - Expenses for technical assistance to local authorities or other entities on mitigation of COVID-19-related threats to public health and safety.
    - Expenses for public safety measures undertaken in response to COVID-19.
    - Expenses for quarantining individuals.
3. Payroll expenses for public safety, public health, health care, human services, and similar employees whose services are substantially dedicated to mitigating or responding to the COVID-19 public health emergency.
4. Expenses of actions to facilitate compliance with COVID-19-related public health measures, such as:
    - Expenses for food delivery to residents, including, for example, senior citizens and other vulnerable populations, to enable compliance with COVID-19 public health precautions.
    - Expenses to facilitate distance learning, including technological improvements, in connection with school closings to enable compliance with COVID-19 precautions.
    - Expenses to improve telework capabilities for public employees to enable compliance with COVID-19 public health precautions.

- Expenses of providing paid sick and paid family and medical leave to public employees to enable compliance with COVID-19 public health precautions.
- COVID-19-related expenses of maintaining state prisons and county jails, including as relates to sanitation and improvement of social distancing measures, to enable compliance with COVID-19 public health precautions.
- Expenses for care for homeless populations provided to mitigate COVID-19 effects and enable compliance with COVID-19 public health precautions.

5. Expenses associated with the provision of economic support in connection with the COVID-19 public health emergency, such as:
   - Expenditures related to the provision of grants to small businesses to reimburse the costs of business interruption caused by required closures.
   - Expenditures related to a State, territorial, local, or Tribal government payroll support program.
   - Unemployment insurance costs related to the COVID-19 public health emergency if such costs will not be reimbursed by the federal government pursuant to the CARES Act or otherwise.
6. Any other COVID-19-related expenses reasonably necessary to the function of government that satisfy the Fund's eligibility criteria.

Nonexclusive examples of ineligible expenditures[3]

The following is a list of examples of costs that would *not* be eligible expenditures of payments from the Fund.

1. Expenses for the State share of Medicaid.[4]
2. Damages covered by insurance.
3. Payroll or benefits expenses for employees whose work duties are not substantially dedicated to mitigating or responding to the COVID-19 public health emergency.
4. Expenses that have been or will be reimbursed under any federal program, such as the reimbursement by the federal government pursuant to the CARES Act of contributions by States to State unemployment funds.
5. Reimbursement to donors for donated items or services.
6. Workforce bonuses other than hazard pay or overtime.
7. Severance pay.
8. Legal settlements.

[3] In addition, pursuant to section 5001(b) of the CARES Act, payments from the Fund may not be expended for an elective abortion or on research in which a human embryo is destroyed, discarded, or knowingly subjected to risk of injury or death. The prohibition on payment for abortions does not apply to an abortion if the pregnancy is the result of an act of rape or incest; or in the case where a woman suffers from a physical disorder, physical injury, or physical illness, including a life-endangering physical condition caused by or arising from the pregnancy itself, that would, as certified by a physician, place the woman in danger of death unless an abortion is performed. Furthermore, no government which receives payments from the Fund may discriminate against a health care entity on the basis that the entity does not provide, pay for, provide coverage of, or refer for abortions.

[4] *See* 42 C.F.R. § 433.51 and 45 C.F.R. § 75.306.

CARES Reimbursement Request Spreadsheet

13-Jul-20

Total CARES Award to Glenwood Springs; $863,509.81

DRAFT ESTIMATE	**Estimated COVID Expenditure**
Business Grants	$200,000
Lift-up	$20,000
PPE	$70,000
IT Equipment	$9,000
Housing Homeless During Crises	$100,000
COVID Homeless Community Facilitation	$20,000
Legal Costs related to COVID 19	$80,000
Lisenting Sessions Consultant	$7,400
Listening Sessions Broadnet	$16,299
Additional Business Grants	$200,000
Rental Assistance	$100,000
Downtown and Two Rivers Park Restroom Sanitation	$75,000
COVID Coordinator (Gary) Salary 10/12 of year	$113,000
25% of ACM Salary COVID Communications	$24,375
50% of PIO's Salary on Crisis Communications	$33,333
Unbudgeted Staff or Contract to clean select restrooms	$2,500
Total Expenditures	**$1,070,907**