AGENDA
CITY OF GLENWOOD SPRINGS
REGULAR CITY COUNCIL MEETING
JANUARY 6, 2022
VIRTUAL MEETING ONLY
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.*

ATTENTION: To ensure your written comments are included in the City Council packet, public comments must be received by 4 p.m. (closing time of City Hall) on the day before City Council meetings. Comments may be submitted to ryan.muse@cogs.us or delivered to the City Clerk's Office at 101 W. 8th Street.
Written comments may be submitted after this deadline and will be shared via email to City Council but are not guaranteed to make it into the meeting packet. Submit comments at any time directly to City Council via email at citycouncil@cogs.us.
This meeting is being held on Zoom only. Please check the City website for a link and do not show up to City Hall as no one will be present.

ZOOM INSTRUCTIONS

1. You are invited to a Zoom webinar.
When: Jan 6, 2022 08:30 AM Mountain Time (US and Canada)
Topic: 2022/01/06 Regular Council Work Session - AM

Please click the link below to join the webinar:
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Webinar ID: 811 0345 0849
International numbers available: https://us02web.zoom.us/u/kbaPi23Bl3

MORNING WORK SESSION

8:30	2.	Agenda Review	Information/Discussion
8:45	3.	Airport Listening Session Agenda Review	Information/Discussion
9:00	4.	CLEER Contract and Future Sustainability Rebates	Information/Discussion
9:30	5.	Charter Cleanup	Information/Discussion

ZOOM INSTRUCTIONS

6. You are invited to a Zoom webinar.
When: Jan 6, 2022 04:15 PM Mountain Time (US and Canada)
Topic: 2022/01/06 Regular Council Work Session - PM

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Webinar ID: 827 0811 8317
International numbers available: https://us02web.zoom.us/u/kdQ0vsPOme

WORK SESSION

4:45	7.	Planning and Zoning Commission Interviews	Information/Discussion
5:05	8.	Landfill Fees and Equipment Presentation	Information/Discussion
5:45	9.	Climate Action Plan	Information/Discussion

REGULAR SESSION

6:15	10.	Roll Call	
	11.	Pledge of Allegiance	
	12.	Agenda Changes & Conflicts	
6:20	13.	Citizens Appearing Before Council (for items not on the Agenda-comments limited to 3 minutes)	
6:30	14.	Council Comments	
6:40	15.	Proclamation for the Lion's Club's 100-year Anniversary	
6:45	16.	Consent Agenda	Discussion and/or Action
		A. December 2, 2021 Council Minutes	
		B. Resolution 2022-03; A Resolution of the City Council of the City of Glenwood Springs, Colorado Designating a Posting Place for 2022	
		C. CLEER Contract Approval for 2022	
		D. Resolution 2022-01; Great Outdoors Colorado (GOCO) Grant	
		E. Chamber Contract Approval and 2022 Tourism Management Board Strategy	
		F. Approval to allow the Mayor to sign the agreement with the Colorado Department of Transportation for an access line break for the trail construction.	Discussion and/or Action
		G. Ordinance No. 18, Series of 2021, Amending Municipal Code Section 070, 2nd Reading.	
		H. Waste Water Plant Oxidation Ditch 10 Year Equipment Maintenance	

ACTIONS AND/OR PRESENTATIONS

6:45	17.	Planning File 60-20 - Consideration of a Major Site/Architectural Plan Review application for the construction of 300-unit multi-family development in 14 separate buildings in Glenwood Meadows.	Discussion and/or Action
7:00	18.	Ordinance 2022-01; Amending Municipal Code Section 020 Council Voting Code Revision	Discussion and/or Action
7:15	19.	Annexation Petition	Discussion and/or Action
		A. Repeal Ordinance 2021-08	Discussion and/or Action
		B. Resolution 2022-02; Set Referendum for the May 3rd Election Date	Discussion and/or Action
7:30	20.	Ordinance 2022-02; Campaign Finance	Discussion and/or Action
8:00	21.	Paid Parking Decision to Move Forward with Pricing	Discussion and/or Action
8:45	22.	Franchise Management/Spring Cleanup	Discussion and/or Action
9:30	23.	Code of Conduct	Discussion and/or Action
10:00	24.	Report from City Administration	

A. City Manager

B. City Attorney

C. Correspondence Incoming/Outgoing

10:05 25. Adjournment

DRAFT

Work Session/Agenda Planning through April of 2023

City Council Meeting	Work Session Item	Agenda Item
November 4, 2021	Airport Commission BOCC Joint Meeting and Dinner (5-6)	BLD Planning Item Budget Approval Black Hills Energy Presentation Mountain Bike Trails Fare Free on RFTA
November 18, 2021	TDM/Parking Management – Public Input (3-4) Glenwood Springs Association of Realtors (Housing) Mitchel Cooper Water System	Code of Conduct Spring Cleanup Blake Avenue
December 2, 2021 (Chanukah)	Board and Commission Discussion Pedestrian connections, (MOVE STUDY) 2021 Building Codes	Youth Mental Health Paid Parking Decision
December 16, 2021	Parks and Recreation Commission (RFP for South Canyon) Sayre Park Future Phases Housing Commission	Direction on RFP for South Canyon Pedestrian connections, (MOVE STUDY) Approval Decision
January 6, 2022	CLEER/GCE Update (45 Minutes) Code Enforcement Philosophy (15 Minutes)	CLEER Contract on Consent Pricing package for Downtown Parking (if approved earlier)

DRAFT

January 20, 2022	Comp Plan Check In CORA Conversation with Post Independent (4 -5) BRT/local bus optimization (MOVE STUDY) (45 Minutes)	BRT/local bus optimization (MOVE STUDY) (45 Minutes) Vehicular traffic optimization decision
February 3, 2022	Charter Review/Elected Mayor Council Compensation MOVE Study Ped and Cycling Improvements	BRT/local bus optimization (MOVE STUDY) decision 2021 Building Codes
February 17, 2022	Arts and Culture Board Long Term Cemetery Planning	MOVE Study Ped and Cycling Improvements
March 3, 2022	River Commission Water Use Reduction Solutions/Incentives Lone Pine Property	
March 17, 2022 (Purim ends in the evening of March 17)	Financial Advisory Board Encampment Cleanup/Solutions Transient impacts to downtown/solutions	
April 7, 2022	Ad Hoc Committee for Affordable Housing Recommendation Planning Commission	
April 21, 2022 (Passover is 4/15-4/23 – Mayor Holiday)	Airport Commission Vale Board Dog Park	Ad Hoc Committee for Affordable Housing Recommendation

	Dog Leash Enforcement Vehicular traffic optimization	
May 5, 2022	Art Center/Preforming Arts Center Special Events	
May 19, 2022	Tourism Board North Landing	
June 2, 2022	Historic Preservation Commission Cardiff Schoolhouse Future	
June 16, 2022	RFTA Construction Fill opportunities- Drive-In Theater, Outdoor Amphitheater, Sledding Hill	
July 7, 2022	Downtown Development Authority	
July 21, 2022	RICD Project Confluence (Confluence Park)	
August 4, 2022	Budget Only	
August 18, 2022	Budget Only	
September 1, 2022	Budget Only	
September 15, 2022	Budget Only	
October 6, 2022	Transportation Commission	Budget Hearing
October 20, 2022		Budget Approval
November 3, 2022	River Commission	
November 17, 2022		
December 1, 2022	Housing Commission	
December 15, 2022		

January 5, 2023	Planning Commission	Comp Plan Adoption
January 19, 2023		
February 2, 2023	Arts and Culture Board	
February 16, 2023		
March 2, 2023	Financial Advisory Board	
March 16, 2023		
April 6, 2023	Airport Commission Vale Board	

Items to Schedule:

BRT- Adoption of Both Preferred Alternatives or a Single Alternative

Traffic Report and Recommendations * Includes recommendation to go to North - South couplet on 8th and 9th

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item:	Airport Listening Session Agenda Review
Action Requested:	City Council will discuss the agenda for the upcoming Airport Listening Session.
Department:	City Administration
Presented By:	Debra Figueroa, City Manager
Background Info:	NA
Issues:	NA
Staff Recommendation:	Discussion only.

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: CLEER Contract and Future Sustainability Rebates

Action Requested: None at this time.

Department: Public Works

Presented By: Matthew Langhorst, Public Works Director

Background Info: CLEER has been providing the City's Energy Sustainability Program management for many years and staff would like to continue this relationship into 2022 and beyond. CLEER will be presenting an update to Council and staff will be presenting an updated Scope of Service for the agreement renewal.

Issues: None at this time.

Staff Recommendation: None at this time.

GARFIELD CLEAN ENERGY
Communities joining for a clean energy economy

Town of Parachute | City of Rifle | Town of Silt
Town of New Castle | City of Glenwood Springs
Town of Carbondale | Garfield County
Roaring Fork Transportation Authority
Colorado Mountain College

To: Mayor Godes and Glenwood Springs City Council Members

From: Garfield Clean Energy Collaborative Board and CLEER staff

Date: December 28, 2021

Re: **Garfield Clean Energy update**

On behalf of Garfield Clean Energy Collaborative, we want to thank you for your ongoing participation as a member. We appreciate that the City of Glenwood Springs continues to be a leader in supporting regional collaboration to solve our biggest problems.

Garfield Clean Energy has created a way for our rural region to make significant, measurable progress on energy efficiency, renewable energy, and clean energy transportation targets while creating economic benefits over the last decade. The rest of this memo highlights successes achieved in 2021 with a summary of what to expect in 2022.

Residential and Commercial Program Highlights

In addition to continuing to provide energy coaching services for homeowners and businesses interested in efficiency, beneficial electrification and/or solar, here are some highlights of our work in the residential and commercial sector.

Solarize Garfield County

GCE launched and implemented a very successful bulk buy solar program called Solarize Garfield County. The program launched on March 1st with local company Active Energies Solar as the solar installer (selected through a competitive RFP process). We partnered with Solar Energy International to utilize their Solarize tool kit to provide us with the tools and materials to help launch a program (saving in start-up costs). We set a goal to spur 40 new solar installations in Garfield County through this program, a goal based on other counties' success in implementing the program. We far exceeded those goals, as detailed in the tables below and in this article

Total Enrollments	Xcel customers (eligible for GCE rebate)	Holy Cross customers	Glenwood Springs Electric	Total enrollments
Carbondale	83	51		134
Glenwood Springs	17	34	81	131
New Castle	44	3		47
Silt	16	6		22
Rifle	18	1		19
Parachute/Battlement Mesa	1	6		7
Unknown location / outside of Garfield County / duplicates				48
				408

Systems Sold	Xcel customers (eligible for GCE rebate)	Holy Cross customers	Glenwood Springs Electric	Total Systems sold	Total PV Sold (kW)	Project Costs
Carbondale	23	20	-	43	368.33	$1,122,863
Glenwood Springs	4	10	28	42	320.3	$1,092,181
New Castle	12	-	-	12	86.72	$262,953
Silt	5	-	-	5	50.83	$159,355
Rifle	4	-	-	4	18.08	$57,318
Parachute/ Battlement Mesa	1	3	-	4	27.21	$84,175
Totals	49	33	28	110	**854.975**	**$2,840,383**

Rebates Provided	Total Systems sold	Total rebate amount
Garfield Clean Energy	49	**$67,500**
Holy Cross Energy	33	**$112,251**
Glenwood Springs Electric	28	**$40,500**
Active Energies Solar	110	**$38,325**
Total	110	**$258,576**

Educational Webinars

Garfield Clean Energy events and trainings 2021		
Webinar name	**Date**	**Participants**
Money Saving Seminar for Homeowners with Electric Heating Systems	1/12/21	88
Money Saving Seminar for Homeowners with Propane Heating Systems	1/19/21	41

Replacing your natural gas furnace or AC – consider a Cold Climate Heat Pump	1/26/21	67
	1/30/21	18
Solar + Storage: Is battery backup right for your home?	4/1/21	70
ASHP New Build – for contractors	5/4/21	39
ASHP New Build – for consumers	6/15/21	38
Ductless Mini-split Heat Pumps	8/31/21	57
Heat Pumps for existing homes with electric baseboard heating	9/7/21	42
Heat Pumps for existing homes with ducted furnace systems	9/14/21	26
Electric Vehicle Ride and Drive - December 11 at the Fairgrounds during the Flea Market	12/11/21	30-40

Commercial Coaching

Staff continued to do outreach and provide coaching to businesses, but have found that businesses continue to have limited capacity to pursue projects. With many facing staffing shortages following the pandemic, they have not been able to prioritize tackling efficiency projects. While the numbers have not been close to our goals, here is a list of entities we've provided energy coaching and rebate assistance to in 2021:

- Charcoal Burger - Glenwood Springs
- Colorado River Fire and Rescue - New Castle, Silt and Rifle
- YouthZone - Glenwood Springs
- Our School - Glenwood Springs
- ECOS Enviro and Disaster Restoration - Glenwood Springs
- Honey Butter - Carbondale
- Glenwood Adventure Park and Caverns - Glenwood Springs

Multi-family Design Assistance

With many new construction projects happening, we've provided varying levels of design assistance to help project owners and managers understand the opportunities and benefits of incorporating efficiency and electrification technologies. These include:

- Wipiti Commons, a Habitat for Humanity project in Rifle. Staff have been heavily involved in providing design input throughout the process and are very excited about this low-income, clean energy project.
- Painted Pastures, a multi-family project in Silt
- Sopris Apartments in Carbondale
- Rifle Tiny Homes
- Red Hill Lofts in Carbondale
- Sopris Storage and Apartments in Carbondale

Renewable Energy

The staff for GCE have achieved some significant accomplishments in 2021 related to solar energy. The Post Independent summarized the activity in this article:

https://www.postindependent.com/news/solar-power-projects-flaring-up-all-over-garfield-county/

DOLA Renewable Energy Challenge Grant
In partnership with CORE and Walking Mountains Science Center, we completed all components of the DOLA grant which includes:

- Three County Solar +Storage Study: Meeting local, state and utility clean energy targets while maximizing regional benefits in Eagle, Garfield and Pitkin Counties. We'll provide more details of the findings of this report during the presentation and we've provided the Executive Summary in this packet. The full study can be found at: http://wccleanenergy.org/3-county-solar-study/
- Solar Development Resources for local governments and landowners, along with a dynamic solar map available to solar developers and also useful for planning staff and local utilities.
    - http://wccleanenergy.org/local-government-resources/
    - http://wccleanenergy.org/landowner-resources/
    - http://wccleanenergy.org/solar-map/
- Economic Transition Assessment: A preliminary look at the level of dependence of Garfield County and governmental entities in the county on revenue derived from the oil and gas industry, such as property taxes, severance taxes and federal mineral lease funding.

CMC/Holy Cross Community Scale Solar Project

- Staff worked closely with CMC to identify a solar developer to work with while also working with Holy Cross Energy to put together a tariff program to ensure that the project created wins for all entities involved. This project has taken a few years to put together and here is a great summary article published in the spring: https://www.solarpowerworldonline.com/2021/04/ameresco-plans-solar-storage-project-on-colorado-university-land/

Transportation

Our transportation programs focus on promoting transit and biking/walking and increasing availability of charging stations and electric vehicles.

Electric Vehicle and Charging Station Work

- Grant application submitted on behalf of the Town of Parachute for a new charger at a highway rest area.
- Helped Garfield County submit an application for its administration offices in Rifle.
- Assisted Ecos Environmental in submitting grant applications for EV charging at its offices in Glenwood Springs and Parachute and for an electric box truck.
- Released a short video showing new Electric SUVs for Mountain Driving.
- Hosted an Electric Truck Webinar with Lordstown Motors.
- Connected Glenwood Springs area dealerships with Xcel Energy's new Preferred

Dealership program.

#BikeThere

- Created the first #BikeThere series of programs - held events in each community throughout the month of June:
    - https://www.postindependent.com/news/local/garfield-county-is-getting-ready-to-ride-for-colorado-bike-month/

Outlook and Planning for 2022

The GCE Board worked on the 2022 Strategic Plan at their September Board meeting, which will be approved at the November meeting. In addition to the continued work in all program areas, key elements to the 2022 Strategic Plan will include the following:

- Focused coaching services and rebates for low- to middle-income households to help bring savings to more families;
- Implementing components identified in the Solar+Storage Study Action Plan;
- Working with Grid Alternatives, Energy Outreach Colorado, and Xcel Energy to target outreach to income-qualified residents to highlight special electric vehicle rebates and programs available to them; and
- Strengthening the structure of GCE and adding affiliate member requirements.

To continue strong regional collaboration and success, GCE is requesting that its nine member governments include funding for the Garfield Clean Energy Collaborative in their 2022 budgets. Thank you for your continued participation, support and consideration of this 2022 request.

Attached to this brief memo are the following reports and documents:

a) Solar plus Storage Executive Summary

THREE-COUNTY

SOLAR + STORAGE STUDY AND ACTION PLAN

MEETING LOCAL, STATE AND UTILITY CLEAN ENERGY TARGETS WHILE MAXIMIZING REGIONAL BENEFITS IN EAGLE, GARFIELD & PITKIN COUNTIES

EXECUTIVE SUMMARY



THREE-COUNTY SOLAR + STORAGE STUDY AND ACTION PLAN

OCTOBER 2021

Meeting local, state and utility clean energy targets while maximizing regional benefits in Eagle, Garfield and Pitkin counties.

PROJECT TEAM

Primary Author:
Katharine Rushton, Renewable Energy Program Director,CLEER

Inventory Lead:
Erica Sparhawk, Deputy Director, CLEER

Alice Laird, Executive Director, CLEER

Kim Schlaepfer, Climate Action Collaborative Project Manager, Walking Mountains Science Center

Mona Newton, Executive Director, CORE

Phi Filerman, Community Sustainability Manager, CORE

TECHNICAL ADVISORY COMMITTEE

Steve Beuning, Formerly Holy Cross Energy

Megan Day, National Renewable Energy Laboratory

Kevin Brehm, RMI

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Proofreading: Dave Reed, Zach Benevento-Zahner, Claire Kantor

STUDY FUNDING PARTNERS

The Colorado Department of Local Affairs Renewable Energy Challenge Grant included a package of five projects related to energy use and development in the region:

1. A regional energy inventory to measure energy use, costs and emissions.
2. A study of the potential for further development of solar energy coupled with battery storage, along with a dynamic solar map that identifies all viable land parcels.
3. An online toolbox of resources to inform landowners and local governments about successful solar plus storage project development.
4. Consultation with local governments to streamline the permitting processes for solar energy projects.
5. An economic transition study to assess the local economic implications of shifting from fossil fuels to 100% clean energy.

The online toolbox (3) is hosted on the Western Colorado Clean Energy Network website, and on the CORE and Walking Mountains Science Center websites. The toolbox offers landowners, solar developers and local government officials helpful user-oriented information about community-scale solar projects.

Consultation with local governments (4) is under way with seven municipal and county governments in the region, using the U.S. Department of Energy's SolSmart program[1] for communities as a guide. To date, four local governments in the region have achieved SolSmart designations as communities that are "open for business" for solar energy development.

The economic transition study (5) explains the taxing framework for the oil and gas industry in Colorado, tallies the tax revenues received by local governments, reports on the fiscal impacts that would result from a transition away from fossil energy to renewable energy, and begins to strategize ways to make that transition less disruptive for local governments, workers and businesses.

1. SolSmart Designee Map: https://solsmart.org/our-communities/designee-map/



Wolcott, Eagle County - Emily Kent photo

EXECUTIVE SUMMARY

The state of Colorado, local governments in Eagle, Garfield and Pitkin counties, and the electric utilities serving the three-county region have all set goals to shift the region's electricity supply to renewable energy.

At present, renewable energy only fuels a portion of the three-county region's electricity usage. Most of that clean energy comes from large, utility-scale solar and wind facilities located in other areas. Yet the region is blessed with abundant sunshine, and a significant share of the region's electricity demand could be met by generating more solar-powered electricity within the region.

While utility-scale solar projects produce electricity for the lowest unit cost, building such large facilities within the mountainous three-county region isn't feasible. The region is ideally suited, however, for development of mid-sized community-scale and smaller net-metered systems. The incrementally higher generation costs of these systems can be significantly offset by avoiding long-distance transmission costs and by capturing a share of installation and operational costs to benefit the regional economy. Coupling these systems with battery storage delivers further benefits to consumers and utilities.

This report builds on longstanding efforts in the three counties to accelerate locally-produced clean energy. A team of local clean energy advocates and experts, technical advisors and a national real estate mapping firm worked together to quantify and evaluate the region's potential for development of more community-scale and net-metered solar plus battery storage. The project team also examined how solar plus storage could deliver other benefits to the region, developed a map of all of the potential sites for community-scale solar development and created an online toolbox for landowners and local government officials.

The project team noted the high value of customer-owned, net-metered solar plus storage systems. Because there are so many variables associated with smaller net-metered systems, the team concentrated its in-depth analysis on the potential for community-scale solar plus storage.

This study is focused on the development of new resources for energy production. However, energy efficiency plays a critical role in these calculations. Reductions in electricity consumption achieved through efficiency measures will increase the ratio of local energy production to usage.

Through this study, the project team sought to answer a series of questions about the potential scale of solar plus storage development and the benefits such development could deliver. The answers, presented here as key findings, show exceptional promise for using solar plus storage to help meet renewable energy goals.

EXECUTIVE SUMMARY

KEY FINDINGS

- *How much electricity is used in the region per year?*
  1.86 million megawatt-hours of electricity, at a cost of $193 million, in 2019.

- *How much more community-scale solar could feasibly be developed in the region, under current market conditions?*
  232 megawatts, equal to about 420,000 megawatt-hours of production per year.

- *What roles will battery storage play?*
  Help utilities balance supply and demand, maintain a resilient energy supply during emergencies, and make new solar development viable for the local electric grid.

- *How much of the region's electricity consumption could be met by developing more community-scale solar plus storage?*
  If all 232 MW were developed, it could provide 23% of the region's electricity consumption.

- *What benefits and advantages would come from growth in community-scale and net-metered solar plus storage?*
  Cutting carbon emissions, building resilience in the energy supply, and boosting the economy.

- *What are the local economic benefits for developing 232MW solar plus storage?*
  Local purchase of products and services, property tax revenue, land lease revenue, energy savings and jobs.

- *What barriers and restrictions stand in the way of an even higher amount of solar plus storage development?*
  Grid limitations, energy storage costs, and current regulations.

- *What can the region do to realize its full solar plus storage potential?*
  An action plan, Section 8.0, spells out the steps for local governments, utilities, solar developers and landowners.

DEFINING UTILITY-SCALE, COMMUNITY-SCALE & NET-METERED SOLAR

Utility-scale solar is typically 15 megawatts (MW) or more in size, covering 75 or more acres and connected directly to regional transmission lines.

Community-scale solar (CSS) is typically 1 MW to 15 MW in size, built on parcels of 5 to 75 acres, and connected to the distribution grid.

Net-metered (NM) solar, which can be on rooftops or ground-mounted nearby, is much smaller and usually sized to offset about 100% of the customer's annual energy use. Systems are connected "behind the meter," where they directly offset a customer's electricity



1.0 INTRODUCTION

The Solar-Plus-Storage Study shows that development of more community-scale solar plus storage would meet nearly one quarter of the region's electric consumption, while delivering other benefits. Changes to current regulatory policies and market barriers, coupled with expansion of the electrical transmission grid, could boost that percentage even higher.

In the quest to reach 100 percent clean energy, combining cost-effective utility-scale renewable energy projects with the flexibility and resilience of community-scale solar plus storage will be an essential strategy.

2.0 UNDERSTANDING REGIONAL ENERGY USE & CURRENT SOLAR PRODUCTION

To learn what share of the electricity used in the three-county region could be produced locally, the project team conducted an inventory of energy use for the year 2019. The inventory compiled electricity and natural gas use in buildings and industry, using data from utilities serving the region. The inventory did not quantify transportation energy.

2.1 Energy Use & Cost

In 2019, buildings and industry in Garfield, Eagle and Pitkin counties used:

- 1.86 million megawatt-hours of electricity
- 119.5 million therms of natural gas

In 2019, lighting, powering and heating buildings and industry in the three-county region cost:

- $186.5 million for electricity
- $72 million for natural gas
- $258.5 million total for electricity and natural gas

2.2 Carbon Emissions & Utility Fuel Mix

Carbon emissions from the four main electric utilities serving the region vary depending on fuel mix. Each utility's current share of renewable energy, predominantly from wind turbines, is:

- Xcel Energy: 30%
- Holy Cross Energy: 42%
- Aspen Municipal Utility: 100%
- Glenwood Springs Electric: 100%

2.0 UNDERSTANDING REGIONAL ENERGY USE & CURRENT SOLAR PRODUCTION

Homeowners, businesses and local governments in the region have been investing in solar energy over the past two decades. The six existing community-scale solar arrays have a total generating capacity of 8.4 megawatts, while hundreds of net-metered arrays have a total generating capacity of 24.1 megawatts.

Utilities typically sell little to no net energy to net-metered customers. Therefore, most of these systems and the renewable energy they produce are not reported in the fuel mix of utilities, nor are they factored into the region's total electricity usage or spending.

Solar developers are currently planning another 31.25 megawatts of new community-scale solar projects in the region. These prospective projects are included in the market potential calculations in Section 3.

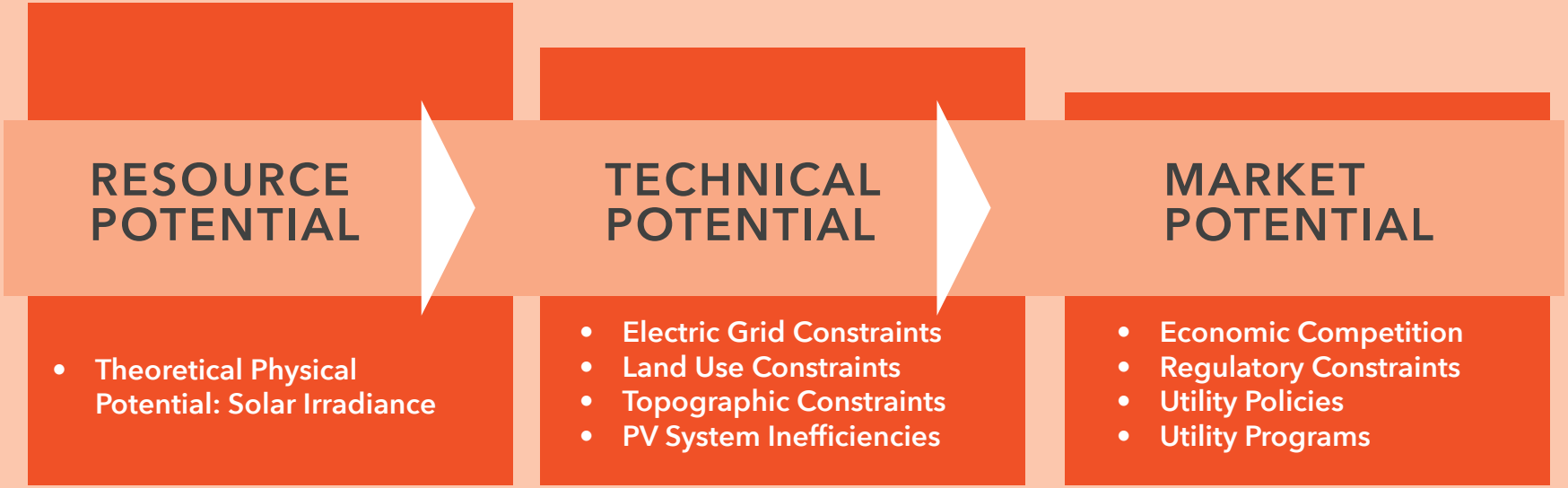
NET-METERED SOLAR CAPACITY IN THE REGION, BY UTILITY, 2020

	Community-scale generating capacity	Community-scale generation per year	Net-metered generating capacity	Net-metered generation per year
Holy Cross Energy	6.4 MW	11,592 MWh	16.7 MW	25,110 MWh
Xcel Energy	2.1MW	3,600 MWh	6.5 MW	9,687 MWh
Glenwood Springs Electric	0 MW	0 MWh	1 MW	1,404 MWh
TOTAL	8.5 MW	15,192 MWh	24.2 MW	36,201 MWh

3.0 REGIONAL POTENTIAL OF COMMUNITY-SCALE SOLAR + STORAGE (CSS+)

To determine how much solar electricity could be produced in the three-county area by community-scale solar, the project team started with the full solar resource potential. In collaboration with a national mapping firm, the team created a dynamic solar map to show a bird's-eye view of open land in the three counties and identify parcels suitable for solar development. The project team then applied various technical criteria to identify suitable private land parcels, and finally narrowed the list of parcels by market limitations that are in play today.

REGIONAL SOLAR POTENTIAL FRAMEWORK & PROCESS OF ANALYSIS



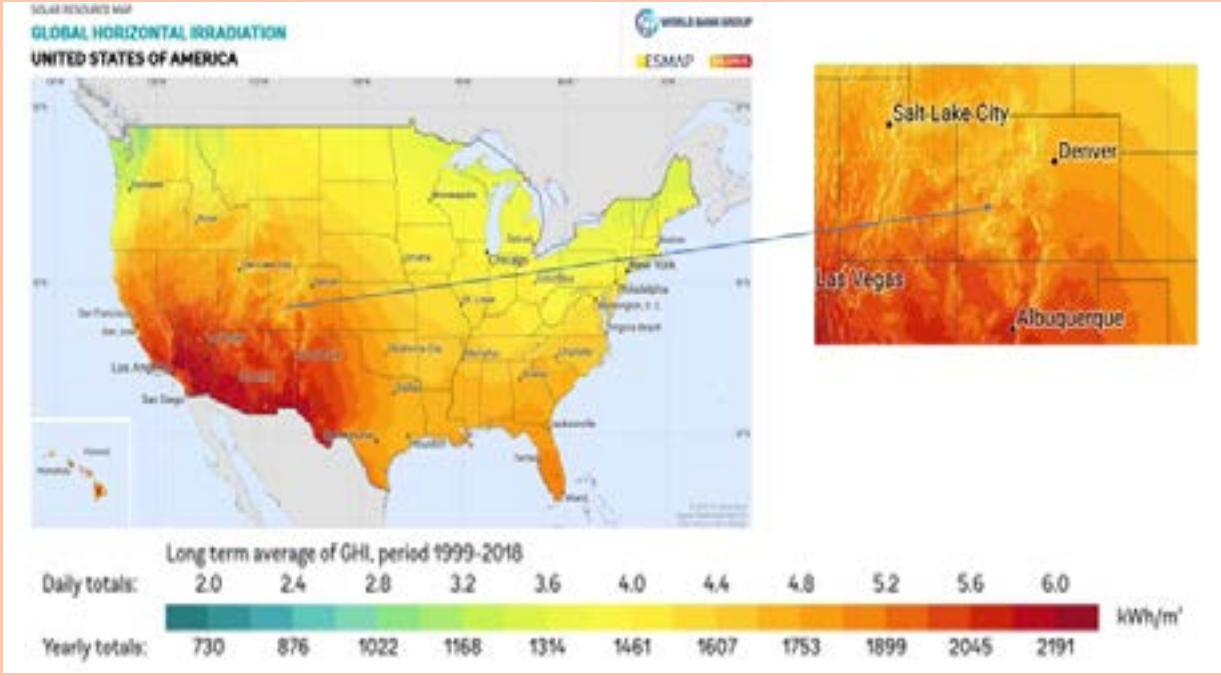
ADAPTED FROM: National Renewable Energy Laboratory, "Estimating Renewable Energy Economic Potential in the United States: Methodology and Initial Results," Brown et al, 2016, p.8.

3.0 REGIONAL POTENTIAL OF COMMUNITY-SCALE SOLAR + STORAGE (CSS+)

3.2 Resource Potential

With an average Global Horizontal Irradiance (GHI), the theoretical potential of sunshine, of approximately 4.8 kilowatt hours per meter squared, the three-county region benefits from an abundant solar resource.

SOLAR IRRADIATION FOR THE CONTIGUOUS 48 STATES



SOURCE: https://globalsolaratlas.info/ download accessed April 5, 2021.

3.3 Technical Potential

The technical potential step applied various practical constraints such as land use, topography, site suitability, factors obtained from local solar developers, and the existing utility grid system and related infrastructure.

TECHNICAL POTENTIAL OF CSS+ SOLAR DEVELOPMENT FOR IDENTIFIED LAND SITES, BY UTILITY SERVICE AREA

SERVICE TERRITORY	LAND PARCELS IDENTIFIED	LAND USE AT AVERAGE 6 ACRES PER MW	POTENTIAL GENERATION CAPACITY	POTENTIAL GENERATION PER YEAR
HOLY CROSS ENERGY	635	2,274 acres	379 MW	688,643 MWh
XCEL ENERGY	87	312 acres	52 MW	94,484 MWh
TOTAL TECHNICAL POTENTIAL	722	2,586 acres	431 MW	783,127 MWh

3.0

REGIONAL POTENTIAL OF COMMUNITY-SCALE SOLAR + STORAGE (CSS+)

3.4 Market Potential

The market potential quantified the maximum amount of solar generation capacity that could be interconnected to the utility grid, taking into account current regulations governing utilities, utility policies and programs in place today, and economic competition from large utility-scale solar projects elsewhere.

MARKET POTENTIAL OF CSS+ SOLAR DEVELOPMENT, BY UTILITY SERVICE AREA

SERVICE TERRITORY	LAND USE AT AVERAGE 6 ACRES PER MW	POTENTIAL GENERATION CAPACITY	POTENTIAL GENERATION PER YEAR
HOLY CROSS ENERGY	1,080 acres	180 MW	327,060 MWh
XCEL ENERGY	312 acres	52 MW	94,484 MWh
TOTAL TECHNICAL POTENTIAL	1,392 acres	232 MW	421,544 MWh

Estimating Market Potential for Battery Storage

Battery storage can be added to almost any PV system. The project team created an example that models one 5 MW / 15 MWh battery storage system on the 12 three-phase feeder lines in the Holy Cross Energy distribution system. The 12 systems were paired with the 180 megawatts of market potential in Holy Cross territory. No storage was modeled for Xcel Energy because it does not yet offer programs and incentives for paired battery storage. (Section 3.4.3)

3.5 Local Development as a Percentage of Actual Consumption

An important reason for this study is to determine how much of the region's current electricity demand could be met by developing more community-scale solar plus storage projects in the region. Is the potential significant enough to make the effort worthwhile? The answer is a definite "Yes."

Community-scale solar plus storage, existing and potential, could meet 23% of the region's present annual electricity consumption.

4.0 REGIONAL POTENTIAL FOR ROOFTOP NET METERED SOLAR + STORAGE (NM+)

The 24 MW of existing net-metered solar in the region is powering residential and commercial buildings, equal to about 3,650 homes. Growth in net-metered solar plus storage (NM+) systems could add substantial local solar generation, further supporting the utility grid and boosting economic benefits.

The project team used a tool developed by NREL (SLOPE) to quantify the potential for rooftop solar at the county level for residential and for commercial electric customers. The tool does not account for utility grid constraints, existing rooftop solar, or utility service territories.

Results are significant. Using the rough estimates generated by the NREL tool, the technical potential for net-metered solar in the region is 487.8 MW. Additional analysis will be needed to quantify the actual market potential for development of more net-metered PV systems in the region, as well as the role and benefits of paired battery storage.

TECHNICAL POTENTIAL OF ROOFTOP NM+ SOLAR GENERATING CAPACITY, BY COUNTY & SECTOR

	RESIDENTIAL	COMMERCIAL	TOTAL BY COUNTY
GARFIELD COUNTY	66.8 MW	175.4 MW	242.2 MW
EAGLE COUNTY	38.1 MW	128.0 MW	166.1 MW
PITKIN COUNTY	15.8 MW	63.7 MW	79.5 MW
TOTAL BY SECTOR	120.7 MW	367.1 MW	487.8 MW

5.0 UNDERSTANDING THE REGIONAL ELECTRICITY MARKET

Advancing renewable energy in the region depends on more than finding suitable locations for solar projects. Other factors include the region's patchwork of electric utility service territories, physical limits to accessing the local distribution grid, barriers inhibiting development of battery storage, and lack of a regional transmission grid operator. The region's current market potential could increase as barriers are adjusted or removed.

RESOURCE POTENTIAL	TECHNICAL POTENTIAL	MARKET POTENTIAL	MARKET POTENTIAL with fewer barriers
• Theoretical Physical Potential: Solar Irradiance	• Electric Grid Constraints • Land Use Constraints • Topographic Constraints • PV System Inefficiencies	• Economic Competition • Regulatory Constraints • Utility Policies • Utility Programs	• Removal of some market barriers to capture more technical potential capacity

ADAPTED FROM: National Renewable Energy Laboratory, "Estimating Renewable Energy Economic Potential in the United States: Methodology and Initial Results," Brown et al, 2016, p.8.

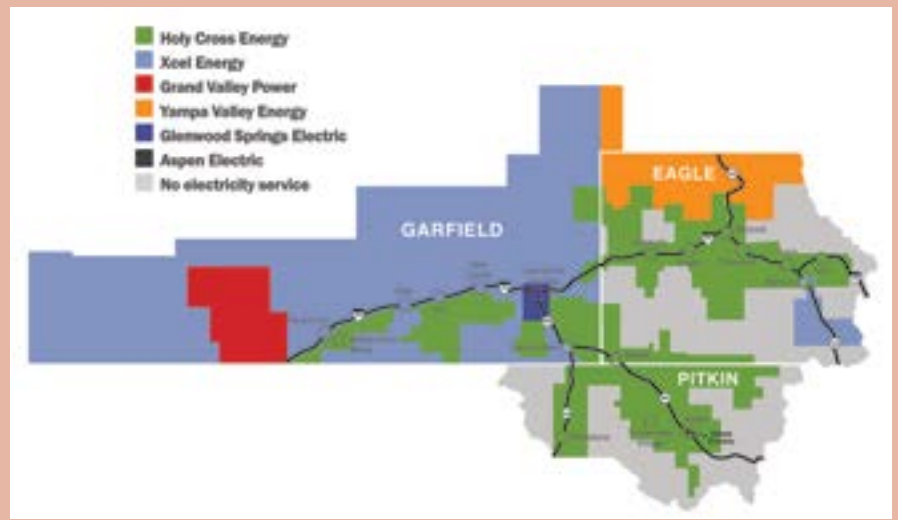
5.1 Regional Retail Electric Service

The three-county region is served by six electric utilities that are operated under three different ownership and regulatory systems.

- Holy Cross Energy, Grand Valley Power and Yampa Valley Energy are rural electric cooperatives, which are not-for-profit entities owned by their customers and governed by an elected board.
- Xcel Energy is an investor-owned utility, which is a for-profit, publicly traded corporation governed by a board of directors.
- Glenwood Springs Electric and Aspen Electric are municipal utilities, owned by city governments and governed by city councils.

Service territories within the three-county region for Grand Valley Power and Yampa Valley Energy are very small spillovers from their main service areas. Because they serve such small portions of the three-county market, they were excluded from further study.

FIGURE 12: ELECTRIC UTILITIES SERVING EAGLE, GARFIELD & PITKIN COUNTIES



5.0 UNDERSTANDING THE REGIONAL ELECTRICITY MARKET

5.2 Regional Wholesale Electric Service

Wholesale electricity is provided to the region by two entities.

Xcel Energy generates much of its electricity at its own facilities in Colorado and other states. These include coal-fired and gas-fired power plants, wind farms and large solar arrays. Xcel provides power to its own retail customers and, under a wholesale contract, to Holy Cross Energy. Xcel Energy's business in Colorado is regulated by the Colorado Public Utilities Commission.

The Municipal Energy Agency of Nebraska (MEAN) provides wholesale electricity and transmission to 69 communities in Colorado, including Glenwood Springs and Aspen, and in Iowa, Nebraska and Wyoming. MEAN is regulated by the Federal Energy Regulatory Commission. While MEAN provides wind-powered electricity to Glenwood Springs and Aspen, it has placed limits on the amount of renewable energy that can be generated by the municipal utilities and their customers.

5.3 Barriers to Grid Infrastructure Access

Use of the regional energy grid by multiple utilities with different operating structures is a longstanding challenge. As renewable energy producers develop generating facilities, obstacles inhibit their ability to push fluctuating levels of electricity onto regional grids.

In Colorado, these include Xcel Energy's practice of restricting access to regional transmission grids and slow processing of interconnection applications. Lack of joint transmission planning across the larger market region is also slowing the transition to clean energy, and "pancaked" transmission charges make purchasing electricity across long distances more expensive.

5.4 Regulatory Barriers to Stand-Alone Battery Storage

Battery storage allows utilities to store low-cost renewable energy when generation is high and demand is low, and use that stored power when demand rises locally or on the wider electric grid. Modifying the federal Investment Tax Credit and the federal Public Utility Regulatory Policies Act to recognize and accommodate stand-alone battery storage would make investments in storage more feasible, especially for rural utilities.

5.5 A Regional Transmission Operator (RTO) for the Mountain West

For Colorado's electric utilities to maximize use of the state's rich solar energy resources, joining or forming a regional transmission organization (RTO) or independent system operator (ISO) is essential. Colorado's grid is too small to balance out supply and demand with increased levels of renewable energy.

RTOs and ISOs are independent organizations that operate electric transmission assets and provide wholesale transmission services within a defined region. Joining an RTO or ISO power pool would balance supply and demand and give utilities access to energy markets that could drive investment in new generation resources.

Promising advances are occurring today to bring transmission operators into the West's regional energy market. Utilities in the mountain west are looking to join the California Independent System Operator or the Arkansas-based SouthWest Power Pool, an RTO.

6.0 ECONOMIC IMPACT ANALYSIS OF REGIONAL MARKET POTENTIAL FOR CSS+

Community-scale solar plus storage projects create a project value chain that starts with installation and continues over the life of the project. Regions where projects are developed can reap economic benefits, especially when local businesses and a trained workforce are prepared to work with developers.

6.1 Local Capture of Project Installation Costs

The project team closely studied installation costs for community-scale solar, using a local example project and ongoing nationwide cost benchmarking studies done by NREL.

Major solar equipment components, which are produced outside the region, account for 45% of project costs. In the local example project, just 10.8% of project costs were spent locally. Local economic benefits could be increased to as much as 21% by using more local contractors and purchasing all "balance of system" hardware locally.

Battery storage improves local grid reliability and can help utilities reduce peak demand costs. However, battery storage is manufactured elsewhere, and less than 3% of installation costs are spent locally.

Cost benchmarking studies informed the project team's work in calculating costs for the region's solar plus storage market potential, identified in Section 3.4. The cost for 232 MW of solar is estimated to be $335 million, and the cost for 12 units of 5 MW / 15 MWh battery storage would be $85 million.

The project team then calculated how much of the installation costs could be captured in the regional economy. Installation costs for solar PV could yield $70.9 million in local spending, and installation of battery storage could yield $2.2 million.

LOCAL ECONOMIC BENEFITS OF MARKET POTENTIAL COMMUNITY-SCALE SOLAR PLUS STORAGE DURING INSTALLATION

	INVESTMENT	PERCENT OF TOTAL PROJECT COST	MAXIMUM POTENTIAL FOR LOCAL CAPTURE
Solar PV 232 MW (AC)	$335.0 million*	21.16%	$70.9 million
Storage (12 units) 5 MW / 15 MWH	$85.2 million*	2.63%	$2.2 million
SOLAR PV PLUS STORAGE TOTAL	$420.2 million*	17.4%	$73.1 million

* These estimates do not account for decreasing equipment and implementation costs over time.

6.0 ECONOMIC IMPACT ANALYSIS OF REGIONAL MARKET POTENTIAL FOR CSS+

6.2 Local Capture of Project Operational Costs

Over its operational life of about 30 years, community-scale solar plus storage systems deliver further value that can be captured in the regional economy. Local spending by project owners includes system maintenance, property taxes on equipment, and lease payments to landowners. Payments for other operational costs, such as insurance, management and administration, will likely go to companies outside the region.

LOCAL ECONOMIC BENEFITS OF MARKET POTENTIAL COMMUNITY-SCALE SOLAR PLUS STORAGE OVER OPERATIONAL LIFE

	MULTIPLIER	LOCAL CAPTURE PER YEAR	LOCAL CAPTURE OVER 30-YEAR SYSTEM LIFE
Operations & Maintenance	232 MW solar	$1.3 million	$37.5 million
Property Taxes	232 MW solar + 12 units of 5 MW / 15 MWH storage	$0.9 million	$26.5 million
Land leases	1,392 acres	$1.0 million	$31.3 million
TOTAL		$3.2 million	$95.3 million

6.3 Employment and Energy Savings Estimates

To estimate the potential benefits of energy cost savings and employment growth, the project team contracted with a consultant who used an input-output modeling tool. Such economic modeling uses assumptions about key factors to create an estimate of future economic impacts.

The modeling used results of the regional energy inventory and the regional solar potential research of this study. It assumed costs for supportive community programs, significant electricity cost savings for utilities and consumers, and gains in project affordability from low-cost financing. The model predicts regional savings in energy spending for utilities and customers, which would boost the regional economy and support employment.

The analysis indicated the possibility of achieving regional energy bill savings of $19 million per year and a sustained average of 260 jobs across the broad regional economy.

6.4 Other Economic Benefits

Distribution utilities would receive other economic benefits, such as reduced demand charges paid to wholesale suppliers and deferred infrastructure upgrades. Utilities and their customers would also benefit financially from improved grid resilience.

7.0 ADDITIONAL BENEFITS OF SOLAR PLUS STORAGE DEVELOPMENT

In addition to generating electricity and contributing to the local economy, solar plus storage can deliver other value-added benefits.

7.1 Reduced Carbon and Greenhouse Gas Emissions

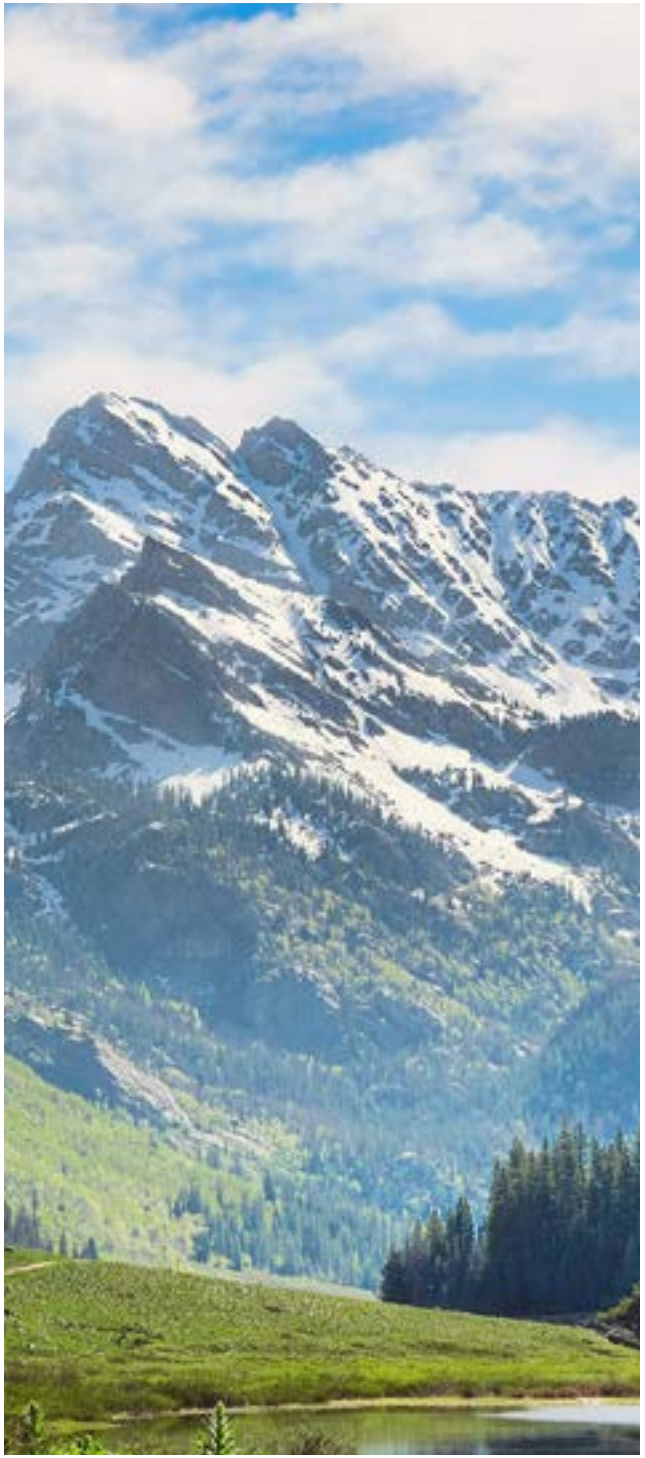
Electricity use in the three-county region produced 838,000 metric tons of carbon dioxide-equivalent (CO_2e) emissions in 2019. Developing the full 232 MW of community-scale solar would reduce emissions by about 298,000 metric tons.

7.2 Power Supply Resilience

A reliable power supply supports our lives and operates essential facilities. Solar plus storage systems can continue to generate new power during an extended outage and draw on stored backup power. This makes communities more resilient during extreme weather, wildfire, flooding, earthquakes, accidental damage and other emergencies.

7.3 Low-Impact Development Practices

A low-impact approach to solar development can improve soil health, retain water, nurture native species, produce food and still provide low-cost clean energy. Practices include replanting native vegetation, particularly plants that attract pollinators, and using grazing animals to control vegetation.



Piney Lake, Eagle County - Emily Kent photo

8.0

Action Plan

The following Action Plan was developed by the project team and presented to stakeholders who had the opportunity to provide input and comments. Stakeholders included the Garfield Clean Energy Board of Directors (comprising nine government partners), Pitkin County BOCC, Eagle County BOCC, Holy Cross Energy, and staff from the National Renewable Energy Lab and RMI.

8.0 ACTION PLAN

1. Commitments to develop local solar + storage

A: Adopt a "local renewable energy first" policy and commit to a certain percentage of the total energy used by the community or the utility power mix to be generated from locally sited clean energy resources.
Local distribution utilities, local governments, businesses

B: Utilize the map, study and resources to inform planning processes (e.g., comprehensive plans, land use planning, utility resource plans) to make the region ready for local renewable energy.
Local governments, local distribution utilities

C: Work together with Municipal Energy Agency of Nebraska (MEAN) to revise contractual clauses that disincentivize rooftop solar production in order to allow higher levels of solar generation on municipal distribution grids.
Local government and municipal utilities in communities that contract with MEAN for energy services

D: Develop an inventory/checklist of potential opportunities to advance local solar + storage projects within each jurisdiction's boundaries, and establish timelines and budgets for implementation.
Local governments, local distribution utilities, businesses, households

E: Codify rooftop solar or solar + storage as an onsite requirement for new construction where possible.
Local governments, Authorities Having Jurisdiction (AHJs)

F: Explore and develop code mechanisms to incentivize solar + storage for existing buildings.
Local governments, AHJs

G: Streamline solar + storage permitting and land use review to remove unintentional barriers and unnecessary cost.
Local governments, AHJs

2. Funding and low-cost financing sources

A: Make low-cost financing sources, grants and rebates easily accessible to every community, our region and other rural regions in a sustained, reliable manner.
State government, federal government, utilities

B: Offer time-limited bulk-buy programs to accelerate rooftop solar + storage implementation with a focus on expanding access to low- and middle-income (LMI) households.
Energy nonprofits, local distribution utilities

C: Create financing models that prioritize local funding and ownership of community scale solar developments to support regional economic development.
Nonprofit/advocacy groups, investors and financial institutions, economic development groups

D: Participate in joint approaches to accelerate solar + storage implementation on local government facilities to utilize economies of scale to reduce costs.
Local governments, clean energy collaboratives (GCE, CAC, UvRFCAC)

E: Make financing, funding and rebate options equitably accessible and inclusive of diverse communities throughout varying utility territories and counties.
State government, federal government, utilities, policy makers

F: Develop mechanisms to help cover the costs of adding solar + storage in new construction to help make sure new structures are built as energy-wise as possible while remaining affordable.
State government, federal government, utilities, policy makers

8.0 ACTION PLAN

3. Investment in regional expertise and capacity building to accelerate clean energy progress

A: Invest in regional expertise and capacity building to accelerate and sustain enduring progress within interconnected regions that share a clean energy workforce and utility territories.
State government, local governments, foundations and philanthropists

B: Conduct an analysis of Western Slope supply chains to identify and take action on clean energy business and manufacturing opportunities and challenges.
Economic development groups, Colorado Energy Office, OEDIT, Just Transition office

C. Invest in annual data collection on a regional basis to track and guide progress on reaching clean energy targets with timely, actionable data.
Local governments, energy groups, climate and clean energy advocates

D. Remember that the overall effort is a marathon, not a sprint – find ways to maintain sustained commitment to developing regional knowledge, awareness, community will and widespread collaboration needed to reach challenging 100% renewable goals.
Local governments, energy groups, climate and clean energy advocates, foundations

E: Continue/increase investment in programs that implement efficiency measures and reduce demand so that existing renewable resources provide a larger percentage of the total.
State government, local governments, local distribution utilities, energy groups

8.0 ACTION PLAN

4. Utility regulatory and infrastructure improvements

A: Identify and prioritize grid improvements needed in the three-county region and secure the needed funding to make the improvements.
Local distribution utilities

B: Advocate for, help create and join a regional transmission organization (RTO).
Energy nonprofits and partners, state legislature, Colorado Public Utilities Commission

C: Incentivize the addition of battery storage to net-metered solar PV systems through utility rebate programs and other compensation mechanisms.
Local distribution utilities, PUC, energy nonprofits

D: Advocate that FERC update PURPA regulations to include utility-scale storage as a qualifying facility.
Local distribution utilities, local governments

E: Provide education about the importance of infrastructure upgrades and creating an RTO.
Energy nonprofits

5. Best land use practices for solar + storage development

A: Review land use application process and policies to ensure utilization of best practices for solar + storage development.
Local governments

B: Include performance standards in land use permitting by requiring runoff mitigation planning and site revegetation.
Local governments

C: Create a scoring system to assess PV sites as pollinator-friendly using a common statewide methodology.
State government

D: Facilitate training opportunities for local government staff to understand PV development best practices, and methodologies for review and enforcement of those best practices.
Energy nonprofits

E: Prioritize siting solar + storage on available rooftops wherever possible.
Local governments

6. Supportive tax policies and improved incentives

A: Advocate for changes to the federal Investment Tax Credit to extend eligibility to standalone storage technologies (those not sited with solar).
Federal government, state government, local governments, industry groups, nonprofit/advocacy groups

B: Advance federal legislation that would provide the value of the solar investment tax credit as a cash payment to those unable to monetize the tax credit (e.g., LMI households, nonprofits and governmental entities).
Federal government, state government, local governments, industry groups, nonprofit/advocacy groups

C: Create incentive structures for solar + storage that are not based around tax credits and are accessible to nonprofit organizations.
Federal government, state government

D. Ensure that large-scale solar developments pay annual taxes that can help replace a portion of the public revenue generated by fossil fuels without discouraging solar development.
State government

7. Expanded economic development support to rural regions and transition economies

A: To more fully maximize the economic development benefits of meeting the state 100% Renewable Goal, provide more assistance to rural regions throughout the state to tap the economic development benefits of clean energy with the following actions:

- Provide tools to maximize local solar development on rooftops and land sites.
- Identify, map and accelerate local solar + storage in each region of the state.
- Provide funding including low-cost financing, equitable access to funding sources for rebates and grants throughout the state.

B: Increase and strengthen easily accessible expertise at the regional and state agency level to help remove barriers and accelerate the use of solar + storage and other renewable technologies.
State government, Colorado Energy Office

C: Focus on equity by providing development incentives to low-income housing and communities that incorporate solar + storage.
State government, local governments

D: Focus on equity by providing development incentives to community solar gardens that provide lower-cost energy to LMI households.
State government, local governments

E: Support the growth of the clean energy industry with business development grants, technical assistance, innovation grants and incubators.
Federal and state governments, local economic development organizations

E. Provide funding and programs to help all regions in getting to 100% renewable energy, realizing that even places that have made progress have a long way to go.
Federal and state government, foundations

8.0 ACTION PLAN

8. Education and training

A: Provide sustained, reliable funding and support to community colleges and community partners to establish/enhance solar + storage comprehensive workforce job training programs, ongoing workshops, and professional development opportunities.
State government: workforce training department

B: Create educational apprentice and professional accreditation opportunities for high school and community college students interested in working in the renewable energy and related industries.
Schools, colleges, nonprofits,professional accreditation organizations

C: Ensure that pertinent building professionals (engineers, architects, general contractors, trades, etc.) are trained to integrate solar PV + storage systems into traditional building design and construction.
Colorado Energy Office, nonprofits, industry associations, building departments

D: Include energy education in K-12 curriculum to prepare and empower all students (no matter what field they go into), to be aware consumers, decision makers on energy issues.
Schools, colleges, Colorado Energy Office

AGREEMENT FOR PROFESSIONAL SERVICES

This AGREEMENT FOR PROFESSIONAL SERVICES is made this _____ day of _____ 2021 between the CITY OF GLENWOOD SPRINGS, a home rule municipality under the laws of the State of Colorado ("City"), and CLEAN ENERGY ECONOMY FOR THE REGION, a Colorado non-profit corporation ("Contractor").

WITNESSETH:

In consideration of the mutual covenants and agreements herein contained, the parties hereto agree as follows:

1. Scope of Agreement. Contractor agrees to provide administration and implementation of energy efficiency programs related to the City's electric utility services, as more fully identified on **Exhibit A** attached hereto and incorporated herein.

2. Consideration. The City agrees to pay Contractor no more than 90% of what has been budgeted within the Energy Conservation line item within each years budget. The scope of CLEER services will be defined within the programs listed on **Exhibit A**.

3. Term. This Agreement shall be effective as of January 1, 2022 and shall remain in effect until December 31, 2022, or unless earlier terminated pursuant to Section 11 of this Agreement. This agreement can be extended upon mutual agreement by both parties for one-year durations with an end date of possible extension of December 31, 2025.

4. Agreement Subject to Appropriations. It is expressly understood and agreed that the City's performance of this Agreement is subject to appropriations being made by the City Council of the City of Glenwood Springs. In the event City Council fails to make or maintain sufficient appropriations to pay any costs incurred under this Agreement, the Agreement shall be terminated immediately.

5. Independent Contractor. Contractor is providing services independently and is not an employee of the City. Contractor shall not be entitled to any benefits provided to City employees. Contractor understands the difference in status between an independent contractor and an employee and acknowledges and stipulates that Contractor is neither eligible nor entitled to statutory or legal benefits or provisions of labor codes or other such similar statutes. The parties further agree that the City shall not withhold from Contractor unemployment insurance, social security or any other withholdings. Contractor agrees to be responsible for all such payments required by law.

a. Contractor acknowledges and agrees that he is not entitled to unemployment insurance benefits unless unemployment compensation is provided by Contractor or some other entity. Contractor also acknowledges and agrees to report all payments received from the City on his federal and state income tax returns and is obligated to pay any and all resulting federal and state income tax obligations. Contractor will indemnify the City for any such payments required but not paid.

b. Contractor acknowledges and agrees that he is not covered by the City's workers' compensation coverage and is not entitled to workers' compensation benefits. The City will be held harmless, and Contractor will indemnify the City for any liability arising out of or caused by Contractor's business and/or persons engaged in operations covered by this Agreement.

c. In making and performing this contract, Contractor acts and at all times shall act as an independent contractor and shall maintain operations that are separate and distinct from the City. Nothing contained in this Agreement shall be construed or applied as to create or imply the relationship of partners, joint adventurers, or of employer or employee between the parties hereto.

6. Standard of Care. The standard of care applicable to Contractor's services will be the same degree of care, skill, and diligence normally employed by professionals performing the same or similar services.

7. Indemnity. Contractor hereby covenants and agrees to indemnify, save, and hold harmless the City, its officers, employees, and agents from any and all liability, loss, costs, charges, obligations, expenses, attorneys' fees, litigation, judgments, damages, and claims arising from or out of any negligent act or omission or other tortious conduct of Contractor, its officers, employees, or agents in the performance or nonperformance of its obligations under this Agreement.

8. Insurance. Contractor has provided proof of general liability insurance. The liability insurance shall name the City as an additional insured thereunder, with appropriate endorsements with single limit liability coverage of at least One Million Dollars ($1,000,000.00). Contractor shall maintain this insurance for the term of this Agreement.

9. Governmental Immunity. Nothing herein shall be interpreted as a waiver of governmental immunity, to which the City would otherwise be entitled under §24-10-101, et seq., C.R.S., as amended.

10. Employees, Subcontractors and Assignees. The providing of professional services required under Section 1 of this Agreement shall be the responsibility of Contractor. Contractor may employ or subcontract with additional persons to assist in the performance of this Agreement. Supervision and payment of any such persons shall be the sole and exclusive responsibility of Contractor. Notwithstanding the foregoing, however, this Agreement shall not be assigned by Contractor to a third party without the prior express written consent of the City.

11. Termination. If at any time the City is dissatisfied with the services of Contractor for any reason whatsoever, the City may terminate this Agreement effective immediately upon the delivery of written notice to Contractor. In the event of any such termination, the City shall pay Contractor for services rendered to the date of termination.

12. Agreement Administration and Notice. For purposes of administering this Agreement, the City's Public Works Director will represent the City in carrying out the purposes and intent of this Agreement. Any notices required to be given pursuant to this Agreement shall be delivered as follows:

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

To the Contractor: CLEER
P.O. Box 428
Carbondale, CO 81623
Phone: 970-704-9200

13. Responsibilities. Contractor shall be responsible for all damages to persons or property caused by the Contractor, its agents, employees or sub-Contractors, to the extent caused by its negligent acts, errors and omissions hereunder, and shall indemnify and hold harmless the City from any claims or actions brought against by reason thereof.

14. Entire Agreement. This Agreement constitutes the entire agreement between the parties. The provisions of this Agreement may be amended at any time by the mutual consent of both parties. The parties shall not be bound by any other agreements, either written or oral, except as set forth in this Agreement.

15. Governing Law. The laws of the State of Colorado shall govern the validity, performance and enforcement of this Agreement. Venue for any action instituted pursuant to this agreement shall lie in Garfield County, Colorado.

16. Authority. Each person signing this Agreement represents and warrants that said person is fully authorized to enter into and execute this Agreement and to bind the party it represents to the terms and conditions hereof.

17. Attorneys' Fees. Should this Agreement become the subject of litigation between the City and Contractor, the prevailing party shall be entitled to recovery of all actual costs in connection therewith, including but not limited to attorneys' fees and expert witness fees. All rights concerning remedies and/or attorneys' fees shall survive any termination of this Agreement.

18. Counterparts. This Agreement may be executed in counterparts, including any facsimile copies, each of which shall be deemed an original and all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands this _____ day of _____ 202___.

[Acknowledgements on following page]

CITY OF GLENWOOD SPRINGS

_____
Johnathan Godes, Mayor

ATTEST:

_____
Ryan Muse, City Clerk

CLEAN ENERGY ECONOMY FOR THE REGION

By: _____
Alice Hubbard Laird, Executive Director

STATE OF COLORADO)
) ss.
COUNTY OF GARFIELD)

The foregoing AGREEMENT FOR PROFESSIONAL SERVICES was acknowledged before me this _____ day of _____ 202__ by Alice Hubbard Laird as Executive Director of Clean Energy Economy for the Region.

Witness my hand and official seal.

My commission expires: _____

_____
Notary Public

2022 PROPOSED REBATES - EXHIBIT A

Rebates are available to Glenwood Springs Electric customers on a first come first serve basis while funds last. Invoices must be submitted within 90 days of the completion date. Maximum rebate amounts are per account per year. CLEER staff helps members apply for MEAN and Black Hills Energy rebates whenever available.

Rebates are NOT to exceed $112,500 in 2022.

RESIDENTIAL (RETROFITS ONLY)

Low-to-Moderate (LMI) Household Incentives:
Rebate amount: up to $4,000/year, in combination with Garfield Clean Energy, MEAN, and/or Black Hills Energy rebates
Criteria:

- Free home energy assessments for renters or homeowners (includes health and safety check for combustion appliances/HVAC)
- Families living below 120% AMI qualify (rebate amount will be tiered depending on income level)
- Weatherization, HVAC upgrades, LEDs, electric panel upgrade and refrigerators

Home Energy Assessment
Rebate amount $300

- Must be performed by a BPI certified Building Analyst
- Include blower door test and a CAZ (Combustion Appliance Zone) test

Air Sealing
Rebate amount: 25% of project cost up to $500
Criteria:

- Pre and post-blower door assessment required

· Air leakage must be reduced by 10% or more as measured in CFM50 by blower door test

Insulation

Rebate amount: 25% of project cost up to $500 for all insulation projects

Criteria:

· Air sealing must be completed prior to adding insulation unless Natural Air Changes per Hour (NACH) is 0.35 or lower.

· Pre- and post-blower door assessment required

· Insulation project must meet 2018 International Energy Conservation Code (IEEC) requirements

· Attic, crawlspace, and walls qualify for rebate

Multifamily Envelope

Rebate amount: 25% of project cost up to $10,000 per complex

Criteria:

· Four or more units per building

· Entire building must be air sealed and/or insulated

· Pre- and post-blower door assessment required on one unit per building

· Air leakage must be reduced by 10% or more as measured in CFM50 by blower door test

· Insulation project must meet 2018 International Energy Conservation Code (IEEC) requirements

LED Lighting

Rebate amount: 50% of project cost up to $200

Criteria:

· Replace non-LED bulbs with LED bulbs or fixture

· Must be Energy Star LEDs or Design Lights Consortium (DLC) certified

Heating and Cooling

Cold Climate Air Source Heat Pump

Rebate amount: 25% of project cost up to $1,000 (can be matched with MEAN rebate)

Criteria:

· Fuel Switch (to electric heat from a fossil fuel heating system)

· Ducted: HSPF 9+; Ductless: HSPF 10+

- Must be rated for cold climates and provide heat down to -5 or colder
- Load calculation required to the right-size outside unit and derate for high elevation
- Must be used as the primary heat source in the home
- AHRI Certification required
- Learn more about heat pumps:
    - https://neep.org/sites/default/files/resources/ASHP_buyingguide_5.pdf

Evaporative Cooler (swamp)

Rebate amount: 25% of project cost up to $200

Criteria:

- Must be permanently installed in the home
- No previous swamp cooler installed

Smart (Wi-Fi Enabled) or Programmable Thermostats

Rebate amount: $50/unit (up to 4 per account)

Criteria:

- Home is heated with electricity
- Existing thermostat is non-programmable

Water Heater

Rebate amount: 25% of project cost up to $1,000

Criteria:

- Fuel switch (to Heat Pump water heater from a fossil fuel water heating system)
- Hybrid/electric heat pump water heater models only
- Energy Star rated
    - https://www.energystar.gov/productfinder/product/certified-water-heaters/results
- Learn more about heat pump water heaters:
    - https://www.energy.gov/energysaver/heat-pump-water-heaters

Heat Tape Timer

Rebate amount: 25% of project cost up to $200

Criteria:

- No current controls
- Timer must be hardwired
- Heat tape must not be turned on 4 pm to 9 pm during the winter months

E-Bikes

Rebate amount: $200

- Purchase within 81601 zip code
- Two E-bikes per household limit
- Intend to use the E-bike to offset vehicle miles

EV Charging Station

Rebate amount: $500

- Must have a NEMA 14-50 outlet to plug in to or the charger must be hardwired to a 240V Circuit
- Must be installed by a licensed electrician
- Must be ENERGY STAR certified and UL Listed

Electric Panel Upgrade

Rebate amount: $1,000

- The electric panel must be upgraded to 200 amps or greater and must include an EV charger circuit and a water heater circuit
- Panel upgrades must be done for the purpose of home electrification measures and/or solar PV installation.
- Properties must demonstrate completed installation of either a Level 2 EV charger or an electric heat pump water heater.

Bundle Rebates

The bonus incentive requires all two to be completed within 90 days. Home envelope includes air sealing and insulation projects.

- Home envelope + cold climate heat pump installation: $500 bonus
- Home envelope + cold climate heat pump + heat pump water heater: $750 bonus
- Home envelope + cold climate heat pump installation + EV Charger: $750 bonus

Annual GWSE rebate limit:

$ 3,000 + bundle bonus per member per year

Commercial (RETROFITS ONLY)

Rebate amount: 50% of the project cost up to $7,500

- Projects based on $0.02 per kWh in estimated savings over 10 years

· Upgrades include EC motors, lighting controls, chillers, variable frequency drives (VFD), and cold climate heat pumps

LED Lighting

Rebate amount: 50% up to $7,500

Criteria:

· Replace non-LED bulbs with qualifying LED fixtures or bulbs

· Bulbs must be recycled

· $0.02 per kWh in estimated savings over 10 years

· All fixtures or LED bulbs must be Energy Star rated or Design Lights Consortium (DLC) certified

Program Administrative Details and Costs

CLEER staff will provide the following services:

· Walkthrough assessments for businesses

· Energy Coaching and technical assistance to businesses to identify priority projects, find contractors, review bids, understand rebates and ROI for comprehensive projects, and meet final project energy savings tracking requirements

· Energy Coaching services to assist homeowners (including LMI) to identify priority projects based on home energy assessment reports, find qualified contractors, review bids, understand rebates, and secure financing to move projects forward

· Program branding, earned media, case study, direct outreach, web presence, customer bill insert, community partner outreach, and linkage with neighboring energy programs

· Reporting, rebate processing, presentations, program development, administration, management, coordination with city staff

· Assistance with MEAN's DSM Survey and EIA reporting

Administrative costs are NOT to exceed $60,000 in 2022.

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item:	Charter Cleanup
Action Requested:	Discussion of potential charter amendments that would be on a future ballot. City Attorney Karl Hanlon will lead the discussion and provide handouts.
Department:	City Administration
Presented By:	Karl Hanlon, City Attorney
Background Info:	Potential changes to the Glenwood Springs Charter may be considered for a future ballot.
Issues:	None.
Staff Recommendation:	This is a discussion only.

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: Planning and Zoning Commission Interviews

Action Requested: Planning and Zoning Commission Interviews

Department: City Administration

Presented By: Jenn Ooton, Assistant City Manager

Background Info: James Woodrow Hardcastle Jr applied for the Planning and Zoning Commission on November 4th, 2021. Mitchell Weimer applied for the Planning and Zoning Commission on December 28th, 2021.

Two Planning Commission seats will open in February. Appointments for the Planning Commission expire the day before the first regular meeting of the City Council in February, according to the Municipal Code. Sumner Schachter, whose term expires in February, has served three successive terms on the Planning and Zoning Commission and cannot reapply. Ben West is not seeking reappointment.

Both Planning Commission alternates, Peter Waller and Amy Connerton have indicated interest in filling the regular seats. Because they were both recently interviewed by City Council, neither was scheduled for an additional interview in this cycle.

According to the Municipal Code, appointments to the boards and commissions shall be by the City Council for terms of three (3) years each, and each member shall serve until his/her successor is appointed and takes office; provided, however, that the initial terms of office may be shortened by the City Council so as to provide overlapping terms of office. Council may appoint up to three alternate members of a board or commission.

The Planning Commission appointments are anticipated to be on the January 20 agenda.

Issues: None.

Staff Recommendation: Staff defers to Council

Respondent

12 | Anonymous

1441:11
Time to complete

Planning and Zoning Commission Application

Thank you for your interest and time commitment in serving your community. Please complete all questions on this application.

Composition of the Planning and Zoning Commission:
(as defined in Title 020 of the Glenwood Springs Municipal Code)
a. Seven (7) citizens who are residents of the City.

Personal Information

1. Membership Qualifications *

Are you a resident of Glenwood Springs within city limits? You must be a resident within city limits to qualify.

- (●) Yes
- ( ) No

2. Name *

James Woodrow Hardcastle Jr

3. Home Address *

619 west 11th st, GWS, CO 81601

4. Mailing Address *

619 west 11th st, GWS, CO 81601

5. Home Phone *

970-355-8601

6. Work Phone *

970-384-5200

7. Mobile Phone *

970-355-8601

8. Email Address *

jimhardcastle5@gmail.com

9. Occupation *

6th Grade Teacher

Personal and Professional Interests

10. Why are you interested in serving on the Planning and Zoning Commission? *

I want to serve my community and be a part of thoughtful, calculated, and well thought out community development processes.

11. What do you view as your role if selected as a member to the Planning and Zoning Commission? *

My role is as an impartial and unbiased decision making partner responsible for reviewing all documents delivered to me in a timely fashion, showing up for all meetings, and being prepared to listen to staff presentations and recommendations, applicants and their concerns, and all other interested parties making public comments on all cases.

12. What experience have you had in the land use approval process? *

I have over 16 years of urban planning experience as a senior and junior planner in land use, zoning, and affordable housing, within the public and private sector.

13. Do you have any particular areas of interest or a particular perspective relating to land use development in Glenwood Springs? *

None in particular, though I am an educated and past-practicing professional urban planner who is very interested in every aspect of land use and zoning; from staff reports, site design, land use modifications, zoning requests, comprehensive planning, code interpretation and revisions, PUDs, conflicting uses, conflict negotiation, and community involvement and consensus efforts.

14. Can you describe an experience making a decision that made people unhappy? *

As a junior staff subdivision planner in San Antonio, Texas, when a moratorium was put into place on all new applications for subdivision in an area where sink holes were causing foundation issues and risks in previous development dwelling units. Because of our public awareness and communication with the standard engineers and surveyors who did work with our office on a daily basis, we were able to minimize the amount of dissatisfaction with our department and the process as a whole for our customers. We were also able to weather the moratorium and not only retain relationships with the professional community we worked with, we gained their trust for future collaboration.

15. Can you separate yourself from personal opinions and represent the City's goals, policies, plans, and the Glenwood Springs Municipal Code in an equitable fashion? *

Yes, absolutely I can do this.

16. The Planning and Zoning Commission members generally attend two meetings a month and can have extensive packet materials to review in preparation for meetings. Do you have any existing time commitments that will hamper your ability to serve? *

No, I do not.

17. Are you aware of and understand the quasi-judicial function of the Planning and Zoning Commission? *

Yes, I am very aware of the function of this commission.

18. What experience do you have working with people on a board, commission, or committee? *

I have experience presenting and/or facilitating on small town development, state historic and archeological review, and historical design and review boards, among others, in Linn County, Iowa and San Antonio, Texas. I have routinely presented extensive staff reports with recommendations which I have written to Zoning, Planning and Zoning, and historical commissions in Texas, Iowa, and Garfield County, Colorado. I have acted as a member of and presented to numerous committees over a 16 year period.

19. Please enter today's date. *

11/4/2021

20. Have you served on the Planning and Zoning Commission before? *

- (●) No
- ( ) Yes

Powers and Duties of the Planning and Zoning Commission

(as defined in Title 020 of the Glenwood Springs Municipal Code)

f. Powers and Duties
The powers and duties of the Planning and Zoning Commission shall be:
(1) To develop and recommend a master plan subject to the approval of the City Council and its environ in accordance with the provisions of this Code and the laws of the State.
(2) To recommend to the City Council boundaries of zone districts and regulations to be enforced therein, in accordance with the provisions of this Code and the laws of the State.
(3) To review proposals relating to subdivision, development and use of land and make decisions or recommendations on such proposals, in accordance with the procedures and provisions set forth in this Code.
(4) To hear and decide appeals wherein there is a question of interpretation of the zone district map, the master plan or related documents and similar questions as they may arise in the administration of this Code.
(5) The Planning and Zoning Commission shall have the duty and power to act on appeals with regard to matters arising from enforcement of provisions of Title 070 of this Code, including:

- a. Review of administrative decisions. To hear and decide appeals where it is alleged there is error in any action, including any order, interpretation, requirement, decision or determination made by an administrative official of the city in the enforcement of Title 070 of this Code.
- b. Variances. To hear and decide requests for variances from the zoning provisions and sign regulation provisions where there are unique, unnecessary and unreasonable hardships in the way of carrying out the strict letter of said provisions; and to hear and decide requests for variances to allow deviations from restrictions upon the construction and placement of buildings and other structures on site. Examples of such variances include, but are not limited to, modifications of minimum area requirements, building coverage and setback restrictions. Variances from permitted and special review uses in zone district text shall not be considered.

(6) To perform such other functions as required by the provisions of Title 070.
(7) To service as the Building Board of Appeals.

Appointment, Removal, Term and Vacancies of Boards and Commissions

(Per the Glenwood Springs, CO Municipal Code 020.020.040)

(a) Appointment and term of members. Except as otherwise provided, all appointments to the boards and commissions shall be by the City Council for terms of three (3) years each, and each member shall serve until his/her successor is appointed and takes office; provided, however, that the initial terms of office may be shortened by the City Council so as to provide overlapping terms of office. Appointments shall expire the day before the first regular meeting of the City Council in each month according to the following schedule:
February:
Planning and Zoning Commission;

(b) Alternate members. The City Council at its discretion may appoint up to three (3) persons as alternate members for each board or commission. If a regular member of a board or commission is to be absent from a meeting, the presiding officer for the meeting may select an alternate member to fill such absence and to attend and serve at the meeting. The alternate member may exercise all powers at the meeting which the absent regular member could exercise, and the alternate's powers and privileges shall terminate at the end of the meeting attended. The presiding officer may at his/her discretion select the same alternate to serve at successive meetings in the absence of any member.

(c) Limit to term of members. No board member shall serve more than two (2) successive terms on the same board or commission.

(d) Removal of members. All appointed members of a board or commission shall be subject to removal, at any time, by the City Council. In the event an appointed member of a board or commission ceases to qualify for membership, his or her appointment is immediately terminated.

(e) Vacancies. The City Council shall fill all vacancies on boards and commissions by appointment for the unexpired term.

(Code 1971 §§ 2-63, 2-64, 2-67; 6-95 § 1; 10-07 § 2; Ord. No. 9-2018 , § 2, 4-20-2018)

Respondent

14 | Anonymous

13:37
Time to complete

Planning and Zoning Commission Application

Thank you for your interest and time commitment in serving your community. Please complete all questions on this application.

Composition of the Planning and Zoning Commission:
(as defined in Title 020 of the Glenwood Springs Municipal Code)
a. Seven (7) citizens who are residents of the City.

Personal Information

1. Membership Qualifications *

Are you a resident of Glenwood Springs within city limits? You must be a resident within city limits to qualify.

- (●) Yes
- ( ) No

2. Name *

Mitchell Weimer

3. Home Address *

121 Polo Road

4. Mailing Address *

121 Polo Road

5. Home Phone *

202-215-1576

6. Work Phone *

202-215-1576

7. Mobile Phone *

202-215-1576

8. Email Address *

mitchell.weimer@gmail.com

9. Occupation *

Business Strategy Consultant (Director) with PricewaterhouseCoopers

Personal and Professional Interests

10. Why are you interested in serving on the Planning and Zoning Commission? *

Growth in the valley is inevitable - this is an incredible place to live, and we will only continue to attract people interested in living and working here. The GWS community has the opportunity to smartly embrace that growth, but it also has the responsibility to properly and sustainably manage it. Having lived in areas of the country where people are leaving, planning for smart growth is a wonderful challenge to face, and I would look forward to participating in that planning.

11. What do you view as your role if selected as a member to the Planning and Zoning Commission? *

I am a small-town Colorado native who left the state after college and have since lived abroad and along both coasts. I've seen wonderful things happen to communities - as well as long-term mistakes made. To the Commission's planning and advisory efforts, I offer my Colorado roots and wide perspective to guide the Council toward smart, creative, common-sense planning decisions with the aim of benefitting current and future residents and businesses. As to the more routine application reviews and hearings, my role is to understand and apply the city's plans, policies, and code in an equitable manner.

12. What experience have you had in the land use approval process? *

My first experience was while living in Jersey City, New Jersey, working with the city on approvals, variances, historical protections, and various certificates. Currently - and locally - I am working with the Town of Silt to annex and zone ~20 acres of riverfront. I've had to study Silt's Master Plan, understand their Municipal Code, the parcel's current status, and the process to submit an Annexation and Development Agreement, Planned Unit Development documents, Sketch Plan Applications, and Master Subdivision Applications - as well as coordinate with FEMA, CDOT, and others. I've also become well versed with OEDIT grants, Opportunity Zone funding, and the like. It's been a learning process, but I've enjoyed working through it, and I know it's given me a great perspective and set of experiences to bring to the Commission.

13. Do you have any particular areas of interest or a particular perspective relating to land use development in Glenwood Springs? *

Our responsibility to grow smartly means serving both current and future residents, bringing creative thinking and broad experience to the table, considering a decision's full range of implications well into the future, and partnering with the town's Council and other committees to allow GWS the energy, vibrancy, beauty, and sense of community it deserves. I'm particularly interested in helping shape our downtown core and riverfront but believe that every corner of the city deserves equal attention.

14. Can you describe an experience making a decision that made people unhappy? *

I was an Army officer for 5 years, and have been a corporate leader/executive for almost 20. I've had to make decisions that left some people unhappy, such as policy decisions and promotions selections. And I've had to make decisions that left many people unhappy, such as headcount reductions, budget decisions, and strategic directions. The worst scenario is an unpopular decision that cannot be defended. You must apply clear, critical thinking; ground yourself in a consistent decision-making framework; and demonstrate empathy, respect, and honesty. In this way, all decisions (especially the unpopular ones) become defensible, and those who disagree can at least understand why it was made.

15. Can you separate yourself from personal opinions and represent the City's goals, policies, plans, and the Glenwood Springs Municipal Code in an equitable fashion? *

Of course. The city's goals, policies, plans, and Code are in themselves equitable. My role would be to ensure they are in turn equitably applied in the commission's decisions and planning.

16. The Planning and Zoning Commission members generally attend two meetings a month and can have extensive packet materials to review in preparation for meetings. Do you have any existing time commitments that will hamper your ability to serve? *

I do not have any existing time commitments that would hamper my ability to serve.

17. Are you aware of and understand the quasi-judicial function of the Planning and Zoning Commission? *

I understand that occasionally the commission must act in a quasi-judicial function. In this capacity, it acts more as a court, applying existing standards and ordinances to the facts presented by the parties. When in this capacity, it is even more critical to properly engage with the public, demonstrate transparency, respect, and fairness, and consistently adhere to established frameworks.

18. What experience do you have working with people on a board, commission, or committee? *

I've participated on numerous boards and committees over the years, whether a community-based committee or professional board. My common approach has been to show up prepared, be fully dedicated, recognize what I bring to the table, and strive to work in partnership with the rest of the group.

19. Please enter today's date. *

12/28/2021

20. Have you served on the Planning and Zoning Commission before? *

- (•) No
- ( ) Yes

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made by an administrative official of the city in the enforcement of Title 070 of this Code.

- b. Variances. To hear and decide requests for variances from the zoning provisions and sign regulation provisions where there are unique, unnecessary and unreasonable hardships in the way of carrying out the strict letter of said provisions; and to hear and decide requests for variances to allow deviations from restrictions upon the construction and placement of buildings and other structures on site. Examples of such variances include, but are not limited to, modifications of minimum area requirements, building coverage and setback restrictions. Variances from permitted and special review uses in zone district text shall not be considered.

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(e) Vacancies. The City Council shall fill all vacancies on boards and commissions by appointment for the unexpired term.

(Code 1971 §§ 2-63, 2-64, 2-67; 6-95 § 1; 10-07 § 2; Ord. No. 9-2018 , § 2, 4-20-2018)

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: Landfill Fees and Equipment Presentation

Action Requested: None

Department: Public Works

Presented By: Elizabeth Mauro, Landfill Manager
Matthew Langhorst, Public Works Director

Background Info: Council and staff to discuss staff's suggested 2022 landfill price updates, equipment and building needs, and ways to increase diversion of recyclable materials. The 2022 suggested price structure is designed to maintain current services, be financially sustainable and encourage diversion.

Issues: 2022 Landfill prices, equipment needs, encourage diversion

Staff Recommendation: Discussion at Work Session Level

GENERAL MATERIALS

Material Type	In County Tipping Fee	Out of County Tipping Fee
Municipal Solid Waste	$51.45 / ton	$103.00 / ton
Residential Waste (1) 30 Gallon Bag Unloaded at Recycle Center	$4.00/Unit	
Construction/Demolition/loose trash	$50.40 / ton	$71.40 / ton
Unsorted C&D/loose trash	$80.00 / ton	$115.00 / ton
Concrete/crushable rock	$40.00 / ton	
Contaminated Soil**	$54.60 / ton	
Screenable Soil	$10.00/ ton	
Waste Soil (cover dirt, not screenable)	$25.00/ ton	
Brush and Wood (separated)	$35.00 / ton	
Metal Appliances	$10.00 / each	
Refrigerator / Freezer / AC Unit	$30.00 / each	
Other Recyclable Metal (separated)	FREE	
Mattress / Box spring	$8.40/ each	
Large Animal (over 300 lbs)	$12.60 / each	
Medium Animal (up to 300 lbs)	$10.50 / each	
Non-friable Asbestos***	$52.50 / ton	
Septic Tank Liquid	$0.23 / gallon	$0.35 / gallon
Car Wash Liquid Waste	$0.29 / gallon	$0.35 / gallon
Grease Liquid Waste	$0.23 / gallon	$0.35 / gallon
Biosolids	$40.00 / ton	
Minimum Charge	$9.00 / load	
Uncovered Load Fee	$40.00 each	
Clean Up Fee	$75.00 each	

TIRES	
Tire Type	**Tipping Fee**
Passenger car/light truck	$6.00 / tire
Passenger car/light truck with rim	$12.00 / tire
Large truck	$12.00 / tire
Large truck with rim	$24.00 / tire
Tires Cut (quartered or sidewalls cut out)	$89.00 / ton

ELECTRONICS AND TELEVISIONS	
Electronic Type	**Tipping Fee**
Television (17inches and smaller)	$12.00
Television (between 18 and 23 inches)	$20.00
Television (between 24 and 31 inches)	$35.00
Television (between 32 and 36 inches)	$45.00
Television (37 inches and larger)	$60.00
Console units/projection television	$55.00
Flat Screens (between 15 and 22 inches)	$15.00
Flat Screens (between 23 to 27 inches)	$20.00
Flat Screens (between 28 and 39 inches)	$25.00
Flat Screens (between 40 to 50 inches)	$30.00
Flat Screens (between 51 and 70 inches)	$40.00
Any broken or disassembled TV	$10.00 added
CPU and tower	$15.00
Laptop	$8.00
Audio and Video	$8.00
Computer Monitors	$20.00

PRINTERS AND MICROWAVES	
Waste Type	**Tipping Fee**
Small printer	$15.00

Medium printer	$25.00
Floor standing copier or printer	$65.00
Microwave	$5.00

YARD AND FARM WASTE

Material Type	Tipping Fee
Wood Chipped	$8.00/ ton
Grass and Leaves	$12.00/ ton
Cardboard Materials ($5 Min Charge)	$10.00/ ton
Brush and Wood (separated)	$35.00 / ton
Manure ($20 Min. Charge)	$20.00/ ton

PRODUCTS FOR SALE

PRODUCT TYPE	Price
Compost	$31.50/ per ton
Topsoil	$42.00/ per ton
Wood Chips	$30.00/ per ton



South Canyon Landfill & Resource Recovery Site

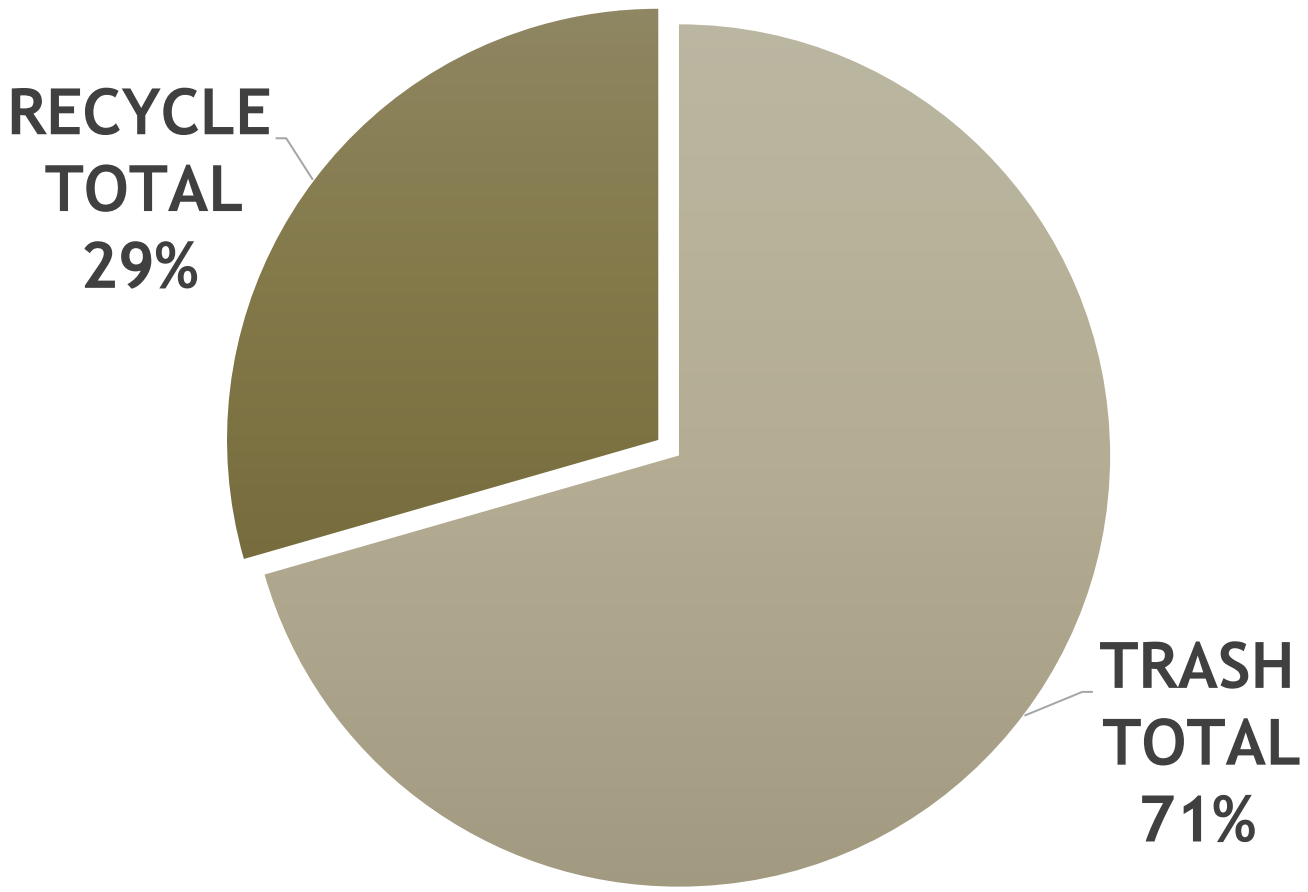
Summary of 2020 waste totals

Upcoming Expenses

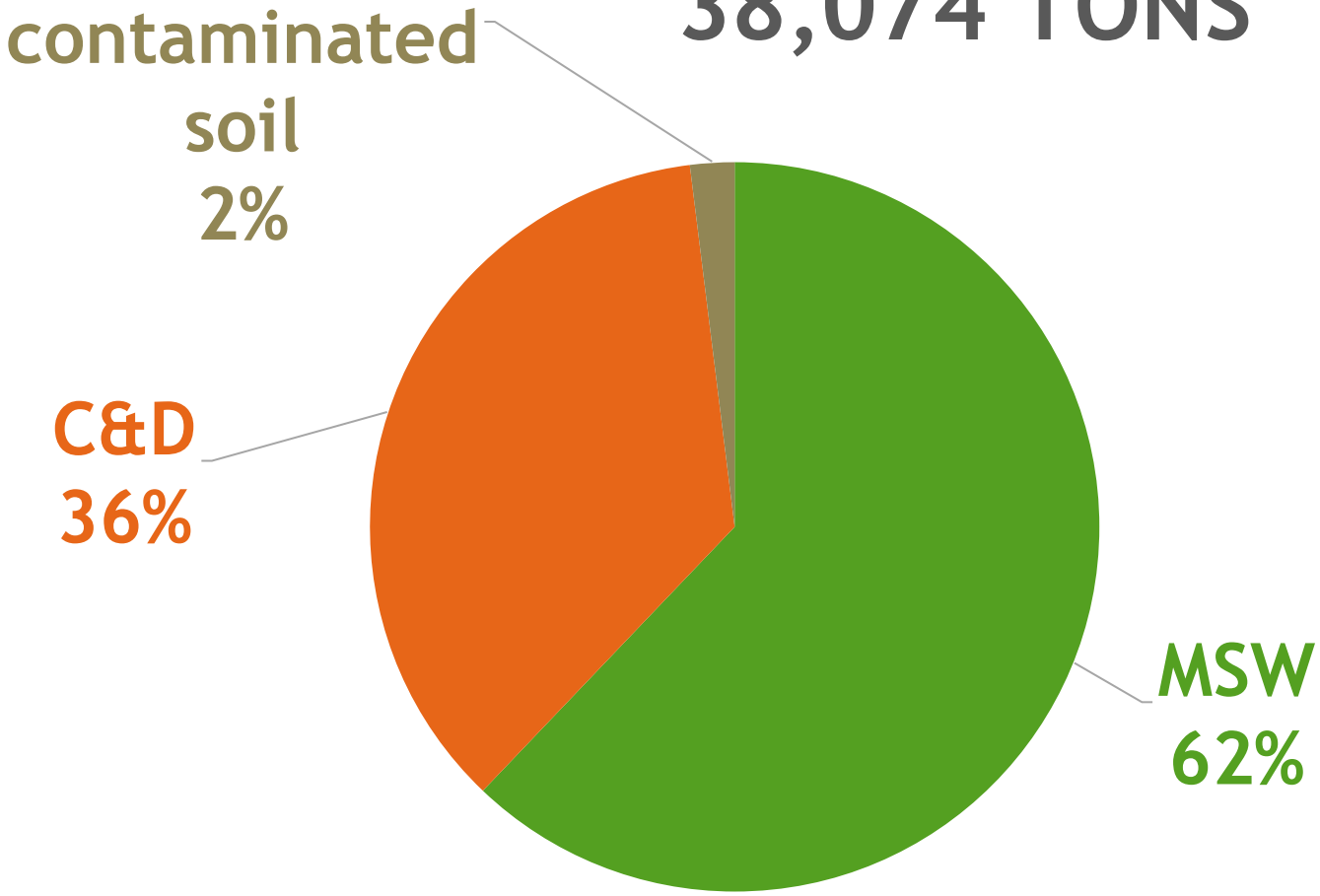
Price Recommendation for 2022

Discussion

2020 Total Waste: 53,969 tons



2020 LANDFILLED WASTE: 38,074 TONS





2020 RECYCLED WASTE: 15,895 TONS

RECYLING

Costs us about **$220** per ton

Main Costs:

1. Full time staff at the recycle center
2. Hauling

Subsidized by:

1. trash tipping fees
2. annual State recycling rebate



All our recyclables are processed and re-sold within North America. We know they get recycled thanks to our very low contamination rate and transparent communication from Eagle County's MRF system.

Liquid wastes

-The new facility for carwash (2.2 MG) & septic waste (0.6 MG) cost over $600,000 and was completed in December 2021

-Septic and Grease liquid wastes can be turned into beneficial products – carwash waste cannot

-Grease is managed entirely as part of the compost facility

-Testing and reporting requirements cost more time and money each year



upcoming expenses:

- 2022-2023: Expansion review process $150,000
- Spring 2022: Trommel Screen Purchase $300,000
  - Save landfill space and generate income by significantly accelerating topsoil recycling
  - Opportunity to save money by applying rental cost to purchase price
- Spring 2022: Scale replacement $140,000
  - Conversion to digital scale technology, steel deck
- 2022-2027: Compactor replacement $722,000
  - Current machine has 12,000 hours on it, which is high
  - Breakdowns lead to less efficient use of airspace
- 2023-2024: Office/Crew Room trailer $100,000
- 2025: Ponds 3/4 re-line or close $300,000



Bomag 773



- Delivery in March/April
- 5-year payment schedule
- 10,000-hour warranty
- 41 tons
- 450 HP

2022 price recommendations: key points

- 5% base increase to almost keep up with inflation
- adjustment on liquids to cover facility improvements and align revenue with management costs
- ‘Unsorted’ C&D waste category
- Financial incentives to promote diversion
- Simplification
- Out of county price for MSW needed to incentivize other counties to continue to manage their own waste

Definition of 'Unsorted C&D Waste': Any load of construction/demolition waste containing more than 5% by volume divertible materials as estimated visually by landfill staff. Divertible materials include metal, appliances, concrete, dirt, rock, brush, leaves, grass, food waste, pallets, untreated lumber, cardboard, paper, and mattresses.

Recommended 2022 Prices:

Material Type	In County Tipping Fee	Out of County Tipping Fee	Units	Change from 2021
MSW	51.45	103.00 (NEW)	Per ton	5% up
1 30-gallon bag residential trash	4.00	-	Each	0%
C&D/loose trash	50.40	71.40	Per ton	5% up
Unsorted C&D	80.00	115.00	Per ton	NEW
Concrete/Crushable	40.00	-	Per ton	0%
Contaminated Soil	54.6	-	Per ton	5% up
Screenable Soil	10.00	-	Per ton	0%
Cover Dirt	25.00	-	Per ton	0%
Brush and Wood	35.00	-	Per ton	0%
Metal Appliances	10.00	-	Each	0%

Material Type	In County Tipping Fee	Out of County Tipping Fee	Units	Change from 2021
Refrigerator/AC Unit	30.00	-	Each	0%
Other Metal	0.00	-	Per ton	100% down
Mattress/Box Spring	8.40	-	Each	5% up
Animal >300 lbs.	12.60	-	Each	5% up
Animal <300 lbs.	10.50	-	Each	5% up
Non-friable Asbestos	52.50	-	Per ton	5% up
Septic Tank Liquid	0.23	0.35	Per gallon	15% up
Carwash Waste	0.29	0.35	Per gallon	15% up
Grease Liquid Waste	0.23	0.35	Per gallon	23% down
Biosolids	40.00	-	Per ton	2% up
Minimum Charge	9.00	-	Each	13% up
Uncovered Load Fee	40.00	-	Each	100% up
Clean Up Fee	75.00	-	Each	NEW
Tire (car/truck)	6.00	-	Each	20% up
Tire + Rim (car/truck)	12.00	-	Each	20% up
Large Tire (equip/semi)	12.00	-	Each	20% up

Material Type	In County Tipping Fee	Out of County Tipping Fee	Units	Change from 2021
Large Tire + Rim (equip/semi)	24.00	-	Each	20% up
Cut Tires	89.00	-	Per ton	0%
All E-Waste: no change	varies	-	Each	0%
Wood (chipped)	8.00	-	Per ton	0%
Grass/Leaves	12.00	-	Per ton	0%
Cardboard	10.00	-	Per ton	0%
Food Waste	12.00	-	Per ton	0%
Manure	20.00	-	Per ton	0%
Smoke Detectors	10.00	-	Each	0%
FOR SALE PRODUCTS		-		
Compost	31.50	-	Per ton	5% up
Screened Topsoil	42.00	-	Per ton	5% up
Wood Chips	30.00	-	Per ton	0%

How do our prices compare?

Waste Type	South Canyon 2021	South Canyon 2022	Pitkin County 2021	Garfield County 2021	Eagle County 2021
MSW	49.00/ton	**51.45/ton**	61.50/ton	44.00-84.00/ton	39.00/ton
C&D	48.00/ton	**50.40/ton**	93.75/ton	44.00-84.00/ton	48.00/ton
Unsorted C&D	48.00/ton	**80.00/ton**	153.75/ton	44.00-84.00/ton	48.00/ton
Septic	0.20/gal	**0.23/gal**	none	0.20/gal	none
Screenable Dirt	10.00/ton	**10.00/ton**	10.50/ton	No soil recycling	No soil recycling
Food Waste	12.00/ton	**12.00/ton**	15.00/ton	No compost	No compost
Scrap Metal	20.00/ton	**FREE**	FREE	FREE	21.00/ton
Minimum Charge	8.00	**9.00**	15.00	6.00	6.00

Would Council like to use other strategies to increase diversion?

- Education
- Policies that can be enforced at Landfill:
  - Price differential for sorted/unsorted C&D loads
  - Single material bans (ie no metal in trash)
- Policies that could be enforced by Community Development staff, depending on staff availability:
  - Require deconstruction for certain projects
  - Waste management plan can be required as part of permit applications
  - Proof of sorting (via landfill or hauler receipts) can be required for CO issue
- Point-of-sale policies:
  - Bans (ie single use plastic ban, Styrofoam ban)
  - EPR (Extended Producer Responsibility) – usually state level regulation

Questions & Discuss

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item:	Climate Action Plan
Action Requested:	City Council requested a discussion about updating the Climate Action Plan. The current version of the plan is attached.
Department:	City Administration
Presented By:	Debra Figueroa, City Manager
Background Info:	NA
Issues:	None.
Staff Recommendation:	This item is for discussion.

CITY OF GLENWOOD SPRINGS

ENERGY & CLIMATE ACTION PLAN

Prepared by the
Glenwood Springs
Energy Efficiency Ad Hoc Committee

PROPOSED

September 18, 2008

SECTION IV REVISED

January 15, 2009

SWR+E 56

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SECTION I – EXECUTIVE SUMMARY

This Climate Action Plan for the City of Glenwood Springs is the result of nearly two years of work by the Glenwood Springs Energy Efficiency Ad Hoc Committee. City Council asked the committee to develop the plan and gave the committee a free rein in deciding what points to include.

Knowing that other cities have already adopted climate action plans, committee members combed through hundreds of recommendations to assemble a rough draft. They held many lively discussions about points borrowed from other plans, suggestions contributed by community residents and ideas of their own.

While the work could have continued to develop a document that might be more complete or better organized, the committee members felt it was important to deliver the plan to City Council for discussion and adoption. Now is the time for the Glenwood Springs community to begin work on reducing emissions. Committee members see this plan as a living document — one that should be revisited and revised on a yearly basis. Some recommendations and targets will be achieved, others will require a redoubling of efforts, and some may become irrelevant or obsolete.

The report begins with a summary of the greenhouse gas inventory the Energy Committee conducted in 2007 (Section III), followed by suggested targets for reducing greenhouse gas emissions and solid waste (Section IV).

Thankfully, the City of Glenwood Springs is not starting at zero in its effort to reduce its overall carbon footprint. From the wisdom of the city's founders to create a gravity-flow water system to today's wastewater plant operators, who are capturing methane from the treatment process, the city already benefits from many actions and policies that reduce its greenhouse gas emissions. The plan includes a list of 52 existing measures in place today (Section V).

Glenwood Springs must take more strident actions in order to meet the emissions reduction targets set in this plan and seen in the Colorado Climate Action Plan issued in 2007 by Gov. Ritter. The health of our economy and our environment depends on our community taking the deliberate steps spelled out in this plan. We can follow the examples set by other communities that are many steps ahead of us, and we can set an example for those who have yet to take on this mission.

The Climate Action Plan is divided into five sections: General Climate and Energy, Transportation, Energy Efficiency, Renewable Energy and Waste Management. Together, the plan offers 172 recommendations for improving the sustainability of city government and the community as a whole.

From this list, the Energy Committee chose 10 Best Bets. They are not the cheapest, the easiest, the fastest or the largest recommendations. They are, in the view of the committee members, the **most important** measures the city should adopt and pursue.

Top 10 Best Bets

1. Implement a Glenwood Springs' Electric Department program to provide rebates to offset part of installation costs of photovoltaic or solar hot water systems for residents or businesses. Set incentives at levels comparable to or greater than those offered to surrounding communities by Holy Cross Energy. Renewable Energy, 1.1

2. Purchase additional clean electricity from solar, geothermal, wind, hydroelectric or biomass sources. Offer electric utility customers a renewable energy purchase choice with a voluntary rate premium. Renewable Energy, 1.2

3. Appoint a staff person and commit significant resources to coordinate energy issues for the city government and the community. General Climate and Energy, 1.1

4. As part of audit project, conduct an investment-grade energy audit of community center facilities, particularly the pool and ice rink. This audit should consider alternative energy retrofit options, including geothermal, solar, and waste heat utilization from one facility to another. Analysis should also examine options in which the ice rink is fully enclosed and operated year-round. Energy Efficiency, 2.2

5. Study the feasibility of tapping geothermal energy for heating and cooling systems and for power generation. Study the potential of creating a geothermal energy district to heat and cool clusters of commercial and/or residential buildings. Renewable Energy, 3.1

6. Continue to improve Ride Glenwood public transportation by providing more frequent service, longer hours of service, and more neighborhoods served. Ensure quick transfers between Ride Glenwood and RFTA regional buses. Transportation, 6.1

7. Reduce vehicle miles traveled (VMT) using transportation demand management (TDM) practices. Ideas include incentives to reduce the volume of single-occupancy vehicles. Transportation, 7

8. Create a permanent City Energy and Climate Commission to carry out this Climate Action Plan and keep it updated over time. General Climate and Energy, 1.2

9. Develop and implement an outdoor lighting conservation program with education and incentives to reduce consumption of electricity using limited hours, motion sensors, efficient lighting upgrades, and other measures. Energy Efficiency, 6.5

10. Revise policies related to Spring Cleanup to promote separate waste streams, allowing for the composting of organic wastes and recycling of metals, while maintaining the convenience of the service. Waste Management 1.2

SECTION II - INTRODUCTION

This climate action plan was developed by the City of Glenwood Springs to help address issues of global and local climate change, rising energy costs and to stimulate measures that enhance community sustainability. By adopting this climate action plan, City Council is directing the city government to lead by example, and encouraging residents of Glenwood Springs to work towards a more sustainable future.

Background

On Dec. 21, 2006, Glenwood Springs City Council endorsed the Mayor's Climate Change Protection agreement. It created the Energy Efficiency Ad Hoc Committee (i.e., "energy committee") on April 5, 2007. The first goal of the committee was to develop a greenhouse gas inventory for all city government operations. This project was presented to the City Council on Dec. 6, 2007. Key results are summarized in Section III, and the entire report can be reviewed online at www.ci.glenwood-springs.co.us.

With the city's approximate energy use and greenhouse gas emissions established as a baseline, the energy committee then tackled its most important goal: to develop this multi-year climate action plan for the city. Committee members reviewed existing plans from neighboring towns and cities and from other states, and solicited suggestions from community members in preparing the initial draft.

The draft plan has been reviewed by city staff and by local climate and energy experts. Their comments were incorporated into the draft document to City Council, or presented as accompanying memos. Following input from City Council, the subsequent draft was released for public comment. Council made final changes, and adopted the final plan on (DATE).

SECTION III – EMISSIONS INVENTORY

The Glenwood Springs Energy Efficiency Ad Hoc Committee conducted a greenhouse gas emissions inventory for city government buildings and operations. The original charge from the Glenwood Springs City Council asked for the city government's output of atmospheric carbon dioxide - or carbon footprint - for 1990. That year is considered a baseline in the Kyoto Protocol and the U.S. Mayors Climate Protection Agreement. In addition, the City Council asked for current figures on greenhouse gas emissions.

By going through the city's 1992 budget document, which contained total 1990 actual spending, committee members were able to obtain dollar amounts paid for electricity, natural gas, gasoline and diesel fuels by department. From that, the committee estimated a carbon emissions footprint for city government in 1990.

Obtaining information for more recent years was more time-consuming, but yielded a more exact number. Committee members reviewed the city's electricity, natural gas, gasoline and diesel fuels energy bills for the years 2001 through 2006. The most extensive study, including the scores of accounts for city street lights, was done for the calendar year 2006.

The results are as follows:

	1990	2006
City population	6,561	8,743
City government budget	$12.7 million	$36.2 million
City government energy spending	$253,246	$919,271
Total tons of CO2	**3,204 tons**	**7,337 tons**
Tons of city government CO_2 per capita	0.49	0.84
Tons of city government CO_2 per $1 million city budget	252	203
Dollars spent on energy per $1 million city budget	$19,940	$25,394

SECTION IV – REDUCTION TARGETS

City Government

- Reduce greenhouse gas emissions from all city facilities operations to 20 percent below 2006 levels by 2012.

The City has already signed the U.S. Mayor's Climate Protection Agreement, in which we committed to reducing GHG emissions to 7 percent below 1990 levels by 2012. This translates into about a 45 percent reduction from 2006 levels, based on the rough estimate of 1990 emissions and the 2006 emissions total reported in the committee's GHG Inventory of October 2007.

- Reduce energy use, per gross square foot, for the city's total existing building portfolio to 25 percent below 2006 levels by 2012.

This target is similar to the State of Colorado's Greening Government goal and is in line with our preliminary building audit report, which suggested 5 to 10 percent savings in our four newest buildings could easily be achieved with the first phase of basic energy efficiency measures. In addition, energy efficiency reductions of this magnitude and higher have been achieved by many local governments and corporations, using aggressive energy efficiency programs.

- Reduce vehicle petroleum consumption by 25 percent (by volume) by 2012.

This target matches the State of Colorado's Greening Government goal for state government. This performance-based target allows staff to use a full range of reduction programs, including replacement of existing vehicles with hybrids, electric vehicles, or higher mpg gasoline/diesel vehicles, and various trip reduction plans.

City Electric Department

- Reduce per capita electric consumption in the city electric department service area to 20 percent below 2006 levels by 2012.

Electricity consumption is a major contributor to the community's GHG emissions. Per capita consumption will have to be reduced if we intend to meet the community's GHG emission reduction target. Per capita use rose dramatically in the last several years — a trend that is unsustainable with respect to our Energy & Climate Action Plan goals. This goal is similar to the State of Colorado's Greening Government energy reduction goal.

- Purchase or install local generation to provide at least 30 percent of the city's electric supply from clean energy sources by 2012.

The state of Colorado set a target of 20 percent by 2012 and Carbondale's target is 30 percent by 2015, but Glenwood Springs should be able to do better because we own our electric utility. Aspen has already achieved a 75 percent renewable portfolio and will reach 82 percent with its Castle Creek hydro plant recommissioning. Xcel Energy is aiming for higher than 20 percent by 2012.

Further wind purchases from MEAN or others should allow Glenwood Springs to top the 20 percent threshold. To reach 30 percent, the city will need to offer solar incentives to electric department service area residents (and claim these renewable credits) and develop city-owned solar, micro-hydro, geothermal or other alternative energy power projects.

South Canyon Landfill

- Divert 50 percent of municipal solid waste from the landfill by 2012.
- Divert at least 50 percent of construction and demolition debris by 2012, through deconstruction rather than demolition, by 2012.

Glenwood Springs community

Reduce greenhouse gas emissions to 30 percent below 2006 levels by 2020, and to 80 percent below 2006 levels by 2050.

This community-wide goal is probably the most important target to be adopted by Council, and will require concerted effort by many local organizations and determined leadership from the city. As a practical matter, a community-wide baseline emissions inventory must first be undertaken. To attain this target, the city government will need to provide incentives, collaboration and education. These targets are similar to the state-wide targets established in the Colorado Climate Action Plan of 2007 and are in line with the Kyoto Protocol targets.

Further discussion on targets

The Climate Action Plan should be considered a living document and the targets can and should be revisited as we move forward. There are many nuances as to the exact nature of GHG targets, but there are two procedural issues that should be addressed initially.

First, we must define "GHG emissions" with respect to measuring progress towards the targets. There are many different man-made gas emissions that can be evaluated, and some jurisdictions look at six or more greenhouse gases. For simplicity at the beginning of our program, *we recommend that only carbon dioxide emissions be evaluated.*

Second, there are several ways to define GHG emissions that attempt to normalize emissions targets to account for trends in population or economic activity. Here, *we recommend that total, unadjusted GHG emissions be used*, without adjustment for population or economic growth, both for the sake of simplicity and to follow this enlightened approach used by many other jurisdictions.

SECTION V - EXISTING ACTIVITIES

Climate and Energy Policies and Actions

1. City Council approved the signing of the U.S. Mayors' Climate Protection Agreement and appointed the Glenwood Springs Energy Efficiency Ad Hoc Committee
2. The Glenwood Springs Energy Efficiency Ad Hoc Committee:
   a. Conducted a greenhouse gas inventory of municipal buildings and operations (see Section III).
   b. Arranged for an expert to conduct a preliminary energy audit of municipal buildings.
   c. Drafted this climate action plan for the community.

Transportation

1. Ride Glenwood Springs is currently a free bus service.
2. Ride Glenwood Springs uses bio-diesel fuel most of the year.
3. The Police Department has converted most of its fleet to flex-fuel vehicles and is pursuing fuel sources.
4. RFTA buses provide "bikes on buses" for valley-wide riders.
5. RFTA offers discounted bus passes for city employees.
6. The city developed and sponsors a transportation demand management program, TRY – Transportation, Responsibility and You.
7. The city formed the Commuter Club to encourage carpooling, vanpooling, transit, biking and walking.
8. The city offers flexible work schedules so employees can minimize commute time.
9. The city offers two employee van pools from Rifle to Glenwood Springs.
10. The city is replacing most of its general vehicles, including carpooling vehicles, with hybrid cars.
11. The city supports The Traveler van to provide transportation to seniors and disabled riders.
12. The city supports the Safe Routes to Schools program.
13. The Bicycle and Pedestrian Program integrates bicycles and walking into the transportation system by working with all city departments and other governmental agencies to create complete and

accessible sidewalk networks, more bicycle lanes, bicycle parking racks, wide curb lanes and other facilities.

14. The city continues to implement its RiverTrail master to develop a city-wide bike and pedestrian trail system.
15. City employees use bicycles for work errands when possible, and a city-owned bicycle is available for their use. Showers are available for employees at city buildings.
16. Police use bicycles during special events.
17. The city cooperates in the Communities in Motion program. It markets and promotes educational programs to increase awareness of the range of transportation options available for residents and visitors. The city sponsors Bus Rider and Carpool Appreciation Day, Bike to Work Day, Trails Day and related events.

Energy Efficiency

1. The city's water system is, for the most part, gravity fed, which reduces the need for pump stations for water delivery. This gravity-fed design dates back to the founding of the city in the 1880s.
2. The city adopted International Energy Conservation Code (IECC) of 2006.
3. The city Finance Department is including monthly usage figures for electricity and natural gas for all its meters to allow easier calculation of the city government carbon emissions.
4. The city's purchasing agent and Fleet Maintenance Department have begun purchasing energy efficient hybrid and flex-fuel vehicles.
5. The city encourages and practices moving data and documents in digital format to avoid using paper.
6. City-owned traffic signals use LED bulbs, with signal synchronization.
7. The pool at the Community Center is being treated with a liquid pool cover to minimize heat loss and evaporation.
8. The purchasing agent is replacing old light bulbs with energy efficient bulbs in municipal facilities.
9. In its new municipal buildings, the city installed zone programmable thermostats, ozone friendly and energy efficient refrigerants, and computer-controlled HVAC systems that enable chilled water systems to operate in economy mode when buildings are unoccupied. The new buildings also use automatic light-dimming switches in common areas, bathrooms and closets, so lights automatically turn off.
10. The city continues its working relationships with the Colorado Municipal League, National League of Cities, the Governor's Energy Office, the Community Office for Resource Efficiency (CORE), the Cool Communities committee, and other coalitions to leverage efforts to raise efficiency standards.

    The city's new wastewater treatment plant is being engineered with and energy monitoring control system.
11. The Electric Department page on the city's website offers information on energy conservation.

Renewable Energy

1. The city purchases X percent of its supply as wind power and X percent as hydroelectricity through its electricity wholesaler.
2. Bus shelters in Glenwood Springs are lighted with power generated by solar energy.
3. The existing wastewater treatment facility uses an anaerobic digester to capture methane gas, which is used to run a boiler and heat the building.

4. City Council appointed a Geothermal Task Force to investigate geothermal energy opportunities.
5. The city has enacted a net metering policy that allows continuous credit for electricity generated from grid-tied renewable sources.
6. New speed indicator signs along Midland Avenue are solar-powered.

Waste Management

1. The city operates a staffed recycling drop-off center, presently open for four hours on two days a week and six hours on Saturday. It accepts office paper, cardboard, newspapers and magazines, commingled glass and metals, certain plastics and paperboard, and non-automotive batteries.
2. The Public Works Department supports a leaf and Christmas tree composting program.
3. Funds have been earmarked within the city's fleet service fund for replacement of old vehicles. Under-used and old city vehicles, as well as unclaimed impounded vehicles, are disposed of at the annual surplus sale, or picked up by a salvage company for recycling.
4. Obsolete city computers are sent to the Garfield County e-waste facility, or are sent to the Pitkin County landfill for recycling. Decommissioned computers are rebuilt and redistributed as single-user computers, such as at information kiosks or work stations with simple program demands.
5. Bio-solids from the wastewater treatment plant are applied to local agricultural lands, providing a secondary benefit reducing the use of chemical fertilizers.
6. Recycle bins for paper, cans and plastic are located throughout city buildings; the materials are collected for recycling.
7. The recycling page on city's website explains recycling services available, materials accepted at the drop-off facility and hours of operation.

Other Measures (Landscaping, Housing, Purchasing, Water and Wastewater)

1. The Parks and Recreation Commission and City Council are working with a local gardening group to locate a community garden.
2. The city continues to qualify for designation as a Tree City USA, maintaining the designation for more than 20 years.
3. In cooperation with Garfield County Housing Authority, the city has instituted an affordable housing program to entice/encourage city employees to live in Glenwood Springs.
4. The city offers local bidders a 5 percent variable above the lowest bid for construction services or procurement of goods and supplies, in order to promote local businesses.
5. Most city park irrigation systems have rain sensors, and raw water is used in some areas for landscape irrigation.
6. At the wastewater treatment plant, effluent is used to water the lawns and run the chlorinators.

SECTION VI – CLIMATE ACTION PLAN

GENERAL CLIMATE AND ENERGY

1. City Policy and Activities
    1. Appoint a staff person and commit significant resources to coordinate energy issues for the city government and the community.
    2. Create a permanent City Energy and Climate Commission to carry out this Climate Action Plan and keep it updated over time.
    3. Join and participate in a national and/or state voluntary emissions reporting program.
    4. Recognize businesses that adopt practices to reduce their carbon footprint.
    5. Promote and support green business development within the city.
    6. Review and update all policies and ordinances that affect energy use so they are consistent with the goals set forth in this climate action plan.
    7. Work with other groups to promote overall climate and energy improvements. (Community Office for Resource Efficiency - CORE, Clean Energy Economy for the Region - CLEER, the Governor's Energy Office, Colorado Municipal League, National League of Cities, Cities for Climate Protection Campaign, etc.) Consider joining the U.S. Green Building Council or ICLEI for resources and networking.

2. Smart Growth
    1. Urge Garfield County to adopt an energy efficiency plan. In the intervening time, urge Garfield County to apply the city's climate action plan measures to all developments adjacent to the city.
    2. Develop and support policies and programs that assist developers of commercial, residential and public projects to meet the energy efficiency and renewable energy measures in this plan.
    3. Provide education and training opportunities for developers seeking to build green. Provide links to websites that offer up-to-date information on green building and energy efficiency.
    4. Develop incentives for development proposals that employ compact land use, are located near public transit stops, and allow residents to be less reliant on the car. Promote high-density and in-fill development through zoning policies such as transit-oriented development.

3. Educational Programs
    1. Create a challenge for the community, modeled after the 10 Percent Challenge in Burlington, Vt., to raise public awareness about global climate change and to encourage households and businesses to reduce their carbon footprints. Set targets for footprint reductions. Involve students, community groups, workplaces, and neighborhoods to maintain and enhance Glenwood Springs as a clean, green, healthy city.
    2. Encourage schools to educate children and teens on energy efficiency and climate change issues and actions.
    3. Support a "Local First" program, such as the local farmer's markets, for food and other products. Encourage residents and businesses to buy locally grown and produced food and other products whenever possible.

4. Purchasing
    1. City fleet: consider retread tires, recycled antifreeze, parts washers and brake cleaners.

2. Cleaning products: Use cleaning products with low environmental impacts, such as non-acid or neutral pH window and bowl cleaners or quaternary disinfectants.

5. Open Space, Trees and Landscaping
    1. Evaluate municipal code and city guidelines that address landscaping and irrigation to maximize water conservation and increase irrigation efficiency.
    2. Promote the planting of trees and shrubs to increase shading and to absorb CO2.
    3. Preserve open space inside and outside the city.
    4. Maintain healthy urban forests and street trees. Specifically, plant more trees in Two Rivers Park and along bike paths and along new streets.
    5. Design and implement a municipal water conservation program for city facilities and parks. Use xeriscape landscaping and remove bluegrass lawn from city property wherever possible.
    6. Consider expanding the city's raw water irrigation system.
    7. Establish xeriscape demonstration projects and xeriscape landscaping requirements.
    8. Encourage community gardens.

TRANSPORTATION

1. Transportation Policies and Activities

    Work with other groups to leverage efforts to raise fuel efficiency standards and to cooperate in measures that positively affect the efficiency of Glenwood's transportation system.

2. City Employee Measures
    1. Establish a policy to encourage telecommuting by city employees, where appropriate.
    2. Encourage the practice of walking or biking to errands meetings.
    3. Provide loaner bikes with locks for staff to use.
    4. Use teleconferencing in place of travel when feasible.
    5. Maximize trip efficiency.
    6. Increase use of police officer bicycle patrols.
    7. Reduce or eliminate vehicle idling.
    8. Provide each department with a monthly list of its fuel consumption and publicize the information to encourage departments to reduce vehicle usage and fuel consumption.
    9. Provide free or reduced cost regional bus passes for city employees, and work with RFTA to enhance employee bus service.

3. Purchasing
    1. Purchase hybrid, flex fuel, biodiesel or other clean-burning vehicles for all uses in which these vehicles are available and proven to meet functional requirements. For uses where such vehicles are not available, purchase those with the highest fuel mileage and lowest carbon emissions that are economically feasible and fulfill the job requirements.
    2. Purchase low emission, fuel-efficient vehicles.
    3. Investigate cooperative purchasing efforts with other public agencies.
    4. Consider green preference points in awarding contracts.

4. City Fleet
    1. Increase use of clean-burning fuels for all vehicles in the City fleet, such as compressed natural gas or bio-diesel. Implement equipment and fuel storage conversions for dispensing fuels.
    2. Retrofit all diesel and bio-diesel work vehicles with emission-reduction devices, such as diesel particulate filters or diesel oxidation catalysts.
    3. Prohibit all vehicles from idling for more than 5 minutes. Exceptions apply only in situations where safety would be compromised, such as for law enforcement, fire or ambulance.

5. Transit
    1. Continue to improve public transportation by providing more frequent service, longer hours of service, and more neighborhoods served. Ensure quick transfers between Ride Glenwood and RFTA regional buses.
    2. Improve bus stops to include shelters, bike access, bike racks. Maintain passenger access in all seasons.
    3. Design roadways to allow for bus slip lanes.
    4. Support programs that increase the use of transit and reflect the true cost of driving a private vehicle.
    5. Support passenger and commuter rail service in the valley and statewide.

6. Transportation Demand Management
   Reduce vehicle miles traveled (VMT) using transportation demand management (TDM) practices. Ideas include incentives to reduce the volume of single-occupancy vehicles, such as:
    1. Employer-paid van pools
    2. Car sharing
    3. A car-pooling coordination board and/or website, with Commuter Pool and School Pool options.
    4. HOV lanes
    5. User fee or tax on vehicles per household
    6. Expansion of bus service
    7. Reduction or elimination of the upgrading of roads, bridges and parking lots. Close off some streets to vehicles, making the city pedestrian-friendly.
    8. Prioritize zero emission transportation, including walking, bicycling, and electric vehicles (EV), such as scooters, motorcycles, three-wheeled vehicles, golf carts, cars and trucks that operate on electricity.
    9. Establish safe transportation routes for all forms of zero emission transportation.
    10. Offer free or very inexpensive bicycle and/or EV rental systems.
    11. Place more bike racks throughout the city.
    12. Expand parking availability for emissions-free vehicles, make it free, and provide recharging parking spaces for plug-in vehicles.
    13. Continue the design and construction of a comprehensive pedestrian and bicycle trail system throughout the city.
    14. Improve sidewalk conditions and ensure they meet ADA standards.
    15. Encourage businesses to offer Free Wheels, a bike loaner program.

16. Encourage participation in the Commuter Club, a cooperative with Communities in Motion. Members are entered in prize drawings, local businesses discounts, e-mail alerts and carpool matching.
17. Conduct ongoing publicity campaigns to promote sustainable transportation, including the promotion of biking, walking as main transportation modes.

7. Community Actions
    1. Encourage local availability of cleaner-burning fuels.
    2. Prohibit vehicles from idling for more than 5 minutes.
    3. Offer an Air Aware-Gas Cap Exchange Program – exchange leaking, missing or otherwise faulty gas caps for new ones for passenger cars, trucks and recreational vehicles. Encourage local businesses to participate in program by offering free or lower-priced replacement caps.
    4. Encourage school district officials to restrict school enrollments to neighborhoods surrounding the facility.
    5. Encourage school district officials to use clean-burning school buses and to initiate a no-idling policy for school buses.
    6. Promote community purchases of compact, hybrid and other efficient vehicles.
    7. Encourage businesses to provide safe bike parking and pedestrian access, particularly in parking lots.

ENERGY EFFICIENCY

1. Energy Efficiency Policies, Ordinances and Code Changes
    1. Require all new construction to be at least 25 percent more efficient than the IECC 2006 by 2015.
    2. Require all homes to have a Home Energy Rating System (HERS) evaluation prior to any real estate sales transaction. Subsidize the cost of the evaluations for homes considered to be part of the city's affordable housing stock. Work with the Glenwood Springs Association of Realtors to include HERS ratings in the MLS books.
    3. Adopt an ordinance that encourages smaller and more energy efficient new home designs by requiring additional building fees for large homes or homes that will use excessive amounts of energy.
    4. Support changes to state water law to allow gray-water reuse systems.
    5. Implement into the Development Code the requirement to demonstrate energy efficient site planning, landscaping and structure design. Projects should reduce the demand for heating, cooling, water use and lighting, and facilitate the use of non-carbon-emitting energy resources.
    6. Emphasize enforcement of building codes to ensure energy efficiency and resource efficiency practices.

2. Municipal Buildings
    1. Complete the municipal building energy audit project by November 2008. Implement all cost-effective efficiency measures (i.e., those with paybacks of less than 10 years) by December 2009.

2. As part of audit project, conduct an investment-grade energy audit of community center facilities, particularly the pool and ice rink. This audit should consider alternative energy retrofit options, including geothermal, solar, and waste heat utilization from one facility to another. Analysis should also examine options in which the ice rink is fully enclosed and operated year-round.
3. Design all new municipal buildings to be carbon neutral, or require that all new municipal buildings achieve the LEED Platinum rating or equivalent. Consider the certification costs associated with LEED and investigate building standards other than LEED, such as "Green Globes" being tested at Western State College.
4. Incorporate "LEED for Existing Buildings" principles, or equivalent, into city operations and maintenance.
5. Create employee Green Teams. Create and support policies, similar to the Clean Air Consortium Checklist, that address areas such as lighting and computer use, thermostat settings, flex policies, telecommuting, waste management, and purchasing.
6. Purchase ENERGY STAR equipment and appliances, where available, for city facilities. Require vendors and service providers to include this option in specifications and RFP's.
7. Install reflective roofing or green roofs on municipal buildings, where recommended by energy auditors.

3. Energy Management and Electric Utility
    1. Improve the existing annual municipal energy and carbon inventory system with automated data collection and monthly updating, to provide more timely and effective energy management decisions.
    2. Expand on the municipal energy and carbon inventory system to track aggregated energy and carbon footprints for the entire community of Glenwood Springs.
    3. Partner with SourceGas to encourage natural gas demand side management programs within the city.
    4. Direct the city Electric Department to provide hourly electric demand profiles to larger customers, upon request, to encourage better energy management.

4. Water and Wastewater Treatment
    1. Conduct a comprehensive energy and environmental audit of entire municipal water system by June 2009. Determine the carbon emissions and energy consumption associated with water delivery, water treatment and wastewater treatment. Use this information in marketing to support water conservation efforts. Implement all cost-effective efficiency measures by December 2009.
    2. Require all new municipal water and wastewater projects, including the new wastewater treatment plant, to be high-level LEED certifiable.
    3. Incorporate an energy monitoring and control system into the design of the new wastewater treatment plant.
    4. Adopt ordinances that prohibit water wasting and require water-efficient design in new construction.
    5. Design and implement a community water conservation program that offers incentives and educates the community on water efficiency practices.

5. Homes and Businesses
    1. Implement a pilot energy efficiency assessment of existing residential and commercial buildings in the City, in order to establish a baseline inventory, identify potential efficiency technologies, strategies, and costs.
    2. Provide rebates and/or zero interest loans for energy efficiency projects for existing residential and commercial buildings, including lighting and appliance upgrades, insulation and weatherization measures, and HVAC improvements. Loans could be managed by a cooperating entity, such as a local bank.
    3. Provide incentives for new projects that achieve certification with Energy Star, LEED-Platinum or equivalent.
    4. Develop and market the Insulate Colorado program (sponsored by Governor's Energy Office), which provides rebates to homeowners for insulation and air sealing services.
    5. Provide free or reduced cost residential energy audits for existing homes. The city could pay contractors or train city staff to conduct the audits.
    6. Implement or participate in a low-income weatherization program for existing homes.
    7. Develop residential and commercial Green Building Programs to promote best practices in the community. Conduct meetings with contractors and builders to encourage their input on regulatory issues and to provide green building education.

6. Outdoor Lighting
    1. Conduct a streetlight and traffic signal energy audit and analysis by June 2009. Implement cost-effective efficiency measures by December 2009. The analysis should consider the energy savings that could be achieved by reducing streetlight density and hours of operation.
    2. Encourage the Colorado Department of Transportation to upgrade streetlight and signal lighting to energy efficient fixtures within the city.
    3. Reduce the city's holiday lighting to 30 days per year, reduced holiday lighting in quantity or hours of operation; and convert all city holiday lighting to LED bulbs in time for the 2008 holiday season.
    4. Proactively enforce the city's exterior lighting code and lighting portions of the sign code on public and private property throughout the city. Consider improvements to these codes that would emphasize energy efficiency and place a value on dark skies.
    5. Develop and implement an outdoor lighting conservation program with education and incentives to reduce consumption of electricity using limited hours, motion sensors, efficient lighting upgrades, and other measures.

7. Community Outreach & Education
    1. Distribute free energy and water conservation kits to citizens as a way of spreading the word of the City's efficiency efforts. The kits could contain a compact fluorescent light bulb and water efficient showerhead.
    2. Launch an energy efficiency challenge campaign for community residents and businesses.
    3. Promote neighborhood ECOTEAMS to encourage energy efficiency upgrades and recycling rate improvements, etc.
    4. Encourage the new library and other public projects within the city to be designed to be carbon neutral.

5. Promote the city's energy efficiency efforts by providing information about city efforts and achievements on the city's website and through other venues. Make city and community energy use data widely visible.
6. Offer energy saving tips and resources, including nuts and bolts details, through brochures, free energy efficiency starter kits, workshops, booths at events, on websites, presentations to classes and groups, and cable TV shows.
7. Improve the city Electric Department web pages to offer more information on energy efficiency opportunities and demand side management (DSM) programs.
8. Publicize CORE rebates, utility rebates, tax deductions, and other incentives for energy efficiency home or business upgrades.
9. Promote local energy efficiency training and education opportunities, such as E-Star home energy rating seminars.

RENEWABLE ENERGY

1. Renewable Energy Policy and Activities
    1. Implement a Glenwood Springs' Electric Department program to provide rebates to offset part of installation costs of photovoltaic or solar hot water systems for residents or businesses. Set incentives at levels comparable to or greater than those offered to surrounding communities by Holy Cross Energy.
    2. Purchase additional clean electricity from solar, geothermal, wind, hydroelectric or biomass sources. Offer electric utility customers a renewable energy purchase choice with a voluntary rate premium.
    3. In negotiating the city's next wholesale electric purchased power agreement, maintain maximum flexibility to increase the city's clean energy portfolio through that provider and from other sources.
    4. Reduce or eliminate building fees for renewable energy projects and for projects that incorporate renewable energy.
    5. Revise the city code to allow clean-burning wood stoves in new or existing buildings.
    6. Protect solar access for all property owners and assist in working out conflicts between solar access, trees and structures.
    7. Establish a capital program to set aside funds for energy conservation and renewable energy.

2. Solar Energy
    1. Install solar panels or devices on municipal facilities, including the water and wastewater treatment plants. Partner with the Governor's Energy Office, CORE/CLEER and private sector to leverage city funding.
    2. Provide system evaluations and rebates to revive decommissioned solar domestic hot water systems.

3. Geothermal Energy
    1. Study the feasibility of tapping geothermal energy for heating and cooling systems and for power generation. Study the potential of creating a geothermal energy district to heat and cool clusters of commercial and/or residential buildings.

2. If feasible, install a geothermal heating system for the pool and pool enclosure space at the Community Center. Publicize energy cost savings.

4. Biomass Energy
    1. Study the feasibility of capturing methane from the wastewater treatment plant for onsite generation of electricity and heat.
    2. Study the feasibility of generating fuel stock, electricity or heat at the landfill.

5. Hydroelectric Energy
    1. Study the feasibility of developing hydropower energy using the city's water and wastewater systems.

6. Community Actions
    1. Institute or support an educational program that provides information and technical assistance to the public regarding renewable energy alternatives.

1. WASTE MANAGEMENT

1. Solid Waste and Recycling Policies and Activities
    1. Set a city-wide goal of becoming a zero-waste community. This can be achieved through a combination of aggressive waste reduction measures (reduce, re-use, repair) and highly accessible recycling and composting programs to handle wastes that can't be avoided. Improving waste collection and waste diversion programs will extend the life of the South Canyon Landfill, which is an economic benefit to the city.
    2. Revise policies related to city-wide Spring Cleanup, while ensuring the convenience of the service for residents. Require curbside separation of waste streams, allowing for composting and recycling. Consider alternatives such as "free dump day" coupons or limited, scheduled pickups for residents.
    3. Revive or participate in the regional solid waste coalition to maximize efficiencies for handling recycled materials and solid waste.
    4. Ban plastic shopping bags and require retailers to provide durable, reusable bags as options for customers who don't bring their own.
    5. Ban Styrofoam containers for take-away food products.
    6. Support amendments to state law in order to end the current requirements for hard copy documents conveyed from one agency to another, and to allow digital files.
    7. Require new residential and commercial construction to be designed with enough space in trash enclosure areas to accommodate waste separation and recycling.
    8. Require special events to be zero-waste, by composting food scraps, separating recyclable materials and using washable, re-usable tableware, serving containers and linens.
    9. Amend the construction and demolition permitting system to encourage diversion of construction wastes from landfill disposal.
    10. Ban the disposal of any materials that can be recycled or composted. Implement penalties for non-compliance with recycling programs.
    11. Explore more energy-efficient means of sorting, consolidating and shipping recyclable materials to market, such as rail. Avoid shipping materials to Pitkin County for sorting/consolidation.

12. Explore a biomass or methane recovery project at South Canyon Landfill.

2. Waste Reduction and Purchasing
    1. Convert city government functions to a 100 percent digital work system to promote a paperless environment.
    2. Educate on the pre-recycling concepts of reduce, reuse, repair. Explain best practices for reducing the use of paper, packaging and other "throw-away" items and materials. Emphasize economic and energy conservation values of reusing durable items rather than purchasing single-use throw-aways, such as plastic water bottles.
    3. Good ideas: Recycle laser cartridges. Buy recycled-content playground and park equipment. Use biodegradable or trash can liners, or no liners.
    4. Reduce consumption of janitorial paper products by using rags and reusable cleaning devices.
    5. Consider joining EPA's WasteWi$e program. Purchase high-percentage recycled content paper (preferably post-consumer), and encourage city-wide adoption of this guideline. Incorporate contract language with outside vendors to encourage use of recycled content paper.

3. Recycling
    1. Extend hours for city's recycling drop-off facility. Continue to staff the facility during all open hours. Consider the option of using volunteers to assist.
    2. Expand types of plastics and other materials accepted at the in-town drop-off and South Canyon recycling centers.
    3. Conduct a campaign to increase recycling. Provide information on recycling opportunities and details on the city website and via brochures, booths at events, presentations to classes and groups, cable TV shows and other creative means.
    4. Offer information on recycling options in neighboring communities.
    5. Report on where recycled materials end up.
    6. Report on types and volumes of waste collected each year. Compare volume of recycled materials to trash going to the landfill, and track our progress year to year.
    7. Promote increased recycling in all city facilities and by all city employees to divert as many recyclable materials as possible, including paper, cardboard, cans and bottles, containers and engine oil. Publicize achievements on the city's website, so residents can see the commitment of city employees to "greening government."
    8. Educate residents and visitors on benefits of recycling: energy and land conservation achieved by reusing materials rather than consuming more virgin materials; extending life of landfill and deferring the costs to taxpayers of landfill cell closure and opening a new cell.

4. Composting Organic Wastes
    1. Make it easier for residents to compost yard wastes, and divert organic wastes from landfill burial. Develop year-round composting at an in-town location; haul collected waste to South Canyon for composting.
    2. Make it easier for residents, grocery stores, restaurants and schools to compost food scraps. Explore bear-proof food composting methods.
    3. Build a strong market for finished compost and mulch created by leaf, tree and yard waste collection programs by offering it to city residents at a reduced cost or for free.
    4. Continue collecting Christmas trees at an in-town location. Run them through a chipper on-site and offer chips to residents for mulch, rather than hauling to South Canyon.

5. Educate residents and businesses on how to handle wastes that can be composted.

5. Recycling Scrap Metal, Electronic Wastes, Building Materials and Other Materials.
    1. Establish a workable system to collect used appliances and other scrap metal for recycling through a drop-off facility, while providing some pick-up services for residents who can't transport large items.
    2. Develop a program to collect Freon from appliances headed to the scrap yard.
    3. Cooperate with Garfield County on collections of e-waste for recycling. Include information on city's website about hours and locations of collections and materials accepted. Add an in-town location as part of the rotation of collection sites.
    4. Evaluate a system for responsible disposal of compact and full-size fluorescent light bulbs.
    5. Decrease use of hazardous solvents and encourage oil recycling in vehicle maintenance shops.
    6. Recycle asphalt and concrete from street, building and landscaping projects.
    7. Require on-site sorting of construction debris for construction, demolition and remodeling projects to maximize recycling, minimize trash. Promote de-construction and reuse or recycling of materials as opposed to demolition and disposal.
    8. Learn best practices and work with other communities to deal with hard to recycle materials, such as tires, batteries, motor oil, antifreeze, electronics, light bulbs, appliances, worn-out furniture and clothing — so everything residents want to get rid of has a place to go.

6. Trash Hauling
    1. Amend the Municipal Code to allow the city to regulate trash hauler services as part of the annual business license process.
    2. The city should be divided into service territories to avoid multiple haulers serving the same neighborhoods or routes. The city could enact this change by convening a meeting of trash hauling companies, where parties would agree on a fair division of neighborhoods.
    3. Require trash haulers to bill customers based on volume or "pay as you throw" rates, with inverted block rates to encourage recycling.
    4. Require haulers to incorporate business and residential curbside recycling for a flat monthly fee. Materials accepted should be expanded to include cardboard and paperboard.
    5. Require haulers to drive up steep streets and then pick up on the downhill run to save fuel.

7. Community Actions
    1. Encourage businesses and government agencies to reduce, reuse, repair and recycle as part of their daily routine.
    2. Encourage take-out food to be provided in washable, reusable containers, or in containers that can be recycled.
    3. Encourage a "green business" ethic that promotes creative solutions to recycling in business and commercial settings.

SECTION VII – ACROYNMS AND ORGANIZATIONS

ADA	Americans with Disabilities Act
ADG	Anaerobic digester gas
AFV	Alternative fuel vehicle
ATV	All terrain vehicle
BTU	British thermal unit
CF	Compact fluorescent light bulb
CCF	100 cubic feet (measurement of natural gas usage)
CFC	Chlorofluorocarbons
CH4	Methane
CO2	Carbon dioxide
CO2e	Carbon dioxide equivalent (methane is converted to CO2e)
CNG	Compressed natural gas
DSM	Demand-side management
EkWh	Equivalent kWh (nat.gas + elec)
EV	Electric vehicle
F	Degrees Fahrenheit
FTE	Full time employee
GHG	Greenhouse gases
HOV	High occupancy vehicle
HVAC	Heating, ventilation and air conditioning
kWh	Kilowatt hour
LED	Light emitting diode
LPG	Liquid propane gas
MSW	Municipal solid waste
NG	Natural gas
P2	Pollution prevention
PV	Photovoltaic
RFP	Request for proposal
SO2	Sulfur dioxide
SOV	Single occupancy vehicle
TAFS	Transportation Alternatives Feasibility Study
TDM	Transportation Demand Management
TRY	Transportation, Responsibility and You
ULEV	Ultra low emission vehicles
VMT	Vehicle miles traveled
W	Watt
WWTP	Wastewater treatment plant
ZEV	Zero emission vehicles

ALAPCO	Association of Local Air Pollution Control Officials
APTA	American Public Transportation Association
CML	Colorado Municipal League
CCP	Cities for Climate Protection

CORE	Community Office for Resource Efficiency
DOE	U.S. Department of Energy
GEO	Governor's Energy Office
HBA	Home Builder's Association
IAC	Industrial Assessment Center
IDAP	Integrated Design Assistance Program
IECC	International Energy Conservation Code
ICLEI	International Council for Local Environmental Initiatives
ISO	International Organization for Standardization
LEED	Leadership in Energy Efficiency and Design
NAECA	National Appliance Energy Conservation Act
NCS	Natural Capitalism Solutions
NLC	National League of Cities
RFTA	Roaring Fork Transportation Authority
STAPPA	State and Territorial Air Pollution Program Administrators

SECTION VIII – ACKNOWLEDGEMENTS

The City of Glenwood Springs would like to thank all Glenwood Springs citizens who provided ideas for this plan, city staff who provided important input, expert reviewers Dan Richardson and Joani Matranga, and especially the members of the Energy Efficiency Ad Hoc Committee who worked to develop this plan: Ann Hopkinson, Hugh MacPherson, Greg Jeung, Heather McGregor, George Wear and Russ Arensman, with help from Hugh Plant, Don Gorman and Marilee Rippy. City Clerk Robin Unsworth served as the staff for the committee, maintaining a strong commitment for the principles and the process.

Public comments for this plan were received from John Barbee, Mary Russell, Ed Rosenberg, Kim Montague and Charlie Wertheim, Andrea Holland-Sears, John Stephens, Mike Vanian and Jennifer Vanian.

Robin Unsworth

From: George Wear [ghwater@sopris.net]
Sent: Wednesday, January 21, 2009 10:26 AM
To: 'Heather McGregor'; 'Robin Unsworth'
Subject: revised e&cap

Heather & Robin:
Here's a few more minor edits:

Top 10 Best Bets:
#6 should be Transportation 5.1
#7 should be Transportation 6
#10 the language does not match WM 1.2....I don't know which one we want to change, Heather?

Section V
Energy Efficiency #10: should actually be numbered as #10 and #11; then #11 becomes #12. Also, #11 should read, "...with **an** energy monitoring...".
Renewable Energy #1: I think these numbers now are 11.5% wind and 4% hydro.

Thanks for taking care of this!
George

From: Heather McGregor [mailto:mcgregor@rof.net]
Sent: Wednesday, January 21, 2009 8:56 AM
To: Robin Unsworth
Cc: Don Gorman; Russ Arensman; Ann Hopkinson; Hugh MacPherson; George Wear; Greg Jeung
Subject:

Robin,

Attached is the revised version of the proposed Glenwood Springs Energy & Climate Action Plan, with the revised targets in section 4.

Please post this new version on the city website.

Thanks,

Heather McGregor
mcgregor@rof.net

63 Co. Rd. 116
Glenwood Springs, Colo. 81601

(970) 945-4490 home
(970) 618-1570 cell

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: Proclamation for the Lion's Club's 100-year Anniversary

Action Requested: Mayor Godes will make a proclamation in honor of the Lion's Club's 100-year anniversary.

Department: City Clerk

Presented By:

Background Info:

Issues:

Staff Recommendation:

A PROCLAMATION IN HONOR OF THE LION'S CLUB'S 100 YEAR ANNIVERSARY

WHEREAS, The Glenwood Springs Lion's Club was founded on January 8, 1922 as one of the first Lion's Clubs chartered in Western Colorado, and;

WHEREAS, The Glenwood Springs Lion's Club is responsible for many community service projects such as constructing the baseball stands at Sayre Park, and;

WHEREAS, The Glenwood Springs Lion's Club has provided hundreds of scholarships for local students, and;

WHEREAS, The Glenwood Springs Lion's Club has multiple programs dedicated toward optical needs, from their Kidsight Eye Screening for preschool and early school age children, to collecting used eyeglasses for recycling, to the Lions Optical Assistance Program, and;

WHEREAS, The Glenwood Springs Lion's Club has an annual health fair;

AND WHEREAS, In the last 100 years, the Glenwood Springs Lion's Club has done numerous chartable deeds and given back to the community in more ways than modern memory is able to recall.

THEREFORE BE IT RESOLVED, I, Jonathan Godes, Mayor of Glenwood Springs in the State of Colorado, ask all our city residents to join me in honoring the Glenwood Springs Lion's Club as they celebrate their 100 year anniversary.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Seal of the City of Glenwood Springs, Colorado to be affixed, this 6th day of January, in the year 2022.

_____

Jonathan Godes, Mayor

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: December 2, 2021 Council Minutes

Action Requested: December 2, 2021 City Council Minutes

Department: City Clerk

Presented By:

Background Info:

Issues:

Staff Recommendation:

MINUTES

CITY OF GLENWOOD SPRINGS

REGULAR CITY COUNCIL MEETING

DECEMBER 2, 2021

101 W. 8TH STREET

6:15 PM

Note: Official meeting minutes are located on the City website via YouTube video at the following link: https://www.youtube.com/user/GlenwoodSprings1885/videos. The times in agenda items indicate approximately where the item can be found on the YouTube video timeline.

REGULAR SESSION

:10 Roll Call – already taken

Present: Mayor Godes, Mayor Pro-Tem Willman, Councilor Kaup, Councilor Wussow, Councilor Hershey, and Councilor Stepp. Also present were Debra Figueroa, City Manager; Steve Boyd, Chief Operating Office, Jenn Ooton, Asst., Matt Langhorst, Director of Public Works, Yvette Gustad, Finance Director, Brian Smith, Parks and Recreation Director, and Karl Hanlon, City Attorney.

:11 Pledge of Allegiance

Mayor Godes led the Pledge.

:12 Agenda Changes and Conflicts

Comments made by Councilor Stepp and City Attorney Karl Hanlon, to remove Glenwood Canyon Restoration Alliance Charter from Consent agenda to consider as a separate item.

:12 Citizens Appearing Before Council

No Citizen comments were made.

:12 Council Comments

Comments were made by Councilor Hershey, Mayor Pro-Tem Willman, Councilor Kaup, Councilor Wussow, and Mayor Godes.

:15 Motion for Consent

:15 Councilor Hershey moved, seconded by Councilor Kaup, to approve the consent agenda, with the exception of item G.

Motion passed unanimously.

:16 Glenwood Canyon Restoration Alliance Charter

Councilor Stepp recused herself.

:16 Councilor Kaup moved, seconded by Mayor Pro-Tem Willman, to accept the Glenwood Canyon Restoration Alliance Charter.

Motion passed unanimously.

Councilor Stepp returned to Council Chamber

:16 Black Hills Energy

Comment made by City Manager Debra Figueroa

Manager of Government Affairs for Black Hill Energy Carly West, presented.

Comments were made by Councilor Stepp

:28 Glenwood Springs Historical Society Grant Request

Glenwood Springs Historical Society representative Bill Kight, presented.

Comments were made by Mayor Pro-Tem Willman, Bill Kight, Chief Operating Officer Steve Boyd, City Manager Debra Figueroa, Councilor Kaup, Councilor Wussow, Councilor Hershey, Mayor Godes, and Councilor Stepp.

:46 Mayor Godes opened public comment.

Public comment was taken.

:48 Mayor Godes closed public comment.

Comments were made by Councilor Stepp, City Manager Debra Figueroa, and Councilor Davis.

:50 Councilor Davis moved, seconded by Councilor Hershey, to offer a letter of support, to match up with whatever the County support is, up to fifty thousand dollars, and for Debra Figueroa to find a source of funding.

Comments were made by Mayor Pro-Tem Willman, Bill Kight, Councilor Kaup, and Mayor Godes

:55 Councilor Davis amended motion, seconded by Councilor Hershey, to offer a letter of support, to match what the Garfield County Commissioners approve, up to fifty thousand dollars. Before any money is issued, the Glenwood Springs Historical Society will give a budget, how the money will be spent, and an overall plan. This part will be approved at Debra Figueroa's discretion.

Ayes: Willman, Kaup, Hershey, Wussow, Davis, Stepp

Nays: Godes

Motion passed 6-1.

:56 Planning Item 57-21 Amending Municipal Code Title 070

Economic and Community Development's Hannah Klausman, presented.

1:01 Mayor Godes opened public comment.

No public comments were taken.

1:01 Mayor Godes closed public comment.

1:01 Councilor Wussow moved, seconded by Councilor Stepp, on Planning Item 57-21 Amending Municipal Code Title 070 in consideration of Code text amendment to Municipal Code Title 070, including but not exclusive sections 070.030, 070.040, 070.060 and 070.070, to approve with the recommended findings on page one and two of the Staff Report as well as the Ordinance 18.

Motion passed unanimously.

Comments were made by Mayor Pro-Tem Willman.

1:02 Roaring Fork Mountain Bike Association

Roaring Fork Mountain Bike Association Executive Director Mike Pritchard, presented.

Comments were made by Councilor Stepp, Mike Pritchard, Parks and Recreation Director Brian Smith, Councilor Kaup, City Manager Debra Figueroa, Mayor Godes, Councilor Wussow, City Attorney Karl Hanlon.

1:36 Mayor Godes opened for public comment.

Public comment was taken.

1:51 Mayor Godes closed public comment.

Comments were made by Councilor Stepp, City Manager Debra Figueroa.

1:55 Councilor Stepp moved, seconded by Councilor Kaup, in the future, add a line item to the Parks and Rec Department to have a budget amount for soft trails, and assign to the Parks and Rec Commission for the recommendation.

Comments were made by Mayor Pro-Tem Willman, Councilor Hershey, Councilor Kaup, Councilor Davis, Mayor Godes.

2:09 Councilor Stepp amended motion, seconded by Councilor Kaup, to add a line item for 2022 with the recommendation of the Parks and Rec Commission, and if the funding for 2022 can be found, to apply it there.

2:10 Councilor Kaup withdraws second.

2:10 Councilor Wussow seconded.

Comments were made by Councilor Wussow, Councilor Hershey, Mayor Godes, Councilor Davis.

Ayes: Stepp, Davis, Wussow

Nays: Willman, Godes, Hershey, Kaup

Motion failed 4-3.

Comments were made by Councilor Wussow.

2:18 Recess

2:29 Ordinance 2021-20: An ordinance of the City of Glenwood Springs, Colorado amending article 020.030 of the Glenwood Springs Municipal Code by the addition of section 020.030.120 to provide terms and conditions for limited telephone and electronic participation by members of City Council at City Council meetings

2:29 Councilor Hershey moved, seconded by Mayor Godes, to move item 15 to the end of the meeting if there is still time.

Motion passed unanimously.

2:30 Blake Avenue Roadway Work Discussion

Public Works Director Matt Langhorst, presented.

2:34 Mayor Pro-Tem Willman moved, seconded by Councilor Wussow, to delay this project until 2023.

Motion passed unanimously.

2:37 Mount Sopris Drive School Pedestrian Safety and Stormwater Issue

Public Works Director Matt Langhorst, presented.

Comments were made by Councilor Davis, Public Works Director Matt Langhorst, Councilor Stepp, City Engineer Terri Partch, Mayor Godes, Councilor Kaup, and Councilor Hershey.

2:48 Mayor Godes opened for public comment

Public comment was taken.

2:55 Mayor Godes closed public comment.

2:55 Mayor Pro-Tem Willman moved, seconded by Mayor Godes, to approve Mount Sopris Drive School Pedestrian Safety and Stormwater project, not to exceed two hundred and thirty-five thousand dollars, and be added to the 2022 budget with money coming from the marijuana tax and safeguard the school's budget.

Comments were made by Councilor Davis, Mayor Pro-Tem Willman, City Manager Debra Figueroa, and Public Works Director Matt Langhorst

2:56 Mayor Pro-Tem Willman amended motion, seconded by Mayor Godes, to approve Mount Sopris Drive School Pedestrian Safety and Stormwater project, after the engineering staff come back with the budget for it.

Comments were made by Councilor Kaup, Mayor Godes, City Engineer Terri Partch, Public Works Director Matt Langhorst, and Councilor Wussow.

Motion passed unanimously.

3:00 Ordinance 19, Series of 2021; An Ordinance of the City Council of the City of Glenwood Springs to Amend the 2021 Budget Appropriation (ONE READING)

Chief Operating Officer Steve Boyd, presented.

Comments were made by Councilor Wussow, Chief Operating Officer Steve Boyd, City Manager Debra Figueroa.

3:02 Mayor Godes opened for public comment.

No public comment was taken.

3:32 Mayor Godes closed public comment.

3:02 Mayor Pro-Tem Willman moved, seconded by Councilor Hershey, to approve Ordinance 19, Series of 2021; An Ordinance of the City Council of the City of Glenwood Springs to Amend the 2021 Budget Appropriation.

Passed unanimously.

3:02 Ordinance 21, Series of 2021; An Ordinance of the City of Glenwood Springs, appropriating funds for the 2022 Budget (ONE READING)

Chief Operating Officer Steve Boyd, presented.

Comments were made by Councilor Hershey and City Attorney Karl Hanlon.

3:03 Councilor Wussow moved, seconded by Councilor Stepp, to approve Ordinance 21, Series of 2021; An Ordinance of the City of Glenwood Springs, appropriating funds for the 2022 Budget.

3:04 Mayor Godes opened for public comment.

No public comment was taken.

3:04 Mayor Godes closed public comment.

Motion passed unanimously.

Comments were made by City Attorney Karl Hanlon.

3:04 Direction regarding the pending lawsuit against the City brought by BLD Group pursuant to Colorado Rules of Civil Procedure 106

3:04 Councilor Hershey moved, seconded by Councilor Davis, directing the City Attorney, and giving him authority with regards to a pending lawsuit against the City brought by BLD Group pursuant to Colorado Rules of Civil Procedure 106, to enter into a stipulation to address the claim presented.

Motion passed unanimously.

Comments were made by Councilor Hershey and City Attorney Karl Hanlon

3:06 Ordinance 2021-20: An ordinance of the City of Glenwood Springs, Colorado amending article 020.030 of the Glenwood Springs Municipal Code by the addition of section 020.030.120 to provide terms and conditions for limited telephone and electronic participation by members of City Council at City Council meetings

Comments were made by Councilor Hershey, City Attorney Karl Hanlon, Councilor Kaup, Mayor Godes and Mayor Pro-Tem Willman, Councilor Wussow.

3:09 Mayor Godes moved, seconded by Councilor Wussow, to move the agenda item to the January 6, 2022, Council meeting.

Ayes: Hershey, Kaupo, Godes, Davis, Stepp, Wussow

Nays: Willman

Motion passed 6-1.

3:09 Report from City Administration

City Manager

Comments were made by City Manager Debra Figueroa.

City Attorney

Comments were made by City Attorney Karl Hanlon.

Correspondence Incoming/Outgoing

Comments were made by Mayor Godes and Mayor Pro-Tem Willman.

3:11 Adjournment

3:11 Councilor Stepp moved, seconded by Councilor Wussow, to adjourn.

Ayes: Willman, Kaupo, Godes, Davis, Stepp, Wussow

Nays: Hershey

Motion passed 6-1.

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item:	Resolution 2022-03; A Resolution of the City Council of the City of Glenwood Springs, Colorado Designating a Posting Place for 2022
Action Requested:	Approve notice of posting place
Department:	City Clerk
Presented By:	Ryan Muse, City Clerk
Background Info:	Each year the City is required to formally designate a place for the official notice of City meetings and events. The designated location is City Hall.
Issues:	None
Staff Recommendation:	Approval

RESOLUTION 2022 – 03

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF GLENWOOD SPRINGS, COLORADO, DESIGNATING A PUBLIC PLACE FOR POSTING MEETING NOTICES DURING CALENDAR YEAR 2022.

WHEREAS, the Colorado Open Meetings Law requires that all meetings at which the adoption of any proposed City policy or other formal action be held only after full and timely notice to the public; and

WHEREAS, Section 24-6-402(2)(c) C.R.S., as amended, requires City Council to designate a public place for posting notices of any such meetings; and

WHEREAS, this designation must occur each calendar year; and

WHEREAS, the bulletin board entitled "Official Public Notices" located in the lobby of City Hall has previously been and is hereby again designated as the place for such postings.

NOW, THEREFORE, IT IS RESOLVED BY THE CITY COUNCIL OF THE CITY OF GLENWOOD SPRINGS, COLORADO, THAT:

Section 1. Pursuant to Section 24-6-402(2)(c) of the Colorado Revised Statutes, as amended, and unless otherwise designated, the bulletin board entitled "Official Public Notices" and located in the lobby of the Glenwood Springs City Hall, located at 101 W. 8th Street, Glenwood Springs, Colorado 81601, is hereby designated as the appropriate place for posting public notices of all regular and special meetings of the City Council and its designated boards and commissions for the 2021 calendar year.

Section 2. All such notices, except those of emergency meetings, shall be posted at this designated place at least twenty-four (24) hours prior to the holding of the respective meeting.

INTRODUCED, READ, AND PASSED THIS 6TH DAY OF JANUARY 2022.

CITY OF GLENWOOD SPRINGS, COLORADO

_____

Jonathan Godes, Mayor

ATTEST:

_____

Ryan Muse, Assistant City Clerk

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: CLEER Contract Approval for 2022

Action Requested: Approval of the Energy Sustainability Management agreement between CLEER and the City of Glenwood Springs Electric Department for 2022.

Department: Public Works

Presented By: Matthew Langhorst, Public Works Director

Background Info: CLEER has been managing the main portions of the City of Glenwood Springs Electric Department Energy Sustainability program for the last few years. The team at CLEER is efficient with their management of the program and we would like to continue this relationship with them for the foreseeable future.

Issues: None

Staff Recommendation: Staff is Recommending Approval of the Energy Sustainability Management agreement between CLEER and the City of Glenwood Springs Electric Department for 2022.

2022 PROPOSED REBATES - EXHIBIT A

Rebates are available to Glenwood Springs Electric customers on a first come first serve basis while funds last. Invoices must be submitted within 90 days of the completion date. Maximum rebate amounts are per account per year. CLEER staff helps members apply for MEAN and Black Hills Energy rebates whenever available.

Rebates are NOT to exceed $112,500 in 2022.

RESIDENTIAL (RETROFITS ONLY)

Low-to-Moderate (LMI) Household Incentives:
Rebate amount: up to $4,000/year, in combination with Garfield Clean Energy, MEAN, and/or Black Hills Energy rebates
Criteria:

- Free home energy assessments for renters or homeowners (includes health and safety check for combustion appliances/HVAC)
- Families living below 120% AMI qualify (rebate amount will be tiered depending on income level)
- Weatherization, HVAC upgrades, LEDs, electric panel upgrade and refrigerators

Home Energy Assessment
Rebate amount $300

- Must be performed by a BPI certified Building Analyst
- Include blower door test and a CAZ (Combustion Appliance Zone) test

Air Sealing
Rebate amount: 25% of project cost up to $500
Criteria:

- Pre and post-blower door assessment required

· Air leakage must be reduced by 10% or more as measured in CFM50 by blower door test

Insulation

Rebate amount: 25% of project cost up to $500 for all insulation projects

Criteria:

· Air sealing must be completed prior to adding insulation unless Natural Air Changes per Hour (NACH) is 0.35 or lower.

· Pre- and post-blower door assessment required

· Insulation project must meet 2018 International Energy Conservation Code (IEEC) requirements

· Attic, crawlspace, and walls qualify for rebate

Multifamily Envelope

Rebate amount: 25% of project cost up to $10,000 per complex

Criteria:

· Four or more units per building

· Entire building must be air sealed and/or insulated

· Pre- and post-blower door assessment required on one unit per building

· Air leakage must be reduced by 10% or more as measured in CFM50 by blower door test

· Insulation project must meet 2018 International Energy Conservation Code (IEEC) requirements

LED Lighting

Rebate amount: 50% of project cost up to $200

Criteria:

· Replace non-LED bulbs with LED bulbs or fixture

· Must be Energy Star LEDs or Design Lights Consortium (DLC) certified

Heating and Cooling

Cold Climate Air Source Heat Pump

Rebate amount: 25% of project cost up to $1,000 (can be matched with MEAN rebate)

Criteria:

· Fuel Switch (to electric heat from a fossil fuel heating system)

· Ducted: HSPF 9+; Ductless: HSPF 10+

- Must be rated for cold climates and provide heat down to -5 or colder
- Load calculation required to the right-size outside unit and derate for high elevation
- Must be used as the primary heat source in the home
- AHRI Certification required
- Learn more about heat pumps:
    - https://neep.org/sites/default/files/resources/ASHP_buyingguide_5.pdf

Evaporative Cooler (swamp)

Rebate amount: 25% of project cost up to $200

Criteria:

- Must be permanently installed in the home
- No previous swamp cooler installed

Smart (Wi-Fi Enabled) or Programmable Thermostats

Rebate amount: $50/unit (up to 4 per account)

Criteria:

- Home is heated with electricity
- Existing thermostat is non-programmable

Water Heater

Rebate amount: 25% of project cost up to $1,000

Criteria:

- Fuel switch (to Heat Pump water heater from a fossil fuel water heating system)
- Hybrid/electric heat pump water heater models only
- Energy Star rated
    - https://www.energystar.gov/productfinder/product/certified-water-heaters/results
- Learn more about heat pump water heaters:
    - https://www.energy.gov/energysaver/heat-pump-water-heaters

Heat Tape Timer

Rebate amount: 25% of project cost up to $200

Criteria:

- No current controls
- Timer must be hardwired
- Heat tape must not be turned on 4 pm to 9 pm during the winter months

E-Bikes

Rebate amount: $200

- Purchase within 81601 zip code
- Two E-bikes per household limit
- Intend to use the E-bike to offset vehicle miles

EV Charging Station

Rebate amount: $500

- Must have a NEMA 14-50 outlet to plug in to or the charger must be hardwired to a 240V Circuit
- Must be installed by a licensed electrician
- Must be ENERGY STAR certified and UL Listed

Electric Panel Upgrade

Rebate amount: $1,000

- The electric panel must be upgraded to 200 amps or greater and must include an EV charger circuit and a water heater circuit
- Panel upgrades must be done for the purpose of home electrification measures and/or solar PV installation.
- Properties must demonstrate completed installation of either a Level 2 EV charger or an electric heat pump water heater.

Bundle Rebates

The bonus incentive requires all two to be completed within 90 days. Home envelope includes air sealing and insulation projects.

- Home envelope + cold climate heat pump installation: $500 bonus
- Home envelope + cold climate heat pump + heat pump water heater: $750 bonus
- Home envelope + cold climate heat pump installation + EV Charger: $750 bonus

Annual GWSE rebate limit:

$ 3,000 + bundle bonus per member per year

Commercial (RETROFITS ONLY)

Rebate amount: 50% of the project cost up to $7,500

- Projects based on $0.02 per kWh in estimated savings over 10 years

· Upgrades include EC motors, lighting controls, chillers, variable frequency drives (VFD), and cold climate heat pumps

LED Lighting

Rebate amount: 50% up to $7,500

Criteria:

· Replace non-LED bulbs with qualifying LED fixtures or bulbs

· Bulbs must be recycled

· $0.02 per kWh in estimated savings over 10 years

· All fixtures or LED bulbs must be Energy Star rated or Design Lights Consortium (DLC) certified

Program Administrative Details and Costs

CLEER staff will provide the following services:

· Walkthrough assessments for businesses

· Energy Coaching and technical assistance to businesses to identify priority projects, find contractors, review bids, understand rebates and ROI for comprehensive projects, and meet final project energy savings tracking requirements

· Energy Coaching services to assist homeowners (including LMI) to identify priority projects based on home energy assessment reports, find qualified contractors, review bids, understand rebates, and secure financing to move projects forward

· Program branding, earned media, case study, direct outreach, web presence, customer bill insert, community partner outreach, and linkage with neighboring energy programs

· Reporting, rebate processing, presentations, program development, administration, management, coordination with city staff

· Assistance with MEAN's DSM Survey and EIA reporting

Administrative costs are NOT to exceed $60,000 in 2022.

AGREEMENT FOR PROFESSIONAL SERVICES

This AGREEMENT FOR PROFESSIONAL SERVICES is made this _____ day of _____ 2021 between the CITY OF GLENWOOD SPRINGS, a home rule municipality under the laws of the State of Colorado ("City"), and CLEAN ENERGY ECONOMY FOR THE REGION, a Colorado non-profit corporation (“Contractor”).

WITNESSETH:

In consideration of the mutual covenants and agreements herein contained, the parties hereto agree as follows:

1. Scope of Agreement. Contractor agrees to provide administration and implementation of energy efficiency programs related to the City’s electric utility services, as more fully identified on **Exhibit A** attached hereto and incorporated herein.

2. Consideration. The City agrees to pay Contractor no more than 90% of what has been budgeted within the Energy Conservation line item within each years budget. The scope of CLEER services will be defined within the programs listed on **Exhibit A**.

3. Term. This Agreement shall be effective as of January 1, 2022 and shall remain in effect until December 31, 2022, or unless earlier terminated pursuant to Section 11 of this Agreement. This agreement can be extended upon mutual agreement by both parties for one-year durations with an end date of possible extension of December 31, 2025.

4. Agreement Subject to Appropriations. It is expressly understood and agreed that the City’s performance of this Agreement is subject to appropriations being made by the City Council of the City of Glenwood Springs. In the event City Council fails to make or maintain sufficient appropriations to pay any costs incurred under this Agreement, the Agreement shall be terminated immediately.

5. Independent Contractor. Contractor is providing services independently and is not an employee of the City. Contractor shall not be entitled to any benefits provided to City employees. Contractor understands the difference in status between an independent contractor and an employee and acknowledges and stipulates that Contractor is neither eligible nor entitled to statutory or legal benefits or provisions of labor codes or other such similar statutes. The parties further agree that the City shall not withhold from Contractor unemployment insurance, social security or any other withholdings. Contractor agrees to be responsible for all such payments required by law.

a. Contractor acknowledges and agrees that he is not entitled to unemployment insurance benefits unless unemployment compensation is provided by Contractor or some other entity. Contractor also acknowledges and agrees to report all payments received from the City on his federal and state income tax returns and is obligated to pay any and all resulting federal and state income tax obligations. Contractor will indemnify the City for any such payments required but not paid.

b. Contractor acknowledges and agrees that he is not covered by the City's workers' compensation coverage and is not entitled to workers' compensation benefits. The City will be held harmless, and Contractor will indemnify the City for any liability arising out of or caused by Contractor's business and/or persons engaged in operations covered by this Agreement.

c. In making and performing this contract, Contractor acts and at all times shall act as an independent contractor and shall maintain operations that are separate and distinct from the City. Nothing contained in this Agreement shall be construed or applied as to create or imply the relationship of partners, joint adventurers, or of employer or employee between the parties hereto.

6. Standard of Care. The standard of care applicable to Contractor's services will be the same degree of care, skill, and diligence normally employed by professionals performing the same or similar services.

7. Indemnity. Contractor hereby covenants and agrees to indemnify, save, and hold harmless the City, its officers, employees, and agents from any and all liability, loss, costs, charges, obligations, expenses, attorneys' fees, litigation, judgments, damages, and claims arising from or out of any negligent act or omission or other tortious conduct of Contractor, its officers, employees, or agents in the performance or nonperformance of its obligations under this Agreement.

8. Insurance. Contractor has provided proof of general liability insurance. The liability insurance shall name the City as an additional insured thereunder, with appropriate endorsements with single limit liability coverage of at least One Million Dollars ($1,000,000.00). Contractor shall maintain this insurance for the term of this Agreement.

9. Governmental Immunity. Nothing herein shall be interpreted as a waiver of governmental immunity, to which the City would otherwise be entitled under §24-10-101, et seq., C.R.S., as amended.

10. Employees, Subcontractors and Assignees. The providing of professional services required under Section 1 of this Agreement shall be the responsibility of Contractor. Contractor may employ or subcontract with additional persons to assist in the performance of this Agreement. Supervision and payment of any such persons shall be the sole and exclusive responsibility of Contractor. Notwithstanding the foregoing, however, this Agreement shall not be assigned by Contractor to a third party without the prior express written consent of the City.

11. Termination. If at any time the City is dissatisfied with the services of Contractor for any reason whatsoever, the City may terminate this Agreement effective immediately upon the delivery of written notice to Contractor. In the event of any such termination, the City shall pay Contractor for services rendered to the date of termination.

12. Agreement Administration and Notice. For purposes of administering this Agreement, the City's Public Works Director will represent the City in carrying out the purposes and intent of this Agreement. Any notices required to be given pursuant to this Agreement shall be delivered as follows:

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

To the Contractor: CLEER
P.O. Box 428
Carbondale, CO 81623
Phone: 970-704-9200

13. Responsibilities. Contractor shall be responsible for all damages to persons or property caused by the Contractor, its agents, employees or sub-Contractors, to the extent caused by its negligent acts, errors and omissions hereunder, and shall indemnify and hold harmless the City from any claims or actions brought against by reason thereof.

14. Entire Agreement. This Agreement constitutes the entire agreement between the parties. The provisions of this Agreement may be amended at any time by the mutual consent of both parties. The parties shall not be bound by any other agreements, either written or oral, except as set forth in this Agreement.

15. Governing Law. The laws of the State of Colorado shall govern the validity, performance and enforcement of this Agreement. Venue for any action instituted pursuant to this agreement shall lie in Garfield County, Colorado.

16. Authority. Each person signing this Agreement represents and warrants that said person is fully authorized to enter into and execute this Agreement and to bind the party it represents to the terms and conditions hereof.

17. Attorneys' Fees. Should this Agreement become the subject of litigation between the City and Contractor, the prevailing party shall be entitled to recovery of all actual costs in connection therewith, including but not limited to attorneys' fees and expert witness fees. All rights concerning remedies and/or attorneys' fees shall survive any termination of this Agreement.

18. Counterparts. This Agreement may be executed in counterparts, including any facsimile copies, each of which shall be deemed an original and all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands this _____ day of _____ 202___.

[Acknowledgements on following page]

CITY OF GLENWOOD SPRINGS

_____
Johnathan Godes, Mayor

ATTEST:

_____
Ryan Muse, City Clerk

CLEAN ENERGY ECONOMY FOR THE REGION

By: _____
Alice Hubbard Laird, Executive Director

STATE OF COLORADO)
) ss.
COUNTY OF GARFIELD)

The foregoing AGREEMENT FOR PROFESSIONAL SERVICES was acknowledged before me this _____ day of _____ 202__ by Alice Hubbard Laird as Executive Director of Clean Energy Economy for the Region.

Witness my hand and official seal.

My commission expires: _____

_____
Notary Public

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: Resolution 2022-01; Great Outdoors Colorado (GOCO) Grant

Action Requested: Approval of a resolution supporting a grant application to Great Outdoors Colorado.

Department: City Administration

Presented By: Debra Figueroa, City Manager

Background Info: The Forest Service Foundation and the City of Glenwood Springs are partnering on a grant submittal for $2.2 million under the GOCO Community Impact Funding grant. The project is for the emergency restoration at Hanging Lake including debris removal, temporary trail maintenance, heritage and field resource survey work, and design/construction of a more resilient trail to Hanging Lake.

Council authorized a $50,000 contribution to match this grant from Tourism Grant funds that are administered by FAB.

Issues: None.

Staff Recommendation: Approval of the resolution agreeing to be a co-applicant on the grant application.

RESOLUTION 2022-01

A RESOLUTION OF THE CITY COUNCIL OF GLENWOOD SPRINGS, COLORADO, APPLYING FOR THE COMMUNITY IMPACT GRANT PROGRAM FROM THE STATE BOARD OF THE GREAT OUTDOORS COLORADO TRUST FUND FOR THE COMPLETION OF THE HANGING LAKE TRAIL EMERGENCY RESTORATION PROJECT

WHEREAS, the City of Glenwood Springs supports the Great Outdoors Colorado grant application for the Hanging Lake Trail Emergency Restoration Project, and if the grant is awarded, the City of Glenwood Springs supports the completion of the project; and

WHEREAS, the Hanging Lake Trail is a beloved community trail and the City of Glenwood Springs' top tourist attraction; and

WHEREAS, the closure of the Hanging Lake Trail due to mudslides led to the cancellation of over 15,000 reservations to visit the trail in the 2021 season, demonstrating the high demand for reopening the trail as soon as possible; and

WHEREAS, the City of Glenwood Springs has requested $2,200,000 from Great Outdoors Colorado for the Hanging Lake Trail Emergency Restoration Project; and

WHEREAS, the City of Glenwood Springs intends to work with the National Forest Foundation, the United States Forest Service, and other local nonprofit partners to remove debris, construct a temporary trail, design, and construct a more resilient, permanent trail, and restore other damaged areas on the popular Hanging Lake Trail.

NOW, THEREFORE, IT IS RESOLVED BY THE CITY COUNCIL OF THE CITY OF GLENWOOD SPRINGS, COLORADO, THAT:

Section 1: The City Council of the City of Glenwood Springs strongly supports the application for a grant with Great Outdoors Colorado.

Section 2: If the grant is awarded, the City Council of the City of Glenwood Springs strongly supports the fulfillment of the project.

Section 3: If the grant is awarded, the City Council hereby authorizes the Mayor or Mayor Pro Tem to sign the grant agreement with Great Outdoors Colorado.

Section 4: If the grant is awarded, the City Council of the City of Glenwood Springs authorizes the expenditure of funds necessary to meet the terms and obligations of the grant agreement.

Section 5: This resolution to be in full force and effect from and after its ratification on January 6, 2022.

INTRODUCED, READ, AND PASSED THIS 6TH DAY OF JANUARY 2022.

CITY OF GLENWOOD SPRINGS, COLORADO

_____

Jonathan Godes, Mayor

ATTEST:

_____

Ryan Muse, City Clerk

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item:	Chamber Contract Approval and 2022 Tourism Management Board Strategy
Action Requested:	Approval of the City's Contract with the Chamber
Department:	City Administration
Presented By:	Debra Figueroa, City Manager
Background Info:	Council approves all contracts over $100,000. This is funded from the 2022 Tourism Fund.
Issues:	None
Staff Recommendation:	Approval

AGREEMENT FOR PROFESSIONAL SERVICES

This AGREEMENT FOR PROFESSIONAL SERVICES between the CITY OF GLENWOOD SPRINGS, a municipality under the laws of the State of Colorado ("City") and GLENWOOD SPRINGS CHAMBER RESORT ASSOCIATION, a Colorado corporation ("Chamber"), is effective January 1, 2022 no matter the date on which it was signed.

WITNESSETH:

In consideration of the mutual covenants and agreements herein contained, the parties hereto agree as follows:

1. Scope of Agreement. Chamber agrees to perform for the City Tourism Promotion Services more particularly described in the Marketing Plan attached hereto as **Exhibit "A"** and incorporated herein ("Marketing Plan").

2. Consideration. The City agrees to pay the Chamber in accordance with the proposed budget attached hereto as **Exhibit "A"** and incorporated herein.

3. Term. This Agreement shall be effective from January 1, 2022 through December 31, 2022.

4. Independent Contractor. Chamber is providing services independently and is not an employee of the City. Chamber shall not be entitled to any benefits provided to City employees. Chamber understands the difference in status between an independent contractor and an employee and acknowledges and stipulates that Chamber is neither eligible nor entitled to statutory or legal benefits or provisions of labor codes or other such similar statutes. The parties further agree that the City shall not withhold from Chamber unemployment insurance, social security or any other withholdings. Chamber agrees to be responsible for all such payments required by law.

4.1 Chamber acknowledges and agrees that it is not entitled to unemployment insurance benefits unless unemployment compensation is provided by Chamber or some other entity. Chamber also acknowledges and agrees to report all payments received from the City on its federal and state income tax returns and is obligated to pay any and all resulting federal and state income tax obligations. Chamber will indemnify the City for any such payments required but not paid.

4.2 Chamber acknowledges and agrees that it is not covered by the City's workers' compensation coverage and is not entitled to workers' compensation benefits. The City will be held harmless, and Chamber will indemnify the City for any liability arising out of or caused by Chamber's business and/or persons engaged in operations covered by this Agreement.

4.3 In making and performing this contract, Chamber acts and at all times shall act as an independent contractor and shall maintain operations that are separate and distinct from the City. Nothing contained in this Agreement shall be construed or applied as to create or imply the relationship of partners, joint adventurers, or of employer or employee between the parties hereto.

5. Definitions. For purposes of this Agreement the following definitions shall apply:

Ad Production Expense. Design and creative (photographs/videos) work for tourism-related ads or other print or electronic materials.

Associated Staff. Refers to any staff hired by the Chamber, who is expressly involved with the promotion of tourism, directed by the Director of Tourism, and paid through budgeted funds allocated through the Tourism Marketing budget.

Association Memberships. Memberships in tourism-related or industry specific organizations.

Billboard. Advertising on mass transit and billboards.

Bookkeeping Services. Covers costs of bookkeeping, for the tourism promotion fund, e.g., accounts payable/receivable; billing co-op advertising partners; providing detailed P&L statements; tracking reimbursable marketing expenses for postage and printing, any tourism promotion fund bills which have been paid by the Chamber.

Building Costs & Equipment. Includes office space for the Director of Tourism and any associated staff; telephone system, telephones and regular monthly long distance and local phone bills; desks and furniture; office equipment to include computers, fax machine, use of copier and any other equipment; ; software including database management software; virus protection; and all other software; high speed internet access; IT support on related equipment; equipment maintenance; use of common areas.

Cooperative Advertising. Joint advertising efforts between the tourism promotion department and various tourism-related businesses.

Direct Mail. Bulk direct mailing to individuals regarding specific advertising campaigns, including design, printing, postage and handling. These costs may include services provided by the Chamber or by a mail house.

Distribution. Distribution, storage and shipping of brochures to distribution outlets and costs of brochure distribution companies.

Financial Interest. Any undertaking or activity in which the Chamber will receive money from the City other than for payment of services pursuant to this Agreement.

Fulfillment. Postage costs incurred from responding to specific requests for tourism-related information.

Internet Listings, Website & Links. Infrastructure improvements, search engine optimization, marketing, promotion and sales of the Glenwood Springs visitor destination on visitglenwood.com and its' social channels.

Outside Consultants. Outside professionals retained to accomplish specific goals of the Marketing Plan.

Print Advertising. Advertising in news publications, and various industry and trade publications, such as travel guides, state guides, and travel magazines.

Promotional Items. Giveaway items such as Glenwood Springs branded merchandise.

Public Relations & Social Media. Public Relations initiatives include press releases, articles, Internet placements and media familiarization tours. Social Media initiatives include targeted online advertising and posts. Also, includes, payments to outside consultants providing public relations and social media services.

Research and Tracking. Research to gain adequate knowledge of our target audience and demographics for branding issues and determining how promotional initiatives can be best executed. Budget will also fund tracking measures of marketing, advertising, and public relations.

Special Events & Group Marketing. For events, tour groups, meetings, reunions coming to Glenwood Springs, the Chamber may provide support as appropriate and determined by the Director of Tourism.

Tourism Management Board. Nine member board as created and defined in the Glenwood Springs Municipal Code Article 020.020.

Trade Shows. Includes shows geared toward the travel industry. This area also includes marketing items for shows and promotional items purchased for giveaways at shows and for conventions and groups.

Travel. Covers travel expenses for the Director of Tourism and Associated Staff. Purpose is for attendance at trade shows or other out-of-town business meetings and functions. Includes transportation, lodging, meals and incidentals, does not include alcohol or personal entertainment. This area also includes reimbursement for mobile phones of Director of Tourism and Associated Staff.

TV/Radio. Television and radio advertising budget utilized for messages and promotions.

Visitor Center/Visitor Services. Includes staffing, space and furnishings, and all ancillary costs, for visitor information center, provided by the Chamber. Visitor Center shall be open as follows:

November through May: Monday – Friday 9 a.m. to 5 p.m.
Saturday 10 a.m. to 2 p.m.
June through October: Monday – Friday 9 a.m. to 5 p.m.,
Saturday 10 a.m. to 2 p.m.
Sunday 10 a.m. to 2 p.m.
The GSCRA may adjust hours as necessary based on demand.

Holiday Hours (10 a.m. to 2 p.m.) – Memorial Day, Independence Day, Labor Day
Holiday closures - Thanksgiving Day, Christmas Eve, Christmas Day, New Year's Day. Special closures – Strawberry Days or other chamber Special Events.
NOTE: Special circumstances may cause closure.

6. Duties of Chamber.

6.1 Implement the Marketing Plan in cooperation with the Tourism Management Board and City Council.

6.2 Provide periodic updates with at least an annual presentation to the City Council regarding the status of the Marketing Plan.

6.3 Recommend and implement changes and amendments, as needed to the Marketing Plan approved by City Council or its designee.

7. Payment for Services. Invoices shall be paid within fourteen (14) days of receipt subject to the following:

7.1 Invoices shall be in a form approved by the Finance Director and shall have backup for all expenses listed thereon.

7.2 All expenditures shall be approved for payment by City Council or its designee.

7.3 Travel expenses for any persons other than the Director of Tourism and Associated Staff shall be pre-approved by the City Council or its designee. Expenses incurred for meals and mileage shall be reimbursed at the current applicable I.R.S. rate

7.4 No credit card expenditures, other than the Director of Tourism and Associated Staff shall be reimbursed and such expenditures shall comply with the Chamber's written credit card policy adopted March 13, 2019 and attached hereto as **Exhibit "C."**

7.5 Separate Accounts. Any money received and disbursed pursuant to this Agreement shall be reflected in a separate account maintained by the Chamber and shall be strictly segregated from all other monies received, handled, or disbursed by the Chamber pursuant to activities other than described herein. Such monies shall be accounted for in the same manner as used by the City for its own accounts.

7.6 Record Keeping and Inspections. The Chamber shall cooperate fully with the Tourism Management Board and City Council or its designee to maintain full and complete records of any and all activities performed pursuant to this Agreement and shall make such records available for inspection by the City upon request and during the Chamber's regular business hours. The City also reserves the right to inspect, review and audit any phase of the Chamber's performance hereunder either on a continuing or spot-check basis.

8. Disclosure of Financial Interest. Chamber shall disclose in writing to the City any Financial Interest it has in any transaction including without limitation special events, publications and activities for which City funds are used in whole or in part, including without limitation promotion, Printing, storage or Distribution.

9. City Representative; Work Product.

9.1 A City Council representative shall sit as an ad hoc non-voting

member of both the Glenwood Springs Chamber Resort Association and the Tourism Management Board during the term of this Agreement.

9.2 All work product created pursuant to this Agreement paid for with Tourism Promotion Funds is and shall remain the property of the City, including but not limited to URL addresses, web content, contact lists and research information, printed materials, photographic and video assets, and all consultant work products, except for the domain name glenwoodchamber.com that is registered and paid for by the Chamber.

10. Work By Illegal Aliens Prohibited. This paragraph shall apply to the extent that Chamber's performance of work under this Agreement does not involve the delivery of a specific end product other than reports that are merely incidental to the performance of said work, or information technology services or information technology products and services. Pursuant to Section 8-17.5-101, C.R.S., et. seq., Chamber warrants, represents, acknowledges, and agrees that:

10.1 Chamber does not knowingly employ or contract with an illegal alien.

10.1 Chamber shall not knowingly employ or contract with an illegal alien to perform works or enter into a contract with a subcontractor that fails to verify to Chamber that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this Agreement.

10.2 Chamber has participated in or attempted to participate in the basic pilot employment verification program created in Public Law 208, 104th Congress, as amended, and expanded in Public Law 156, 108th Congress, as amended, administered by the Department of Homeland Security (hereinafter, "E-Verify") in order to verify that Chamber does not employ illegal aliens. If Chamber is not accepted into E-Verify prior to entering into this Agreement, Chamber shall forthwith apply to participate in E-Verify and shall submit to the City written verification of such application within five (5) days of the date of this Agreement. Chamber shall continue to apply to participate in E-Verify, and shall certify such application to the City in writing, every three (3) months until Chamber is accepted or this Agreement is completed, whichever occurs first. This Section shall be null and void if E-Verify is discontinued.

10.3 Chamber shall not use E-Verify procedures to undertake pre-employment screening of job applicants while this Agreement is being performed.

10.4 If Chamber obtains actual knowledge that a subcontractor performing work under this Agreement knowingly employs or contracts with an illegal alien, Chamber shall be required to:

10.4.1 notify the subcontractor and the City within three (3) days that Chamber has actual knowledge that the subcontractor is employing or contracting with an illegal alien; and

10.4.2 terminate the subcontract with the subcontractor if within three (3) days of receiving the notice required pursuant to this subparagraph the subcontractor does not stop employing or contracting with the illegal alien; except that Chamber shall not terminate the contract with the subcontractor if during such three (3) days the subcontractor provides information to establish that the subcontractor has not knowingly employed or contracted with an illegal alien.

10.5 Chamber shall comply with any reasonable request by the Colorado Department of Labor and Employment ("Department") made in the course of an investigation that the Department is undertaking pursuant to the authority established in subsection 8-17.5-102(5), C.R.S.

10.6 If Chamber violates this Section, the City may terminate this Agreement for breach of contract. If this Agreement is so terminated, Chamber shall be liable for actual and consequential damages to the City arising out of said violation.

11. Indemnity, Insurance and Governmental Immunity Act.

11.1 Chamber hereby covenants and agrees to indemnify, save, and hold harmless the City, its officers, employees, and agents from any and all liability, loss, costs, charges, obligations, expenses, attorneys' fees, litigation, judgments, damages, claims, and demands of any kind whatsoever arising from or out of any negligent act or omission or other tortious conduct of Chamber, its officers, employees, or agents in the performance or nonperformance of its obligations under this Agreement.

11.2 Chamber has provided proof of general liability insurance to the City upon execution of this Agreement. City may require increased coverage based on particular project requirements.

11.3 Nothing herein shall be interpreted as a waiver of governmental immunity, to which the parties would otherwise be entitled under §24-10-101, et seq., C.R.S., as amended.

12. Termination. The City or the Chamber may terminate this Agreement at any time by providing a minimum thirty (30) calendar days' written notice to the other party. If the parties have mutually determined that the work has become infeasible, the parties agree to terminate the Agreement in accordance with this Section 12. In the event this Agreement is terminated, the Chamber shall be compensated for all work performed to date including a pro-rated amount for work items begun but not completed.

13. Agreement Administration and Notice. For purposes of administering this Agreement, the City Manager hereby appoints the City Finance Director to represent the City in carrying out the purposes and intent of this Agreement. Any notices required to be given pursuant to this Agreement shall be delivered as follows:

To the City: Finance Director
City of Glenwood Springs
101 West 8th Street
Glenwood Springs, CO 81601

Copies to: City Manager
City of Glenwood Springs
101 West 8th Street
Glenwood Springs, CO 81601

To the Chamber: Lisa Langer, Director of Tourism and
Angela Anderson, President and CEO
Glenwood Springs Chamber Resort Association
P.O. Box 1238, 802 Grand Avenue
Glenwood Springs, CO 81602-1238

14. Entire Agreement. This Agreement constitutes the entire agreement between the parties. The provisions of this Agreement may be amended at any time by the mutual consent of both parties. The parties shall not be bound by any other agreements, either written or oral, except as set forth in this Agreement.

15. Governing Law. The laws of the State of Colorado shall govern the validity, performance and enforcement of this Agreement. Venue for any action instituted pursuant to this agreement shall lie in Garfield County, Colorado.

16. Authority. Each person signing this Agreement represents and warrants that said person is fully authorized to enter into and execute this Agreement and to bind the party it represents to the terms and conditions hereof.

17. Attorneys' Fees. Should this Agreement become the subject of litigation between the City and Chamber, the prevailing party shall be entitled to recovery of all actual costs in connection therewith, including but not limited to attorneys' fees and expert witness fees. All rights concerning remedies and/or attorneys' fees shall survive any termination of this Agreement.

18. Counterparts. This Agreement may be executed in counterparts, including any facsimile copies, each of which shall be deemed an original and all of which together shall constitute one and the same instrument.

19. Agreement Subject to Appropriations. It is expressly understood and agreed that the City's performance of this Agreement is subject to appropriations being made by the City Council of the City of Glenwood springs. In the event City Council fails to make or maintain sufficient appropriations to pay any costs incurred under this Agreement, the Agreement shall be terminated immediately.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands this _____ day of January, 2022.

CITY OF GLENWOOD SPRINGS

ATTEST:

By: _____
Jonathan Godes, Mayor

_____
Ryan M. Muse, City Clerk

GLENWOOD SPRINGS CHAMBER
RESORT ASSOCIATION, INC.

By: _____
Angela Anderson, President and
Chief Executive Officer

By:_____
Eric Brotherson, Chairman

STATE OF COLORADO)
) ss.
COUNTY OF GARFIELD)

The foregoing AGREEMENT FOR PROFESSIONAL SERVICES was acknowledged before me this _____ day of January, 2022 by Angela Anderson as President and Chief Executive Officer and Eric Brotherson as Chairman of Glenwood Springs Chamber Resort Association, Inc.

Witness my hand and official seal.

My commission expires: _____

_____
Notary Public

EXHIBIT A

		2022 TPF BUDGET - AMENDED (85% of TOTAL TPF RECEIPTS)	2020	2021	2022
1	CODE	2022 TPF REVENUE (85% of accommodations tax receipts 9/1/2020-8/31/2021)	1,148,795	951,926	1,147,762
		*2021 Tourism Promotion Budget incudes $300K from TPF Reserves		*300K in above	
2	56413	NON-MARKETING/ADVERTISING EXPENSES (VC & TP Dept. Overhead	115,000	75,000	100,000
3		2022 BUDGET FOR SUPPORT COSTS (Salaries, Taxes, Benefits, Accting	187,556	181,736	190,740
4		2022 SUPPORT COSTS IN RELATION TO TOTAL TPF BUDGET	26.3%	26.9%	25.3%
5		2022 WORKING TOURISM MARKETING BUDGET	846,239	695,190	857,022
6	56416	Advertising - Includes Print, Online, Out-of-Home, Radio & Television	663,284	595,956	716,088
		Media Creative, Graphic Design, photos, video production, agency-			
		related Fees/Commissions, discretionary social ad & content creation			
7	56414	Public Relations	25,750	1,000	10,500
8	56415	Vacation Planner Printing/Distribution	36,600	29,600	36,400
9	56417	Hosting - Website, Video, Photos, Domains, Email, Social	24,100	24,284	23,564
10	56418	Internet Management	25,000	25,000	20,000
11	56419	Direct Mail and Fulfillment	9,500	6,000	9,000
12	56420	Trade Shows	7,450	2,500	2,500
13	56421	Industry Specific Organizations & Education	7,405	3,275	5,300
14	56424	Group and International Marketing	26,100	2,000	16,800
15	56422	Miscellaneous	2,250	675	1,380
16	56423	Travel for Shows / Conferences / Meetings	18,800	4,900	15,490
17	56429	Consultants	0.00	0.00	0.00
18		Contingency for Emergencies (Fires, Pandemics, I-70 disasters)			0.00
19		2022 TOTAL TOURISM MARKETING EXPENSE	846,239	695,190	857,022

EXHIBIT B

CORPORATE CREDIT CARD USE/REIMBURSEMENT

It is the policy of the GSCRA to limit the issuance of credit cards to the CEO and others as approved by the CEO. Individuals receiving a credit card will sign a Credit Card Issuance Form. Employees must complete a monthly purchase log, attach receipts and submit to the VP of Finance. All expenses require a detailed description of business purpose. In the case of conference travel a conference agenda, brochure, name badge, etc. should be attached.

Under no circumstances may corporate credit cards be used for individual purchases. In the event the card is inadvertently used for a personal item, payment in full must be made at the time of the initial billing.

Reimbursed expenses are those necessary and reasonable to effectively carry out the employee's work and appropriately represent the GSCRA in the manner in which the expenditure is related.

Employees who use cash or personal credit cards for business-related purchases must fill out an expense report and include receipts for reimbursement. The CEO must approve and sign all expense reports before reimbursement is made. In the case of CEO purchases, a board member must approve expenditures before a reimbursement check is issued to the CEO. Expense reports for actual expenses are to be turned in within 30 days of incurring the expense(s). Expense reports must match all receipts attached. Payment will be made only if report and corresponding documentation agree.

GLENWOOD SPRINGS

COLORADO

2022 Visit Glenwood

Marketing Plan and Budget





2022 Tourism Promotion Marketing Plan
By Lisa Langer, Director of Tourism Promotion

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- Internet Management – Content Development/Design Enhancements
- Direct Mail and Fulfillment
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Note: Numbers in parenthesis correspond to related sections of the 2022 Budget

The 2022 Marketing Plan

The tourism budget for 2022 has been set at **$1,147,762 (1)**. This is an increase of 17% over the base budget set for 2021, which included Tourism Reserves of $300,000. It is important to note that the tourism budget is based upon 85%* of accommodations tax receipts collected from September 1 through August 31 of the year prior to calendar year budget. The collections period saw a 30% uptick due to post-pandemic lockdowns and pent-up demand to travel domestically. **Previously, the tourism budget was 92.5% of receipts. The updated percentage was voted by the Glenwood Springs City Council on October 21, 2021.*

Non-Marketing/Advertising Expenses include visitor services at the 802 Grand Avenue Visitor Center. The amount of support for 2022 has been set at **$100,000 (2)**. This amount covers costs incurred by the GSCRA for visitor-related services including D&O insurance for the city's Tourism Promotion Board, Tourism Promotion department's brochure storage, phone lines, email, and IT hardware/support. As a result of COVID-19, the Glenwood Springs Chamber Resort Association, chose to downsize from six individual offices to one co-working office, located directly adjacent to the Glenwood Springs Visitor Center (in the CMC administrative building). This allows for the Tourism Promotion staff to work remotely for a majority of the year.

Support Costs for 2022 have been set at **$190,740 (3)**. This amount includes salaries, benefits, and payroll taxes for both the Director of Tourism and Tourism Project Manager. Also included in this section are bookkeeping services, which include bi-annual audits and annual budget reviews. The combined Visitor Center and Tourism Promotion department support costs represent **25.9% (4)** of the total 2022 Tourism Promotion Budget.

The Working Tourism Marketing Budget for 2022 is $857,022 (5).

The marketing budget must be somewhat pliable within the parameters of the overall budgeted amount. If opportunities outside of the typical buys arise, the Tourism Management Board may request additional funding from the Tourism Fund Reserves. Reserve Funds were drastically reduced as a result of the pandemic. The City Finance Department has indicated that if the overall budget is within the total approved budgeted amount, requests to shift dollars from one category to another is unnecessary. The following information summarizes each section of the budget and further explains proposed expenditures.

Advertising – includes Print, Online, Out-of-Home, Radio & Television, PPC, Media Creative (Graphic Design, video production, Agency-Related Fees & Commissions), social media advertising, digital, and co-ops. Budgeted at $716,088 (6)

Xuma Communications is contracted to manage, create and place advertising in close communication with the Director of Tourism. Xuma will manage all aspects of the allocated advertising budget including creative, production and media costs.

I. Agency Responsibilities, Creative Development and Production

Agency fees and production costs to be billed as a monthly retainer for $9,000 per month (2021 was $7,500 and previous to that $10,000 per month).

- Development of overall strategic and creative approach of 2022 marketing based on marketing goals and secondary research
- Development and presentation of strategy and creative
- Develop an overall strategy for media and final media plan
- Develop tactical creative components to support media plan
    - Production of all components (to be mutually agreed upon following approval of media plan), which may include but is not limited to:
        - Television
        - Out-of-Home
        - Online Video
        - Digital Banners
        - Print
        - Radio
- Develop tactical creative components separate from paid media
    - Production of all components (to be mutually agreed upon following approval of plan), which may include but is not limited to:
        - Collateral (including but not limited to 2022 travel guide)
        - Videos (including 6-30 second videos for social media)
        - Guerilla marketing efforts (These efforts may not be available or practical in 2022)
- Ensure all materials are in-line with tourism standards and Glenwood Springs goals for 2022
- General support of account, including travel, planning sessions, meetings and additional support as required by Glenwood Springs tourism department.

II. Media Strategy. Planning, Buying, Execution, Maintenance and Reporting Media costs and planning fees not to exceed $489,000

- Development and presentation of media objectives, and strategies by target audience and seasonality**.** This includes a review of all media types leading to a recommended media mix and spend level recommendation to achieve agreed upon goals
- Ensure all media strategies are in line with goals
- Strategic development of media plan
- Revisions to media plan based on client input
- Presentation of final media plan
- Media negotiations of rates, positioning, placement and value-added promotional opportunities
- Develop and establish metrics and measurement goals
- Review and analyze media spend to establish success measurements and metrics
- Optimization of all media to maximize effectiveness
- Periodic reporting on all media to ensure effectiveness and make any necessary recommendations

- Ensure that all media and promotions run as ordered; all necessary make goods are received
- Update flowcharts and budget reflecting actual media, spending and achievement of goals against spend
- Media plan and mix to be mutually agreed upon by Glenwood Springs, Thayer and Xuma Communications.

III. Fee Structure

- All agency fees are payable monthly, due in full net 30 days, billed on the last day of each month.
- Agency fees will be billed at a rate of $160/hour.
- Contract period: January 1, 2022, through December 31, 2022
- **Total contract: $597,000**

BlizzardPress is contracted to provide marketing services to generate online traffic. Specific tasks are designed to increase ROI within the dictated monthly budget and with the BlizzardPress team, working with the staff of Visit Glenwood Springs, the tourism department of Glenwood Springs Chamber Resort Association (GSCRA).

Visit Glenwood Springs, on behalf of the City of Glenwood Springs, is contracted with BlizzardPress to pay monthly payments of $2,250 for a **total of $27,000** to market www.VisitGlenwood.com.

Paid Search Advertising in Google Ads and YouTube is managed by BlizzardPress Marketing with an agreed upon $2,500 monthly* budget (*fluctuates throughout the year) for a **total of $30,000**. BlizzardPress will also manage the paid Facebook & Instagram advertising at a monthly budget of $1,000 for a **total of $12,000**. Both Google Ads and Social Media buys will be separate from BlizzardPress fees and charged directly to the tourism promotion credit card. BlizzardPress will provide suggestions to maintain building quality links to the website and evaluate renewing and new online directories.

BlizzardPress researches and implements proven Search Engine Optimization & Marketing techniques. The owners work closely with partners to identify those services deemed as most critical to success and strategizes to develop services implementation. Please keep in mind that these services are based upon the availability of resources and budget and may be modified as we adapt to changes within the industry and budgetary constraints.

Service Definitions

- Consultation ~ Email/phone correspondence and training with Client, Webmaster and Vendors.
- Search Engine Optimization ~ SEO & Keyword research followed by website and content recommendations, on-page optimization, quarterly site audits including broken Link review/update, XML Sitemap review and submission to Google, Structured Data Review/Update.
- Local Search Citation monitoring with submission recommendations.

- Paid Advertising ~ Google Ads monthly maintenance including Ad copy, bid adjustments, ROI Reporting and performance analysis.
- Website Performance Analysis ~ Via Google Analytics, Search Console and Tag Manager will evaluate website traffic, behavior and conversions. Assessment of search engine appearance and performance of on-page optimization, website indexing and usability. Recommendations for increased performance will be provided.

Public Relations
Budgeted at $10,500 (7)

Scope of Work

In the past, Visit Glenwood Springs has worked with independent contractors to provide Media Pitching, Media Hosting and Press Releases as needed. These responsibilities have been brought in-house and will be performed by the tourism promotion staff.

The budgeted amount also includes fees for CTO media receptions, posting of press releases and a limited Meltwater Media platform.

Responsibilities Include:

- Pitch story ideas to key writers, editors and media who specialize in travel, tourism and hospitality industries and international news media journalists.
- Serve as official Visit Glenwood Springs spokespersons
- Communicate with in-state tourism industry organizations (Colorado Tourism Office, CO Hotel & Lodging Association, Destination Colorado, Colorado Ski Country, etc.)
- Respond to media leads provided by the Colorado Tourism Office
- Assist and respond to individual media seeking onsite visits
- Create press releases as needed

Vacation Planner Printing and Distribution
Budgeted at $36,400 (8)

Glenwood Springs' tourism promotion produces a 28-page full color travel guide for distribution and direct mail. In 2022, Xuma Communications will produce the piece. The printed piece is shipped and distributed as follows:

- Brochure Express – Montrose, Delta, Grand Junction
- Colorado Activities Center – I-70, Hwys. 285 & 24, Summit County, N. & S. Front Range & DIA
- Certified Folder & Display – GJ, Durango, NE. CO Super Cities + web ads
- Vail Distribution – Eagle Airport plus 72 locations in Vail, Avon & Beaver Crk.
- Red Wheel Media – Aspen Airport plus curated locations in Aspen and Snowmass
- Visit Denver – Distribution in Denver Visitor Center (this service is part of membership with Denver Metro Convention & Visitors Bureau).

Hosting (Website, Video, Photos, Domains, Email, Social Media Tools, etc.
Budgeted at $23,564 (9)

- CrowdRiff social media photo aggregator, annual online hosting/management of photo and video library
- Website Hosting

- Website Monitoring monthly service
- Email for website leads through Twilo/Sendgrid
- Domain Renewals & Hosting through GoDaddy.com
- Constant Contact online program for email marketing/e-newsletters
- Social Media Management Tools
- Google docs storage
- Zoom account for virtual meetings

Internet Management Budgeted at $20,000 (10)

In 2020, www.visitglenwood.com was refreshed on the current "mobile-first" WordPress platform. Although, the content and continued enhancement of the new site is managed in-house, in-depth design elements will continue to be updated through BlizzardPress. VisitGlenwood.com is a visitor-first, functional repository and planning website for Glenwood Springs visitor content. In 2022, we will continue to add content, blogs, video, and Google API's. BlizzardPress will continue to consult on website usability and search engine optimization through 2022. Resort Trends will continue to provide monthly blogs and content as directed.

Direct Mail and Fulfillment Budgeted at $9,000 (11)

There is an increase of vacation/group planning through internet and downloading of online brochures, however, many trip planners still like to have a hard copy of a destination's brochure before visiting. This area of the 2022 budget addresses the direct fulfillment of such visitor requests. Most of the individual mailing leads are forwarded to Bulk Mail Pros, but requests are also handled in-house by visitor center staff. Visit Glenwood staff ships cases of vacation and group planners to welcome centers across Colorado and to group tour operators both domestic and international. Brochures are also provided to many groups and meetings participants who visit Glenwood Springs. In 2022, we expect less group and meetings requests.

Promo Items for Media & Groups / Industry Specific Organizations & Education Budgeted at $2,500 (12) and $5,300 (13) respectively

Trade Show representation has been cut. Staff will continue to provide promotional items for group travel leaders, visiting media and media events.

For Industry Specific Organizations & Education, Visit Glenwood will continue to pay for affiliations with the following organizations:

- Rocky Mountain Lodging (RML) – monthly Colorado occupancy reports
- Colorado Association of Destination Marketing Organizations (CADMO)
- Colorado Tourism Conference – registration for two
- Visit Denver (DMCVB)
- Travel Industry Alliance of Colorado (TIAC) – dues + legislative reception sponsorship
- Training specific to marketing
- Other workshops or conferences specific to tourism marketing or management

Group and International Marketing / Miscellaneous
Budgeted at $16,800 (14) and $1,380 (15) respectively

Group and International Marketing shows:

- Go West Summit – attendance at the western states' marketplace for international tours/travel – the 2023 summit fee will be paid in 2022
- IPW – Co-op fee for partnership participation in the CO Tourism Office booth
- CTO Familiarization Tours (FAMs) – hosting of tour operators and media
- Tour Colorado membership – this group represents its members at NTA and ABA

Miscellaneous costs include tourism marketing meetings and luncheons held by tourism department staff and office equipment/supplies not covered by GSCRA.

Travel for Conferences / Meetings
Budgeted at $15,490 (16)

Included in this area are the following expenses/reimbursements:

- Transportation - Air, Train, Bus
- Cell Phone reimbursement - monthly reimbursement for Director of Tourism and Tourism Project Manager
- Lodging – overnight stays for meetings, conferences, sales missions, etc.
- Meals – while on tourism business, meetings, conferences, sales missions
- Mileage – reimbursement for tourism-related travel
- Other Travel – related fees including parking, tips, shuttles, cabs, bag fees, etc.

The Partners and History of Glenwood Springs Tourism Promotion

Vision

Be the preferred regional tourism destination.

Mission

To promote regional activities, attractions & events to increase tourism spending in Glenwood Springs. *(From Strategic Planning Retreat Nov. 2010)*

History of Glenwood Springs Tourism Promotion

Tourism Promotion Fund creation in 1985

The Tourism Promotion Fund was created by a Chamber-led initiative and approved by Glenwood Springs voters in 1985, to allow for an accommodations tax to be collected by lodges (and paid by consumers) to create a reliable, sustainable and appropriate funding mechanism for continued marketing of the primary industry in Glenwood Springs. Since that "bed tax" was instituted, the Chamber Resort Association has sought and gained voter approvals twice to not only renew the tax, but to increase it to its current level of 2.5% and to remove the sunsetting clause (approved 2000).

Initially this fund was administered through the City of Glenwood Springs government through a council appointed tourism commission. The commission hired an advertising agency, and the Chamber responded to visitor information requests and information, events for visitors, and public relations functions such as hosting travel writers. Another organization called Central Reservations dealt with hotel reservations. The process was fragmented and inefficient, and a more streamlined approach was undertaken in 1988.

Chamber Resort Association formed in 1988

The Glenwood Springs Chamber Resort Association (GSCRA) was incorporated in 1988 and formed by a merge with the City of Glenwood Springs tourism commission, Central Reservations and the Glenwood Springs Chamber. Since that time, the GSCRA has managed the accommodations tax-based tourism promotion fund and executed its annual tourism marketing plan and related budget. The GSCRA was formed with the input and vision of the mayor, city manager, chamber leadership, hotels, and activities businesses in the community as an economic development initiative. Community leaders recognized that tourism was the main industry in Glenwood Springs and that there should be continuous investment to sustain and grow annual tourism business.

The purpose of the Resort Association was to accomplish the following:

1. Organize area vacation products and services into one-stop-shopping for guests.
2. Combine community promotion and sales efforts for greater efficiency and more return on investment.
3. Create a broader funding base to generate more money for tourism promotion.
4. Insure the stability of funding through the creation of a mandatory funding structure.
5. Allocate these funds by a single budgetary process to maximize the return to area businesses.

Tourism Management Board Roles

The Glenwood Springs Tourism Management Board is a committee of the City of Glenwood Springs Municipal Government, tasked to govern the Tourism Fund. In accordance with Resolution 2021-31, the Tourism Fund is derived from an 85% portion of accommodations tax receipts from September 1 through August 31 of the year prior to budget. Under current city legislation, the total collected accommodations tax funds are to be appropriated with 85 percent toward destination marketing services and programs and 15 percent toward support of tourism-related events or impacts as determined by the city council. The resolution also requires a marketing reserve fund balance at a desired level of 15 percent of prior year's collections (September 1 through August 31). As a committee of the City of Glenwood Springs, the Tourism Management Board must follow open meetings laws in noticing meetings with more than two members in attendance.

The Tourism Management Board determines policy, reviews the budget and expenditures, sets goals and establishes the overall focus to maximize return on investments with Glenwood Springs' tourism marketing dollars. Accountability, oversight, and override authority is provided by the Glenwood Springs City Council. The over-arching goal of the Glenwood Springs Tourism Management Board and its role in the stewardship of the Tourism Fund is to grow tourism business for the economic benefit of Glenwood Springs.

The nine-member Glenwood Springs Tourism Management Board is comprised of community and tourism stakeholders, appointed by the City of Glenwood Springs Council. Each Board member serves a two-year term that can be renewed for a total of four years. A board member may be reappointed after one year hiatus per City Council. The Board generally meets the second Thursday of each month from 2:00 PM to 4:00 PM at Glenwood Springs City Hall. As the selected organization for the destination marketing contract, GSCRA is required to have a presence at each monthly meeting and other meetings as necessary. In close collaboration with the Tourism Management Board, the GSCRA Tourism Department develops, executes and reports on the annual marketing plan and budget and is accountable to the Glenwood Springs Tourism Management Board and City Council.

2022 Tourism Management Board members/affiliations (New Members Join in March)

- Krissy Clary, Chair ~ Colorado Ranch House – *Restaurant*
- Nancy Heard, Vice Chair ~ Glenwood Caverns Adventure Park – *Tourism*
- Scott Dyer, Treasurer ~ Best Western Antlers – *Lodging*
- Taylor Thulson ~ Hotel Colorado – *Lodging*
- Suzanne Emery ~ Glenwood Caverns & IMHS – *Tourism*
- Mike Mercatoris ~ Grind – *GSCRA Board Representative*
- Patrick Drake ~ Blue Sky Adventures – *Citizen/Resident*
- Sharon Brady ~ Cooper Wine & Spirits – *Citizen/Resident*
- Heather Montrose-Cowan ~ *Citizen/Resident*

Powers and Duties of the Tourism Management Board (GSMC 020.020.030[M]):
(1) To investigate, study and report to the City Council: a. All matters concerning tourism marketing and promotion that pertain to the benefit of Glenwood Springs and the area within the 81601-postal zip code, and b. Other matters concerning the subject of tourism marketing and promotion which may be pertinent to the benefit of the city and the area within the 81601-postal zip code.

(2) To coordinate with City Staff, Community Organizations, Community Businesses, and other Boards and Commissions, when applicable to efficiently market and promote tourism to the benefit of Glenwood Springs and the area within the 81601-postal zip code.

(3) To, at its discretion, and in addition to initiatives that directly market and promote features and attractions within the City and the area within the 81601-postal zip code, market and promote the geographical proximity of Glenwood Springs to other features and attractions outside of the 81601-postal zip code in ways that could reasonably be expected to benefit the City.

(4) To establish rules of procedure and order for the Board to follow.

(5) To review tourism marketing plans; to set tourism marketing goals, to determine the methods to accomplish and measure success in accomplishing those goals; to determine the appropriate staff and marketing contractor(s)/vendor(s) resources needed; to recommend to the City Council an annual tourism marketing budget; to recommend, to the City Council, award of contract(s) for the best candidate for contract staff and marketing contractor(s)/vendor(s), deemed necessary, based upon an approved Request for Proposal, Request for Qualification or other process; and to provide oversight of performance of contract staff and marketing vendor(s)/contractor(s) contract terms to ensure the efficient and effective implementation of the marketing goals and to report performance to City Council.

(6) To meet with the City Council on an annual basis, or as often as requested by the City Council, to identify marketing priorities of the city.

Tourism Management Board: *Amended by City Council May 20, 2021*
a. Two (2) representatives from tourism-related businesses located within the city;
b. Two (2) representatives from lodging businesses located within the city;
c. One (1) representative from restaurant or retail businesses located within city;
d. One (1) representative from the Glenwood Springs Chamber Resort Association; and
e. Three (3) citizens, who are residents of the city that may have a financial interest in a tourism-related business.

Tourism Department Staff Roles and Responsibilities:
The Director of Tourism serves on the staff of the Glenwood Springs Chamber Resort Association. Through a collaborative approach, he/she works closely with the Glenwood Springs Tourism Management Board to produce and execute an annual marketing plan and corresponding budget to implement the Visit Glenwood Springs' (tourism department) and Board's strategies. Responsibilities include regular reporting on marketing initiatives, advertising placements and budget expenditures to provide transparency and board/community accountability.

The Director of Tourism:
Creates and manages the annual Tourism Fund budget and related marketing plan, with approval by the chamber and tourism boards and the City Council. Manages monthly Tourism Management Board meetings and scheduling. Monthly payables are generated by the Director of Tourism with oversight by GSCRA's bookkeeper, tourism management board treasurer and the City Finance Director. Regular reporting to City Council is encouraged.

- Generates ideas for new marketing campaigns and collaborates with tourism partners to participate in promotional offerings.
- Works with contracted agencies/vendors to create ads and sales collateral, place media buys and provide digital marketing strategies and solutions.
- Speaks on behalf of Visit Glenwood Springs tourism community
- Oversees the duties of the Tourism Project Manager.
- Handles day-to-day operations and decision-making including managing public relations and overseeing website, social media, and content creation, coordinating with professional group tour operators and meeting planners.
- Attends appropriate travel and tourism tradeshows, sales missions, and conferences.
- Assists with management of the Glenwood Springs Visitor Center.

The Tourism Project Manager:
Serves on the staff of the Glenwood Springs Chamber Resort Association under the management of the Director of Tourism, duties include:

- Website development and content management of VisitGlenwood.com
- Social media management including Facebook, Twitter, Instagram, Google+, etc.
- Leads data management, culmination, dissemination for mail-house fulfillment
- Act as content curator for photo, video and branding assets
- Create Constant Contact template and maintain data base for email marketing
- Generate ideas/content for new e-news blasts, social and website marketing
- Monitor and report on Google Analytics & social media engagement
- Coordination of website marketing/SEO/Pay-per-click through contractor
- Attendance at monthly tourism management board meetings (transcribe minutes)
- Assistance for groups - responding to group and wedding leads
- Group tour and meetings follow-up (touching base after shows and/or meetings)
- Attendance at appropriate travel industry tradeshows, training, and conferences

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		related Fees/Commissions, discretionary social ad & content creation			
7	56414	Public Relations	25,750	1,000	10,500
8	56415	Vacation Planner Printing/Distribution	36,600	29,600	36,400
9	56417	Hosting - Website, Video, Photos, Domains, Email, Social	24,100	24,284	23,564
10	56418	Internet Management	25,000	25,000	20,000
11	56419	Direct Mail and Fulfillment	9,500	6,000	9,000
12	56420	Trade Shows	7,450	2,500	2,500
13	56421	Industry Specific Organizations & Education	7,405	3,275	5,300
14	56424	Group and International Marketing	26,100	2,000	16,800
15	56422	Miscellaneous	2,250	675	1,380
16	56423	Travel for Shows / Conferences / Meetings	18,800	4,900	15,490
17	56429	Consultants	0.00	0.00	0.00
18		Contingency for Emergencies (Fires, Pandemics, I-70 disasters)			0.00
19		2022 TOTAL TOURISM MARKETING EXPENSE	846,239	695,190	857,022

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: Approval to allow the Mayor to sign the agreement with the Colorado Department of Transportation for an access line break for the trail construction.

Action Requested: Approval to allow the mayor to sign an agreement with CDOT to allow an access line break for the trail construction.

Department: Engineering

Presented By: Terri Partch, City Engineer

Background Info: The City, New Castle , RFTA and the LoVa Trail Coalition have been working to build a new trail connection between west Glenwood and New Castle. The trail is being built in small sections due to cost. The city and the partner agencies listed above obtained a GCFMLD grant in the amount of $700,000 to extend the trail construction another 700' to the west. The construction requires an Access Line Break Agreement with CDOT for the construction.

Issues: None at this time.

Staff Recommendation: Approve the Mayor's signature on the Access Line Break Agreement with CDOT.

Project Number: I-70-1(8)113 Section 2
Location: Glenwood Springs, I 70 LOVA Trail Crossing
Parcel: AC-LOVA-S1P3-1

LICENSE

The Department of Transportation, State of Colorado ("Licensor"), whose legal address is 2829 W. Howard Place, Denver, Colorado, 80204, hereby grants to the City of Glenwood Springs ("Grantee"), whose legal address is 101 West Eighth Street, City of Glenwood Springs, Garfield County, State of Colorado, 81601, to wit:

> PERMISSION TO CROSS OVER the access control line of the Colorado Department of Transportation from and to the real property in Lot 3 of Section 6, Township 6 South, Range 89 West of the Sixth Principal Meridian, in the County of Garfield Colorado, ("the property"). as described in the attached Exhibits A and B, FOR THE PURPOSE OF activities associated with construction, maintenance and use of the LOVA Trail within the Right of Way of Interstate Highway No. 70.

This instrument constitutes a bare License, conferring no enforceable right in Licensee and creating no property interest. It is a mere personal privilege, non-transferable and revocable at will, but shall be valid and remain in effect in perpetuity unless terminated for good cause in writing by either party. This License shall not be considered a commitment by Licensor nor in any way authorizes or guarantees any continuing use of the License. This License authorizes the aforementioned construction, operation, maintenance, and repair work. The Licensee shall locate all utilities prior to commencing construction work. Licensee shall be responsible for the prompt restoration of CDOT right-of-way to the condition found prior to commencing work. To the extent permitted by law, Licensee assumes liability for the construction, operation, maintenance, repair and use of the of the entranceways and agrees to defend, indemnify, and hold harmless the Federal Highway Administration and the Licensor and any employees, agents, contractors, or other representatives of the Licensor against any and all damages, claims, liability, loss, or expenses, including attorney's fees and litigation costs, arising from or in any way related to the construction, operation, or use of the entranceways or the issuance or use of this License. This License is not a State Highway Access Permit or a State Highway Utility Permit.

Signed this _____ day of _____, 2021

ATTEST:

STATE OF COLORADO
DEPARTMENT OF TRANSPORTATION

_____
Alicia Clemons
Chief Clerk – Property Management

_____
Joshua Laipply, P.E.
Chief Engineer

Licensee: City of Glenwood Springs

By: _____

Title: _____

State of Colorado)
) ss.
County of Garfield)

The foregoing instrument was acknowledged before me on this _____ day of _____, 2021,
By _____.

WITNESS MY HAND AND OFFICAL SEAL.

My commission expires: _____.

_____
Notary Public

EXHIBIT "A"

PROJECT NUMBER: I-70-1(8)113 Section 2
ACCESS CONTROL: AC-LOVA-S1P3-1
DATE: April 14, 2021

LEGAL DESCRIPTION

The real property of the Grantor in Lot 3 of Section 6, Township 6 South, Range 89 West, of the 6th Principal Meridian, County of Garfield, State of Colorado, granting access along or across the access line or lines described as follows

I-70-1(8)113 Section 2	AC-LOVA1-S1P3-1	Southerly Line
Project Number	Parcel Number	Location of Line

Commencing at Southeast Corner of said Section 6, (a found 3.25" Department of Interior Aluminum Cap on a 2.5" Aluminum Post, properly marked and dated 1995), thence N. 57°11'12" W., a distance of 3919.67 feet, to a point on the southerly right-of-way line of Interstate Highway No. 70 (April, 2021), the TRUE POINT OF BEGINNING;

1. Thence N. 85°44'30" W., along said right-of-way line, a distance of 16.28 feet;

2. Thence S. 08°57'30" W., along said right-of-way line, a distance of 14.03 feet, the POINT OF TERMINUS.

Bearings recited herein are relative to a bearing of N. 81°15'05" W. (a distance of 6601.69 feet) between the Southeast Corner of said Section 6 (a found 3.25" Department of Interior Aluminum Cap on a 2.5" Aluminum Post, properly marked and dated 1995), and the West Quarter Corner of said Section 6 (a found 3.25" Department of Interior Aluminum Cap on a 2.5" Aluminum Post, properly marked and dated 1994).

For and on Behalf of SGM, Inc. and the
City of Glenwood Springs, Colorado
Shawn Binion, PLS 38200



City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item:	Ordinance No. 18, Series of 2021, Amending Municipal Code Section 070, 2nd Reading.
Action Requested:	Approval of Ordinance 18, Series of 2021 Amending Title 070 of the Municipal Code
Department:	Economic and Community Development
Presented By:	Hannah Klausman, Assistant Director, Economic & Community Development
Background Info:	This is a second reading of the ordinance.
Issues:	None.
Staff Recommendation:	Staff recommends approval of the Ordinance.

ORDINANCE NO. 18

SERIES OF 2021

AN ORDINANCE OF THE CITY OF GLENWOOD SPRINGS, COLORADO, AMENDING SECTIONS OF TITLE 070 OF THE MUNICIPAL CODE

WHEREAS, the City of Glenwood Springs ("Glenwood Springs" or the "City") is a home rule municipality organized under Article XX of the Colorado Constitution and with the authority of the Glenwood Springs Home Rule Charter; and

WHEREAS, on August 2, 2018, City Council approved a revised development code as set forth in Title 070 of the Municipal Code; and

WHEREAS, in the process of applying the revised development code, City staff discovered errors and omissions that require correction and provisions that warrant clarification as set forth in **Exhibit A** attached hereto; and

WHEREAS, the Planning and Zoning Commission considered amendments to Title 070 at a public hearing held October 26, 2020 and recommended approval of the amendments to the development code as set forth in **Exhibit A**; and

WHEREAS, the City Council finds that the amendments set forth in **Exhibit A** are necessary to correct and clarify the development code.

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

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

Section 2. Title 070 of the Glenwood Springs Municipal Code is hereby amended as set forth in **Exhibit A** attached hereto.

INTRODUCED, READ ON FIRST READING, PASSED AND ORDERED PUBLISHED BY TITLE ONLY THIS 2nd DAY OF DECEMBER 2021.

CITY OF GLENWOOD SPRINGS, COLORADO

_____
Jonathan Godes, Mayor

ATTEST:

_____
Ryan Muse, City Clerk

INTRODUCED, READ ON SECOND READING, AND ORDERED PUBLISHED BY TITLE ONLY TO BE EFFECTIVE TEN DAYS FOLLOWING THE DATE OF SECOND PUBLICATION THIS 6th DAY OF JANURARY 2022.

CITY OF GLENWOOD SPRINGS, COLORADO

_____
Jonathan Godes, Mayor

ATTEST:

_____
Ryan Muse, City Clerk

ATTACHMENT A
Text being deleted is ~~stricken~~; added text is **bold and underlined**

070.030.020(e) Table of Allowed Uses
Table 030.1

Use Category	Use Type	Use-Specific Standards
Storage and Warehousing	Storage of hazardous liquids and gasses	070.030.030(b)(2)

…..

070.030.030 Use-Specific Standards

…

(c) Residential Uses

~~(1) *Household Living, Generally.* Except for single-family detached dwellings, each dwelling unit shall have a separate entrance or window facing a street frontage.~~

…

070.040.040 Common Open Space.

(b) *Applicability.*

(1) *General.* Unless new development is expressly exempted in accordance with Subsection (2) below, the standards in this Section shall apply to all new development subject to:

a. Planned Development Rezoning (Subsection 070.060.040(b));
b. Special Use Permit (Subsection 070.060.050(e));
c. Major Subdivision Preliminary Plat Approval (Subsection 070.060.060(b));
d. Minor Subdivision Plat Approval (Subsection 070.060.060(a));
e. Major Site/Architectural Plan Approval (Subsection 070.060.050(a)(5));~~ or~~
f. Minor Site/Architectural Plan Approval (Subsection 070.060.050(a)(4))~~.~~; or
g. Administrative Site/Architectural Plan Approval (Subsection 070.060.050(a)(3).

…

~~070.040.120 Affordable and Workforce Housing.~~

~~(a) *In General.* Reserved.~~

~~(b) *Voluntary Provisions.*~~

~~(1) *Deed-Restricted Development.*~~

~~a. *Applicability.* Any new development of for-rent residential units in the City may voluntarily with the City enter into an affordable housing deed-restriction agreement consistent with the terms and conditions of this Subsection 070.040.120(b)(1).~~
~~b. *Deed Restriction.* The deed restriction provided for in this Subsection shall be recorded by the owner of the property burdened thereby and remain a covenant and restriction running with the property for a period of thirty (30) years unless otherwise terminated.~~

c. *Affordability.*

1. The gross rental price, including utility allowance and non-optional fees, of any deed-restricted unit shall not, at the time of leasing, exceed the maximum rents established according to Colorado Housing and Finance Authority, Colorado County Income and Rent Table, for one hundred twenty (120) percent of the Garfield County Area Median Income.
2. The average of all deed-restricted units in a development shall not exceed one hundred (100) percent of the maximum rents established according to the Colorado Housing and Finance Authority, Colorado County Income and Rent Table, as determined at the time each individual unit was leased.

d. *Impact Fees.* The deed restriction shall provide for a waiver of the following impact and improvement fees required by this Code according to the percentage of new for-rent units restricted thereby:

1. Any water or sewer tap fee required under 080.040.010(c) or 080.030.010(c), respectively.
2. Any water or sewer system improvement fee required under Article 080.060.
3. Any school land dedication required under Subsection 070.040.030(g)(4), School Land Dedication.
4. Any fire and emergency service impact fees required under Subsection 070.040.030(g)(5), Fire and Emergency Services Impact Fee.
5. Any parkland dedication fees required under 070.040.030(g)(2), Parkland Dedication.

Said fees shall be calculated and determined prior to development and remain unpaid, in abeyance, to be depreciated over a period of thirty (30) years from the issuance of a certificate of occupancy for the unit(s). Straight line depreciation shall be used. Any restricted party that knowingly fails to adhere to the requirements of the deed restriction or this Subsection 070.040.120(b)(1) for any portion of a year shall be required to immediately pay the remaining un-depreciated impact and improvement fees upon thirty (30) days' written notice from the City. The restricted party's failure to pay such amount upon notice shall result in an automatic lien upon the property plus a penalty of ten (10) percent of the amount owed, plus the reasonable costs of fees, including attorney fees, spent in collection. Said lien shall thereafter be collected as provided in Section 080.010.100 of the Code.

e. *Occupancy Requirement.*

1. Primary occupants shall sign an affidavit of qualification and be qualified to rent a deed-restricted unit under this Subsection 070.040.120(b)(1) according to any of the following criteria:
   i. Employed to primarily work at a physical location within the 81601 postal zip code;
   ii. Directly employed by a company that has its principal office located within the 81601 postal zip code;
   iii. Enrolled as a full-time student at a local educational institution;
   iv. Being sixty-five (65) years of age or greater; or
   v. Receiving social security disability benefits.

   Qualifying occupants may have roommates not employed within the 81601 postal zip code or by a company not having its principal office within the 81601 postal zip code.
2. No occupant of a deed-restricted unit shall engage in any business activity on or in the unit, except as allowed under Subsection 070.030.040(d)(3), Home Occupations, of this Code.

3. In the rental and occupancy of the units, there shall be no discrimination on the basis of age, race, creed, color, sex, sexual orientation, disability, religion, national origin, marital status, gender identity, or affiliation.
4. When a unit becomes vacant, the owner shall promptly make it available and actively market said unit for lease to another qualified occupant in accordance with the deed restriction and any rental guidelines adopted by the City.
5. Each unit shall only be leased and occupied by residents who will utilize the unit as his or her principal place of residence. A "principal place of residence" shall mean the dwelling in which one's habitation is fixed and to which a person, whenever he or she is absent, has a present intention of returning after a departure or absence there from.
6. In the event the employment or student enrollment status of the occupant of any unit is altered so as to no longer meet the qualifications of this Subsection, said occupant shall be permitted to reside in the unit under the same terms and conditions of the unit lease, except that no extension of the lease term shall be granted.

f. *Market Conversion.* The owner of a deed-restricted unit may convert a unit to rent or sale at market rate upon written notice to the City. Upon market conversion, the owner shall record an amendment to the deed restriction for the termination thereof. Upon the first rental or sale of any such converted unit, the owner shall pay to the City the amount of any and all proportional, amortized, and depreciated impact and improvement fees then outstanding.

g. *Reporting Requirement.* The owner of a deed-restricted unit shall annually, between December 1 and December 15, provide a report and proof to the City or its designated representative agency of its compliance with the rental requirements set forth in this Subsection for the prior twelve-month period. Said report shall contain, at a minimum:
1. The number of deed-restricted units rented pursuant to this Subsection;
2. The period each unit was rented and the status by which the were occupant(s) qualified under the deed restriction;
3. The monthly rental price; and
4. The taxes, special assessments, and homeowners' association and management fees, and any other fees or charges, including common utilities, assessed to each unit.

(c) *Housing Units Developed Under Prior Inclusionary Housing Program.* All housing units developed under the provisions of the inclusionary housing program repealed by Ordinance 21, Series of 2017, shall remain subject to the terms and conditions of approval previously agreed upon, including the applicability of the Glenwood Springs Community Housing Guidelines as administered by the Garfield County Housing Authority.

(d) *Repealer.* Any ordinance or resolutions or parts thereof in conflict with Ordinance 21, Series of 2017, are hereby repealed to the extent of such conflict only.

(Ord. No. 19-2018 , § 2(Exh. A), 8-2-2018; Ord. No. 16-2019 , § 2(Exh. A), 9-5-2019)

....

070.060.050 Development Permits

(a) *Site/Architectural Plan Review.*

(1) *Purpose.* This Subsection describes the process by which proposed development is reviewed for compliance with the development and design standards of this Code. The site/architectural plan review procedure ensures that potential impacts of development are

considered before submittal of an application for final plan approval (pursuant to the City of Glenwood Springs Engineering Standards) or issuance of a building permit.

(2) *Applicability.*

…

c. *Referral and Call-Up Procedures.*

1. Off Street Parking Alternative Request

i. *Director Referral to Planning Commission.*

a. The Director may refer Parking Alternative Requests to the Planning Commission for a final decision.

b. After reviewing a referred request, the Planning Commission shall vote to make a final decision or to refer to the City Council for a final decision.

…

070.060.060 Subdivisions Procedures

(a) *Minor Subdivision.*

(1) *Purpose.* The minor subdivision procedure is used to evaluate proposed subdivisions that will create few lots or involve minimal adjustments to approved final plats. The minor subdivision procedure also provides an administrative process to correct plat errors and adjust property boundaries.

(2) *Applicability.*

a. The minor subdivision procedure shall apply to:
   ~~1. Properties within an approved preliminary plat;~~
   ~~2~~.1. Subdivisions creating three (3) or fewer lots or ten (10) or fewer condominium units within a single plat; and
   ~~3~~.2. Condominiumizations within an existing building that do not include land dedication.
b. The following are eligible to be processed as a minor subdivision, provided that Subparagraph a. is met:
   1. Consolidation of two (2) or more lots into a single lot ~~on a single previously recorded final plat~~; or
   2. Boundary or lot line adjustments ~~to an approved final plat~~; or
   3. Correction of errors on an approved final plat.

…

(b) *Preliminary Plat.*

(1) *Purpose.* The preliminary plat procedure provides a mechanism for the City to review an overall plan for a proposed subdivision to ensure compliance with this Code, the Comprehensive Plan, and the adequate provision of facilities and services in the City.

(2) *Applicability.* A preliminary plat is required if the proposed subdivision:

~~a. Is on land that has not been platted;~~
~~b~~ a. Will produce four (4) or more lots;
~~c~~.b. Will include the dedication of public right-of-way, other public tracts, or public improvements not determined to be eligible for minor subdivision processing; or

~~d~~ c.. Is not eligible to be processed as a minor subdivision, pursuant to Subsection 070.060.060(a)(3).

…

070.060.070 Flexibility and Relief Procedures.

(a) *Variance.*

…

(b) *Administrative Adjustment*

…

(4) *Administrative Adjustment Procedure.*

a. *Application Submittal and Handling.*

1. The developer of a property may submit an application to the Director requesting consideration of an administrative adjustment as outlined in Table 060.3: Allowable Administrative Adjustments.

2. An application for an administrative adjustment associated with ~~shall only be submitted and reviewed concurrently~~ any application for a special use permit, temporary use permit, site/architectural plan approval (administrative, minor, or major), or plat approval (minor, preliminary, final, or condominium) shall be reviewed concurrently.

2. Each code standard in Table 060.3 shall be considered a separate administrative adjustment request as it relates to the approval criteria in Subsection 070.060.070(b)(5), but multiple adjustments may be considered in one (1) administrative adjustment application.

b. *Review and Decision.*

1. Where ~~the~~ a concurrently reviewed, or standalone application requires review and approval by the Director, the Director shall review the application and shall approve, approve with conditions, or deny the adjustment based on the criteria in Subsection 070.060.070(b)(5). The Director may refer the administrative adjustment to the DRC prior to making a decision.

2. Where ~~the~~ a concurrently reviewed application requires review and approval by the Planning Commission or City Council, the Commission or Council, as applicable, shall review and decide the administrative adjustment application based on the criteria in in Subsection 070.060.070(b)(5).

…

070.060.020 Summary Table of Development Review Procedures.

Table 060.1: Summary of Development Review Procedures										
KEY: R= Review and Recommendation D= Review and Decision A= Appeal ✓ = required										
Procedure	Code Reference	Notice			Pre-App. Neigh. Meeting	Pre-Application Conference	Review and Decision-Making Bodies			
		Published	Mailed	Posted			Staff	DRC	Planning Comm.	City Council
ORDINANCE AMENDMENTS										
Rezoning	070.060.040(a)	✓	✓	✓	✓	✓	R	R	R	D

Rezoning to Planned Unit Development (PUD)		070.060.040(b)	✓	✓	✓	✓	✓	R	R	R	D
Code Amendment (Text)		070.060.040(c)	✓					R	R	R	D
Annexation		070.060.040(d)	Per Colorado statutes								
DEVELOPMENT PERMITS											
Site/Architectural Plan Review	Admin.	070.060.050(a)(3)	Note [1]		~~✓~~	~~D~~	~~R~~ ✓	~~A~~ D	R	A	
	Minor	070.060.050(a)(4)	✓	✓	✓		✓	R	R	D	A
	Major	070.060.050(a)(5)	✓	✓	✓	✓	✓	R	R	R	D

…

070.070.030 All Other Terms Defined

…

Focal Point *(Nonresidential and mixed use).* A box formed from lines extending thirty (30) feet away from intersecting property lines on corner lots. As noted in Figure 040-24 of Section 070.040.090.

City Council
STAFF REPORT
City of Glenwood Springs
December 2, 2021

Agenda Item: Planning Item 57-21 Amending Municipal Code Title 070

Action Requested: Consideration of Code Text Amendments to Municipal Code Title 070 including but not exclusive of Sections 070.030, 070.040, 070.060 and 070.070.

Department: Economic and Community Development

Presented By: Hannah Klausman, Assistant Director, Economic & Community Development

Background Info: In August 2018, the City adopted a new Land Use Development Code which updated a code that had been in place since the 1970s. As staff applies the new code, we continue to find errors that require correction and provisions that need clarification or modification.

A spreadsheet which details the requested amendments is included in the Planning and Zoning Commission staff report on page 3 through 7. The spreadsheet includes an explanation of the issues and the recommended corrections or additions.

For general reference, a link to the Development Code is provided here.

Planning and Zoning Commission reviewed the code changes at their regularly scheduled meeting on October 26, 2021 and unanimously recommended approval. The staff report and minutes from this meeting are included as attachments to this report.

For actions involving amendments to the Land Use Code, the Planning & Zoning Commission is a recommending body to City Council. All Municipal Code amendments are completed by ordinance, which requires two hearings before City Council.

Issues: NA

Staff Recommendation: Staff recommends **approval** of the amendments with the following findings:

Recommended Findings:

1. Pursuant to the authority in the Glenwood Springs Municipal Charter and Colorado Revised Statutes §29-20-101 et seq., and §31-23-301 et seq., as amended the City of Glenwood Springs has the authority to plan for and regulate the use of land within the municipality and to regulate and restrict the height, number of stories, and size of buildings and other structures, the percentage of lot that may be occupied, the size of yards, courts, and other open spaces, the density of population, the height and location of trees and other vegetation, and the location and use of buildings, structures, and land for trade, industry, residence, or other purposes.

2. The proposed text amendments-

a. Are consistent with the Comprehensive Plan and other City policies;

b. Do not conflict with other provisions of this Code or other provisions in the Glenwood Springs Municipal Code;

c. Are necessary to address a demonstrated community need;

d. Are necessary to respond to substantial changes in conditions and/or policy; and

e. Are consistent with the general purpose and intent of this Code.

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: Waste Water Plant Oxidation Ditch 10 Year Equipment Maintenance

Action Requested:

Department: Public Works

Presented By: Matthew Langhorst, Public Works Director

Background Info: The Waste Water plant team is in the process of preparing bids and RFS for the list of 10-year maintenance items that need to be completed in 2022. One of the items on that 10-year list is the removal and replacement of the Oxidation Ditch mixers. The plan for 2022 is to replace 2 out of the 4 mixers that are within the ditches.

This is a sole source proposal for the work because the mixers were originally supplied by WesTech and the equipment needs to be replaced with the same materials, thus we are limited to using WesTech for the work. The proposal for Labor is $ 40,200 and parts/equipment is $166,272, for a total cost of $206,472.00. The original plan for 2022 was to replace all 4 of the mixers, but with the blower work that has come to light in the last few months, the team has decided to replace 2 mixers in 2022 and schedule the next 2 for 2023.

Issues: None

Staff Recommendation: Staff is recommending that City Council approve WesTech to complete the Oxidation Ditch mixer work at a cost of $206,472.00 which is within the 10-year maintenance budget already approved by council for 2022.

WESTECH QUOTATION

WESTECH	P.O. BOX 65068 SALT LAKE CITY, UTAH 84165-0068	Phone: 801-265-1000 Fax: 801-265-1080	Quotation No. Q38558-140446

Thank you for the opportunity to quote you with your equipment needs.

Please review the following and contact us to place an order or ask any question.

Date:	12/20/2021	Proj Manager:	JEFFREY FLITTON	Ship Via:	BEST WAY
RFQ No.:		Prime Job No:	21017A	Freight:	FOB SHIPPING POINT, FREIGHT PREPAID & ADDED
Quoted by:	JEFFREY FLITTON	Prime Name:	GLENWOOD SPRINGS, CO WWTP		
Phone:	801-290-1512 or 801-290-1208	Equipment:	LANDOX MIXERS	Lead Time:	18 WEEKS
Email:	JFLITTON@WESTECH-INC.COM	Tax Exemption No.:	CO SALES TAX EXEMPTION ON FILE	Quote Valid:	TO 1/31/22
For Group:	15	Payment Terms:	NET 30 DAYS		

Bill To:	CITY OF GLENWOOD SPRINGS WWTP CATHERINE BACON 101 W 8TH STREET GLENWOOD SPRINGS, CO 81601 UNITED STATES OF AMERICA	Ship To:	CITY OF GLENWOOD SPRINGS WWTP CATHERINE BACON 2315 WULFSOHN ROAD GLENWOOD SPRINGS, CO 81601 UNITED STATES OF AMERICA
GLE010		76573	
Tel/Cell:	970-384-6382 / 970-456-6206 CATHERINE.BACON@COGS.US	Tel/Cell:	970-384-6382 / 970-456-6205

Doc	No.	Part/Dwg Number	Description	Qty	Units	Unit Price	Net Price
68088	112	A124 A	GEAR REDUCER W/ HIGH SPEED MOTOR COUPLING	1	EA	$86,940.00	$86,940.00
68088	112A		OIL PUMP _ SUMITOMO GEAR REDUCER	1	EA	$3,324.00	$3,324.00
68088	112B		UPGRADED HIGH SPEED COUPLING_MOTOR TO REDUCER	1	EA	$1,914.00	$1,914.00
68088	112C		STANDARD OIL PRESSURE SWITCH _ SUMITOMO GEAR REDUCER	4	EA	$1,559.00	$6,236.00
68088	113	A125 A	REDUCER COUPLING (LOW SPEED) INCLUDES MOUNTING TO LANDOX BEARING SHAFT	2	EA	$12,511.00	$25,022.00
68088	113A		WEAR ELEMENTS ONLY_ LOW SPEED REDUCER COUPLING	2	SET	$2,668.00	$5,336.00
68088	118	A128 A	LANDOX BEARING ASSEMBLY_COMPLETE	2	EA	$55,888.00	$111,776.00
68088	118A		LANDOX BEARING-INTERNAL COMPONENTS ONLY (BEARINGS, SEALS, BOLTS)	2	EA	$6,332.00	$12,664.00

No sales, GST, PST, use, or other taxes have been included in our pricing. No discounts accepted.

Quoted in US Dollars Grand Total $253,212.00

Less Line1 86,940.00

= $166,272

-Please see the attached General Terms and Conditions. All purchase orders for Aftermarket parts need to be in US dollars.

-Minimum Order amount is US$100.

-All information provided with and including this proposal is considered proprietary and is not for distribution without express written consent of WesTech Engineering LLC.

-WesTech prefers that payments under $3,000 are processed by Credit Card. Any orders over $10,000 can not be accepted by Credit Card and will be invoiced at terms. This is to include freight and taxes. A processing fee of up to 4 percent on Credit Cards may be added where allowed by law.

This Quotation is subject to all specifications above as well as all attachments included with this document.

Thank you again for your quote request!

Best Regards,

Jeff Flitton

Terms of Sales

Order No: Q38558-140446

Terms and Conditions appearing in any order based on this proposal which are inconsistent herewith shall not be binding on WesTech Engineering LLC. The sale and purchase of equipment described herein shall be governed exclusively by the foregoing proposal and the following provisions:

1. SPECIFICATIONS: WesTech Engineering LLC is furnishing its standard equipment as outlined in the proposal and as will be covered by final approved drawings. The equipment may not be in strict compliance with the Engineer's/Owner's plans, specifications, or addenda as there may be deviations. The equipment will, however, meet the general intention of the mechanical specifications of these documents.

2. ITEMS INCLUDED: This proposal includes only the equipment specified herein and does not include erection, installation, accessories, nor associated materials such as controls, piping, etc., unless specifically listed.

3. PARTIES TO CONTRACT: WesTech Engineering LLC is not a party to or bound by the terms of any contract between WesTech Engineering LLC's customer and any other party. WesTech Engineering LLC's undertakings are limited to those defined in the contract between WesTech Engineering LLC and its direct customers.

4. PRICE AND DELIVERY: All selling prices quoted are subject to change without notice after 30 days from the date of this proposal unless specified otherwise. Unless otherwise stated, all prices are F.O.B. WesTech Engineering LLC or its supplier's shipping points. All claims for damage, delay or shortage arising from such equipment shall be made by Purchaser directly against the carrier. When shipments are quoted F.O.B. job site or other designation, Purchaser shall inspect the equipment shipped, notifying WesTech Engineering LLC of any damage or shortage within forty-eight hours of receipt, and failure to so notify WesTech Engineering LLC shall constitute acceptance by Purchaser, relieving WesTech Engineering LLC of any liability for shipping damages or shortages.

5. PAYMENTS: All invoices are net 30 days. Delinquencies are subject to a 1.5 percent service charge per month or the maximum permitted by law, whichever is less on all past due accounts. Pro rata payments are due as shipments are made. If shipments are delayed by the Purchaser, invoices shall be sent on the date when WesTech Engineering LLC is prepared to make shipment and payment shall become due under standard invoicing terms. If the work to be performed hereunder is delayed by the Purchaser, payments shall be based on the purchase price and percentage of completion. Products held for the Purchaser shall be at the risk and expense of the Purchaser. Unless specifically stated otherwise, prices quoted are for equipment only. These terms are independent of and not contingent upon the time and manner in which the Purchaser receives payment from the owner.

6. PAYMENT TERMS: Credit is subject to acceptance by WesTech Engineering LLC's Credit Department. If the financial condition of the Purchaser at any time is such as to give WesTech Engineering LLC, in its judgment, doubt concerning the Purchaser's ability to pay, WesTech Engineering LLC may require full or partial payment in advance or may suspend any further deliveries or continuance of the work to be performed by the WesTech Engineering LLC until such payment has been received.

7. ESCALATION: If shipment is, for any reason, deferred by the Purchaser beyond the normal shipment date, or if material price increases are greater than 5% from proposal date to material procurement date, stated prices set forth herein are subject to escalation. The escalation shall be based upon increases in labor and material and other costs to WesTech Engineering LLC that occur in the time period between quotation and shipment by WesTech Engineering LLC Purchaser agrees to this potential escalation regardless of contradicting terms in the contract, except when an agreed upon escalation adder is included in the price.

a) The total quoted revised price is based upon changes in the indices published by the United States Department of Labor, Bureau of Labor Statistics. Labor will be related to the Average Hourly Earnings indices found in the Employment and Earnings publication. Material will be related to the Metal and Metal Products Indices published in Wholesale Prices and Prices Indices.

(b) Price revision for items furnished to, and not manufactured by WesTech Engineering LLC, which exceed the above escalation calculation, will be passed along by WesTech Engineering LLC to Purchaser based upon the actual increase in price to WesTech Engineering LLC for the period from the date of quotation to the date of shipment by WesTech Engineering LLC. Any item that is so revised will be excluded from the index escalation calculations set forth in subparagraph (a) above.

8. APPROVAL: If approval of equipment submittals by Purchaser or others is required, a condition precedent to WesTech Engineering LLC supplying any equipment shall be such complete approval.

9. INSTALLATION SUPERVISION: Prices quoted for equipment do not include installation supervision. WesTech Engineering LLC recommends and will, upon request, make available, at WesTech Engineering LLC's then current rate, an experienced installation supervisor to act as the Purchaser's employee and agent to supervise installation of the equipment. Purchaser shall at its sole expense furnish all necessary labor equipment, and materials needed for installation.

Responsibility for proper operation of equipment, if not installed by WesTech Engineering LLC or installed in accordance with WesTech Engineering LLC's instructions, and inspected and accepted in writing by WesTech Engineering LLC, rests entirely with Purchaser; and any work performed by WesTech Engineering LLC personnel in making adjustment or changes must be paid for at WesTech Engineering LLC's then current per diem rates plus living and traveling expenses.

WesTech Engineering LLC will supply the safety devices described in this proposal or shown in WesTech Engineering LLC's drawings furnished as part of this order but excepting these, WesTech Engineering LLC shall not be required to supply or install any safety devices whether required by law or otherwise. The Purchaser hereby agrees to indemnify and hold harmless WesTech Engineering LLC from any claims or losses arising due to alleged or actual insufficiency or inadequacy of the safety devices offered or supplied hereunder, whether specified by WesTech Engineering LLC or Purchaser, and from any damage resulting from the use of the equipment supplied hereunder.

10. ACCEPTANCE OF PRODUCTS: Products will be deemed accepted without any claim by Purchaser unless written notice of non-acceptance is received by WesTech Engineering LLC within 30 days of delivery if shipped F.O.B. point of shipment, or 48 hours of delivery if shipped F.O.B. point of destination. Such written notice shall not be considered received by WesTech Engineering LLC unless it is accompanied by all freight bills for said shipment, with Purchaser's notations as to damages, shortages and conditions of equipment, containers, and seals. Non-accepted products are subject to the return policy stated below.

11. TAXES: Any federal, state, or local sales, use or other taxes applicable to this transaction, unless specifically included in the price, shall be for Purchaser's account.

12. TITLE: The equipment specified herein, and any replacements or substitutes therefore shall, regardless of the manner in which affixed to or used in connection with realty, remain the sole and personal property of WesTech Engineering LLC until the full purchase price has been paid. Purchaser agrees to do all things necessary to protect and maintain WesTech Engineering LLC's title and interest in and to such equipment; and upon Purchaser's default, WesTech Engineering LLC may retain as liquidated damages any and all partial payments made and shall be free to enter the premises where such equipment is located and remove the same as its property without prejudice to any further claims on account of damages or loss which WesTech Engineering LLC may suffer from any cause.

13. INSURANCE: From date of shipment until the invoice is paid in full, Purchaser agrees to provide and maintain at its expense, but for WesTech Engineering LLC's benefit, adequate insurance including, but not limited to, builders risk insurance on the equipment against any loss of any nature whatsoever.

14. SHIPMENTS: Any shipment of delivery dates recited represent WesTech Engineering LLC's best estimate but no liability, direct or indirect, is assumed by WesTech Engineering LLC for failure to ship or deliver on such dates.

WesTech Engineering LLC shall have the right to make partial shipments; and invoices covering the same shall be due and payable by Purchaser in accordance with the payment terms thereof. If Purchaser defaults in any payment when due hereunder, WesTech Engineering LLC may, without incurring any liability therefore to Purchaser or Purchaser's customers, declare all payments immediately due and payable with maximum legal interest thereon from due date of said payment, and at

Terms of Sales

Order No: Q38558-140446

its option, stop all further work and shipments until all past due payments have been made, and/or require that any further deliveries be paid for prior to shipment.

If Purchaser requests postponements of shipments, the purchase price shall be due and payable upon notice from WesTech Engineering LLC that the equipment is ready for shipment; and thereafter any storage or other charge WesTech Engineering LLC incurs on account of the equipment shall be for the Purchaser's account.

If delivery is specified at a point other than WesTech Engineering LLC or its supplier's shipping points, and delivery is postponed or prevented by strike, accident, embargo, or other cause beyond WesTech Engineering LLC's reasonable control and occurring at a location other than WesTech Engineering LLC or its supplier's shipping points, WesTech Engineering LLC assumes no liability in delivery delay. If Purchaser refuses such delivery, WesTech Engineering LLC may store the equipment at Purchaser's expense. For all purposes of this agreement such tender of delivery or storage shall constitute delivery.

15. WARRANTY: WESTECH ENGINEERING LLC WARRANTS EQUIPMENT IT SUPPLIES ONLY IN ACCORDANCE WITH THE WARRANTY EXPRESSED IN THE ATTACHED COPY OF "WESTECH WARRANTY" AGAINST DEFECTS IN WORKMANSHIP AND MATERIALS WHICH IS MADE A PART HEREOF. SUCH WARRANTY IN LIEU OF ALL OTHER WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, WHETHER WRITTEN, ORAL, EXPRESSED, IMPLIED OR STATUTORY, WESTECH ENGINEERING LLC SHALL NOT BE LIABLE ANY CONTINGENT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES FOR ANY REASON WHATSOEVER.

16. PATENTS: WesTech Engineering LLC agrees that it will, at its own expense, defend all suits or proceedings instituted against Purchaser and pay any award of damages assessed against it in such suits or proceedings, so far as the same are based on any claim that the said equipment or any part thereof constitutes an infringement of any apparatus patent of the United States issued at the date of this Agreement, provided WesTech Engineering LLC is given prompt notice in writing of the institution or threatened institution of any suit or proceeding and is given full control of the defense, settlement, or compromise of any such action; and Purchaser agrees to give WesTech Engineering LLC needed information, assistance, and authority to enable WesTech Engineering LLC so to do. In the event said equipment is held or conceded to infringe such a patent, WesTech Engineering LLC shall have the right at its sole option and expense to a) modify the equipment to be non-infringing, b) obtain for Purchaser the license to continue using said equipment, or c) accept return of the equipment and refund to the Purchaser the purchase price thereof less a reasonable charge for the use thereof. WesTech Engineering LLC will reimburse Purchaser for actual out-of-pocket expenses, exclusive of legal fees, incurred in preparing such information and rendering such assistance at WesTech Engineering LLC's request. The foregoing states the entire liability of WesTech Engineering LLC, with respect to patent infringement; and except as otherwise agreed to in writing, WesTech Engineering LLC assumes no responsibility for process patent infringement.

17. SURFACE PREPARATION AND PAINTING: If furnished, shop primer paint is intended to serve only as minimal protective finish. WesTech Engineering LLC will not be responsible for the condition of primed or finish painted surfaces after equipment leaves its shops. Purchasers are invited to inspect paint in shops for proper preparation and application prior to shipment. WesTech Engineering LLC assumes no responsibility for field surface preparation or touch-up of shipping damage to paint. Painting of fasteners and other touch-up to painted surfaces will be by Purchaser's painting contractor after mechanism installation.

Motors, gear motors, and other components not manufactured by WesTech Engineering LLC will be painted with that manufacturer's standard paint system. It is WesTech Engineering LLC's intention to ship major steel components as soon as fabricated, often before drive, motors, and other manufactured components. Unless Purchaser can ensure that shop primed steel shall be field painted within thirty (30) days after arrival at the job site, WesTech Engineering LLC encourages the Purchaser to order these components without primer.

WesTech Engineering LLC's prices are based on paints and surface preparations as outlined in the main body of this proposal. In the event that an alternate paint system is selected, WesTech Engineering LLC requests that Purchaser's order advise of the paint selection. WesTech Engineering LLC will then either adjust the price as may be necessary to comply or ship the material unpainted if compliance is not possible due to application problems or environmental controls.

18. CANCELLATION, SUSPENSION, OR DELAY: After acceptance by WesTech Engineering LLC, this proposal, or Purchaser's order based on this proposal, shall be a firm agreement and is not subject to cancellation, suspension, or delay except upon payment by Purchaser of appropriate charges which shall include all costs incurred by WesTech Engineering LLC to date of cancellation, suspension, or delay plus a reasonable profit. Additionally, all charges related to storage and/or resumption of work, at WesTech Engineering LLC's plant or elsewhere, shall be for Purchaser's sole account; and all risks incidental to storage shall be assumed by Purchaser.

19. RETURN OF PRODUCTS: No products may be returned to WesTech Engineering LLC without WesTech Engineering LLC's prior written permission. Said permission may be withheld by WesTech Engineering LLC at its sole discretion.

20. BACKCHARGES: WesTech Engineering LLC will not approve or accept backcharges for labor, materials, or other costs incurred by Purchaser or others in modification, adjustment, service, or repair of WesTech Engineering LLC-furnished materials unless such back charge has been authorized in advance in writing by a WesTech Engineering LLC employee, by a WesTech Engineering LLC purchase order, or work requisition signed by WesTech Engineering LLC.

21. INDEMNIFICATION: Purchaser agrees to indemnify WesTech Engineering LLC from all costs incurred, including but not limited to court costs and reasonable attorney fees, from enforcing any provisions of this contract, including but not limited to breach of contract or costs incurred in collecting monies owed on this contract.

22. ENTIRE AGREEMENT: This proposal expresses the entire agreement between the parties hereto superseding any prior understandings, and is not subject to modification except by a writing signed by an authorized officer of each party.

23. MOTORS AND MOTOR DRIVES: In order to avoid shipment delays of WesTech Engineering LLC equipment, the motor drives may be sent directly to the job site for installation by the equipment installer. Minor fit-up may be required.

24. EXTENDED STORAGE: Extended storage instructions will be part of information provided to shipment. If equipment installation and start-up is delayed more than 30 days, the provisions of the storage instructions must be followed to keep WARRANTY in force.

25. LIABILITY: Professional liability insurance, including but not limited to, errors and omissions insurance, is not included. In any event, liability for errors and omissions shall be limited to the lesser of $100,000USD or the value of the particular piece of equipment (not the value of the entire order) supplied by WesTech Engineering LLC against which a claim is sought.

26. ARBITRATION NEGOTIATION: Any controversy or claim arising out of or relating to the performance of any contract resulting from this proposal or contract issued, or the breach thereof, shall be settled by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association, and judgment upon the award rendered by the arbitrator(s) may be entered to any court having jurisdiction.

ACCEPTED BY PURCHASER

Customer Name: _____

Customer Address: _____

Contact Name: _____

Contact Phone: _____

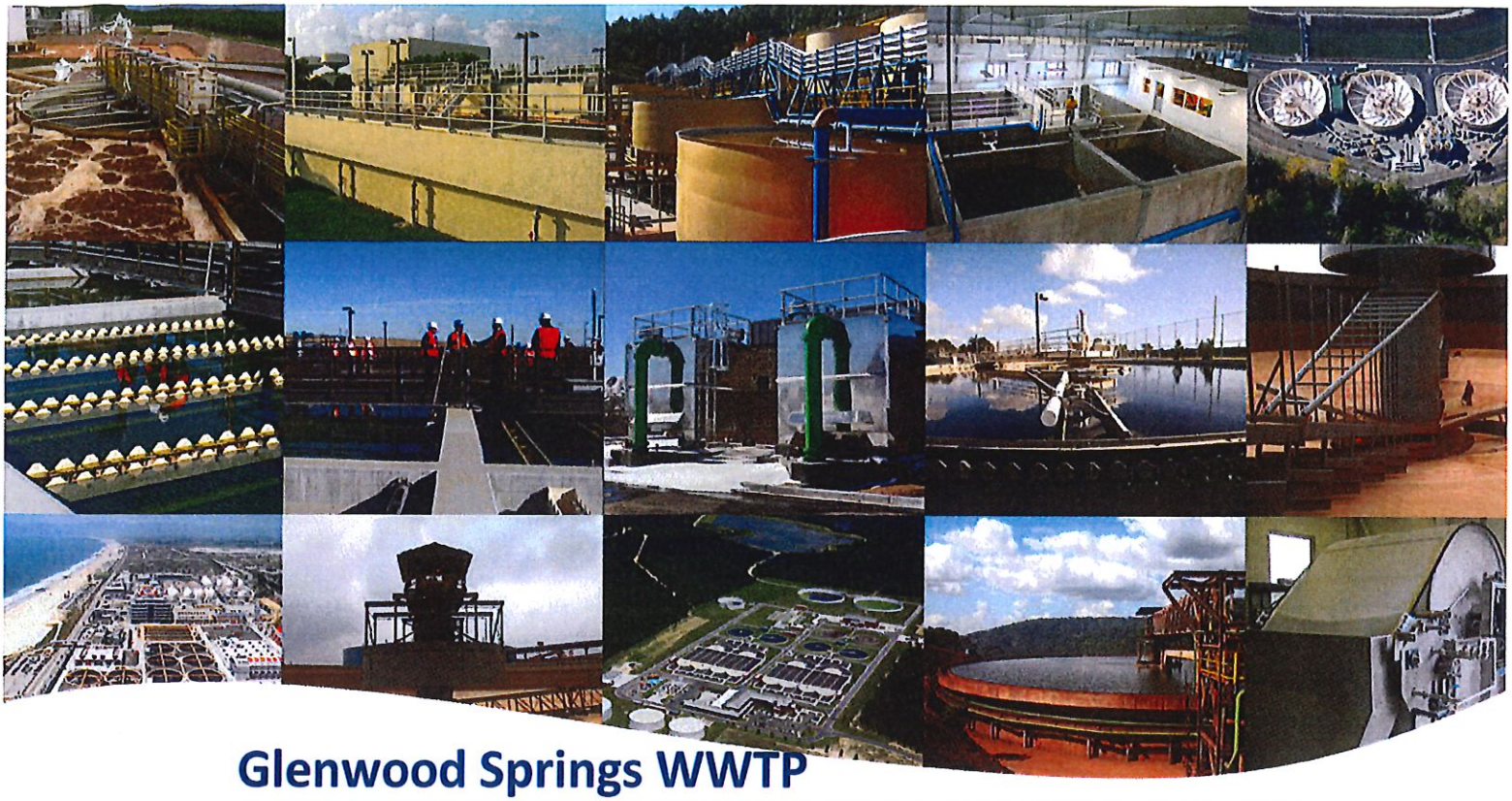
Contact Email: _____

Signature: _____

Printed Name: _____

Title: _____

Date: _____



Glenwood Springs WWTP

Glenwood Springs, CO

Equipment Furnished by
WesTech Engineering LLC
3665 South West Temple
Salt Lake City, UT 84115
USA
801.265.1000
801.265.1080 fax

WesTech Represented by
Goble Sampson
3303-770-6418
jqueen@goblesampson.com

Quote Furnished by

Johanna Loeza
801-290-1454
jloeza@westech-inc.com

David Mendenhall
801-290-1860
dmendenhall@westech-inc.com

Scope of Supply
On Site Service

WesTech Proposal: 2199212
Date: November 11, 2021

WESTECH

WesTech Service Quote

Quote Name: Glenwood Springs WWTP
Proposal Number: 2199212
Date: November 11, 2021
WesTech Reference Project #: 21017A

1. Bidder's Contact Information

Company Name	WesTech Engineering LLC
Contact Name	Johanna Loeza
Phone	801-290-1454
Email	jloeza@westech-inc.com
Address: Number/Street	3665 S West Temple
Address: City, State, Zip	Salt Lake City, UT 84115

2. Pricing (USD)

Scope of Service

Purpose of Service – On Site Install Service to install parts on Landox Mixers.	$ 40,200.00
Days on Site: 2 Tech 8 day on Site	
If Needed, Price of Each Additional Day for this Trip	$ 2,300.00

Clarifications

1. Trip minimum is 1 trip, 1 day onsite. Rate includes travel & living expenses.
2. Rates are based on 8-hour work and travel days, Monday thru Friday. Additional onsite hours over 8 hours will be billed at $225 per hour (or any part thereof).
3. Travel and on-site days that occur on Saturday or Sunday will be billed at an additional $600 per day.
4. Trip prices are based on a purchase order being received two (2) weeks prior to the first day on site. Purchase orders received after that point may be assessed a fee to cover the additional cost for air fare.
5. Payment Terms: 100% Net due 15 days after the service is complete.
6. Contact WesTech at least 4 weeks prior to needing the service to verify availability of a technician.

ACCEPTED BY PURCHASER

Customer Name: _____

Customer Address: _____

_____

_____

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Contact Name: _____

Contact Phone: _____

Contact Email: _____

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: Planning File 60-20 - Consideration of a Major Site/Architectural Plan Review application for the construction of 300-unit multi-family development in 14 separate buildings in Glenwood Meadows.

Action Requested: **Action 1 – Major Site/Architectural Plan Review** – for the construction of 300 multi-family residential apartment units.

Department: Economic and Community Development

Presented By: Trent Hyatt, Senior Planner

Background Info: The Planning and Zoning Commission (Commission) is the recommending body to City Council for all Major Site/Architectural Plan Review applications. The Commission considered the proposal at their August 24, 2021 regular meeting where public comment was taken. All information/materials provided to the Commission and the minutes from each meeting are attached for your review.

Issues: For a complete analysis of various issues related to the proposal, please refer to the attached staff reports, staff memos and public comments submitted to date. However, the list below is a summary of the topics addressed by the Commission during the review process.

Issues Addressed/Recommendations to Applicant
1. Request to add affordable/attainable/inclusionary housing to the project via City's voluntary system improvement fee waiver program;
2. Need to improve pedestrian connectivity, add more stairways to Wulfsohn;
3. Improve screening/buffering of proposed parking areas;
4. Similarity of building design and bedroom configurations;
5. Landscaping and related water use;
6. Need to provide details related to proposed shuttle operations;
7. Proposal limited to only one housing type (apartments);
8. Concerns regarding density and addition of traffic to and condition of Wulfsohn Road.

Planning and Zoning Commission Discussion/Recommendation
The Commission voted unanimously 6-0 to recommend approval of the application to City Council 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 appears to be consistent with all dimensional, design, development, and all other standards of the Glenwood Meadows Zoning and Development Plan and Glenwood Springs Municipal Code;
3. The site/architectural plan does is consistent with the precedent setting land use approval, the Glenwood Meadows Annexation Zoning and Development Plan; 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 Glenwood Springs Municipal Code specific City staff comments prior to submittal of any future development permit (including but not limited to a Final Plans Review) application.
2. 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.
3. Prior to approval of any future development review application, the applicant shall apply for and receive the approval of a CDOT access permit, where applicable.

4. The applicant shall receive approval of the related Minor Subdivision application to create the development parcel and residual lots.
5. 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.
6. The applicant shall comply fully with the Memorandum of Understanding between the City and Glenwood Meadows, LLC executed May 5, 2021.
7. The applicant shall deed restrict a minimum of 10 units as owner occupied at 100 percent of AMI for a period of five years.
8. Prior to submitting a building or grading permit application, the applicant shall
a. Submit a Final Plans Review 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.

Applicant Response
Regarding attainable housing, the applicant improved upon their initial offering of voluntarily restricting 10 units to 100% of AMI by increasing the number to 15. While they are not voluntarily offering to restrict 20% of the total units as resident of occupied, they do intend to meet the requirements via procedures outlines in the response letter attached to the staff report.

Related to the design, the applicant has increased variations in materials and colors in an attempt to diversify the similar aesthetic of the proposed buildings. Please see pages 72-83 of the revised plan set attached hereto.

Staff Recommendation: **Action 1 – Major Site/Architectural Plan Review** – for the construction of 300 multi-family residential apartment units.

Staff Recommendation
Staff recommends **approval (with conditions)** of the Site/Architectural Plan Review application with the findings and conditions outlined below. Please note, the recommended conditions include revisions related to the applicant's changes stemming from the Commission's recommendations.

Recommended Findings:
1. The site/architectural plan is consistent with the general purpose and intent of the Code;
2. The site/architectural plan appears to be consistent with all dimensional, design, development, and all other standards of the Glenwood Meadows Zoning and Development Plan and Glenwood Springs Municipal Code;
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4. The applicant shall receive approval of the related Minor Subdivision application to create the development parcel and residual lots.
5. 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.
6. The applicant shall comply fully with the Memorandum of Understanding between the City and Glenwood Meadows, LLC executed May 5, 2021.
7. The applicant shall deed restrict a minimum of 15 units as owner occupied at an average of 100 percent of AMI per the City's voluntary system improvement fee waiver program.
8. Prior to submitting a building or grading permit application, the applicant shall
a. Submit a Final Plans Review 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.

Karp Neu Hanlon PC
ATTORNEYS AT LAW
www.mountainlawfirm.com

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201 14th Street, Suite 200
P. O. Drawer 2030
Glenwood Springs, CO 81602

Aspen
323 W. Main Street
Suite 301
Aspen, CO 81611

Montrose
1544 Oxbow Drive
Suite 224
Montrose, CO 81402

Office: 970.945.2261
Fax: 970.945.7336
Direct Mail to Glenwood Springs

DATE: December 30, 2021

TO: Glenwood Springs Mayor and Council

FROM: Karp Neu Hanlon, P.C.

RE: Planning File 60-20

This matter comes before Council based on the stipulation entered into in Case No. 2021CV30155, District Court, Garfield County regarding the BLD land-use hearing conducted on November 18, 2021. As Council is aware, that hearing ended in a 3-3 tie on a motion to approve which under the provisions of the Glenwood Springs Municipal Code Section 020.030.100 resulted in a denial of the application. BLD Group LLC and Glenwood Meadows LLC sued the City pursuant to Colorado Rules of Civil Procedure 106, claiming a violation of due process as a result of no findings being made to support the denial. The City entered into a stipulation with the plaintiffs for this matter to come back before the full Council for a decision, as well as addressing the requirements of the Code regarding tie votes.

BLD GROUP AFFORDABLE HOUSING PLAN

BLD Group filed its application for 300 rental apartment units in Glenwood Meadows in December 2020, prior to the City's February 2021 enactment of its current Community Housing Standards. This means BLD is not subject to these Community Housing Standards, which require 20% of residential units to be "resident occupied community housing" and one half of these units, 10%, to be deed restricted to an initial rental price based on an average of no more than 100% AMI.

Moreover, there is already Community Housing constructed within the Glenwood Meadows master plan. In fact, Glenwood Meadows, LLC, the current owner of the parcel, was responsible for creating 60 of the most affordable units in the City when it constructed the Glenwood Greens project in 2013. These 60 units are deed restricted to 40/60/80% of AMI and are adjacent to the BLD project. Both parcels are within the Residential High zone district of the Meadows. When considering the existing 60 affordable units within Glenwood Meadows' RH district out of the total 475 permitted units, a minimum of 12.6% of the entire Glenwood Meadows RH zone development will be deed restricted affordable units—at levels exceeding the current code requirement to average 100% AMI.

BLD's application was stalled for several months while City Staff and BLD negotiated contributions to various infrastructure improvements to serve the project. Pursuant to the Memorandum of Understanding between the City and BLD, BLD has committed to contributing up to $625,000 for City infrastructure upgrades contingent upon approval of this site plan. Nonetheless, BLD has heard the requests from Staff and the Planning Commission that community housing is desperately wanted and needed within the City. Therefore, BLD is offering the following:

(1) Voluntary Affordable and Workforce Housing Program.

BLD will place 15 of its units into the City's voluntary Affordable and Workforce Housing program as described in 070.045.120(b), which requires 100% AMI rents to local occupants and allows for the waiver of certain City fees. With the addition of these units, upon completion of the BLD project, 21% of completed units in the Glenwood Meadows RH zone district will be deed restricted units, more than double the City's recently enacted Community Housing Standard of 10%, at rents averaging below 100% of AMI.

(2) Local Preference.

The current Community Housing Guidelines require 20% of units to be "resident occupied." According to the Lofts at Red Mountain Management, the Lofts are currently at 65% resident occupied. We have every reason to believe BLD's project will far exceed 20% resident occupied. The City's current RO guidelines as enacted require waiting and lease periods, and other administrative burdens that would materially impact occupancy, available financing for the project, and ultimately its viability. Consequently, BLD cannot agree to the City's current RO guidelines. Nonetheless, BLD strongly believes in serving the community. Therefore, BLD is willing to offer a local preference for its units as follows:

Upon request from the City, BLD will annually report to the City the percentage of its units which qualify as "resident occupied" under the City's current Code. Additionally, in the event the percentage of "resident occupied" units is ever below 20%, BLD Group will implement a preference to prospective tenants who otherwise qualify and meet the City's current occupancy requirement for community housing:

(a) Employed to primarily work at a physical location within the 81601 zip code;
(b) Directly employed by a company that has its principal office located within the 81601 zip code;
(c) Enrolled as a full-time student at a local educational institution;
(d) Is sixty-five years of age or older; or
(e) Is receiving social security disability benefits.

GLENWOOD MEADOWS MULTI-FAMILY HOUSING

Glenwood Springs, Colorado

MAJOR SITE / ARCHITECTURE REVIEW

SUBMITTAL #5: October 26, 2021

INDEX OF SHEETS

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SHEET 2 OF 4
SHEET 3 OF 4
SHEET 4 OF 4

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GR2	PRELIMINARY GRADING PLAN - SHEET 2
UT1	PRELIMINARY UTILITY PLAN - SHEET 1
UT2	PRELIMINARY UTILITY PLAN - SHEET 2

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L1.1	DEVELOPMENT AREA SITE PLAN
L1.2	SITE PLAN ENLARGEMENT KEY PLAN
L1.3	ENLARGED SITE PLAN
L1.4	ENLARGED SITE PLAN
L1.5	ENLARGED SITE PLAN
L1.6	ENLARGED SITE PLAN
L1.7	ENLARGED SITE PLAN
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EXBT 11	PERSPECTIVE ILLUSTRATION
EXBT 12.1	SITE SECTION
EXBT 12.2	SITE SECTION
EXBT 12.3	SITE SECTION
EXBT 13	WEST ENTRY PLAN AND PROFILE
EXBT 14	POOL WALL GRADING

Architecture Sheet Set

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A-2	BUILDING TYPE 1 FLOOR PLANS
A-3	BUILDING TYPE 1 FLOOR PLANS
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A-5	BUILDING TYPE 1 FLOOR PLANS
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A-26	BUILDING TYPE 3 E/W ELEVATIONS
A-27	BUILDING TYPE 3 SECTION
A-28	APARTMENT UNIT FLOOR PLANS
A-29	APARTMENT UNIT FLOOR PLANS
A-30	GARAGE BUILDING ELEVATION
A-31	CLUBHOUSE FLOOR PLANS
A-32	CLUBHOUSE ROOF PLANS
A-33	CLUBHOUSE N/S ELEVATIONS
A-34	CLUBHOUSE E/W ELEVATIONS
A-35	BUILDING MATERIALS
A-36	BLDG. TYPE 1 SOUTH ELEV. (RENDERED)
A-37	BLDG. TYPE 1 NORTH ELEV. (RENDERED)
A-38	BLDG. TYPE 1 EAST ELEV. (RENDERED)
A-39	BLDG. TYPE 1 WEST ELEV. (RENDERED)
A-40	BLDG. TYPE 2 SOUTH ELEV. (RENDERED)
A-41	BLDG. TYPE 2 NORTH ELEV. (RENDERED)
A-42	BLDG. TYPE 2 EAST ELEV. (RENDERED)
A-43	BLDG. TYPE 2 WEST ELEV. (RENDERED)
A-44	BLDG. TYPE 3 SOUTH ELEV. (RENDERED)
A-45	BLDG. TYPE 3 NORTH ELEV. (RENDERED)
A-46	BLDG. TYPE 3 EAST ELEV. (RENDERED)
A-47	BLDG. TYPE 3 WEST ELEV. (RENDERED)

PROJECT TEAM

LANDSCAPE ARCHITECT

DHM DESIGN CORPORATION
311 MAIN STREET, SUITE 102
CARBONDALE, CO 81623
PHONE: (970) 963-6520
CONTACT: JEN DICUOLLO

ARCHITECTURE

BLD GROUP
1500 CORDOVA RD
FORT LAUDERDALE, FL 33316
PHONE: (954) 578-6008
CONTACT: RICHARD COBA

CIVIL ENGINEER

HIGH COUNTRY ENGINEERING
1517 BLAKE AVE, #101
GLENWOOD SPRINGS, CO 81601
PHONE: (970) 945-8676
CONTACT: ROGER NEAL

BASIS OF BEARING / BENCHMARK

BEARINGS ARE BASED UPON A #5 REBAR WITH ALUMINUM CAP L.S. #5933 FOUND AT THE SOUTHEASTERLY, A FOUND #5 REBAR WITH ALUMINUM CAP L.S.
25954 FOUND AT THE NORTHEASTERLY CORNER OF SUBJECT LOT 1A, USING A BEARING OF N00°21'00"E BETWEEN THE TWO DESCRIBED MONUMENTS.

LOCATION MAP



UNIT AND SITE AMENITY DATA

LOT SIZE INFORMATION	Acres	SF
Lot 2 - Phase 1	**27.9 Acres**	**1,215,160 sf**
LIMITS OF DISTURBANCE		Proposed (SF & %)
Lot 2 - Phase 1		**895.561 sf** *74% Lot Size*
OFF-STREET PARKING SPACES	Required # Vehicle Spaces	Proposed # Vehicle Spaces
Residence Parking *1.7 spaces per unit*	**510 Spaces** *Phase 1 Count: 300 units*	**510 Spaces**
Clubhouse *1 per 400 sf of building area plus 1 per 10,000 sf of outdoor space*	**29 Spaces** *Phase 1 Count: 10,900 sf Building and 11,000 sf of Outside area*	**29 Spaces**
ADA	**20 Spaces**	**38 Spaces**
TOTAL PARKING	**539 Spaces**	**539 Spaces**

LOT COVERAGE	Required (SF & %)	Proposed (SF & %)
	50% Max Lot Coverage *(Bldgs + Garages only)*	**173,910 sf** *14.3% of Parcel*
AVERAGE SLOPE WITHIN LIMITS OF DISTURBANCE	Percentage (%)	
	16%	
BICYCLE PARKING	Required # Spaces	Proposed # Spaces
Bike Racks *150 parking spaces- 9 bike parking spaces plus 1 space for each 50 vehicle spaces provided after the first 150 spaces*	**17 Bike Parking Spaces** *Phase 1 Count: 538 Parking Spaces*	**160 Bike Parking Spaces**

RESIDENTIAL UNITS	Buildings	Units
Building Type 1	**7 Buildings**	**168 Units**
Building Type 2	**3 Buildings**	**60 Units**
Building Type 3	**3 Buildings**	**72 Units**
TOTAL	**13 Buildings**	**300 Units**
BUILDING HEIGHT	Required	Proposed
	40 ft. maximum	**37 ft.** *roof center line to grade*

COMMON AMENITY SPACE	Required (SF)	Provided (SF)
Community Center & Daycare		**20,960 sf**
Community Gardens		**7,665 sf**
Amenity Spaces between Buildings		**30,160 sf**
Trail Connections		**2,058 sf**
Dog Yard		**36,432 sf**
TOTAL	**60,000 sf** *Required: 200 sf per unit Phase 1 Count: 300 units*	**97,275 sf**

LANDSCAPE DATA

OPEN SPACE	SQUARE FOOTAGE	TREES		SHRUBS	
		REQUIRED *(1/1200 SF)*	PROVIDED	REQUIRED (1/400 SF)	PROVIDED
Upper tier - disturbed	87,483 SF	73	74	219	366
Lower tier - disturbed	79,351 SF	66	66	198	285

INTERNAL DRIVEWAY	LINEAR FEET	TREES	
		REQUIRED *(1/35 LF)*	PROVIDED
Flat Tops View Dr (Sunny Aspen)	2,071 LF	59	60
Wolf Liam Lane	1,735 LF	50	50
Adios Avenue	1,748 LF	50	50

PARKING AREAS	Total Parking Area (SF)	Landscaped Area (SF & %)	TREES		SHRUBS	
			REQUIRED *(1/1200 SF)*	PROVIDED	REQUIRED (1/400 SF)	PROVIDED
Parking Lots	29,694 SF	10,485 SF *(35% of the parking area)*	25	40	74	240

TOTAL LANDSCAPED AREA	Proposed (SF & %)
	304,510 sf *25% Lot Size*
TOTAL IMPERVIOUS AREA	Proposed (SF & %)
	591,051 sf *49% Lot Size*

OPEN SPACE	Required (SF & %)	Proposed (SF & %)
	486,064 sf *40% Lot Size*	**504,083 sf** *41.5% Lot Size*

SNOW STORAGE NOTE: ON-SITE SNOW STORAGE WILL BE PROVIDED IN LANDSCAPE AREAS AT THE EAST AND WEST ENDS OF THE BUILDING ROWS AND BEHIND THE CURB WHERE SIDEWALKS DO NOT EXIST. FINAL SNOW MANAGEMENT WILL BE REFINED BASED ON GEOTECHNICAL REVIEW, RECOMMENDATIONS, AND GRADING & DRAINAGE PLAN.

LEGAL DESCRIPTION

PARCEL A:
****
NOTE: THE FOLLOWING LEGAL DESCRIPTION IS PRELIMINARY AND IS SUBJECT TO CHANGE UPON COMPLIANCE WITH THE REQUIREMENTS UNDER SCHEDULE B-1, HEREIN.
****
LOTS 11C-B AND 11C-C, GLENWOOD MEADOWS FILING NO. 6, ACCORDING TO THE PLAT THEREOF
RECORDED SEPTEMBER 7, 2017 AT RECEPTION NO. 897037
COUNTY OF GARFIELD, STATE OF COLORADO
PARCEL B:
EASEMENTS FOR UTILITIES, DRAINAGE AND ACCESS AS DESCRIBED AND DEPICTED IN RECIPROCAL EASEMENT AGREEMENT RECORDED MAY 5, 17, 2012 UNDER RECEPTION NO. 818857 AND FIRST AMENDMENTS TO RECIPROCAL EASEMENT AGREEMENT RECORDED MAY 18, 2017 UNDER RECEPTION NO. 892528.

FEMA FLOODPLAIN STATEMENT

PARCELS A & B ARE LOCATED WITHIN ZONE D ACCORDING TO FEMA MAP PANELS 0802051431B AND 0802051432B BOTH EFFECTIVE 01/03/1986. ACCORDING TO FEMA, NO ADDITIONAL DIGITAL DATA IS AVAILABLE IN THIS AREA.

PUBLIC IMPROVEMENTS STATEMENT

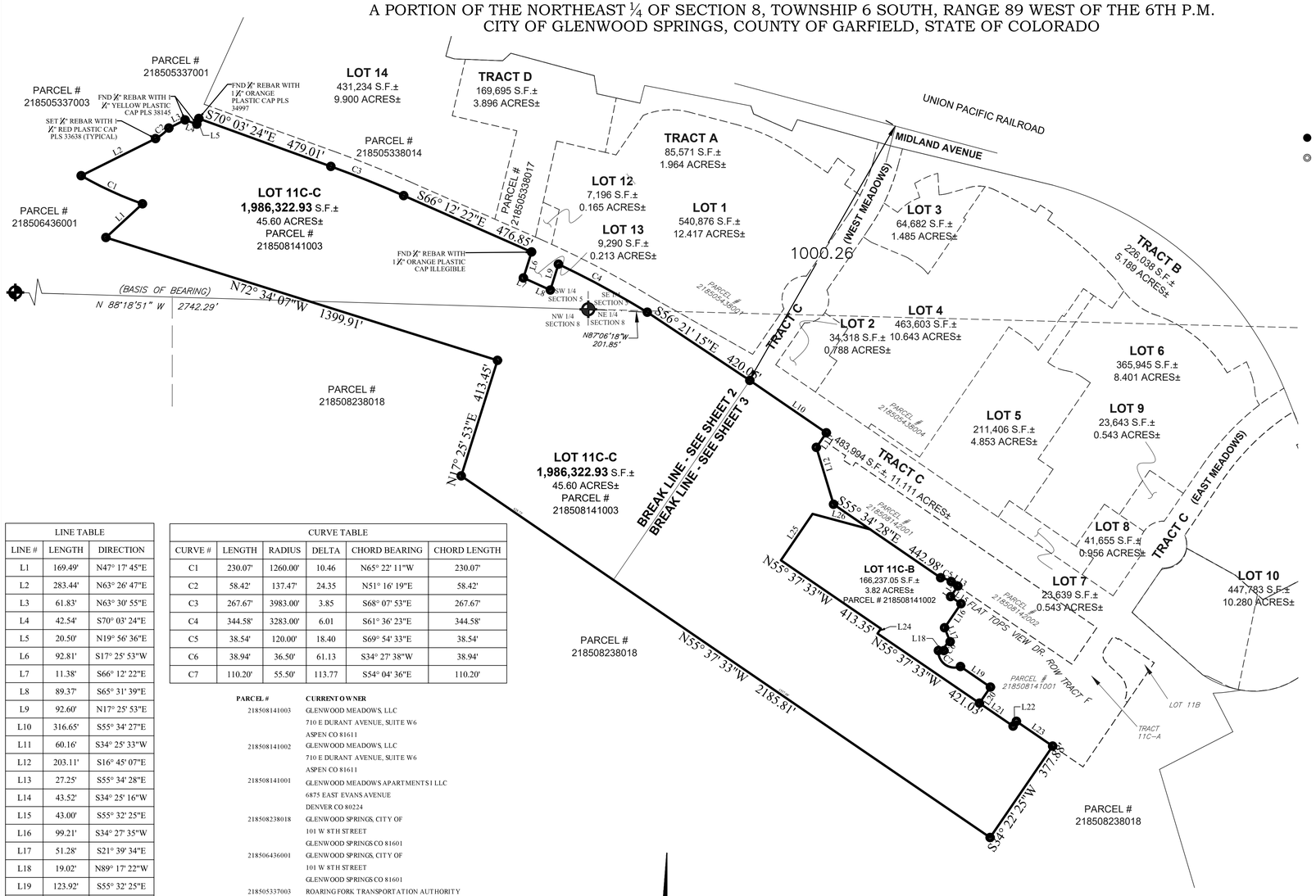
THE PUBLIC IMPROVEMENTS FOR THE ENTIRETY OF THE GLENWOOD MEADOWS SUBDIVISION HAVE BEEN SATISFIED AS MEMORIALIZED IN THE JULY 2013 MOU BETWEEN THE DEVELOPER (GLENWOOD MEADOWS, LLC) AND THE CITY OF GLENWOOD SPRINGS. THESE PUBLIC IMPROVEMENTS INCLUDED OFF-SITE TRAFFIC IMPROVEMENTS, ON- AND OFF-SITE PEDESTRIAN TRAIL IMPROVEMENTS, WATER RIGHTS CONVEYANCES, OFF-SITE RIVERTRAIL CONTRIBUTIONS, TRANSIT IMPROVEMENTS, AND PUBLIC OPEN SPACE DEDICATIONS. IN JUNE OF 2021 THE CITY OF GLENWOOD SPRINGS AND GLENWOOD MEADOWS, LLC ENTERED INTO A MOU THAT ADDED PUBLIC IMPROVEMENTS ABOVE AND BEYOND THE PREVIOUSLY SATISFIED REQUIREMENTS, INCLUDING INFRASTRUCTURE UPGRADES AND TRAFFIC IMPACT FEES. THE PROJECT PROPOSAL INCLUDES ON-SITE PUBLIC IMPROVEMENTS INCLUDING A SIDEWALK EXTENSION ALONG WULFSOHN ROAD, PUBLICLY-ACCESSIBLE TRAILHEADS TO OPEN SPACE, AND A PUBLICLY-AVAILABLE DAYCARE FACILITY.

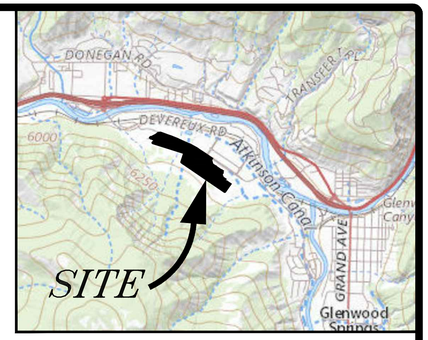
GEOLOGIC HAZARDS DISCLOSURE

THE PROPERTY IS SUBJECT TO GEOLOGIC HAZARDS PER THE ADOPTED MAPPING BY THE CITY OF GLENWOOD SPRINGS. HAZARDS TO NOTE ARE SEVERE POTENTIAL FOR HYDROCOMPACTION, AND FOR OFF-SITE DEBRIS FLOW. A FINAL GEOLOGIC HAZARD REPORT WILL BE SUBMITTED UPON APPLICATION OF A BUILDING PERMIT.

ALTA/ACSM LAND TITLE SURVEY

LOTS 11C-B AND 11C-C, GLENWOOD MEADOWS FILING NO. 6, ACCORDING TO THE PLAT THEREOF
RECORDED SEPTEMBER 7, 2017 AT RECEPTION NO. 897037
A PORTION OF THE NORTHEAST ¼ OF SECTION 8, TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE 6TH P.M.
CITY OF GLENWOOD SPRINGS, COUNTY OF GARFIELD, STATE OF COLORADO





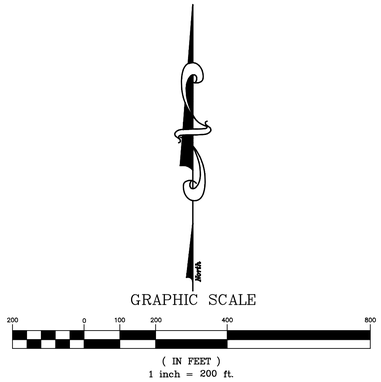
VICINITY MAP
SCALE: 1" = 3000'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L1	169.49'	N47° 17' 45"E
L2	283.44'	N63° 26' 47"E
L3	61.83'	N63° 30' 55"E
L4	42.54'	S70° 03' 24"E
L5	20.50'	N19° 56' 36"E
L6	92.81'	S17° 25' 53"W
L7	11.38'	S66° 12' 22"E
L8	89.37'	S65° 31' 39"E
L9	92.60'	N17° 25' 53"E
L10	316.65'	S55° 34' 27"E
L11	60.16'	S34° 25' 33"W
L12	203.11'	S16° 45' 07"E
L13	27.25'	S55° 34' 28"E
L14	43.52'	S34° 25' 16"W
L15	43.00'	S55° 32' 25"E
L16	99.21'	S34° 27' 35"W
L17	51.28'	S21° 39' 34"E
L18	19.02'	N89° 17' 22"W
L19	123.92'	S55° 32' 25"E
L20	66.33'	S34° 22' 27"W
L21	138.97'	S55° 37' 33"E
L22	20.00'	N34° 22' 25"E
L23	150.00'	S55° 37' 33"E

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C1	230.07'	1260.00'	10.46	N65° 22' 11"W	230.07'
C2	58.42'	137.47'	24.35	N51° 16' 19"E	58.42'
C3	267.67'	3983.00'	3.85	S68° 07' 53"E	267.67'
C4	344.58'	3283.00'	6.01	S61° 36' 23"E	344.58'
C5	38.54'	120.00'	18.40	S69° 54' 33"E	38.54'
C6	38.94'	36.50'	61.13	S34° 27' 38"W	38.94'
C7	110.20'	55.50'	113.77	S54° 04' 36"E	110.20'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L24	20.00'	N34° 22' 27"E
L25	191.73'	N34° 22' 04"E
L26	202.63'	S75° 00' 01"E

PARCEL #	CURRENT OWNER
218508141003	GLENWOOD MEADOWS, LLC 710 E DURANT AVENUE, SUITE W6 ASPEN CO 81611
218508141002	GLENWOOD MEADOWS, LLC 710 E DURANT AVENUE, SUITE W6 ASPEN CO 81611
218508141001	GLENWOOD MEADOWS APARTMENTS I LLC 6875 EAST EVANS AVENUE DENVER CO 80224
218508238018	GLENWOOD SPRINGS, CITY OF 101 W 8TH STREET GLENWOOD SPRINGS CO 81601
218506436001	GLENWOOD SPRINGS, CITY OF 101 W 8TH STREET GLENWOOD SPRINGS CO 81601
218505337003	ROARING FORK TRANSPORTATION AUTHORITY 0766 INDUSTRY WAY CARBONDALE CO 81623
218505337001	ROARING FORK TRANSPORTATION AUTHORITY 0051 SERVICE CENTER DRIVE ASPEN CO 81611
218505338014	CENTURA VENTURES LLC 9100 E MINERAL CIRCLE ENGLEWOOD CO 80112
218505338017	GLENWOOD SPRINGS, CITY OF 101 W 8TH STREET GLENWOOD SPRINGS CO 81601
218508142001	SC GLENWOOD I LLC 760 W MAIN STREET, STE 140 BARRINGTON IL 60010
218508142002	SC GLENWOOD II LLC 760 W MAIN STREET, STE 140 BARRINGTON IL 60010
218505438004	TARGET CORPORATION PO BOX 72028 PHOENIX AZ 85050
218505438001	WEINGARTEN MILLER GLENWOOD LLC 6900 EAST BELLEVIEW AVENUE SUITE 300 GREENWOOD VILLAGE CO 80111



LEGEND AND NOTES:

● - INDICATES FOUND MONUMENT AS DESCRIBED

◎ - INDICATES MONUMENT TO BE SET AS DESCRIBED

- DATE OF SURVEY: SEPTEMBER 5 - 8, 2020

- UNIT OF MEASUREMENT: US SURVEY FOOT

- ZONING DATA TO BE PROVIDED BY CLIENT

- PARCELS A & B ARE LOCATED WITHIN ZONE D ACCORDING TO FEMA MAP PANELS 0802051431B AND 0802051432B BOTH EFFECTIVE 01/03/1986. ACCORDING TO FEMA, NO ADDITIONAL DIGITAL DATA IS AVAILABLE IN THIS AREA.

- BEARINGS ARE BASED UPON A #5 REBAR WITH ALUMINUM CAP L.S. #5933 FOUND AT THE SOUTHEASTERLY, A FOUND #5 REBAR WITH ALUMINUM CAP L.S. 25954 FOUND AT THE NORTHEASTERLY CORNER OF SUBJECT LOT 1A, USING A BEARING OF N00°21'00"E BETWEEN THE TWO DESCRIBED MONUMENTS.

- THIS ALTA LAND TITLE SURVEY IS BASED UPON INFORMATION PROVIDED BY LAND TITLE GUARANTEE COMPANY IN ORDER NUMBER ABS63015235-4 DATED AUGUST 26, 2020. THIS PROPERTY IS SUBJECT TO THE FOLLOWING EXCEPTIONS PER SAID ORDER NUMBER ABS63015235-4:

8. EXISTING LEASES AND TENANCIES, IF ANY. **NOTHING TO PLOT.**

9. RIGHT OF PROPRIETOR OF A VEIN OR LODE TO EXTRACT AND REMOVE HIS ORE THEREFROM SHOULD THE SAME BE FOUND TO PENETRATE OR INTERSECT THE PREMISES AS RESERVED IN UNITED STATES PATENT RECORDED SEPTEMBER 30, 1949, IN BOOK 245 AT PAGE 268. **NOTHING TO PLOT.**

10. RIGHT OF PROPRIETOR OF A VEIN OR LODE TO EXTRACT AND REMOVE HIS ORE THEREFROM SHOULD THE SAME BE FOUND TO PENETRATE OR INTERSECT THE PREMISES AS RESERVED IN UNITED STATES PATENT RECORDED SEPTEMBER 30, 1949, IN BOOK 245 AT PAGE 269. **NOTHING TO PLOT.**

11. EASEMENTS AND RIGHTS OF WAY AS GRANTED TO THE MOUNTAIN STATES TELEPHONE AND TELEGRAPH COMPANY IN INSTRUMENT RECORDED JUNE 25, 1936 IN BOOK 183 AT PAGE 430. **NOTHING TO PLOT.**

12. RIGHT OF PROPRIETOR OF A VEIN OR LODE TO EXTRACT AND REMOVE HIS ORE THEREFROM SHOULD THE SAME BE FOUND TO PENETRATE OR INTERSECT THE PREMISES AS RESERVED IN UNITED STATES PATENT RECORDED SEPTEMBER 30, 1949, IN BOOK 245 AT PAGE 270. **NOTHING TO PLOT.**

13. (THIS ITEM WAS INTENTIONALLY DELETED) **NOTHING TO PLOT.**

14. TERMS, CONDITIONS AND PROVISIONS OF ANNEXATION AND DEVELOPMENT AGREEMENT RECORDED DECEMBER 06, 2002 IN BOOK 1414 AT PAGE 526 AND THE AMENDMENT RECORDED MAY 6, 2004 IN BOOK 1585 AT PAGE 438 AND THE AMENDED AGREEMENT RECORDED JULY 26, 2004 IN BOOK 1607 AT PAGE 895 AND THIRD AMENDMENT RECORDED DECEMBER 2, 2010 UNDER RECEPTION 795138 AND AMENDED AND RESTATED THIRD AMENDMENT RECORDED AUGUST 16, 2011 UNDER RECEPTION NO. 806719 AND RERECORDED AUGUST 18, 2011 UNDER RECEPTION NO. 806794 AND FOURTH AMENDMENT RERECORDED AUGUST 8, 2013 UNDER RECEPTION NO. 839074 AND FOURTH AMENDMENT RERECORDED APRIL 10, 2015 UNDER RECEPTION NO. 861345. **NOTHING TO PLOT.**

NOTE: INCLUSIONARY HOUSING CREDITS ASSIGNMENT IN CONNECTION WITH THE ABOVE AGREEMENT RECORDED MAY 17, 2012 UNDER RECEPTION NO. 818854. MEMORANDUM OF UNDERSTANDING RECORDED JULY 18, 2013 UNDER RECEPTION NO. 838187

15. (THIS ITEM WAS INTENTIONALLY DELETED) **NOTHING TO PLOT.**

16. EASEMENTS AND NOTES AS SHOWN ON THE PLAT FOR GLENWOOD MEADOWS NO. 2, RECORDED AUGUST 9, 2004 UNDER RECEPTION NO. 657439. **PLOTTED HEREON.**

17. EASEMENTS AND NOTES ON THE PLAT OF GLENWOOD MEADOWS NO. 4 RECORDED OCTOBER 28, 2009 UNDER RECEPTION NO. 776958. **UNCLEAR DOCUMENTS, UNABLE TO EVALUATE.**

18. EASEMENTS AND NOTES ON THE PLAT OF GLENWOOD MEADOWS NO. 5 RECORDED MAY 17, 2010 UNDER RECEPTION NO. 818851. **PLOTTED HEREON.**

19. EASEMENTS AND NOTES ON THE PLAT OF GLENWOOD MEADOWS NO. 4 - LOT LINE ADJUSTMENT RECORDED MARCH 13, 2012 UNDER RECEPTION NO. 815777. **PLOTTED HEREON.**

20. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN AGREEMENT RECORDED JUNE 29, 2012 UNDER RECEPTION NO. 820756. **NOTHING TO PLOT.**

21. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN AGREEMENT RECORDED JUNE 29, 2012 UNDER RECEPTION NO. 820755. **NOTHING TO PLOT.**

22. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN RECIPROCAL EASEMENT AGREEMENT RECORDED MAY 17, 2012 UNDER RECEPTION 818857. **NOTHING TO PLOT.**

EASEMENT MODIFICATION RECORDED MAY 18, 2017 UNDER RECEPTION NO. 892528.

23. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN ACCESS AND MAINTENANCE AGREEMENT RECORDED MAY 17, 2012 UNDER RECEPTION 818859. **PLOTTED HEREON.**

24. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN DEVELOPMENT AGREEMENT RECORDED MAY 17, 2012 UNDER RECEPTION NO. 818856 AND AMENDMENT RECORDED MAY 18, 2017 AT RECEPTION NO. 892527. **NOTHING TO PLOT.**

25. (THIS ITEM WAS INTENTIONALLY DELETED). **NOTHING TO PLOT.**

26. (THIS ITEM WAS INTENTIONALLY DELETED). **NOTHING TO PLOT.**

27. EASEMENTS AND NOTES ON THE PLAT OF GLENWOOD MEADOWS NO. 6 RECORDED SEPTEMBER 7, 2017 UNDER RECEPTION NO. 897037. **PLOTTED HEREON.**

28. (THIS ITEM WAS INTENTIONALLY DELETED). **NOTHING TO PLOT.**

LEGAL DESCRIPTION:

PARCEL A:

****
NOTE: THE FOLLOWING LEGAL DESCRIPTION IS PRELIMINARY AND IS SUBJECT TO CHANGE UPON COMPLIANCE WITH THE REQUIREMENTS UNDER SCHEDULE B-1, HEREIN.
****

LOTS 11C-B AND 11C-C, GLENWOOD MEADOWS FILING NO. 6, ACCORDING TO THE PLAT THEREOF RECORDED SEPTEMBER 7, 2017 AT RECEPTION NO. 897037
COUNTY OF GARFIELD, STATE OF COLORADO

PARCEL B:

EASEMENTS FOR UTILITIES, DRAINAGE AND ACCESS AS DESCRIBED AND DEPICTED IN RECIPROCAL EASEMENT AGREEMENT RECORDED MAY 5, 17, 2012 UNDER RECEPTION NO. 818857 AND FIRST AMENDMENTS TO RECIPROCAL EASEMENT AGREEMENT RECORDED MAY 18, 2017 UNDER RECEPTION NO. 892528.

SURVEYOR'S CERTIFICATE:

TO:
BLD GROUP, LLC,
ALPINE BANK,
AND LAND TITLE GUARANTEE COMPANY
OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY

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, 6(B), 8, 11, 13, 14, 16, 17, 18, AND 19 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON MARCH 28, 2020 DATE OF PLAT OR MAP: SEPTEMBER 2-8, 2020.

COLORADO REGISTERED JEFFREY ALLEN TUTTLE 33638 PROFESSIONAL LAND SURVEYOR

09/16/2020
JEFFREY ALLEN TUTTLE L.S. 33638 — DATE

NOTICE: ACCORDING TO COLORADO LAW, YOU **MUST** COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER 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.

TUTTLE SURVEYING SERVICES
923 COOPER AVENUE
GLENWOOD SPRINGS, COLORADO 81601
(970) 928-9708 (FAX 947-9007)
Email- jeff@tss-us.com

TUTTLE SURVEYING SERVICES

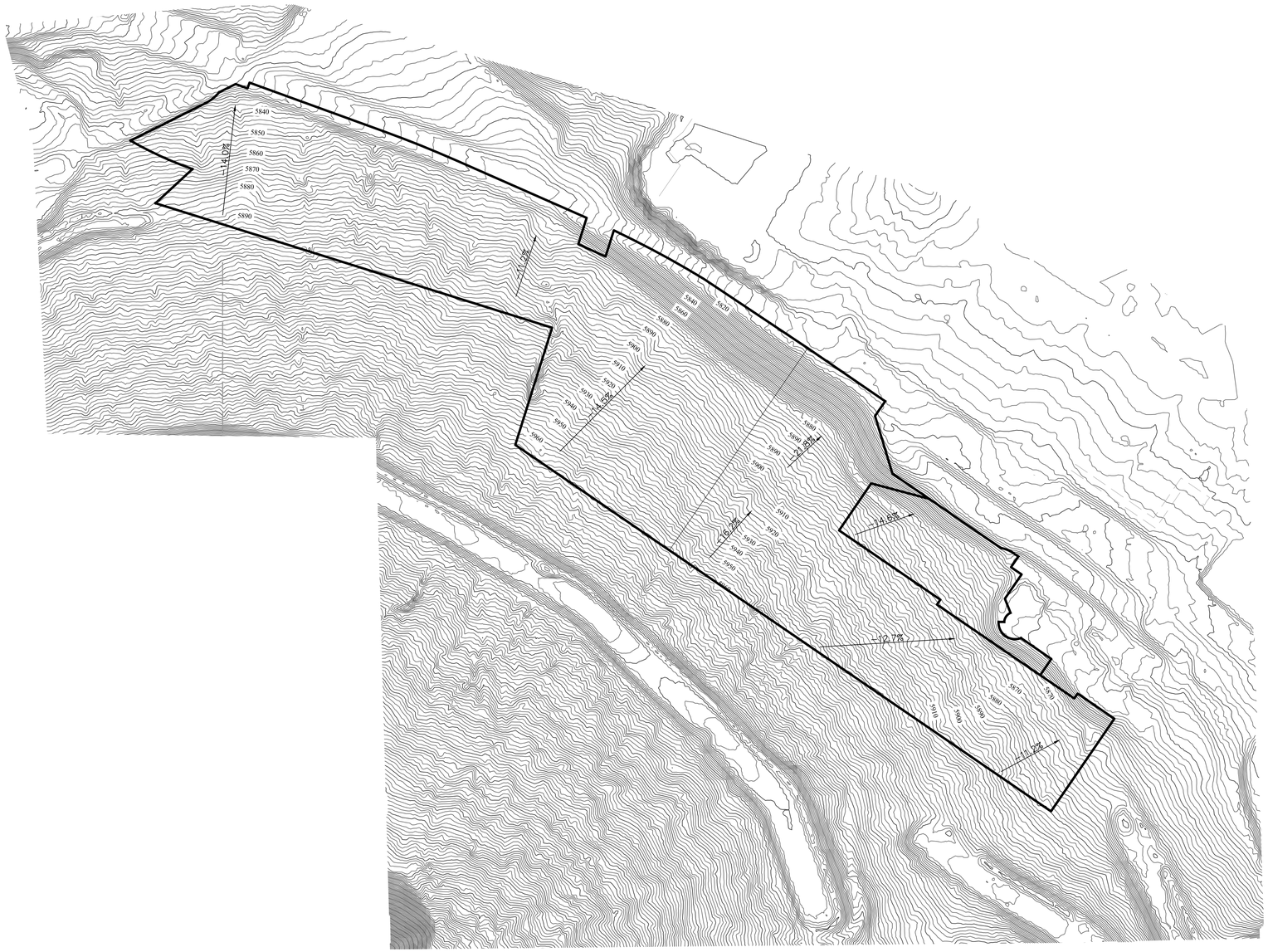
ALTA/ACSM LAND TITLE SURVEY

TBD GLENWOOD MEADOWS
GLENWOOD SPRINGS, CO 81647

DRAWN BY: JG
DATE: 09/16/2020

ALTA/ACSM LAND TITLE SURVEY

LOTS 11C-B AND 11C-C, GLENWOOD MEADOWS FILING NO. 6, ACCORDING TO THE PLAT THEREOF
RECORDED SEPTEMBER 7, 2017 AT RECEPTION NO. 897037
A PORTION OF THE NORTHEAST ¼ OF SECTION 8, TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE 6TH P.M.
CITY OF GLENWOOD SPRINGS, COUNTY OF GARFIELD, STATE OF COLORADO



GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

NOTES:

CONTOUR DATA OBTAINED FROM US GEOLOGICAL SURVEY 2017 DATA,
STATE PLAIN NAD 83 CENTRAL ZONE. FIELD VERIFICATION MAY BE NECESSARY
IN AREAS CRITICAL TO DESIGN.

SURVEYOR'S CERTIFICATE:

TO:
BLD GROUP, LLC,
ALPINE BANK,
AND LAND TITLE GUARANTEE COMPANY
OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY

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, 6(B), 8, 11, 13, 14, 16, 17, 18, AND 19 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON MARCH 28, 2020
DATE OF PLAT OR MAP: SEPTEMBER 2-8, 2020.

COLORADO REGISTERED JEFFREY ALLEN TUTTLE 33638 PROFESSIONAL LAND SURVEYOR

JEFFREY ALLEN TUTTLE L.S. 33638 — 09/16/2020 DATE

NOTICE: ACCORDING TO COLORADO LAW, YOU **MUST** COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER 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.

TUTTLE SURVEYING SERVICES
923 COOPER AVENUE
GLENWOOD SPRINGS, COLORADO 81601
(970) 928-9708 (FAX 947-9007)
Email- jeff@tss-us.com
TUTTLE SURVEYING SERVICES

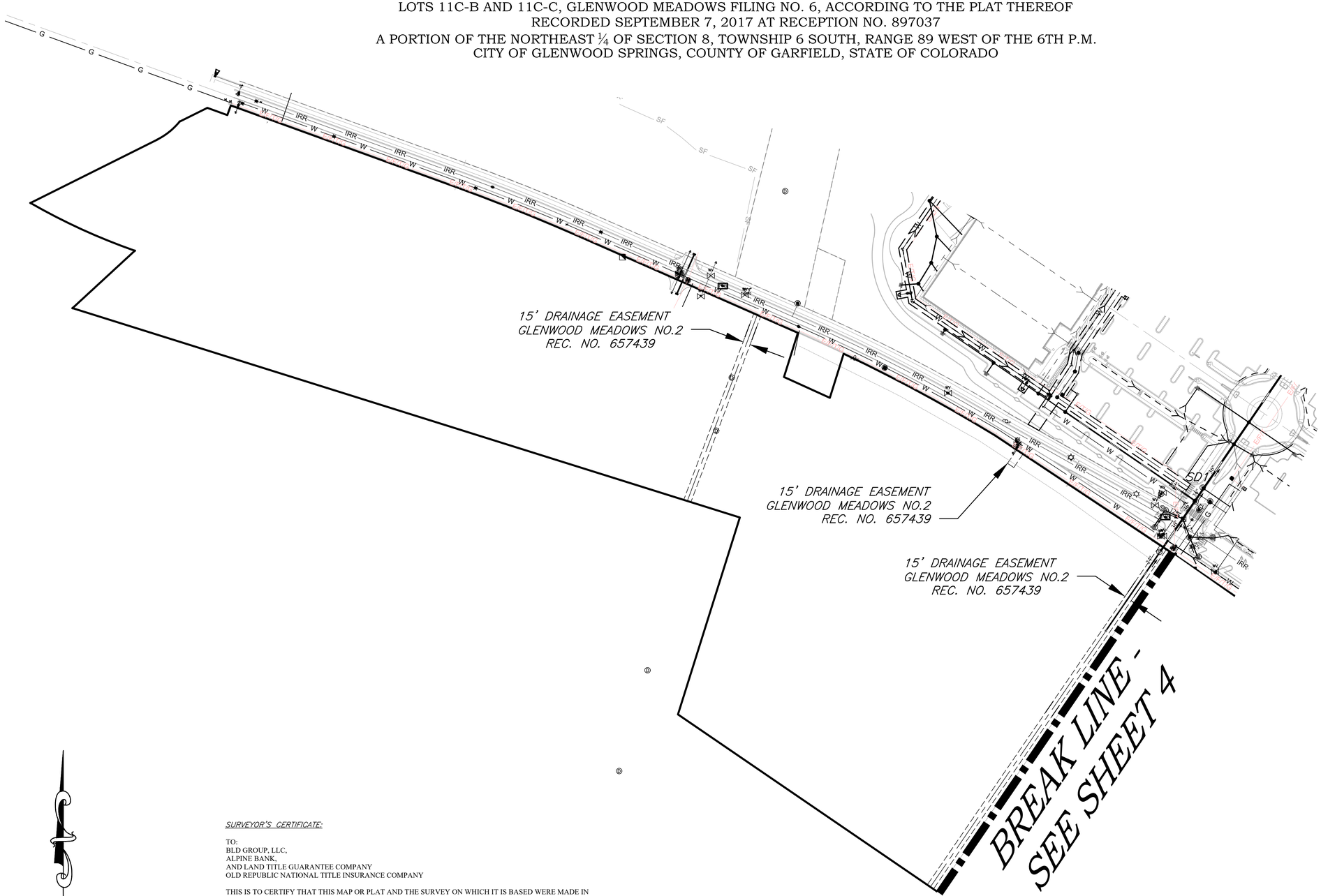
ALTA/ACSM LAND TITLE SURVEY

TBD GLENWOOD MEADOWS
GLENWOOD SPRINGS, CO 81647

DRAWN BY: JG
DATE: 09/16/2020

ALTA/ACSM LAND TITLE SURVEY

LOTS 11C-B AND 11C-C, GLENWOOD MEADOWS FILING NO. 6, ACCORDING TO THE PLAT THEREOF
RECORDED SEPTEMBER 7, 2017 AT RECEPTION NO. 897037
A PORTION OF THE NORTHEAST ¼ OF SECTION 8, TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE 6TH P.M.
CITY OF GLENWOOD SPRINGS, COUNTY OF GARFIELD, STATE OF COLORADO



LEGEND

- TV PEDESTAL
- ELECTRICAL TRANS
- CLEAN–OUT
- WATER VALVE
- TELE. PEDESTAL
- ELEC. PEDESTAL
- SET #5 REBAR & CAP L.S. NO. 33638
- FOUND PROPERTY CORNER AS DESCRIBED
- UTILITY POLE/ POWER POLE
- ANCHOR
- TELE. VAULT
- ELECT. VAULT
- LIGHT POLE
- MARKER/ SIGN
- HANDICAP
- FIRE HYDRANT
- WATER SHUTOFF
- GAS VALVE
- SAN. SEWER MH
- ST. SEWER MH
- ELECT. MH
- TELEPHONE MH
- WATER MH
- WATER METER
- GAS METER
- ELECTRICAL METER
- STORM GRATE
- ELECTRIC MARKER
- GAS MARKER
- IRRIGATION VALVE BOX

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

SURVEYOR'S CERTIFICATE:

TO:
BLD GROUP, LLC,
ALPINE BANK,
AND LAND TITLE GUARANTEE COMPANY
OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY

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, 6(B), 8, 11, 13, 14, 16, 17, 18, AND 19 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON MARCH 28, 2020 DATE OF PLAT OR MAP: SEPTEMBER 2-8, 2020.

COLORADO REGISTERED JEFFREY ALLEN TUTTLE 33638 PROFESSIONAL LAND SURVEYOR

09/16/2020
JEFFREY ALLEN TUTTLE L.S. 33638 — DATE

NOTICE: ACCORDING TO COLORADO LAW, YOU **MUST** COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER 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.

TUTTLE SURVEYING SERVICES
923 COOPER AVENUE
GLENWOOD SPRINGS, COLORADO 81601
(970) 928–9708 (FAX 947–9007)
Email– jeff@tss–us.com

TUTTLE SURVEYING SERVICES

ALTA/ACSM LAND TITLE SURVEY

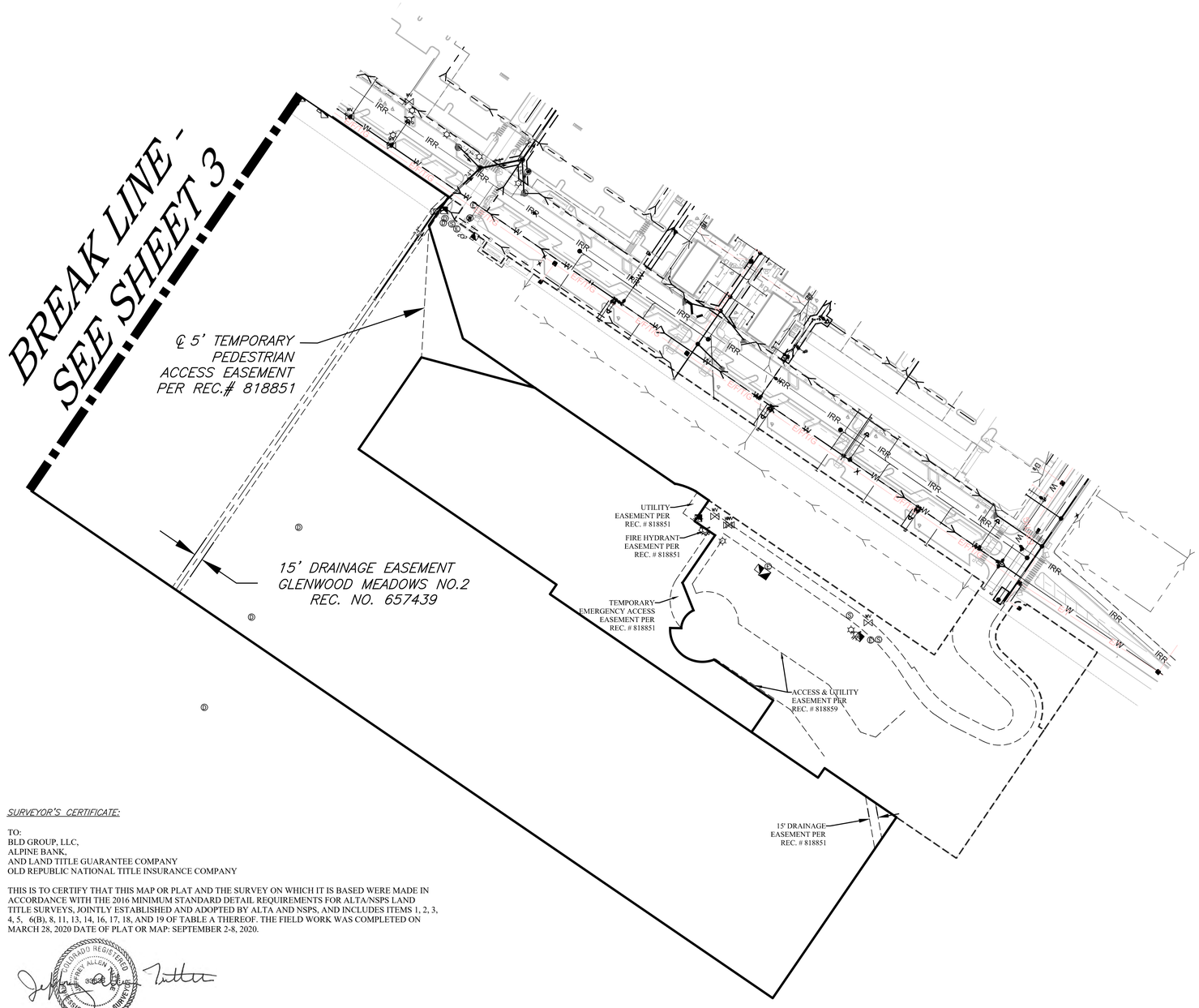
TBD GLENWOOD MEADOWS
GLENWOOD SPRINGS, CO 81647

DRAWN BY: JG
DATE: 09/16/2020

3 OF 4

ALTA/ACSM LAND TITLE SURVEY

LOTS 11C-B AND 11C-C, GLENWOOD MEADOWS FILING NO. 6, ACCORDING TO THE PLAT THEREOF
RECORDED SEPTEMBER 7, 2017 AT RECEPTION NO. 897037
A PORTION OF THE NORTHEAST ¼ OF SECTION 8, TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE 6TH P.M.
CITY OF GLENWOOD SPRINGS, COUNTY OF GARFIELD, STATE OF COLORADO



LEGEND

- TV PEDESTAL
- ELECTRICAL TRANS
- CLEAN–OUT
- WATER VALVE
- TELE. PEDESTAL
- ELEC. PEDESTAL
- SET #5 REBAR & CAP L.S. NO. 33638
- FOUND PROPERTY CORNER AS DESCRIBED
- UTILITY POLE/ POWER POLE
- ANCHOR
- TELE. VAULT
- ELECT. VAULT
- LIGHT POLE
- MARKER/ SIGN
- HANDICAP
- FIRE HYDRANT
- WATER SHUTOFF
- GAS VALVE
- SAN. SEWER MH
- ST. SEWER MH
- ELECT. MH
- TELEPHONE MH
- WATER MH
- WATER METER
- GAS METER
- ELECTRICAL METER
- STORM GRATE
- ELECTRIC MARKER
- GAS MARKER
- IRRIGATION VALVE BOX

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

SURVEYOR'S CERTIFICATE:

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AND LAND TITLE GUARANTEE COMPANY
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COLORADO REGISTERED JEFFREY ALLEN TUTTLE 33638 PROFESSIONAL LAND SURVEYOR

JEFFREY ALLEN TUTTLE L.S. 33638 — 09/16/2020 DATE

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TUTTLE SURVEYING SERVICES

ALTA/ACSM LAND TITLE SURVEY

TBD GLENWOOD MEADOWS
GLENWOOD SPRINGS, CO 81647

DRAWN BY: JG
DATE: 09/16/2020

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

PRELIMINARY
NOT FOR
CONSTRUCTION

WULFSOHN RD.

INSTALL NEW LOT 14 CURB CUT
ACROSS FORM PROPOSED ACCESS

EXISTING CURB CUT TO BE REMOVED.
INSTALL 74–LF, 24–IN STANDARD
CURB & GUTTER.
EXISTING UTILITY STUBS TO REMAIN

TW: 5887.68
BW: 5882.68

TW: 5893.15
BW: 5888.03

TW: 5882.68
BW: 5876.68

TW: 5886.47
BW: 5880.58

TW: 5883.94
BW: 5878.01

TW: 5881.44
BW: 5877.32

TW: 5912.01
BW: 5906.23

TW: 5917.85
BW: 5915.77

TW: 5923.68
BW: 5919.24

TW: 5938.20
BW: 5934.75

TW: 5938.72
BW: 5923.16

TW: 5919.18
BW: 5917.85

TW: 5922.03
BW: 5919.99

TW: 5940.21
BW: 5938.75

TW: 5928.46
BW: 5928.72

TW: 5945.11
BW: 5941.65

TW: 5944.85
BW: 5938.85

TW: 5938.34
BW: 5932.34

LEGEND

	EXISTING	PROPOSED
	STORM MANHOLE	WATER SHUTOFF VALVE
	SANITARY CLEAN–OUT	WATER VALVE
	SANITARY MANHOLE	TEE W/THRUST BLOCK
	FIRE HYDRANT	BEND W/THRUST BLOCK
	WATER VALVE	FIRE HYDRANT
	WATER MANHOLE	INLET
	GAS METER	CURB INLET
	TELEPHONE PEDESTAL	STORM MANHOLE
	LIGHT POLE	SANITARY MANHOLE
	UTILITY POLE	SANITARY CLEANOUT
	SIGN	CABLE MANHOLE
		ELECTRIC MANHOLE
		ELECTRIC TRANSFORMER
BOUNDARY		
RIGHT–OF–WAY		
EASEMENT		
STRUCTURE		
ASPHALT		
GRAVEL		
CONCRETE		
RETAINING WALL		
CENTERLINE ROAD		
CURB AND GUTTER		
FLOWLINE		
PAVEMENT STRIPING		
WATER MAIN	W	W
WATER SERVICE		WS
SEWER MAIN	SS	S
SEWER SERVICE	SS SS	SS SS
OVERHEAD ELECTRIC	OE	
ELECTRIC	E	E
CATV	CTV	C
TELEPHONE	T	T
GAS	G	G
STORM SEWER		
CONTOUR	6158	6158

NOTES

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3. CONTOUR INFORMATION OBTAINED FROM US GEOLOGICAL SURVEY 2017 DATA, STATE PLANE NAD 83 CENTRAL ZONE. FIELD VERIFICATION MAY BE NECESSARY IN AREAS CRITICAL TO DESIGN.

COLORADO 811
CALL BEFORE
YOU DIG
Utility Notification
Center of Colorado

NO.	DATE	REVISION	BY
1	12/11/20	MAJOR SITE / ARCH. REVIEW	MGG
2	1/22/21	MAJOR SITE / ARCH. REVIEW #2	MGG
3	7/2/21	MAJOR SITE / ARCH. REVIEW #3	MGG
4	8/13/21	MAJOR SITE / ARCH. REVIEW #4	MGG

DRAWN BY: MGG
CHECKED BY: MGG
DATE: 8/13/2021
FILE:
SCALE 1" = 40'

HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101,
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 · FAX (970) 945-2555
WWW.HCENG.COM

BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

PRELIMINARY GRADING PLAN
SHEET 1

PROJECT NO.
2201044.00

GR1

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

PRELIMINARY NOT FOR CONSTRUCTION

COLORADO 811 CALL BEFORE YOU DIG
Utility Notification Center of Colorado

LEGEND

	EXISTING	PROPOSED
	STORM MANHOLE	WATER SHUTOFF VALVE
	SANITARY CLEAN-OUT	WATER VALVE
	SANITARY MANHOLE	TEE W/THRUST BLOCK
	FIRE HYDRANT	BEND W/THRUST BLOCK
	WATER VALVE	FIRE HYDRANT
	WATER MANHOLE	INLET
	GAS METER	CURB INLET
	TELEPHONE PEDESTAL	STORM MANHOLE
	LIGHT POLE	SANITARY MANHOLE
	UTILITY POLE	SANITARY CLEANOUT
	SIGN	CABLE MANHOLE
		ELECTRIC MANHOLE
		ELECTRIC TRANSFORMER
BOUNDARY		
RIGHT-OF-WAY		
EASEMENT		
STRUCTURE		
ASPHALT		
GRAVEL		
CONCRETE		
RETAINING WALL		
CENTERLINE ROAD		
CURB AND GUTTER		
FLOWLINE		
PAVEMENT STRIPING		
WATER MAIN	W	W
WATER SERVICE		WS
SEWER MAIN	SS	S
SEWER SERVICE	SS SS	SS SS
OVERHEAD ELECTRIC	OE	
ELECTRIC	E	E
CATV	CTV	C
TELEPHONE	T	T
GAS	G	G
STORM SEWER		
CONTOUR	6158	6158

NOTES:

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3. CONTOUR INFORMATION OBTAINED FROM US GEOLOGICAL SURVEY 2017 DATA, STATE PLANE NAD 83 CENTRAL ZONE. FIELD VERIFICATION MAY BE NECESSARY IN AREAS CRITICAL TO DESIGN.

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4	8/13/21	MAJOR SITE / ARCH. REVIEW #4	MGG

DRAWN BY: MGG
CHECKED BY: MGG
DATE:
FILE: SCALE 1" = 40'

HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101,
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 · FAX (970) 945-2555
WWW.HCENG.COM

BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

PRELIMINARY GRADING PLAN
SHEET 2

PROJECT NO.
2201044.00

GR2

PRELIMINARY
NOT FOR
CONSTRUCTION

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

WULFSOHN RD.

CONNECT TO EXISTING IRRIGATION MAIN PER CITY OF GLENWOOD SPRINGS STANDARDS

CONNECT TO EXISTING WATERMAIN PER CITY OF GLENWOOD SPRINGS STANDARDS

EXISTING WATERMAIN STUBS TO BE ABANDONED PER CITY OF GLENWOOD SPRINGS STANDARDS

EXISTING IRRIGATION STUBS TO BE ABANDONED PER CITY OF GLENWOOD SPRINGS STANDARDS

INSTALL NEW MANHOLE ON EXISTING STORM SEWER

249.99'–12" HDPE @ 2.31%

EXISTING CURB CUT TO BE REMOVED

24.06'–12" HDPE @ 1.00%

12.19'–15" HDPE @ 19.23%

CONNECT TO EXISTING STORM SEWER STRUCTURE

116.60'–15" HDPE @ 17.79%

14.00'–12" HDPE @ 2.00%

229.99'–12" HDPE @ 0.75%

229.98'–12" HDPE @ 0.75%

14.00'–12" HDPE @ 2.00%

14.00'–12" HDPE @ 5.70%

EXISTING 24" STORM PIPE "1B"

INSTALL MANHOLE ON EXISTING STORM SEWER

144.48'

134.80'–12" HDPE @ 4.00%

333.20'–12" HDPE @ 1.09%

333.20'–12" HDPE @ 1.09%

400.00'–8" PVC @ 1.10%

227.44'–8" PVC @ 1.10%

8" D.I.P. WATER MAIN

SAN–MH8

SAN–MH7

63.43'–12" HDPE @ 2.24%

24.00'–12" HDPE @ 1.00%

141.58'–12" HDPE @ 6.97%

62.32'–12" HDPE @ 3.62%

24.00'–12" HDPE

11.0' TYP.
10. MIN.

6" PVC SANITARY SERVICE, TYP.

6" D.I.P. WATER SERVICE, TYP.

51.17'–12" HDPE @ 4.12%

260.75'–8" PVC @ 1.13%

8" D.I.P. WATER MAIN

SAN–MH14

95.95'–12" HDPE @ 9.05%

116.56'–12" HDPE @ 10.77%

COMBINED FIRE/DOMESTIC WATER SERVICE CONNECTIONS TO BE NFPA24 COMPLIANT, TYP.

EXISTING STORM SEWER TO BE ABANDONED/REMOVED

INSTALL MANHOLE ON EXISTING STORM SEWER

LEGEND

EXISTING	PROPOSED
STORM MANHOLE	WATER SHUTOFF VALVE
SANITARY CLEAN–OUT	WATER VALVE
SANITARY MANHOLE	TEE W/THRUST BLOCK
FIRE HYDRANT	BEND W/THRUST BLOCK
WATER VALVE	FIRE HYDRANT
WATER MANHOLE	INLET
GAS METER	CURB INLET
TELEPHONE PEDESTAL	STORM MANHOLE
LIGHT POLE	SANITARY CLEANOUT
UTILITY POLE	CABLE MANHOLE
SIGN	ELECTRIC VAULT
	ELECTRIC TRANSFORMER

BOUNDARY
RIGHT–OF–WAY
EASEMENT
STRUCTURE
ASPHALT
GRAVEL
CONCRETE
RETAINING WALL
CENTERLINE ROAD
CURB AND GUTTER
FLOWLINE
PAVEMENT STRIPING
WATER MAIN
WATER SERVICE
SEWER MAIN
SEWER SERVICE
OVERHEAD ELECTRIC
ELECTRIC
CATV
TELEPHONE
GAS
IRRIGATION
STORM SEWER

NOTES

1. SURVEY COMPLETED BY TUTTLE SURVEYING SERVICES. REFER TO ALTA/ASCM LAND TITLE SURVEY DATED 10/08/20 FOR EXISTING CONDITIONS INFORMATION. DATE OF SURVEY SEPTEMBER 5–8, 2020.
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4. ALL COMBINED FIRE/DOMESTIC WATER SERVICES SHALL BE NFPA24 COMPLIANT.
5. PUBLICLY DEDICATED UTILITIES SHALL HAVE UTILITY EASEMENT FOR ACCESS AND MAINTENANCE.
6. ALL FIRE HYDRANTS TO HAVE 15' EASEMENT FOR ACCESS AND MAINTENANCE.
7. ALL UTILITY EASEMENTS TO BE SHOW AN FINALIZED ON PERMIT PLANS.
8. ALL WET UTILITIES WILL REQUIRE JOINTS/BELLS WITHIN ENTIRE PROJECT AREA.
9. ALL UNUSED UTILITY STUBS SHALL BE ABANDONED PER COGS STANDARDS.

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Utility Notification Center of Colorado

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DRAWN BY: MGG
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DATE: 8/13/2021
FILE:
SCALE 1" = 40'

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BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

PRELIMINARY UTILITY PLAN
SHEET 1

PROJECT NO.
2201044.00

UT1

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

PRELIMINARY NOT FOR CONSTRUCTION

CONNECT TO IRRIGATION STUB PER CITY OF GLENWOOD SPRINGS STANDARDS

CONNECT TO WATERMAIN STUB PER CITY OF GLENWOOD SPRINGS STANDARDS

EXISTING SANITARY MANHOLE TO BE REMOVED

EXISTING 24" STORM PIPE "1C"

INSTALL MANHOLE ON EXISTING STORM SEWER

8.45'–12" HDPE @ 2.00%

162.17'–12" HDPE @ 1.00%

EXISTING STORM STRUCTURES TO BE REMOVED BETWEEN NEW STORM SEWER, TYP.

62.11'–12" HDPE @ 1.00%

258.98'–12" HDPE @ 1.73%

172.26'–8" PVC @ 0.40%

246.66'–8" PVC @ 0.40%

SAN–MH6

SAN–MH5

SAN–MH3

144.71'–8" PVC @ 4.74%

194.90'–8" PVC @ 5.62%

8" D.I.P. WATER MAIN

SAN–MH4

58.94'–8" PVC @ 4.80%

SAN–MH9

11.0' TYP. 10' MIN.

27.38'–12" HDPE @ 1.00%

172.71'–12" HDPE @ 8.85%

192.09'–8" PVC @ 7.95%

SAN–MH1

57.66'–8" PVC @ 13.94%

173.68'–8" PVC @ 7.21%

INSTALL NEW SANITARY MANHOLE PER CITY OF GLENWOOD SPRINGS STANDARDS

24.04'–12" HDPE @ –1.00%

148.42'–12" HDPE @ –1.00%

SAN–MH2

60.25'–12" HDPE @ –8.63%

CONNECT TO EXISTING STORM INLET PER CITY OF GLENWOOD SPRINGS STANDARDS

24.00'–12" HDPE @ –1.00%

33.20'–8" PVC @ 5.83%

SAN–MH10

42.16'–12" HDPE @ 8.53%

SAN–MH12

216.91'–12" HDPE @ 5.65%

70.74'–12" HDPE @ 0.98%

247.80'–8" PVC @ 1.10%

SAN–MH13

8" D.I.P. WATER MAIN

SAN–MH11

6" PVC SANITARY SERVICE, TYP.

EXISTING STORM PIPE TO BE ABANDONED/REMOVED, TYP.

16" D.I.P. WATER SERVICE, TYP.

184.67'–12" HDPE @ 3.14%

24.00'–12" HDPE @ 1.00%

45.18'–12" HDPE @ 1.00%

8" D.I.P. WATER MAIN

234.00'–12" HDPE @ –5.00%

200.51'–12" HDPE @ 10.33%

28.24'–12" HDPE @ 8.33%

48.69'–12" HDPE @ 2.00%

COMBINED FIRE/DOMESTIC WATER SERVICE CONNECTIONS TO BE NFPA24 COMPLIANT, TYP.

60.33'–12" HDPE @ 12.31%

93.82'–12" HDPE @ 2.14%

INSTALL MANHOLE ON EXISTING STORM SEWER

EXISTING 12" STORM PIPE

EXISTING 12" STORM PIPE "1C"

LEGEND

	EXISTING	PROPOSED
	STORM MANHOLE	WATER SHUTOFF VALVE
	SANITARY CLEAN–OUT	WATER VALVE
	SANITARY MANHOLE	TEE W/THRUST BLOCK
	FIRE HYDRANT	BEND W/THRUST BLOCK
	WATER VALVE	FIRE HYDRANT
	WATER MANHOLE	INLET
	GAS METER	CURB INLET
	TELEPHONE PEDESTAL	STORM MANHOLE
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	SIGN	CABLE MANHOLE
		ELECTRIC VAULT
		ELECTRIC TRANSFORMER
BOUNDARY		
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GRAVEL		
CONCRETE		
RETAINING WALL		
CENTERLINE ROAD		
CURB AND GUTTER		
FLOWLINE		
PAVEMENT STRIPING		
WATER MAIN	W	W
WATER SERVICE		WS
SEWER MAIN	SS	S
SEWER SERVICE	SS SS	SS SS
OVERHEAD ELECTRIC	OE	
ELECTRIC	E	E
CATV	CTV	C
TELEPHONE	T	T
GAS	G	G
IRRIGATION		IRR
STORM SEWER		

NOTES

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FILE: SCALE 1" = 40'

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GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

PRELIMINARY UTILITY PLAN

SHEET 2

PROJECT NO.
2201044.00

UT2

REMAINDER PARCEL
12.213 ACRES

BUYER'S PARCEL
27.929 ACRES

REMAINDER PARCEL
9.265 ACRES

0' 75' 150' 300'
Scale: 1" = 150'

IMAGES
P:\Contracts\GLENWOOD MEADOWS APARTMENTS-20101\10_DESIGN\Modeling\3_Rendering\20210923 - Updated Renderings\11.jpg
P:\Contracts\GLENWOOD MEADOWS APARTMENTS-20101\10_DESIGN\Modeling\3_Rendering\20210923 - Updated Renderings\12.jpg
P:\Contracts\GLENWOOD MEADOWS APARTMENTS-20101\10_DESIGN\Modeling\3_Rendering\20210923 - Updated Renderings\13.jpg
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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE
2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

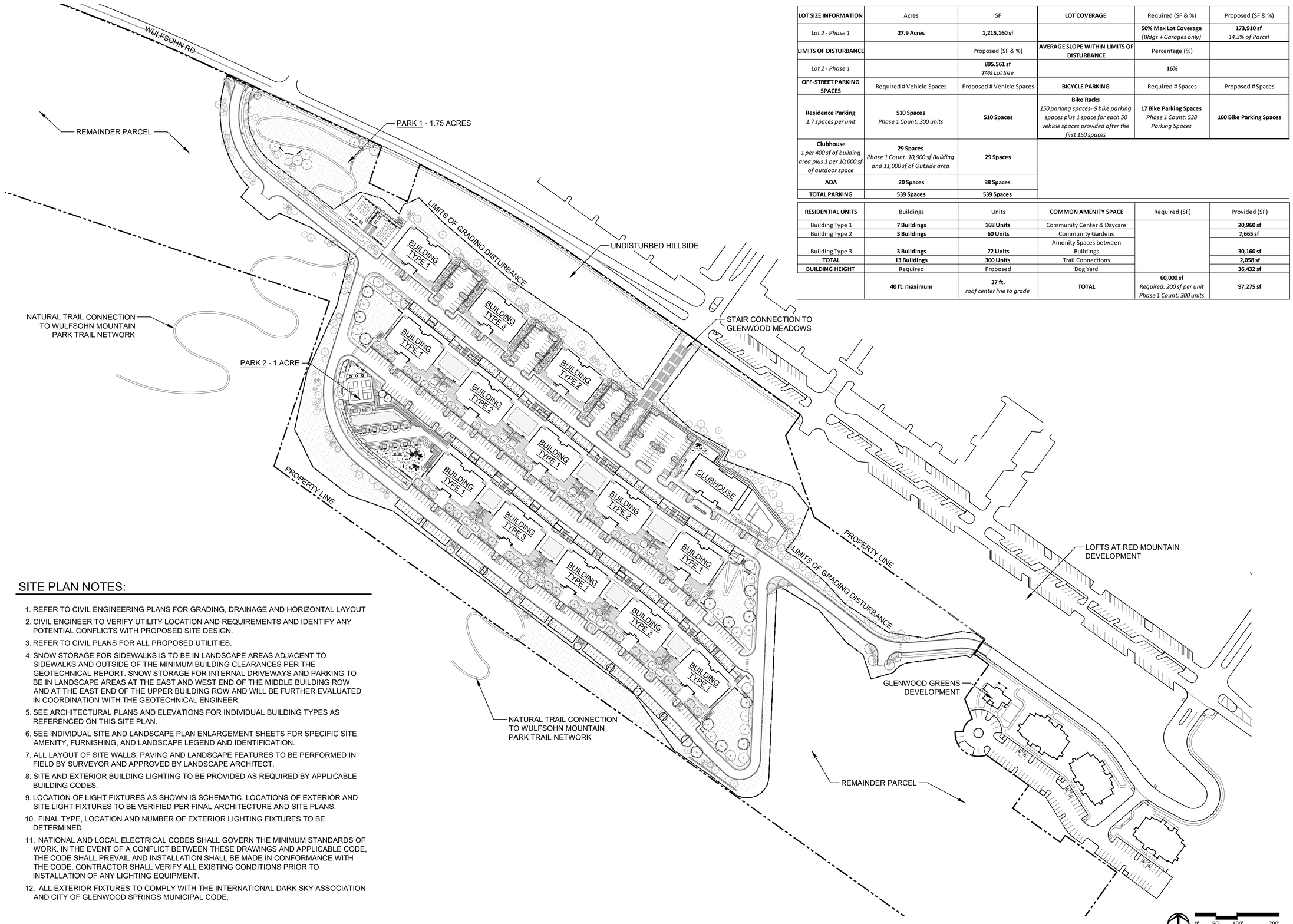
JOB DESCRIPTION:
MAJOR SITE /
ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN

SCALE:

SHEET NUMBER:
L1.0

SHEET_____OF_____



UNIT AND SITE AMENITY DATA:

LOT SIZE INFORMATION	Acres	SF	LOT COVERAGE	Required (SF & %)	Proposed (SF & %)
Lot 2 - Phase 1	**27.9 Acres**	**1,215,160 sf**		**50% Max Lot Coverage** *(Bldgs + Garages only)*	**173,910 sf** *14.3% of Parcel*
LIMITS OF DISTURBANCE		Proposed (SF & %)	**AVERAGE SLOPE WITHIN LIMITS OF DISTURBANCE**	Percentage (%)	
Lot 2 - Phase 1		**895.561 sf** **74%** *Lot Size*		**16%**	
OFF-STREET PARKING SPACES	Required # Vehicle Spaces	Proposed # Vehicle Spaces	**BICYCLE PARKING**	Required # Spaces	Proposed # Spaces
Residence Parking *1.7 spaces per unit*	**510 Spaces** *Phase 1 Count: 300 units*	**510 Spaces**	**Bike Racks** *150 parking spaces- 9 bike parking spaces plus 1 space for each 50 vehicle spaces provided after the first 150 spaces*	**17 Bike Parking Spaces** *Phase 1 Count: 538 Parking Spaces*	**160 Bike Parking Spaces**
Clubhouse *1 per 400 sf of building area plus 1 per 10,000 sf of outdoor space*	**29 Spaces** *Phase 1 Count: 10,900 sf Building and 11,000 sf of Outside area*	**29 Spaces**			
ADA	**20 Spaces**	**38 Spaces**			
TOTAL PARKING	**539 Spaces**	**539 Spaces**			

RESIDENTIAL UNITS	Buildings	Units	COMMON AMENITY SPACE	Required (SF)	Provided (SF)
Building Type 1	**7 Buildings**	**168 Units**	Community Center & Daycare		**20,960 sf**
Building Type 2	**3 Buildings**	**60 Units**	Community Gardens		**7,665 sf**
Building Type 3	**3 Buildings**	**72 Units**	Amenity Spaces between Buildings		**30,160 sf**
TOTAL	**13 Buildings**	**300 Units**	Trail Connections		**2,058 sf**
BUILDING HEIGHT	Required	Proposed	Dog Yard		**36,432 sf**
	40 ft. maximum	**37 ft.** *roof center line to grade*	**TOTAL**	**60,000 sf** *Required: 200 sf per unit Phase 1 Count: 300 units*	**97,275 sf**

SITE PLAN NOTES:

1. REFER TO CIVIL ENGINEERING PLANS FOR GRADING, DRAINAGE AND HORIZONTAL LAYOUT
2. CIVIL ENGINEER TO VERIFY UTILITY LOCATION AND REQUIREMENTS AND IDENTIFY ANY POTENTIAL CONFLICTS WITH PROPOSED SITE DESIGN.
3. REFER TO CIVIL PLANS FOR ALL PROPOSED UTILITIES.
4. SNOW STORAGE FOR SIDEWALKS IS TO BE IN LANDSCAPE AREAS ADJACENT TO SIDEWALKS AND OUTSIDE OF THE MINIMUM BUILDING CLEARANCES PER THE GEOTECHNICAL REPORT. SNOW STORAGE FOR INTERNAL DRIVEWAYS AND PARKING TO BE IN LANDSCAPE AREAS AT THE EAST AND WEST END OF THE MIDDLE BUILDING ROW AND AT THE EAST END OF THE UPPER BUILDING ROW AND WILL BE FURTHER EVALUATED IN COORDINATION WITH THE GEOTECHNICAL ENGINEER.
5. SEE ARCHITECTURAL PLANS AND ELEVATIONS FOR INDIVIDUAL BUILDING TYPES AS REFERENCED ON THIS SITE PLAN.
6. SEE INDIVIDUAL SITE AND LANDSCAPE PLAN ENLARGEMENT SHEETS FOR SPECIFIC SITE AMENITY, FURNISHING, AND LANDSCAPE LEGEND AND IDENTIFICATION.
7. ALL LAYOUT OF SITE WALLS, PAVING AND LANDSCAPE FEATURES TO BE PERFORMED IN FIELD BY SURVEYOR AND APPROVED BY LANDSCAPE ARCHITECT.
8. SITE AND EXTERIOR BUILDING LIGHTING TO BE PROVIDED AS REQUIRED BY APPLICABLE BUILDING CODES.
9. LOCATION OF LIGHT FIXTURES AS SHOWN IS SCHEMATIC. LOCATIONS OF EXTERIOR AND SITE LIGHT FIXTURES TO BE VERIFIED PER FINAL ARCHITECTURE AND SITE PLANS.
10. FINAL TYPE, LOCATION AND NUMBER OF EXTERIOR LIGHTING FIXTURES TO BE DETERMINED.
11. NATIONAL AND LOCAL ELECTRICAL CODES SHALL GOVERN THE MINIMUM STANDARDS OF WORK. IN THE EVENT OF A CONFLICT BETWEEN THESE DRAWINGS AND APPLICABLE CODE, THE CODE SHALL PREVAIL AND INSTALLATION SHALL BE MADE IN CONFORMANCE WITH THE CODE. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO INSTALLATION OF ANY LIGHTING EQUIPMENT.
12. ALL EXTERIOR FIXTURES TO COMPLY WITH THE INTERNATIONAL DARK SKY ASSOCIATION AND CITY OF GLENWOOD SPRINGS MUNICIPAL CODE.

IMAGES
P:\Corrected\GLENWOOD MEADOWS APARTMENTS-2019\9_Land Use Permit Revised\CAD\Sheets\SITE PLAN SUBMITAL.dwg
LAYOUT: SITE PLAN - 11x17
USER: Mark Hall
NAME
Saved: 10/26/2021 10:40:08 AM

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE 2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
DEVELOPMENT AREA SITE PLAN

SCALE:

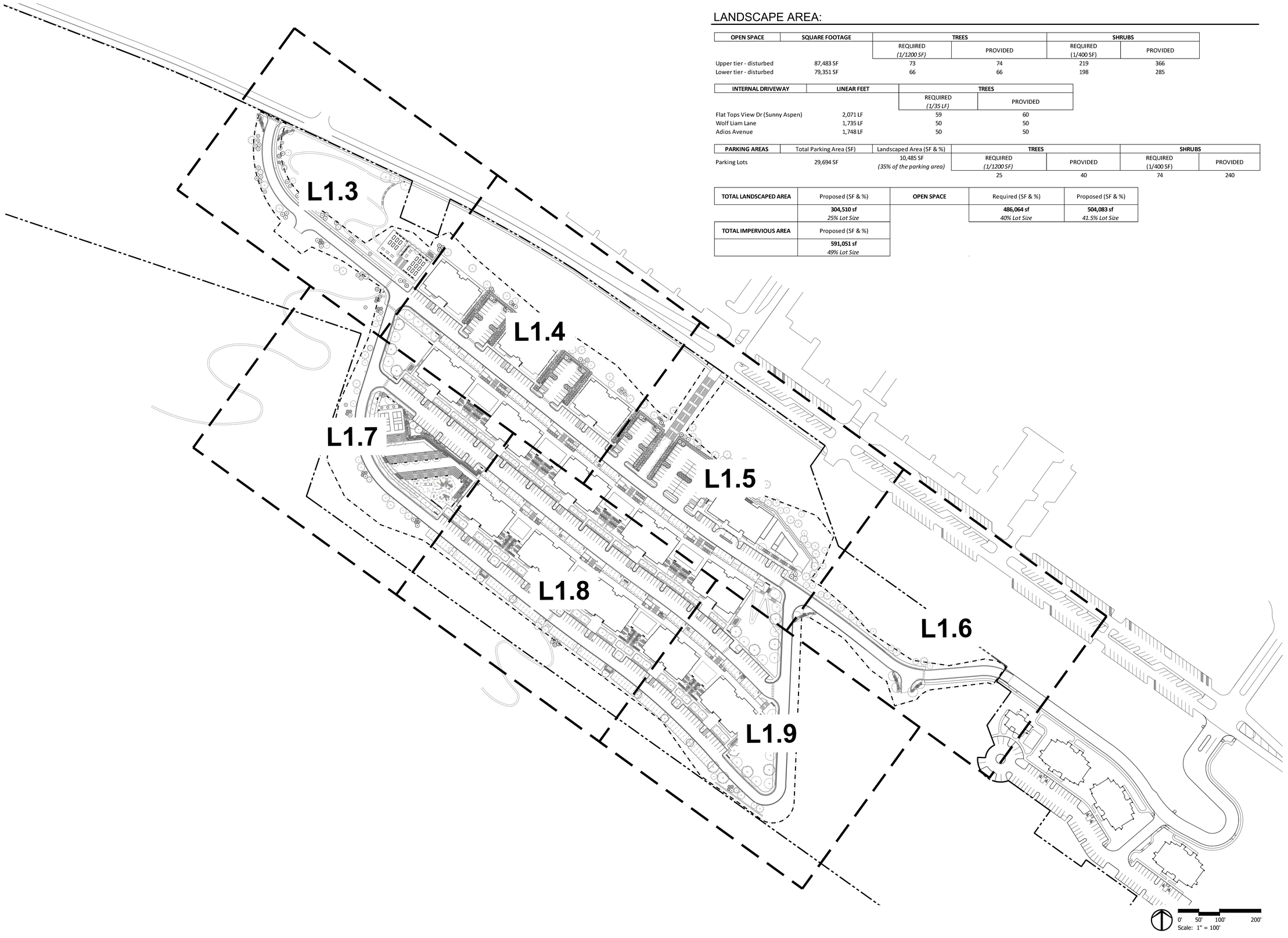
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LANDSCAPE AREA:

OPEN SPACE	SQUARE FOOTAGE	TREES		SHRUBS	
		REQUIRED *(1/1200 SF)*	PROVIDED	REQUIRED (1/400 SF)	PROVIDED
Upper tier - disturbed	87,483 SF	73	74	219	366
Lower tier - disturbed	79,351 SF	66	66	198	285

INTERNAL DRIVEWAY	LINEAR FEET	TREES	
		REQUIRED *(1/35 LF)*	PROVIDED
Flat Tops View Dr (Sunny Aspen)	2,071 LF	59	60
Wolf Liam Lane	1,735 LF	50	50
Adios Avenue	1,748 LF	50	50

PARKING AREAS	Total Parking Area (SF)	Landscaped Area (SF & %)	TREES		SHRUBS	
			REQUIRED *(1/1200 SF)*	PROVIDED	REQUIRED (1/400 SF)	PROVIDED
Parking Lots	29,694 SF	10,485 SF *(35% of the parking area)*	25	40	74	240

TOTAL LANDSCAPED AREA	Proposed (SF & %)	OPEN SPACE	Required (SF & %)	Proposed (SF & %)
	304,510 sf *25% Lot Size*		**486,064 sf** *40% Lot Size*	**504,083 sf** *41.5% Lot Size*

TOTAL IMPERVIOUS AREA	Proposed (SF & %)
	591,051 sf *49% Lot Size*

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE 2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT KEY PLAN

SCALE:

SHEET NUMBER:
L1.2

SHEET_____OF_____

XERIC PERENNIALS / ORNAMENTAL GRASSES ENTRY GARDEN BED

CONNECTION TO EXISTING WULFSOHN CURB CUT

WULFSOHN RD.

PROPERTY LINE

TRASH RECEPTACLE

LOCAL ACCESS TRAILHEAD

STAIR CONNECTION

SOFT SURFACE TRAIL

NATIVE SEED

AC CONDENSING UNTIS

FENCE (6' MAX. HEIGHT)

TERRACED PLANTER

TRASH RECEPTACLES

PARK 1

XERIC PERENNIALS / ORNAMENTAL GRASSES ENTRY GARDEN BED

CRUSHER FINES SEATING AREA

COMMUNITY GARDEN WITH RAISED PLANTER BOXES

RETAINING WALL (6' MAX. HEIGHT)

PROPOSED ROAD; RE: CIVIL

CRUSHER FINES

PICNIC TABLE

PARK BENCH

ADA ACCESSIBLE COMMUNITY GARDEN

REMAINDER PARCEL

STREET LIGHT TYP.

MATCHLINE: REFERENCE SHEET L1.4

LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING DISTURBANCE
- SITE WALL
- PARK BENCH
- TRASH RECEPTACLE
- DOG WASTE STATION
- PICNIC TABLE
- BIKE RACK
- ENCLOSED DUMPSTER
- STREET LIGHT
- WALL MOUNTED LIGHT
- BOLLARD LIGHT
- EVERGREEN TREES
- DECIDUOUS TREES
- ORNAMENTAL TREES
- SHRUBS
- NATIVE TREES / SHRUBS
- XERIC PERENNIALS AND ORNAMENTAL GRASSES
- NATIVE SEED MIX
- ARTIFICIAL TURF
- ROCK MULCH

NATIVE SHRUBS / SMALL TREES

SIGHT TRIANGLES; PER: CIVIL

CROSSWALK

TRASH RECEPTACLE

LOCAL ACCESS TRAILHEAD

NATIVE SHRUBS / SMALL TREES

DOG WASTE STATION

TRAILHEAD KIOSK

LIMITS OF GRADING DISTURBANCE

NATURAL TRAIL CONNECTION TO WULFSOHN MOUNTAIN PARK TRAIL NETWORK

0' 10' 20' 40'

Scale: 1" = 20'

IMAGES
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LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE 2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

SHEET NUMBER:
L1.3

SHEET_____OF_____

WULFSOHN RD.

PROPERTY LINE

WULFSOHN SIDEWALK

NATIVE SEED

EXISTING LANDSCAPE TO REMAIN

LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING DISTURBANCE
- SITE WALL
- PARK BENCH
- TRASH RECEPTACLE
- DOG WASTE STATION
- PICNIC TABLE
- BIKE RACK
- ENCLOSED DUMPSTER
- STREET LIGHT
- WALL MOUNTED LIGHT
- BOLLARD LIGHT
- EVERGREEN TREES
- DECIDUOUS TREES
- ORNAMENTAL TREES
- SHRUBS
- NATIVE TREES / SHRUBS
- XERIC PERENNIALS AND ORNAMENTAL GRASSES
- NATIVE SEED MIX
- ARTIFICIAL TURF
- ROCK MULCH

LIMITS OF GRADING DISTURBANCE

NATIVE TREES AND SHRUBS TO SCREEN RETAINING WALLS AT PARKING

NATIVE TREES AND SHRUBS TYP.

NATIVE REVEGETATION AREA

NATIVE TREES AND SHRUBS TYP.

MATCHLINE: REFERENCE SHEET L1.3

SIDEWALK

RETAINING WALL (6' MAX. HEIGHT)

AC CONDENSING UNITS

BUILDING TYPE 1

DOUBLE ROW OF SHRUBS, TRIANGULAR SPACING TYP.

ROCK MULCH TYP.

BIKE RACK

RESIDENT PARKING LOT

19'-0" TYP.

9'-0" TYP.

SIDEWALK

STREET LIGHT TYP.

SIGHT TRIANGLES; PER: CIVIL

MAILBOXES

STREET PARKING

ROCK MULCH TYP.

BUILDING TYPE 3

MOUNTED STREETLIGHT TYP.

ENCLOSED BICYCLE PARKING AREA

SHRUBS TO SCREEN DUMPSTERS TYP.

COVERED GARAGE / PARKING BELOW; RE: ARCH

RETAINING WALL (6' MAX. HEIGHT)

STAIRCASE

DOG WASTE STATION

SIDEWALK

BOLLARD LIGHT TYP.

PARK BENCH

DOG YARD

RETAINING WALL (6' MAX. HEIGHT)

STAIRCASE

BUILDING TYPE 1

ARTIFICIAL TURF

SIDEWALK

RETAINING WALL (6' MAX. HEIGHT)

AC CONDENSING UNITS

19'-0" TYP.

9'-0" TYP.

BIKE RACK

RESIDENT PARKING LOT

STREETLIGHT TYP.

11'-0" TYP.

WALL MOUNTED STREET LIGHT TYP.

ENCLOSED BICYCLE PARKING AREA

DUMPSTER ENCLOSURE

TERRACED PLANTERS

COVERED GARAGE / PARKING BELOW; RE: ARCH

ROCK MULCH TYP.

BUILDING TYPE 2

ARTIFICIAL TURF

DOUBLE ROW OF SHRUBS, TRIANGULAR SPACING TYP.

SIDEWALK

ROCK MULCH TYP.

BUILDING TYPE 2

BUILDING TYPE 1

MATCHLINE: REFERENCE SHEET L1.5

MATCHLINE: REFERENCE SHEET L1.7

MATCHLINE: REFERENCE SHEET L1.8

N

0' 10' 20' 40'

Scale: 1" = 20'

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SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

SHEET NUMBER:
L1.4

SHEET____OF____

WULFSOHN RD.

WULFSOHN SIDEWALK

ENTRY PLANTING WITH XERIC PERENNIALS AND ORNAMENTAL GRASSES

NATIVE SEED

PLANTER TYP.

BOLLARD LIGHT TYP.

STAIRCASE

LIMITS OF GRADING DISTURBANCE

XERIC PERENNIALS AND ORNAMENTAL GRASSES

EXISTING LANDSCAPE TO REMAIN

PROPERTY LINE

RETAINING WALL (6' MAX. HEIGHT)

CLUBHOUSE / DAYCARE PARKING LOT

DAYCARE PLAYGROUND (AGES 2-5)

FENCE (6' MAX. HEIGHT)

AC CONDENSING UNITS

RETAINING WALL (6' MAX. HEIGHT)

NATIVE TREES AND SHRUBS TYP.

POOL DECK

FENCE (6' MAX. HEIGHT)

RESIDENT PARKING LOT

19'-0" TYP.

9'-0" TYP.

19'-0" TYP.

9'-0" TYP.

11'-0" TYP.

39'-0"

38'-0"

19'-0"

9'-0" TYP.

13'-6"

38'-0"

DOUBLE ROW OF SHRUBS, TRIANGULAR SPACING TYP.

CLUBHOUSE

GATE

MAILBOXES

BIKE RACK

BIKE RACK

POOL

SPA

19'-0" TYP.

30'-4"

9'-0" TYP.

33'-6"

CLUBHOUSE AND DAYCARE COVERED DROP OFF AREA

19'-0" TYP.

9'-0" TYP.

9'-0" TYP.

19'-0" TYP.

SIGHT TRIANGLES; PER: CIVIL

SIGHT TRIANGLES; PER: CIVIL

SIDEWALK

MAILBOXES

ENTRY PLANTING WITH ORNAMENTAL SHRUBS, XERIC PERENNIALS, AND ORNAMENTAL GRASSES

GARAGE / PARKING BELOW; RE: ARCH

ENCLOSED BICYCLE PARKING AREA

ENCLOSED BICYCLE PARKING AREA

ENCLOSED BICYCLE PARKING AREA

BOLLARD LIGHT TYP.

COVERED GARAGE / PARKING BELOW; RE: ARCH

RETAINING WALL (6' MAX. HEIGHT)

COVERED GARAGE / PARKING BELOW; RE: ARCH

TERRACED PLANTERS

DOG WASTE STATION

ROCK MULCH TYP.

RETAINING WALL (6' MAX. HEIGHT)

BUILDING TYPE 1

ARTIFICIAL TURF

BUILDING TYPE 2

ARTIFICIAL TURF

BUILDING TYPE 1

MATCHLINE: REFERENCE SHEET L1.4

MATCHLINE: REFERENCE SHEET L1.6

MATCHLINE: REFERENCE SHEET L1.8

MATCHLINE: REFERENCE SHEET L1.9

0' 10' 20' 40'

Scale: 1" = 20'

LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING DISTURBANCE
- SITE WALL
- PARK BENCH
- TRASH RECEPTACLE
- DOG WASTE STATION
- PICNIC TABLE
- BIKE RACK
- ENCLOSED DUMPSTER
- STREET LIGHT
- WALL MOUNTED LIGHT
- BOLLARD LIGHT
- EVERGREEN TREES
- DECIDUOUS TREES
- ORNAMENTAL TREES
- SHRUBS
- NATIVE TREES / SHRUBS
- XERIC PERENNIALS AND ORNAMENTAL GRASSES
- NATIVE SEED MIX
- ARTIFICIAL TURF
- ROCK MULCH

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE: 2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

SHEET NUMBER:
L1.5

SHEET____OF____

LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING DISTURBANCE
- SITE WALL
- PARK BENCH
- TRASH RECEPTACLE
- DOG WASTE STATION
- PICNIC TABLE
- BIKE RACK
- ENCLOSED DUMPSTER
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- DECIDUOUS TREES
- ORNAMENTAL TREES
- SHRUBS
- NATIVE TREES / SHRUBS
- XERIC PERENNIALS AND ORNAMENTAL GRASSES
- NATIVE SEED MIX
- ARTIFICIAL TURF
- ROCK MULCH

MATCHLINE: REFERENCE SHEET L1.5

PROPERTY LINE

EXISTING RED MOUNTAIN LOFTS DEVELOPMENT

UNDISTURBED HILLSIDE

GLENWOOD GREENS DEVELOPMENT

NATIVE TREES AND SHRUBS TYP.

SIDEWALK

STREET LIGHT TYP.

ENTRY ROAD; RE: CIVIL

FUTURE DEVELOPMENT PARCEL

SIGHT TRIANGLES; PER: CIVIL

SIGHT TRIANGLES; PER: CIVIL

ENTRY PLANTING WITH ORNAMENTAL SHRUBS, XERIC PERENNIALS, AND ORNAMENTAL GRASSES

NATIVE SEED

SIGHT TRIANGLES; PER: CIVIL

LIMITS OF GRADING DISTURBANCE

ENTRY PLANTING WITH ORNAMENTAL SHRUBS, XERIC PERENNIALS, AND ORNAMENTAL GRASSES

CONNECTION POINT FOR FUTURE DEVELOPMENT ROAD

MATCHLINE: REFERENCE SHEET L1.9

0' 10' 20' 40'
Scale: 1" = 20'

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REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

SHEET NUMBER:
L1.6

SHEET_____OF_____

IMAGES
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MATCHLINE: REFERENCE SHEET L1.3

MATCHLINE: REFERENCE SHEET L1.4

MATCHLINE: REFERENCE SHEET L1.8

DOG WASTE STATION

BIKE RACK

BUILDING TYPE 1

TERRACED PLANTERS

AC CONDENSING UNITS

BUILDING TYPE 2

19'-0" TYP.

9'-0" TYP.

CROSSWALK

RETAINING WALL (6' MAX. HEIGHT)

PARK BENCH

ARTIFICIAL TURF AREA

PICNIC TABLE

FENCE (6' MAX. HEIGHT)

SIDEWALK

(2) PICKLE BALL COURTS

TERRACED PLANTER

XERIC PERENNIALS AND GRASSES TYP.

STREET PARKING

MAILBOXES

SIGHT TRIANGLES; PER: CIVIL

PROPOSED ROAD; RE: CIVIL

NATURAL TRAIL CONNECTION TO WULFSOHN MOUNTAIN PARK TRAIL NETWORK

PARK 2

SEATING STEPS

ARTIFICIAL TURF

AC CONDENSING UNITS TYP.

PLANTER TYP.

SEATING STEPS

STAIRCASE

SIDEWALK

PAVED PATH

BOLLARD LIGHT TYP.

POURED IN PLACE PLAY SURFACING

ADA ACCESSIBLE PLAYGROUND (AGES 5-12)

MAILBOXES

NATIVE TREES AND SHRUBS TYP.

STREET LIGHT TYP.

NATIVE REVEGETATION AREA

LIMITS OF GRADING DISTURBANCE

EXISTING LANDSCAPE TO REMAIN

PROPERTY LINE

0' 10' 20' 40'
Scale: 1" = 20'

LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING DISTURBANCE
- SITE WALL
- PARK BENCH
- TRASH RECEPTACLE
- DOG WASTE STATION
- PICNIC TABLE
- BIKE RACK
- ENCLOSED DUMPSTER
- STREET LIGHT
- WALL MOUNTED LIGHT
- BOLLARD LIGHT
- EVERGREEN TREES
- DECIDUOUS TREES
- ORNAMENTAL TREES
- SHRUBS
- NATIVE TREES / SHRUBS
- XERIC PERENNIALS AND ORNAMENTAL GRASSES
- NATIVE SEED MIX
- ARTIFICIAL TURF
- ROCK MULCH

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE: 2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

SHEET NUMBER:
L1.7

SHEET____OF____

MATCHLINE: REFERENCE SHEET L1.4

MATCHLINE: REFERENCE SHEET L1.5

MATCHLINE: REFERENCE SHEET L1.7

MATCHLINE: REFERENCE SHEET L1.9

BUILDING TYPE 2

AC CONDENSING UNITS

STAIRCASE

TERRACED PLANTERS

RETAINING WALL (6' MAX. HEIGHT)

BUILDING TYPE 1

BIKE RACK

19'-0" TYP.

9'-0" TYP.

STREETLIGHT TYP.

DECORATIVE PAVERS TYP.

MOUNTED STREETLIGHT TYP.

DUMPSTER ENCLOSURE

BICYCLE PARKING AREA

FENCE (6' MAX. HEIGHT)

TRANSFORMER LOCATION; RE: CIVIL

COVERED GARAGE / PARKING BELOW; RE: ARCH

STAIRCASE

TERRACED PLANTERS

WALL MOUNTED STREET LIGHT TYP.

RETAINING WALL (6' MAX. HEIGHT)

ROCK MULCH TYP.

ARTIFICIAL TURF

BUILDING TYPE 3

STAIRCASE

PARK BENCH

BUILDING TYPE 1

TERRACED PLANTERS

AC CONDENSING UNITS

RETAINING WALL (6' MAX. HEIGHT)

BUILDING TYPE 3

STAIRCASE

TERRACED PLANTERS

AC CONDENSING UNITS

BIKE RACK

STREET LIGHT TYP.

DUMPSTER ENCLOSURE

COVERED CARPORT PARKING SPACES

DECORATIVE PAVERS TYP.

TRASH RECEPTACLE

DOG WASTE STATION

LOCAL ACCESS TRAILHEAD

XERIC PERENNIALS AND GRASSES TYP.

STREETLIGHT TYP.

SHRUBS TO SCREEN DUMPSTERS TYP.

LIMITS OF GRADING DISTURBANCE

TRAILHEAD KIOSK

NATIVE TREES AND SHRUBS TYP.

NATIVE SEED

NATURAL TRAIL CONNECTION TO WULFSOHN MOUNTAIN PARK TRAIL NETWORK

PROPERTY LINE

LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING DISTURBANCE
- SITE WALL
- PARK BENCH
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- XERIC PERENNIALS AND ORNAMENTAL GRASSES
- NATIVE SEED MIX
- ARTIFICIAL TURF
- ROCK MULCH

0' 10' 20' 40'

Scale: 1" = 20'

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MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

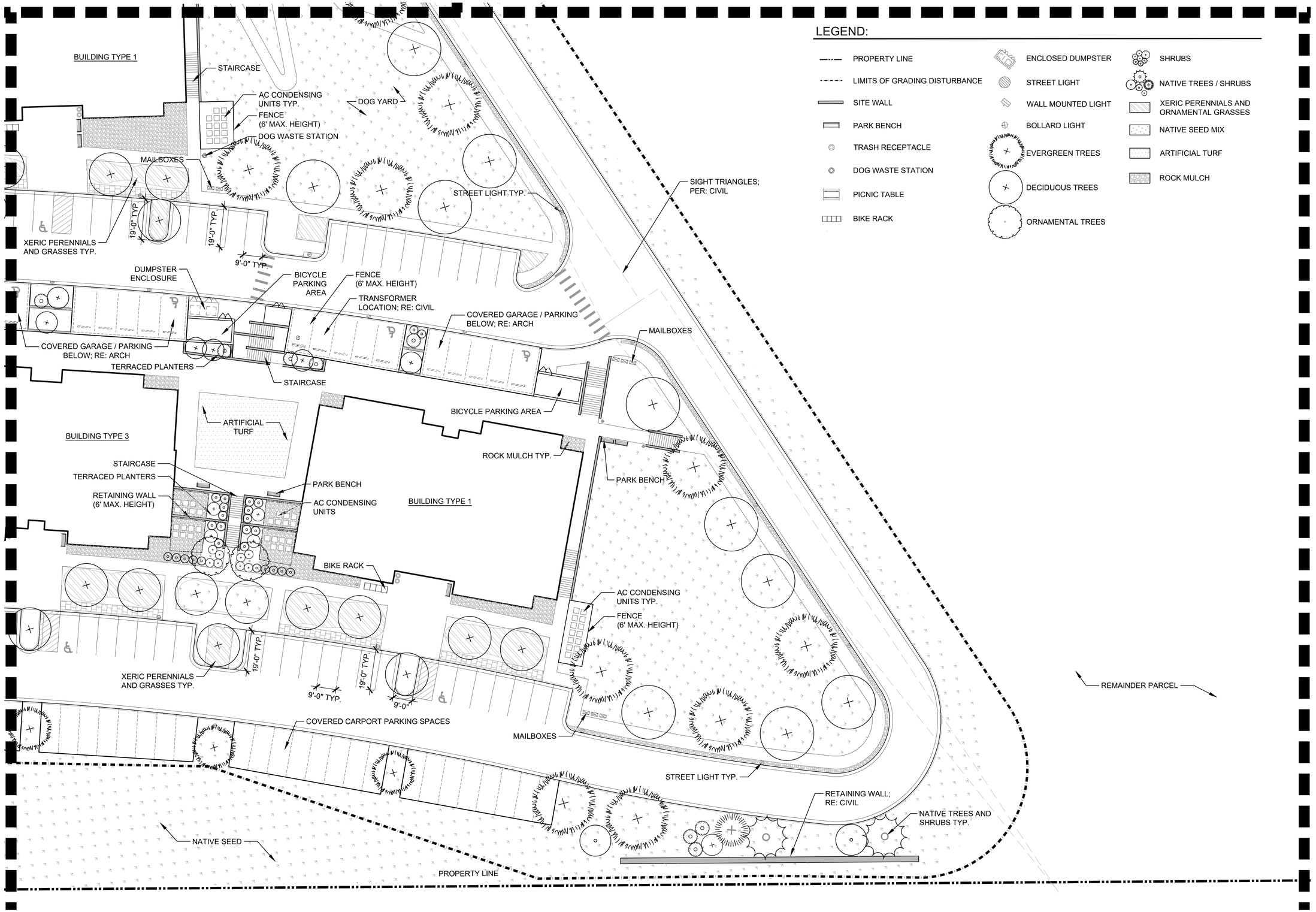
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MATCHLINE: REFERENCE SHEET L1.6

MATCHLINE: REFERENCE SHEET L1.8



LEGEND:

- PROPERTY LINE
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REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

SHEET NUMBER:
L1.9

SHEET_____OF_____

LANDSCAPE NOTES:

1. ALL PLANTING WILL MEET THE MINIMUM SIZES AS REQUIRED BY THE CITY OF GLENWOOD SPRINGS DEVELOPMENT CODE.
2. TREE AND SHRUB QUANTITIES COMPLY WITH THE REQUIRED MINIMUM QUANTITIES IN THE GLENWOOD MEADOWS DESIGN GUIDELINES FOR RESIDENTIAL NEIGHBORHOODS.
3. PARKING LOTS EDGES HAVE BEEN SCREENED FROM PUBLIC VIEW WITH PLANT MATERIAL AS REQUIRED IN THE GLENWOOD MEADOWS DESIGN GUIDELINES.
4. ALL LANDSCAPE PLANTING TO RECEIVE IRRIGATION. IRRIGATION SYSTEM TO BE PROFESSIONALLY DESIGNED TO LIMIT WATER CONSUMPTION. DRIP IRRIGATION TO BE USED WHEREVER POSSIBLE TO MINIMIZE RUN-OFF FROM SPRINKLERS.
5. IRRIGATION SYSTEM DESIGN, OPERATION AND MAINTENANCE TO COMPLY WITH THE GLENWOOD MEADOWS GEOTECHNICAL MITIGATION REQUIREMENTS AND GEOTECHNICAL REPORT FOR THE PROPERTY.
6. ALL LANDSCAPE PLANTINGS TO BE LOCATED AT LEAST 6' FROM THE BUILDINGS TO AVOID ADDING IRRIGATION WATER TO THE SOILS BENEATH THE STRUCTURES PER THE RECOMMENDATION OF THE GEOTECHNICAL REPORT.
7. FINAL LANDSCAPE AND IRRIGATION PLANS TO BE CERTIFIED BY GEOTECHNICAL ENGINEER FOR CONFORMANCE WITH GEOTECHNICAL RECOMMENDATIONS AS DEVELOPED FOR THIS SITE.
8. PROPOSED PLANTING AND IRRIGATION SYSTEM TO BE MAINTAINED BY THE APARTMENT COMPLEX MANAGEMENT.
9. ALL LANDSCAPE PLANTINGS ARE LOCATED TO ALLOW FOR SNOW STORAGE AREAS EQUALING 20% OF THE ADJACENT PAVING AREAS.
10. ALL DISTURBED AREAS ON THE PROJECT SITE TO BE REVEGETATED. SEE LANDSCAPE PLANS FOR PROPOSED PLANTING.
11. PLANT MATERIAL IS TO BE HEALTHY SPECIMENS FREE FROM DISEASE OR DAMAGE.
12. ALL MATERIALS USED SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE CURRENT AMERICAN STANDARDS FOR NURSERY STOCK, PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
13. ALL PLANT MATERIAL TO BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
14. CONTRACTOR TO STAKE ALL TREE LOCATIONS PER PLAN. OBTAIN LANDSCAPE ARCHITECT'S APPROVAL OF STAKED LOCATIONS PRIOR TO PLANTING.
15. STOCKPILED PLANT MATERIAL TO BE PLACED IN THE SHADE AND HAND-WATERED UNTIL PLANTED.
16. MAINTAIN POSITIVE DRAINAGE AWAY FROM WALLS, WALKS, BUILDINGS, AND OTHER STRUCTURES AT ALL TIMES. FINE GRADING SHALL BE APPROVED PRIOR TO SEEDING.
17. DO NOT PLACE MULCH WITHIN 6" OF TREE TRUNKS
18. INSTALL LANDSCAPE EDGER AT ALL BED/ GRASS BORDERS.
19. SEE CIVIL PLANS FOR PROPOSED GRADING AND DRAINAGE.
20. THE CONTRACTOR SHALL FINE GRADE ALL AREAS TO BE PLANTED.
21. THE CONTRACTOR SHALL REMOVE REQUIRED DEPTH OF SOIL ALONG WALKWAYS TO ACCOMMODATE SEED, TOPSOIL OR MULCH DEPTH.
22. SEE GEOTECHNICAL REPORT FOR RECOMMENDATIONS WITHIN 10' OF STRUCTURES. CONTACT OWNER'S REPRESENTATIVE IMMEDIATELY SHOULD A CONFLICT ARISE BETWEEN THESE PLANS AND THE GEOTECHNICAL REPORT.

PROPOSED PLANT LIST FROM GLENWOOD MEADOWS DESIGN GUIDELINES:

DECIDIOUS TREES

Botanic Name	*Common Name*
Acer campestre	Hedge Maple
Acer freemanii 'Autumn Blaze'	Autumn Blaze Maple
Acer tataricum subsp. *ginnala* 'Flame'	Flame Amur Maple
Amelanchier canadenis	Serviceberry
Catalpa speciosa	Catalpa
Celtis occidentalis	Hackberry
Crataegus ambigua	Russian Hawthorn
Crataegus crus-galli	Cockspur Hawthorn
Crataegus crus-galli var. *inermis*	Thornless Cockspur Hawthorn
Crataegus viridis 'Winter King'	Winter King Hawthorne
Gleditsia triacanthos f. inermis	Thornless Honeylocust 'Shademaster'
Gleditsia triacanthos f. inermis 'Imperial'	Honey Locust, Imperial
Gleditsia triacanthos f. inermis 'Skyline'	Honey Locust, Skyline
Gleditsia triacanthos f. inermis 'Sunburst'	Honey Locust, Sunburst
Prunus virginiana 'Shubert'	Canada Red Chokecherry
Pyrus calleryana 'Chanticleer'	Callery Pear
Quercus macrocarpa	Bur Oak
Robinia pseudoacacia 'Purple Robe'	Black Locust / Purple Robe Locust
Sorbus hybrida	Oakleaf Mountain Ash
Syringa reticulata	Japanese Tree Lilac
Tilia americana	American Linden
Tilia americana 'Redmond'	Redmond Linden
Tilia cordata 'Greenspire'	Littleleaf Linden
Ulmus Americana	American Elm

EVERGREEN TREES

Botanic Name	*Common Name*
Abies lasiocarpa	Subalpine or Rocky Mountain Fir
Juniperus scopulorum 'Wichita Blue'	Rocky Mountain Juniper
Picea engelmannii	Engelmann Spruce
Picea glauca 'Densata'	Black Hills Spruce
Picea pungens	Colorado Spruce
Picea pungens 'Glauca'	Colorado Blue Spruce
Pinus cembroides var. edulis	Pinyon Pine
Pinus flexilis	Limber Pine
Pinus nigra	Austrian Pine
Pinus ponderosa	Ponderosa Pine
Pinus strobiformis	Southwestern White Pine
Pinus sylvestris	Scotch Pine

SHRUBS

Botanic Name	*Common Name*
Arctostaphylos uva-ursi	Kinnikinnick
Artemisia cana	Silver Sagebrush
Artemisia filifolia	Sand Sagebrush
Berberis thunbergii 'Burgundy Carousel'	Burgundy Carousel Japanese Barberry
Caryopteris x clandonensis 'Blue Mist'	Blue Mist Spirea
Chrysothamnus nauseosus var. *nauseosus*	Dwarf Blue Rabbitbrush
Forestiera neomexicana	New Mexico Privet
Juniperus chinensis 'Armstrong'	Armstrong Juniper
Juniperus horizontalis 'Wiltonii'	Blue Rug Juniper
Juniperus sabina 'Buffalo'	Buffalo Juniper
Juniperus scopulorum 'Cologreen'	Cologreen Juniper
Juniperus scopulorum 'Moonglow'	Moonglow Juniper
Juniperus scopulorum 'Skyrocket'	Skyrocket Juniper
Junperus squamata 'Blue Star'	Blue Star Juniper
Ligustrum vulgare 'Cheyenne'	Cheyenne Privet
Perovskia atriplicifolia	Russian Sage
Philadelphus lewisii 'Blizzard'	Blizzard Mockorange
Physocarpus opulifolius 'Diabolo'	Diabolo Ninebark
Prunus virginiana melanocarpa	Rocky Mountain/Native Chokecherry
Quercus gambelii	Gambel Oak
Rhus aromatica 'Gro-Low'	Dwarf Fragrant Sumac
Rhus glabra	Smooth Sumac
Shepherdia argentea	Silver Buffaloberry
Speraea japonica 'Little Princess'	Little Princess Spirea
Syringa vulgaris 'Charles Joly'	Double Red French Lilac
Yucca glauca	Soapweed Yucca

PERENNIALS

Botanic Name	*Common Name*
Achillea millefolium 'Terra Cotta'	Terra Cotta Yarrow
Achillea 'Moonshine'	Moonshine Yarrow
Artemisia 'Powis Castle'	Powis Castle Sage
Campanula glomerata 'Superba'	Clustered Bellflower
Cerastium tomentosum	Snow in Summer
Dianthus graniticus	Granite Pinks
Echinacea purpurea	Purple Coneflower
Gazania linearis 'Colorado Gold'	Hardy Gazania
Iris x germanica cultivars	Bearded Iris
Lavandula angustifolia 'Munstead'	English Lavender
Penstemon digitalis 'Huskers Red'	Huskers Red Penstemon
Penstemon pinifolius	Pineleaf Penstemon
Penstemon strictus	Rocky Mt. Penstemon
Salvia superba	Perennial Salvia
Salvia n. 'May Night'	May Night Salvia
Salvia sylvestris 'Caradonna'	Caradonna Salvia
Sedum 'Autumn Joy'	Autumn Joy Sedum
Sedum 'Matrona'	Matrona Sedum

ORNAMENTAL GRASS

Calamagrostis acutiflora 'Karl Foerster'	Feather Reed Grass
Helictotrichon sempervirens	Blue Avena Grass
Miscanthus sinensis 'Yaku Jima'	Yaku Jima Maiden Grass
Pennisetum orientale 'Karly Rose'	Pink Oriental Fountian Grass
Pennisetum alopecuroides 'Hameln'	Dwarf Fountain Grass

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE
2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PLANT LIST AND GENERAL NOTES

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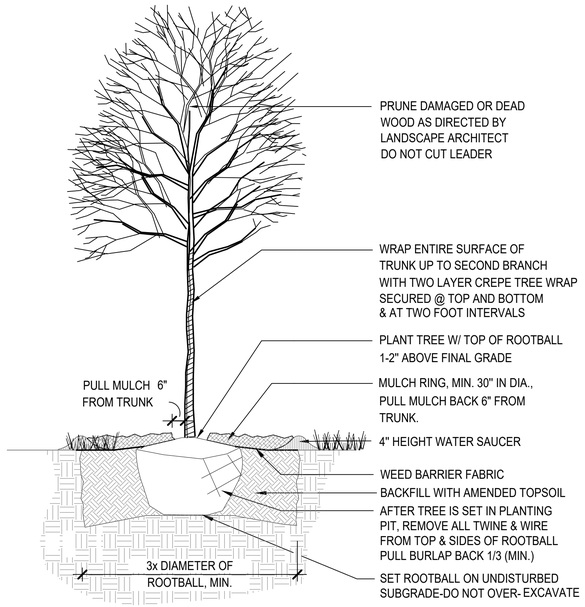
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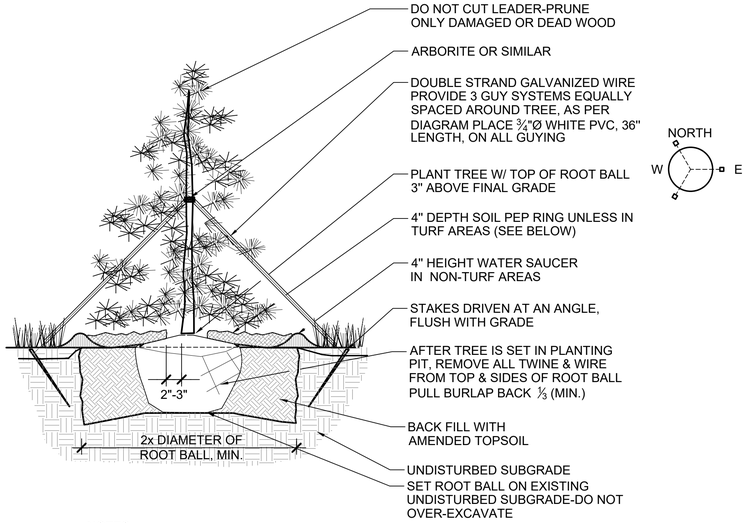


NOTES: 1. MULCH TO BE 4" DEEP. MULCH TO BE SOIL PEP. CONTRACTOR TO PROVIDE SAMPLE FOR APPROVAL BY LANDSCAPE ARCHITECT AND OWNER PRIOR TO INSTALLATION.

2. ALL TREES 3" DIAMETER OR LARGER MAY BE STAKED FOR ONE YEAR IF PROPOSED BY LANDSCAPE CONTRACTOR AND APPROVED BY OWNER'S REPRESENTATIVE.

1 L2.1 DECIDUOUS TREE PLANTING

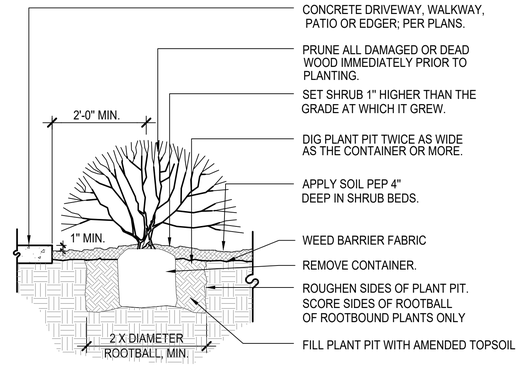
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NOTES:
1. PULL MULCH BACK 2" TO 3" FROM TRUNK OF TREE

2 L2.1 EVERGREEN TREE PLANTING

NOT TO SCALE

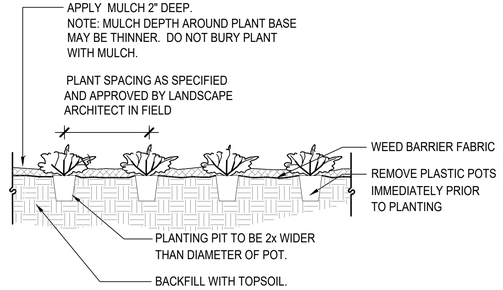


NOTES:

1. ANY BROKEN OR CRUMBLING ROOTBALL WILL BE REJECTED. REMOVING THE CONTAINERS WILL NOT BE AN EXCUSE FOR DAMAGED ROOTBALLS.
2. HOLD GRADE 1" BELOW EDGE OF WALK OR CURB
3. ALL MULCH TO BE SOIL PEP. CONTRACTOR TO PROVIDE SAMPLE FOR APPROVAL BY LANDSCAPE ARCHITECT AND OWNER PRIOR TO INSTALLATION.

3 L2.1 SHRUB PLANTING

NOT TO SCALE

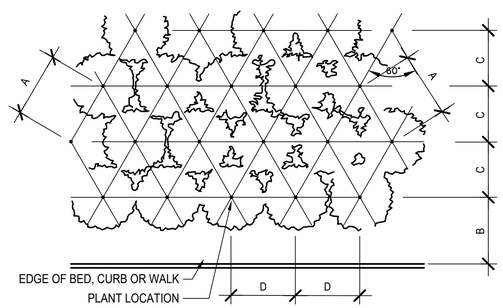


NOTE: MULCH TO BE SOIL PEP. CONTRACTOR TO PROVIDE SAMPLE FOR APPROVAL BY LANDSCAPE ARCHITECT AND OWNER PRIOR TO INSTALLATION.

4 L2.1 ORNAMENTAL GRASS AND PERENNIAL

NOT TO SCALE

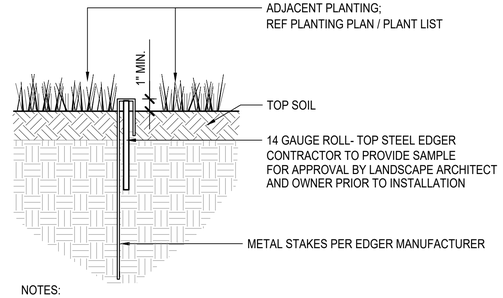
PLANT SPACING	A	B	C	D
6"	6"	6"	5"	6"
8"	8"	6"	7"	8"
12"	12"	8"	10"	12"
18"	18"	9"	15½"	18"
24"	24"	18"	21"	24"
30"	30"	15"	26"	30"
36"	36"	30"	31"	36"
48"	48"	30"	42"	48"
60"	60"	36"	52"	60"



NOTE:
ALIGN FRONT ROW PARALLEL TO BED LINE

5 L2.1 SHRUB/ ORNAMENTAL GRASS / GROUNDCOVER PLANTING LAYOUT - TRIANGULAR SPACED

NOT TO SCALE



NOTES:

1. SET ALL EDGING 1" ABOVE FINISH GRADE AS SHOWN.
2. EDGING SHALL ABUT ALL CONCRETE CURBS AND WALKS PERPENDICULAR OR AS SHOWN ON PLANS, AND FLUSH W/ GRADES OF CONCRETE.
3. ALL JOINTS TO BE SECURELY STAKED.
4. EDGING TO BE PARALLEL WITH GRADE.
5. INSTALL EDGER PER MANUFACTURERS SPECIFICATIONS USING SPLICES AND CORNERS AS DIRECTED.

6 L2.1 LANDSCAPE EDGER

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LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE 2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PLANTING DETAILS

SCALE:

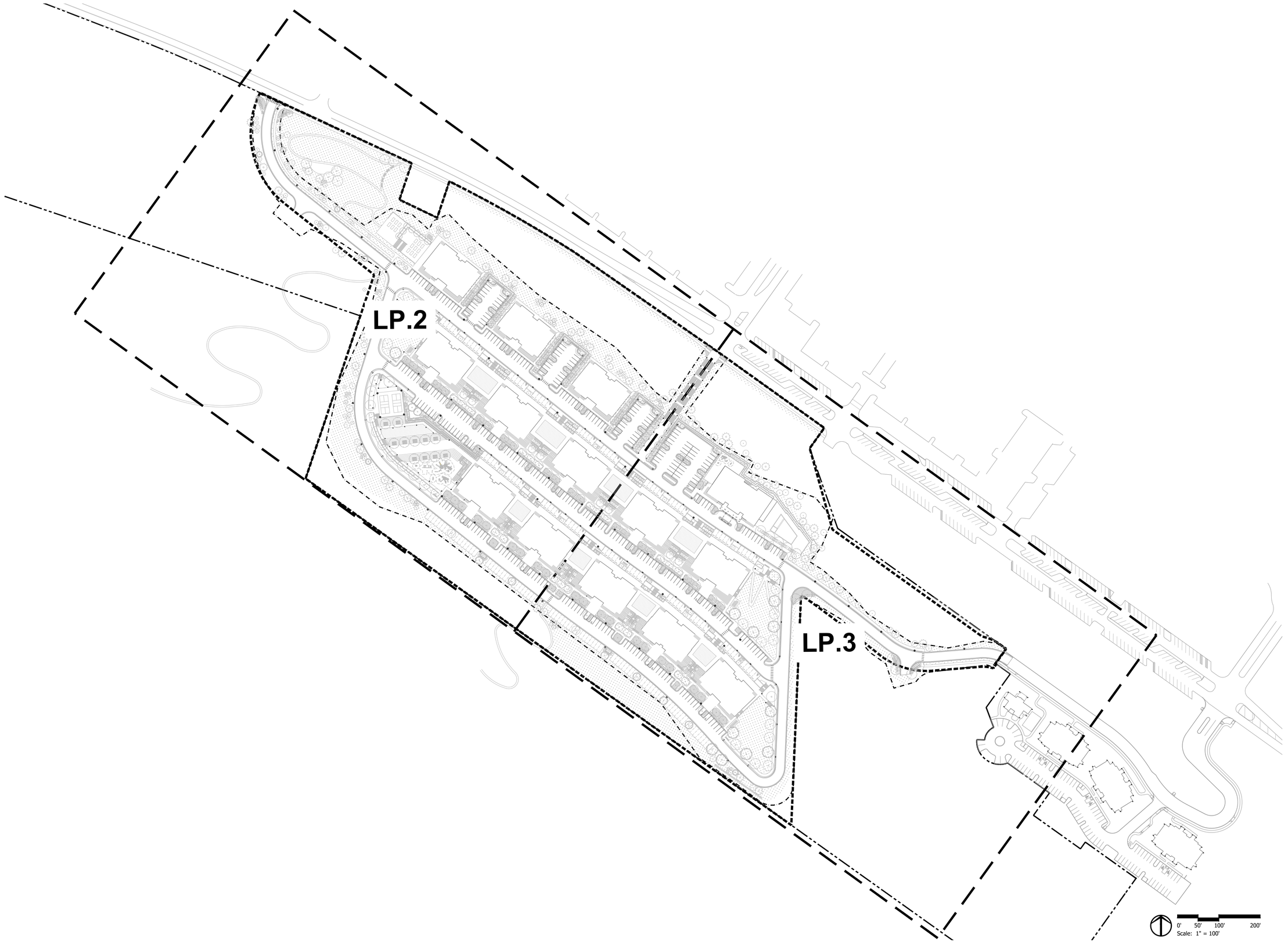
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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE
2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

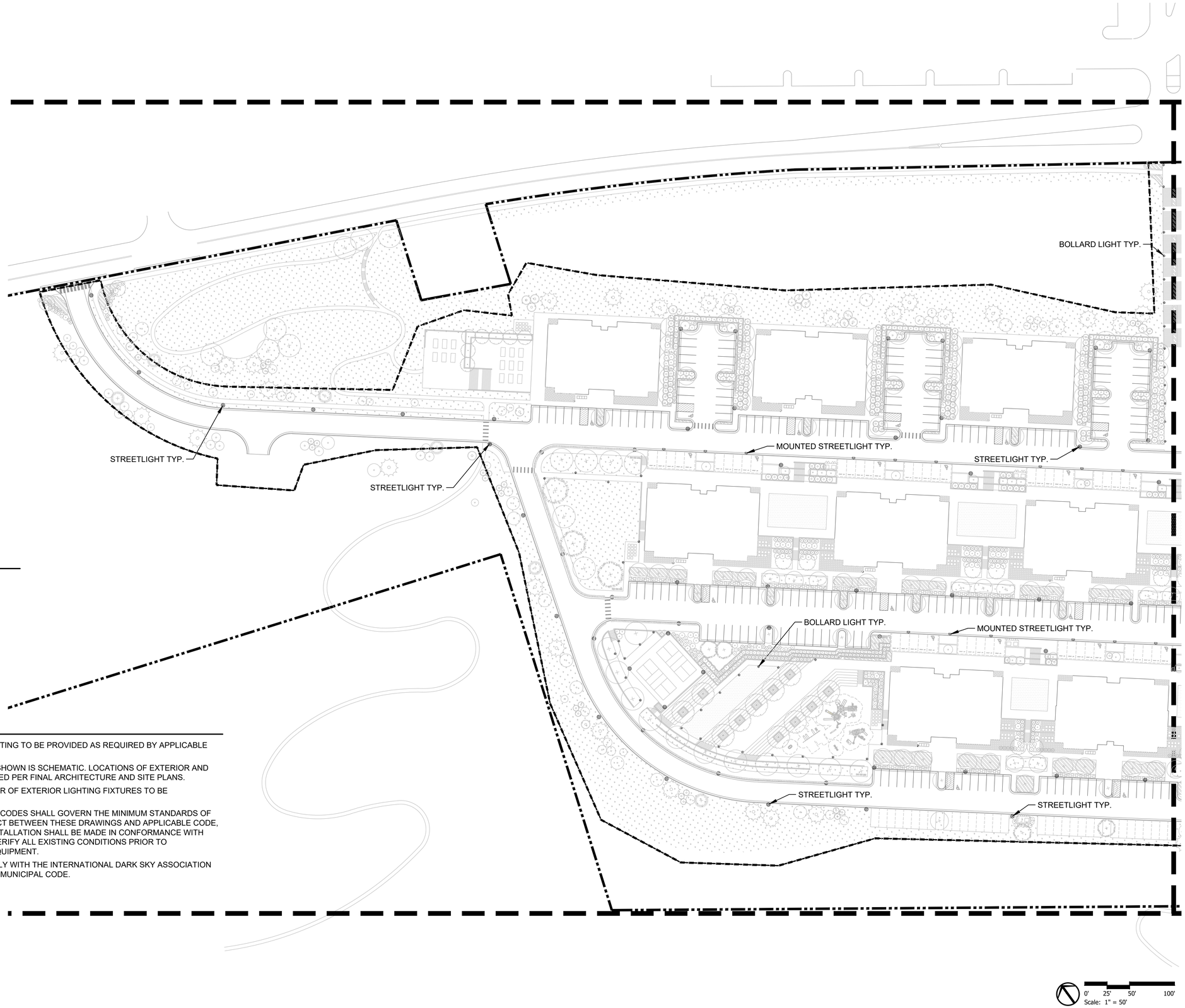
JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE LIGHTING ENLARGEMENT KEY PLAN

SCALE:

SHEET NUMBER:
LP.1

SHEET_____OF_____



LEGEND:

- PROPERTY LINE
- STREET LIGHT
- WALL MOUNTED LIGHT
- BOLLARD LIGHT

SITE LIGHTING NOTES:

1. SITE AND EXTERIOR BUILDING LIGHTING TO BE PROVIDED AS REQUIRED BY APPLICABLE BUILDING CODES.
2. LOCATION OF LIGHT FIXTURES AS SHOWN IS SCHEMATIC. LOCATIONS OF EXTERIOR AND SITE LIGHT FIXTURES TO BE VERIFIED PER FINAL ARCHITECTURE AND SITE PLANS.
3. FINAL TYPE, LOCATION AND NUMBER OF EXTERIOR LIGHTING FIXTURES TO BE DETERMINED.
4. NATIONAL AND LOCAL ELECTRICAL CODES SHALL GOVERN THE MINIMUM STANDARDS OF WORK. IN THE EVENT OF A CONFLICT BETWEEN THESE DRAWINGS AND APPLICABLE CODE, THE CODE SHALL PREVAIL AND INSTALLATION SHALL BE MADE IN CONFORMANCE WITH THE CODE. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO INSTALLATION OF ANY LIGHTING EQUIPMENT.
5. ALL EXTERIOR FIXTURES TO COMPLY WITH THE INTERNATIONAL DARK SKY ASSOCIATION AND CITY OF GLENWOOD SPRINGS MUNICIPAL CODE.

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE: 2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE LIGHTING ENLARGEMENT

SCALE:

SHEET NUMBER:
LP.2

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BOLLARD LIGHT TYP.

STREETLIGHT TYP.

MOUNTED STREETLIGHT TYP.

BOLLARD LIGHT TYP.

MATCHLINE: REFERENCE SHEET LP.2

STREETLIGHT TYP.

STREETLIGHT TYP.

STREETLIGHT TYP.

LEGEND:

- PROPERTY LINE
- STREET LIGHT
- WALL MOUNTED LIGHT
- BOLLARD LIGHT

SITE LIGHTING NOTES:

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0' 25' 50' 100'
Scale: 1" = 50'

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LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

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2021.10.07

REVISIONS:
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JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE LIGHTING ENLARGEMENT

SCALE:

SHEET NUMBER:
LP.3

SHEET_____OF_____

DOG YARD





Dog yards, as labeled on revised sheet set, to be located within the open space areas throughout the property. Dog waste stations will be located near open space areas and at each local access trailhead.

COMMUNITY AREA







Community amenity spaces to be located between apartment buildings. ADA access shall be provided to all community/amenity spaces. Further design studies will continue to develop and finalize amenity features and materials.

AMENITIES







Potential site amenities options offered throughout the site. Currently, two pickleball courts are designed as a part of Park 2. Additionally, bench seating is located near each amenity space.

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DESIGN IMAGERY

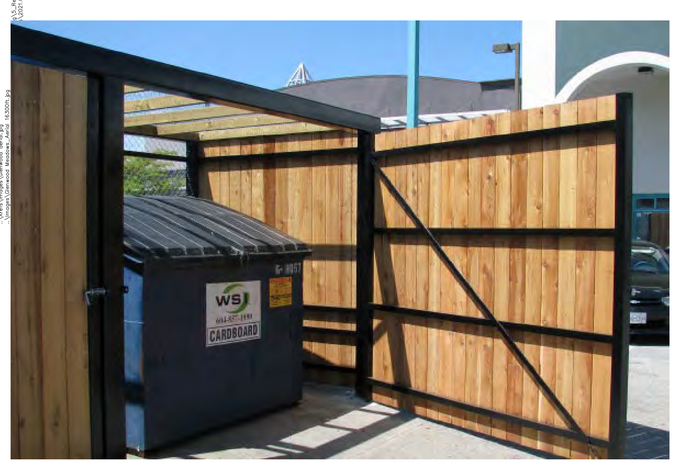
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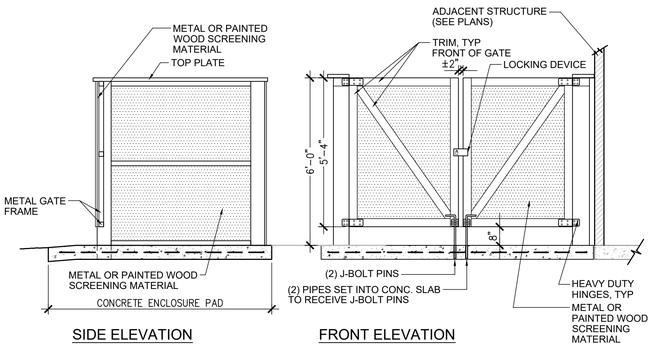
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SHEET_____OF_____

DUMPSTER ENCLOSURE/UTILITY SCREEN







Character images and conceptual detail of proposed dumper enclosures and utility screening. Enclosures are designed to be integrated within retaining wall layouts. The dumpster enclosure screening shall be visually compatible with building materials and have planted material terraced along the hillside to soften the enclosure appearance. Dumpster enclosures will comply with the code and bear proofing requirements.

FENCE







Design recommendation for internal fencing design. Consistent style of fencing to be implemented throughout the overall site design for material cohesiveness. Fencing material shall be compatible with the overall site design and landscaping. Durable black aluminum fencing, similar to that used by DHM at Glenwood Hot Springs (as seen in the bottom image) is a recommended style.

RETAINING WALLS







Retaining walls shall be compatible with the overall site design and designed to conform to the existing natural terrain. Retaining wall heights limited to 6' max. with 3' min. planting zone between terraced walls. Anticipated materials and wall types are gravity block, precast block/MSE, or concrete. Final layout and materials to be determined after review of final geotechnical report.

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GLENWOOD MEADOWS MULTI FAMILY HOUSING
LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE
2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

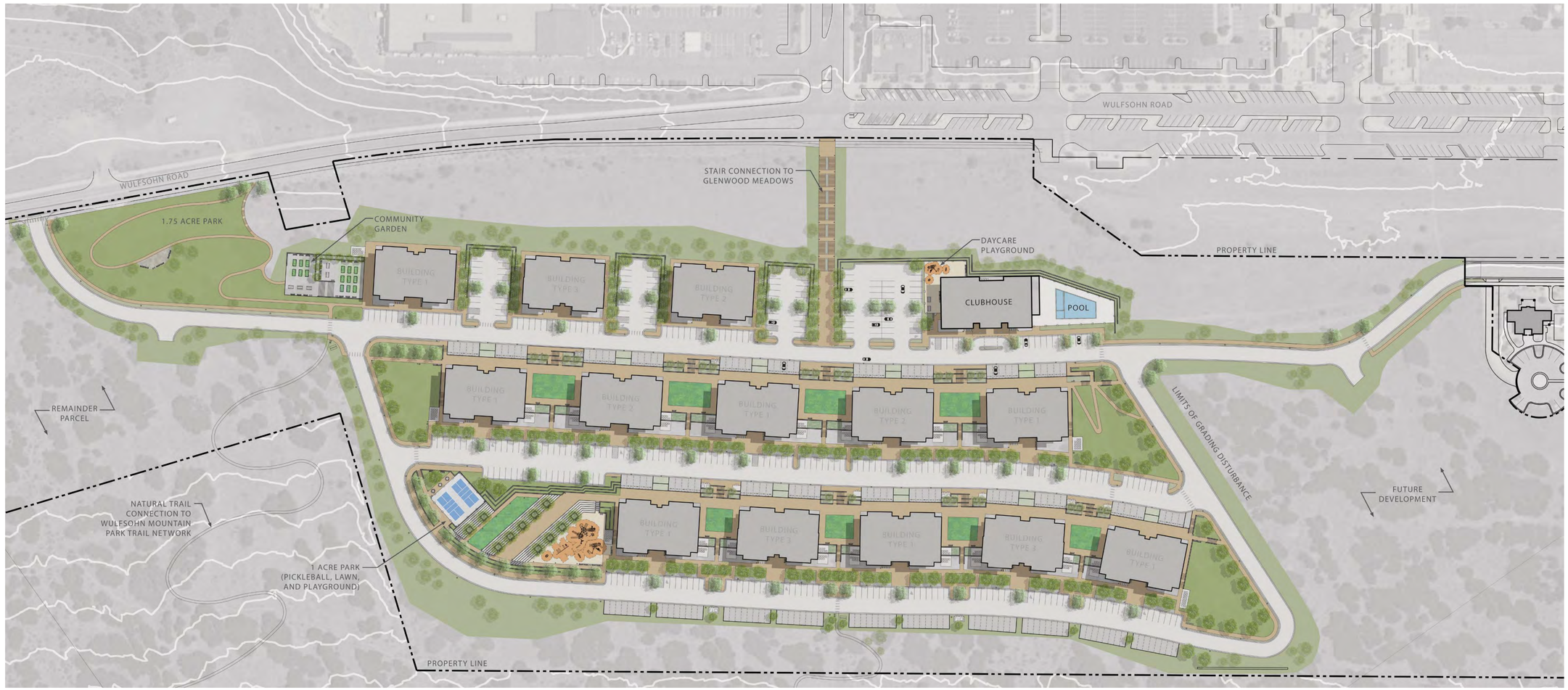
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MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
DESIGN IMAGERY

SCALE:

SHEET NUMBER:
LD.2

SHEET_____OF_____



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LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE
2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN RENDERING

SCALE:

SHEET NUMBER:
EXBT 1

SHEET_____OF_____



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SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 2

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LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE
2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 3

SHEET_____OF_____



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GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: 2201
DATE: 2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 4

SHEET_____OF_____



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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE
2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 5

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SCALE:

SHEET NUMBER:
EXBT 6

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE: 2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 7

SHEET_____OF_____



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[DATE: 10-26-2021 BY: Mike]

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE:
2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 8

SHEET_____OF_____



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Oct 26, 2021 - 10:26am

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE: 2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 9

SHEET_____OF_____

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE
2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE /
ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE
ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 10

SHEET_____OF_____



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DATE
Fri, Oct 29, 2021 - 11:16am

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE
2021.10.07

REVISIONS:
SUBMITTAL #4: 2021.08.13
SUBMITTAL #5: 2021.10.26
REVISIONS:

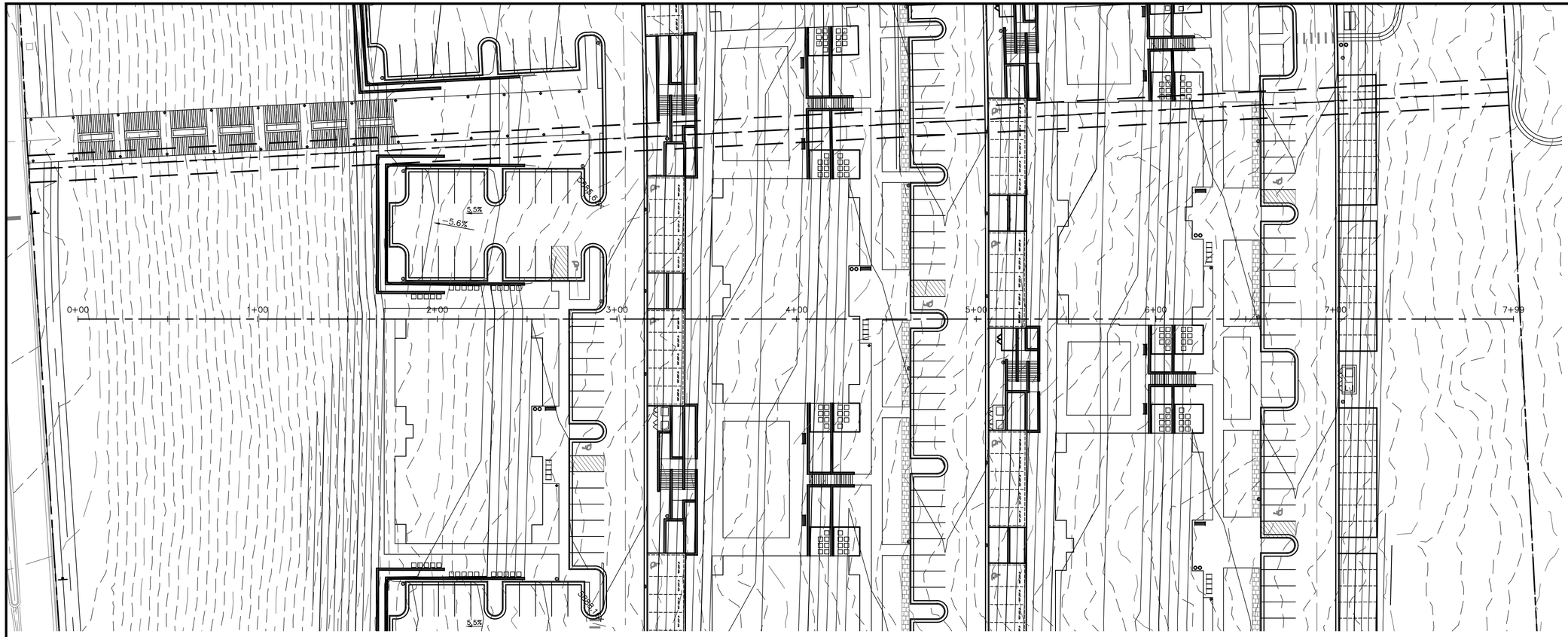
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MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

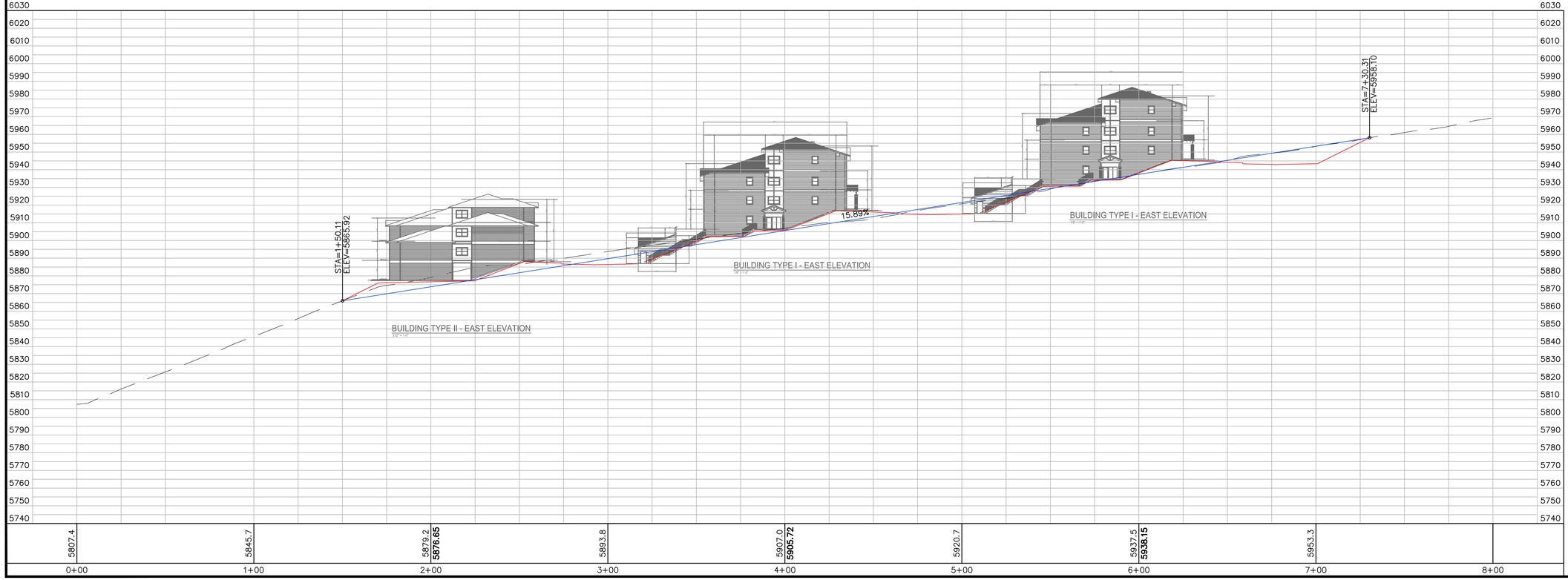
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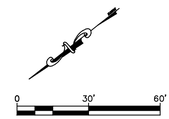
SHEET NUMBER:
EXBT 11

SHEET_____OF_____



SECTION PROFILE





PRELIMINARY
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CONSTRUCTION

COLORADO 811
CALL BEFORE
YOU DIG
Utility Notification
Center of Colorado

NO.	DATE	REVISION	BY
1	12/11/20	MAJOR SITE / ARCH. REVIEW	MGG
2	1/22/21	MAJOR SITE / ARCH. REVIEW #2	MGG
3	7/2/21	MAJOR SITE / ARCH. REVIEW #3	MGG

DRAWN BY: MGG
CHECKED BY: MGG
DATE:
FILE:

HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101,
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 · FAX (970) 945-2555
WWW.HCENG.COM

BLD GROUP, LLC;
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

SITE SECTIONS
EXHIBIT

PROJECT NO.
2201044.00

EXBT 12,1

SECTION2 PROFILE

PRELIMINARY
NOT FOR
CONSTRUCTION

0 30' 60'

COLORADO 811
CALL BEFORE
YOU DIG
Utility Notification
Center of Colorado

NO.	DATE	REVISION	BY
1	12/11/20	MAJOR SITE / ARCH. REVIEW	MGG
2	1/22/21	MAJOR SITE / ARCH. REVIEW #2	MGG
3	7/2/21	MAJOR SITE / ARCH. REVIEW #3	MGG

DRAWN BY: MGG
CHECKED BY: MGG
DATE:
FILE:

HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101,
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 · FAX (970) 945-2555
WWW.HCENG.COM

BLD GROUP, LLC;
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

SITE SECTIONS
EXHIBIT

PROJECT NO.
2201044.00

EXBT 12.2

SECTION3 PROFILE

0 30' 60'

PRELIMINARY NOT FOR CONSTRUCTION

COLORADO 811 CALL BEFORE YOU DIG Utility Notification Center of Colorado

NO.	DATE	REVISION	BY
1	12/11/20	MAJOR SITE / ARCH. REVIEW	MGG
2	1/22/21	MAJOR SITE / ARCH. REVIEW #2	MGG
3	7/2/21	MAJOR SITE / ARCH. REVIEW #3	MGG

DRAWN BY: MGG
CHECKED BY: MGG
DATE:
FILE:

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GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 • FAX (970) 945-2555
WWW.HCENG.COM

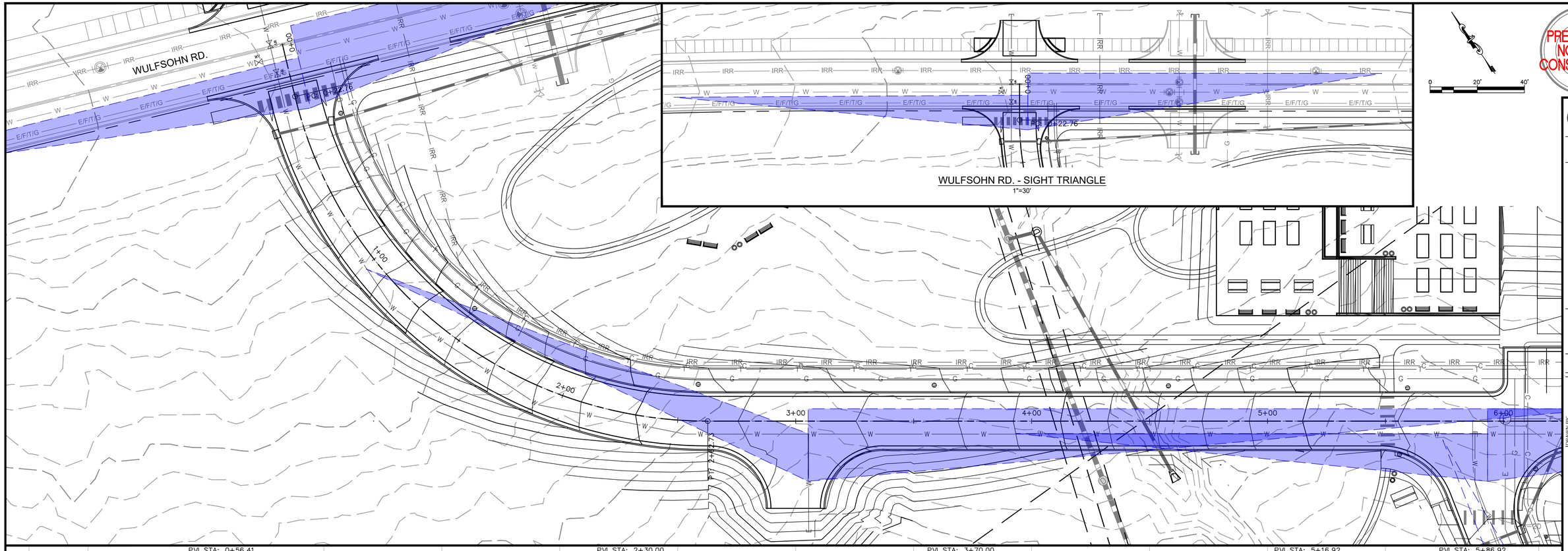
BLD GROUP, LLC;
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

SITE SECTIONS
EXHIBIT

PROJECT NO.
2201044.00

EXBT 12.3



Packet Page 225

COLORADO 811
CALL BEFORE
YOU DIG
Utility Notification
Center of Colorado

NO.	DATE	REVISION	BY
1	12/11/20	MAJOR SITE / ARCH. REVIEW	MGG
2	1/22/21	MAJOR SITE / ARCH. REVIEW #2	MGG
3	7/2/21	MAJOR SITE / ARCH. REVIEW #3	MGG

DRAWN BY: MGG
CHECKED BY: MGG
DATE:
FILE:
SCALE 1" = 20'

HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101,
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 FAX (970) 945-2555
WWW.HCENG.COM

BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

WEST ENTRY PLAN & PROFILE
EXHIBIT

PROJECT NO.
2201044.00

EXBT 13

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

FOR PRELIMINARY REVIEW

TW: 5865.00
BW: 5859.00
TW: 5872.00
BW: 5866.00
TW: 5879.00
BW: 5873.00

5824 5826 5828 5830 5832 5834 5836 5838 5840 5842 5844 5846 5848 5850 5852 5854 5856 5858

2.0

COLORADO 811
CALL BEFORE YOU DIG
Utility Notification Center of Colorado

NO.	DATE	REVISION	BY

DRAWN BY: HCE
CHECKED BY: HCE
DATE: MO/DA/YEAR
FILE: FILE

HIGH COUNTRY ENGINEERING, INC.
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PHONE (970) 945-8676 · FAX (970) 945-2555
WWW.HCENG.COM

BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

POOL WALL GRADING EXHIBIT

PROJECT NO.
2201044.00
TASK

EXHBT 14

GLENWOOD SPRINGS

COLORADO

DESCRIPTION OF DRAWINGS

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A 26	Bldg Type-III - West & East Elevation		
A 27	Bldg Type-III - Section		

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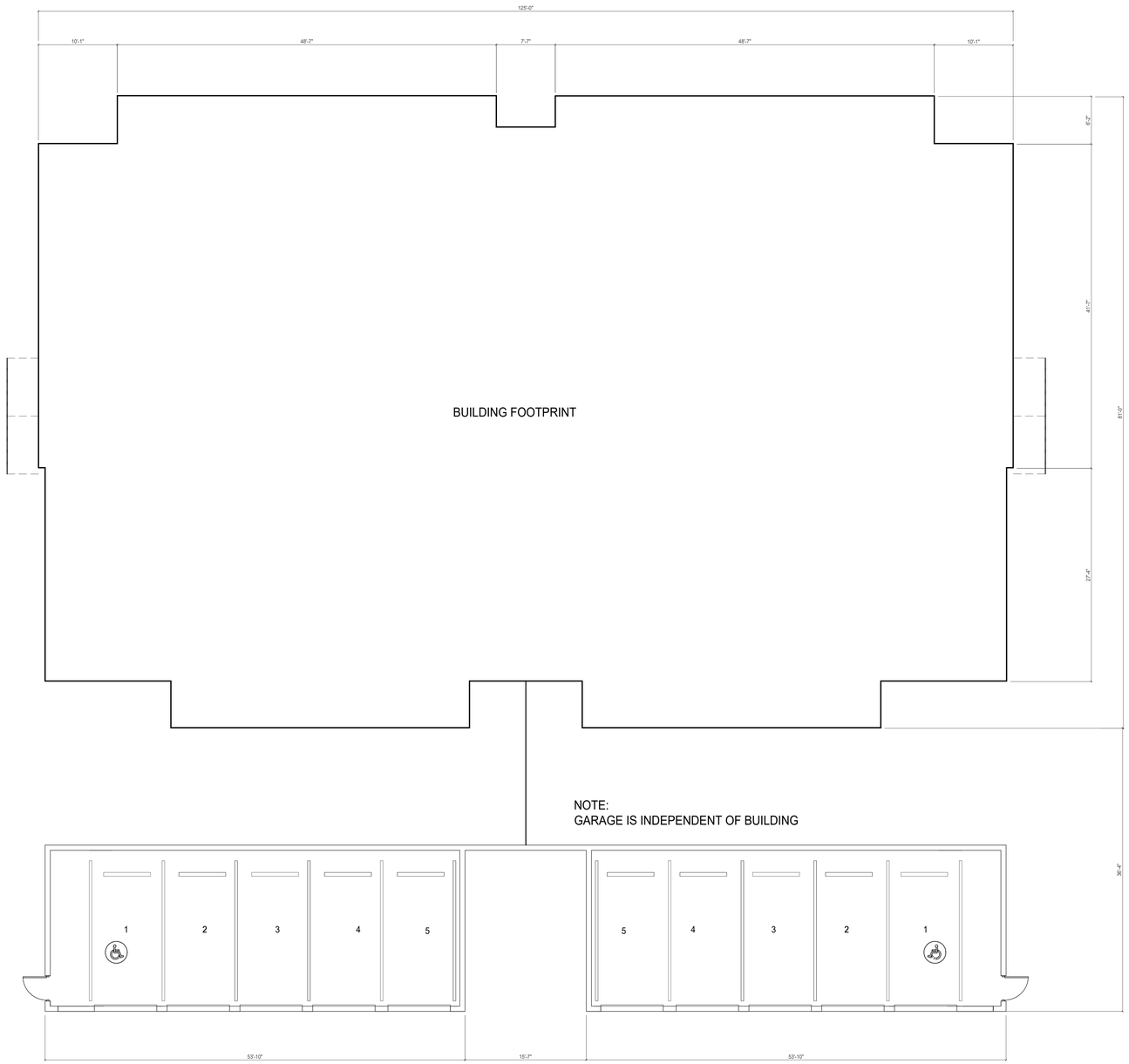
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV.	COMMENT	DATE
1	06/29/2021	
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: NTS

INDEX

A-01



BUILDING TYPE I - GARAGE LEVEL

1/8" = 1'-0"

BUILDING TYPE I				
LEVEL	GROSS AREA	OPEN FLOOR CORRIORS	CORRIDOR, ELEVATOR AND STORAGE	NET AREA
GARAGE (10 CARS)	2,630	0	0	2630
LOWER LEVEL	5,855	0	1824	4031
1ST LEVEL	9,623	0	1653	7970
2ND LEVEL	9,623	243	1648	7732
3RD LEVEL	5,675	243	1732	3700
TOTAL BUILDING	33,406			23,433
NO. OF BUILDINGS	7			7
TOTAL FOR BUILDING TYPE I	233,842			164,031

PHASE I - 300 APARTMENTS TOTAL					
BUILDING TYPE	I	II	III	TOTAL BUILDINGS	
NO. OF BUILDINGS	7	3	3	13	
Unit Types					%
3 BEDROOM	42	-	-	42	14.00%
2 BEDROOM - UNIT C1	0	36	36	72	24.00%
2 BEDROOM - UNIT C2	42	-	-	42	14.00%
1 BEDROOM - UNIT B1	0	24	36	60	20.00%
1 BEDROOM - UNIT B2	42	-	-	42	14.00%
STUDIO	42	-	-	42	14.00%
TOTAL UNITS	168	60	72	300	100.00%

PHASE I - 300 APARTMENTS TOTAL					
APARTMENT TYPE	NUMBER OF APARTMENTS	APARTMENT AREAS (SF)			TOTAL AREA (SF)
		INTERIOR	BALCONY	INTERIOR & BALCONY	
3 BEDROOM	42	1,269	80	1,349	56,658
2 BEDROOM - UNIT C1	72	1,126	80	1,206	86,832
2 BEDROOM - UNIT C2	42	1,109	80	1,189	49,938
1 BEDROOM - UNIT B1	60	704	80	784	47,040
1 BEDROOM - UNIT B2	42	711	71	782	32,844
STUDIO	42	593	80	673	28,266
					301,578

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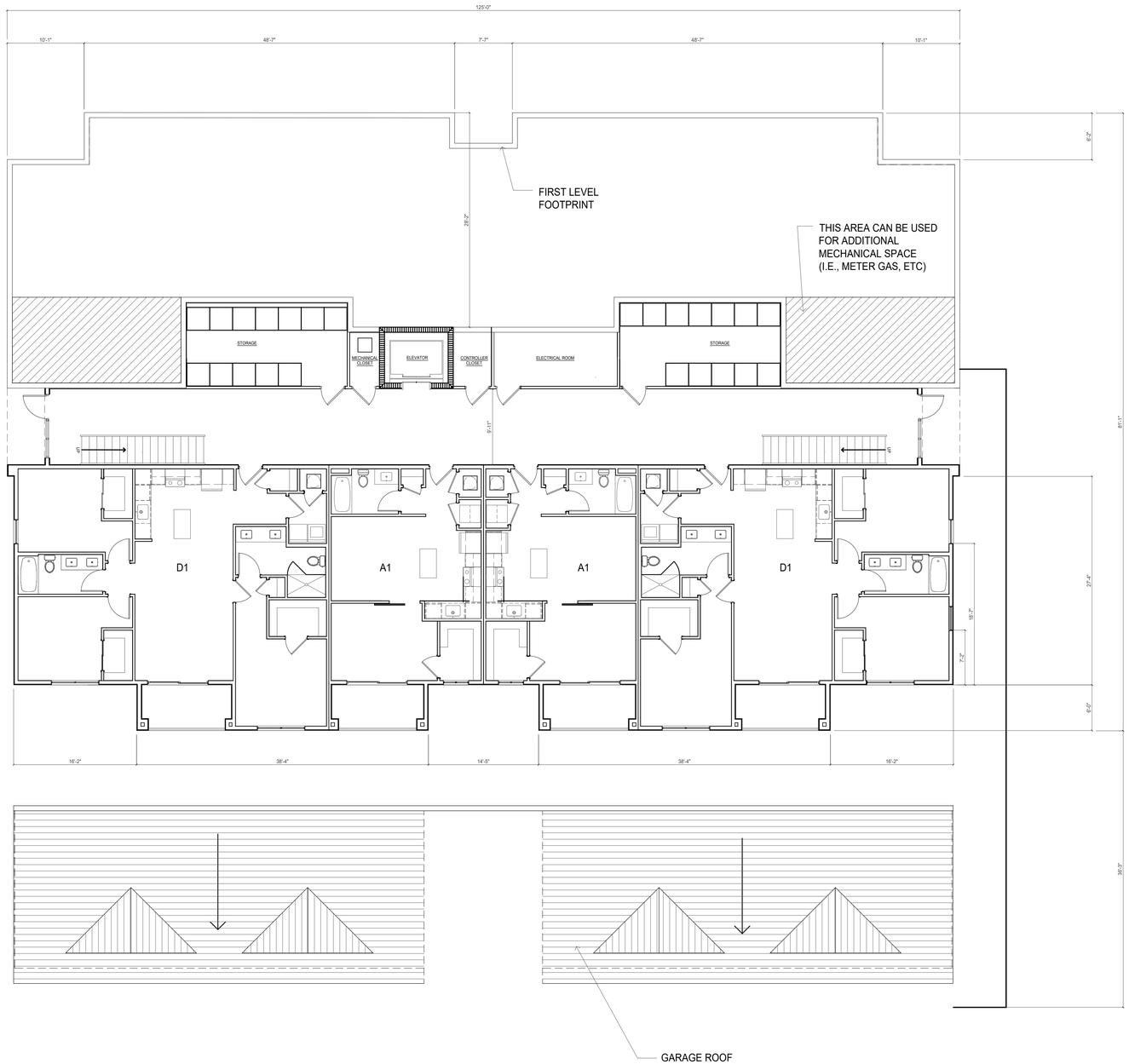
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	DATE	COMMENT
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE I

A-1



BUILDING TYPE I - LOWER LEVEL

1/8" = 1'-0"

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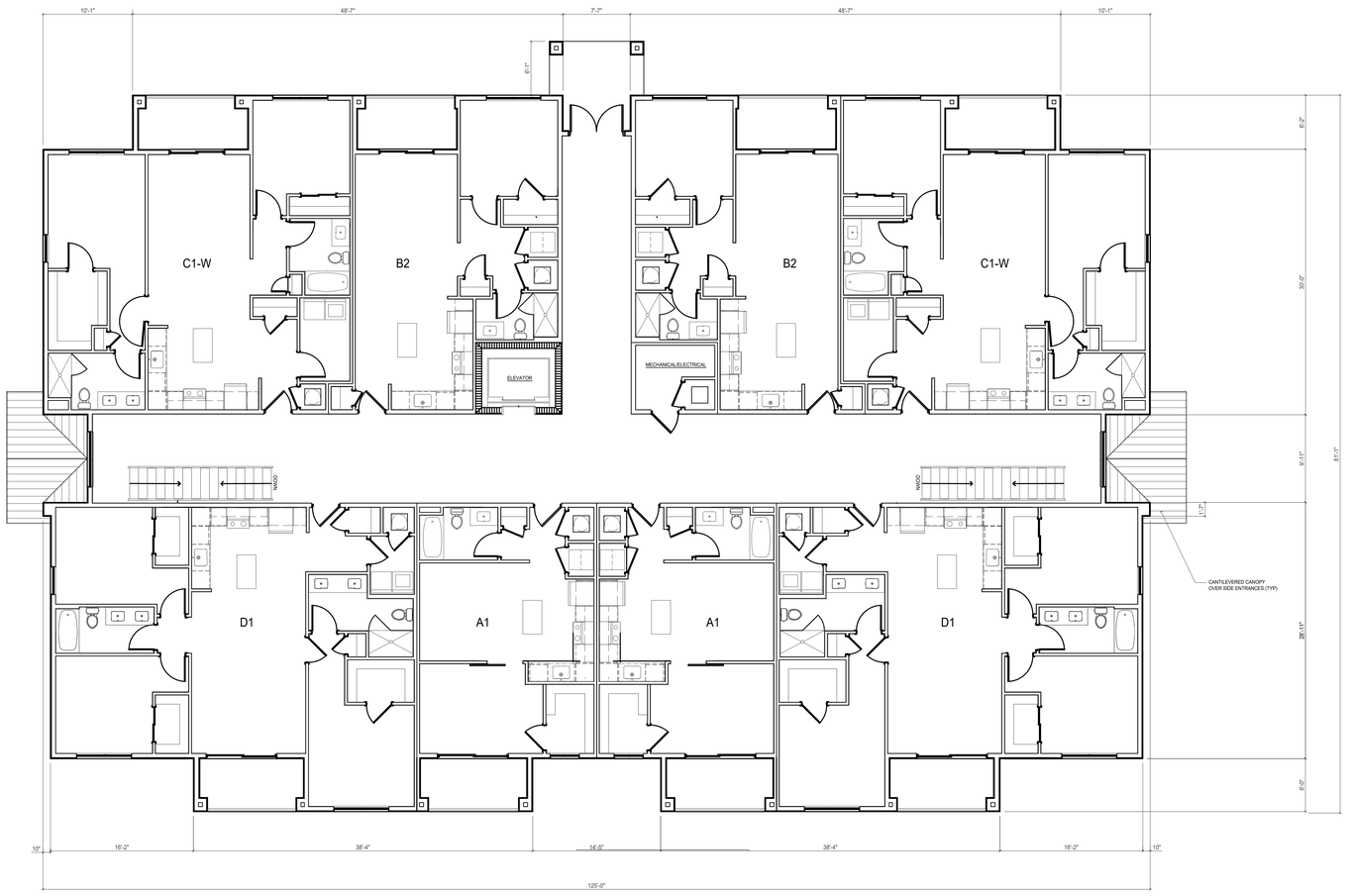
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

BY: RC
DATE: 12/28/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE I

A-2



BUILDING TYPE I - FIRST FLOOR

1/8" = 1'-0"

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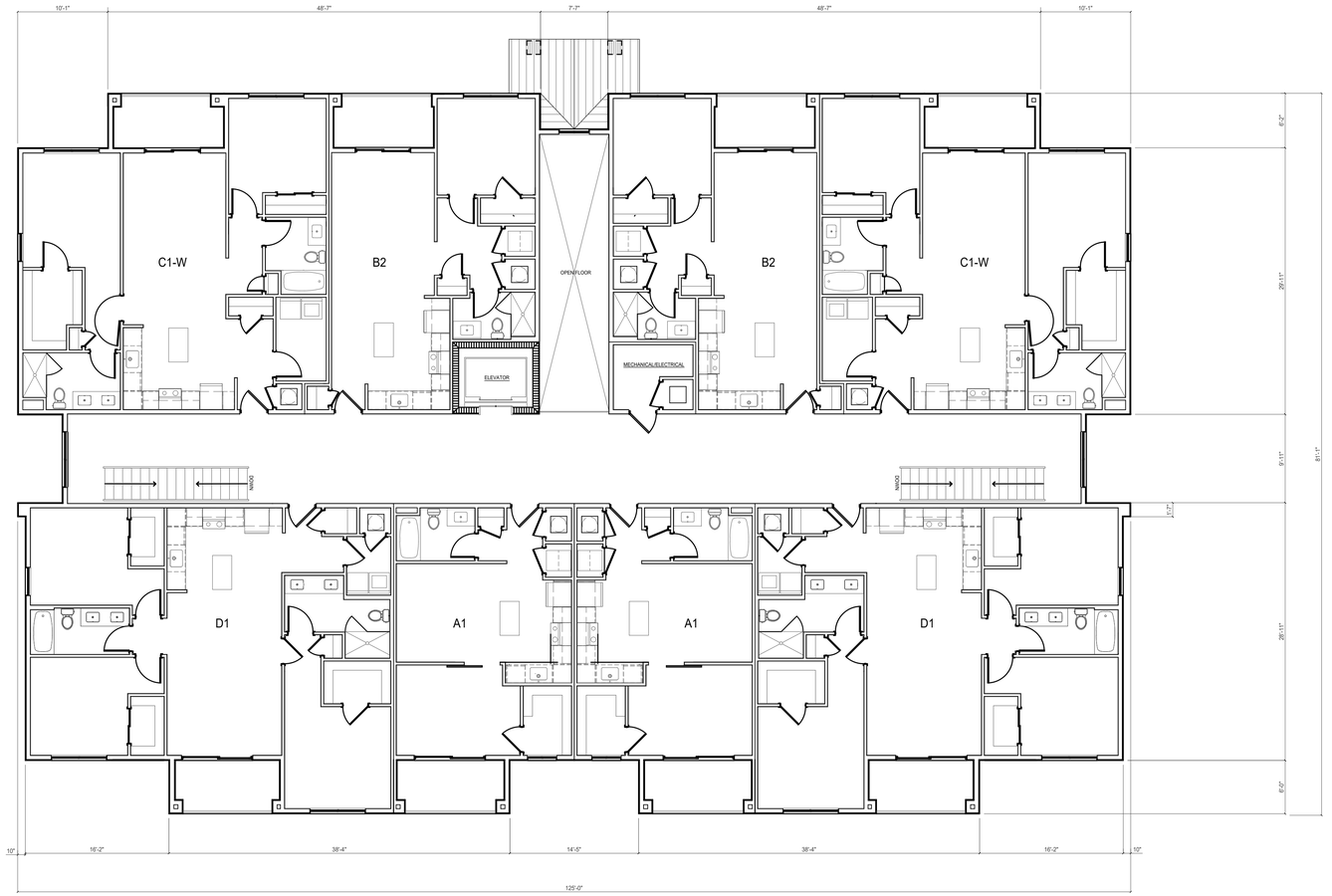
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV#	COMMENT	DATE

BY: RC
DATE: 12/28/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE I

A-3



BUILDING TYPE I - SECOND FLOOR

1/8" = 1'-0"

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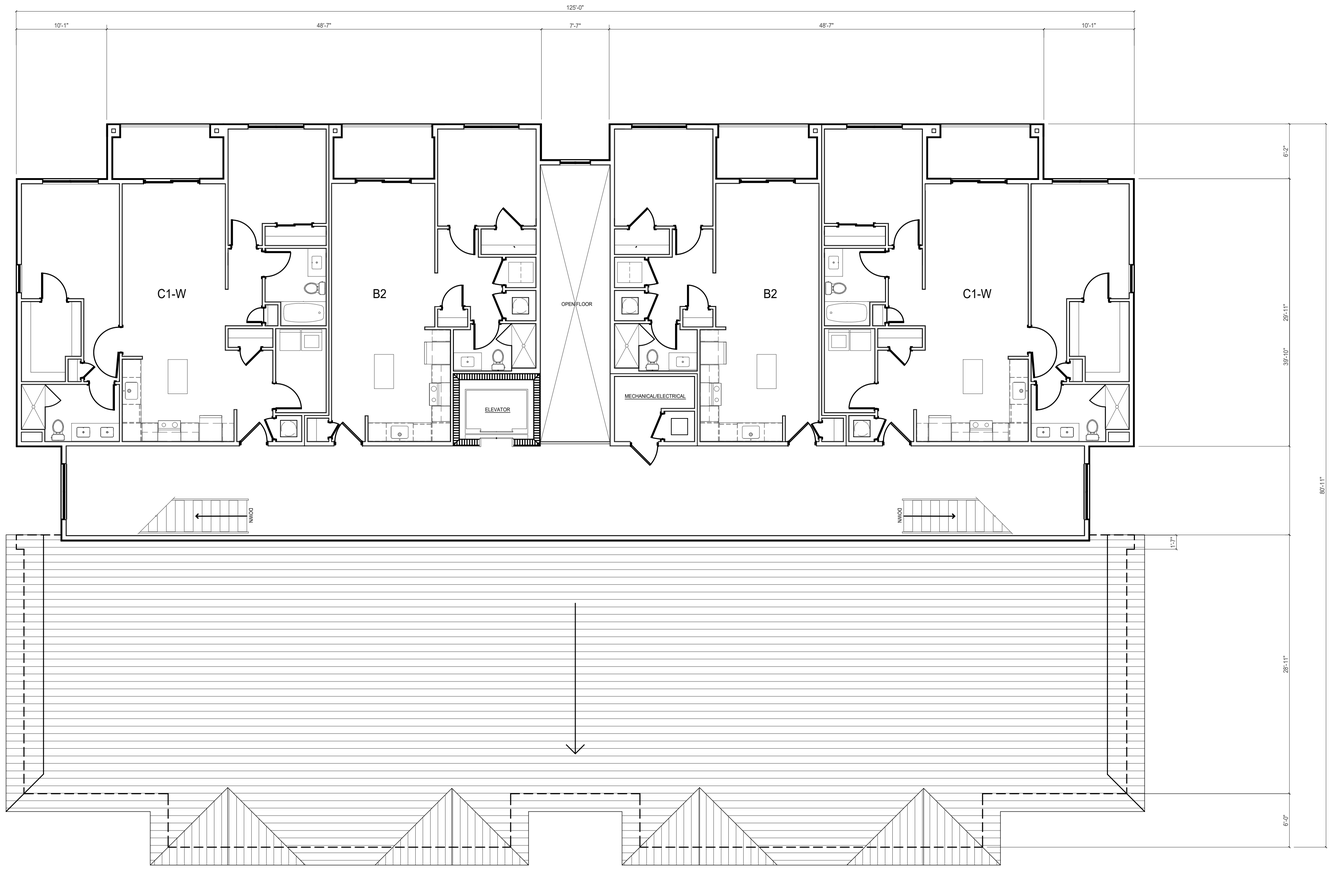
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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	DATE
COMMENT	
BY:	RC
DATE:	12/28/2020
SCALE:	1/8" = 1'-0"

BUILDING TYPE I

A-4



BUILDING TYPE I - THIRD FLOOR

1/8" = 1'-0"

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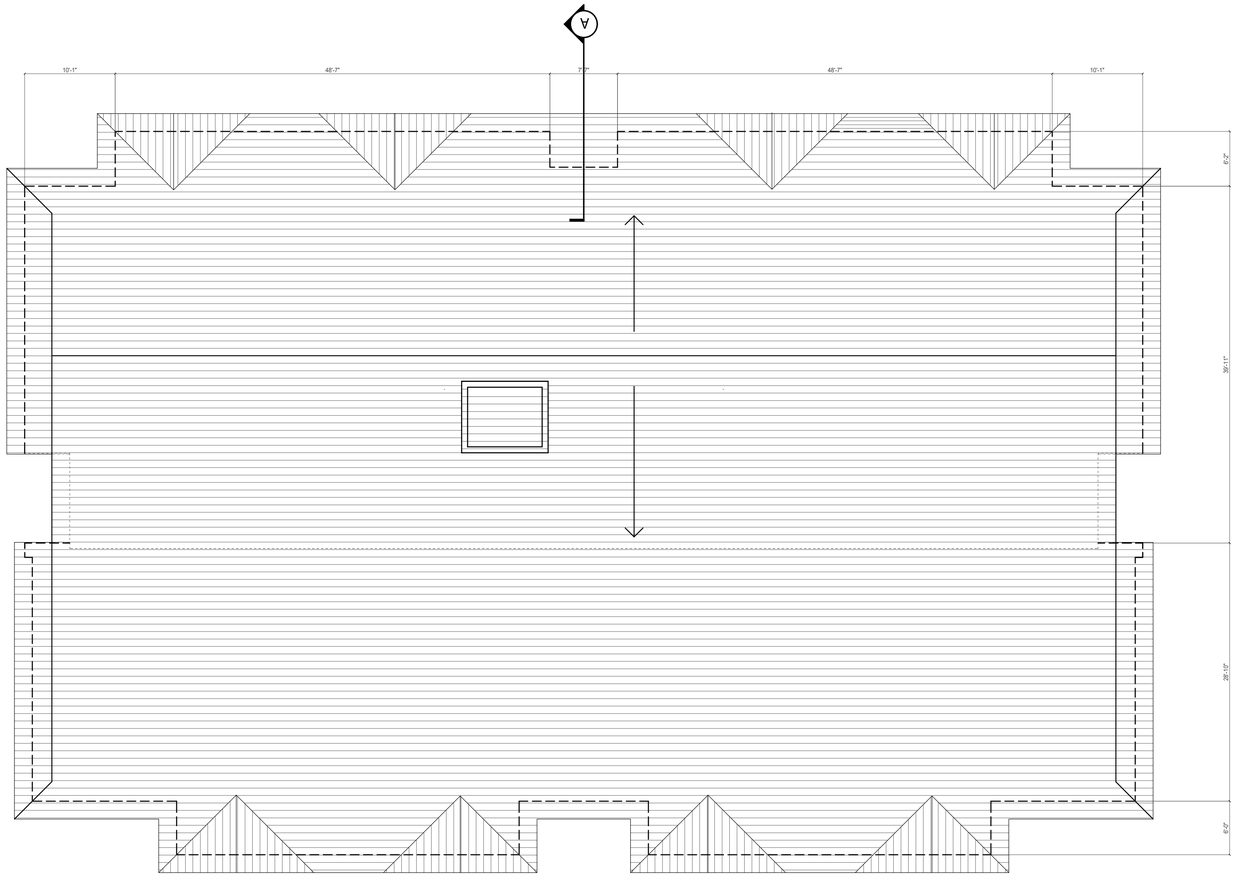
PROJECT:
GLENWOOD SPRINGS
COLORADO

BY:	DATE	COMMENT
RC	12/26/2020	
RC	07/26/2021	2

DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE I

A-5



BUILDING TYPE I - ROOF

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	Comment	DATE
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

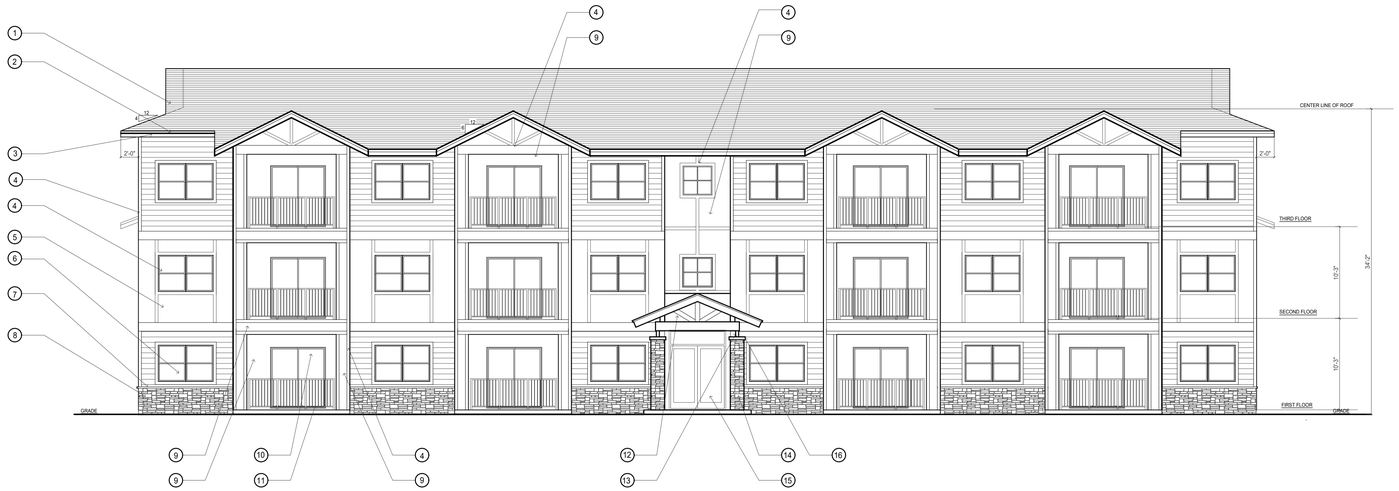
BUILDING TYPE I

A-6



BUILDING TYPE I - NORTH ELEVATION

1/8" = 1'-0"



BUILDING TYPE I - SOUTH ELEVATION

1/8" = 1'-0"

EXTERIOR FINISH SCHEDULE - BUILDING TYPE III			
LABEL	ITEM	PRODUCT	COLOR
1	ROOFING	CERTAINTEED ASPHALT SHINGLES- LANDMARK PRO SOLARIS	CINDER BLACK
2	FASCIA	HARDIE BOARD - 5/4 BOARD 7.25" WIDE	ARTIC WHITE
3	SOFFIT	HARDIETRIM BOARD - 24" WIDE	ARTIC WHITE
4	TRIM	HARDIE TRIM BOARD - 4" WIDE	ARTIC WHITE
5	SIDING	HARDIE PLANK LAP SIDING - CEDAR MILL- 7" HIGH	NAVAJO BEIGE
6	WINDOW	ALUMINUM - SINGLE HUNG	BRONZE
7	STONE SILL	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
8	STONE CLADDING	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
9	STUCCO - BUILDINGS	HARDIE PANEL VERTICAL SIDING STUCCO	MONTEREY TAUPE
10	BALCONY DOOR	ALUMINUM SLIDING GLASS DOOR	WHITE
11	RAILING - BALCONY	ALUMINUM PICKET RAILING	WHITE
12	BUIDING ENTRANCE CANOPY	HEAVY TIMER FRAMING	MINWAX JACOBEEAN #2750
13	BUILDING ENTRY COLUMNS	STRUCTURAL STEEL	BLACK
14	STONE CLADDED COLUMN	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
15	ENTRANCE DOOR	ALUMINUM GLASS DOOR	WHITE
16	STONE COLUMN CAP	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
17	RAILING - ROOF DECK COMMON AMENITY SPACE	ALUMINUM PICKET RAILING	WHITE
18	STUCCO - RESIDENTIAL GARAGES	3 - COAT SMOOTH CEMENT STUCCO FINISH	MONTEREY TAUPE
19	GARAGE DOOR	INSULATED METAL	WHITE
20	DOOR	METAL CLAD DOOR	MONTEREY TAUPE

BUILDING TYPE I					
NORTH ELEVATION			SOUTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET		SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	4089	NA	GROSS WALL	3866.00	NA
NET STONE CLADDING	169.91	4.2%	NET STONE CLADDING	187.48	4.8%
NET SIDING	1460.59	35.7%	NET SIDING	1371.74	35.5%
NET STUCCO FINISH	1584	38.7%	NET STUCCO FINISH	1269.10	32.8%
NET GLAZING	874.5	21.4%	NET GLAZING	1037.68	26.8%
EAST ELEVATION			WEST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET		SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	3294	NA	GROSS WALL	3294	NA
NET STONE CLADDING	-	-	NET STONE CLADDING	-	-
NET SIDING	2672.23	81.1%	NET SIDING	2672.23	81.1%
NET STUCCO FINISH	451.37	13.7%	NET STUCCO FINISH	451.37	13.7%
NET GLAZING	170.4	5.2%	NET GLAZING	170.4	5.2%

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PROJECT:
GLENWOOD SPRINGS
COLORADO

DATE	COMMENT	BY
07/26/2021		RC
12/26/2020		
1/8" = 1'-0"		

REV: 2

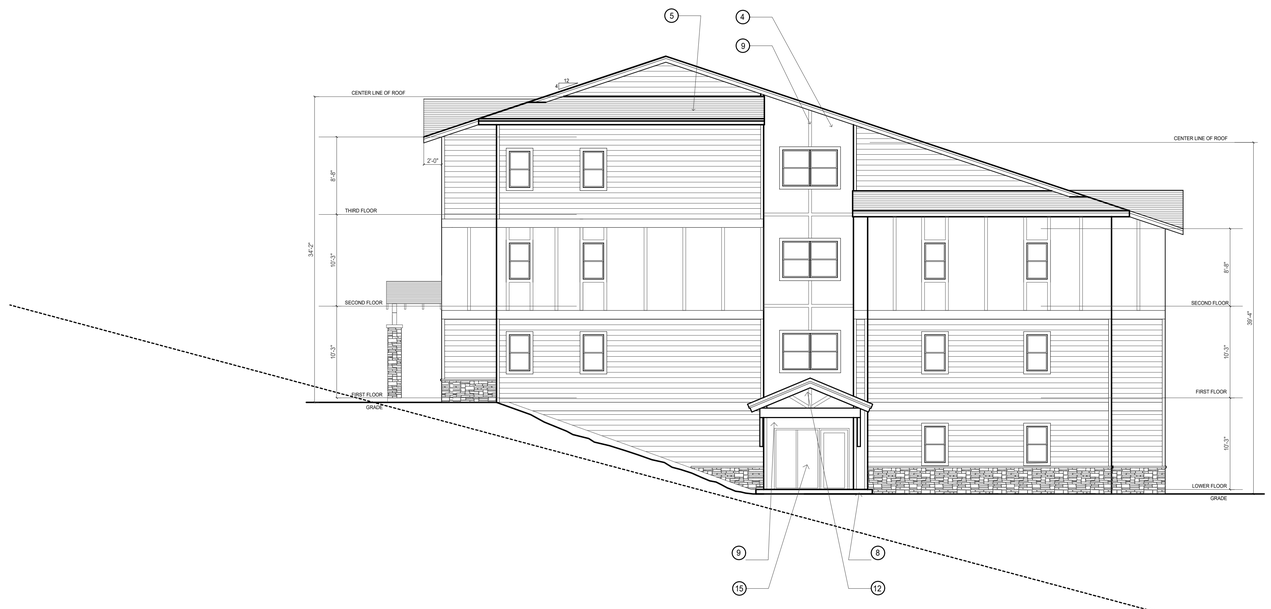
BUILDING TYPE I

A – 7



BUILDING TYPE I - EAST ELEVATION

1/8" = 1'-0"



BUILDING TYPE I - WEST ELEVATION

1/8" = 1'-0"

BUILDING TYPE I - EAST ELEVATION

1/8" = 1'-0"

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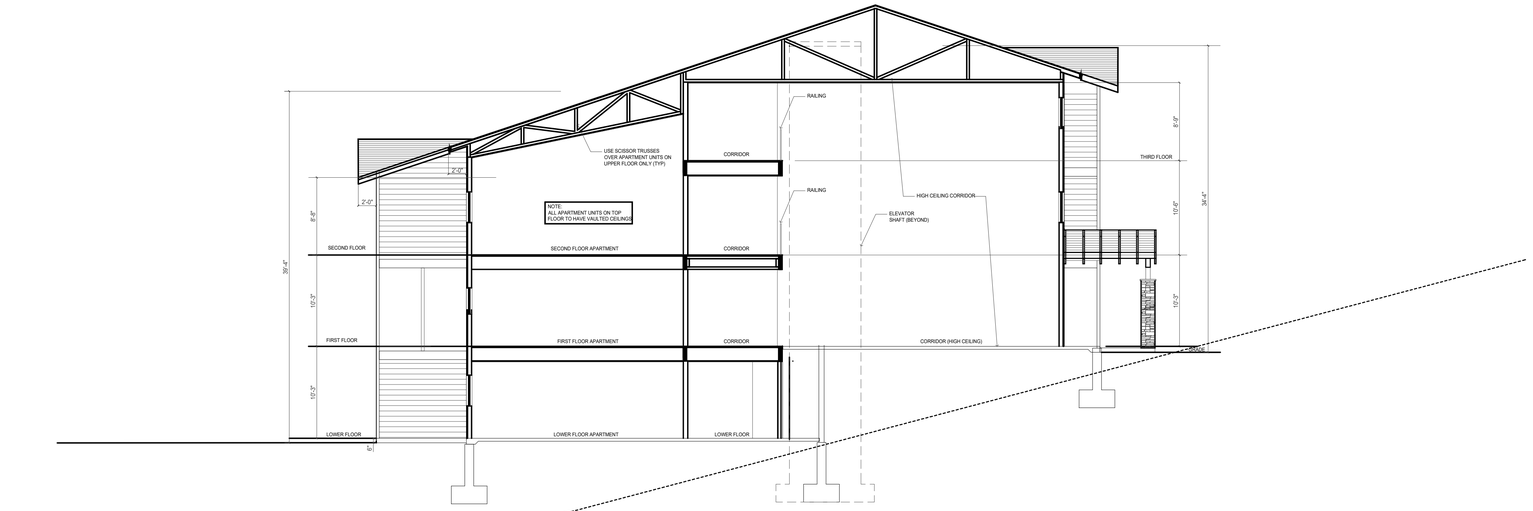
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE I

A-8



BUILDING TYPE I - SECTION A

1/8" = 1'-0"

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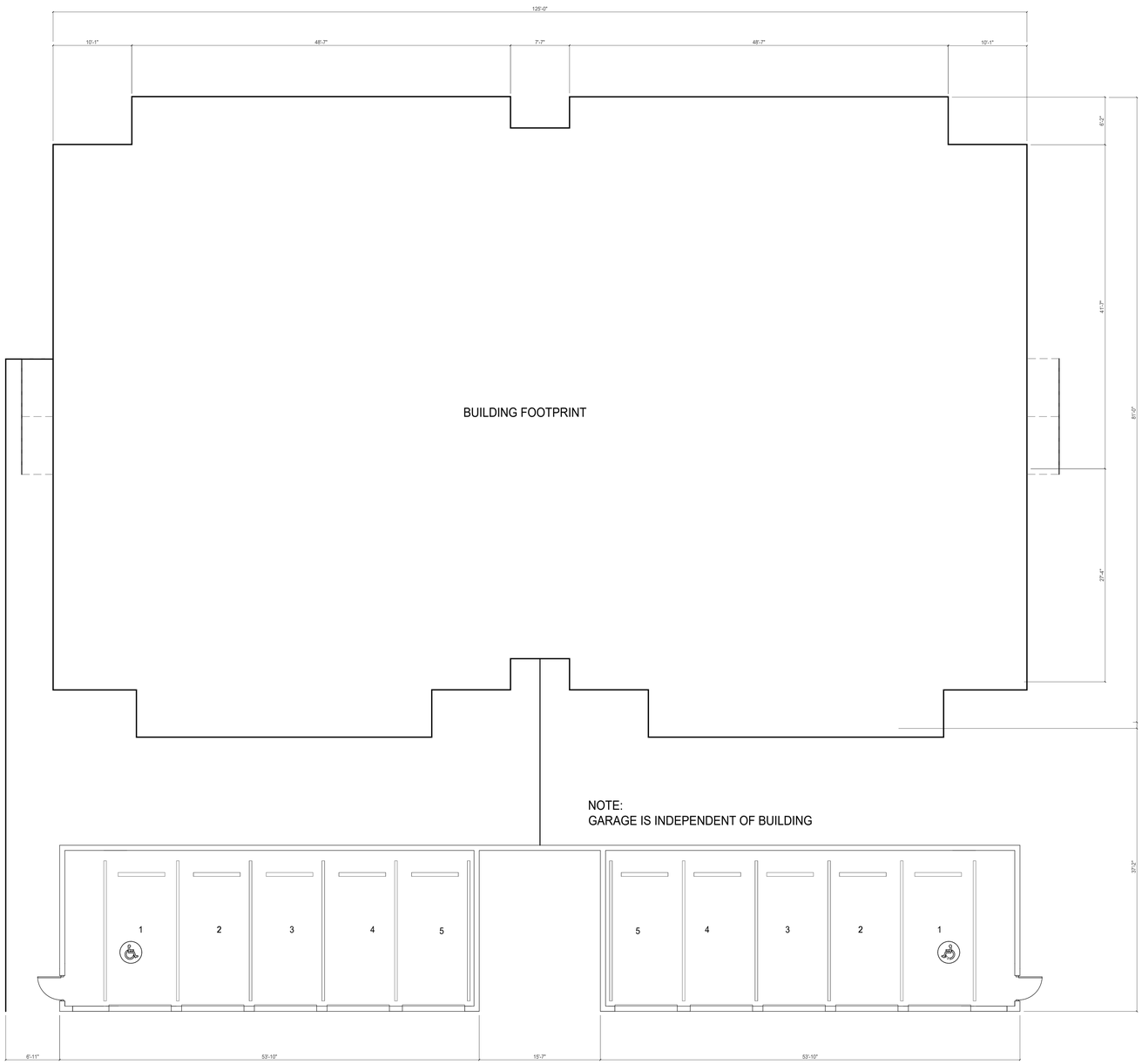
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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	Comment	DATE
BY:	RC	
DATE:	12/26/2020	
SCALE:	1/8" = 1' - 0"	

BUILDING TYPE I

A–9



BUILDING TYPE II - GARAGE LEVEL

1/8" = 1'-0"

BUILDING TYPE II				
LEVEL	GROSS AREA	OPEN FLOOR CORRIORS	CORRIDOR, ELEVATOR AND STORAGE	NET AREA
GARAGE (10 CARS)	2,630	0	0	2630
LOWER LEVEL	6,038	0	1830	4208
1ST LEVEL	9,778	0	1653	8125
2ND LEVEL	8,245	486	1147	6612
3RD LEVEL	5,697	243	1508	3946
TOTAL BUILDING	32,388			22,891
NO. OF BUILDINGS	3			3
TOTAL FOR BUILDING TYPE II	97,164			68,673

PHASE I - 300 APARTMENTS TOTAL					
BUILDING TYPE	I	II	III	TOTAL BUILDINGS	
NO. OF BUILDINGS	7	3	3	13	
Unit Types					%
3 BEDROOM	42	-	-	42	14.00%
2 BEDROOM - UNIT C1	0	36	36	72	24.00%
2 BEDROOM - UNIT C2	42	-	-	42	14.00%
1 BEDROOM - UNIT B1	0	24	36	60	20.00%
1 BEDROOM - UNIT B2	42	-	-	42	14.00%
STUDIO	42	-	-	42	14.00%
TOTAL UNITS	168	60	72	300	100.00%

PHASE I - 300 APARTMENTS TOTAL					
APARTMENT TYPE	NUMBER OF APARTMENTS	APARTMENT AREAS (SF)			TOTAL AREA (SF)
		INTERIOR	BALCONY	INTERIOR & BALCONY	
3 BEDROOM	42	1,269	80	1,349	56,658
2 BEDROOM - UNIT C1	72	1,126	80	1,206	86,832
2 BEDROOM - UNIT C2	42	1,109	80	1,189	49,938
1 BEDROOM - UNIT B1	60	704	80	784	47,040
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STUDIO	42	593	80	673	28,266
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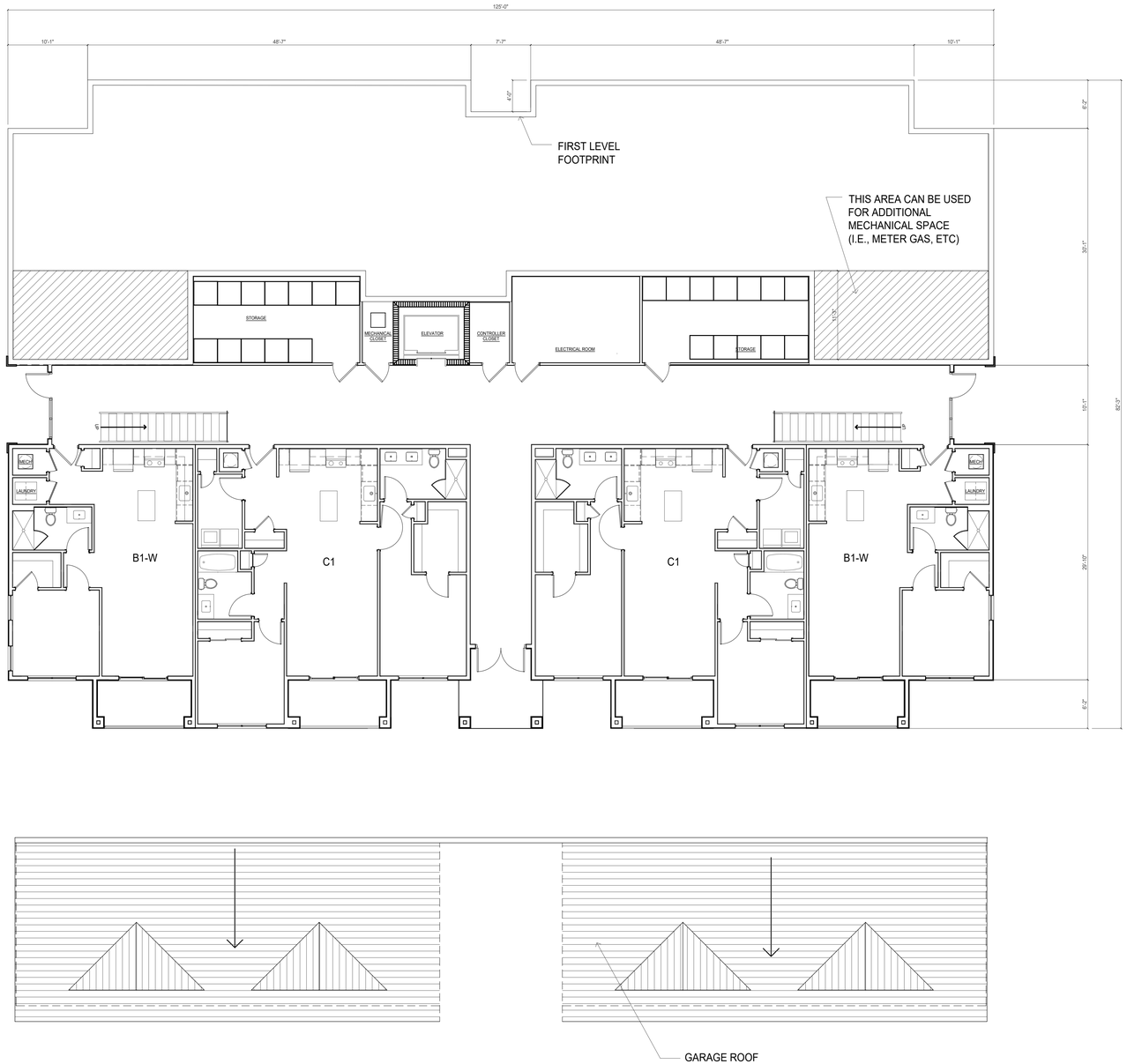
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	DATE	COMMENT
2	07/28/2021	

BY: RC
DATE: 12/28/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE II

A-10



BUILDING TYPE II - LOWER LEVEL

1/8" = 1'-0"

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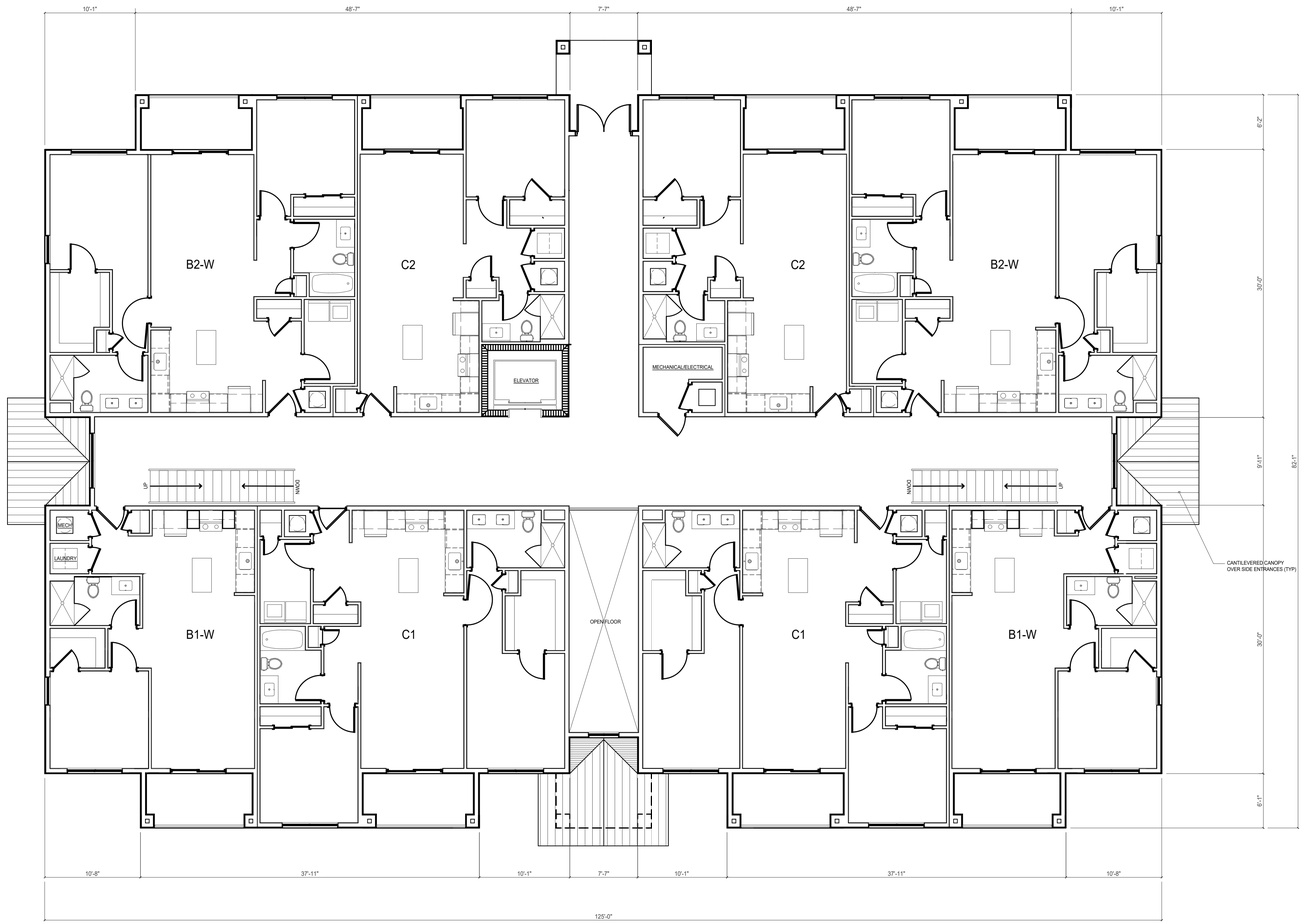
BLDGROUP
1500 Cordova Road - Suite 300
Ft Lauderdale, FL 33316

PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE
BY:	R/C	
DATE:	12/26/2020	
SCALE:	1/8" = 1' - 0"	

BUILDING TYPE II

A–11



BUILDING TYPE II - FIRST FLOOR

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

BY: RC
DATE: 12/24/2020
SCALE: 1/8" = 1' - 0"

BUILDING TYPE II

A–12



BUILDING TYPE II - SECOND FLOOR

1/8" = 1'-0"

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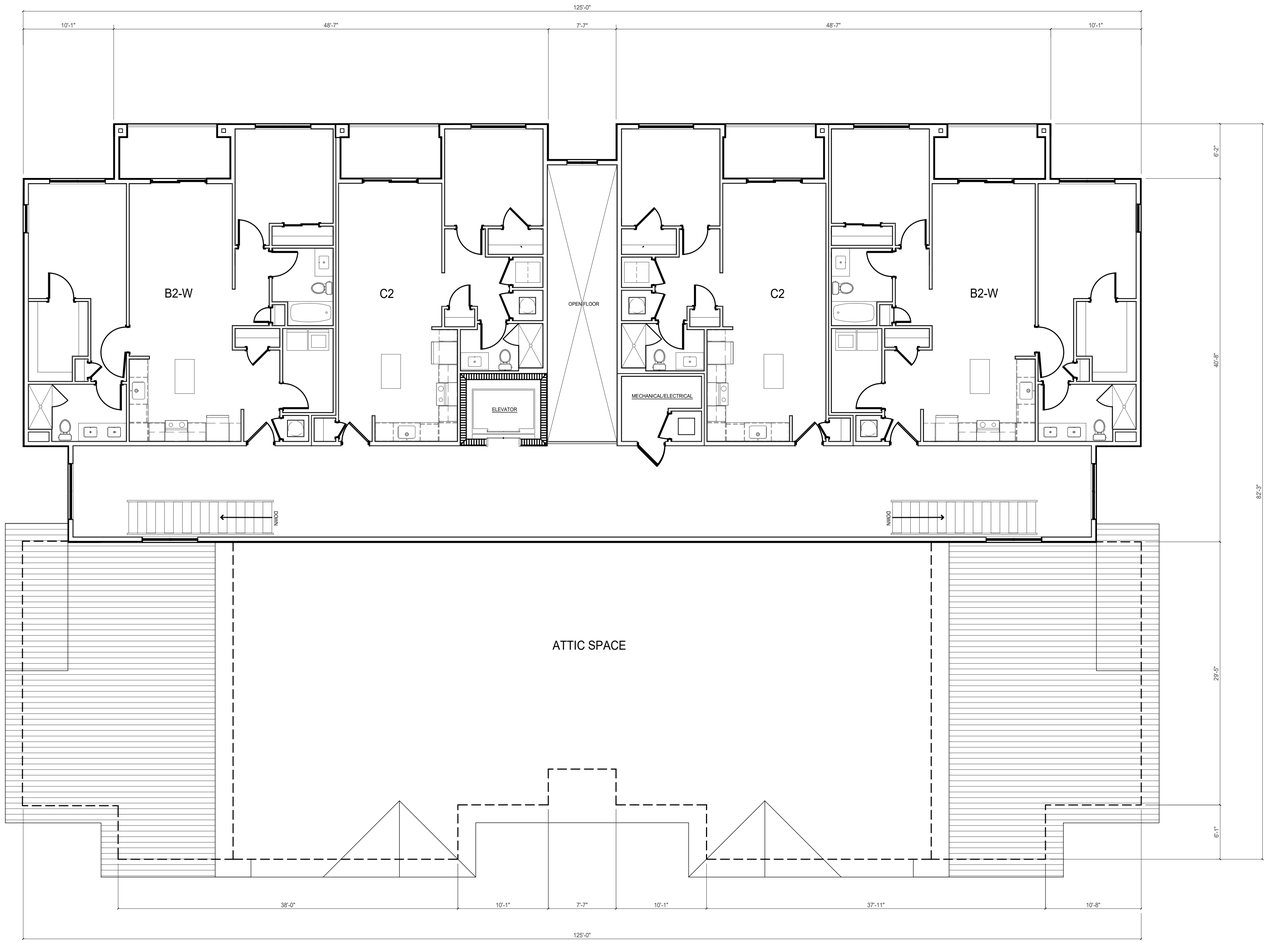
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE II

A-13



BUILDING TYPE II - THIRD FLOOR

1/8" = 1'-0"

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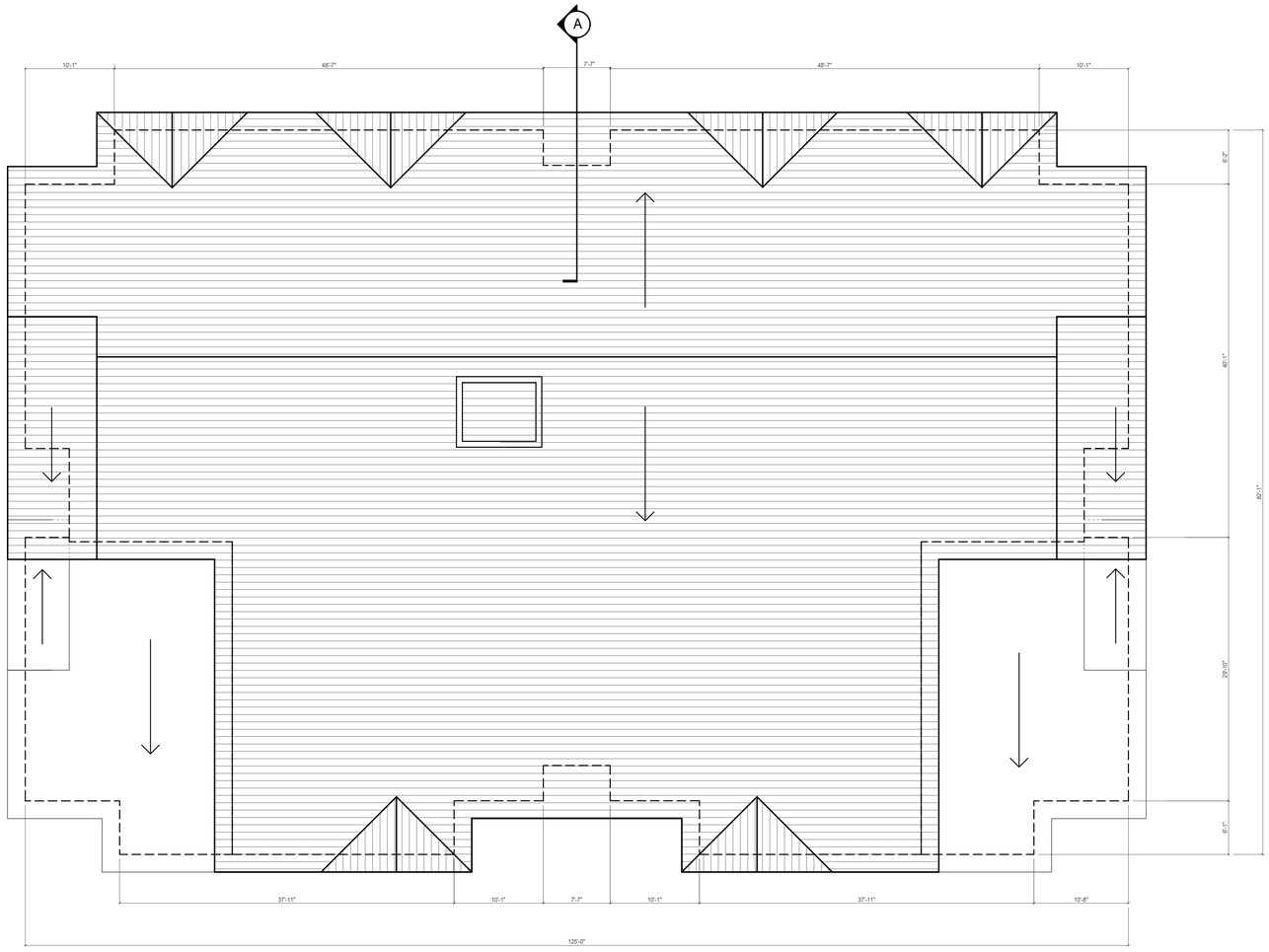
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	Comment	DATE
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE II

A-14



BUILDING TYPE II - ROOF

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	Comment	DATE
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1' - 0"

BUILDING TYPE II

A-15



BUILDING TYPE II - NORTH ELEVATION

1/8" = 1'-0"



BUILDING TYPE II - SOUTH ELEVATION

1/8" = 1'-0"

EXTERIOR FINISH SCHEDULE - BUILDING TYPE III			
LABEL	**ITEM**	**PRODUCT**	**COLOR**
1	ROOFING	CERTAINTEED ASPHALT SHINGLES- LANDMARK PRO SOLARIS	CINDER BLACK
2	FASCIA	HARDIE BOARD - 5/4 BOARD 7.25" WIDE	ARTIC WHITE
3	SOFFIT	HARDIETRIM BOARD - 24" WIDE	ARTIC WHITE
4	TRIM	HARDIE TRIM BOARD - 4" WIDE	ARTIC WHITE
5	SIDING	HARDIE PLANK LAP SIDING - CEDAR MILL- 7" HIGH	NAVAJO BEIGE
6	WINDOW	ALUMINUM - SINGLE HUNG	BRONZE
7	STONE SILL	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
8	STONE CLADDING	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
9	STUCCO - BUILDINGS	HARDIE PANEL VERTICAL SIDING STUCCO	MONTEREY TAUPE
10	BALCONY DOOR	ALUMINUM SLIDING GLASS DOOR	WHITE
11	RAILING - BALCONY	ALUMINUM PICKET RAILING	WHITE
12	BUIDING ENTRANCE CANOPY	HEAVY TIMER FRAMING	MINWAX JACOBEEAN #2750
13	BUILDING ENTRY COLUMNS	STRUCTURAL STEEL	BLACK
14	STONE CLADDED COLUMN	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
15	ENTRANCE DOOR	ALUMINUM GLASS DOOR	WHITE
16	STONE COLUMN CAP	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
17	RAILING - ROOF DECK COMMON AMENITY SPACE	ALUMINUM PICKET RAILING	WHITE
18	STUCCO - RESIDENTIAL GARAGES	3 - COAT SMOOTH CEMENT STUCCO FINISH	MONTEREY TAUPE
19	GARAGE DOOR	INSULATED METAL	WHITE
20	DOOR	METAL CLAD DOOR	MONTEREY TAUPE

BUILDING TYPE II					
	NORTH ELEVATION			**SOUTH ELEVATION**	
	SURFACE AREA	**PERCENTAGE OF NET**		**SURFACE AREA**	**PERCENTAGE OF NET**
GROSS WALL	4071	NA	**GROSS WALL**	3866.00	NA
NET STONE CLADDING	212.56	-	**NET STONE CLADDING**	#REF!	#REF!
NET SIDING	1720.9	42.3%	**NET SIDING**	#REF!	#REF!
NET STUCCO FINISH	1126.73	27.7%	**NET STUCCO FINISH**	1269.10	32.8%
NET GLAZING	1010.81	24.8%	**NET GLAZING**	1037.68	26.8%
	EAST ELEVATION			**WEST ELEVATION**	
	SURFACE AREA	**PERCENTAGE OF NET**		**SURFACE AREA**	**PERCENTAGE OF NET**
GROSS WALL	3270.19	NA	**GROSS WALL**	3270.19	NA
NET STONE CLADDING	-	-	**NET STONE CLADDING**	-	-
NET SIDING	2759.89	84.4%	**NET SIDING**	2759.89	84.4%
NET STUCCO FINISH	377.67	11.5%	**NET STUCCO FINISH**	377.67	11.5%
NET GLAZING	132.63	4.1%	**NET GLAZING**	132.63	4.1%

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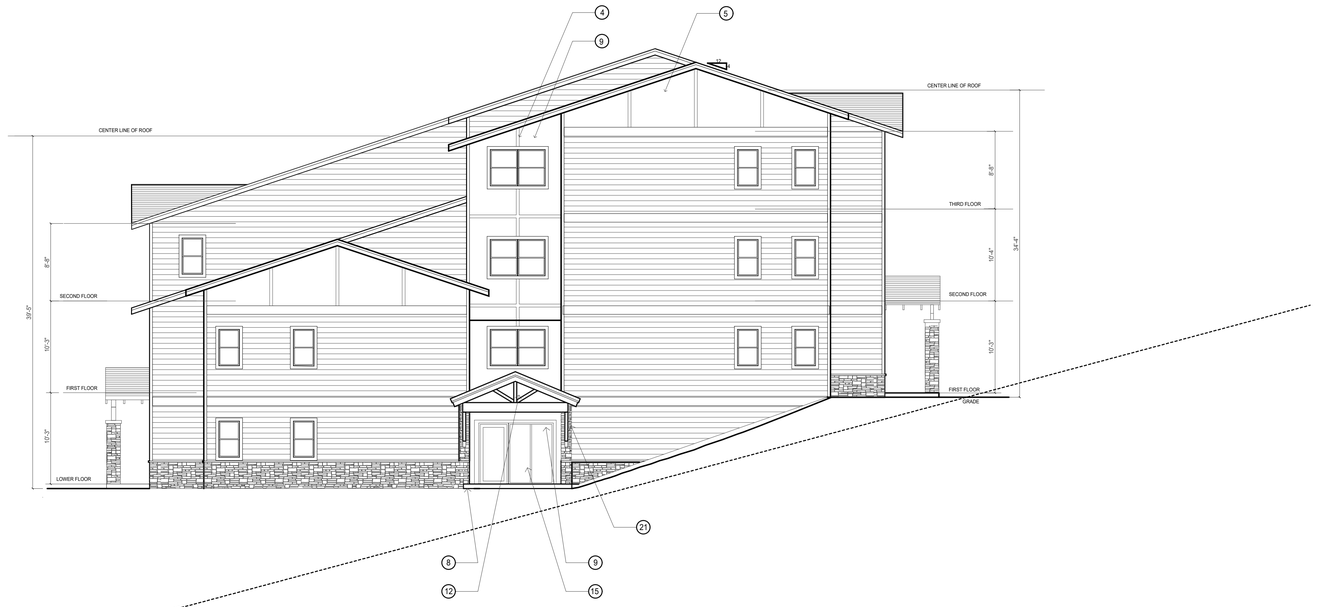
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE
2	07/26/2021	

BY: RC
DATE: 12/29/2020
SCALE: 1/8" = 1'-0"

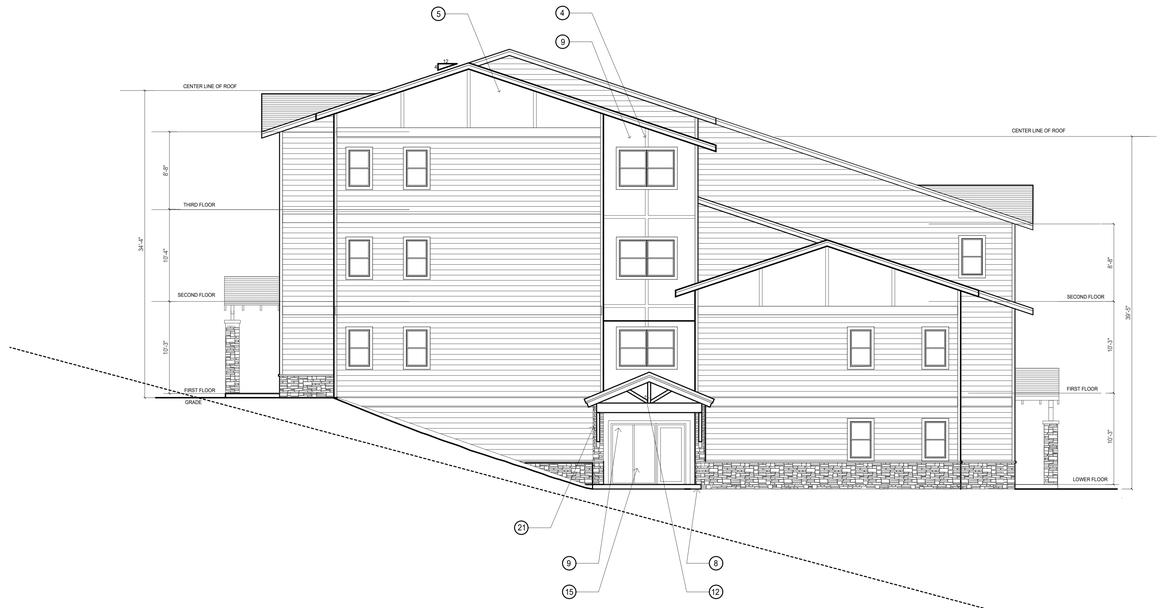
BUILDING TYPE II

A-16



BUILDING TYPE II - EAST ELEVATION

1/8" = 1'-0"



BUILDING TYPE II - EAST ELEVATION

1/8" = 1'-0"

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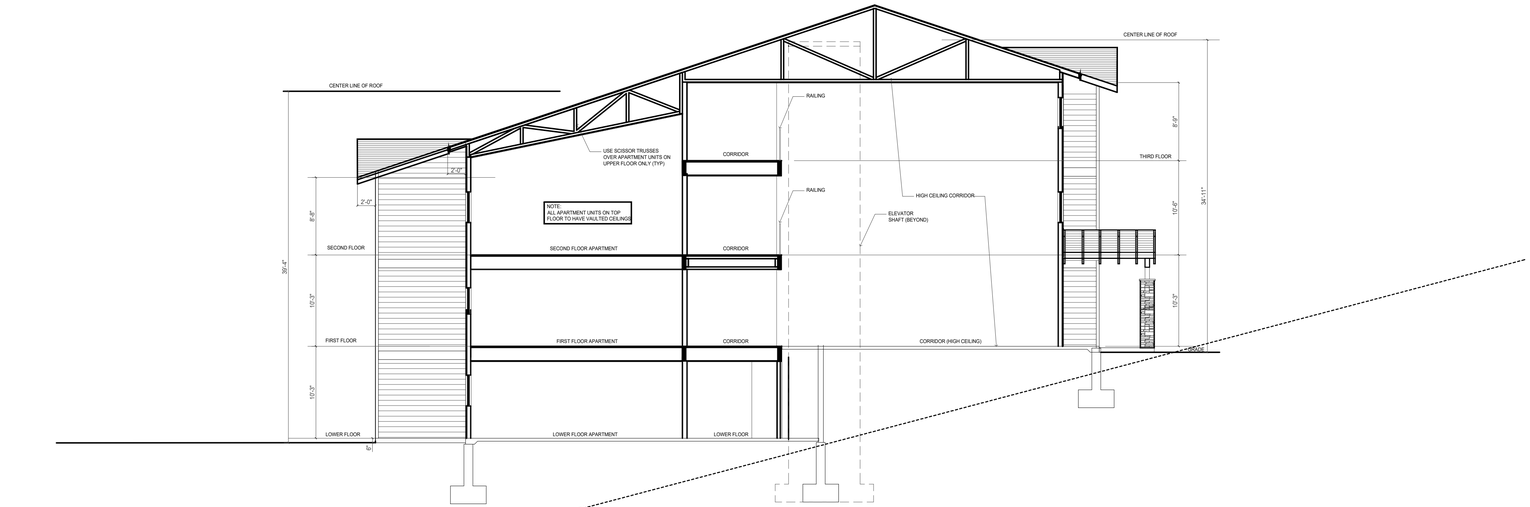
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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV:	COMMENT	DATE
		BY: RC
		DATE: 12/28/2020
		SCALE: 1/8" = 1'-0"

BUILDING TYPE II

A-17



BUILDING TYPE II - SECTION A

1/8" = 1'-0"

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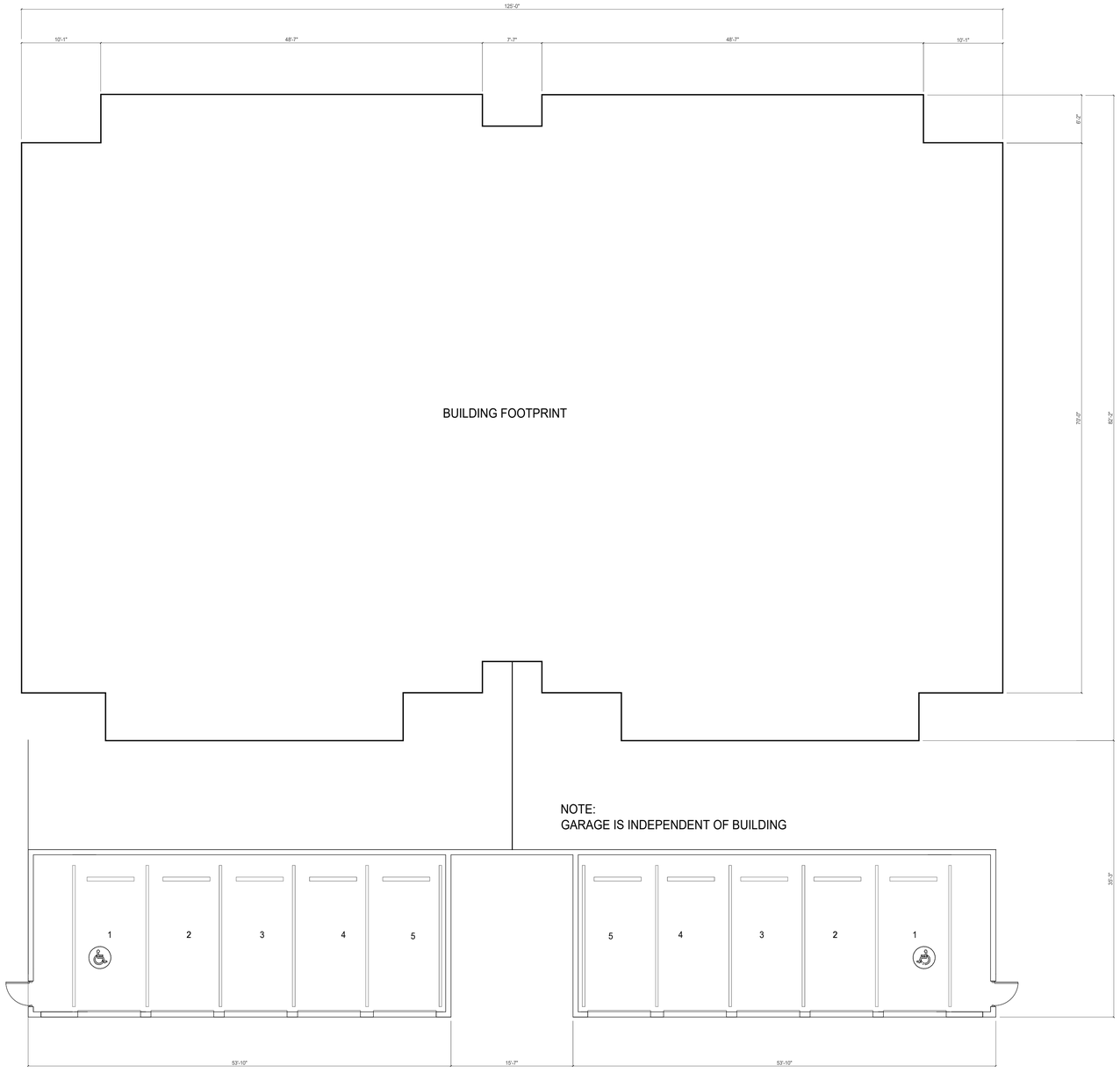
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

BY: RC
DATE: 12/28/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE II

A-18



BUILDING TYPE III - GARAGE LEVEL

1/8" = 1'-0"

BUILDING TYPE III				
LEVEL	GROSS AREA	OPEN FLOOR CORRIORS	CORRIDOR, ELEVATOR AND STORAGE	NET AREA
GARAGE (10 CARS)	2,630	0	0	2630
LOWER LEVEL	6,038	0	1830	4208
1ST LEVEL	9,778	0	1653	8125
2ND LEVEL	9,778	486	1147	8145
3RD LEVEL	5,675	243	1508	3924
TOTAL BUILDING	33,899			24,402
NO. OF BUILDINGS	3			3
TOTAL FOR BUILDING TYPE III	101,697			73,206

PHASE I - 300 APARTMENTS TOTAL					
BUILDING TYPE	I	II	III	TOTAL BUILDINGS	
NO. OF BUILDINGS	7	3	3	13	
Unit Types					%
3 BEDROOM	42	-	-	42	14.00%
2 BEDROOM - UNIT C1	0	36	36	72	24.00%
2 BEDROOM - UNIT C2	42	-	-	42	14.00%
1 BEDROOM - UNIT B1	0	24	36	60	20.00%
1 BEDROOM - UNIT B2	42	-	-	42	14.00%
STUDIO	42	-	-	42	14.00%
TOTAL UNITS	168	60	72	300	100.00%

PHASE I - 300 APARTMENTS TOTAL					
APARTMENT TYPE	NUMBER OF APARTMENTS	APARTMENT AREAS (SF)			TOTAL AREA (SF)
		INTERIOR	BALCONY	INTERIOR & BALCONY	
3 BEDROOM	42	1,269	80	1,349	56,658
2 BEDROOM - UNIT C1	72	1,126	80	1,206	86,832
2 BEDROOM - UNIT C2	42	1,109	80	1,189	49,938
1 BEDROOM - UNIT B1	60	704	80	784	47,040
1 BEDROOM - UNIT B2	42	711	71	782	32,844
STUDIO	42	593	80	673	28,266
					301,578

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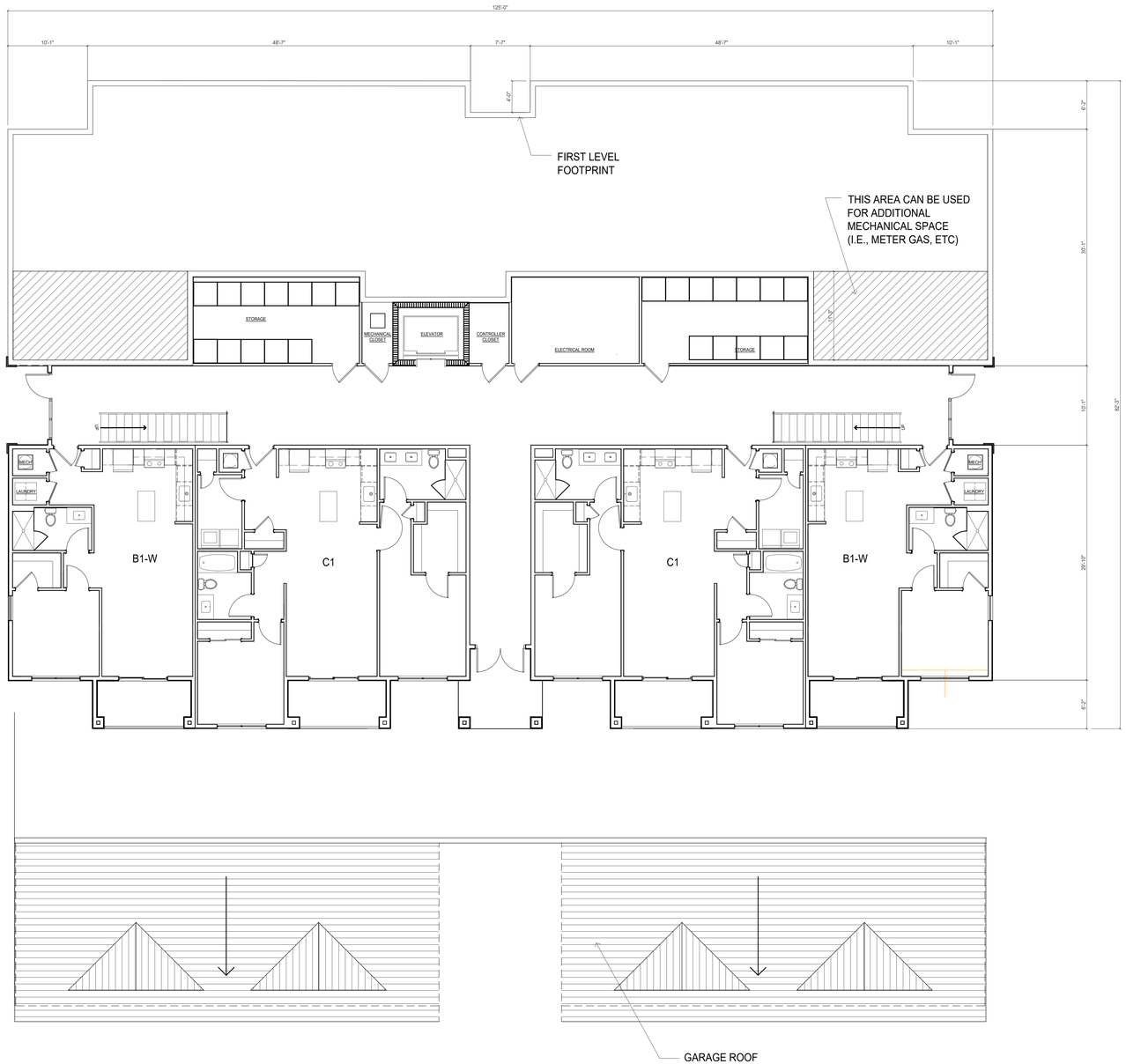
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	DATE	COMMENT
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE III

A-19



BUILDING TYPE III - LOWER LEVEL

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE III

A-20



BUILDING TYPE III - FIRST FLOOR

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	DATE	COMMENT
BY:	RC	
DATE:	12/28/2020	
SCALE:	1/8" = 1'-0"	

BUILDING TYPE III

A-21



BUILDING TYPE III - SECOND FLOOR

1/8" = 1'-0"

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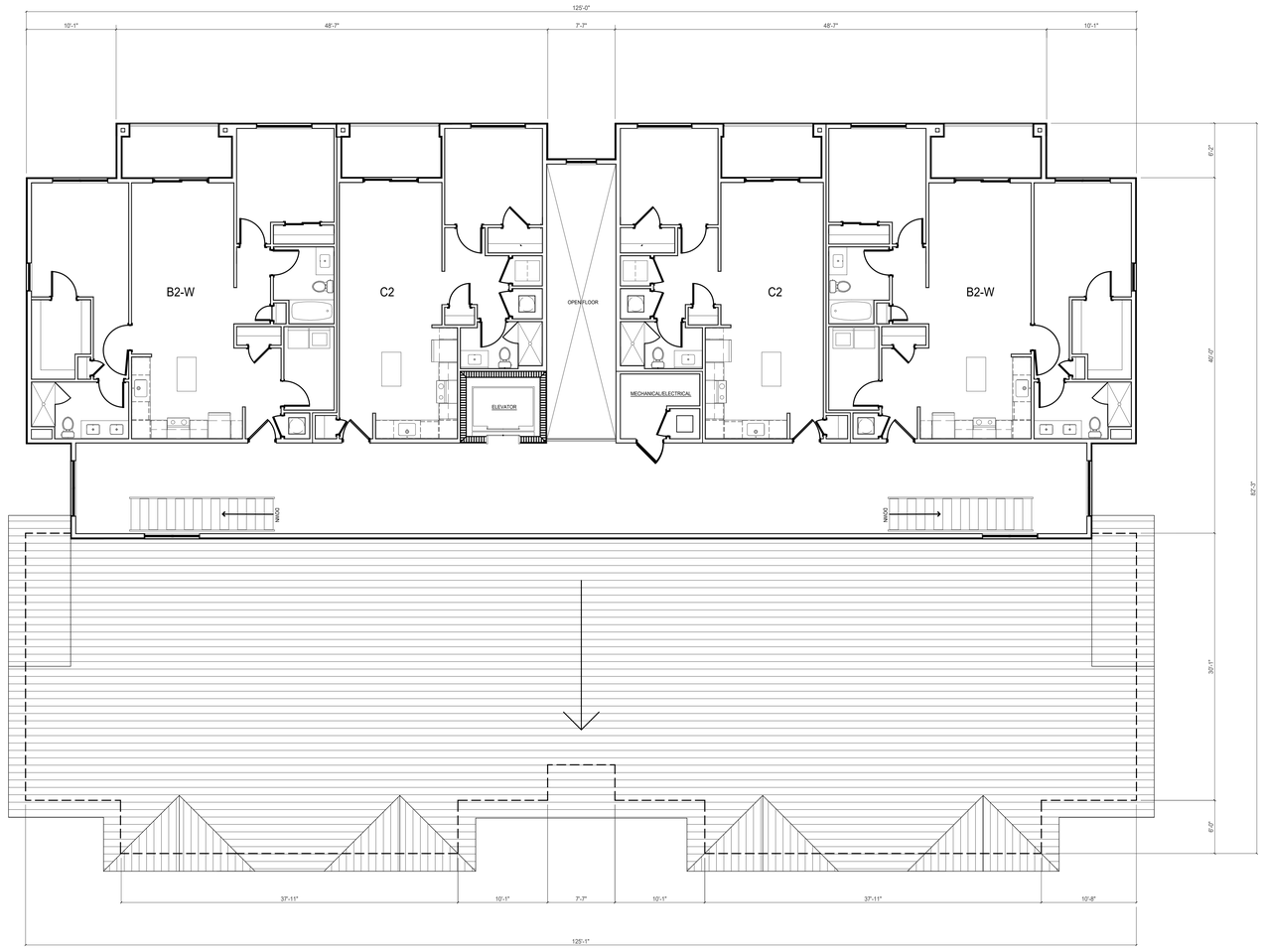
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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	Comment	DATE
	R/C	12/26/2020
	SCALE:	1/8" = 1' - 0"

BUILDING TYPE III

A-22



BUILDING TYPE III - THIRD FLOOR

1/8" = 1'-0"

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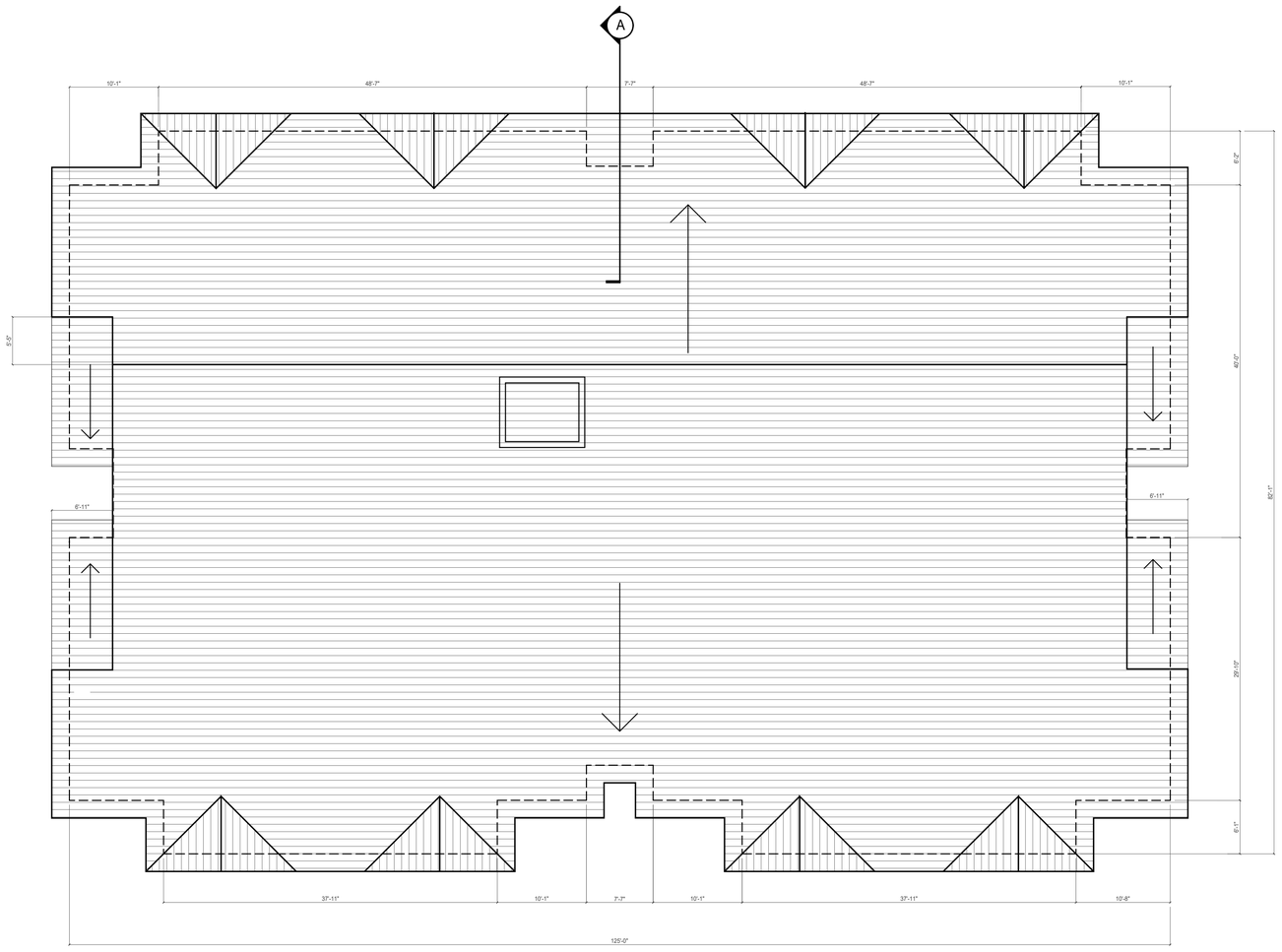
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PROJECT:
GLENWOOD SPRINGS
COLORADO

DATE	COMMENT	BY
07/26/2021		RC
		DATE: 12/26/2020
		SCALE: 1/8" = 1'-0"

BUILDING TYPE III

A-23



BUILDING TYPE III - ROOF

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	Comment	DATE
2	07/26/2021	

BY: RC
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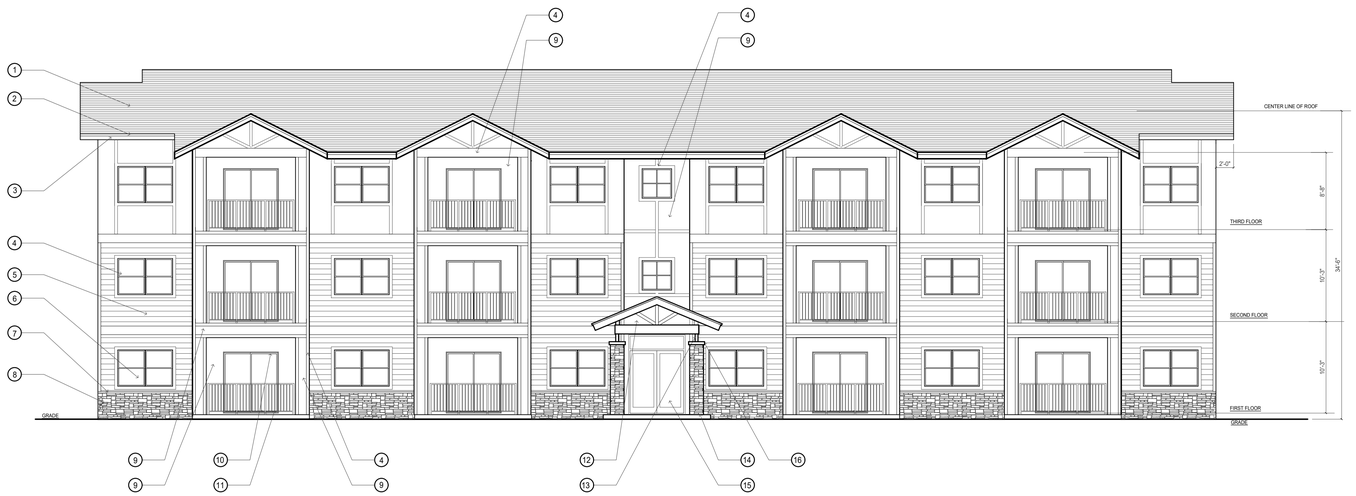
BUILDING TYPE III

A-24



BUILDING TYPE III - NORTH ELEVATION

1/8" = 1'-0"



BUILDING TYPE III - SOUTH ELEVATION

1/8" = 1'-0"

EXTERIOR FINISH SCHEDULE - BUILDING TYPE III			
LABEL	**ITEM**	**PRODUCT**	**COLOR**
1	ROOFING	CERTAINTEED ASPHALT SHINGLES- LANDMARK PRO SOLARIS	CINDER BLACK
2	FASCIA	HARDIE BOARD - 5/4 BOARD 7.25" WIDE	ARTIC WHITE
3	SOFFIT	HARDIETRIM BOARD - 24" WIDE	ARTIC WHITE
4	TRIM	HARDIE TRIM BOARD - 4" WIDE	ARTIC WHITE
5	SIDING	HARDIE PLANK LAP SIDING - CEDAR MILL- 7" HIGH	NAVAJO BEIGE
6	WINDOW	ALUMINUM - SINGLE HUNG	BRONZE
7	STONE SILL	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
8	STONE CLADDING	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
9	STUCCO - BUILDINGS	HARDIE PANEL VERTICAL SIDING STUCCO	MONTEREY TAUPE
10	BALCONY DOOR	ALUMINUM SLIDING GLASS DOOR	WHITE
11	RAILING - BALCONY	ALUMINUM PICKET RAILING	WHITE
12	BUIDING ENTRANCE CANOPY	HEAVY TIMER FRAMING	MINWAX JACOBEEAN #2750
13	BUILDING ENTRY COLUMNS	STRUCTURAL STEEL	BLACK
14	STONE CLADDED COLUMN	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
15	ENTRANCE DOOR	ALUMINUM GLASS DOOR	WHITE
16	STONE COLUMN CAP	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
17	RAILING - ROOF DECK COMMON AMENITY SPACE	ALUMINUM PICKET RAILING	WHITE
18	STUCCO - RESIDENTIAL GARAGES	3 - COAT SMOOTH CEMENT STUCCO FINISH	MONTEREY TAUPE
19	GARAGE DOOR	INSULATED METAL	WHITE
20	DOOR	METAL CLAD DOOR	MONTEREY TAUPE

BUILDING TYPE III					
NORTH ELEVATION			**SOUTH ELEVATION**		
	SURFACE AREA	**PERCENTAGE OF NET**		**SURFACE AREA**	**PERCENTAGE OF NET**
GROSS WALL	4112.73	NA	**GROSS WALL**	3866.00	NA
NET STONE CLADDING	205.64	5.0%	**NET STONE CLADDING**	#REF!	#REF!
NET SIDING	1590.56	38.7%	**NET SIDING**	#REF!	#REF!
NET STUCCO FINISH	1278.8	31.1%	**NET STUCCO FINISH**	1269.10	32.8%
NET GLAZING	1037.73	25.2%	**NET GLAZING**	1037.68	26.8%
EAST ELEVATION			**WEST ELEVATION**		
	SURFACE AREA	**PERCENTAGE OF NET**		**SURFACE AREA**	**PERCENTAGE OF NET**
GROSS WALL	3270.19	NA	**GROSS WALL**	3270.19	NA
NET STONE CLADDING	-	-	**NET STONE CLADDING**	-	-
NET SIDING	2759.89	84.4%	**NET SIDING**	2759.89	84.4%
NET STUCCO FINISH	377.67	11.5%	**NET STUCCO FINISH**	377.67	11.5%
NET GLAZING	132.63	4.1%	**NET GLAZING**	132.63	4.1%

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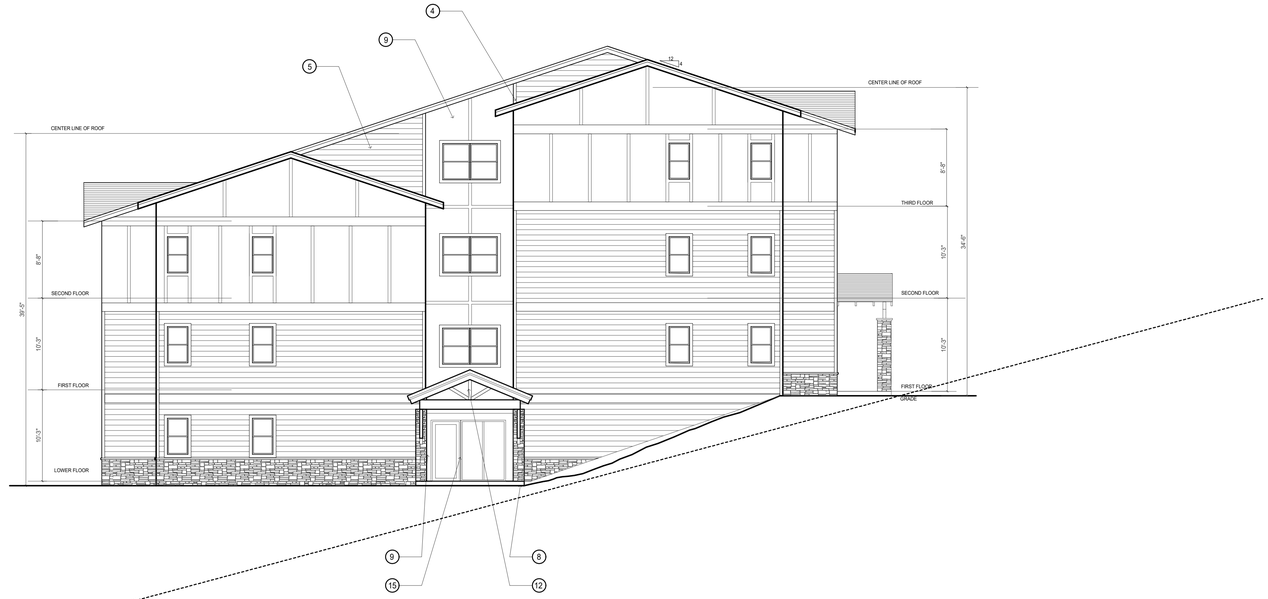
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	DATE	COMMENT
2	07/26/2021	

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DATE: 12/26/2020
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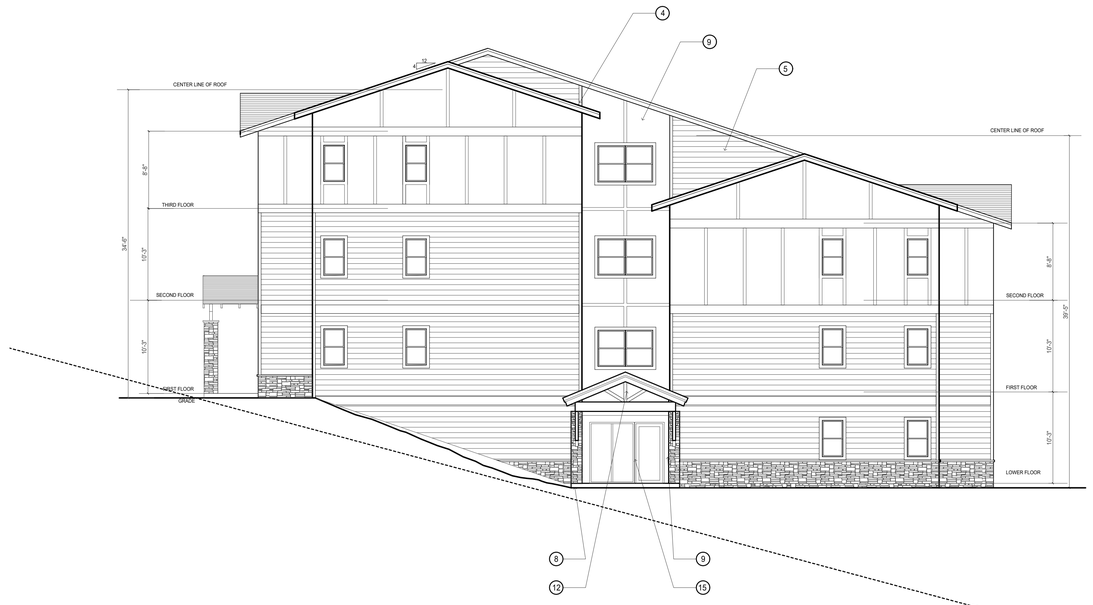
BUILDING TYPE III

A-25



BUILDING TYPE III - EAST ELEVATION

1/8" = 1'-0"



BUILDING TYPE III - WEST ELEVATION

1/8" = 1'-0"

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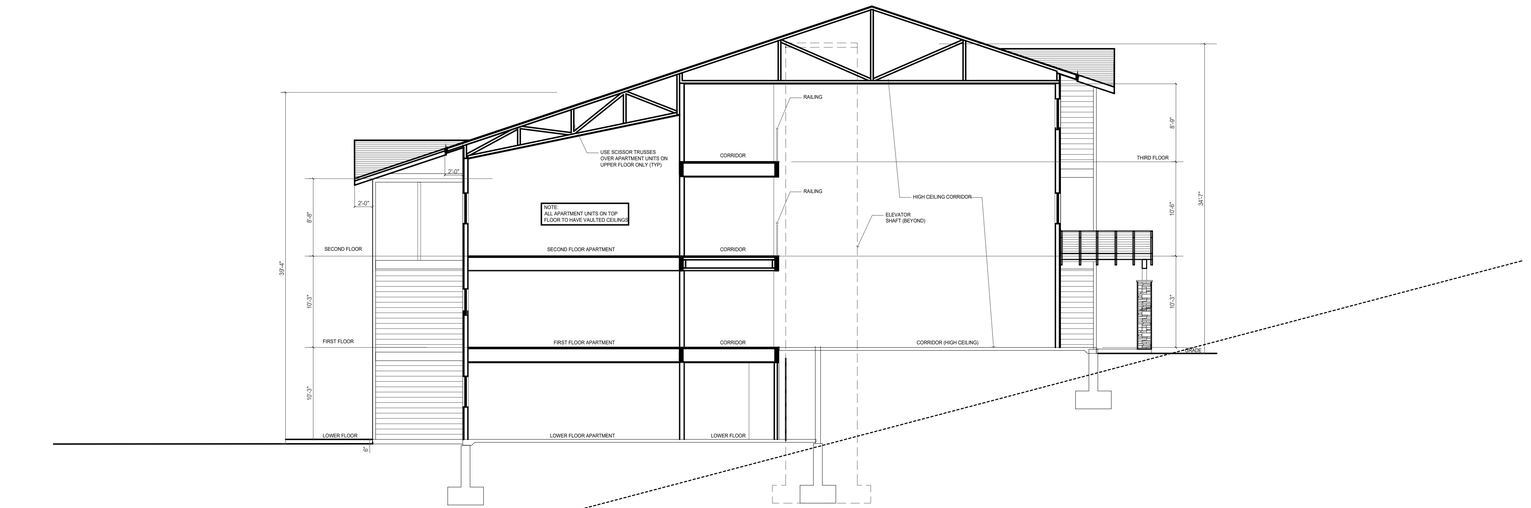
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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE
2	07/26/2021	
		BY: RC
		DATE: 12/26/2020
		SCALE: 1/8" = 1'-0"

BUILDING TYPE III

A-26



BUILDING TYPE III - SECTION A

1/8" = 1'-0"

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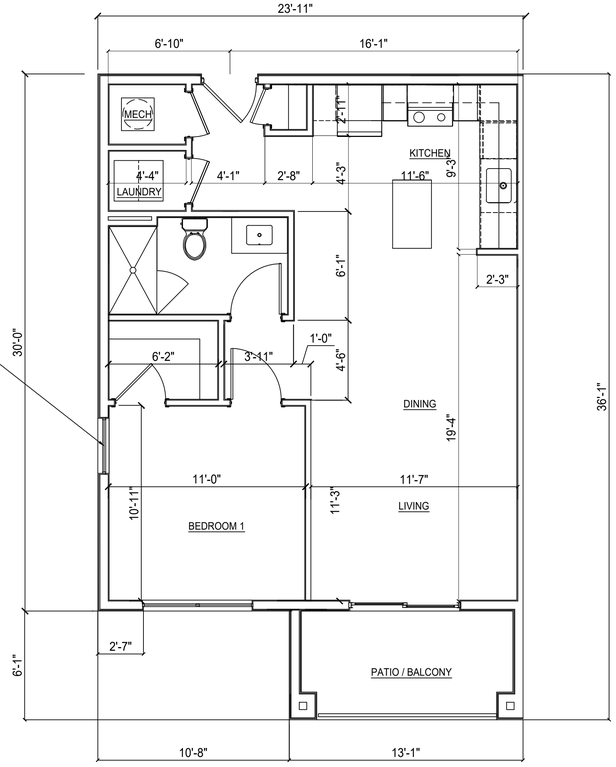
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

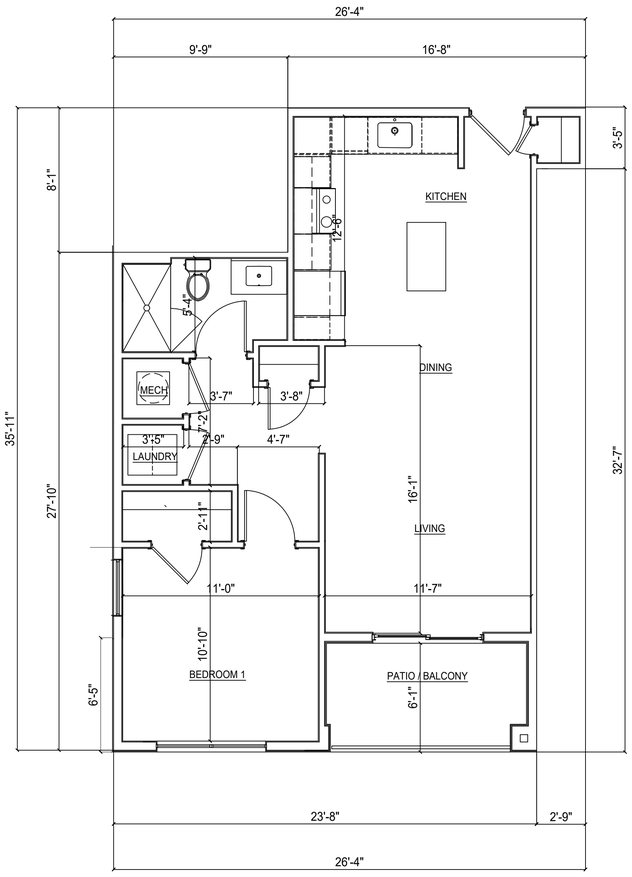
BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE III

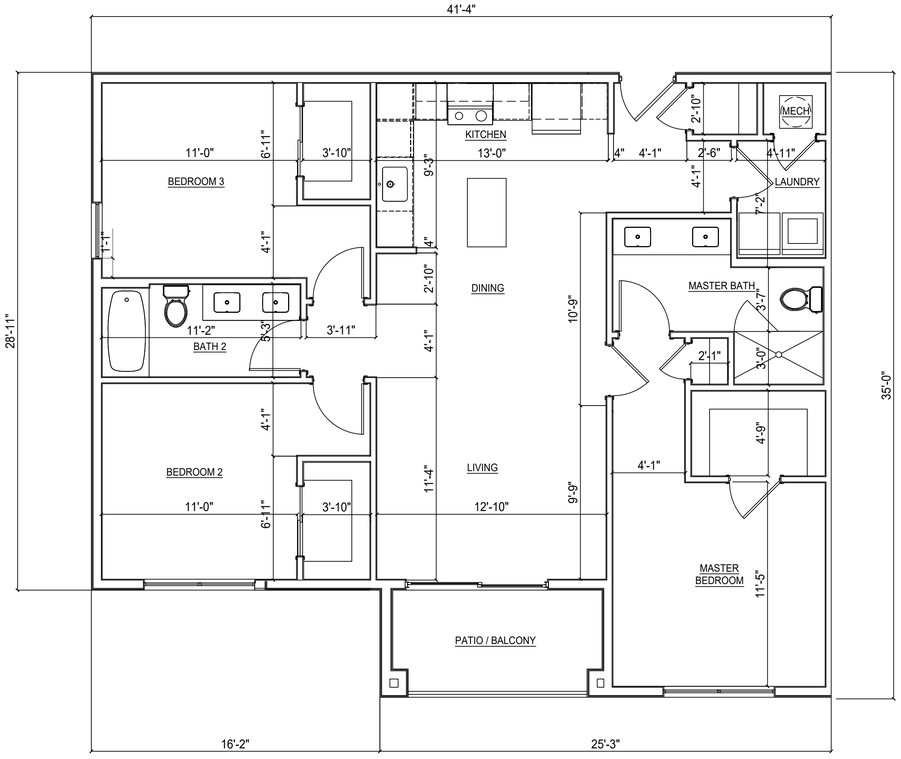
A-27



1 BEDROOM (UNIT B1)
1 BEDROOM (UNIT B1-W)
1/4" = 1'-0"



1 BEDROOM (UNIT B2)
1 BEDROOM (UNIT B2-W)
1/4" = 1'-0"



3 BEDROOM APARTMENT (UNIT D1)
1/4" = 1'-0"

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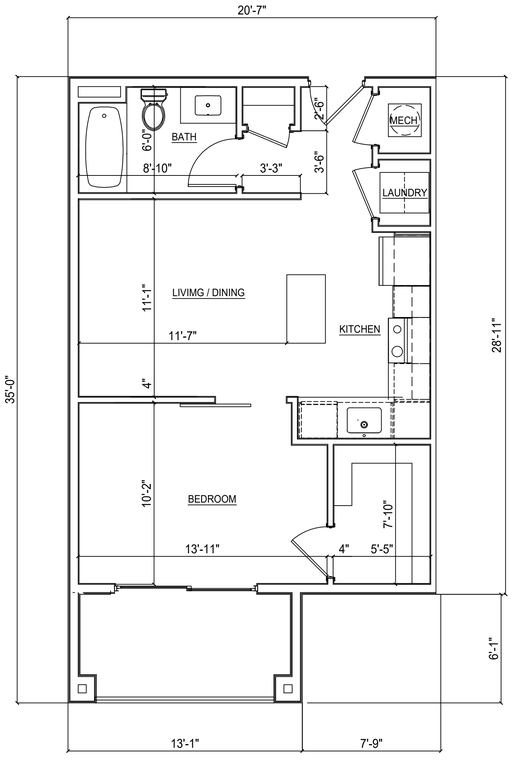
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

BY: RC
DATE: 12/26/2020
SCALE: 1/4" = 1' - 0"

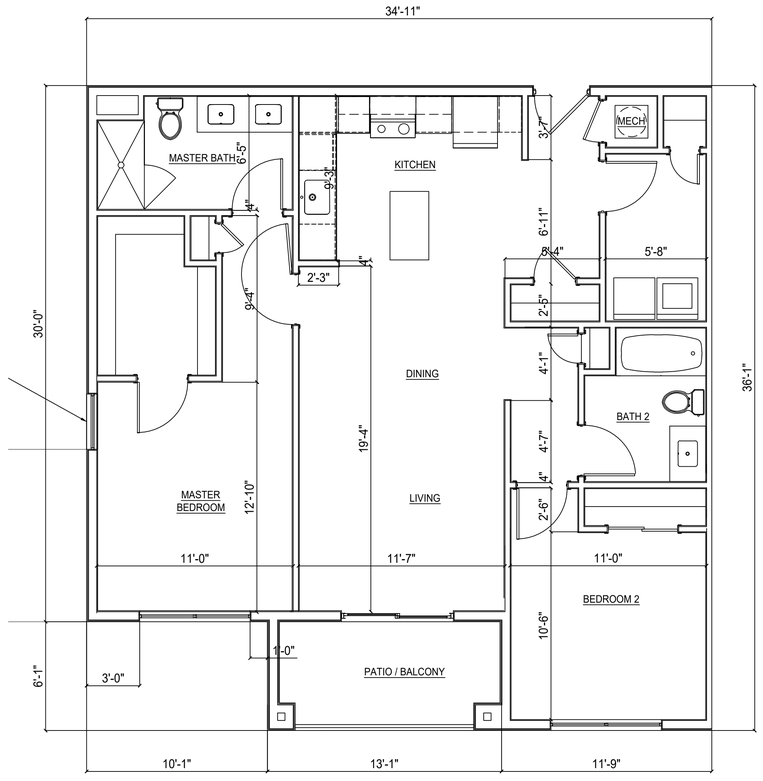
APARTMENT FLOOR PLANS

A – 28



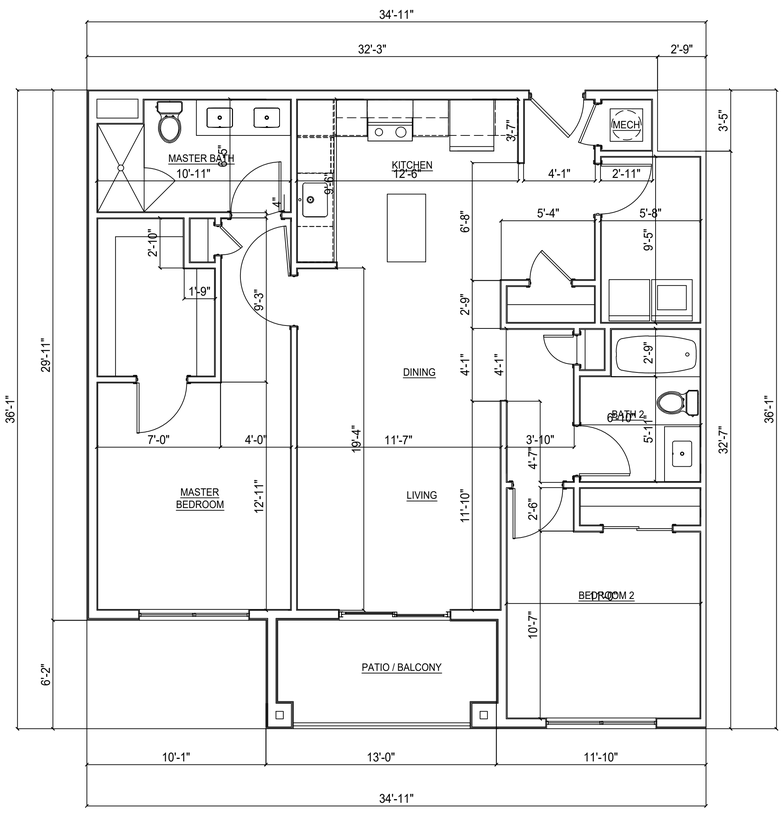
STUDIO (UNIT A1)

1/4" = 1'-0"



2 BEDROOM APARTMENT (UNIT C1)
2 BEDROOM APARTMENT (UNIT C1-W)

1/4" = 1'-0"



2 BEDROOM APARTMENT (UNIT C2)

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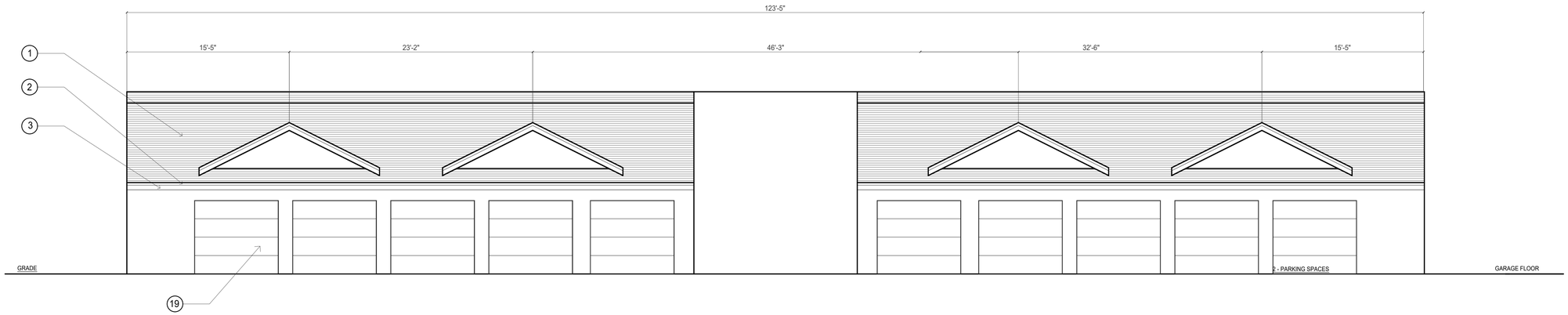
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

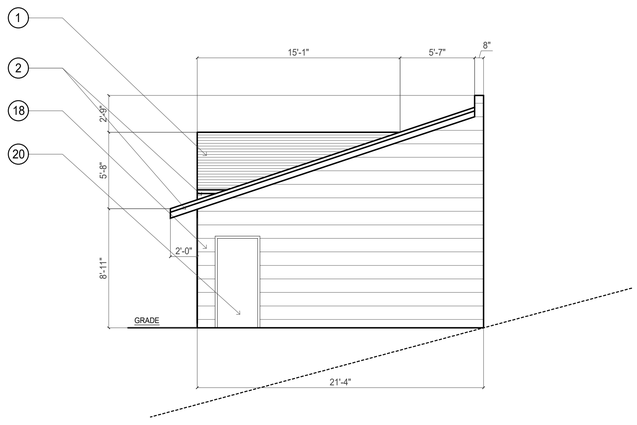
BY: RC
DATE: 12/26/2020
SCALE: 1/4" = 1'-0"

APARTMENT FLOOR PLANS

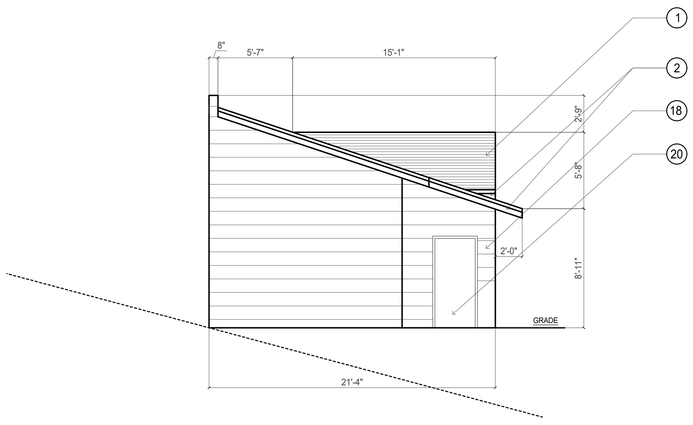
A-29



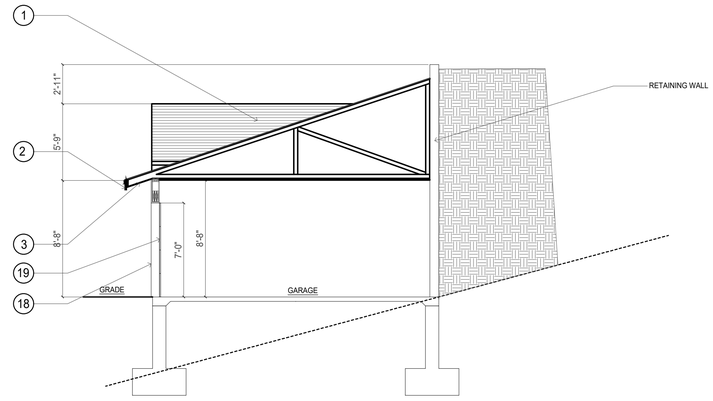
GARAGE - NORTH ELEVATION
3/16" = 1'-0"



GARAGE - EAST ELEVATION
3/16" = 1'-0"



GARAGE - WEST ELEVATION
3/16" = 1'-0"



GARAGE - SECTION
3/16" = 1'-0"

GARAGE ELEVATION FOR BUILDING TYPE I, II, III

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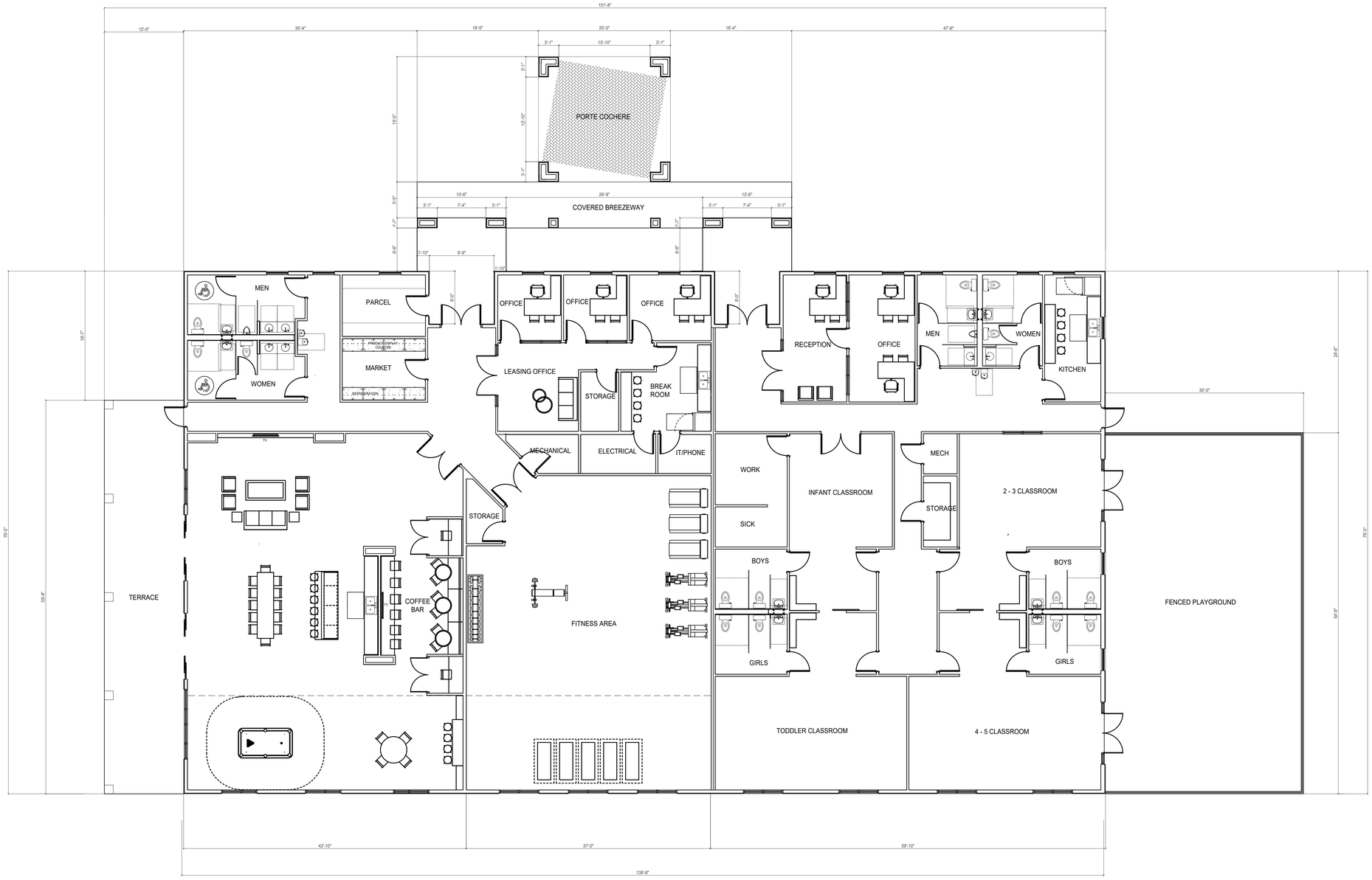
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/4" = 1'-0"

GARAGE ELEVATIONS

A-30



CLUBHOUSE **DAYCARE CENTER**

CLUBHOUSE & DAYCARE CENTER

1/8" = 1'-0"

CLUBHOUSE & DAYCARE				
LEVEL	AREA	COVERED ENTRANCE	TERRACE	TOTAL AREA
CLUBHOUSE	6,284	187	716	7187
DAYCARE	4,629	187	-	4816
BREEZEWAY	364	-	-	364
PORTE COCHERE	380	-	-	380
TOTAL FOR CLUBHOUSE	**11,657**	**374**	**716**	**12,747**

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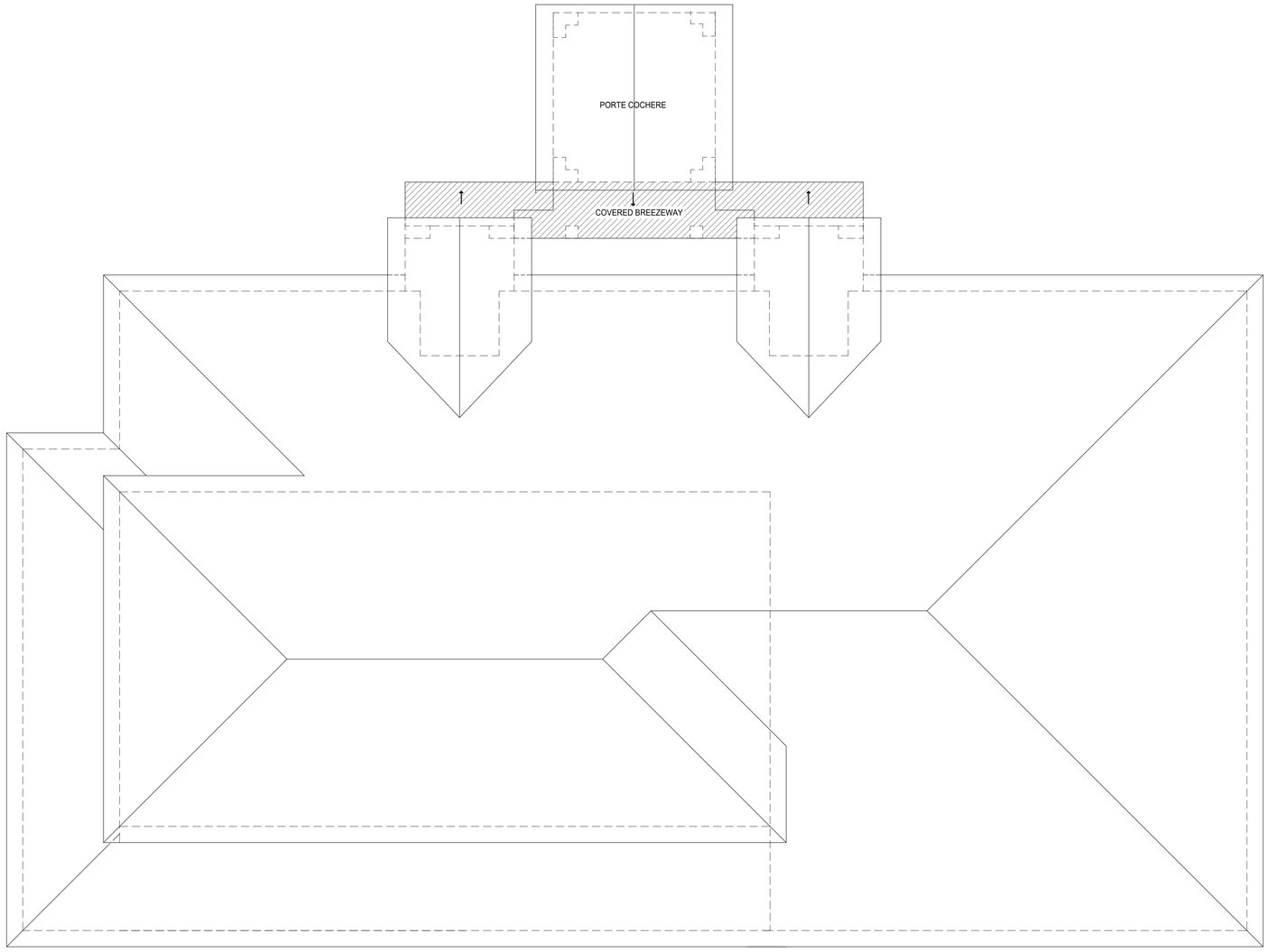
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PROJECT: GLENWOOD SPRINGS COLORADO

REV	Comment	DATE
RC		12/26/2020
		SCALE: 1/8" = 1' - 0"

CLUBHOUSE FLOOR PLAN

A – 31



CLUBHOUSE & DAYCARE CENTER - ROOF PLAN

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

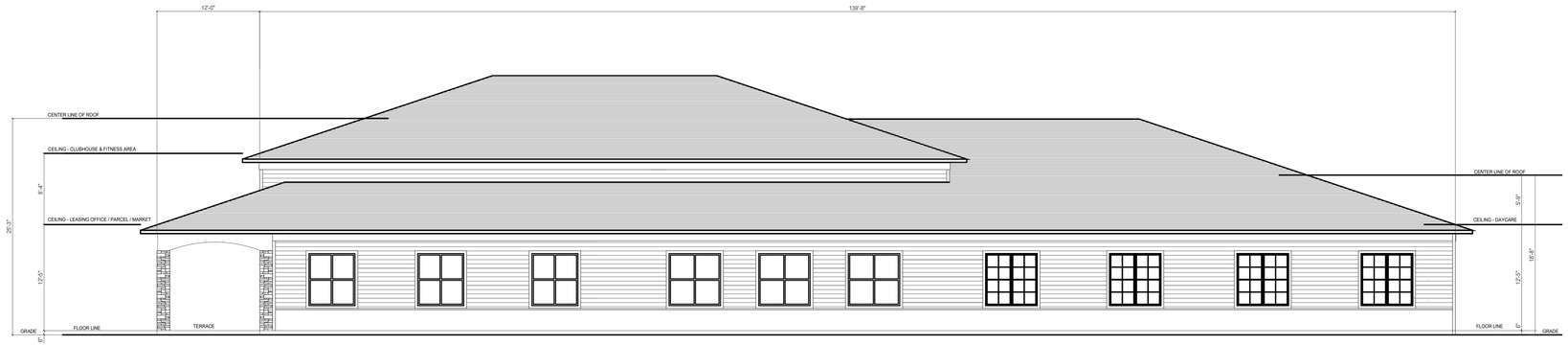
REV	COMMENT	DATE

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1' - 0"

CLUBHOUSE
ROOF PLAN

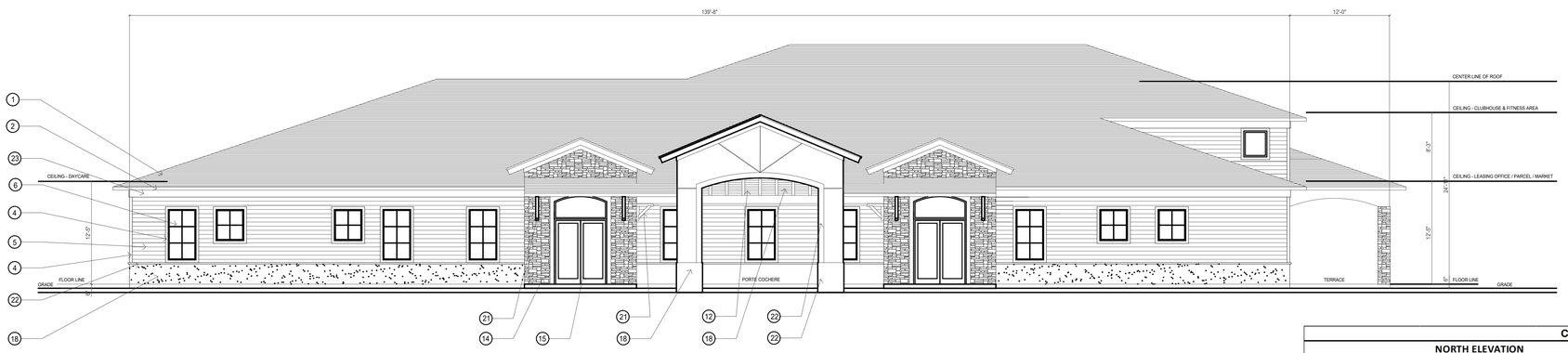
A-32

EXTERIOR FINISH SCHEDULE - CLUBHOUSE			
LABEL	ITEM	PRODUCT	COLOR
1	ROOFING	CERTAINTEED ASPHALT SHINGLES- LANDMARK PRO SOLARIS	CINDER BLACK
2	FASCIA	HARDIE BOARD - 5/4 BOARD 7.25" WIDE	ARTIC WHITE
3	SOFFIT	HARDIETRIM BOARD - 24" WIDE	ARTIC WHITE
4	TRIM	HARDIE TRIM BOARD - 6" WIDE	ARTIC WHITE
5	SIDING	HARDIE PLANK LAP SIDING - CEDAR MILL- 7" HIGH	BOOTHBAY BLUE
6	WINDOW	ALUMINUM - SINGLE HUNG	WHITE
7	STONE SILL	CERTAINTEED - STONE FAÇADE	APALACHIAN TWILIGHT
8	STONE CLADDING	CERTAINTEED - STONE FAÇADE	APALACHIAN TWILIGHT
9	STUCCO - BUILDINGS	HARDIE PANEL VERTICAL SIDING STUCCO	COBBLE STONE
10	BUIDING ENTRANCE CANOPY	HEAVY TIMER FRAMING	MINWAX JACOBEEAN #2750
11	ENTRANCE DOOR	ALUMINUM GLASS DOOR	WHITE
12	STONE COLUMN CAP	CERTAINTEED - STONE FAÇADE	APALACHIAN TWILIGHT
13	STUCCO	3 - COAT SMOOTH CEMENT STUCCO FINISH	COBBLE STONE
14	WALL BRACKET SUPPORT	HEABY TIMBER	MINWAX JACOBEEAN #2750
15	STUCCO MOLDING - CLUBHOUSE	STYROTRIM MOLDING 3.5" X 3.5"	COBBLE STONE
16	TRIM - CLUBHOUSE	HARDIE BOARD - 5/4 BOARD 9.25" WIDE	ARTIC WHITE
17	CARPORT AND BREZEWAY CEILING	T&G WOOD	BROWN TINT



CLUBHOUSE & DAYCARE - NORTH ELEVATION

1/8" = 1'-0"



CLUBHOUSE & DAYCARE - SOUTH ELEVATION

1/8" = 1'-0"

CLUBHOUSE & DAYCARE CENTER					
NORTH ELEVATION			SOUTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET		SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	2337.84	NA	GROSS WALL	1683.19	NA
NET STONE CLADDING	14	0.6%	NET STONE CLADDING	263.22	15.6%
NET SIDING	1113.7	47.6%	NET SIDING	751.57	44.7%
NET STUCCO FINISH	651.48	27.9%	NET STUCCO FINISH	345.06	20.5%
NET GLAZING	558.66	23.9%	NET GLAZING	323.34	19.2%
EAST ELEVATION			WEST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET		SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	2143.88	NA	GROSS WALL	1014.67	NA
NET STONE CLADDING	70	3.3%	NET STONE CLADDING	32.95	3.2%
NET SIDING	1,416.30	66.1%	NET SIDING	600.13	59.1%
NET STUCCO FINISH	321.65	15.0%	NET STUCCO FINISH	169.7	16.7%
NET GLAZING	335.93	15.7%	NET GLAZING	211.89	20.9%

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PROJECT:
GLENWOOD SPRINGS
COLORADO

DATE
COMMENT
REV

BY: RC
DATE: 12/28/2020
SCALE: 1/8" = 1'-0"

CLUBHOUSE ELEVATIONS

A-33



CLUBHOUSE & DAYCARE - WEST ELEVATION

1/8" = 1'-0"



CLUBHOUSE & DAYCARE - EAST ELEVATION

1/8" = 1'-0"

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COLORADO

REV:	COMMENT	DATE

BY: RC
DATE: 12/28/2020
SCALE: 1/8" = 1'-0"

CLUBHOUSE ELEVATIONS

A-34

JAMES HARDIE FIBER CEMENT SIDING



AVAILABLE SIZES

THICKNESS:	0.312"	
LENGTH:	144" boards	
WIDTHS:	6.25"	8.25"
EXPOSURES:	5"	7"
	9.25"	12"
	8"	10.75"
	5.25"	7.25"
	4"	6"

Horizontal Siding



AVAILABLE SIZES

THICKNESS:	0.312"	
LENGTH:	108"	120"
WIDTHS:	48"	48"
	96"	
	48"	

Vertical Siding



AVAILABLE SIZES

THICKNESS:	1"	
LENGTH:	144" boards	
WIDTHS:	3.5"	5.5"
EXPOSURES:	3.5"	5.5"
	7.25"	9.25"
	7.25"	9.25"
	11.25"	
	11.25"	

Battens & Trims

SHERWIN WILLIAMS
EXTERIOR BUILDING COLORS

TYPE-I VERTICAL/HORIZONTAL SIDING SW 6053	TYPE-I BALCONY PANELS SW 6115	TYPE-I BALCONY INTERIOR SW 6055	TYPE-I BATTEN AND TRIM SW 6113

Building Type I

TYPE-II VERTICAL/HORIZONTAL SIDING SW 6115	TYPE-II BALCONY PANELS SW 6054	TYPE-II BALCONY INTERIOR SW 6055	TYPE-II BATTEN AND TRIM SW 6113

Building Type II

TYPE-III VERTICAL/HORIZONTAL SIDING SW 6067	TYPE-III BALCONY PANELS SW 6054	TYPE-III BALCONY INTERIOR SW 6055	TYPE-III BATTEN AND TRIM SW 6114

Building Type III

CERTAINTEED STONE facade



Appalachian Twilight



Pocono Autumn



Highland Slate / Black Granite

CERTAINTEED SHINGLE ROOFING

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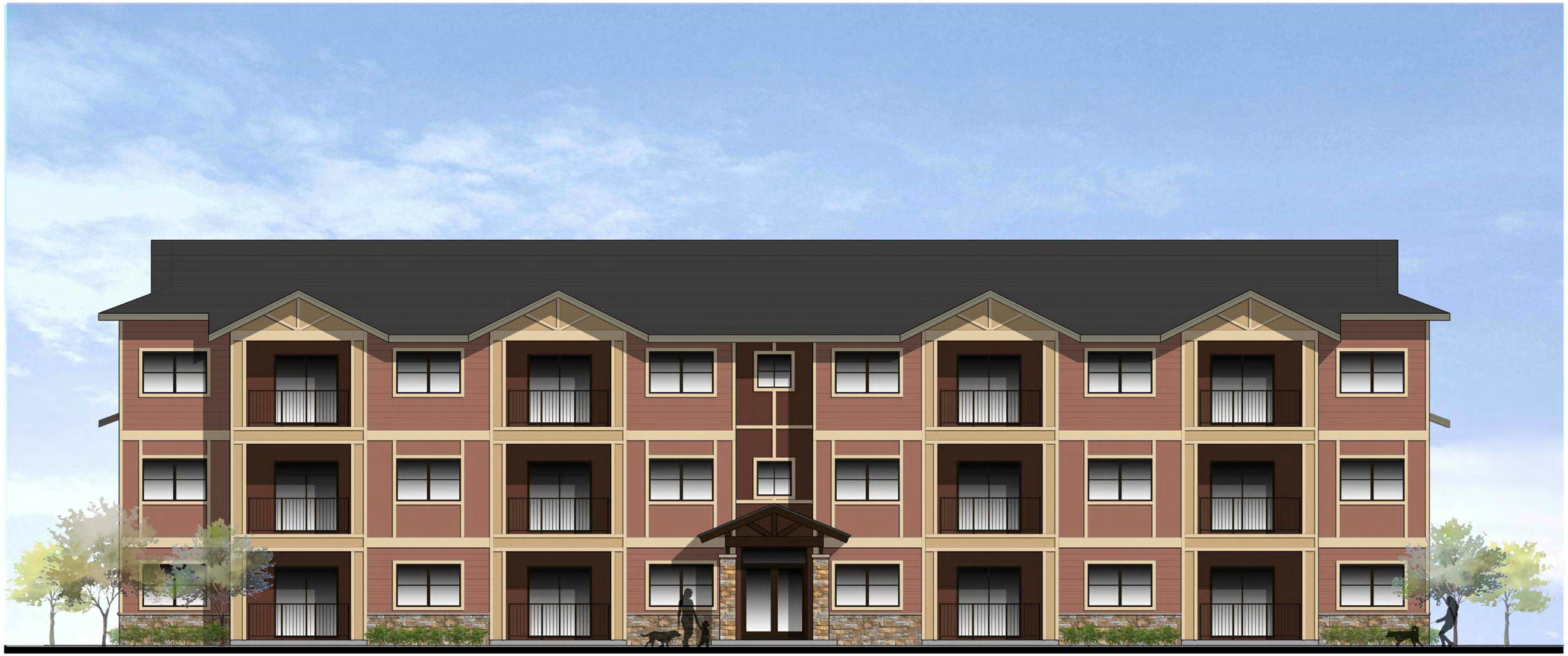
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Ft Lauderdale, FL 33316

PROJECT:
GLENWOOD SPRINGS
COLORADO

REV:	COMMENT	DATE
BY:	RC	
DATE:	12/26/2020	
SCALE:	1/8" = 1'-0"	

EXTERIOR MATERIALS

A-35



BUILDING TYPE I - SOUTH FACADE ELEVATION

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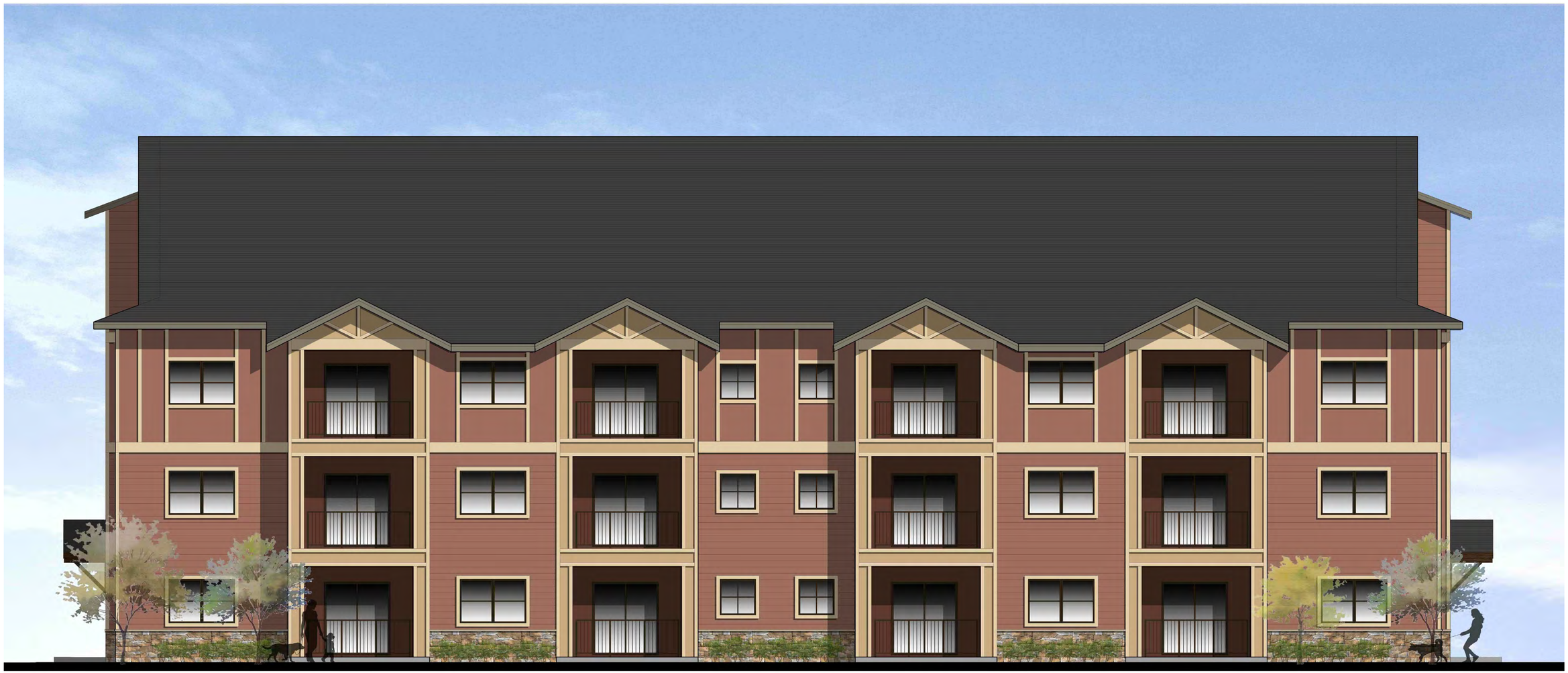
BLDGROUP
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Ft. Lauderdale, FL 33316

PROJECT NAME:
GLENWOOD SPRINGS
COLORADO

By:	Comment	Date
3	Exterior Color Revision	09/17/2020

DRAWING NAME:
BLDG TYPE I
ELEVATION

DRAWING NUMBER:
A-36



BUILDING TYPE I - NORTH FACADE ELEVATION

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PROJECT NUMBER:

PROJECT NAME:
GLENWOOD SPRINGS
COLORADO

No.	Comment	Date
3	Exterior Color Revision	09/17/2021

DRAWING NAME:
BLDG TYPE I
ELEVATION

DRAWING NUMBER:
A-37



BLDG TYPE I - EAST FACADE ELEVATION

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PROJECT NAME:
GLENWOOD SPRINGS
COLORADO

PROJECT NUMBER:

#	Issued	Date
3	Exterior Color Revision	09/17/2020

DRAWING NAME:
BLDG TYPE I
ELEVATION

DRAWING NUMBER:
A-38



BLDG TYPE I - WEST FACADE ELEVATION

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PROJECT NAME:
GLENWOOD SPRINGS
COLORADO

PROJECT NUMBER:

BY	Content	DATE
3	Exterior Color Revision	09/17/2020

DRAWING NAME:
BLDG TYPE I
ELEVATION

DRAWING NUMBER:
A-39



BUILDING TYPE II - SOUTH FACADE ELEVATION

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PROJECT NAME:
GLENWOOD SPRINGS
COLORADO

PROJECT NUMBER:

NO	Comment	DATE
3	Exterior Color Revision	09/17/2020

DRAWING NAME:
BLDG TYPE II
ELEVATION

DRAWING NUMBER:
A-40



BUILDING TYPE II - NORTH FACADE ELEVATION

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PROJECT NAME:
GLENWOOD SPRINGS
COLORADO

PROJECT NUMBER:

BY:	Content:	DATE
3	Exterior Color Revision	09/17/2021

DRAWING NAME:
BLDG TYPE II
ELEVATION

DRAWING NUMBER:
A-41



BLDG TYPE II - EAST FACADE ELEVATION

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PROJECT NAME:
GLENWOOD SPRINGS
COLORADO

No.	Comment	DATE
3	Exterior Color Revision	09/17/2020

DRAWING NAME:
BLDG TYPE II
ELEVATION

DRAWING NUMBER:
A-42



BLDG TYPE II - WEST FACADE ELEVATION

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PROJECT NAME:
GLENWOOD SPRINGS
COLORADO

BY	Comment	DATE
3	Exterior Color Revision	09/17/2020

DRAWING NAME:
BLDG TYPE II ELEVATION

DRAWING NUMBER:
A-43



BUILDING TYPE III - SOUTH FACADE ELEVATION

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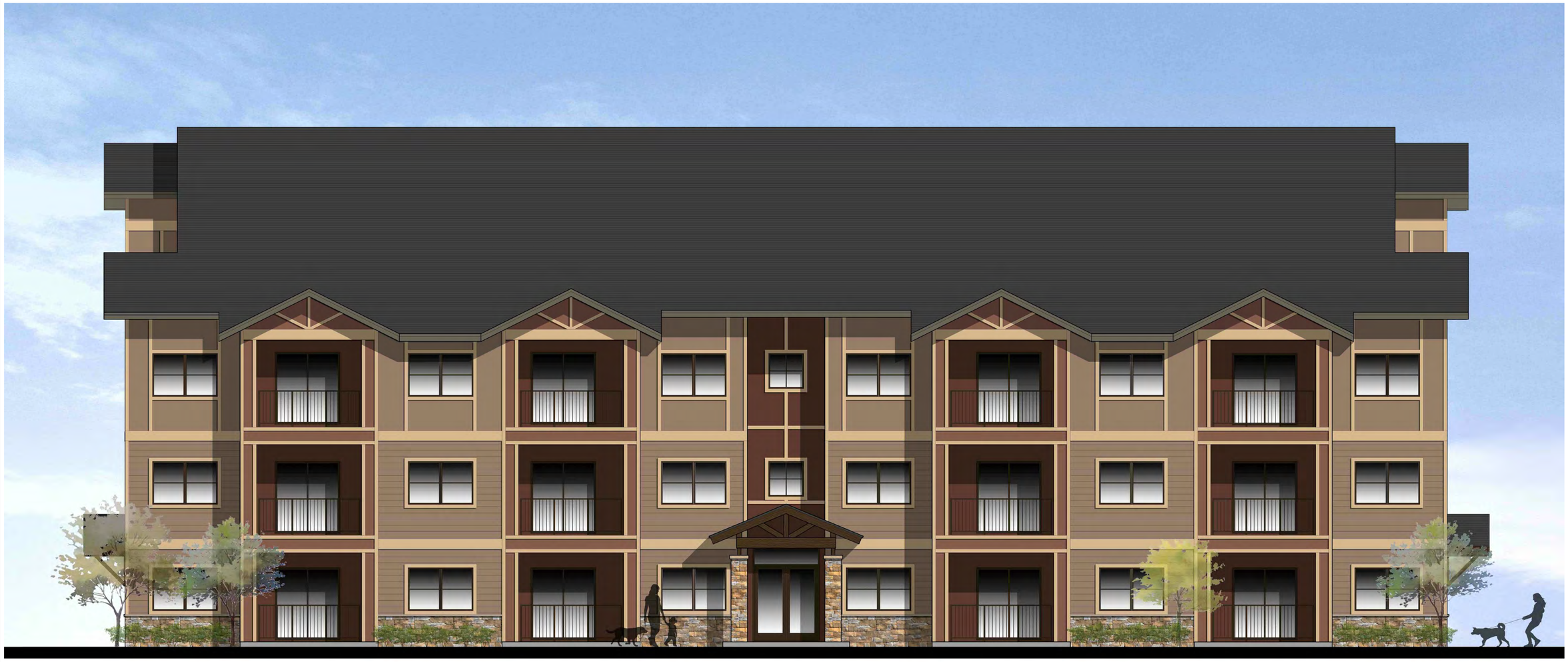
PROJECT NAME:
GLENWOOD SPRINGS
COLORADO

PROJECT NUMBER:

BY:	Comment	DATE
3	Exterior Color Revision	05/17/2021

DRAWING NAME:
BLDG TYPE III
ELEVATION

DRAWING NUMBER:
A-44



BUILDING TYPE III - NORTH FACADE ELEVATION

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CONSULTANTS:

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PROJECT NUMBER:

PROJECT NAME:
GLENWOOD SPRINGS
COLORADO

NO.	Comment	DATE
3	Exterior Color Revision	09/17/2021

DRAWING NAME:
BLDG TYPE III
ELEVATION

DRAWING NUMBER:
A-45



BLDG TYPE III - EAST FACADE ELEVATION

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PROJECT NAME:
GLENWOOD SPRINGS
COLORADO

PROJECT NUMBER:

No.	Content	DATE
3	Exterior Color Revision	09/17/2020

DRAWING NAME:
BLDG TYPE III
ELEVATION

DRAWING NUMBER:
A-46



BLDG TYPE III - WEST FACADE ELEVATION

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PROJECT NAME:
GLENWOOD SPRINGS
COLORADO

BY	Comment	Date
3	Exterior Color Revision	09/17/2020

DRAWING NAME:
BLDG TYPE III
ELEVATION

DRAWING NUMBER:
A-47

Planning and Zoning Commission Report

Date: August 24, 2021
To: Planning and Zoning Commission
From: Trent L. Hyatt, Senior Planner
Subject: #60-20– BLD Group Major Site/Architectural Plan Review

REQUEST	Major Site/Architectural Plan Review for the construction of 300 multi-family residential apartment units.
APPLICANT	BLD Group
OWNER	Glenwood Meadows, LLC
LOCATION	Lots 11 C-B and 11 C-C of Glenwood Meadows Subdivision No. 6, adjacent to Flat Tops View Drive and Wulfsohn Road (PIN: 2185-081-41-002 and 2185-081-41-003)
ZONE	Residential High Density (RH) District (R/3 per Glenwood Meadows Zoning and Development Plan)
SURROUNDING LAND USES	North: Mixed residential/commercial South: Vacant East: Multi-family residential West: Vacant
LOT SIZE	Approximately 27.929 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 Major Site/Architectural Plan Review applications including 25 or more new dwelling units and/or more than 30,000 gross square feet of nonresidential space. Following any approval (with or without conditions) of an application, the applicant must still submit and receive approval of a Final Plans Review application from City staff prior to submitting a building or grading permit application.

Action 1 – Major Site/Architectural Plan Review – construction of 300 multi-family residential apartment units.

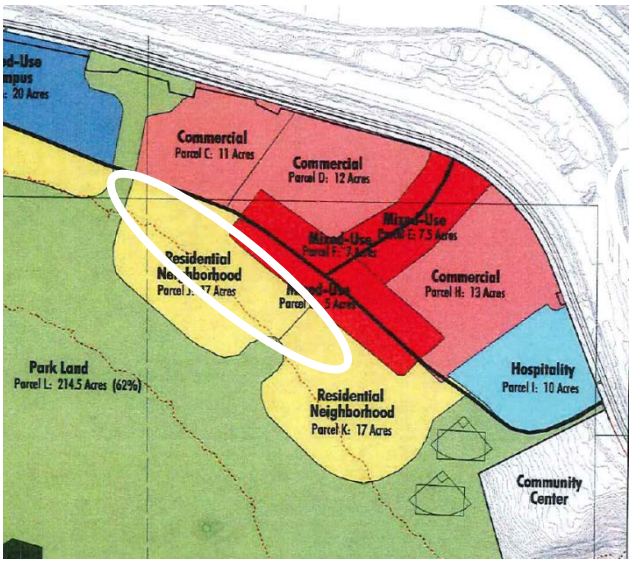
Staff recommendation: *Staff recommends **approval with conditions** of the Major Site/Architectural Plan Review with the findings and conditions on Page 10.*

BACKGROUND/ANALYSIS

History

In 2002, City Council approved the Glenwood Meadows annexation, rezoning, and development plan, which is memorialized in the attached Glenwood Meadows Annexation and Development Agreement which includes the Zoning and Development Plan (GMZDP) as an exhibit. The

document separated the 345-acre Glenwood Meadows property into 12 parcels and five zoning districts. The GMZDP includes general and zone-specific development standards, which at the time, intended to provide an elevated quality of site and building design beyond that of the *Glenwood Springs Municipal Code* (GSMC).



Glenwood Meadows Zoning Map

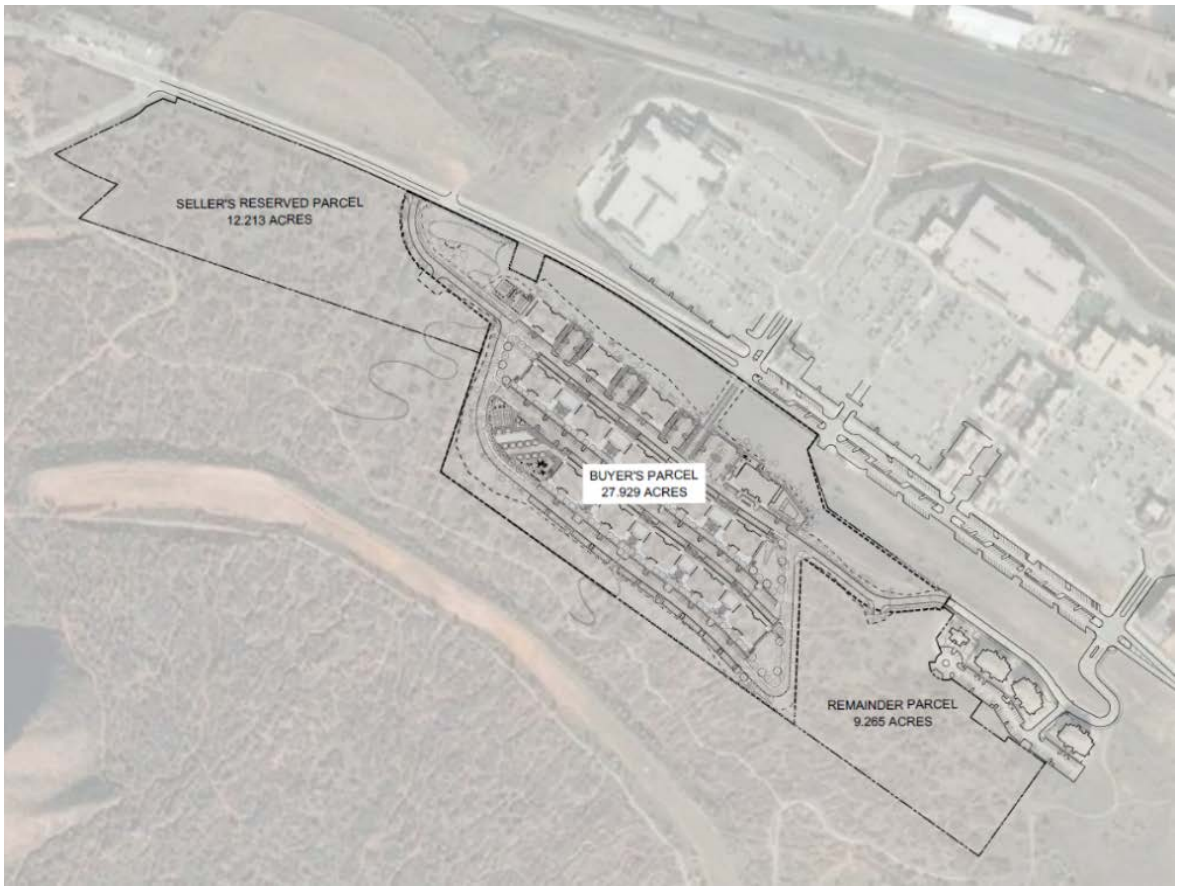


City Zoning Map

As depicted above left, the current application involves portion of Parcels J and K (circled in white) which are designated Residential Neighborhood (RN) in yellow. The RN area was previously zoned R/3 but is Residential High Density (RH) today as depicted in brown above right. The GMZDP allows a total maximum of 300 apartments units in the parcels designated RN, excluding 60 units to the southeast further discussed below. Approval of the proposal, if applicable, will eliminate the possibility of further multi-family apartment development on RN areas of Glenwood Meadows.

As mentioned above, BLD Group proposes the construction of 300 multi-family apartment units in 13 separate buildings on the approximately 27.929 acre (10.74 dwellings units per acre) subject property depicted below. The project also includes the construction of an approximately 20,960 square foot clubhouse and daycare building, and 20 detached garage buildings.

The site lies to the west of Flat Tops View Drive and south of Wulfsohn Road. A Minor Subdivision, which is administrative and not part of this review, is required to create the development parcel depicted below. Application materials include a site plan, floor plans, perspective views, section views, elevations, landscaping plan, grading plan, and related reports which are attached for your review.



Site plan-development site and remaining parcels



Aerial view look east (photo credit: Google Maps)



Similar perspective view to above aerial

Annexation and Development Agreement/Memorandum of Understanding

Upon receipt of the original application submittal in December 2020, staff questioned whether the GMZDP allowed additional multi-family apartment development beyond the 300 unit maximum outlined therein. We were concerned the current proposal would exceed the maximum number of units allowed when combined with the previous development phases of the Lofts at Red Mountain (LARM) to the north. The applicant submitted an appeal of the Community Development Director's interpretation/decision which was never heard by the Commission as it was determined that the 300 multi-family only applies to R-3 designated parcels within Glenwood Meadows, not C-2. Regardless, the owner of the property and the City have entered into the attached memorandum of understanding (MOU) to address certain issues associated with development of the proposal moving forward such as lift station upgrades and traffic impacts.

Development Standards

Site layout, building design, parking, landscaping, and other specifics related to development within Glenwood Meadows are subject to the GMZDP. Sections therein provide General Development Standards (Chapter V. beginning on page 11) as well as standards specific to each area (Chapter X, beginning on page 39) within the development. Where not addressed by the GMZDP, Section 070.040 of the Code applies. Staff provides an overview of the various applicable standards below.

Landscaping and Open Space

Chapter V.H of the GMZDP requires R-3 parcels provide a minimum of 40 percent open space and landscaping based on that amount. Required park land space for the Glenwood Meadows development has been previously satisfied by various improvements or land transfers to the City including the creation of hiking/biking trails, pedestrian infrastructure such as the Midland Trail, transfer of Community Center/garden property, etc. Common open space for future residents of the current proposal is provided via a clubhouse, pickleball courts, community gardens, a dog park, and various trail connections. Native and new landscaping is used to screen interior and exterior

open space, parking, and streetscape areas.

Off Street Parking and Loading

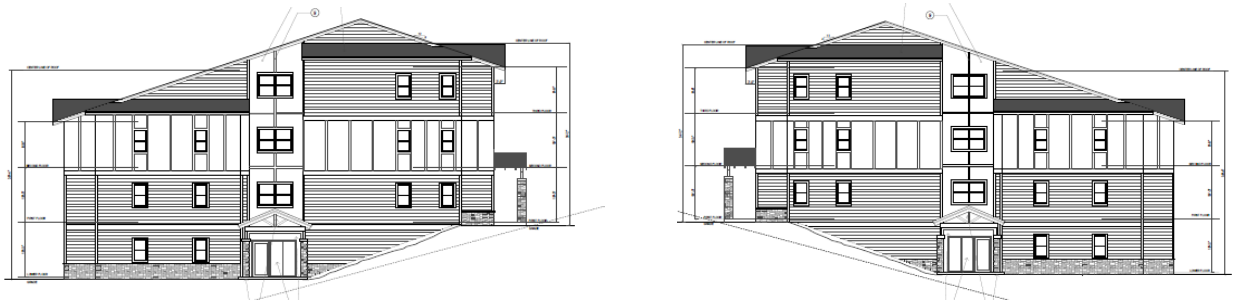
Section 070.030.020(e)/Table 030.1 Table of Allowed Uses outlines 1.5 spaces per multi-family dwelling unit (regardless of size) and one guest space per five dwelling units requiring 510 total spaces for the apartment unit. An additional 27 spaces are provided for the clubhouse. The Code also allows for compact spaces to account for 20 percent of the required number of spaces.

Residential Neighborhoods (R-3) Site Layout and Building Design

Section X of the GMZDP outlines design specifics for the R-3 parcels related to building orientation, architectural elements, heights, and façade articulation. All sides of residential buildings shall display similar architectural interest. The applicant has revised the elevations multiple times to address staff concerns/questions related to design in order to improve building aesthetic. All elevations of each proposed building type display similar interest to the more prominent front and rear (north/south) sides. Multi-family buildings proposed also do not exceed 125 feet in length as outlined in the GMZDP. At least every 50 linear feet, wall planes shall contain offsets or setbacks with a differential in horizontal plane of at least five feet. Roof line/heights along the east and west elevations were revised to be within the maximum height of 40 feet as outlined by Section 070.020.070(b)/Table 020.9 of the Code. Additionally, garage structures were broken up to comply with maximum size standards.



South color elevation-Building Type II



East and west elevations -Building Type 1



North elevation-Building Type 1

Traffic Impacts

Per the attached GMZDP, individual applicants are only required to submit information related to the expected traffic generation associated with each development proposal. This is in lieu of a detailed traffic impact analysis (TIA) per the City's Engineering Standards. Based on the letter submitted with the application, the proposal is expected to generate approximately 1,632 weekday daily trips (108 AM peak hour, 138 PM peak hour). The daycare use is not addressed in the information provided but is not expected to exceed previously estimated trip generation for the development. The property owner has agreed to a $500 per unit traffic impact fee payment toward future Midland Avenue intersection improvements, where needed. While a TIA is not required in this instance, an access permit and related improvements determined necessary may be required by the Colorado Department of Transportation if a 20 percent increase at any state highway intersection (i.e. Interstate 70 exit 114 8th Street at Highway 82/Grand Avenue) is associated with the project. However, the costs of any required improvements will not be borne by the applicant.

Inclusionary Housing

It is important to note that 60 affordable multi-family units, known as the Glenwood Green Apartments, offered at various average medium income (AMI) rates, were previously approved and currently exist within the Glenwood Meadows development. This represents approximately 12.6 of the total residential units approved (475) in the R-3 zoned portion (which excludes LARM approved and proposed units in C-2). However, the applicant has agreed to deed restrict 10 units as owner occupied at 100 precent of AMI for a period of five years.

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 as outlined 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;

The proposal is consistent with the general purpose and intent of the Code regarding guarding against natural hazards, efficient development, compatible design, and addressing development impacts.

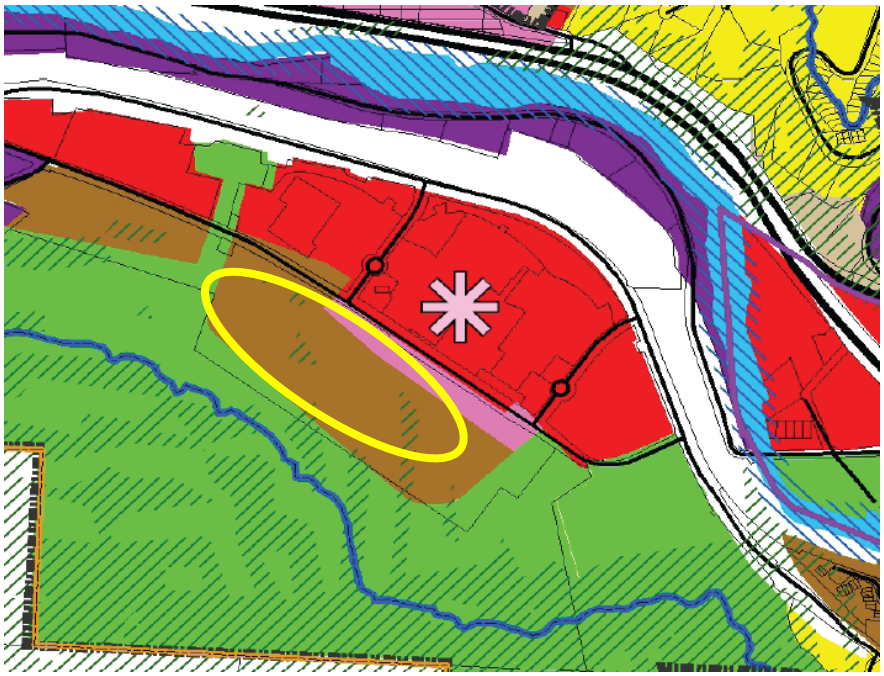
b. The site/architectural plan is consistent with the dimensional, design, development, and all other standards of this Code;

As outlined above, the applicant has worked with staff to address certain aspect of the project that were previously not in compliance with numerous applicable dimensional, design, development, or other standards outlined in the GMZDP and/or GSMC.

c. The site/architectural plan is consistent with any previously approved plat, PUD, or any other precedent land use approval; and

As outlined above, the applicant has worked with staff to address certain aspect of the project that were previously not in compliance with numerous applicable dimensional, design, development, or other standards outlined in the GMZDP and/or GSMC.

d. The site/architectural plan is consistent with the Comprehensive Plan and other adopted City policies and plans.



As shown at right, *Map 2.1 Future Land Use – North 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.

The Code requires identification of the Limits of Disturbance (LOD) and an exact measurement of the average slope within the LOD. The project summary on sheet L1.1 outlines that slopes average below the maximum 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 the GMZDP 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) -Increase the supply of housing that is affordable to the workforce (community

	housing) by implementing the Strategic Housing Plan. (Chapter 6, Page 75) -Encourage housing variety and affordability throughout the community (Chapter 6, Page 76) -Require good design for mixed-use and higher density project (Chapter 6, Page 78)
Staff Comment: Attainable housing supports the City's workforce. 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) -Increase the supply of housing that is affordable to the workforce (community housing) by implementing the Strategic Housing Plan. (Chapter 6, Page 75) -Require good design for mixed-use and higher density projects (Chapter 6, Page 78) -Direct growth inward (Chapter 9, Page 102)
Staff Comment: Attainable housing supports the City's workforce and infill/development allows for easier access to goods/services for the entire community.	

Reviewing Agency Comments
An overview of the attached comments received from referral agencies regarding various application submittals (December 2020, July 2021, and August 2021) is provided below. Please note, many of the comments have been addressed by the applicant throughout the review process.

Engineering - Comments received outline issues related to grading, asphalt depths, soil inconsistencies, and traffic.

Parks and Recreation – Comments received outline the need for suitable plant species, increased recreational opportunities, and trail connections.

Public Works - Comments received outline that all utilities remain private, the need for irrigation details, fire design requirements, necessary water and sewer details, electric system requirements, concerns related to site soils and slopes.

Transportation - Comments received outline the need for better access to transit and sidewalk connectivity.

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 – Major Site/Architectural Plan Review – construction of 300 multi-family residential apartment units.

Staff Recommendation/Suggested Motion
Staff recommends **approval with conditions** of the Major Site/Architectural Plan Review application with the findings and conditions outlined below.

Recommended Findings:
1. The site/architectural plan is consistent with the general purpose and intent of the Code;
2. The site/architectural plan appears to be consistent with all dimensional, design, development, and all other standards of the *Glenwood Meadows Zoning and Development Plan* and *Glenwood Springs Municipal Code*;
3. The site/architectural plan does is consistent with the precedent setting land use approval, the *Glenwood Meadows Annexation Zoning and Development Plan*; 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 *Glenwood Springs Municipal Code* specific City staff comments prior to submittal of any future development permit (including but not limited to a Final Plans Review) application.
2. 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.
3. Prior to approval of any future development review application, the applicant shall apply for and receive the approval of a CDOT access permit, where applicable.
4. The applicant shall receive approval of the related Minor Subdivision application to create the development parcel and residual lots.
5. 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.
6. The applicant shall comply fully with the Memorandum of Understanding between the City and Glenwood Meadows, LLC executed May 5, 2021.
7. The applicant shall deed restrict a minimum of 10 units as owner occupied at 100 precent of AMI for a period of five years.
8. Prior to submitting a building or grading permit application, the applicant shall
    a. Submit a Final Plans Review 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.

GLENWOOD MEADOWS MULTI-FAMILY HOUSING

Glenwood Springs, Colorado

MAJOR SITE / ARCHITECTURE REVIEW

SUBMITTAL #4: August 13, 2021

INDEX OF SHEETS

ALTA Land Title Survey

SHEET 1 OF 4
SHEET 2 OF 4
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Civil Sheet Set

GR1	PRELIMINARY GRADING PLAN - SHEET 1
GR2	PRELIMINARY GRADING PLAN - SHEET 2
UT1	PRELIMINARY UTILITY PLAN - SHEET 1
UT2	PRELIMINARY UTILITY PLAN - SHEET 2

Landscape Sheet Set

L1.0	OVERALL SITE PLAN
L1.1	DEVELOPMENT AREA SITE PLAN
L1.2	SITE PLAN ENLARGEMENT KEY PLAN
L1.3	ENLARGED SITE PLAN
L1.4	ENLARGED SITE PLAN
L1.5	ENLARGED SITE PLAN
L1.6	ENLARGED SITE PLAN
L1.7	ENLARGED SITE PLAN
L1.8	ENLARGED SITE PLAN
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L2.0	PLANT LIST AND GENERAL NOTES
L2.1	PLANTING DETAILS
LP.1	SITE LIGHTING ENLARGEMENT KEY PLAN
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EXBT 6	PERSPECTIVE ILLUSTRATION
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EXBT 8	PERSPECTIVE ILLUSTRATION
EXBT 9	PERSPECTIVE ILLUSTRATION
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EXBT 11	PERSPECTIVE ILLUSTRATION
EXBT 12.1	SITE SECTION
EXBT 12.2	SITE SECTION
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EXBT 13	WEST ENTRY PLAN AND PROFILE
EXBT 14	POOL WALL GRADING

Architecture Sheet Set

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A-2	BUILDING TYPE 1 FLOOR PLANS
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Architecture Sheet Set (Cont.)

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PROJECT TEAM

LANDSCAPE ARCHITECT

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311 MAIN STREET, SUITE 102
CARBONDALE, CO 81623
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ARCHITECTURE

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CONTACT: RICHARD COBA

CIVIL ENGINEER

HIGH COUNTRY ENGINEERING
1517 BLAKE AVE, #101
GLENWOOD SPRINGS, CO 81601
PHONE: (970) 945-8676
CONTACT: ROGER NEAL

LOCATION MAP



UNIT AND SITE AMENITY DATA

LOT SIZE INFORMATION	Acres	SF	LOT COVERAGE	Required (SF & %)	Proposed (SF & %)
Lot 2 - Phase 1	**27.9 Acres**	**1,215,160 sf**		**50% Max. Lot Coverage**	**591,051 sf** *49% Lot Size*
LIMITS OF DISTURBANCE		Proposed (SF & %)	**AVERAGE SLOPE WITHIN LIMITS OF DISTURBANCE**	Percentage (%)	
Lot 2 - Phase 1		**895.561 sf** **74%** *Lot Size*		**16%**	
OFF-STREET PARKING SPACES	Required # Vehicle Spaces	Proposed # Vehicle Spaces	**BICYCLE PARKING**	Required # Spaces	Proposed # Spaces
Residence Parking *1.7 spaces per unit*	**510 Spaces** *Phase 1 Count: 300 units*	**510 Spaces**	**Bike Racks** *150 parking spaces- 9 bike parking spaces plus 1 space for each 50 vehicle spaces provided after the first 150 spaces*	**17 Bike Parking Spaces** *Phase 1 Count: 538 Parking Spaces*	**160 Bike Parking Spaces**
Clubhouse *1 per 400 sf of building area plus 1 per 10,000 sf of outdoor space*	**29 Spaces** *Phase 1 Count: 10,900 sf Building and 11,000 sf of Outside area*	**29 Spaces**			
ADA	**20 Spaces**	**38 Spaces**			
TOTAL PARKING	**539 Spaces**	**539 Spaces**			

RESIDENTIAL UNITS	Buildings	Units	COMMON AMENITY SPACE	Required (SF)	Provided (SF)
Building Type 1	**7 Buildings**	**168 Units**	Community Center & Daycare		**20,960 sf**
Building Type 2	**3 Buildings**	**60 Units**	Community Gardens		**7,665 sf**
Building Type 3	**3 Buildings**	**72 Units**	Amenity Spaces between Buildings		**30,160 sf**
TOTAL	**13 Buildings**	**300 Units**	Trail Connections		**2,058 sf**
BUILDING HEIGHT	Required	Proposed	Dog Yard		**36,432 sf**
	40 ft. maximum	**37 ft.** *roof center line to grade*	**TOTAL**	**60,000 sf** *Required: 200 sf per unit Phase 1 Count: 300 units*	**97,275 sf**

LANDSCAPE DATA

OPEN SPACE	SQUARE FOOTAGE	TREES		SHRUBS	
		REQUIRED *(1/1200 SF)*	PROVIDED	REQUIRED (1/400 SF)	PROVIDED
Upper tier - disturbed	87,483 SF	73	74	219	366
Lower tier - disturbed	79,351 SF	66	66	198	285

INTERNAL DRIVEWAY	LINEAR FEET	TREES	
		REQUIRED *(1/35 LF)*	PROVIDED
Flat Tops View Dr (Sunny Aspen)	2,071 LF	59	60
Wolf Liam Lane	1,735 LF	50	50
Adios Avenue	1,748 LF	50	50

PARKING AREAS	Total Parking Area (SF)	Landscaped Area (SF & %)	TREES		SHRUBS	
			REQUIRED *(1/1200 SF)*	PROVIDED	REQUIRED (1/400 SF)	PROVIDED
Parking Lots	29,694 SF	10,485 SF *(35% of the parking area)*	25	40	74	240

TOTAL LANDSCAPED AREA	Proposed (SF & %)	OPEN SPACE	Required (SF & %)	Proposed (SF & %)
	304,510 sf *25% Lot Size*		**486,064 sf** *40% Lot Size*	**504,083 sf** *41.5% Lot Size*
TOTAL IMPERVIOUS AREA	Proposed (SF & %)			
	591,051 sf *49% Lot Size*			

SNOW STORAGE NOTE: ON-SITE SNOW STORAGE WILL BE PROVIDED IN LANDSCAPE AREAS AT THE EAST AND WEST ENDS OF THE BUILDING ROWS AND BEHIND THE CURB WHERE SIDEWALKS DO NOT EXIST. FINAL SNOW MANAGEMENT WILL BE REFINED BASED ON GEOTECHNICAL REVIEW, RECOMMENDATIONS, AND GRADING & DRAINAGE PLAN.

BASIS OF BEARING / BENCHMARK

BEARINGS ARE BASED UPON A #5 REBAR WITH ALUMINUM CAP L.S. #5933 FOUND AT THE SOUTHEASTERLY, A FOUND #5 REBAR WITH ALUMINUM CAP L.S.
25954 FOUND AT THE NORTHEASTERLY CORNER OF SUBJECT LOT 1A, USING A BEARING OF N00°21'00"E BETWEEN THE TWO DESCRIBED MONUMENTS.

LEGAL DESCRIPTION

PARCEL A:
****
NOTE: THE FOLLOWING LEGAL DESCRIPTION IS PRELIMINARY AND IS SUBJECT TO CHANGE UPON COMPLIANCE WITH THE REQUIREMENTS UNDER SCHEDULE B-1, HEREIN.
****
LOTS 11C-B AND 11C-C, GLENWOOD MEADOWS FILING NO. 6, ACCORDING TO THE PLAT THEREOF
RECORDED SEPTEMBER 7, 2017 AT RECEPTION NO. 897037
COUNTY OF GARFIELD, STATE OF COLORADO
PARCEL B:
EASEMENTS FOR UTILITIES, DRAINAGE AND ACCESS AS DESCRIBED AND DEPICTED IN RECIPROCAL EASEMENT AGREEMENT RECORDED MAY 5, 17, 2012 UNDER RECEPTION NO. 818857 AND FIRST AMENDMENTS TO RECIPROCAL EASEMENT AGREEMENT RECORDED MAY 18, 2017 UNDER RECEPTION NO. 892528.

FEMA FLOODPLAIN STATEMENT

PARCELS A & B ARE LOCATED WITHIN ZONE D ACCORDING TO FEMA MAP PANELS 0802051431B AND 0802051432B BOTH EFFECTIVE 01/03/1986. ACCORDING TO FEMA, NO ADDITIONAL DIGITAL DATA IS AVAILABLE IN THIS AREA.

PUBLIC IMPROVEMENTS STATEMENT

THE PUBLIC IMPROVEMENTS FOR THE ENTIRETY OF THE GLENWOOD MEADOWS SUBDIVISION HAVE BEEN SATISFIED AS MEMORIALIZED IN THE JULY 2013 MOU BETWEEN THE DEVELOPER (GLENWOOD MEADOWS, LLC) AND THE CITY OF GLENWOOD SPRINGS. THESE PUBLIC IMPROVEMENTS INCLUDED OFF-SITE TRAFFIC IMPROVEMENTS, ON- AND OFF-SITE PEDESTRIAN TRAIL IMPROVEMENTS, WATER RIGHTS CONVEYANCES, OFF-SITE RIVERTRAIL CONTRIBUTIONS, TRANSIT IMPROVEMENTS, AND PUBLIC OPEN SPACE DEDICATIONS. IN JUNE OF 2021 THE CITY OF GLENWOOD SPRINGS AND GLENWOOD MEADOWS, LLC ENTERED INTO A MOU THAT ADDED PUBLIC IMPROVEMENTS ABOVE AND BEYOND THE PREVIOUSLY SATISFIED REQUIREMENTS, INCLUDING INFRASTRUCTURE UPGRADES AND TRAFFIC IMPACT FEES. THE PROJECT PROPOSAL INCLUDES ON-SITE PUBLIC IMPROVEMENTS INCLUDING A SIDEWALK EXTENSION ALONG WULFSOHN ROAD, PUBLICLY-ACCESSIBLE TRAILHEADS TO OPEN SPACE, AND A PUBLICLY-AVAILABLE DAYCARE FACILITY.

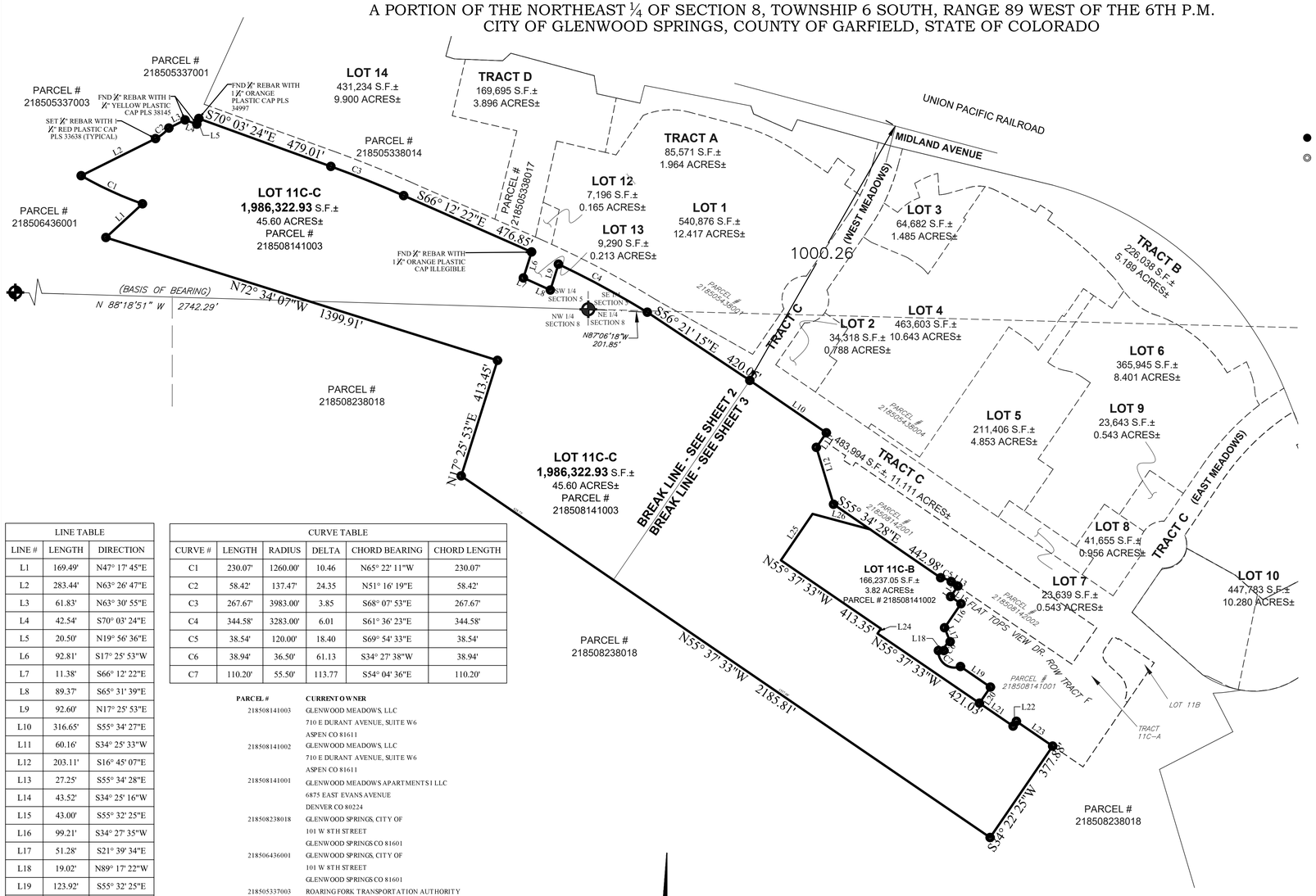
GEOLOGIC HAZARDS DISCLOSURE

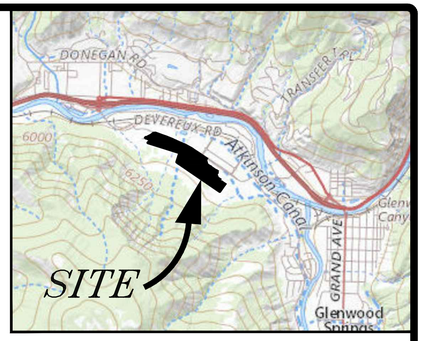
THE PROPERTY IS SUBJECT TO GEOLOGIC HAZARDS PER THE ADOPTED MAPPING BY THE CITY OF GLENWOOD SPRINGS. HAZARDS TO NOTE ARE SEVERE POTENTIAL FOR HYDROCOMPACTION, AND FOR OFF-SITE DEBRIS FLOW. A FINAL GEOLOGIC HAZARD REPORT WILL BE SUBMITTED UPON APPLICATION OF A BUILDING PERMIT.

ALTA/ACSM LAND TITLE SURVEY

LOTS 11C-B AND 11C-C, GLENWOOD MEADOWS FILING NO. 6, ACCORDING TO THE PLAT THEREOF
RECORDED SEPTEMBER 7, 2017 AT RECEPTION NO. 897037

A PORTION OF THE NORTHEAST ¼ OF SECTION 8, TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE 6TH P.M.
CITY OF GLENWOOD SPRINGS, COUNTY OF GARFIELD, STATE OF COLORADO





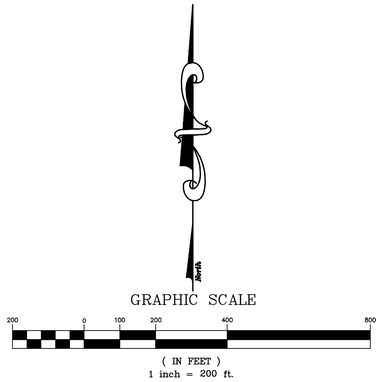
VICINITY MAP
SCALE: 1" = 3000'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L1	169.49'	N47° 17' 45"E
L2	283.44'	N63° 26' 47"E
L3	61.83'	N63° 30' 55"E
L4	42.54'	S70° 03' 24"E
L5	20.50'	N19° 56' 36"E
L6	92.81'	S17° 25' 53"W
L7	11.38'	S66° 12' 22"E
L8	89.37'	S65° 31' 39"E
L9	92.60'	N17° 25' 53"E
L10	316.65'	S55° 34' 27"E
L11	60.16'	S34° 25' 33"W
L12	203.11'	S16° 45' 07"E
L13	27.25'	S55° 34' 28"E
L14	43.52'	S34° 25' 16"W
L15	43.00'	S55° 32' 25"E
L16	99.21'	S34° 27' 35"W
L17	51.28'	S21° 39' 34"E
L18	19.02'	N89° 17' 22"W
L19	123.92'	S55° 32' 25"E
L20	66.33'	S34° 22' 27"W
L21	138.97'	S55° 37' 33"E
L22	20.00'	N34° 22' 25"E
L23	150.00'	S55° 37' 33"E

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C1	230.07'	1260.00'	10.46	N65° 22' 11"W	230.07'
C2	58.42'	137.47'	24.35	N51° 16' 19"E	58.42'
C3	267.67'	3983.00'	3.85	S68° 07' 53"E	267.67'
C4	344.58'	3283.00'	6.01	S61° 36' 23"E	344.58'
C5	38.54'	120.00'	18.40	S69° 54' 33"E	38.54'
C6	38.94'	36.50'	61.13	S34° 27' 38"W	38.94'
C7	110.20'	55.50'	113.77	S54° 04' 36"E	110.20'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L24	20.00'	N34° 22' 27"E
L25	191.73'	N34° 22' 04"E
L26	202.63'	S75° 00' 01"E

PARCEL #	CURRENT OWNER
218508141003	GLENWOOD MEADOWS, LLC 710 E DURANT AVENUE, SUITE W6 ASPEN CO 81611
218508141002	GLENWOOD MEADOWS, LLC 710 E DURANT AVENUE, SUITE W6 ASPEN CO 81611
218508141001	GLENWOOD MEADOWS APARTMENTS I LLC 6875 EAST EVANS AVENUE DENVER CO 80224
218508238018	GLENWOOD SPRINGS, CITY OF 101 W 8TH STREET GLENWOOD SPRINGS CO 81601
218506436001	GLENWOOD SPRINGS, CITY OF 101 W 8TH STREET GLENWOOD SPRINGS CO 81601
218505337003	ROARING FORK TRANSPORTATION AUTHORITY 0766 INDUSTRY WAY CARBONDALE CO 81623
218505337001	ROARING FORK TRANSPORTATION AUTHORITY 0051 SERVICE CENTER DRIVE ASPEN CO 81611
218505338014	CENTURA VENTURES LLC 9100 E MINERAL CIRCLE ENGLEWOOD CO 80112
218505338017	GLENWOOD SPRINGS, CITY OF 101 W 8TH STREET GLENWOOD SPRINGS CO 81601
218508142001	SC GLENWOOD I LLC 760 W MAIN STREET, STE 140 BARRINGTON IL 60010
218508142002	SC GLENWOOD II LLC 760 W MAIN STREET, STE 140 BARRINGTON IL 60010
218505438004	TARGET CORPORATION PO BOX 72028 PHOENIX AZ 85050
218505438001	WEINGARTEN MILLER GLENWOOD LLC 6900 EAST BELLEVIEW AVENUE SUITE 300 GREENWOOD VILLAGE CO 80111



LEGEND AND NOTES:

● - INDICATES FOUND MONUMENT AS DESCRIBED

◎ - INDICATES MONUMENT TO BE SET AS DESCRIBED

- DATE OF SURVEY: SEPTEMBER 5 - 8, 2020

- UNIT OF MEASUREMENT: US SURVEY FOOT

- ZONING DATA TO BE PROVIDED BY CLIENT

- PARCELS A & B ARE LOCATED WITHIN ZONE D ACCORDING TO FEMA MAP PANELS 0802051431B AND 0802051432B BOTH EFFECTIVE 01/03/1986. ACCORDING TO FEMA, NO ADDITIONAL DIGITAL DATA IS AVAILABLE IN THIS AREA.

- BEARINGS ARE BASED UPON A #5 REBAR WITH ALUMINUM CAP L.S. #5933 FOUND AT THE SOUTHEASTERLY, A FOUND #5 REBAR WITH ALUMINUM CAP L.S. 25954 FOUND AT THE NORTHEASTERLY CORNER OF SUBJECT LOT 1A, USING A BEARING OF N00°21'00"E BETWEEN THE TWO DESCRIBED MONUMENTS.

- THIS ALTA LAND TITLE SURVEY IS BASED UPON INFORMATION PROVIDED BY LAND TITLE GUARANTEE COMPANY IN ORDER NUMBER ABS63015235-4 DATED AUGUST 26, 2020. THIS PROPERTY IS SUBJECT TO THE FOLLOWING EXCEPTIONS PER SAID ORDER NUMBER ABS63015235-4:

8. EXISTING LEASES AND TENANCIES, IF ANY. **NOTHING TO PLOT.**

9. RIGHT OF PROPRIETOR OF A VEIN OR LODE TO EXTRACT AND REMOVE HIS ORE THEREFROM SHOULD THE SAME BE FOUND TO PENETRATE OR INTERSECT THE PREMISES AS RESERVED IN UNITED STATES PATENT RECORDED SEPTEMBER 30, 1949, IN BOOK 245 AT PAGE 268. **NOTHING TO PLOT.**

10. RIGHT OF PROPRIETOR OF A VEIN OR LODE TO EXTRACT AND REMOVE HIS ORE THEREFROM SHOULD THE SAME BE FOUND TO PENETRATE OR INTERSECT THE PREMISES AS RESERVED IN UNITED STATES PATENT RECORDED SEPTEMBER 30, 1949, IN BOOK 245 AT PAGE 269. **NOTHING TO PLOT.**

11. EASEMENTS AND RIGHTS OF WAY AS GRANTED TO THE MOUNTAIN STATES TELEPHONE AND TELEGRAPH COMPANY IN INSTRUMENT RECORDED JUNE 25, 1936 IN BOOK 183 AT PAGE 430. **NOTHING TO PLOT.**

12. RIGHT OF PROPRIETOR OF A VEIN OR LODE TO EXTRACT AND REMOVE HIS ORE THEREFROM SHOULD THE SAME BE FOUND TO PENETRATE OR INTERSECT THE PREMISES AS RESERVED IN UNITED STATES PATENT RECORDED SEPTEMBER 30, 1949, IN BOOK 245 AT PAGE 270. **NOTHING TO PLOT.**

13. (THIS ITEM WAS INTENTIONALLY DELETED) **NOTHING TO PLOT.**

14. TERMS, CONDITIONS AND PROVISIONS OF ANNEXATION AND DEVELOPMENT AGREEMENT RECORDED DECEMBER 06, 2002 IN BOOK 1414 AT PAGE 526 AND THE AMENDMENT RECORDED MAY 6, 2004 IN BOOK 1585 AT PAGE 438 AND THE AMENDED AGREEMENT RECORDED JULY 26, 2004 IN BOOK 1607 AT PAGE 895 AND THIRD AMENDMENT RECORDED DECEMBER 2, 2010 UNDER RECEPTION 795138 AND AMENDED AND RESTATED THIRD AMENDMENT RECORDED AUGUST 16, 2011 UNDER RECEPTION NO. 806719 AND RERECORDED AUGUST 18, 2011 UNDER RECEPTION NO. 806794 AND FOURTH AMENDMENT RERECORDED AUGUST 8, 2013 UNDER RECEPTION NO. 839074 AND FOURTH AMENDMENT RERECORDED APRIL 10, 2015 UNDER RECEPTION NO. 861345. **NOTHING TO PLOT.**

NOTE: INCLUSIONARY HOUSING CREDITS ASSIGNMENT IN CONNECTION WITH THE ABOVE AGREEMENT RECORDED MAY 17, 2012 UNDER RECEPTION NO. 818854. MEMORANDUM OF UNDERSTANDING RECORDED JULY 18, 2013 UNDER RECEPTION NO. 838187

15. (THIS ITEM WAS INTENTIONALLY DELETED) **NOTHING TO PLOT.**

16. EASEMENTS AND NOTES AS SHOWN ON THE PLAT FOR GLENWOOD MEADOWS NO. 2, RECORDED AUGUST 9, 2004 UNDER RECEPTION NO. 657439. **PLOTTED HEREON.**

17. EASEMENTS AND NOTES ON THE PLAT OF GLENWOOD MEADOWS NO. 4 RECORDED OCTOBER 28, 2009 UNDER RECEPTION NO. 776958. **UNCLEAR DOCUMENTS, UNABLE TO EVALUATE.**

18. EASEMENTS AND NOTES ON THE PLAT OF GLENWOOD MEADOWS NO. 5 RECORDED MAY 17, 2010 UNDER RECEPTION NO. 818851. **PLOTTED HEREON.**

19. EASEMENTS AND NOTES ON THE PLAT OF GLENWOOD MEADOWS NO. 4 - LOT LINE ADJUSTMENT RECORDED MARCH 13, 2012 UNDER RECEPTION NO. 815777. **PLOTTED HEREON.**

20. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN AGREEMENT RECORDED JUNE 29, 2012 UNDER RECEPTION NO. 820756. **NOTHING TO PLOT.**

21. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN AGREEMENT RECORDED JUNE 29, 2012 UNDER RECEPTION NO. 820755. **NOTHING TO PLOT.**

22. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN RECIPROCAL EASEMENT AGREEMENT RECORDED MAY 17, 2012 UNDER RECEPTION 818857. **NOTHING TO PLOT.**

EASEMENT MODIFICATION RECORDED MAY 18, 2017 UNDER RECEPTION NO. 892528.

23. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN ACCESS AND MAINTENANCE AGREEMENT RECORDED MAY 17, 2012 UNDER RECEPTION 818859. **PLOTTED HEREON.**

24. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN DEVELOPMENT AGREEMENT RECORDED MAY 17, 2012 UNDER RECEPTION NO. 818856 AND AMENDMENT RECORDED MAY 18, 2017 AT RECEPTION NO. 892527. **NOTHING TO PLOT.**

25. (THIS ITEM WAS INTENTIONALLY DELETED). **NOTHING TO PLOT.**

26. (THIS ITEM WAS INTENTIONALLY DELETED). **NOTHING TO PLOT.**

27. EASEMENTS AND NOTES ON THE PLAT OF GLENWOOD MEADOWS NO. 6 RECORDED SEPTEMBER 7, 2017 UNDER RECEPTION NO. 897037. **PLOTTED HEREON.**

28. (THIS ITEM WAS INTENTIONALLY DELETED). **NOTHING TO PLOT.**

LEGAL DESCRIPTION:

PARCEL A:

****
NOTE: THE FOLLOWING LEGAL DESCRIPTION IS PRELIMINARY AND IS SUBJECT TO CHANGE UPON COMPLIANCE WITH THE REQUIREMENTS UNDER SCHEDULE B-1, HEREIN.
****

LOTS 11C-B AND 11C-C, GLENWOOD MEADOWS FILING NO. 6, ACCORDING TO THE PLAT THEREOF RECORDED SEPTEMBER 7, 2017 AT RECEPTION NO. 897037
COUNTY OF GARFIELD, STATE OF COLORADO

PARCEL B:

EASEMENTS FOR UTILITIES, DRAINAGE AND ACCESS AS DESCRIBED AND DEPICTED IN RECIPROCAL EASEMENT AGREEMENT RECORDED MAY 5, 17, 2012 UNDER RECEPTION NO. 818857 AND FIRST AMENDMENTS TO RECIPROCAL EASEMENT AGREEMENT RECORDED MAY 18, 2017 UNDER RECEPTION NO. 892528.

SURVEYOR'S CERTIFICATE:

TO:
BLD GROUP, LLC,
ALPINE BANK,
AND LAND TITLE GUARANTEE COMPANY
OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY

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, 6(B), 8, 11, 13, 14, 16, 17, 18, AND 19 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON MARCH 28, 2020 DATE OF PLAT OR MAP: SEPTEMBER 2-8, 2020.

COLORADO REGISTERED JEFFREY ALLEN TUTTLE 33638 PROFESSIONAL LAND SURVEYOR

09/16/2020
JEFFREY ALLEN TUTTLE L.S. 33638 — DATE

NOTICE: ACCORDING TO COLORADO LAW, YOU **MUST** COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER 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.

TUTTLE SURVEYING SERVICES
923 COOPER AVENUE
GLENWOOD SPRINGS, COLORADO 81601
(970) 928-9708 (FAX 947-9007)
Email- jeff@tss-us.com

TUTTLE SURVEYING SERVICES

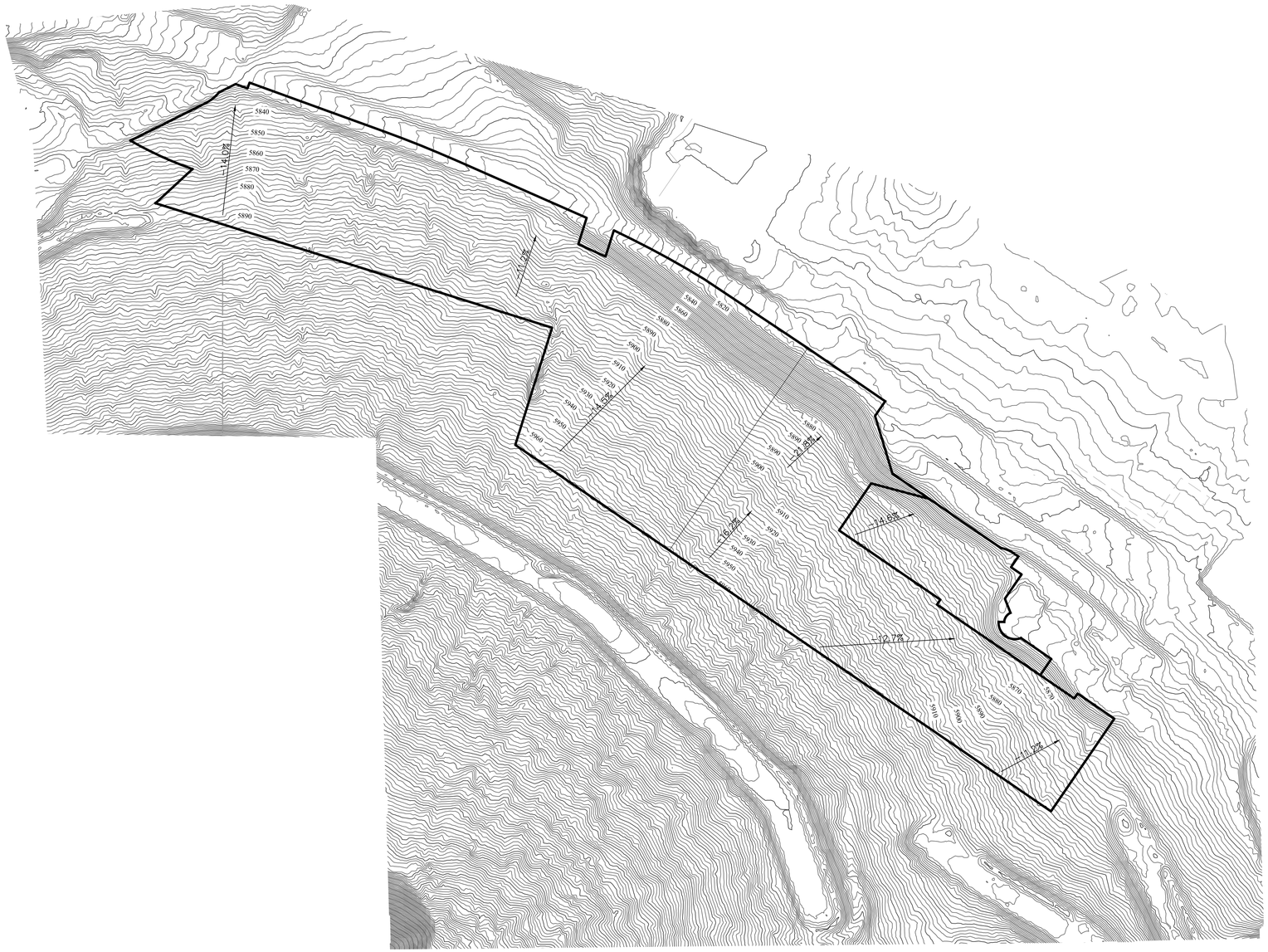
ALTA/ACSM LAND TITLE SURVEY

TBD GLENWOOD MEADOWS
GLENWOOD SPRINGS, CO 81647

DRAWN BY: JG
DATE: 09/16/2020

ALTA/ACSM LAND TITLE SURVEY

LOTS 11C-B AND 11C-C, GLENWOOD MEADOWS FILING NO. 6, ACCORDING TO THE PLAT THEREOF
RECORDED SEPTEMBER 7, 2017 AT RECEPTION NO. 897037
A PORTION OF THE NORTHEAST ¼ OF SECTION 8, TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE 6TH P.M.
CITY OF GLENWOOD SPRINGS, COUNTY OF GARFIELD, STATE OF COLORADO



GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

NOTES:

CONTOUR DATA OBTAINED FROM US GEOLOGICAL SURVEY 2017 DATA,
STATE PLAIN NAD 83 CENTRAL ZONE. FIELD VERIFICATION MAY BE NECESSARY
IN AREAS CRITICAL TO DESIGN.

SURVEYOR'S CERTIFICATE:

TO:
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ALPINE BANK,
AND LAND TITLE GUARANTEE COMPANY
OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY

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DATE OF PLAT OR MAP: SEPTEMBER 2-8, 2020.

COLORADO REGISTERED JEFFREY ALLEN TUTTLE 33638 PROFESSIONAL LAND SURVEYOR

JEFFREY ALLEN TUTTLE L.S. 33638 — 09/16/2020 DATE

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TUTTLE SURVEYING SERVICES

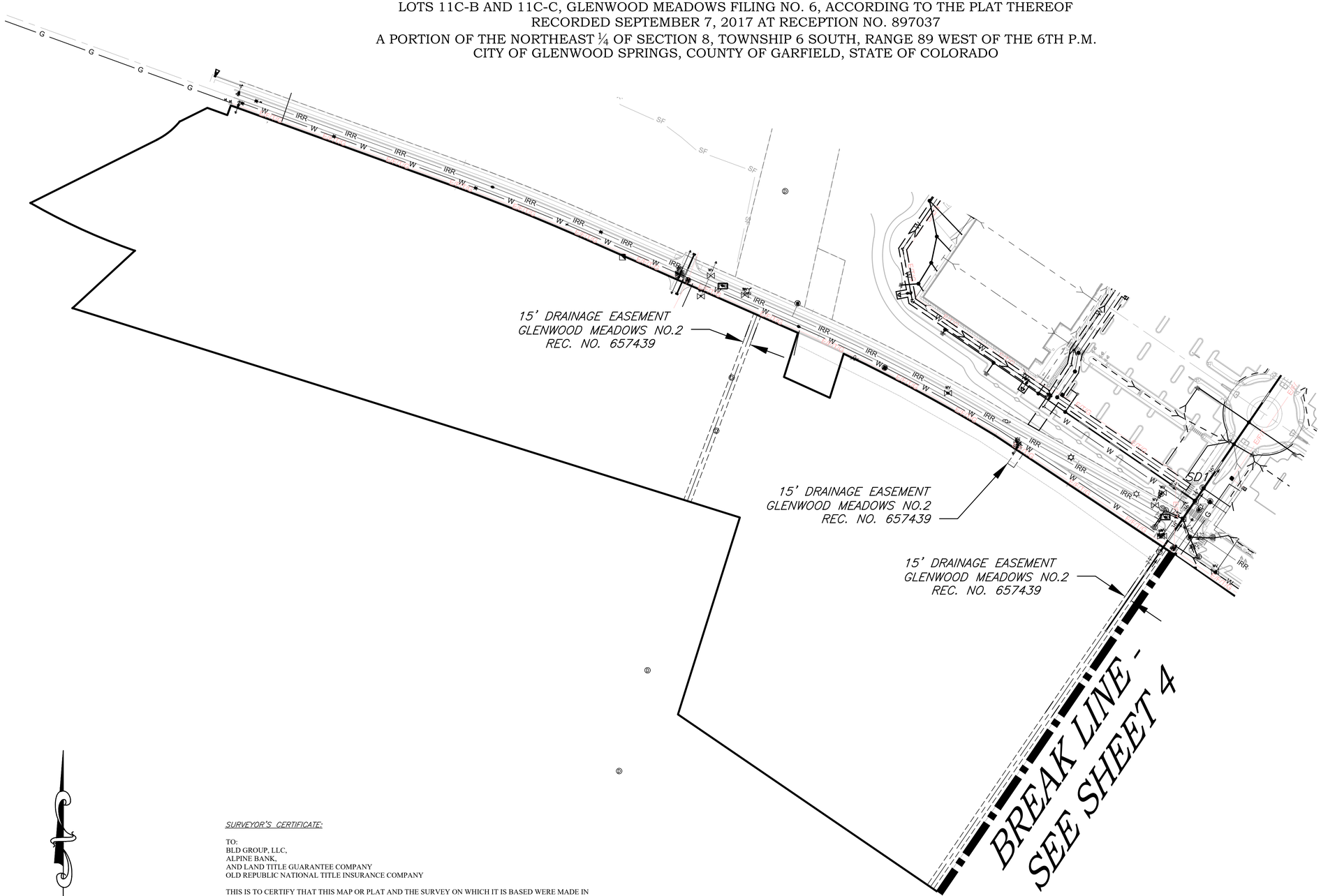
ALTA/ACSM LAND TITLE SURVEY

TBD GLENWOOD MEADOWS
GLENWOOD SPRINGS, CO 81647

DRAWN BY: JG
DATE: 09/16/2020

ALTA/ACSM LAND TITLE SURVEY

LOTS 11C-B AND 11C-C, GLENWOOD MEADOWS FILING NO. 6, ACCORDING TO THE PLAT THEREOF
RECORDED SEPTEMBER 7, 2017 AT RECEPTION NO. 897037
A PORTION OF THE NORTHEAST ¼ OF SECTION 8, TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE 6TH P.M.
CITY OF GLENWOOD SPRINGS, COUNTY OF GARFIELD, STATE OF COLORADO



LEGEND
- TV PEDESTAL
- ELECTRICAL TRANS
- CLEAN–OUT
- WATER VALVE
- TELE. PEDESTAL
- ELEC. PEDESTAL
- SET #5 REBAR & CAP L.S. NO. 33638
- FOUND PROPERTY CORNER AS DESCRIBED
- UTILITY POLE/ POWER POLE
- ANCHOR
- TELE. VAULT
- ELECT. VAULT
- LIGHT POLE
- MARKER/ SIGN
- HANDICAP
- FIRE HYDRANT
- WATER SHUTOFF
- GAS VALVE
- SAN. SEWER MH
- ST. SEWER MH
- ELECT. MH
- TELEPHONE MH
- WATER MH
- WATER METER
- GAS METER
- ELECTRICAL METER
- STORM GRATE
- ELECTRIC MARKER
- GAS MARKER
- IRRIGATION VALVE BOX

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

SURVEYOR'S CERTIFICATE:

TO:
BLD GROUP, LLC,
ALPINE BANK,
AND LAND TITLE GUARANTEE COMPANY
OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY

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COLORADO REGISTERED JEFFREY ALLEN TUTTLE 33638 PROFESSIONAL LAND SURVEYOR

09/16/2020
JEFFREY ALLEN TUTTLE L.S. 33638 — DATE

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(970) 928–9708 (FAX 947–9007)
Email– jeff@tss–us.com

TUTTLE SURVEYING SERVICES

ALTA/ACSM LAND TITLE SURVEY

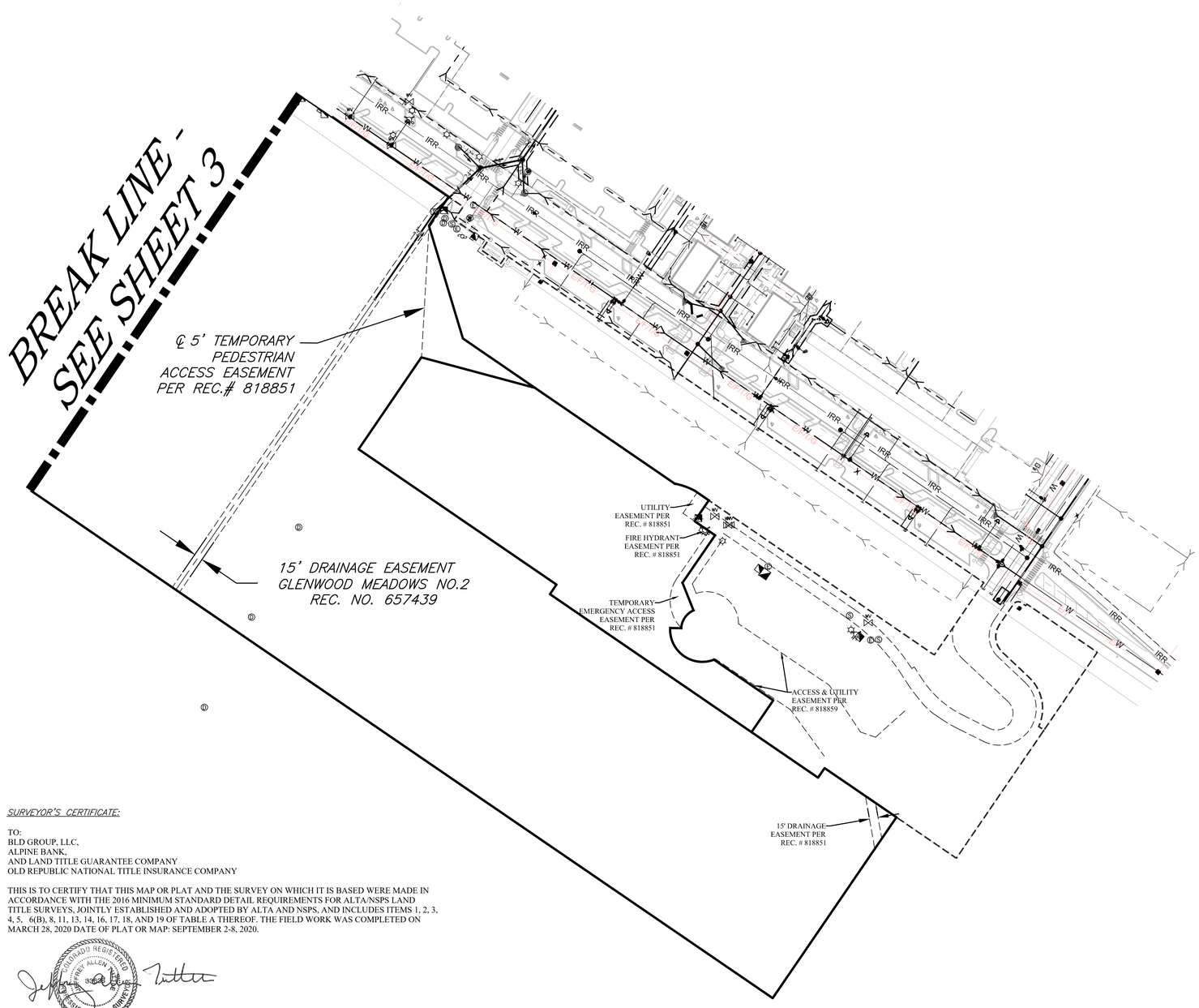
TBD GLENWOOD MEADOWS
GLENWOOD SPRINGS, CO 81647

DRAWN BY: JG
DATE: 09/16/2020

3 OF 4

ALTA/ACSM LAND TITLE SURVEY

LOTS 11C-B AND 11C-C, GLENWOOD MEADOWS FILING NO. 6, ACCORDING TO THE PLAT THEREOF
RECORDED SEPTEMBER 7, 2017 AT RECEPTION NO. 897037
A PORTION OF THE NORTHEAST ¼ OF SECTION 8, TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE 6TH P.M.
CITY OF GLENWOOD SPRINGS, COUNTY OF GARFIELD, STATE OF COLORADO



LEGEND

- TV PEDESTAL
- ELECTRICAL TRANS
- CLEAN–OUT
- WATER VALVE
- TELE. PEDESTAL
- ELEC. PEDESTAL
- SET #5 REBAR & CAP L.S. NO. 33638
- FOUND PROPERTY CORNER AS DESCRIBED
- UTILITY POLE/ POWER POLE
- ANCHOR
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- ELECT. VAULT
- LIGHT POLE
- MARKER/ SIGN
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- ST. SEWER MH
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- TELEPHONE MH
- WATER MH
- WATER METER
- GAS METER
- ELECTRICAL METER
- STORM GRATE
- ELECTRIC MARKER
- GAS MARKER
- IRRIGATION VALVE BOX

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

SURVEYOR'S CERTIFICATE:

TO:
BLD GROUP, LLC,
ALPINE BANK,
AND LAND TITLE GUARANTEE COMPANY
OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY

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COLORADO REGISTERED JEFFREY ALLEN TUTTLE 33638 PROFESSIONAL LAND SURVEYOR

JEFFREY ALLEN TUTTLE L.S. 33638 — 09/16/2020 DATE

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TUTTLE SURVEYING SERVICES
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Email– jeff@tss–us.com

TUTTLE SURVEYING SERVICES

ALTA/ACSM LAND TITLE SURVEY

TBD GLENWOOD MEADOWS
GLENWOOD SPRINGS, CO 81647

DRAWN BY: JG
DATE: 09/16/2020

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

PRELIMINARY NOT FOR CONSTRUCTION

WULFSOHN RD.

INSTALL NEW LOT 14 CURB CUT ACROSS FORM PROPOSED ACCESS

EXISTING CURB CUT TO BE REMOVED. INSTALL 74–LF, 24–IN STANDARD CURB & GUTTER. EXISTING UTILITY STUBS TO REMAIN

TW: 5887.68
BW: 5882.68

TW: 5893.15
BW: 5888.03

TW: 5882.68
BW: 5876.68

TW: 5886.47
BW: 5880.58

TW: 5883.94
BW: 5878.01

TW: 5881.44
BW: 5877.32

TW: 5912.01
BW: 5906.23

TW: 5917.85
BW: 5915.77

TW: 5923.68
BW: 5919.24

TW: 5938.20
BW: 5934.75

TW: 5938.72
BW: 5923.16

TW: 5919.18
BW: 5917.85

TW: 5940.21
BW: 5938.75

TW: 5922.03
BW: 5919.99

TW: 5928.46
BW: 5928.72

TW: 5945.11
BW: 5941.65

TW: 5944.85
BW: 5938.85

TW: 5938.34
BW: 5932.34

LEGEND

	EXISTING	PROPOSED
	STORM MANHOLE	WATER SHUTOFF VALVE
	SANITARY CLEAN–OUT	WATER VALVE
	SANITARY MANHOLE	TEE W/THRUST BLOCK
	FIRE HYDRANT	BEND W/THRUST BLOCK
	WATER VALVE	FIRE HYDRANT
	WATER MANHOLE	INLET
	GAS METER	CURB INLET
	TELEPHONE PEDESTAL	STORM MANHOLE
	LIGHT POLE	SANITARY CLEANOUT
	UTILITY POLE	CABLE MANHOLE
	SIGN	ELECTRIC MANHOLE
		ELECTRIC TRANSFORMER
BOUNDARY		
RIGHT–OF–WAY		
EASEMENT		
STRUCTURE		
ASPHALT		
GRAVEL		
CONCRETE		
RETAINING WALL		
CENTERLINE ROAD		
CURB AND GUTTER		
FLOWLINE		
PAVEMENT STRIPING		
WATER MAIN	W	W
WATER SERVICE		WS
SEWER MAIN	SS	S
SEWER SERVICE	SS SS	SS SS
OVERHEAD ELECTRIC	OE	
ELECTRIC	E	E
CATV	CTV	C
TELEPHONE	T	T
GAS	G	G
STORM SEWER		
CONTOUR	6158	6158

NOTES

1. SURVEY COMPLETED BY TUTTLE SURVEYING SERVICES. REFER TO ALTA/ASCM LAND TITLE SURVEY DATED 10/08/20 FOR EXISTING CONDITIONS INFORMATION. DATE OF SURVEY SEPTEMBER 5–8, 2020.
2. BASIS OF BEARINGS: #5 REBAR WITH ALUMINUM CAP LS #5933 AT THE SOUTHEASTERLY, A FOUND #5 REBAR WITH ALUMINUM CAP L.S. 25954 FOUND AT THE NORTHEASTERLY CORNER OF SUBJECT LOT 1A, USING A BEARING OF N00°21'00"E BETWEEN THE TWO DESCRIBED MONUMENTS.
3. CONTOUR INFORMATION OBTAINED FROM US GEOLOGICAL SURVEY 2017 DATA, STATE PLANE NAD 83 CENTRAL ZONE. FIELD VERIFICATION MAY BE NECESSARY IN AREAS CRITICAL TO DESIGN.

COLORADO 811
CALL BEFORE YOU DIG
Utility Notification Center of Colorado

NO.	DATE	REVISION	BY
1	12/11/20	MAJOR SITE / ARCH. REVIEW	MGG
2	1/22/21	MAJOR SITE / ARCH. REVIEW #2	MGG
3	7/2/21	MAJOR SITE / ARCH. REVIEW #3	MGG
4	8/13/21	MAJOR SITE / ARCH. REVIEW #4	MGG

DRAWN BY: MGG
CHECKED BY: MGG
DATE: 8/13/2021
FILE:
SCALE 1" = 40'

HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101,
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 · FAX (970) 945-2555
WWW.HCENG.COM

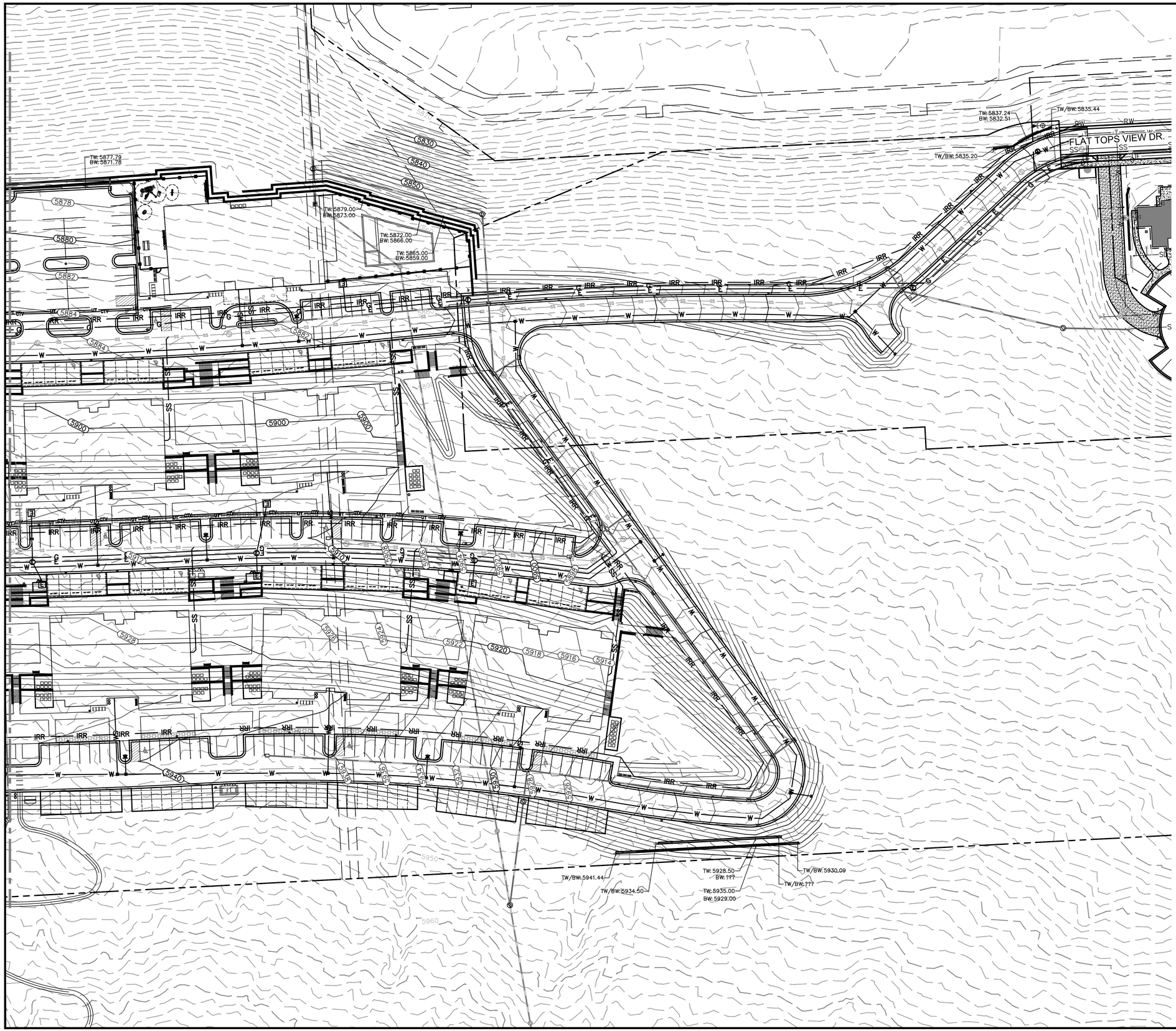
GLENWOOD MEADOWS MULTI-FAMILY

BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

PRELIMINARY GRADING PLAN
SHEET 1

PROJECT NO.
2201044.00

GR1



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

PRELIMINARY
NOT FOR
CONSTRUCTION

LEGEND

	EXISTING	PROPOSED
	STORM MANHOLE	WATER SHUTOFF VALVE
	SANITARY CLEAN-OUT	WATER VALVE
	SANITARY MANHOLE	TEE W/THRUST BLOCK
	FIRE HYDRANT	BEND W/THRUST BLOCK
	WATER VALVE	FIRE HYDRANT
	WATER MANHOLE	INLET
	GAS METER	CURB INLET
	TELEPHONE PEDESTAL	STORM MANHOLE
	LIGHT POLE	SANITARY MANHOLE
	UTILITY POLE	SANITARY CLEANOUT
	SIGN	CABLE MANHOLE
		ELECTRIC MANHOLE
		ELECTRIC TRANSFORMER
BOUNDARY		
RIGHT-OF-WAY		
EASEMENT		
STRUCTURE		
ASPHALT		
GRAVEL		
CONCRETE		
RETAINING WALL		
CENTERLINE ROAD		
CURB AND GUTTER		
FLOWLINE		
PAVEMENT STRIPING		
WATER MAIN	W	W
WATER SERVICE		WS
SEWER MAIN	SS	S
SEWER SERVICE	SS	SS
OVERHEAD ELECTRIC	OE	
ELECTRIC	E	E
CATV	CTV	C
TELEPHONE	T	T
GAS	G	G
STORM SEWER		
CONTOUR	6158	6158

NOTES:

1. SURVEY COMPLETED BY TUTTLE SURVEYING SERVICES. REFER TO ALTA/ASCM LAND TITLE SURVEY DATED 10/08/20 FOR EXISTING CONDITIONS INFORMATION. DATE OF SURVEY SEPTEMBER 5-8, 2020.
2. BASIS OF BEARINGS: #5 REBAR WITH ALUMINUM CAP LS #5933 AT THE SOUTHEASTERLY, A FOUND #5 REBAR WITH ALUMINUM CAP L.S. 25954 FOUND AT THE NORTHEASTERLY CORNER OF SUBJECT LOT 1A, USING A BEARING OF N00°21'00"E BETWEEN THE TWO DESCRIBED MONUMENTS.
3. CONTOUR INFORMATION OBTAINED FROM US GEOLOGICAL SURVEY 2017 DATA, STATE PLANE NAD 83 CENTRAL ZONE. FIELD VERIFICATION MAY BE NECESSARY IN AREAS CRITICAL TO DESIGN.

COLORADO 811
CALL BEFORE YOU DIG
Utility Notification Center of Colorado

NO.	DATE	REVISION	BY
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3	7/2/21	MAJOR SITE / ARCH. REVIEW #3	MGG
4	8/13/21	MAJOR SITE / ARCH. REVIEW #4	MGG

DRAWN BY: MGG
CHECKED BY: MGG
DATE:
FILE: SCALE 1" = 40'

HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101,
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 · FAX (970) 945-2555
WWW.HCENG.COM

BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

PRELIMINARY GRADING PLAN
SHEET 2

PROJECT NO.
2201044.00

GR2

PRELIMINARY
NOT FOR
CONSTRUCTION

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

WULFSOHN RD.

CONNECT TO EXISTING IRRIGATION MAIN PER CITY OF GLENWOOD SPRINGS STANDARDS

CONNECT TO EXISTING WATERMAIN PER CITY OF GLENWOOD SPRINGS STANDARDS

EXISTING WATERMAIN STUBS TO BE ABANDONED PER CITY OF GLENWOOD SPRINGS STANDARDS

EXISTING IRRIGATION STUBS TO BE ABANDONED PER CITY OF GLENWOOD SPRINGS STANDARDS

INSTALL NEW MANHOLE ON EXISTING STORM SEWER

249.99'–12" HDPE @ 2.31%

EXISTING CURB CUT TO BE REMOVED

24.06'–12" HDPE @ 1.00%

12.19'–15" HDPE @ 19.23%

CONNECT TO EXISTING STORM SEWER STRUCTURE

116.60'–15" HDPE @ 17.79%

14.00'–12" HDPE @ 2.00%

229.99'–12" HDPE @ 0.75%

229.98'–12" HDPE @ 0.75%

14.00'–12" HDPE @ 2.00%

14.00'–12" HDPE @ 5.70%

EXISTING 24" STORM PIPE "1B"

INSTALL MANHOLE ON EXISTING STORM SEWER

144.48'

134.80'–12" HDPE @ 4.00%

333.20'–12" HDPE @ 1.09%

333.20'–12" HDPE @ 1.09%

400.00'–8" PVC @ 1.10%

227.44'–8" PVC @ 1.10%

8" D.I.P. WATER MAIN

SAN–MH8

SAN–MH7

63.43'–12" HDPE @ 2.24%

24.00'–12" HDPE @ 1.00%

141.58'–12" HDPE @ 6.97%

62.32'–12" HDPE @ 3.62%

24.00'–12" HDPE

11.0' TYP.
10. MIN.

6" PVC SANITARY SERVICE, TYP.

6" D.I.P. WATER SERVICE, TYP.

51.17'–12" HDPE @ 4.12%

260.75'–8" PVC @ 1.13%

8" D.I.P. WATER MAIN

SAN–MH14

95.95'–12" HDPE @ 9.05%

116.56'–12" HDPE @ 10.77%

358.86' SEE SHEET 2

56.00'–24" HDPE @ 6.00%

38.93'–24" HDPE @ 6.00%

COMBINED FIRE/DOMESTIC WATER SERVICE CONNECTIONS TO BE NFPA24 COMPLIANT, TYP.

EXISTING STORM SEWER TO BE ABANDONED/REMOVED

INSTALL MANHOLE ON EXISTING STORM SEWER

LEGEND

EXISTING	PROPOSED
STORM MANHOLE	WATER SHUTOFF VALVE
SANITARY CLEAN–OUT	WATER VALVE
SANITARY MANHOLE	TEE W/THRUST BLOCK
FIRE HYDRANT	BEND W/THRUST BLOCK
WATER VALVE	FIRE HYDRANT
WATER MANHOLE	INLET
GAS METER	CURB INLET
TELEPHONE PEDESTAL	STORM MANHOLE
LIGHT POLE	SANITARY MANHOLE
UTILITY POLE	CABLE MANHOLE
SIGN	ELECTRIC VAULT
	ELECTRIC TRANSFORMER

BOUNDARY	
RIGHT–OF–WAY	
EASEMENT	
STRUCTURE	
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GRAVEL	
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CURB AND GUTTER	
FLOWLINE	
PAVEMENT STRIPING	
WATER MAIN	W
WATER SERVICE	WS
SEWER MAIN	S
SEWER SERVICE	SS
OVERHEAD ELECTRIC	OE
ELECTRIC	E
CATV	CTV
TELEPHONE	T
GAS	G
IRRIGATION	IRR
STORM SEWER	

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5. PUBLICLY DEDICATED UTILITIES SHALL HAVE UTILITY EASEMENT FOR ACCESS AND MAINTENANCE.
6. ALL FIRE HYDRANTS TO HAVE 15' EASEMENT FOR ACCESS AND MAINTENANCE.
7. ALL UTILITY EASEMENTS TO BE SHOW AN FINALIZED ON PERMIT PLANS.
8. ALL WET UTILITIES WILL REQUIRE JOINTS/BELLS WITHIN ENTIRE PROJECT AREA.
9. ALL UNUSED UTILITY STUBS SHALL BE ABANDONED PER COGS STANDARDS.

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SCALE 1" = 40'

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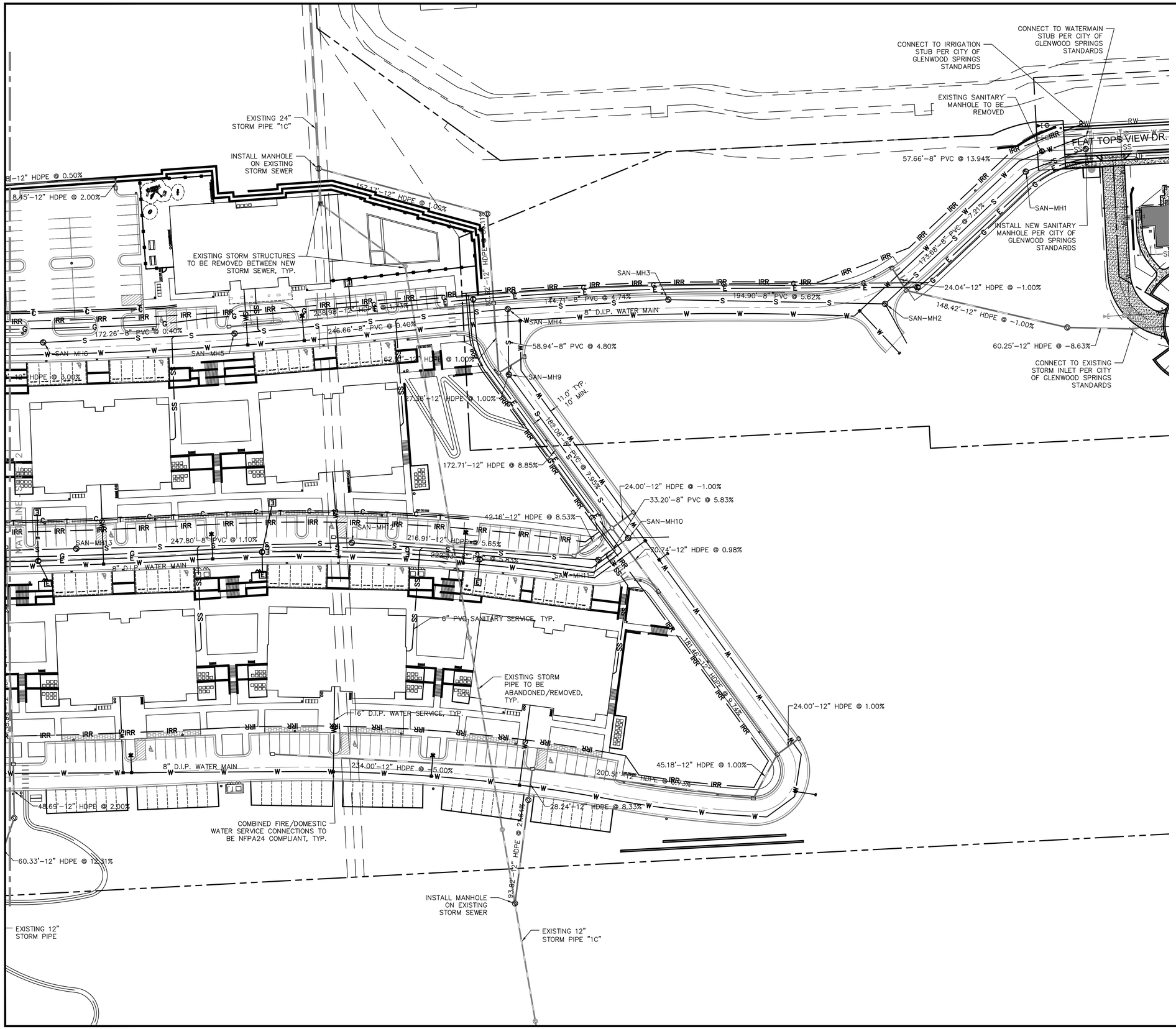
BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

PRELIMINARY UTILITY PLAN
SHEET 1

PROJECT NO.
2201044.00

UT1



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

PRELIMINARY NOT FOR CONSTRUCTION

LEGEND

	EXISTING	PROPOSED
	STORM MANHOLE	WATER SHUTOFF VALVE
	SANITARY CLEAN–OUT	WATER VALVE
	SANITARY MANHOLE	TEE W/THRUST BLOCK
	FIRE HYDRANT	BEND W/THRUST BLOCK
	WATER VALVE	FIRE HYDRANT
	WATER MANHOLE	INLET
	GAS METER	CURB INLET
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CONCRETE		
RETAINING WALL		
CENTERLINE ROAD		
CURB AND GUTTER		
FLOWLINE		
PAVEMENT STRIPING		
WATER MAIN	W	W
WATER SERVICE		WS
SEWER MAIN	SS	S
SEWER SERVICE	SS SS	SS SS
OVERHEAD ELECTRIC	OE	
ELECTRIC	E	E
CATV	CTV	C
TELEPHONE	T	T
GAS	G	G
IRRIGATION		IRR
STORM SEWER		

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DRAWN BY: MGG
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DATE:
FILE: SCALE 1" = 40'

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BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

PRELIMINARY UTILITY PLAN SHEET 2

PROJECT NO.
2201044.00

UT2

SELLER'S RESERVED PARCEL
12.213 ACRES

BUYER'S PARCEL
27.929 ACRES

REMAINDER PARCEL
9.265 ACRES

0' 75' 150' 300'
Scale: 1" = 150'

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NAME
P:\Work\SUMMER MOORE PARTNERS-2019\E_Land Use Permit Revision\CAD\Sheets\SITE PLAN SUBMITTAL.dwg
Jun 11, 2021 - 8:49am

DHM DESIGN
311 Main Street
#102
Carbondale, Co. 81623
970.963.6520
www.dhmdesign.com

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NOT FOR CONSTRUCTION

GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE
2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

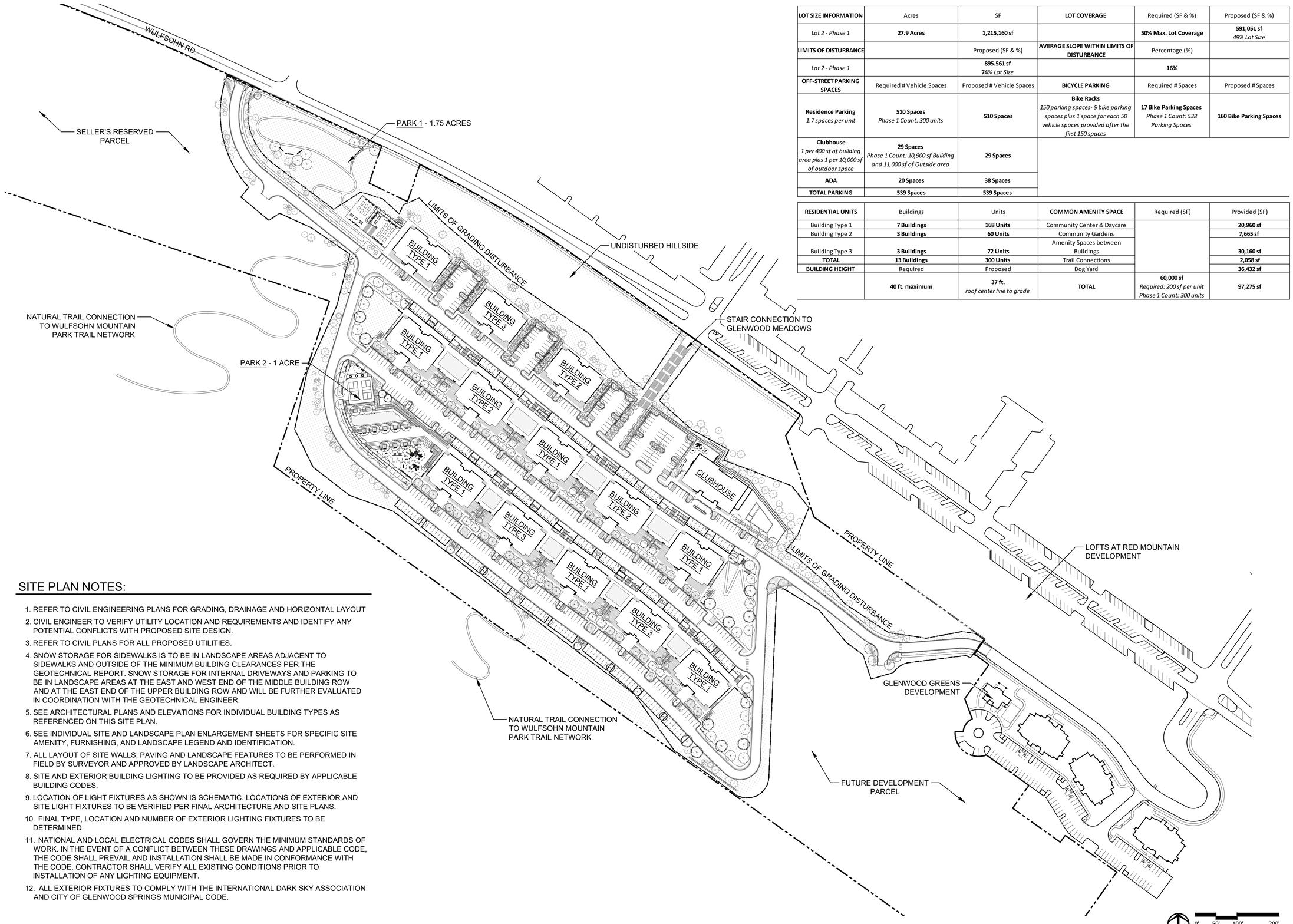
JOB DESCRIPTION:
MAJOR SITE /
ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN

SCALE:

SHEET NUMBER:
L1.0

SHEET_____OF_____



UNIT AND SITE AMENITY DATA:

LOT SIZE INFORMATION	Acres	SF	LOT COVERAGE	Required (SF & %)	Proposed (SF & %)
Lot 2 - Phase 1	**27.9 Acres**	**1,215,160 sf**		**50% Max. Lot Coverage**	**591,051 sf** *49% Lot Size*
LIMITS OF DISTURBANCE		Proposed (SF & %)	**AVERAGE SLOPE WITHIN LIMITS OF DISTURBANCE**	Percentage (%)	
Lot 2 - Phase 1		**895.561 sf** **74**% *Lot Size*		**16%**	
OFF-STREET PARKING SPACES	Required # Vehicle Spaces	Proposed # Vehicle Spaces	**BICYCLE PARKING**	Required # Spaces	Proposed # Spaces
Residence Parking *1.7 spaces per unit*	**510 Spaces** *Phase 1 Count: 300 units*	**510 Spaces**	**Bike Racks** *150 parking spaces- 9 bike parking spaces plus 1 space for each 50 vehicle spaces provided after the first 150 spaces*	**17 Bike Parking Spaces** *Phase 1 Count: 538 Parking Spaces*	**160 Bike Parking Spaces**
Clubhouse *1 per 400 sf of building area plus 1 per 10,000 sf of outdoor space*	**29 Spaces** *Phase 1 Count: 10,900 sf Building and 11,000 sf of Outside area*	**29 Spaces**			
ADA	**20 Spaces**	**38 Spaces**			
TOTAL PARKING	**539 Spaces**	**539 Spaces**			

RESIDENTIAL UNITS	Buildings	Units	COMMON AMENITY SPACE	Required (SF)	Provided (SF)
Building Type 1	**7 Buildings**	**168 Units**	Community Center & Daycare		**20,960 sf**
Building Type 2	**3 Buildings**	**60 Units**	Community Gardens		**7,665 sf**
Building Type 3	**3 Buildings**	**72 Units**	Amenity Spaces between Buildings		**30,160 sf**
TOTAL	**13 Buildings**	**300 Units**	Trail Connections		**2,058 sf**
BUILDING HEIGHT	Required	Proposed	Dog Yard		**36,432 sf**
	40 ft. maximum	**37 ft.** *roof center line to grade*	**TOTAL**	**60,000 sf** *Required: 200 sf per unit* *Phase 1 Count: 300 units*	**97,275 sf**

SITE PLAN NOTES:

1. REFER TO CIVIL ENGINEERING PLANS FOR GRADING, DRAINAGE AND HORIZONTAL LAYOUT
2. CIVIL ENGINEER TO VERIFY UTILITY LOCATION AND REQUIREMENTS AND IDENTIFY ANY POTENTIAL CONFLICTS WITH PROPOSED SITE DESIGN.
3. REFER TO CIVIL PLANS FOR ALL PROPOSED UTILITIES.
4. SNOW STORAGE FOR SIDEWALKS IS TO BE IN LANDSCAPE AREAS ADJACENT TO SIDEWALKS AND OUTSIDE OF THE MINIMUM BUILDING CLEARANCES PER THE GEOTECHNICAL REPORT. SNOW STORAGE FOR INTERNAL DRIVEWAYS AND PARKING TO BE IN LANDSCAPE AREAS AT THE EAST AND WEST END OF THE MIDDLE BUILDING ROW AND AT THE EAST END OF THE UPPER BUILDING ROW AND WILL BE FURTHER EVALUATED IN COORDINATION WITH THE GEOTECHNICAL ENGINEER.
5. SEE ARCHITECTURAL PLANS AND ELEVATIONS FOR INDIVIDUAL BUILDING TYPES AS REFERENCED ON THIS SITE PLAN.
6. SEE INDIVIDUAL SITE AND LANDSCAPE PLAN ENLARGEMENT SHEETS FOR SPECIFIC SITE AMENITY, FURNISHING, AND LANDSCAPE LEGEND AND IDENTIFICATION.
7. ALL LAYOUT OF SITE WALLS, PAVING AND LANDSCAPE FEATURES TO BE PERFORMED IN FIELD BY SURVEYOR AND APPROVED BY LANDSCAPE ARCHITECT.
8. SITE AND EXTERIOR BUILDING LIGHTING TO BE PROVIDED AS REQUIRED BY APPLICABLE BUILDING CODES.
9. LOCATION OF LIGHT FIXTURES AS SHOWN IS SCHEMATIC. LOCATIONS OF EXTERIOR AND SITE LIGHT FIXTURES TO BE VERIFIED PER FINAL ARCHITECTURE AND SITE PLANS.
10. FINAL TYPE, LOCATION AND NUMBER OF EXTERIOR LIGHTING FIXTURES TO BE DETERMINED.
11. NATIONAL AND LOCAL ELECTRICAL CODES SHALL GOVERN THE MINIMUM STANDARDS OF WORK. IN THE EVENT OF A CONFLICT BETWEEN THESE DRAWINGS AND APPLICABLE CODE, THE CODE SHALL PREVAIL AND INSTALLATION SHALL BE MADE IN CONFORMANCE WITH THE CODE. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO INSTALLATION OF ANY LIGHTING EQUIPMENT.
12. ALL EXTERIOR FIXTURES TO COMPLY WITH THE INTERNATIONAL DARK SKY ASSOCIATION AND CITY OF GLENWOOD SPRINGS MUNICIPAL CODE.

IMAGES
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Layout: L1.1
Aug 11, 2021 - 4:39pm

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE 2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
DEVELOPMENT AREA SITE PLAN

SCALE:

SHEET NUMBER:
L1.1

SHEET____OF____

LANDSCAPE AREA:

OPEN SPACE	SQUARE FOOTAGE	TREES		SHRUBS	
		REQUIRED *(1/1200 SF)*	PROVIDED	REQUIRED (1/400 SF)	PROVIDED
Upper tier - disturbed	87,483 SF	73	74	219	366
Lower tier - disturbed	79,351 SF	66	66	198	285

INTERNAL DRIVEWAY	LINEAR FEET	TREES	
		REQUIRED *(1/35 LF)*	PROVIDED
Flat Tops View Dr (Sunny Aspen)	2,071 LF	59	60
Wolf Liam Lane	1,735 LF	50	50
Adios Avenue	1,748 LF	50	50

PARKING AREAS	Total Parking Area (SF)	Landscaped Area (SF & %)	TREES		SHRUBS	
			REQUIRED *(1/1200 SF)*	PROVIDED	REQUIRED (1/400 SF)	PROVIDED
Parking Lots	29,694 SF	10,485 SF *(35% of the parking area)*	25	40	74	240

TOTAL LANDSCAPED AREA	Proposed (SF & %)	OPEN SPACE	Required (SF & %)	Proposed (SF & %)
	304,510 sf *25% Lot Size*		**486,064 sf** *40% Lot Size*	**504,083 sf** *41.5% Lot Size*

TOTAL IMPERVIOUS AREA	Proposed (SF & %)
	591,051 sf *49% Lot Size*

L1.3

L1.4

L1.5

L1.6

L1.7

L1.8

L1.9

A1.4

A1.4

A1.4

0' 50' 100' 200'
Scale: 1" = 100'

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LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE 2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT KEY PLAN

SCALE:

SHEET NUMBER:
L1.2

SHEET_____OF_____

IMAGES
P:\Work\Projects\Glenwood Meadows\Drawings\Site\Images\Site Plan.jpg
P:\Corrected\GLENWOOD MEADOWS APARTMENTS-20191126_3D Models\3_Renderings\20210811 Progress Set\DM_Graphics\Set_L1 - Photo.jpg
P:\Corrected\GLENWOOD MEADOWS APARTMENTS-20191126_3D Models\3_Renderings\20210811 Updated Revised Main Rooftop\DM_Graphics\Set_L2.jpg
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NAME
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LAYOUT: Key Site Plan

XERIC PERENNIALS / ORNAMENTAL GRASSES ENTRY GARDEN BED

CONNECTION TO EXISTING WULFSOHN CURB CUT

WULFSOHN RD.

PROPERTY LINE

TRASH RECEPTACLE

LOCAL ACCESS TRAILHEAD

STAIR CONNECTION

SOFT SURFACE TRAIL

NATIVE SEED

AC CONDENSING UNTIS

FENCE (6' MAX. HEIGHT)

TERRACED PLANTER

TRASH RECEPTACLES

PARK 1

CRUSHER FINES SEATING AREA

COMMUNITY GARDEN WITH RAISED PLANTER BOXES

RETAINING WALL (6' MAX. HEIGHT)

XERIC PERENNIALS / ORNAMENTAL GRASSES ENTRY GARDEN BED

PROPOSED ROAD; RE: CIVIL

CRUSHER FINES

PICNIC TABLE

PARK BENCH

ADA ACCESSIBLE COMMUNITY GARDEN

SELLER RESERVED PARCEL

STREET LIGHT TYP.

SIGHT TRIANGLES; PER: CIVIL

CROSSWALK

TRASH RECEPTACLE

LOCAL ACCESS TRAILHEAD

NATIVE SHRUBS / SMALL TREES

DOG WASTE STATION

TRAILHEAD KIOSK

NATIVE SHRUBS / SMALL TREES

LIMITS OF GRADING DISTURBANCE

NATURAL TRAIL CONNECTION TO WULFSOHN MOUNTAIN PARK TRAIL NETWORK

MATCHLINE: REFERENCE SHEET L1.4

LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING DISTURBANCE
- SITE WALL
- PARK BENCH
- TRASH RECEPTACLE
- DOG WASTE STATION
- PICNIC TABLE
- BIKE RACK
- ENCLOSED DUMPSTER
- STREET LIGHT
- WALL MOUNTED LIGHT
- BOLLARD LIGHT
- EVERGREEN TREES
- DECIDUOUS TREES
- ORNAMENTAL TREES
- SHRUBS
- NATIVE TREES / SHRUBS
- XERIC PERENNIALS AND ORNAMENTAL GRASSES
- NATIVE SEED MIX
- ARTIFICIAL TURF
- ROCK MULCH

0' 10' 20' 40'
Scale: 1" = 20'

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE 2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

SHEET NUMBER:
L1.3

SHEET_____OF_____

WULFSOHN RD.

PROPERTY LINE

WULFSOHN SIDEWALK

NATIVE SEED

EXISTING LANDSCAPE TO REMAIN

LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING DISTURBANCE
- SITE WALL
- PARK BENCH
- TRASH RECEPTACLE
- DOG WASTE STATION
- PICNIC TABLE
- BIKE RACK
- ENCLOSED DUMPSTER
- STREET LIGHT
- WALL MOUNTED LIGHT
- BOLLARD LIGHT
- EVERGREEN TREES
- DECIDUOUS TREES
- ORNAMENTAL TREES
- SHRUBS
- NATIVE TREES / SHRUBS
- XERIC PERENNIALS AND ORNAMENTAL GRASSES
- NATIVE SEED MIX
- ARTIFICIAL TURF
- ROCK MULCH

LIMITS OF GRADING DISTURBANCE

NATIVE TREES AND SHRUBS TO SCREEN RETAINING WALLS AT PARKING

NATIVE TREES AND SHRUBS TYP.

NATIVE REVEGETATION AREA

NATIVE TREES AND SHRUBS TYP.

SIDEWALK

RETAINING WALL (6' MAX. HEIGHT)

AC CONDENSING UNITS

BUILDING TYPE 1

19'-0" TYP.

9'-0" TYP.

ROCK MULCH TYP.

DOUBLE ROW OF SHRUBS, TRIANGULAR SPACING TYP.

BIKE RACK

RESIDENT PARKING LOT

SIDEWALK

STREET LIGHT TYP.

SIGHT TRIANGLES; PER: CIVIL

MAILBOXES

STREET PARKING

BUILDING TYPE 3

SIDEWALK

RETAINING WALL (6' MAX. HEIGHT)

AC CONDENSING UNITS

ROCK MULCH TYP.

BIKE RACK

RESIDENT PARKING LOT

11'-0" TYP.

STREETLIGHT TYP.

MOUNTED STREETLIGHT TYP.

ENCLOSED BICYCLE PARKING AREA

SHRUBS TO SCREEN DUMPSTERS TYP.

COVERED GARAGE / PARKING BELOW; RE: ARCH

RETAINING WALL (6' MAX. HEIGHT)

STAIRCASE

BUILDING TYPE 2

DOUBLE ROW OF SHRUBS, TRIANGULAR SPACING TYP.

SIDEWALK

ROCK MULCH TYP.

BIKE RACK

WALL MOUNTED STREET LIGHT TYP.

ENCLOSED BICYCLE PARKING AREA

DUMPSTER ENCLOSURE

TERRACED PLANTERS

COVERED GARAGE / PARKING BELOW; RE: ARCH

SIDEWALK

BOLLARD LIGHT TYP.

DOG WASTE STATION

PARK BENCH

DOG YARD

RETAINING WALL (6' MAX. HEIGHT)

STAIRCASE

BUILDING TYPE 1

ARTIFICIAL TURF

ROCK MULCH TYP.

BUILDING TYPE 2

ARTIFICIAL TURF

BUILDING TYPE 1

TERRACED PLANTERS

MATCHLINE: REFERENCE SHEET L1.3

MATCHLINE: REFERENCE SHEET L1.5

MATCHLINE: REFERENCE SHEET L1.7

MATCHLINE: REFERENCE SHEET L1.8

0' 10' 20' 40'

Scale: 1" = 20'

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE 2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

SHEET NUMBER:
L1.4

SHEET____OF____

WULFSOHN RD.

WULFSOHN SIDEWALK

PROPERTY LINE

LIMITS OF GRADING DISTURBANCE

ENTRY PLANTING WITH XERIC PERENNIALS AND ORNAMENTAL GRASSES

NATIVE SEED

PLANTER TYP.

BOLLARD LIGHT TYP.

STAIRCASE

XERIC PERENNIALS AND ORNAMENTAL GRASSES

EXISTING LANDSCAPE TO REMAIN

RETAINING WALL (6' MAX. HEIGHT)

CLUBHOUSE / DAYCARE PARKING LOT

RESIDENT PARKING LOT

19'-0" TYP.

9'-0" TYP.

38'-0"

19'-0"

11'-0" TYP.

13'-6"

39'-0"

38'-0"

DOUBLE ROW OF SHRUBS, TRIANGULAR SPACING TYP.

GARAGE / PARKING BELOW; RE: ARCH

ENCLOSED BICYCLE PARKING AREA

COVERED GARAGE / PARKING BELOW; RE: ARCH

BUILDING TYPE 1

ARTIFICIAL TURF

BUILDING TYPE 2

ROCK MULCH TYP.

TERRACED PLANTERS

DAYCARE PLAYGROUND (AGES 2-5)

FENCE (6' MAX. HEIGHT)

AC CONDENSING UNITS

CLUBHOUSE

GATE

MAILBOXES

BIKE RACK

30'-4"

19'-0" TYP.

9'-0" TYP.

33'-6"

CLUBHOUSE AND DAYCARE COVERED DROP OFF AREA

RETAINING WALL (6' MAX. HEIGHT)

POOL DECK

POOL

SPA

NATIVE TREES AND SHRUBS TYP.

FENCE (6' MAX. HEIGHT)

SIGHT TRIANGLES; PER: CIVIL

SIDEWALK

MAILBOXES

ENTRY PLANTING WITH ORNAMENTAL SHRUBS, XERIC PERENNIALS, AND ORNAMENTAL GRASSES

BOLLARD LIGHT TYP.

DOG WASTE STATION

RETAINING WALL (6' MAX. HEIGHT)

MATCHLINE: REFERENCE SHEET L1.4

MATCHLINE: REFERENCE SHEET L1.6

MATCHLINE: REFERENCE SHEET L1.8

MATCHLINE: REFERENCE SHEET L1.9

0' 10' 20' 40'

Scale: 1" = 20'

LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING DISTURBANCE
- SITE WALL
- PARK BENCH
- TRASH RECEPTACLE
- DOG WASTE STATION
- PICNIC TABLE
- BIKE RACK
- ENCLOSED DUMPSTER
- STREET LIGHT
- WALL MOUNTED LIGHT
- BOLLARD LIGHT
- EVERGREEN TREES
- DECIDUOUS TREES
- ORNAMENTAL TREES
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- NATIVE TREES / SHRUBS
- XERIC PERENNIALS AND ORNAMENTAL GRASSES
- NATIVE SEED MIX
- ARTIFICIAL TURF
- ROCK MULCH

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE: 2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

SHEET NUMBER:
L1.5

SHEET_____OF_____

LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING DISTURBANCE
- SITE WALL
- PARK BENCH
- TRASH RECEPTACLE
- DOG WASTE STATION
- PICNIC TABLE
- BIKE RACK
- ENCLOSED DUMPSTER
- STREET LIGHT
- WALL MOUNTED LIGHT
- BOLLARD LIGHT
- EVERGREEN TREES
- DECIDUOUS TREES
- ORNAMENTAL TREES
- SHRUBS
- NATIVE TREES / SHRUBS
- XERIC PERENNIALS AND ORNAMENTAL GRASSES
- NATIVE SEED MIX
- ARTIFICIAL TURF
- ROCK MULCH

MATCHLINE: REFERENCE SHEET L1.5

PROPERTY LINE

EXISTING RED MOUNTAIN LOFTS DEVELOPMENT

UNDISTURBED HILLSIDE

GLENWOOD GREENS DEVELOPMENT

NATIVE TREES AND SHRUBS TYP.

SIDEWALK

STREET LIGHT TYP.

ENTRY ROAD; RE: CIVIL

SIGHT TRIANGLES; PER: CIVIL

FUTURE DEVELOPMENT PARCEL

SIGHT TRIANGLES; PER: CIVIL

ENTRY PLANTING WITH ORNAMENTAL SHRUBS, XERIC PERENNIALS, AND ORNAMENTAL GRASSES

NATIVE SEED

SIGHT TRIANGLES; PER: CIVIL

LIMITS OF GRADING DISTURBANCE

ENTRY PLANTING WITH ORNAMENTAL SHRUBS, XERIC PERENNIALS, AND ORNAMENTAL GRASSES

CONNECTION POINT FOR FUTURE DEVELOPMENT ROAD

MATCHLINE: REFERENCE SHEET L1.9

0' 10' 20' 40'
Scale: 1" = 20'

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE 2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

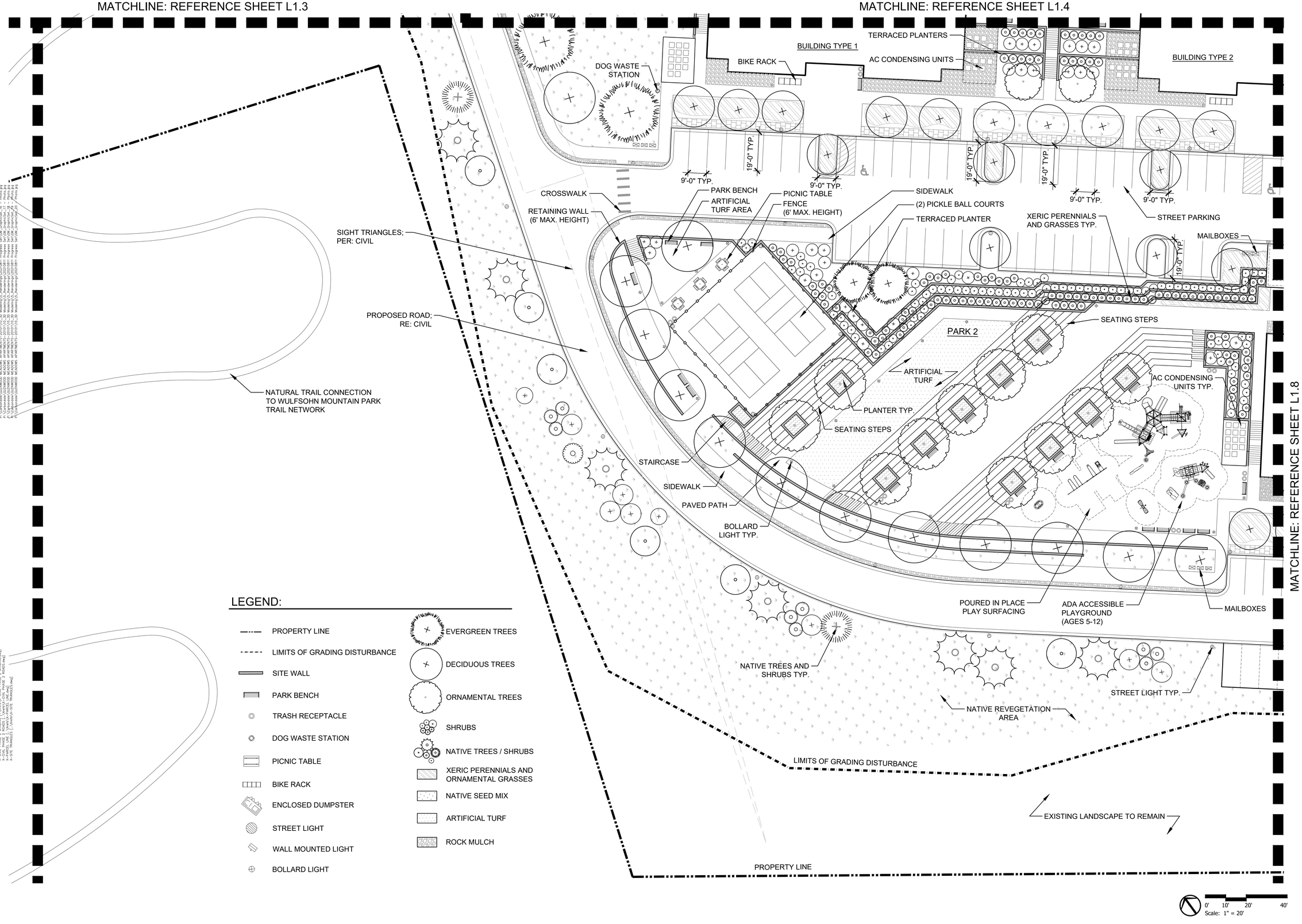
SHEET NUMBER:
L1.6

SHEET_____OF_____

MATCHLINE: REFERENCE SHEET L1.3

MATCHLINE: REFERENCE SHEET L1.4

MATCHLINE: REFERENCE SHEET L1.8



LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING DISTURBANCE
- SITE WALL
- PARK BENCH
- TRASH RECEPTACLE
- DOG WASTE STATION
- PICNIC TABLE
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- ROCK MULCH

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE: 2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

SHEET NUMBER:
L1.7

SHEET____OF____

MATCHLINE: REFERENCE SHEET L1.4

MATCHLINE: REFERENCE SHEET L1.5

MATCHLINE: REFERENCE SHEET L1.7

MATCHLINE: REFERENCE SHEET L1.9

BUILDING TYPE 2

AC CONDENSING UNITS

STAIRCASE

TERRACED PLANTERS

RETAINING WALL (6' MAX. HEIGHT)

BUILDING TYPE 1

BIKE RACK

19'-0" TYP.

9'-0" TYP.

STREETLIGHT TYP.

DECORATIVE PAVERS TYP.

MOUNTED STREETLIGHT TYP.

DUMPSTER ENCLOSURE

BICYCLE PARKING AREA

FENCE (6' MAX. HEIGHT)

TRANSFORMER LOCATION; RE: CIVIL

COVERED GARAGE / PARKING BELOW; RE: ARCH

STAIRCASE

TERRACED PLANTERS

WALL MOUNTED STREET LIGHT TYP.

RETAINING WALL (6' MAX. HEIGHT)

ROCK MULCH TYP.

ARTIFICIAL TURF

BUILDING TYPE 3

PARK BENCH

TRASH RECEPTACLE

DOG WASTE STATION

LOCAL ACCESS TRAILHEAD

STREET LIGHT TYP.

COVERED CARPORT PARKING SPACES

LIMITS OF GRADING DISTURBANCE

TRAILHEAD KIOSK

NATIVE TREES AND SHRUBS TYP.

NATIVE SEED

NATURAL TRAIL CONNECTION TO WULFSOHN MOUNTAIN PARK TRAIL NETWORK

PROPERTY LINE

XERIC PERENNIALS AND GRASSES TYP.

SHRUBS TO SCREEN DUMPSTERS TYP.

LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING DISTURBANCE
- SITE WALL
- PARK BENCH
- TRASH RECEPTACLE
- DOG WASTE STATION
- PICNIC TABLE
- BIKE RACK
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- ORNAMENTAL TREES
- SHRUBS
- NATIVE TREES / SHRUBS
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- NATIVE SEED MIX
- ARTIFICIAL TURF
- ROCK MULCH

0' 10' 20' 40'
Scale: 1" = 20'

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE: 2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

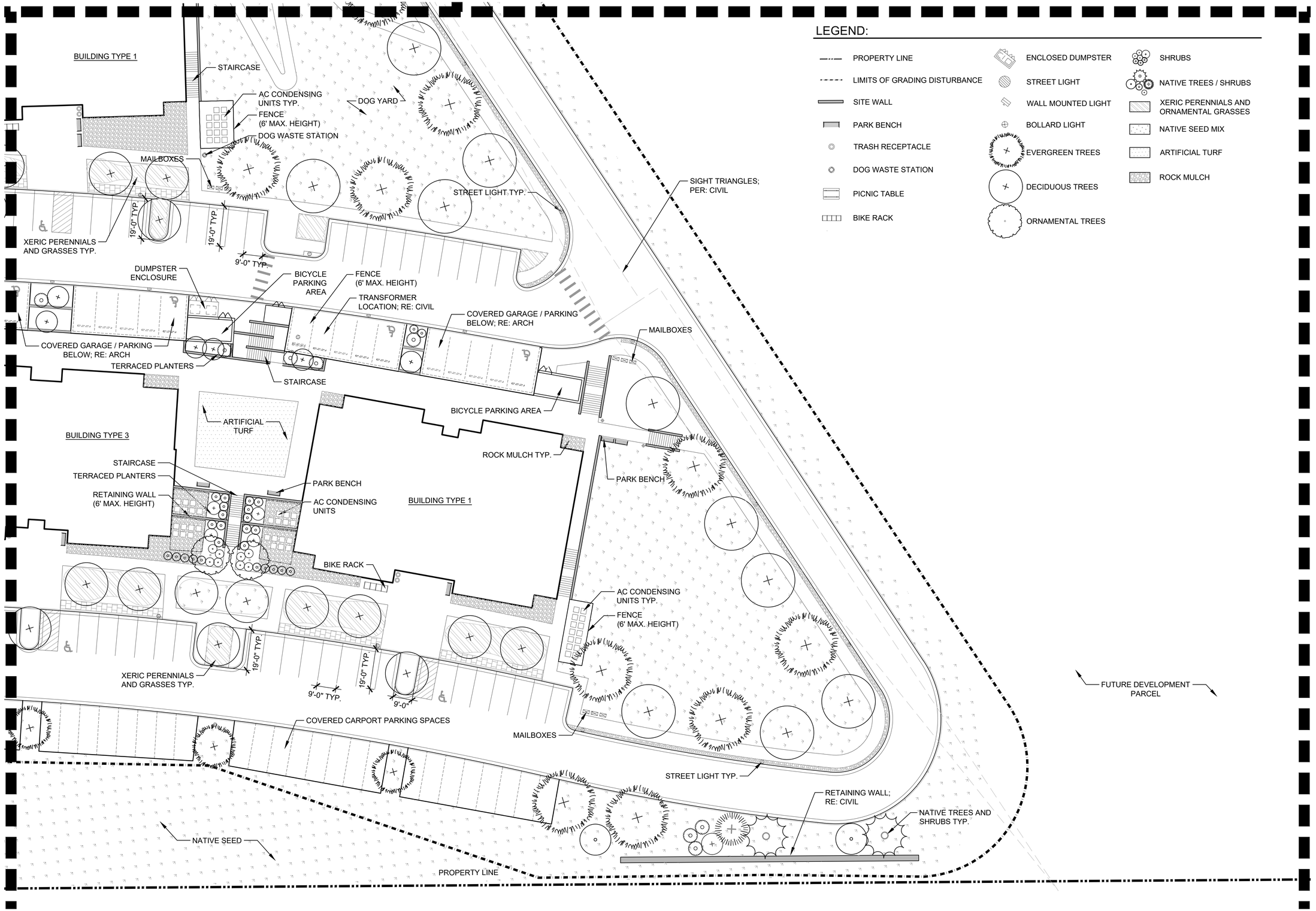
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L1.8

SHEET_____OF_____

MATCHLINE: REFERENCE SHEET L1.5

MATCHLINE: REFERENCE SHEET L1.6

MATCHLINE: REFERENCE SHEET L1.8



LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING DISTURBANCE
- SITE WALL
- PARK BENCH
- TRASH RECEPTACLE
- DOG WASTE STATION
- PICNIC TABLE
- BIKE RACK
- ENCLOSED DUMPSTER
- STREET LIGHT
- WALL MOUNTED LIGHT
- BOLLARD LIGHT
- EVERGREEN TREES
- DECIDUOUS TREES
- ORNAMENTAL TREES
- SHRUBS
- NATIVE TREES / SHRUBS
- XERIC PERENNIALS AND ORNAMENTAL GRASSES
- NATIVE SEED MIX
- ARTIFICIAL TURF
- ROCK MULCH

0' 10' 20' 40'
Scale: 1" = 20'

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE 2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

SHEET NUMBER:
L1.9

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LANDSCAPE NOTES:

1. ALL PLANTING WILL MEET THE MINIMUM SIZES AS REQUIRED BY THE CITY OF GLENWOOD SPRINGS DEVELOPMENT CODE.
2. TREE AND SHRUB QUANTITIES COMPLY WITH THE REQUIRED MINIMUM QUANTITIES IN THE GLENWOOD MEADOWS DESIGN GUIDELINES FOR RESIDENTIAL NEIGHBORHOODS.
3. PARKING LOTS EDGES HAVE BEEN SCREENED FROM PUBLIC VIEW WITH PLANT MATERIAL AS REQUIRED IN THE GLENWOOD MEADOWS DESIGN GUIDELINES.
4. ALL LANDSCAPE PLANTING TO RECEIVE IRRIGATION. IRRIGATION SYSTEM TO BE PROFESSIONALLY DESIGNED TO LIMIT WATER CONSUMPTION. DRIP IRRIGATION TO BE USED WHEREVER POSSIBLE TO MINIMIZE RUN-OFF FROM SPRINKLERS.
5. IRRIGATION SYSTEM DESIGN, OPERATION AND MAINTENANCE TO COMPLY WITH THE GLENWOOD MEADOWS GEOTECHNICAL MITIGATION REQUIREMENTS AND GEOTECHNICAL REPORT FOR THE PROPERTY.
6. ALL LANDSCAPE PLANTINGS TO BE LOCATED AT LEAST 6' FROM THE BUILDINGS TO AVOID ADDING IRRIGATION WATER TO THE SOILS BENEATH THE STRUCTURES PER THE RECOMMENDATION OF THE GEOTECHNICAL REPORT.
7. FINAL LANDSCAPE AND IRRIGATION PLANS TO BE CERTIFIED BY GEOTECHNICAL ENGINEER FOR CONFORMANCE WITH GEOTECHNICAL RECOMMENDATIONS AS DEVELOPED FOR THIS SITE.
8. PROPOSED PLANTING AND IRRIGATION SYSTEM TO BE MAINTAINED BY THE APARTMENT COMPLEX MANAGEMENT.
9. ALL LANDSCAPE PLANTINGS ARE LOCATED TO ALLOW FOR SNOW STORAGE AREAS EQUALING 20% OF THE ADJACENT PAVING AREAS.
10. ALL DISTURBED AREAS ON THE PROJECT SITE TO BE REVEGETATED. SEE LANDSCAPE PLANS FOR PROPOSED PLANTING.
11. PLANT MATERIAL IS TO BE HEALTHY SPECIMENS FREE FROM DISEASE OR DAMAGE.
12. ALL MATERIALS USED SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE CURRENT AMERICAN STANDARDS FOR NURSERY STOCK, PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
13. ALL PLANT MATERIAL TO BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
14. CONTRACTOR TO STAKE ALL TREE LOCATIONS PER PLAN. OBTAIN LANDSCAPE ARCHITECT'S APPROVAL OF STAKED LOCATIONS PRIOR TO PLANTING.
15. STOCKPILED PLANT MATERIAL TO BE PLACED IN THE SHADE AND HAND-WATERED UNTIL PLANTED.
16. MAINTAIN POSITIVE DRAINAGE AWAY FROM WALLS, WALKS, BUILDINGS, AND OTHER STRUCTURES AT ALL TIMES. FINE GRADING SHALL BE APPROVED PRIOR TO SEEDING.
17. DO NOT PLACE MULCH WITHIN 6" OF TREE TRUNKS
18. INSTALL LANDSCAPE EDGER AT ALL BED/ GRASS BORDERS.
19. SEE CIVIL PLANS FOR PROPOSED GRADING AND DRAINAGE.
20. THE CONTRACTOR SHALL FINE GRADE ALL AREAS TO BE PLANTED.
21. THE CONTRACTOR SHALL REMOVE REQUIRED DEPTH OF SOIL ALONG WALKWAYS TO ACCOMMODATE SEED, TOPSOIL OR MULCH DEPTH.
22. SEE GEOTECHNICAL REPORT FOR RECOMMENDATIONS WITHIN 10' OF STRUCTURES. CONTACT OWNER'S REPRESENTATIVE IMMEDIATELY SHOULD A CONFLICT ARISE BETWEEN THESE PLANS AND THE GEOTECHNICAL REPORT.

PROPOSED PLANT LIST FROM GLENWOOD MEADOWS DESIGN GUIDELINES:

DECIDIOUS TREES

Botanic Name	*Common Name*
Acer campestre	Hedge Maple
Acer freemanii 'Autumn Blaze'	Autumn Blaze Maple
Acer tataricum subsp. *ginnala* 'Flame'	Flame Amur Maple
Amelanchier canadenis	Serviceberry
Catalpa speciosa	Catalpa
Celtis occidentalis	Hackberry
Crataegus ambigua	Russian Hawthorn
Crataegus crus-galli	Cockspur Hawthorn
Crataegus crus-galli var. *inermis*	Thornless Cockspur Hawthorn
Crataegus viridis 'Winter King'	Winter King Hawthorne
Gleditsia triacanthos f. inermis	Thornless Honeylocust 'Shademaster'
Gleditsia triacanthos f. inermis 'Imperial'	Honey Locust, Imperial
Gleditsia triacanthos f. inermis 'Skyline'	Honey Locust, Skyline
Gleditsia triacanthos f. inermis 'Sunburst'	Honey Locust, Sunburst
Prunus virginiana 'Shubert'	Canada Red Chokecherry
Pyrus calleryana 'Chanticleer'	Callery Pear
Quercus macrocarpa	Bur Oak
Robinia pseudoacacia 'Purple Robe'	Black Locust / Purple Robe Locust
Sorbus hybrida	Oakleaf Mountain Ash
Syringa reticulata	Japanese Tree Lilac
Tilia americana	American Linden
Tilia americana 'Redmond'	Redmond Linden
Tilia cordata 'Greenspire'	Littleleaf Linden
Ulmus Americana	American Elm

EVERGREEN TREES

Botanic Name	*Common Name*
Abies lasiocarpa	Subalpine or Rocky Mountain Fir
Juniperus scopulorum 'Wichita Blue'	Rocky Mountain Juniper
Picea engelmannii	Engelmann Spruce
Picea glauca 'Densata'	Black Hills Spruce
Picea pungens	Colorado Spruce
Picea pungens 'Glauca'	Colorado Blue Spruce
Pinus cembroides var. edulis	Pinyon Pine
Pinus flexilis	Limber Pine
Pinus nigra	Austrian Pine
Pinus ponderosa	Ponderosa Pine
Pinus strobiformis	Southwestern White Pine
Pinus sylvestris	Scotch Pine

SHRUBS

Botanic Name	*Common Name*
Arctostaphylos uva-ursi	Kinnikinnick
Artemisia cana	Silver Sagebrush
Artemisia filifolia	Sand Sagebrush
Berberis thunbergil 'Burgundy Carousel'	Burgundy Carousel Japanese Barberry
Caryopteris x clandonensis 'Blue Mist'	Blue Mist Spirea
Chrysothamnus nauseosus var. *nauseosus*	Dwarf Blue Rabbitbrush
Forestiera neomexicana	New Mexico Privet
Juniperus chinensis 'Armstrong'	Armstrong Juniper
Juniperus horizontalis 'Wiltonii'	Blue Rug Juniper
Juniperus sabina 'Buffalo'	Buffalo Juniper
Juniperus scopulorum 'Cologreen'	Cologreen Juniper
Juniperus scopulorum 'Moonglow'	Moonglow Juniper
Juniperus scopulorum 'Skyrocket'	Skyrocket Juniper
Junperus squamata 'Blue Star'	Blue Star Juniper
Ligustrum vulgare 'Cheyenne'	Cheyenne Privet
Perovskia atriplicifolia	Russian Sage
Philadelphus lewsii 'Blizzard'	Blizzard Mockorange
Physocarpus opulifolius 'Diabolo'	Diabolo Ninebark
Prunus virginiana melanocarpa	Rocky Mountain/Native Chokecherry
Quercus gambelii	Gambel Oak
Rhus aromatica 'Gro-Low'	Dwarf Fragrant Sumac
Rhus glabra	Smooth Sumac
Shepherdia argentea	Silver Buffaloberry
Speraea japonica 'Little Princess'	Little Princess Spirea
Syringa vulgaris 'Charles Joly'	Double Red French Lilac
Yucca glauca	Soapweed Yucca

PERENNIALS

Botanic Name	*Common Name*
Achillea millefolium 'Terra Cotta'	Terra Cotta Yarrow
Achillea 'Moonshine'	Moonshine Yarrow
Artemisia 'Powis Castle'	Powis Castle Sage
Campanula glomerata 'Superba'	Clustered Bellflower
Cerastium tomentosum	Snow in Summer
Dianthus graniticus	Granite Pinks
Echinacea purpurea	Purple Coneflower
Gazania linearis 'Colorado Gold'	Hardy Gazania
Iris x germanica cultivars	Bearded Iris
Lavandula angustifolia 'Munstead'	English Lavender
Penstemon digitalis 'Huskers Red'	Huskers Red Penstemon
Penstemon pinifolius	Pineleaf Penstemon
Penstemon strictus	Rocky Mt. Penstemon
Salvia superba	Perennial Salvia
Salvia n. 'May Night'	May Night Salvia
Salvia sylvestris 'Caradonna'	Caradonna Salvia
Sedum 'Autumn Joy'	Autumn Joy Sedum
Sedum 'Matrona'	Matrona Sedum

ORNAMENTAL GRASS

Calamagrostis acutiflora 'Karl Foerster'	Feather Reed Grass
Helictotrichon sempervirens	Blue Avena Grass
Miscanthus sinensis 'Yaku Jima'	Yaku Jima Maiden Grass
Pennisetum orientale 'Karly Rose'	Pink Oriental Fountian Grass
Pennisetum alopecuroides 'Hameln'	Dwarf Fountain Grass

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PROJECT NUMBER:
DATE
2021.08.13

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SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PLANT LIST AND GENERAL NOTES

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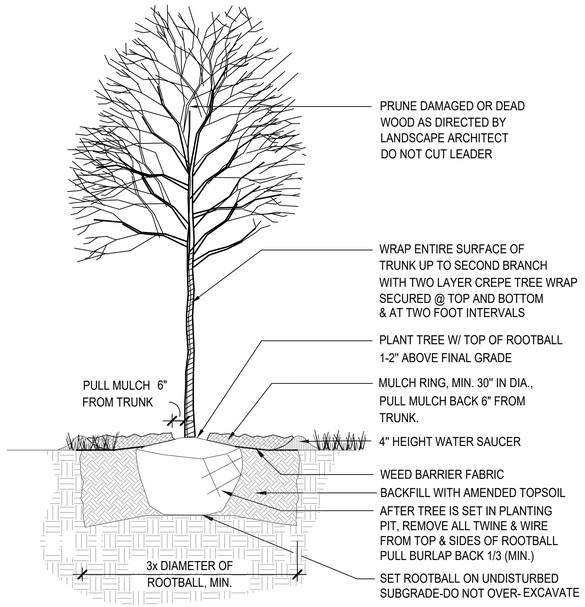
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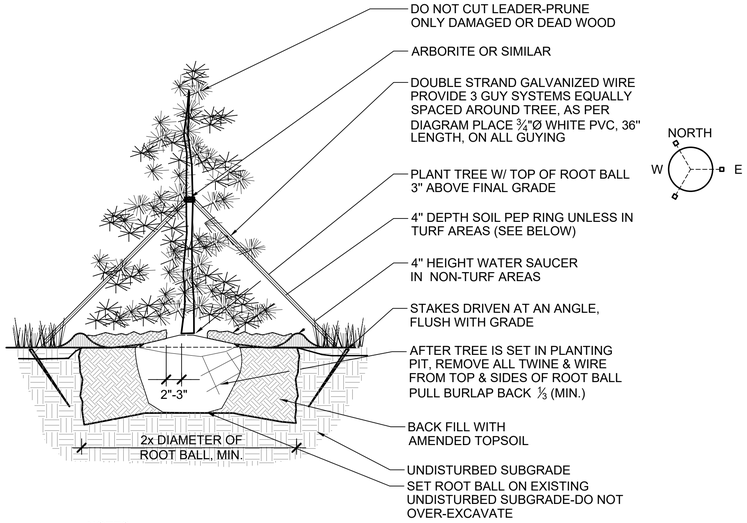
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X-SITE TRIANGLES [..\xrefs\X-SITE TRIANGLES.dwg]



NOTES:
1. MULCH TO BE 4" DEEP. MULCH TO BE SOIL PEP. CONTRACTOR TO PROVIDE SAMPLE FOR APPROVAL BY LANDSCAPE ARCHITECT AND OWNER PRIOR TO INSTALLATION.
2. ALL TREES 3" DIAMETER OR LARGER MAY BE STAKED FOR ONE YEAR IF PROPOSED BY LANDSCAPE CONTRACTOR AND APPROVED BY OWNER'S REPRESENTATIVE.

1 L2.1 DECIDUOUS TREE PLANTING

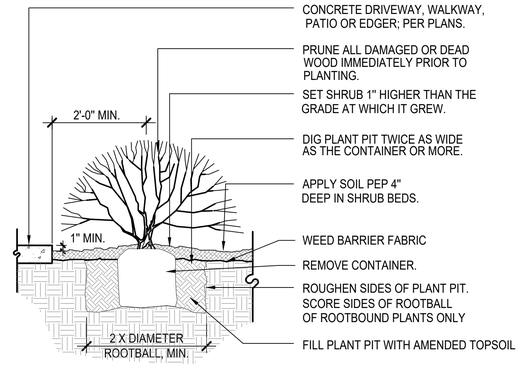
NOT TO SCALE



NOTES:
1. PULL MULCH BACK 2" TO 3" FROM TRUNK OF TREE

2 L2.1 EVERGREEN TREE PLANTING

NOT TO SCALE

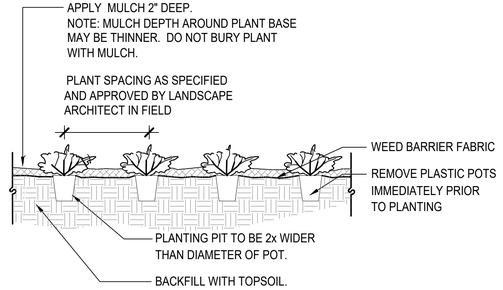


NOTES:

1. ANY BROKEN OR CRUMBLING ROOTBALL WILL BE REJECTED. REMOVING THE CONTAINERS WILL NOT BE AN EXCUSE FOR DAMAGED ROOTBALLS.
2. HOLD GRADE 1" BELOW EDGE OF WALK OR CURB
3. ALL MULCH TO BE SOIL PEP. CONTRACTOR TO PROVIDE SAMPLE FOR APPROVAL BY LANDSCAPE ARCHITECT AND OWNER PRIOR TO INSTALLATION.

3 L2.1 SHRUB PLANTING

NOT TO SCALE

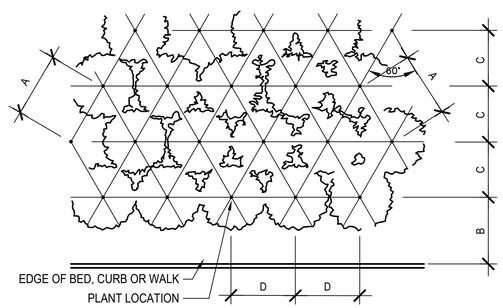


NOTE: MULCH TO BE SOIL PEP. CONTRACTOR TO PROVIDE SAMPLE FOR APPROVAL BY LANDSCAPE ARCHITECT AND OWNER PRIOR TO INSTALLATION.

4 L2.1 ORNAMENTAL GRASS AND PERENNIAL

NOT TO SCALE

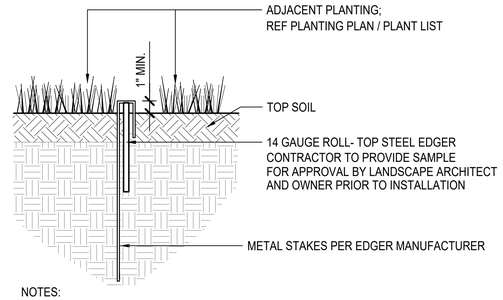
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6"	6"	6"	5"	6"
8"	8"	6"	7"	8"
12"	12"	8"	10"	12"
18"	18"	9"	15½"	18"
24"	24"	18"	21"	24"
30"	30"	15"	26"	30"
36"	36"	30"	31"	36"
48"	48"	30"	42"	48"
60"	60"	36"	52"	60"



NOTE:
ALIGN FRONT ROW PARALLEL TO BED LINE

5 L2.1 SHRUB/ ORNAMENTAL GRASS / GROUNDCOVER PLANTING LAYOUT - TRIANGULAR SPACED

NOT TO SCALE



NOTES:

1. SET ALL EDGING 1" ABOVE FINISH GRADE AS SHOWN.
2. EDGING SHALL ABUT ALL CONCRETE CURBS AND WALKS PERPENDICULAR OR AS SHOWN ON PLANS, AND FLUSH W/ GRADES OF CONCRETE.
3. ALL JOINTS TO BE SECURELY STAKED.
4. EDGING TO BE PARALLEL WITH GRADE.
5. INSTALL EDGER PER MANUFACTURERS SPECIFICATIONS USING SPLICES AND CORNERS AS DIRECTED.

6 L2.1 LANDSCAPE EDGER

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REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PLANTING DETAILS

SCALE:

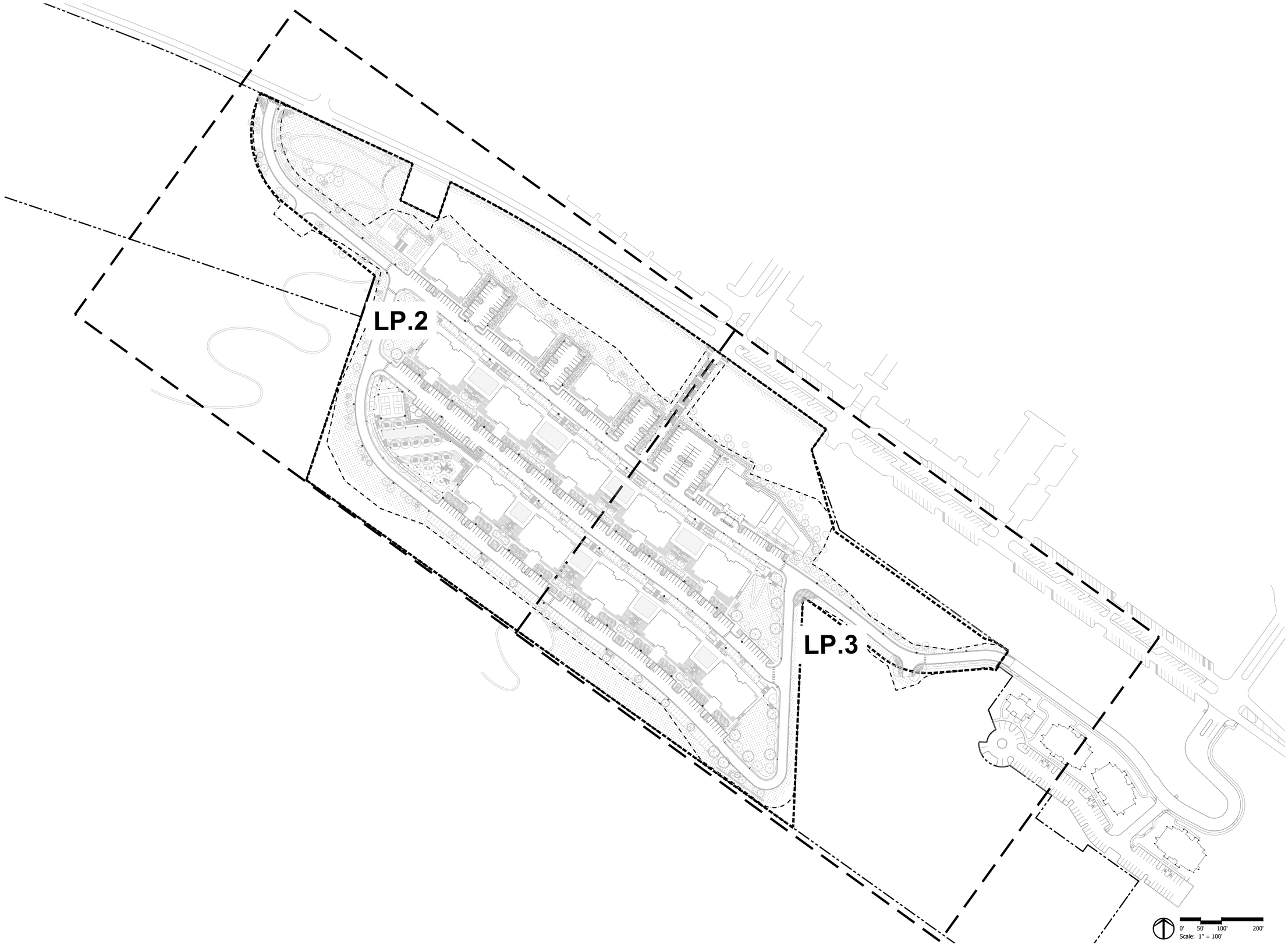
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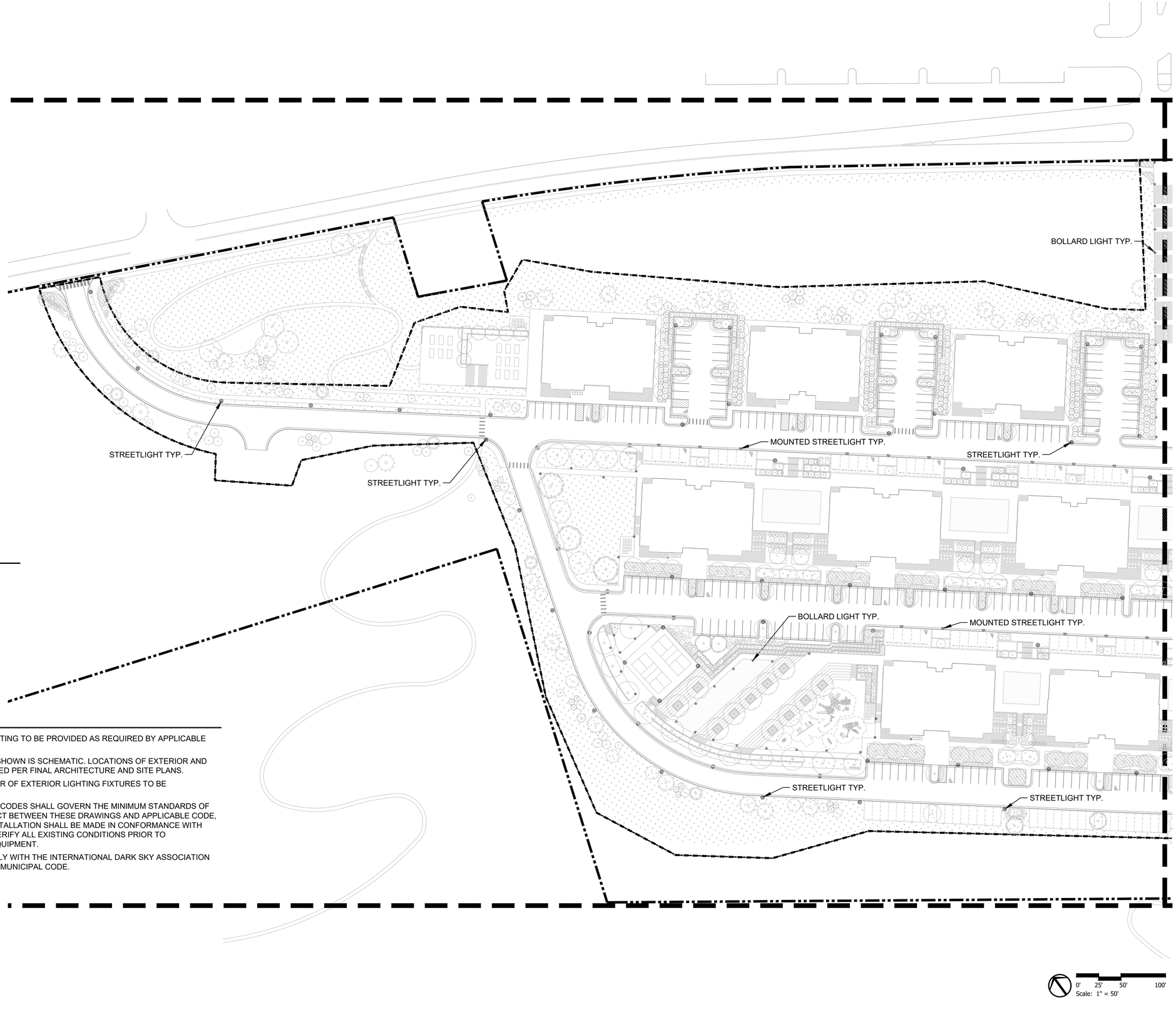
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MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE LIGHTING ENLARGEMENT KEY PLAN

SCALE:

SHEET NUMBER:
LP.1

SHEET_____OF_____



LEGEND:

- PROPERTY LINE
- STREET LIGHT
- WALL MOUNTED LIGHT
- BOLLARD LIGHT

SITE LIGHTING NOTES:

1. SITE AND EXTERIOR BUILDING LIGHTING TO BE PROVIDED AS REQUIRED BY APPLICABLE BUILDING CODES.
2. LOCATION OF LIGHT FIXTURES AS SHOWN IS SCHEMATIC. LOCATIONS OF EXTERIOR AND SITE LIGHT FIXTURES TO BE VERIFIED PER FINAL ARCHITECTURE AND SITE PLANS.
3. FINAL TYPE, LOCATION AND NUMBER OF EXTERIOR LIGHTING FIXTURES TO BE DETERMINED.
4. NATIONAL AND LOCAL ELECTRICAL CODES SHALL GOVERN THE MINIMUM STANDARDS OF WORK. IN THE EVENT OF A CONFLICT BETWEEN THESE DRAWINGS AND APPLICABLE CODE, THE CODE SHALL PREVAIL AND INSTALLATION SHALL BE MADE IN CONFORMANCE WITH THE CODE. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO INSTALLATION OF ANY LIGHTING EQUIPMENT.
5. ALL EXTERIOR FIXTURES TO COMPLY WITH THE INTERNATIONAL DARK SKY ASSOCIATION AND CITY OF GLENWOOD SPRINGS MUNICIPAL CODE.

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE 2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE LIGHTING ENLARGEMENT

SCALE:

SHEET NUMBER:
LP.2

SHEET_____OF_____

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FILE NAME
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BOLLARD LIGHT TYP.

STREETLIGHT TYP.

MOUNTED STREETLIGHT TYP.

BOLLARD LIGHT TYP.

MATCHLINE: REFERENCE SHEET LP.2

STREETLIGHT TYP.

STREETLIGHT TYP.

STREETLIGHT TYP.

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0' 25' 50' 100'
Scale: 1" = 50'

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LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

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SUBMITTAL #4: 2021.08.13
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MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE LIGHTING ENLARGEMENT

SCALE:

SHEET NUMBER:
LP.3

SHEET_____OF_____

DOG YARD





Dog yards, as labeled on revised sheet set, to be located within the open space areas throughout the property. Dog waste stations will be located near open space areas and at each local access trailhead.

COMMUNITY AREA



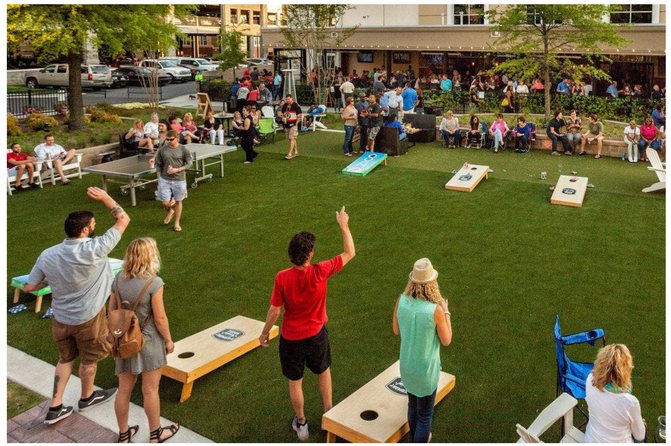




Community amenity spaces to be located between apartment buildings. ADA access shall be provided to all community/amenity spaces. Further design studies will continue to develop and finalize amenity features and materials.

AMENITIES







Potential site amenities options offered throughout the site. Currently, two pickleball courts are designed as a part of Park 2. Additionally, bench seating is located near each amenity space.

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SHEET TITLE:
DESIGN IMAGERY

SCALE:

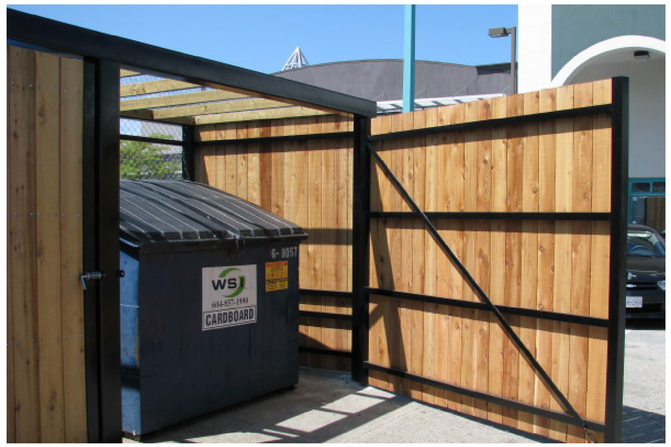
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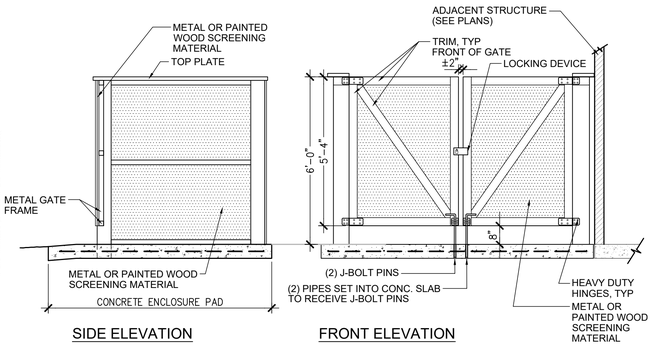
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DUMPSTER ENCLOSURE/UTILITY SCREEN

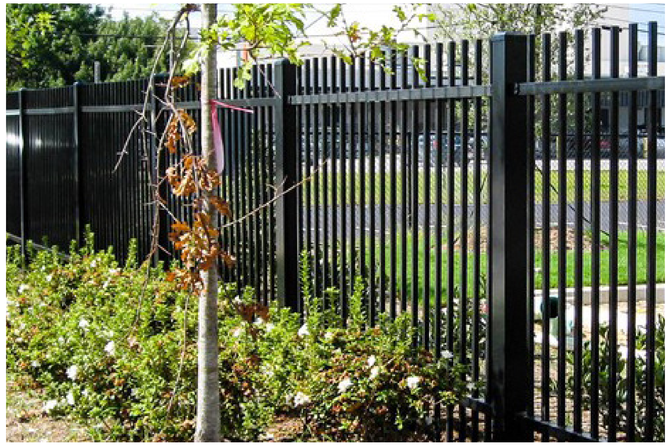






Character images and conceptual detail of proposed dumper enclosures and utility screening. Enclosures are designed to be integrated within retaining wall layouts. The dumpster enclosure screening shall be visually compatible with building materials and have planted material terraced along the hillside to soften the enclosure appearance. Dumpster enclosures will comply with the code and bear proofing requirements.

FENCE







Design recommendation for internal fencing design. Consistent style of fencing to be implemented throughout the overall site design for material cohesiveness. Fencing material shall be compatible with the overall site design and landscaping. Durable black aluminum fencing, similar to that used by DHM at Glenwood Hot Springs (as seen in the bottom image) is a recommended style.

RETAINING WALLS







Retaining walls shall be compatible with the overall site design and designed to conform to the existing natural terrain. Retaining wall heights limited to 6' max. with 3' min. planting zone between terraced walls. Anticipated materials and wall types are gravity block, precast block/MSE, or concrete. Final layout and materials to be determined after review of final geotechnical report.

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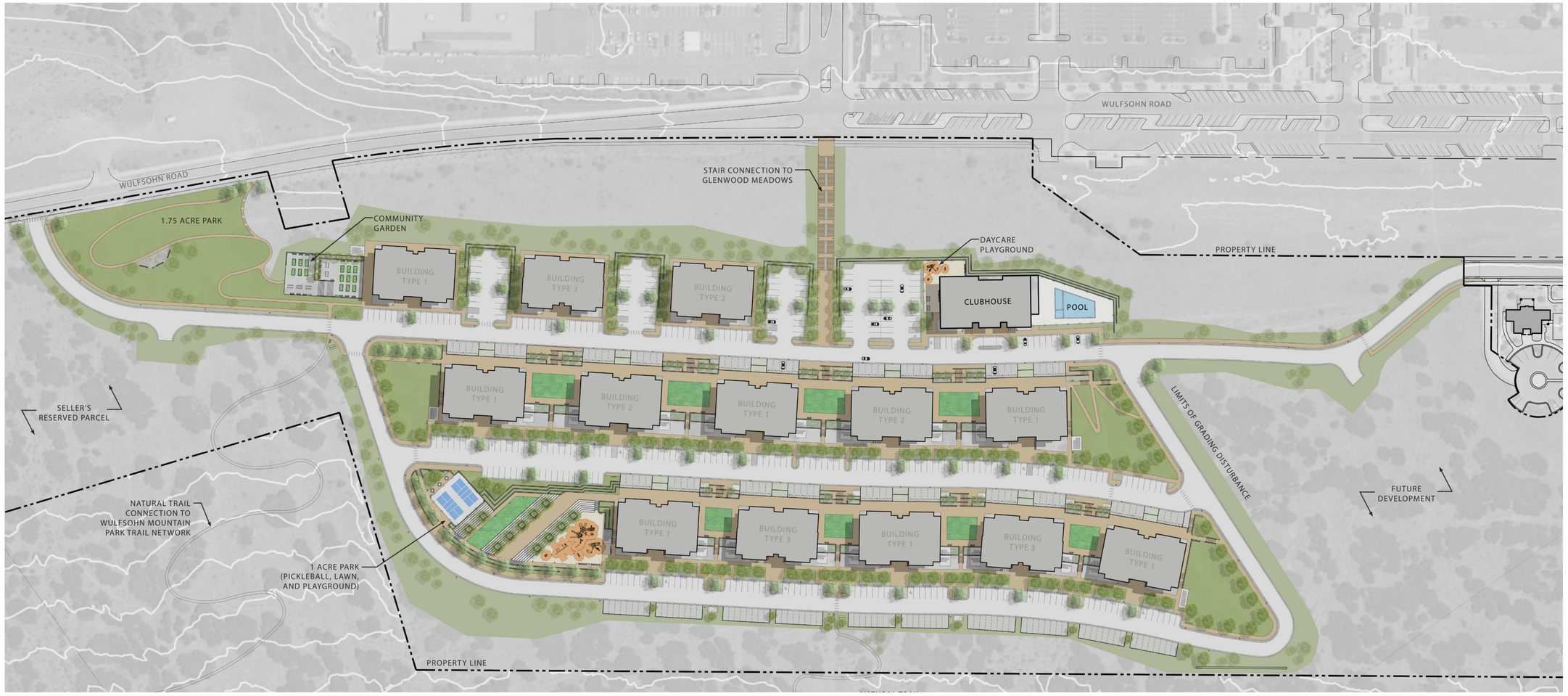
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MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
DESIGN IMAGERY

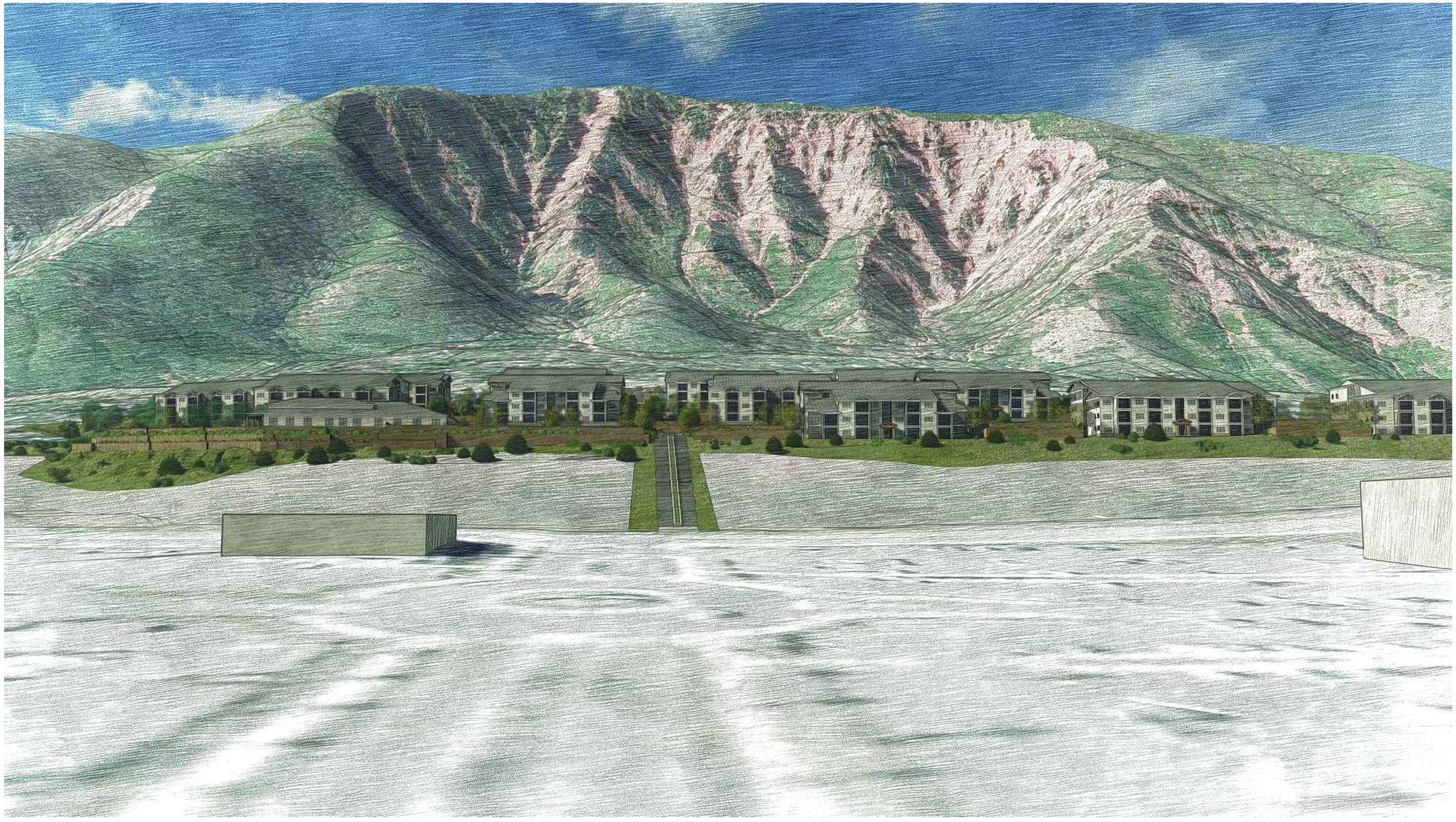
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SHEET_____OF_____



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LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
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2021.08.13

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JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 3

SHEET_____OF_____



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SCALE:

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EXBT 4

SHEET_____OF_____



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DATE Aug 13, 2021 - 2:18pm

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE
2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 5

SHEET_____OF_____



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[8/13/2021 - 9:42 AM - Jeff Tate]

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE
2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 6

SHEET_____OF_____



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LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

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MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 7

SHEET_____OF_____



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brian GLENWOOD MEADOWS APARTMENTS-2019\4_Land Use Permit Revisions\LAND\sheets\SITE PLAN SUBMITAL.dwg
Jul 13, 2021 - 10:14:16am

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LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

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REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 8

SHEET_____OF_____



NAME
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Fri, Aug 13, 2021 - 4:18pm

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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE: 2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

SCALE:

SHEET NUMBER:
EXBT 9

SHEET_____OF_____



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NAME
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[DATE: Aug 06, 2021 4:56pm]

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EXBT 10

SHEET_____OF_____



IMAGES
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DATE
-Aug 13, 2021 - 11:46am

DHM DESIGN

311 Main Street
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Carbondale, Co. 81623
970.963.6520
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GLENWOOD MEADOWS MULTI FAMILY HOUSING

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE
2021.08.13

REVISIONS:
SUBMITTAL #3: 2021.07.02
SUBMITTAL #4: 2021.08.13
REVISIONS:

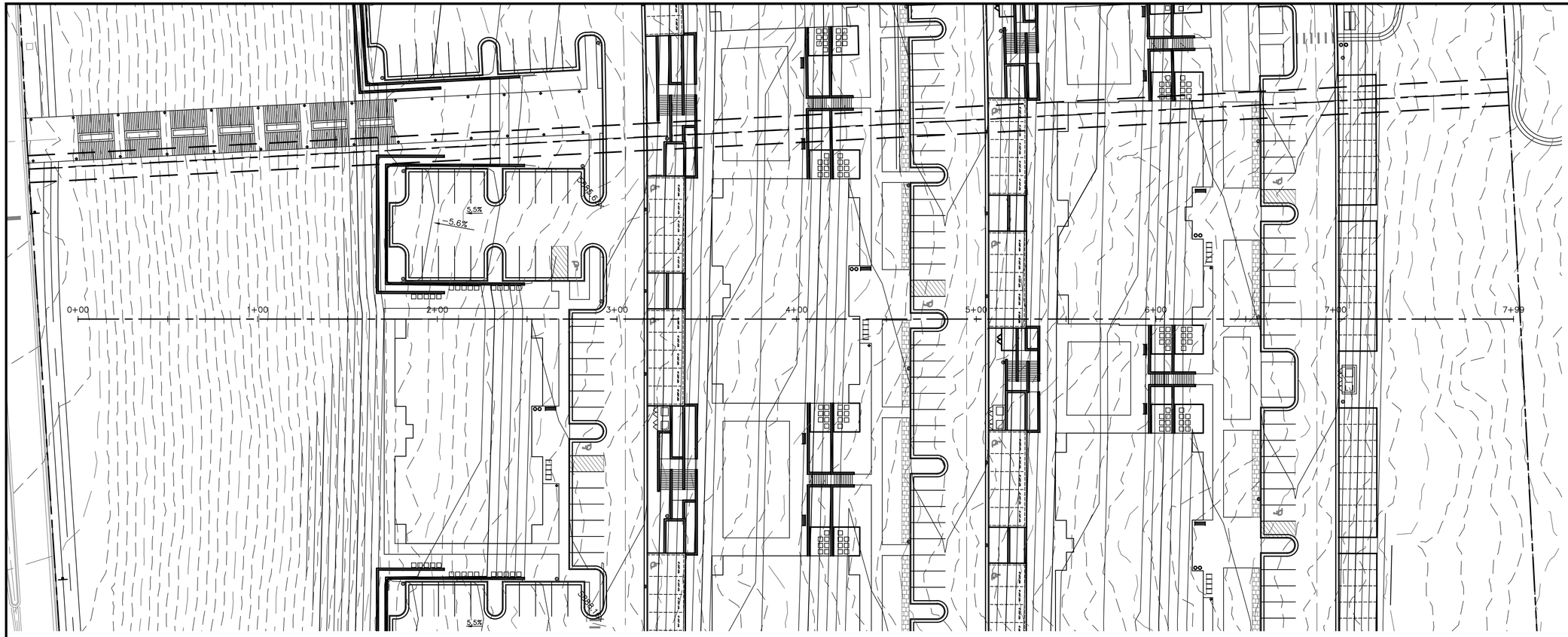
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MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
PERSPECTIVE ILLUSTRATION

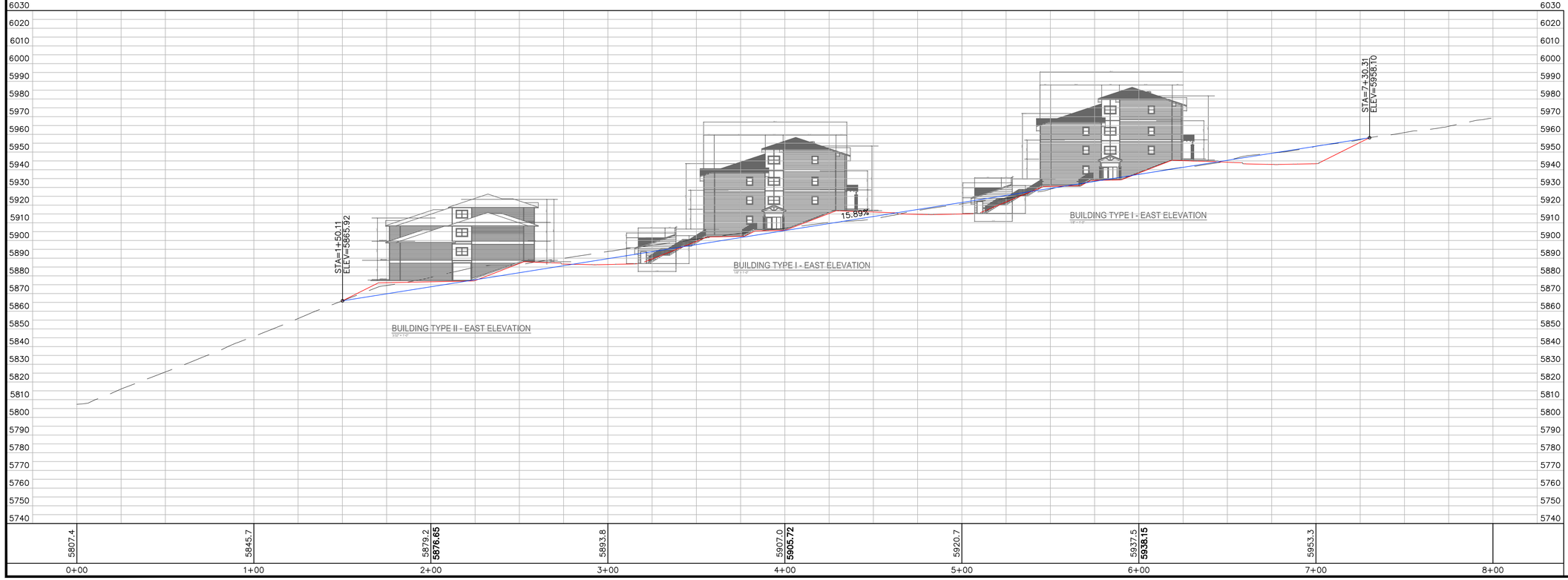
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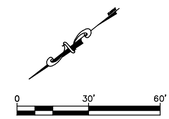
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EXBT 11

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SECTION PROFILE





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1	12/11/20	MAJOR SITE / ARCH. REVIEW	MGG
2	1/22/21	MAJOR SITE / ARCH. REVIEW #2	MGG
3	7/2/21	MAJOR SITE / ARCH. REVIEW #3	MGG

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CHECKED BY: MGG
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FILE:

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GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 · FAX (970) 945-2555
WWW.HCENG.COM

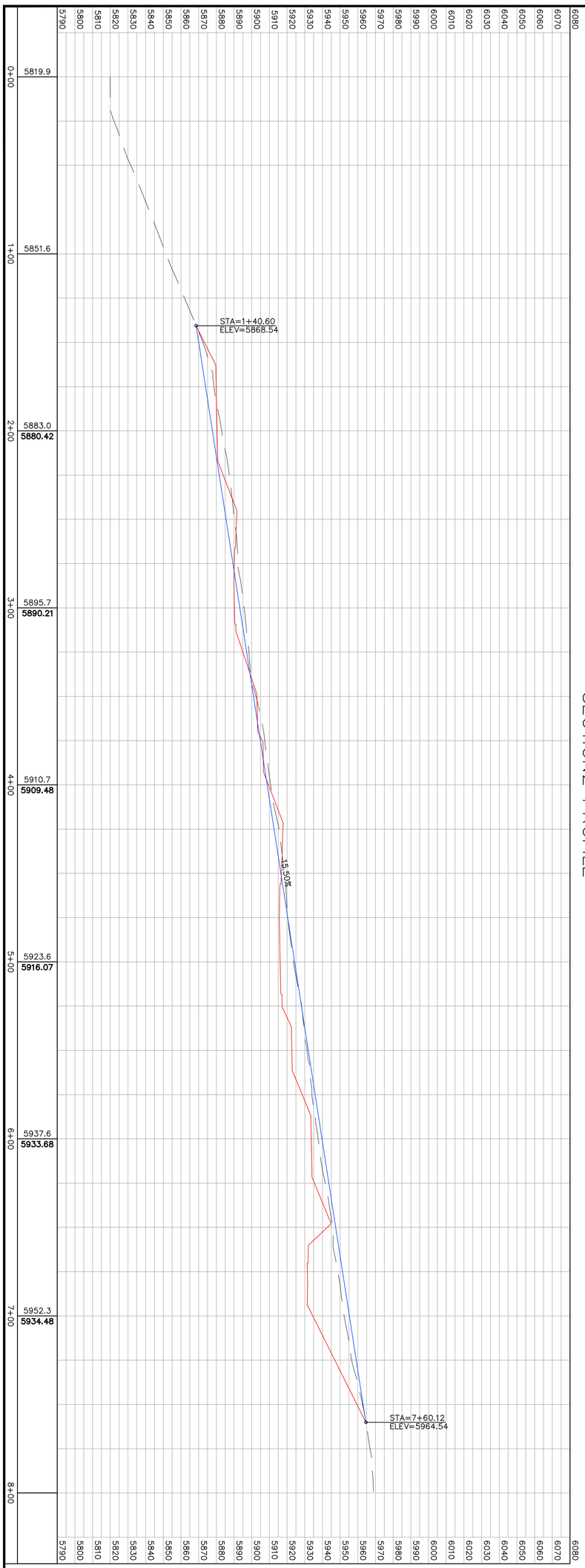
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GLENWOOD MEADOWS MULTI-FAMILY

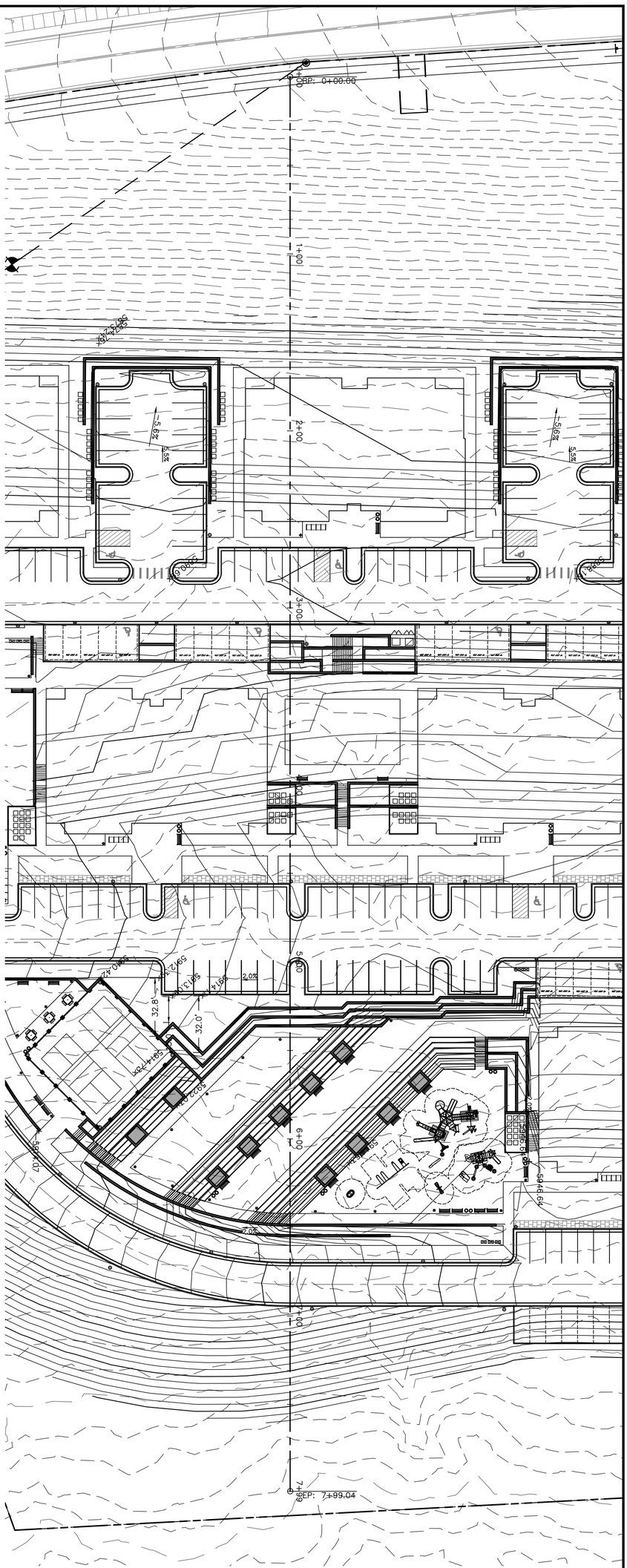
SITE SECTIONS
EXHIBIT

PROJECT NO.
2201044.00

EXBT 12,1



SECTION2 PROFILE


BSP: 0+00.00
EEP: 7+99.04
1+00
2+00
3+00
4+00
5+00
6+00
7+00
5.5%
5.5%
5.5%

SECTION3 PROFILE

PRELIMINARY
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Center of Colorado

NO.	DATE	REVISION	BY
1	12/11/20	MAJOR SITE / ARCH. REVIEW	MGG
2	1/22/21	MAJOR SITE / ARCH. REVIEW #2	MGG
3	7/2/21	MAJOR SITE / ARCH. REVIEW #3	MGG

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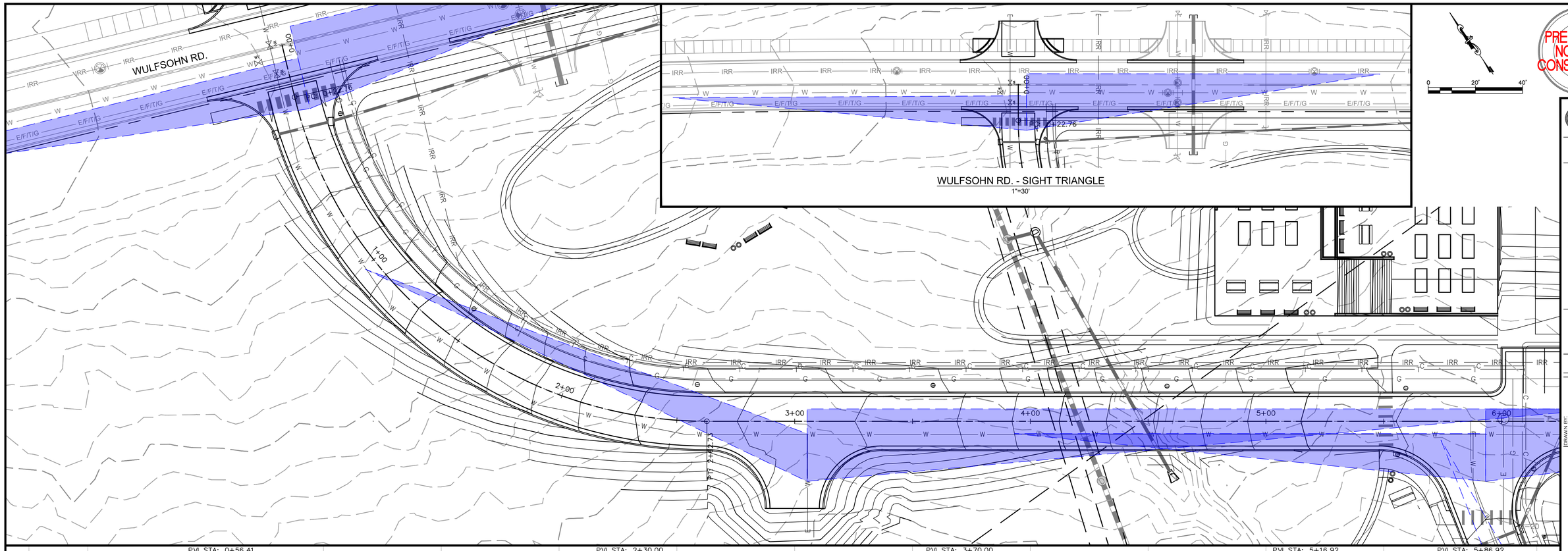
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GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

SITE SECTIONS
EXHIBIT

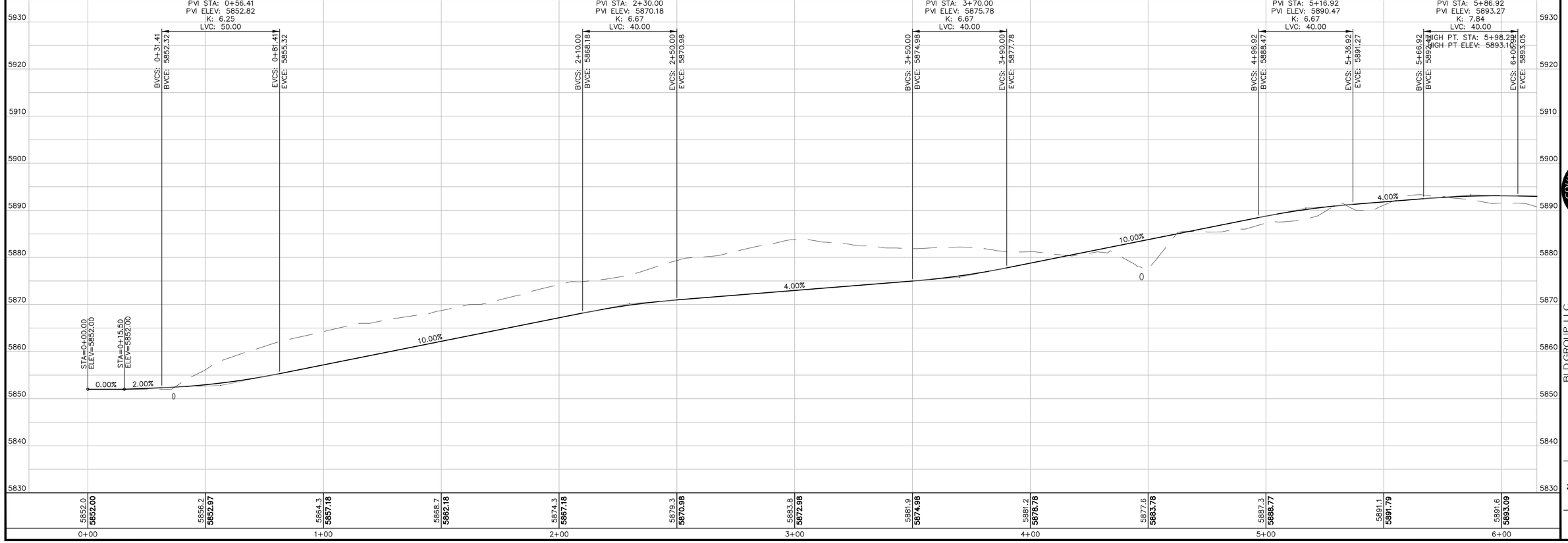
PROJECT NO.
2201044.00

EXBT 12.3



WULFSOHN RD. - SIGHT TRIANGLE
1"=30'

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1	12/11/20	MAJOR SITE / ARCH. REVIEW	MGG
2	1/22/21	MAJOR SITE / ARCH. REVIEW #2	MGG
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DRAWN BY: MGG
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DATE:
FILE:
SCALE 1" = 20'

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WEST ENTRY PLAN & PROFILE
EXHIBIT

PROJECT NO.
2201044.00

EXBT 13

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

FOR PRELIMINARY REVIEW

TW: 5865.00
BW: 5859.00
TW: 5872.00
BW: 5866.00
TW: 5879.00
BW: 5873.00

5866 5864 5862 5864 5862 5860 5864

5818 5820 5822 5824 5826 5828 5830 5832 5834 5836 5838 5840 5842 5844 5846 5848 5850 5852 5854 5856 5858 5860 5862 5864 5866 5868

5824 5826 5828 5830 5832 5834 5836 5838 5840 5842 5844 5846 5848 5850 5852 5854 5856 5858

2.0

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FILE: FILE

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GLENWOOD MEADOWS MULTI-FAMILY

POOL WALL GRADING EXHIBIT

PROJECT NO.
2201044.00
TASK

EXHBT 14

GLENWOOD SPRINGS

COLORADO

DESCRIPTION OF DRAWINGS

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A 4	Bldg Type-I - Second Floor	A 31	Clubhouse & Daycare Center Floor plan
A 5	Bldg Type-I - Third Floor	A 32	Clubhouse & Daycare Center Roof plan
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A 27	Bldg Type-III - Section		

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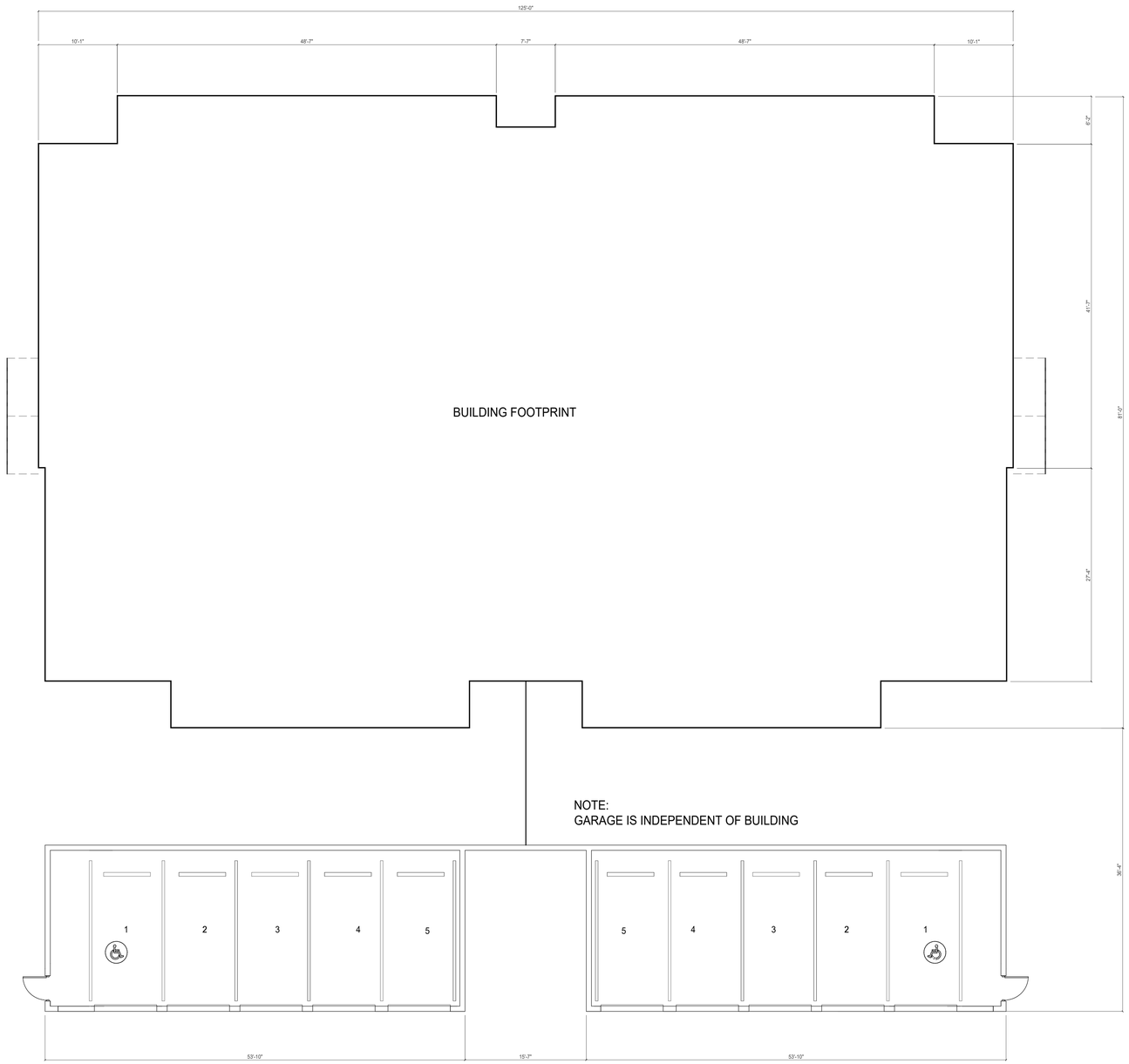
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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE
1	06/29/2021	
2	07/26/2021	
BY:	RC	
DATE:	12/26/2020	
SCALE:	NTS	

INDEX

A–01



BUILDING TYPE I - GARAGE LEVEL

1/8" = 1'-0"

BUILDING TYPE I				
LEVEL	GROSS AREA	OPEN FLOOR CORRIORS	CORRIDOR, ELEVATOR AND STORAGE	NET AREA
GARAGE (10 CARS)	2,630	0	0	2630
LOWER LEVEL	5,855	0	1824	4031
1ST LEVEL	9,623	0	1653	7970
2ND LEVEL	9,623	243	1648	7732
3RD LEVEL	5,675	243	1732	3700
TOTAL BUILDING	33,406			23,433
NO. OF BUILDINGS	7			7
TOTAL FOR BUILDING TYPE I	233,842			164,031

PHASE I - 300 APARTMENTS TOTAL					
BUILDING TYPE	I	II	III	TOTAL BUILDINGS	
NO. OF BUILDINGS	7	3	3	13	
Unit Types					%
3 BEDROOM	42	-	-	42	14.00%
2 BEDROOM - UNIT C1	0	36	36	72	24.00%
2 BEDROOM - UNIT C2	42	-	-	42	14.00%
1 BEDROOM - UNIT B1	0	24	36	60	20.00%
1 BEDROOM - UNIT B2	42	-	-	42	14.00%
STUDIO	42	-	-	42	14.00%
TOTAL UNITS	168	60	72	300	100.00%

PHASE I - 300 APARTMENTS TOTAL					
APARTMENT TYPE	NUMBER OF APARTMENTS	APARTMENT AREAS (SF)			TOTAL AREA (SF)
		INTERIOR	BALCONY	INTERIOR & BALCONY	
3 BEDROOM	42	1,269	80	1,349	56,658
2 BEDROOM - UNIT C1	72	1,126	80	1,206	86,832
2 BEDROOM - UNIT C2	42	1,109	80	1,189	49,938
1 BEDROOM - UNIT B1	60	704	80	784	47,040
1 BEDROOM - UNIT B2	42	711	71	782	32,844
STUDIO	42	593	80	673	28,266
					301,578

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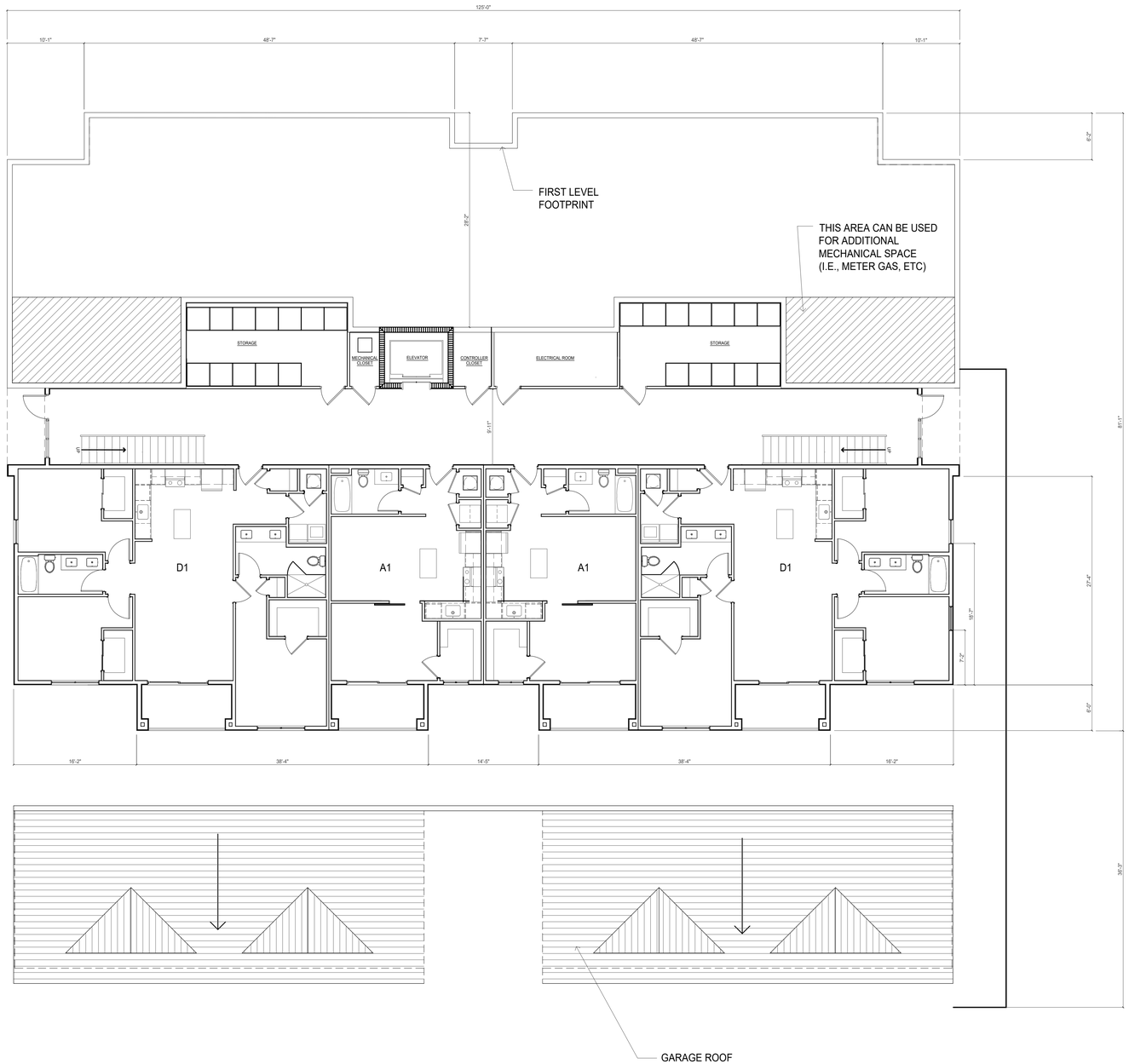
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	DATE	COMMENT
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE I

A-1



BUILDING TYPE I - LOWER LEVEL

1/8" = 1'-0"

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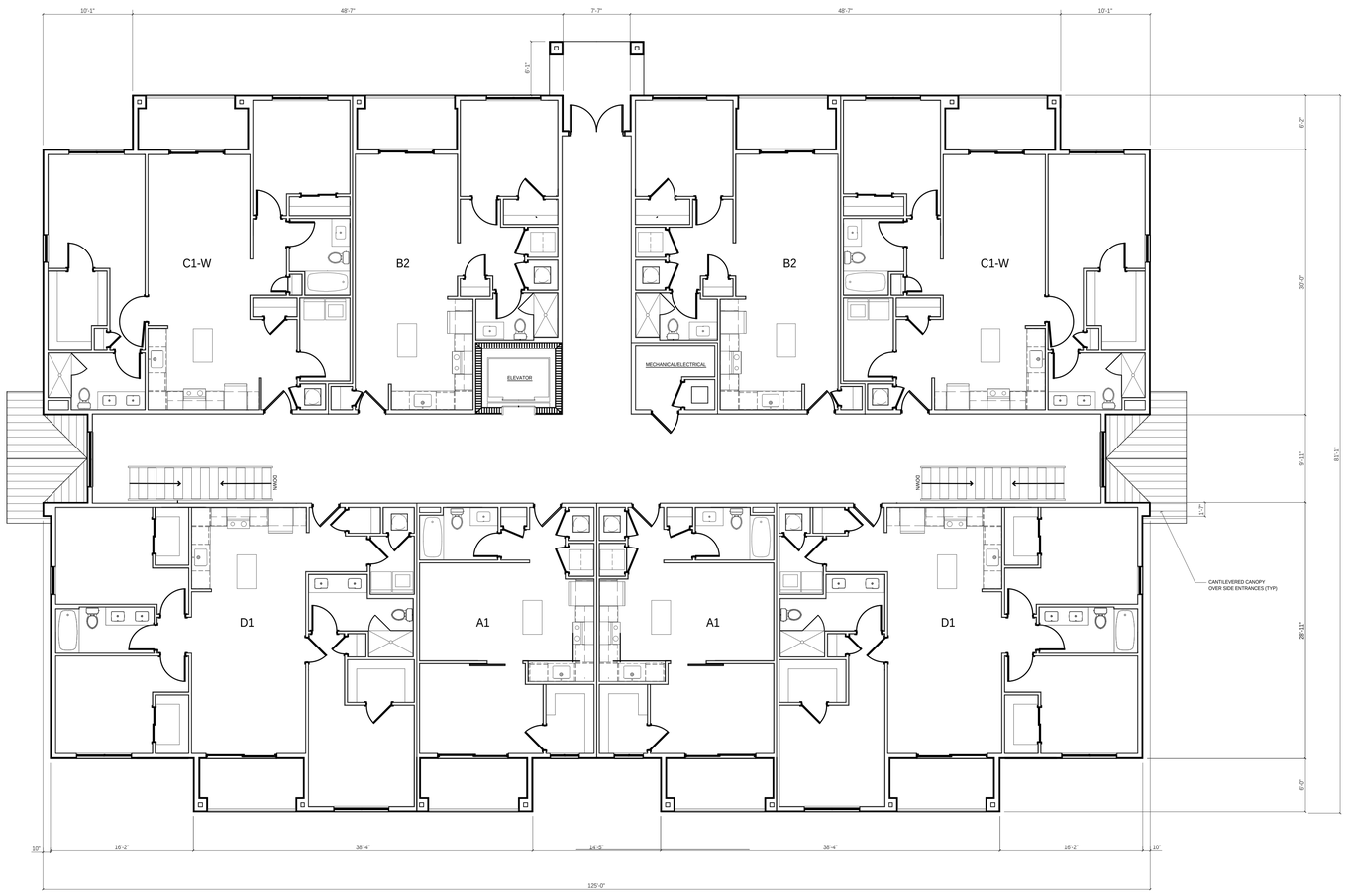
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GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

BY: RC
DATE: 12/28/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE I

A-2



BUILDING TYPE I - FIRST FLOOR

1/8" = 1'-0"

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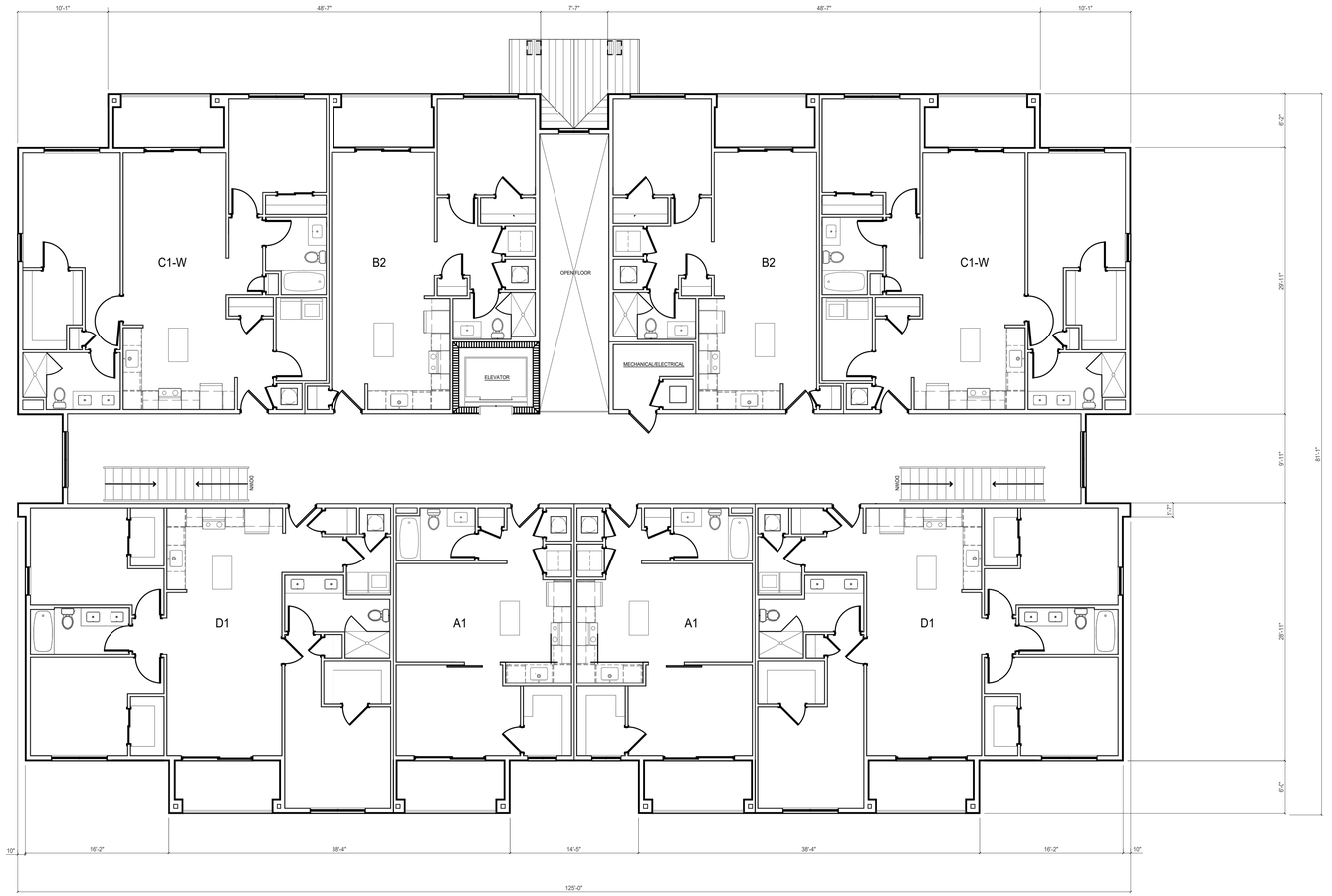
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COLORADO

REV	COMMENT	DATE

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE I

A-3



BUILDING TYPE I - SECOND FLOOR

1/8" = 1'-0"

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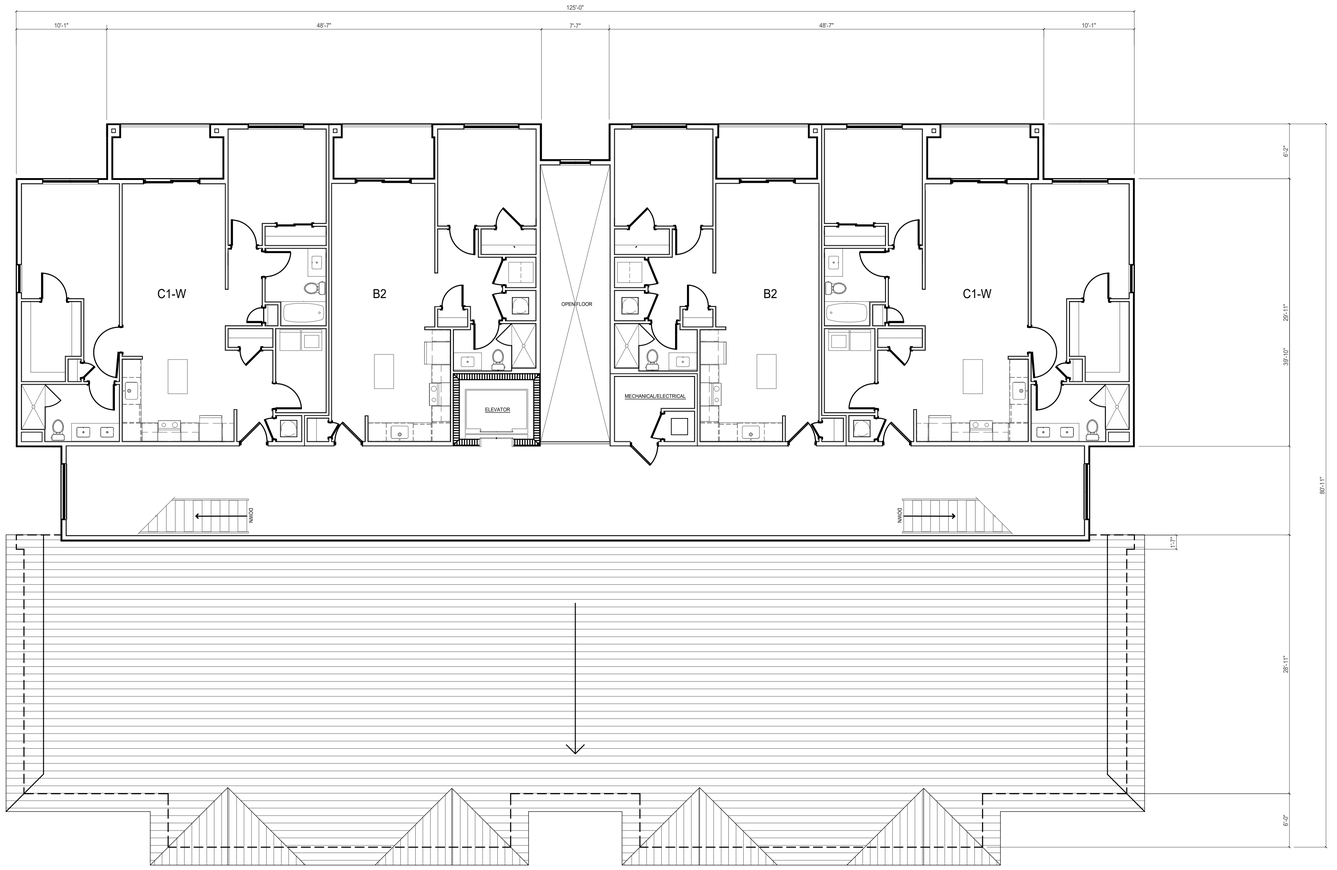
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COLORADO

REV	DATE	COMMENT

BY: RC
DATE: 12/28/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE I

A-4



BUILDING TYPE I - THIRD FLOOR

1/8" = 1'-0"

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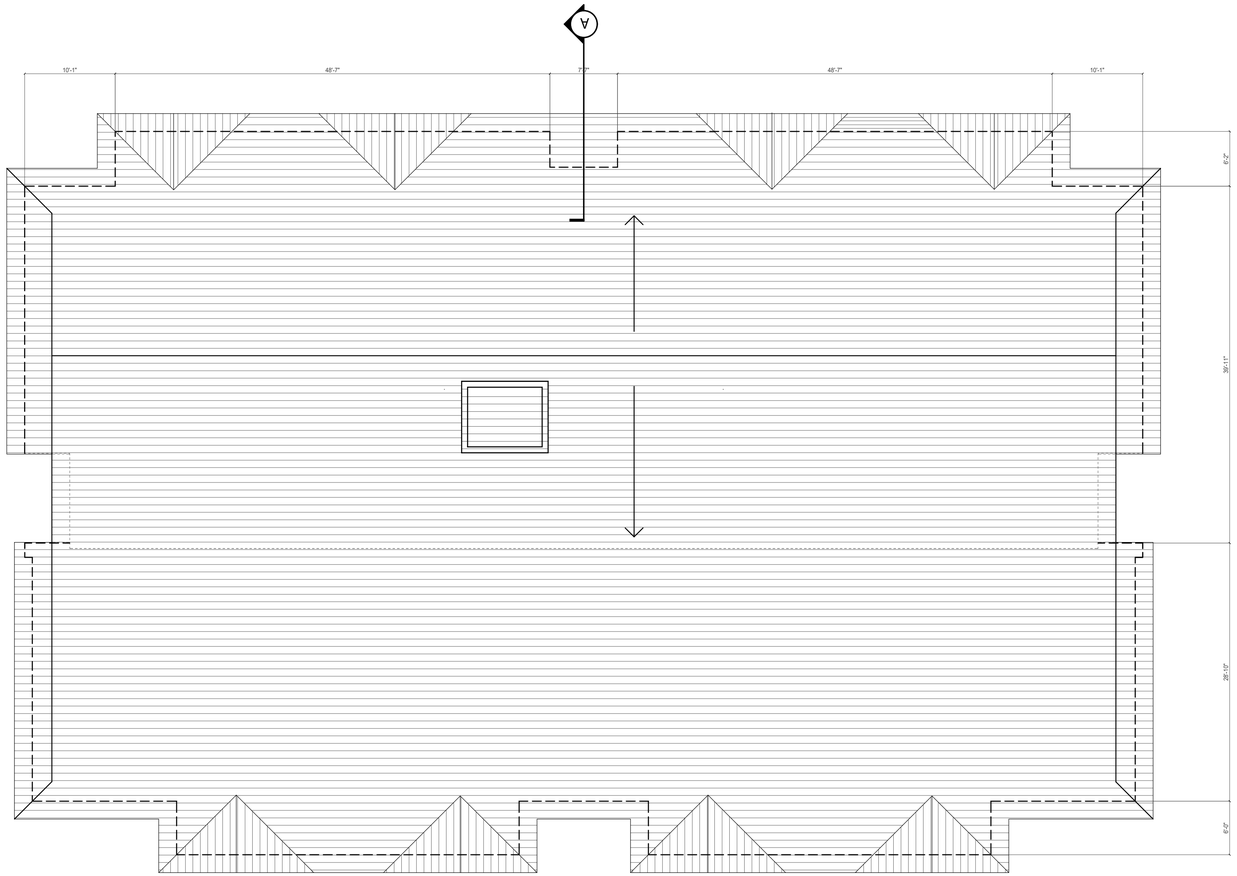
PROJECT:
GLENWOOD SPRINGS
COLORADO

DATE	COMMENT
07/26/2021	

BY:	RC
DATE:	12/26/2020
SCALE:	1/8" = 1'-0"

BUILDING TYPE I

A-5



BUILDING TYPE I - ROOF

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	Comment	DATE
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

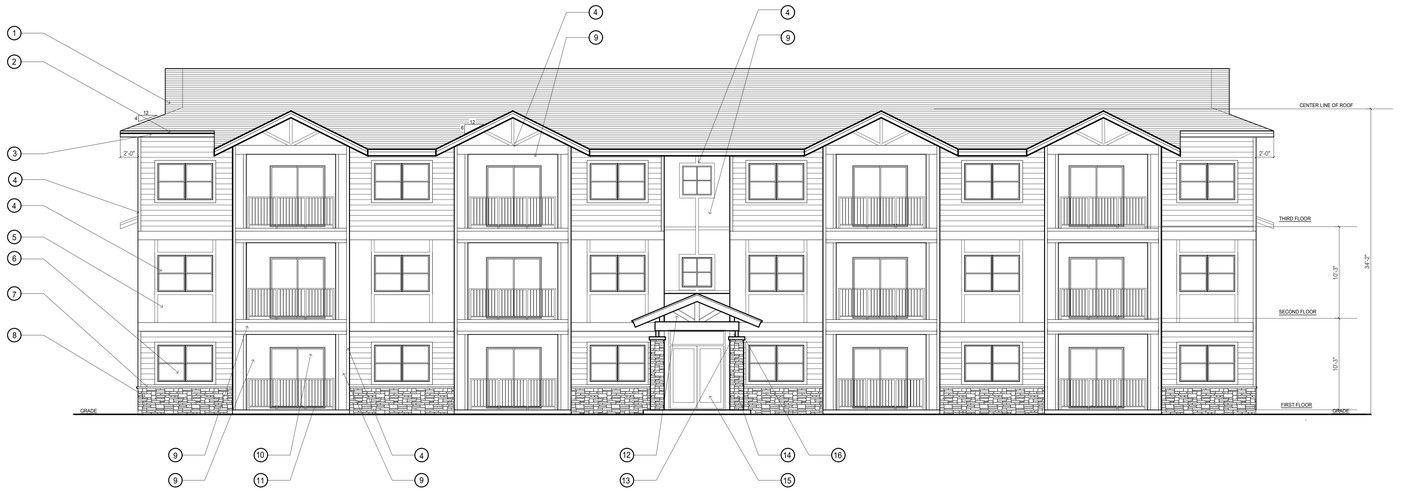
BUILDING TYPE I

A-6



BUILDING TYPE I - NORTH ELEVATION

1/8" = 1'-0"



BUILDING TYPE I - SOUTH ELEVATION

1/8" = 1'-0"

EXTERIOR FINISH SCHEDULE - BUILDING TYPE III			
LABEL	ITEM	PRODUCT	COLOR
1	ROOFING	CERTAINTEED ASPHALT SHINGLES- LANDMARK PRO SOLARIS	CINDER BLACK
2	FASCIA	HARDIE BOARD - 5/4 BOARD 7.25" WIDE	ARTIC WHITE
3	SOFFIT	HARDIETRIM BOARD - 24" WIDE	ARTIC WHITE
4	TRIM	HARDIE TRIM BOARD - 4" WIDE	ARTIC WHITE
5	SIDING	HARDIE PLANK LAP SIDING - CEDAR MILL- 7" HIGH	NAVAJO BEIGE
6	WINDOW	ALUMINUM - SINGLE HUNG	BRONZE
7	STONE SILL	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
8	STONE CLADDING	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
9	STUCCO - BUILDINGS	HARDIE PANEL VERTICAL SIDING STUCCO	MONTEREY TAUPE
10	BALCONY DOOR	ALUMINUM SLIDING GLASS DOOR	WHITE
11	RAILING - BALCONY	ALUMINUM PICKET RAILING	WHITE
12	BUIDING ENTRANCE CANOPY	HEAVY TIMER FRAMING	MINWAX JACOBEEAN #2750
13	BUILDING ENTRY COLUMNS	STRUCTURAL STEEL	BLACK
14	STONE CLADDED COLUMN	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
15	ENTRANCE DOOR	ALUMINUM GLASS DOOR	WHITE
16	STONE COLUMN CAP	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
17	RAILING - ROOF DECK COMMON AMENITY SPACE	ALUMINUM PICKET RAILING	WHITE
18	STUCCO - RESIDENTIAL GARAGES	3 - COAT SMOOTH CEMENT STUCCO FINISH	MONTEREY TAUPE
19	GARAGE DOOR	INSULATED METAL	WHITE
20	DOOR	METAL CLAD DOOR	MONTEREY TAUPE

BUILDING TYPE I		
NORTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	4089	NA
NET STONE CLADDING	169.91	4.2%
NET SIDING	1460.59	35.7%
NET STUCCO FINISH	1584	38.7%
NET GLAZING	874.5	21.4%

SOUTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	3866.00	NA
NET STONE CLADDING	187.48	4.8%
NET SIDING	1371.74	35.5%
NET STUCCO FINISH	1269.10	32.8%
NET GLAZING	1037.68	26.8%

EAST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	3294	NA
NET STONE CLADDING	-	-
NET SIDING	2672.23	81.1%
NET STUCCO FINISH	451.37	13.7%
NET GLAZING	170.4	5.2%

WEST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	3294	NA
NET STONE CLADDING	-	-
NET SIDING	2672.23	81.1%
NET STUCCO FINISH	451.37	13.7%
NET GLAZING	170.4	5.2%

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE
2	07/28/2021	12/28/2020

BY: RC
SCALE: 1/8" = 1'-0"

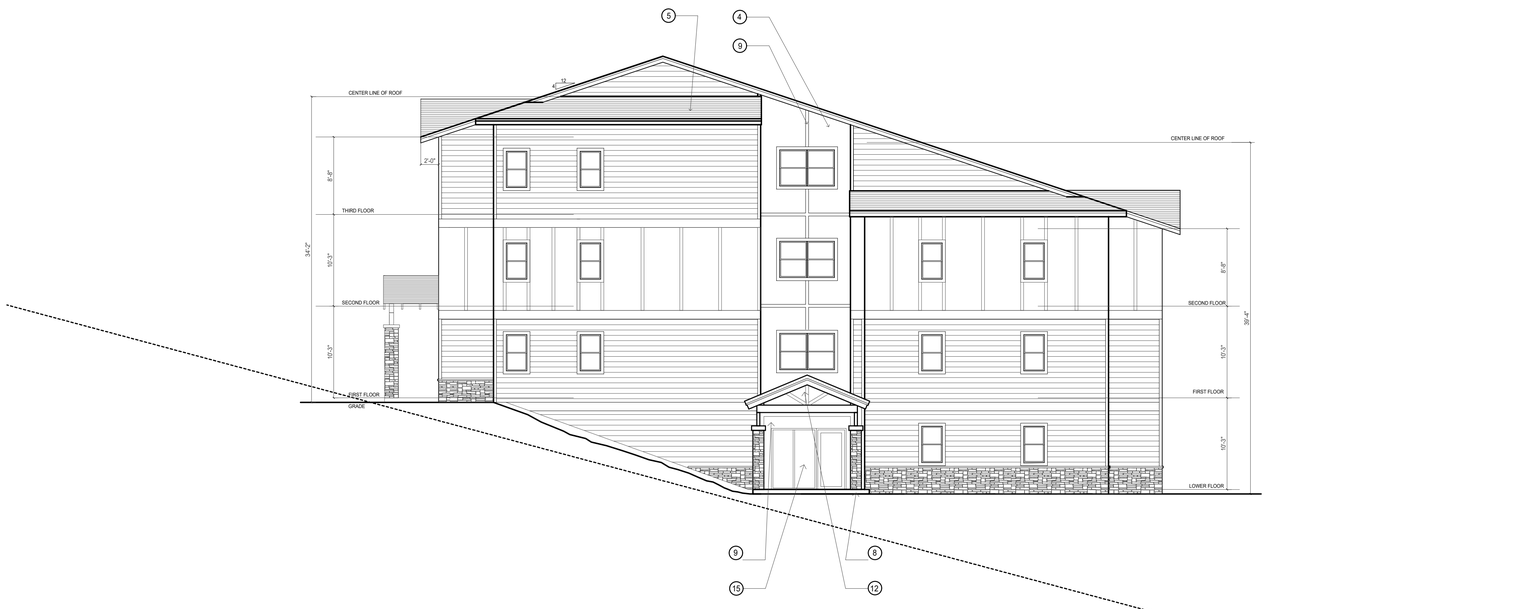
BUILDING TYPE I

A-7



BUILDING TYPE I - EAST ELEVATION

1/8" = 1'-0"



BUILDING TYPE I - WEST ELEVATION

1/8" = 1'-0"

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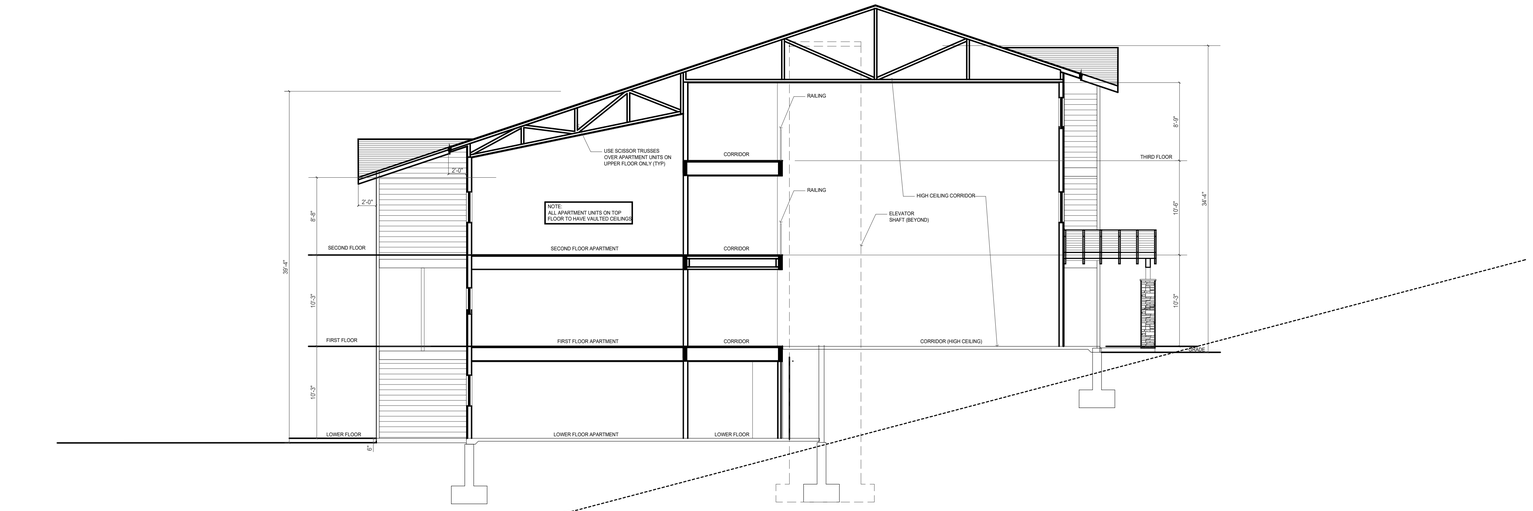
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE I

A-8



BUILDING TYPE I - SECTION A

1/8" = 1'-0"

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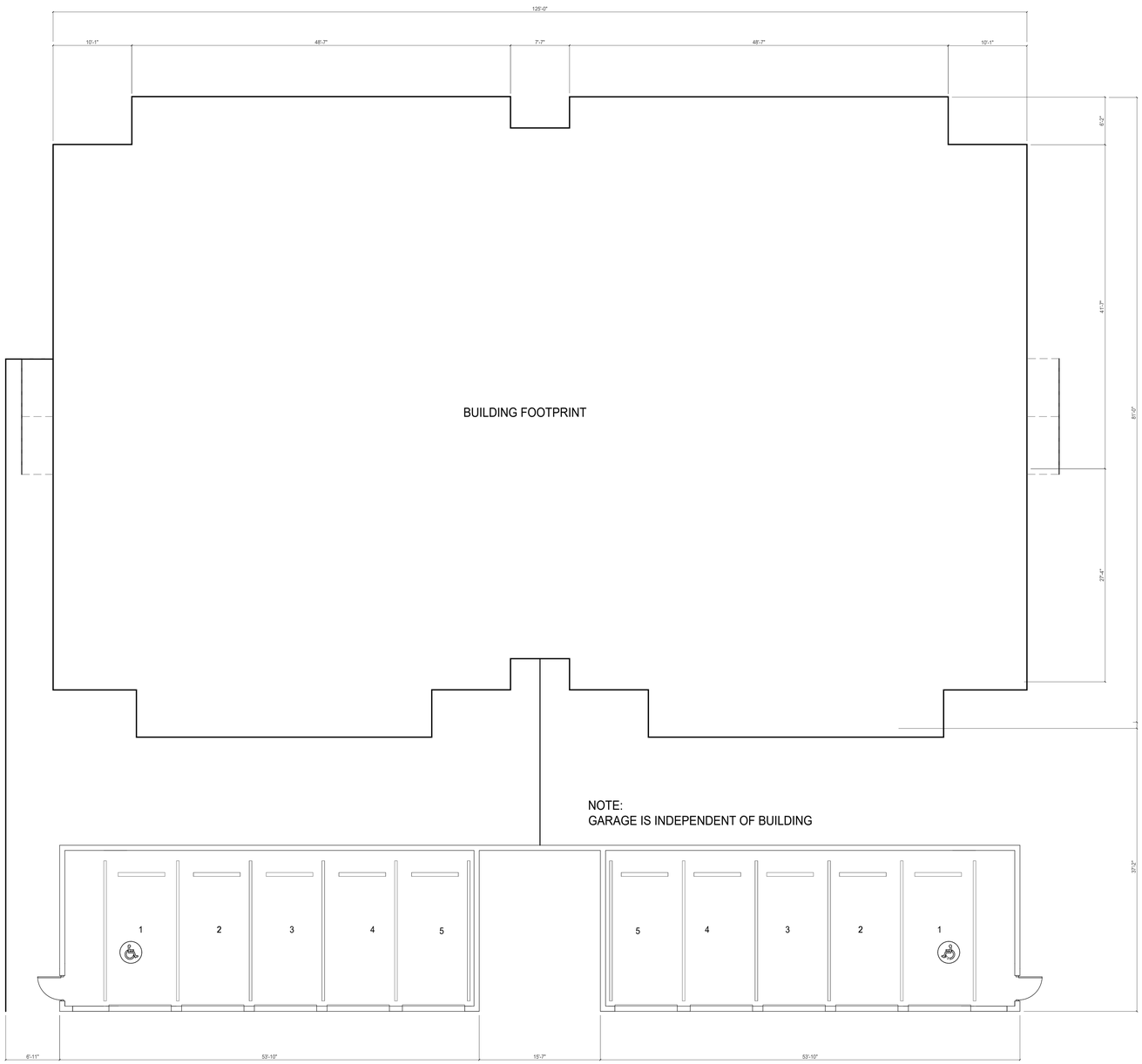
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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	Comment	DATE
BY:	RC	
DATE:	12/26/2020	
SCALE:	1/8" = 1' - 0"	

BUILDING TYPE I

A–9



BUILDING TYPE II - GARAGE LEVEL

1/8" = 1'-0"

BUILDING TYPE II				
LEVEL	GROSS AREA	OPEN FLOOR CORRIORS	CORRIDOR, ELEVATOR AND STORAGE	NET AREA
GARAGE (10 CARS)	2,630	0	0	2630
LOWER LEVEL	6,038	0	1830	4208
1ST LEVEL	9,778	0	1653	8125
2ND LEVEL	8,245	486	1147	6612
3RD LEVEL	5,697	243	1508	3946
TOTAL BUILDING	32,388			22,891
NO. OF BUILDINGS	3			3
TOTAL FOR BUILDING TYPE II	97,164			68,673

PHASE I - 300 APARTMENTS TOTAL					
BUILDING TYPE	I	II	III	TOTAL BUILDINGS	
NO. OF BUILDINGS	7	3	3	13	
Unit Types					%
3 BEDROOM	42	-	-	42	14.00%
2 BEDROOM - UNIT C1	0	36	36	72	24.00%
2 BEDROOM - UNIT C2	42	-	-	42	14.00%
1 BEDROOM - UNIT B1	0	24	36	60	20.00%
1 BEDROOM - UNIT B2	42	-	-	42	14.00%
STUDIO	42	-	-	42	14.00%
TOTAL UNITS	168	60	72	300	100.00%

PHASE I - 300 APARTMENTS TOTAL					
APARTMENT TYPE	NUMBER OF APARTMENTS	APARTMENT AREAS (SF)			TOTAL AREA (SF)
		INTERIOR	BALCONY	INTERIOR & BALCONY	
3 BEDROOM	42	1,269	80	1,349	56,658
2 BEDROOM - UNIT C1	72	1,126	80	1,206	86,832
2 BEDROOM - UNIT C2	42	1,109	80	1,189	49,938
1 BEDROOM - UNIT B1	60	704	80	784	47,040
1 BEDROOM - UNIT B2	42	711	71	782	32,844
STUDIO	42	593	80	673	28,266
					301,578

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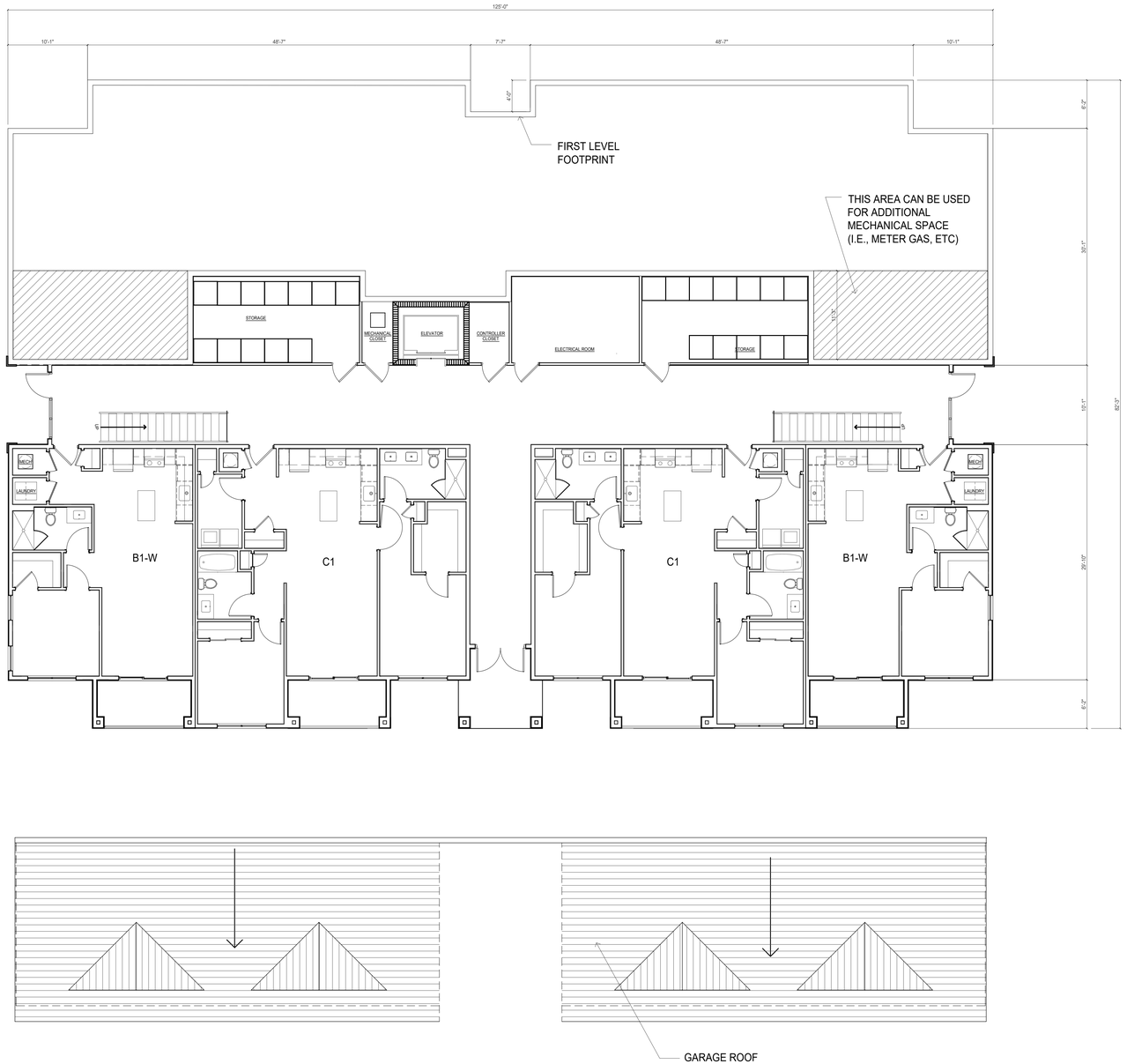
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	DATE	COMMENT
2	07/28/2021	

BY: RC
DATE: 12/28/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE II

A-10



BUILDING TYPE II - LOWER LEVEL

1/8" = 1'-0"

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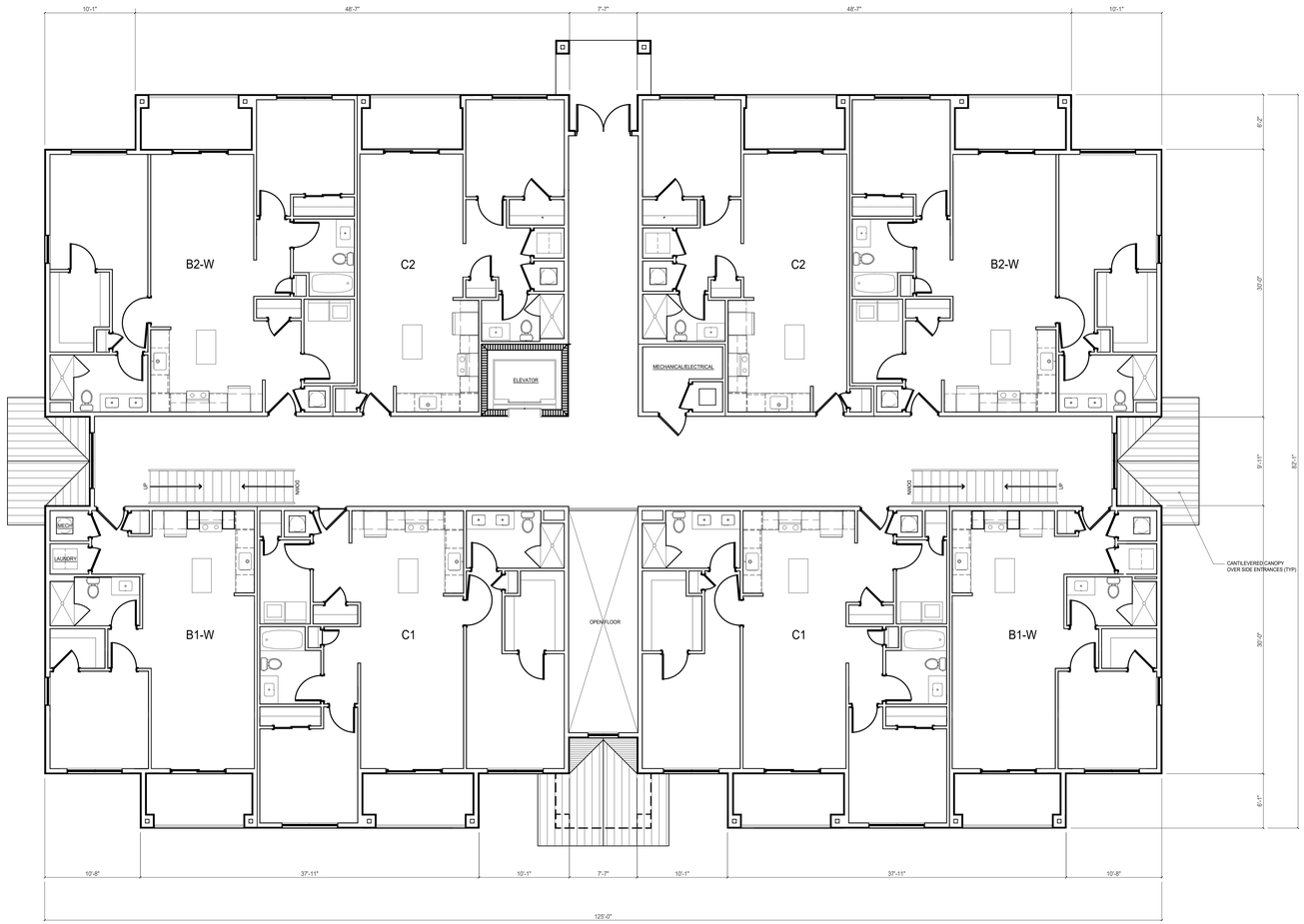
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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE
BY:	R/C	
DATE:	12/26/2020	
SCALE:	1/8" = 1' - 0"	

BUILDING TYPE II

A–11



BUILDING TYPE II - FIRST FLOOR

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

DATE	COMMENT	REV

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE II

A-12



BUILDING TYPE II - SECOND FLOOR

1/8" = 1'-0"

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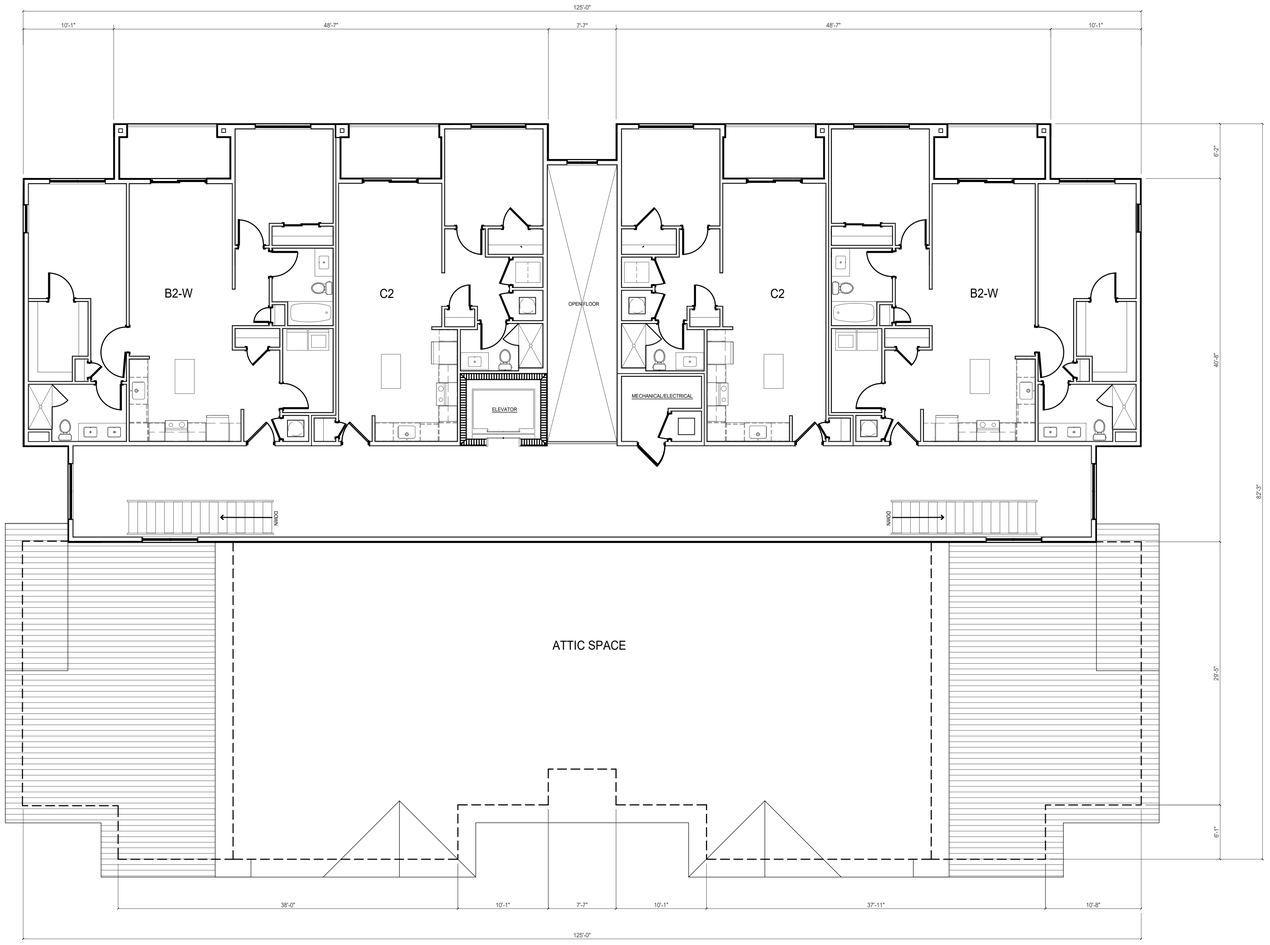
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE II

A–13



BUILDING TYPE II - THIRD FLOOR

1/8" = 1'-0"

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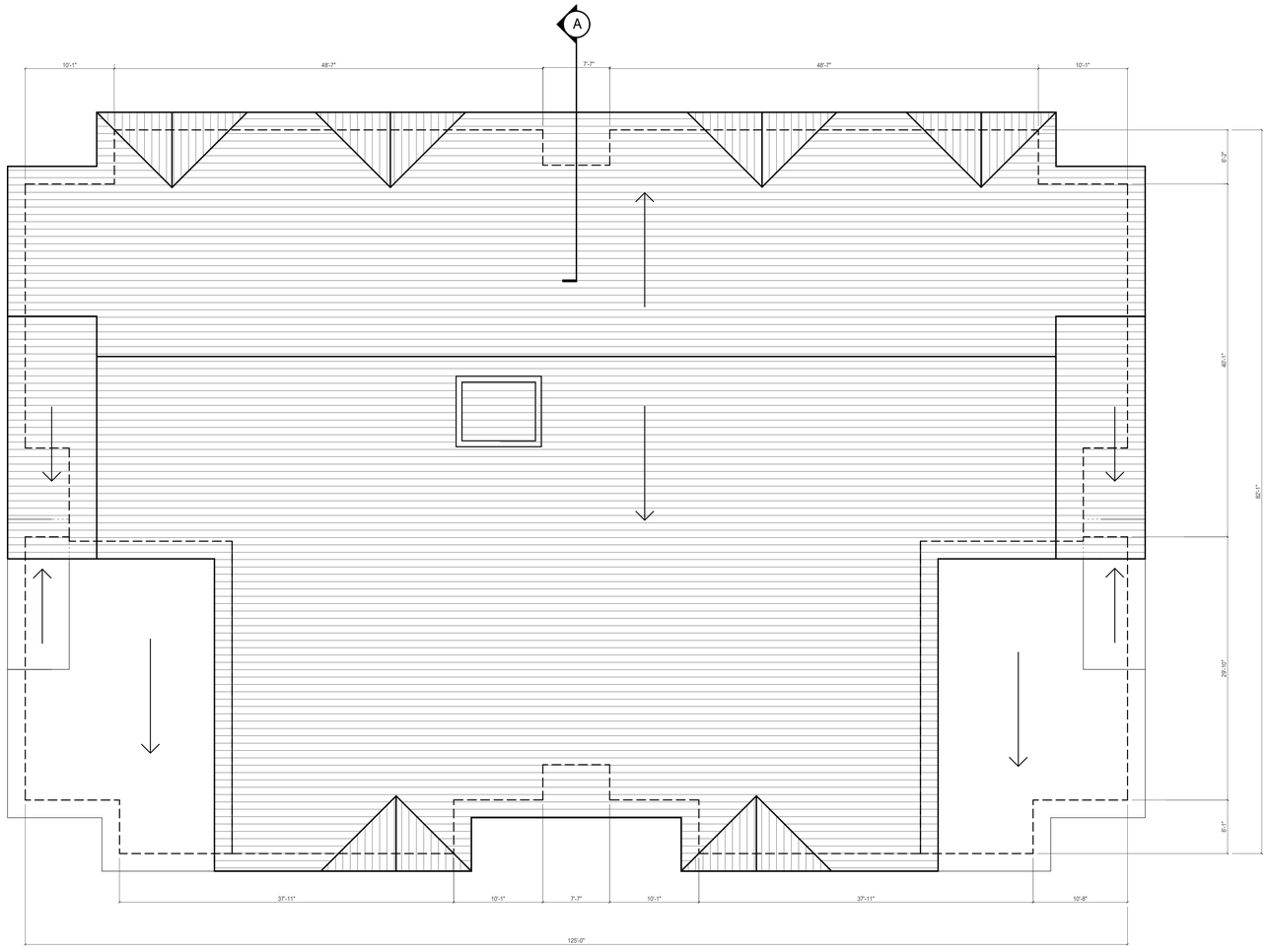
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	Comment	DATE
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1' - 0"

BUILDING TYPE II

A-14



BUILDING TYPE II - ROOF

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	Comment	DATE
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1' - 0"

BUILDING TYPE II

A-15



BUILDING TYPE II - NORTH ELEVATION

1/8" = 1'-0"



BUILDING TYPE II - SOUTH ELEVATION

1/8" = 1'-0"

EXTERIOR FINISH SCHEDULE - BUILDING TYPE III			
LABEL	ITEM	PRODUCT	COLOR
1	ROOFING	CERTAINTEED ASPHALT SHINGLES- LANDMARK PRO SOLARIS	CINDER BLACK
2	FASCIA	HARDIE BOARD - 5/4 BOARD 7.25" WIDE	ARTIC WHITE
3	SOFFIT	HARDIETRIM BOARD - 24" WIDE	ARTIC WHITE
4	TRIM	HARDIE TRIM BOARD - 4" WIDE	ARTIC WHITE
5	SIDING	HARDIE PLANK LAP SIDING - CEDAR MILL- 7" HIGH	NAVAJO BEIGE
6	WINDOW	ALUMINUM - SINGLE HUNG	BRONZE
7	STONE SILL	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
8	STONE CLADDING	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
9	STUCCO - BUILDINGS	HARDIE PANEL VERTICAL SIDING STUCCO	MONTEREY TAUPE
10	BALCONY DOOR	ALUMINUM SLIDING GLASS DOOR	WHITE
11	RAILING - BALCONY	ALUMINUM PICKET RAILING	WHITE
12	BUIDING ENTRANCE CANOPY	HEAVY TIMER FRAMING	MINWAX JACOBEEAN #2750
13	BUILDING ENTRY COLUMNS	STRUCTURAL STEEL	BLACK
14	STONE CLADDED COLUMN	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
15	ENTRANCE DOOR	ALUMINUM GLASS DOOR	WHITE
16	STONE COLUMN CAP	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
17	RAILING - ROOF DECK COMMON AMENITY SPACE	ALUMINUM PICKET RAILING	WHITE
18	STUCCO - RESIDENTIAL GARAGES	3 - COAT SMOOTH CEMENT STUCCO FINISH	MONTEREY TAUPE
19	GARAGE DOOR	INSULATED METAL	WHITE
20	DOOR	METAL CLAD DOOR	MONTEREY TAUPE

BUILDING TYPE II

NORTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	4071	NA
NET STONE CLADDING	212.56	-
NET SIDING	1720.9	42.3%
NET STUCCO FINISH	1126.73	27.7%
NET GLAZING	1010.81	24.8%

SOUTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	3866.00	NA
NET STONE CLADDING	#REF!	#REF!
NET SIDING	#REF!	#REF!
NET STUCCO FINISH	1269.10	32.8%
NET GLAZING	1037.68	26.8%

EAST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	3270.19	NA
NET STONE CLADDING	-	-
NET SIDING	2759.89	84.4%
NET STUCCO FINISH	377.67	11.5%
NET GLAZING	132.63	4.1%

WEST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	3270.19	NA
NET STONE CLADDING	-	-
NET SIDING	2759.89	84.4%
NET STUCCO FINISH	377.67	11.5%
NET GLAZING	132.63	4.1%

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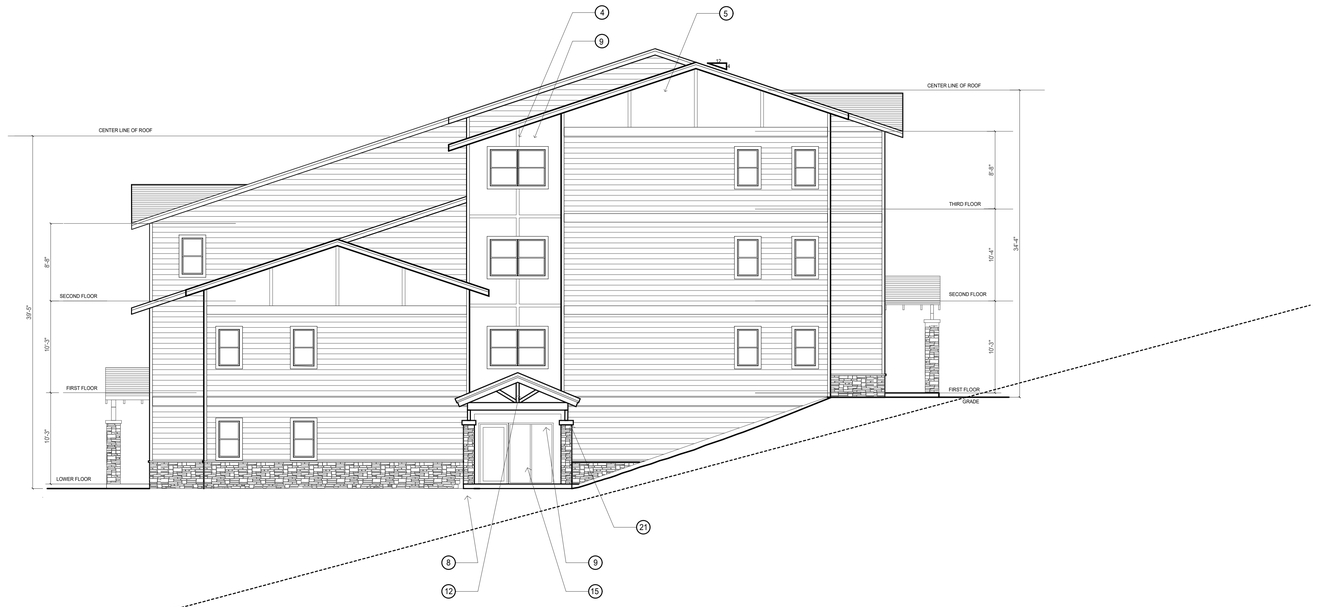
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	DATE	COMMENT
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

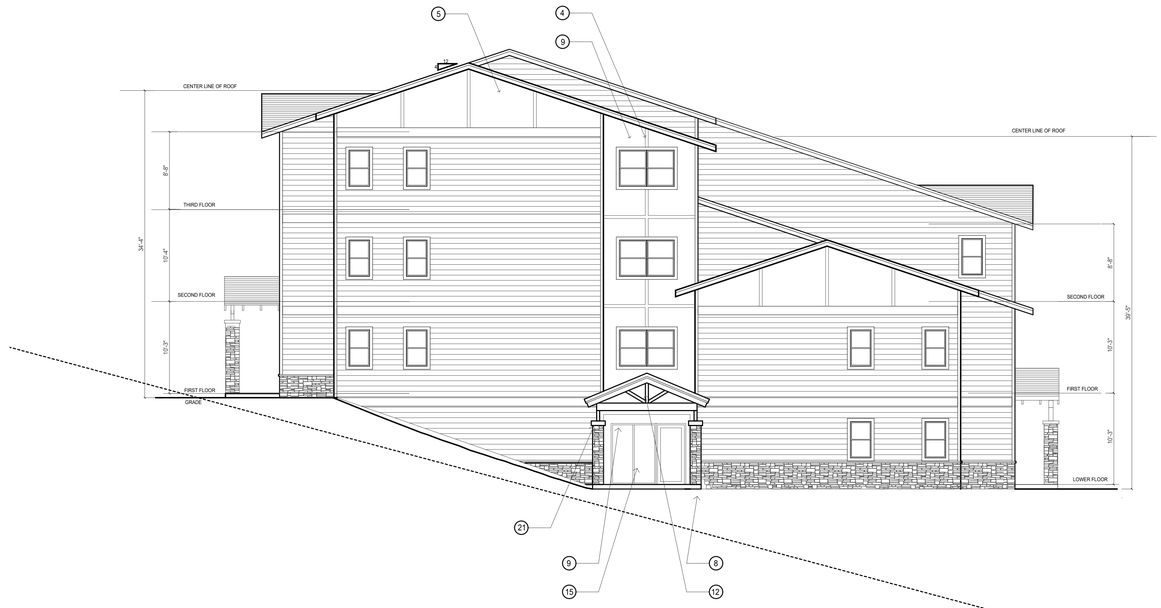
BUILDING TYPE II

A-16



BUILDING TYPE II - EAST ELEVATION

1/8" = 1'-0"



BUILDING TYPE II - EAST ELEVATION

1/8" = 1'-0"

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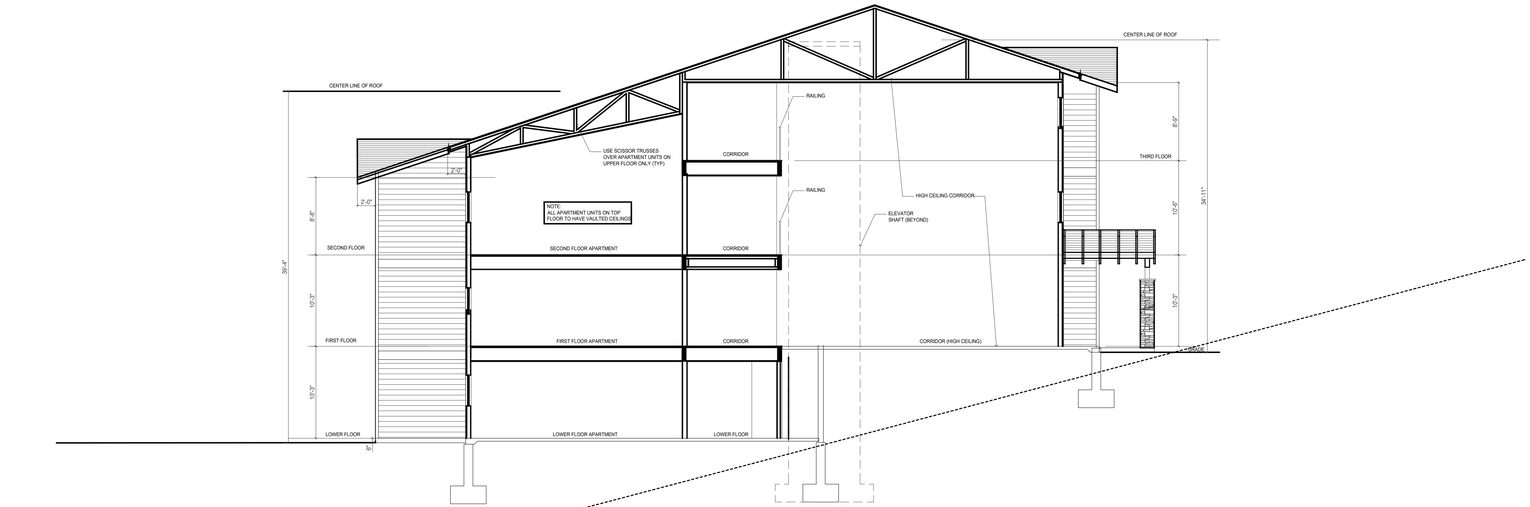
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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV:	COMMENT	DATE
		BY: RC
		DATE: 12/28/2020
		SCALE: 1/8" = 1'-0"

BUILDING TYPE II

A–17



BUILDING TYPE II - SECTION A

1/8" = 1'-0"

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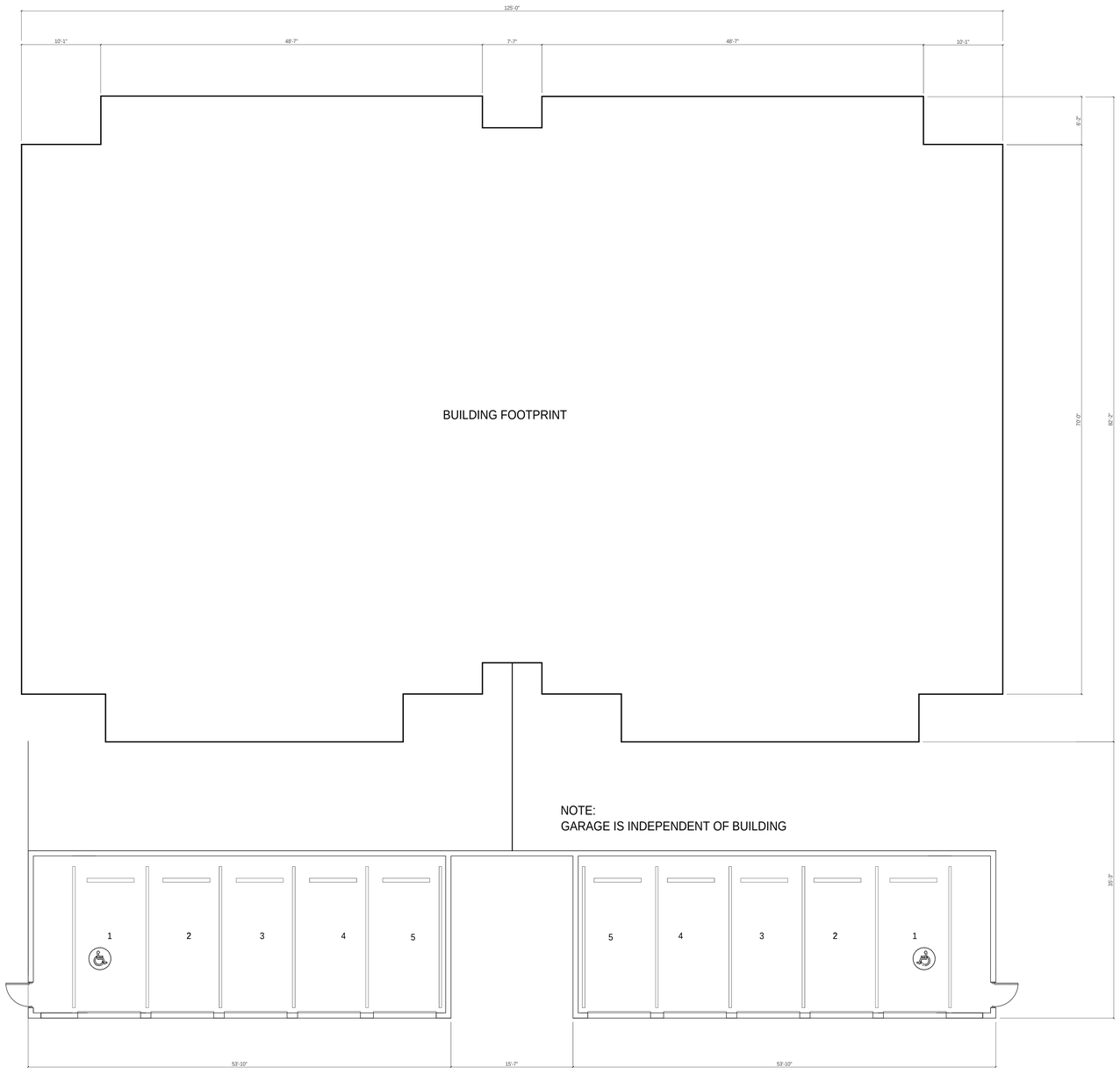
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

BY: RC
DATE: 12/28/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE II

A-18



BUILDING TYPE III - GARAGE LEVEL

1/8" = 1'-0"

BUILDING TYPE III				
LEVEL	GROSS AREA	OPEN FLOOR CORRIORS	CORRIDOR, ELEVATOR AND STORAGE	NET AREA
GARAGE (10 CARS)	2,630	0	0	2630
LOWER LEVEL	6,038	0	1830	4208
1ST LEVEL	9,778	0	1653	8125
2ND LEVEL	9,778	486	1147	8145
3RD LEVEL	5,675	243	1508	3924
TOTAL BUILDING	33,899			24,402
NO. OF BUILDINGS	3			3
TOTAL FOR BUILDING TYPE III	101,697			73,206

PHASE I - 300 APARTMENTS TOTAL					
BUILDING TYPE	I	II	III	TOTAL BUILDINGS	
NO. OF BUILDINGS	7	3	3	13	
Unit Types					%
3 BEDROOM	42	-	-	42	14.00%
2 BEDROOM - UNIT C1	0	36	36	72	24.00%
2 BEDROOM - UNIT C2	42	-	-	42	14.00%
1 BEDROOM - UNIT B1	0	24	36	60	20.00%
1 BEDROOM - UNIT B2	42	-	-	42	14.00%
STUDIO	42	-	-	42	14.00%
TOTAL UNITS	168	60	72	300	100.00%

PHASE I - 300 APARTMENTS TOTAL					
APARTMENT TYPE	NUMBER OF APARTMENTS	APARTMENT AREAS (SF)			TOTAL AREA (SF)
		INTERIOR	BALCONY	INTERIOR & BALCONY	
3 BEDROOM	42	1,269	80	1,349	56,658
2 BEDROOM - UNIT C1	72	1,126	80	1,206	86,832
2 BEDROOM - UNIT C2	42	1,109	80	1,189	49,938
1 BEDROOM - UNIT B1	60	704	80	784	47,040
1 BEDROOM - UNIT B2	42	711	71	782	32,844
STUDIO	42	593	80	673	28,266
					301,578

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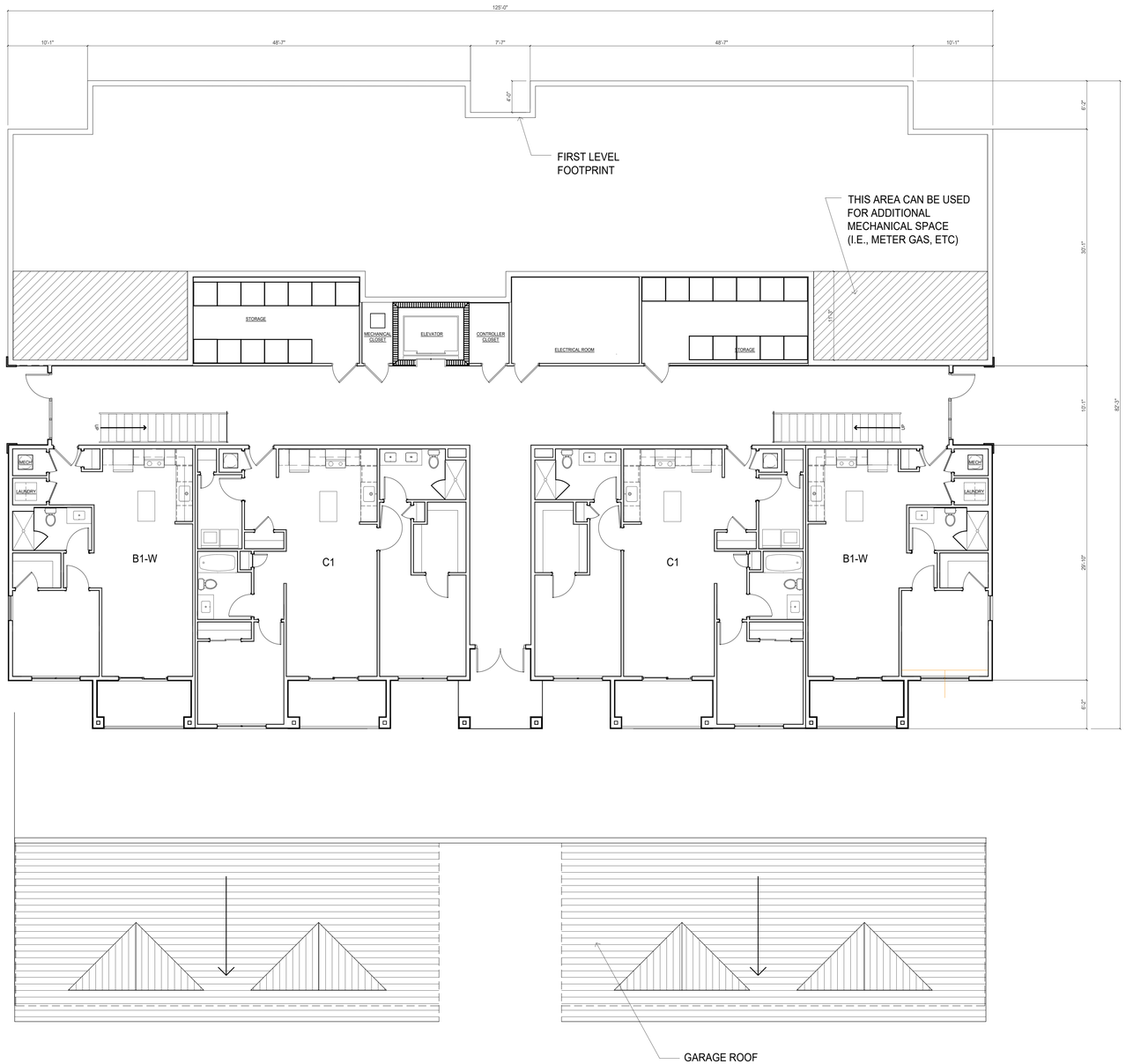
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	DATE	COMMENT
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE III

A-19



BUILDING TYPE III - LOWER LEVEL

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

RJC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING
TYPE III

A-20



BUILDING TYPE III - FIRST FLOOR

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	DATE	COMMENT
BY:	RC	
DATE:	12/28/2020	
SCALE:	1/8" = 1'-0"	

BUILDING TYPE III

A-21



BUILDING TYPE III - SECOND FLOOR

1/8" = 1'-0"

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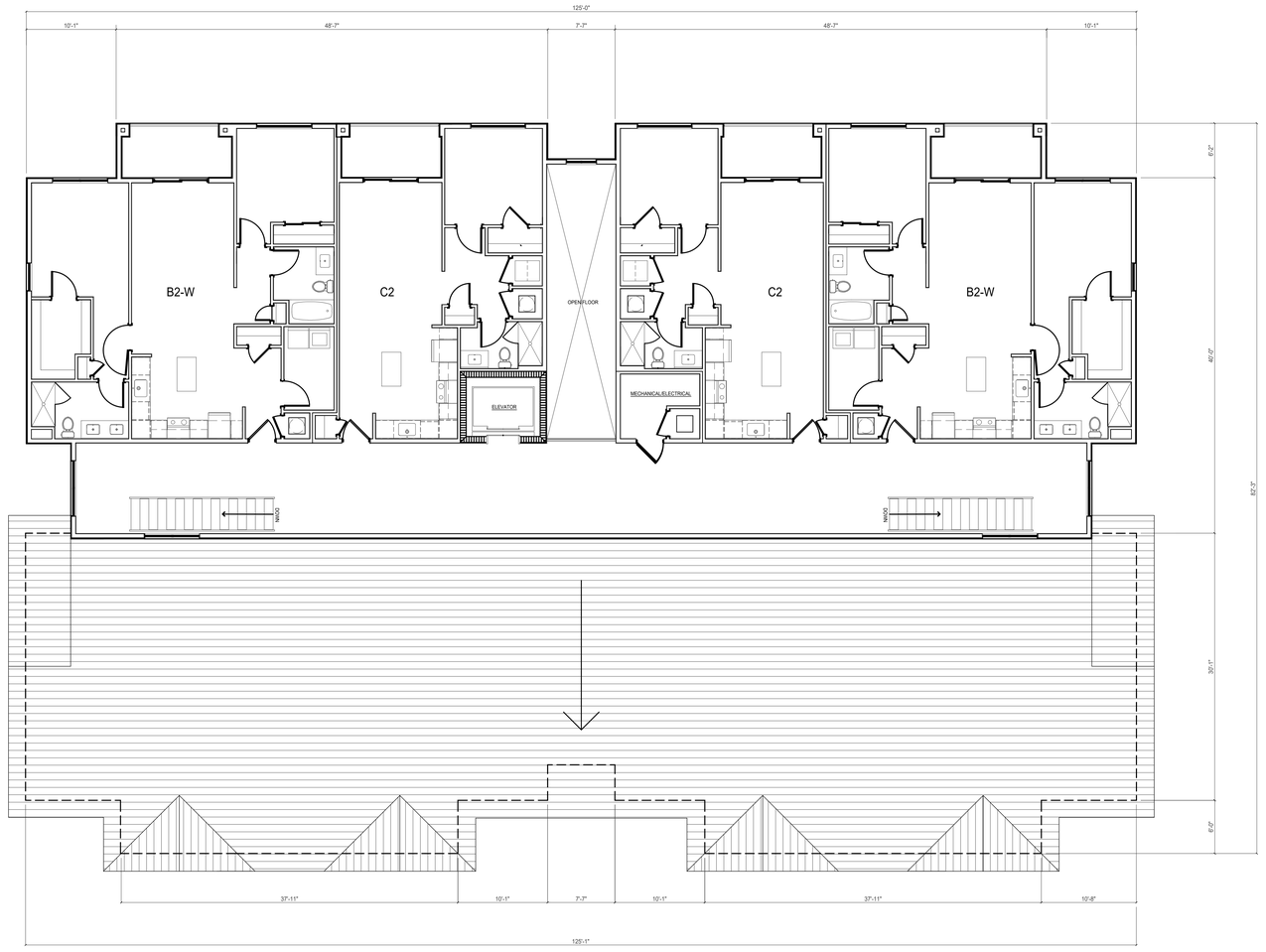
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Ft Lauderdale, FL 33316

PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	Comment	DATE
BY:	R/C	
DATE:	12/26/2020	
SCALE:	1/8" = 1' - 0"	

BUILDING
TYPE III

A-22



BUILDING TYPE III - THIRD FLOOR

1/8" = 1'-0"

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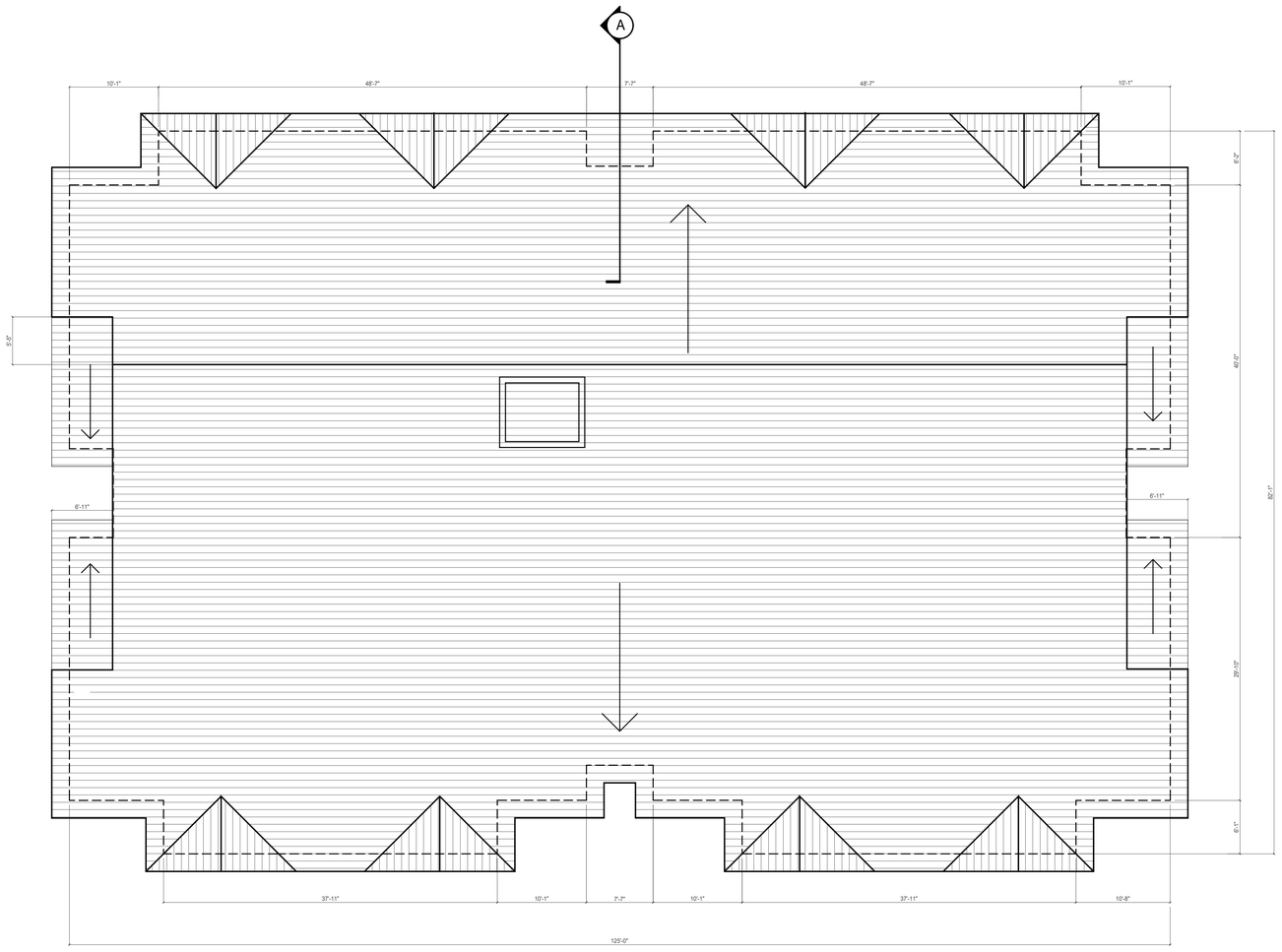
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV:	COMMENT	DATE
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE III

A-23



BUILDING TYPE III - ROOF

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	Comment	DATE
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

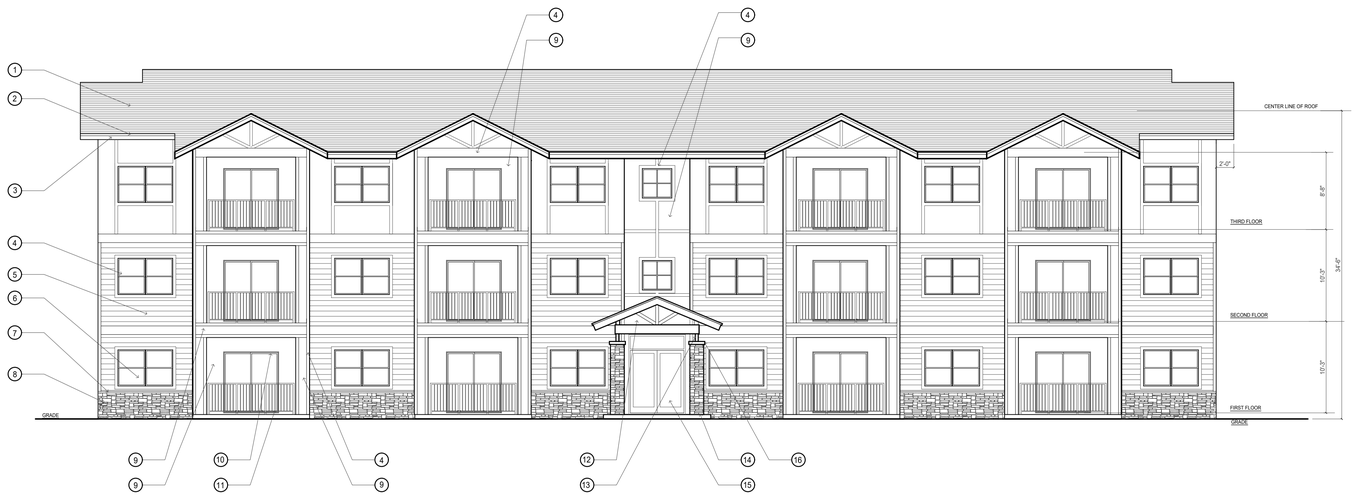
BUILDING TYPE III

A-24



BUILDING TYPE III - NORTH ELEVATION

1/8" = 1'-0"



BUILDING TYPE III - SOUTH ELEVATION

1/8" = 1'-0"

EXTERIOR FINISH SCHEDULE - BUILDING TYPE III			
LABEL	**ITEM**	**PRODUCT**	**COLOR**
1	ROOFING	CERTAINTEED ASPHALT SHINGLES- LANDMARK PRO SOLARIS	CINDER BLACK
2	FASCIA	HARDIE BOARD - 5/4 BOARD 7.25" WIDE	ARTIC WHITE
3	SOFFIT	HARDIETRIM BOARD - 24" WIDE	ARTIC WHITE
4	TRIM	HARDIE TRIM BOARD - 4" WIDE	ARTIC WHITE
5	SIDING	HARDIE PLANK LAP SIDING - CEDAR MILL- 7" HIGH	NAVAJO BEIGE
6	WINDOW	ALUMINUM - SINGLE HUNG	BRONZE
7	STONE SILL	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
8	STONE CLADDING	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
9	STUCCO - BUILDINGS	HARDIE PANEL VERTICAL SIDING STUCCO	MONTEREY TAUPE
10	BALCONY DOOR	ALUMINUM SLIDING GLASS DOOR	WHITE
11	RAILING - BALCONY	ALUMINUM PICKET RAILING	WHITE
12	BUIDING ENTRANCE CANOPY	HEAVY TIMER FRAMING	MINWAX JACOBEEAN #2750
13	BUILDING ENTRY COLUMNS	STRUCTURAL STEEL	BLACK
14	STONE CLADDED COLUMN	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
15	ENTRANCE DOOR	ALUMINUM GLASS DOOR	WHITE
16	STONE COLUMN CAP	CERTAINTEED - STONE FAÇADE	POCONO AUTUMN
17	RAILING - ROOF DECK COMMON AMENITY SPACE	ALUMINUM PICKET RAILING	WHITE
18	STUCCO - RESIDENTIAL GARAGES	3 - COAT SMOOTH CEMENT STUCCO FINISH	MONTEREY TAUPE
19	GARAGE DOOR	INSULATED METAL	WHITE
20	DOOR	METAL CLAD DOOR	MONTEREY TAUPE

BUILDING TYPE III					
NORTH ELEVATION			**SOUTH ELEVATION**		
	SURFACE AREA	**PERCENTAGE OF NET**		**SURFACE AREA**	**PERCENTAGE OF NET**
GROSS WALL	4112.73	NA	**GROSS WALL**	3866.00	NA
NET STONE CLADDING	205.64	5.0%	**NET STONE CLADDING**	#REF!	#REF!
NET SIDING	1590.56	38.7%	**NET SIDING**	#REF!	#REF!
NET STUCCO FINISH	1278.8	31.1%	**NET STUCCO FINISH**	1269.10	32.8%
NET GLAZING	1037.73	25.2%	**NET GLAZING**	1037.68	26.8%
EAST ELEVATION			**WEST ELEVATION**		
	SURFACE AREA	**PERCENTAGE OF NET**		**SURFACE AREA**	**PERCENTAGE OF NET**
GROSS WALL	3270.19	NA	**GROSS WALL**	3270.19	NA
NET STONE CLADDING	-	-	**NET STONE CLADDING**	-	-
NET SIDING	2759.89	84.4%	**NET SIDING**	2759.89	84.4%
NET STUCCO FINISH	377.67	11.5%	**NET STUCCO FINISH**	377.67	11.5%
NET GLAZING	132.63	4.1%	**NET GLAZING**	132.63	4.1%

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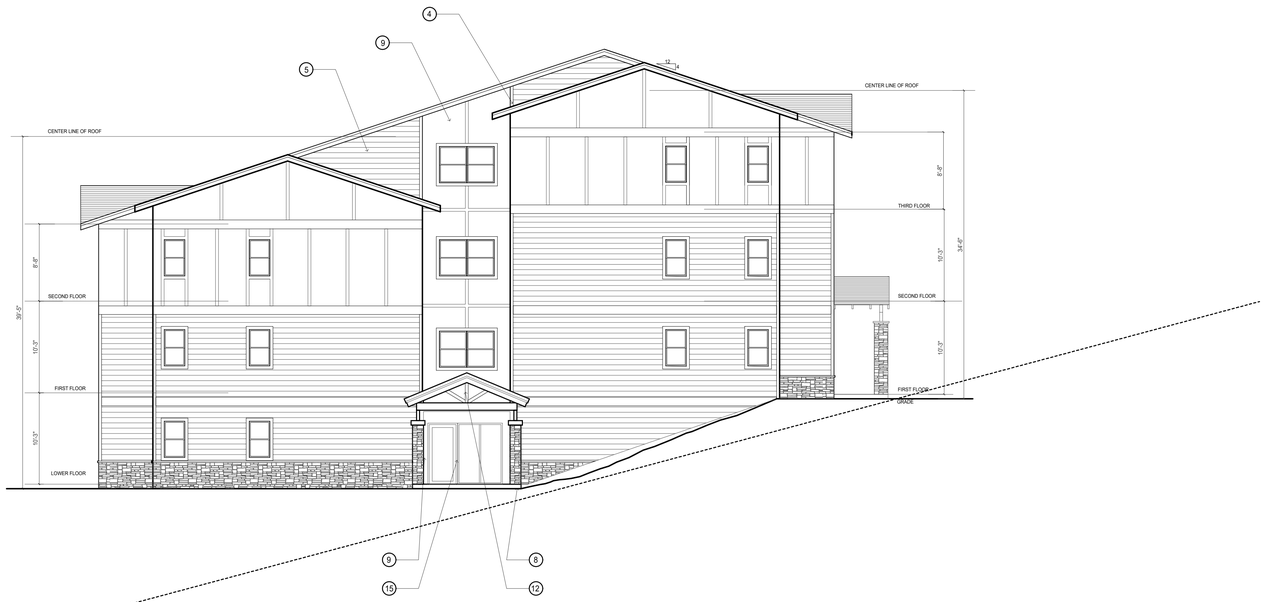
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	DATE	COMMENT
2	07/26/2021	

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

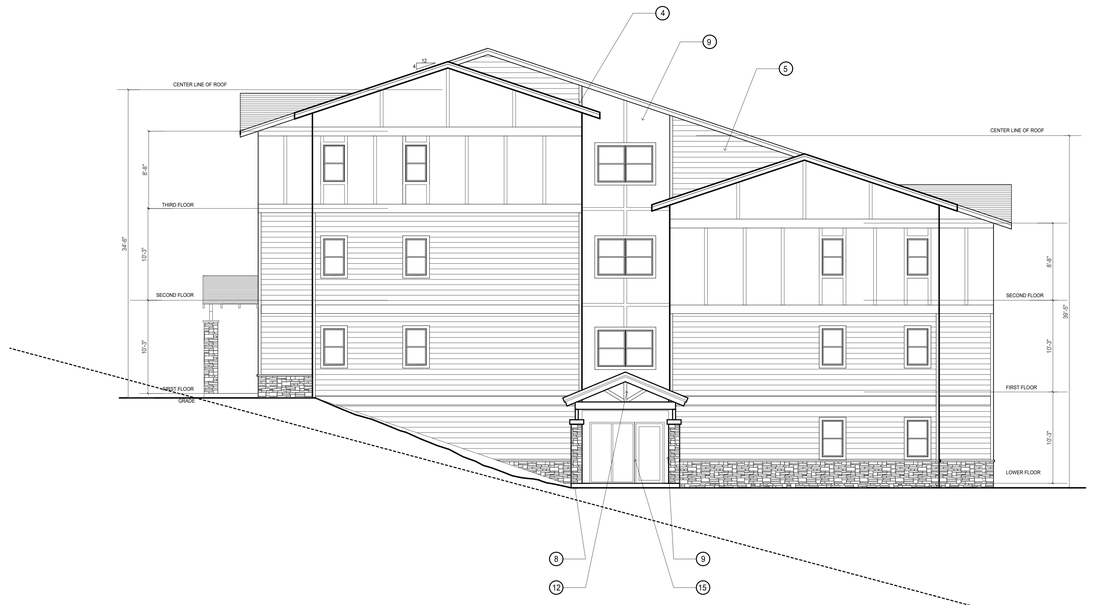
BUILDING TYPE III

A-25



BUILDING TYPE III - EAST ELEVATION

1/8" = 1'-0"



BUILDING TYPE III - WEST ELEVATION

1/8" = 1'-0"

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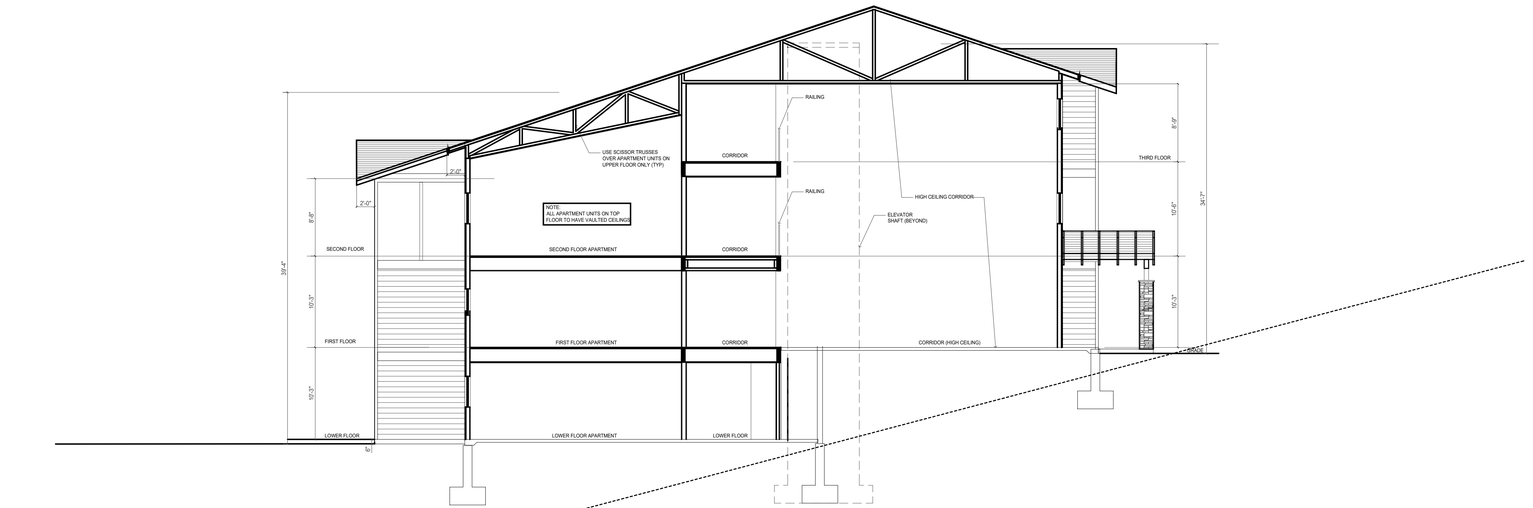
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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE
2	07/26/2021	
		BY: RC
		DATE: 12/26/2020
		SCALE: 1/8" = 1'-0"

BUILDING TYPE III

A-26



BUILDING TYPE III - SECTION A

1/8" = 1'-0"

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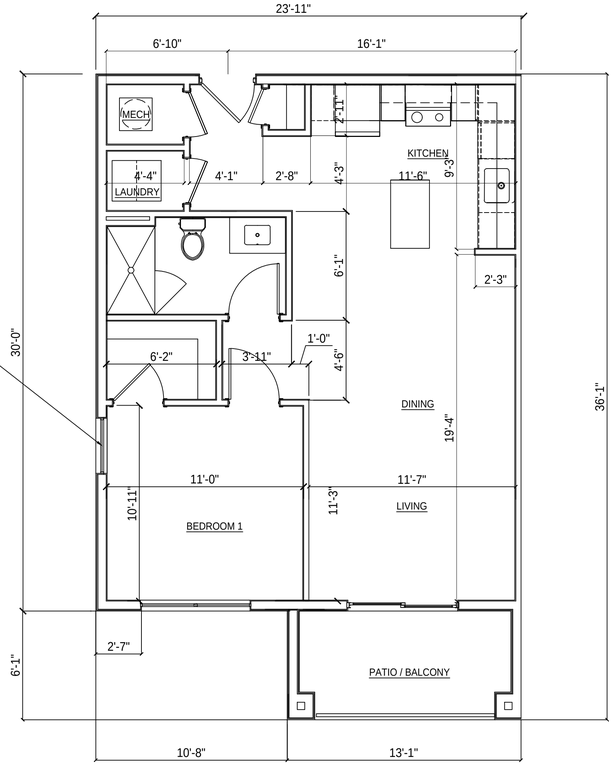
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

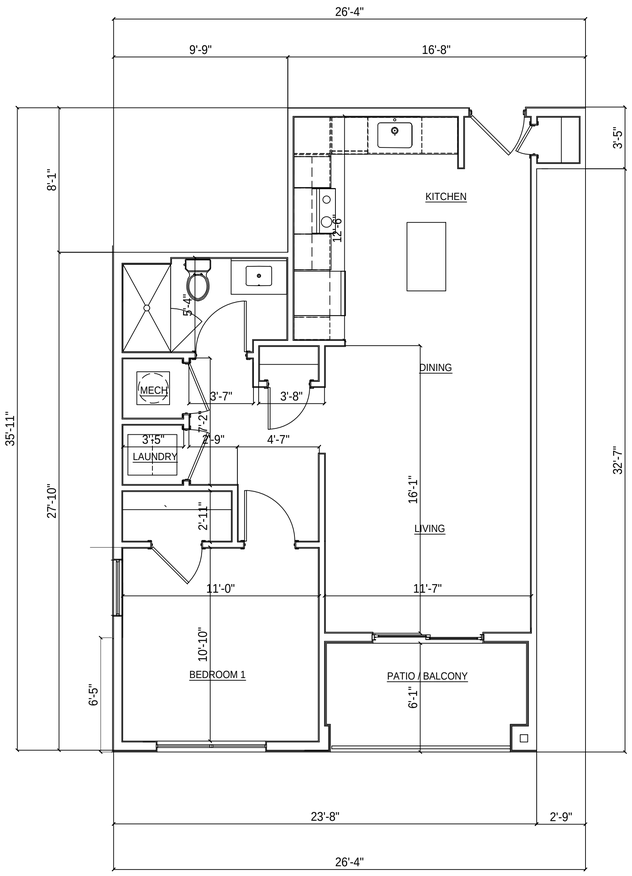
BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1'-0"

BUILDING TYPE III

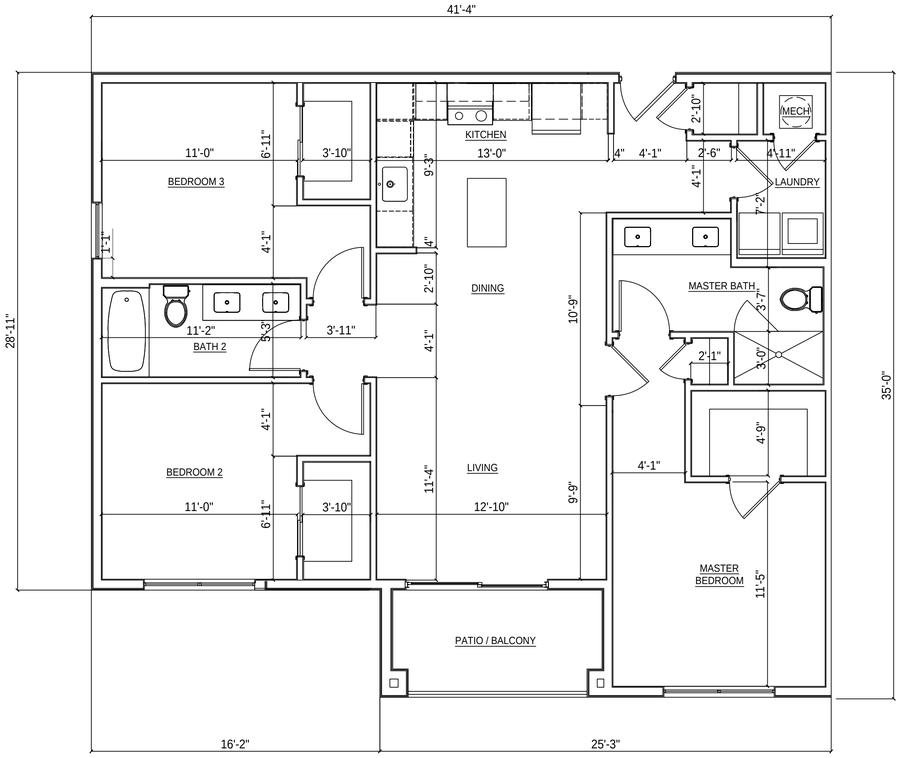
A-27



1 BEDROOM (UNIT B1)
1 BEDROOM (UNIT B1-W)
1/4" = 1'-0"



1 BEDROOM (UNIT B2)
1 BEDROOM (UNIT B2-W)
1/4" = 1'-0"



3 BEDROOM APARTMENT (UNIT D1)
1/4" = 1'-0"

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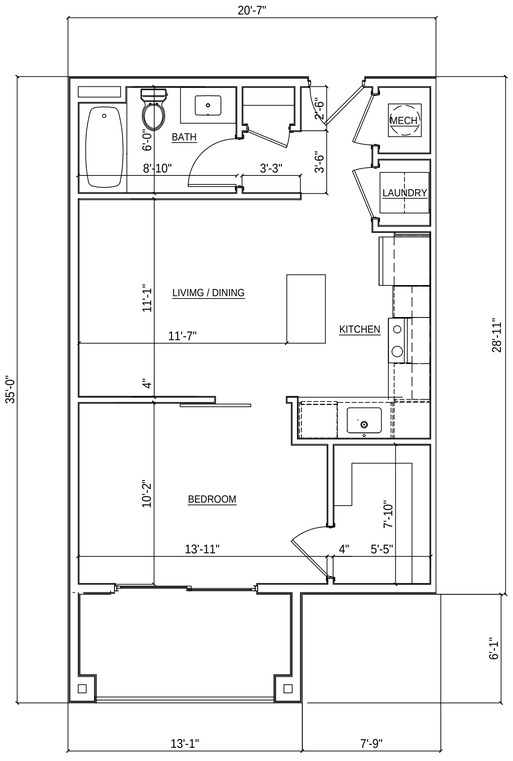
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

BY: RC
DATE: 12/26/2020
SCALE: 1/4" = 1' - 0"

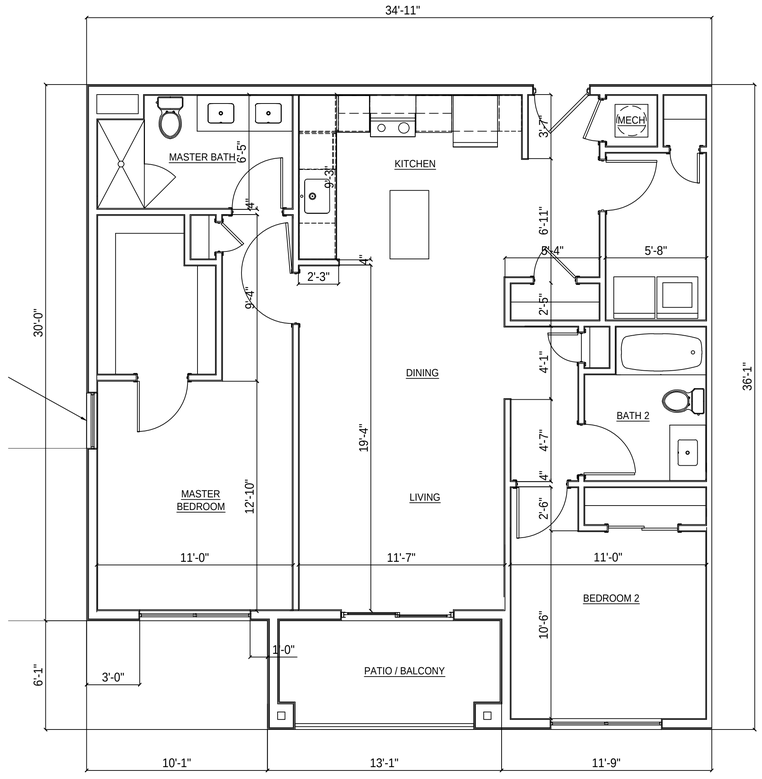
APARTMENT FLOOR PLANS

A-28



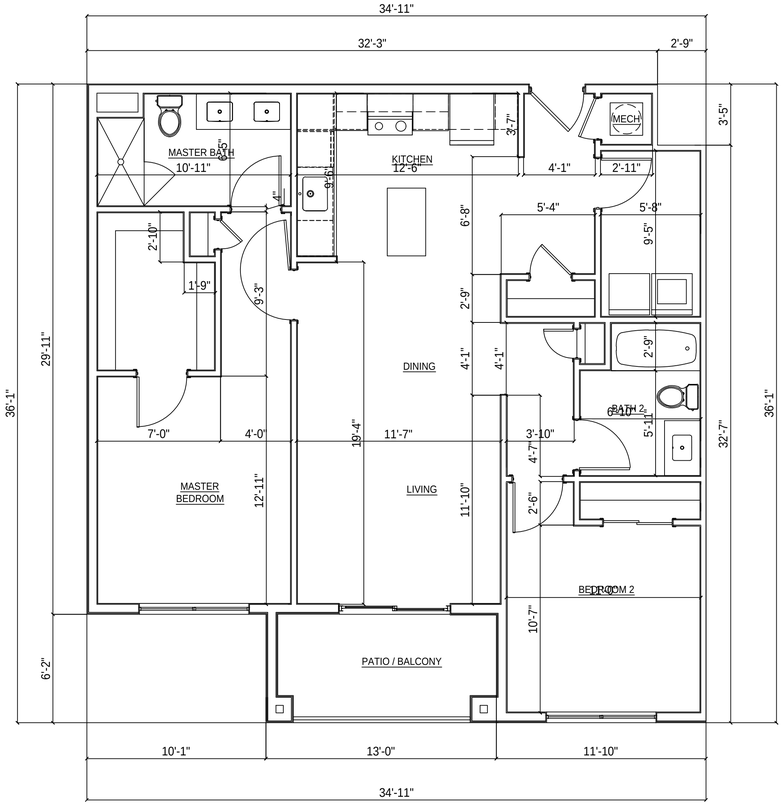
STUDIO (UNIT A1)

1/4" = 1'-0"



2 BEDROOM APARTMENT (UNIT C1)
2 BEDROOM APARTMENT (UNIT C1-W)

1/4" = 1'-0"



2 BEDROOM APARTMENT (UNIT C2)

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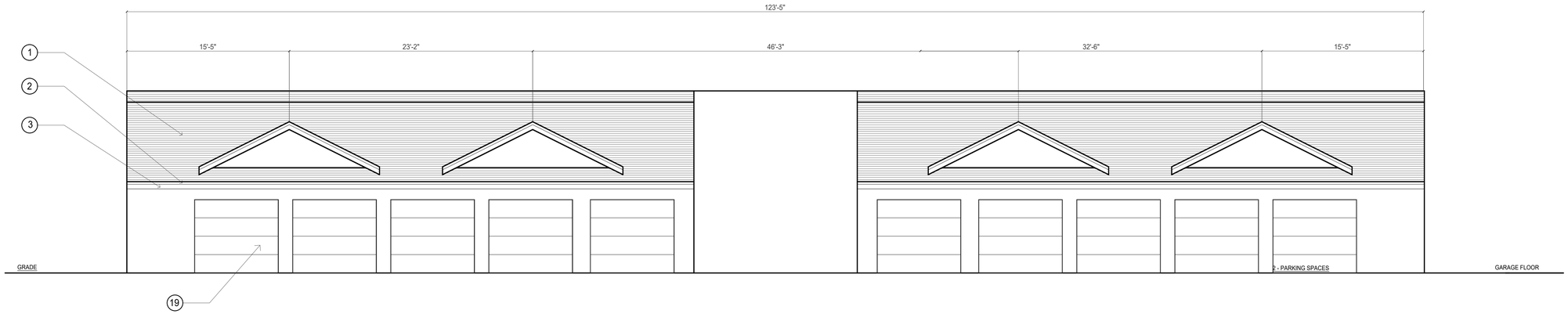
PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

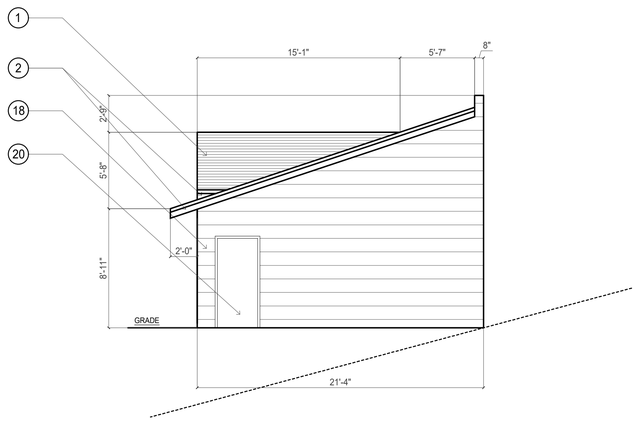
BY: RC
DATE: 12/26/2020
SCALE: 1/4" = 1' - 0"

APARTMENT FLOOR PLANS

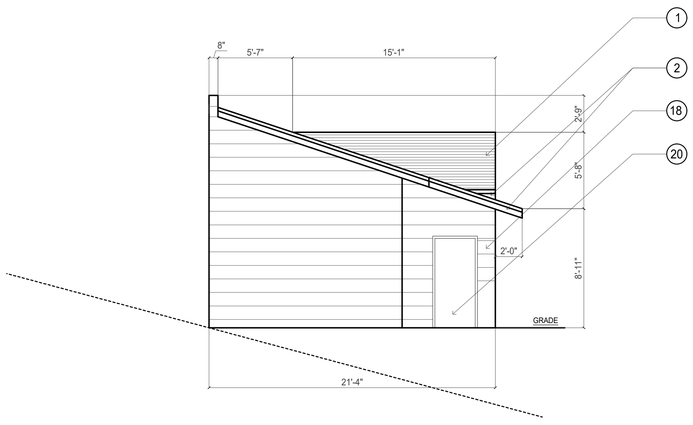
A-29



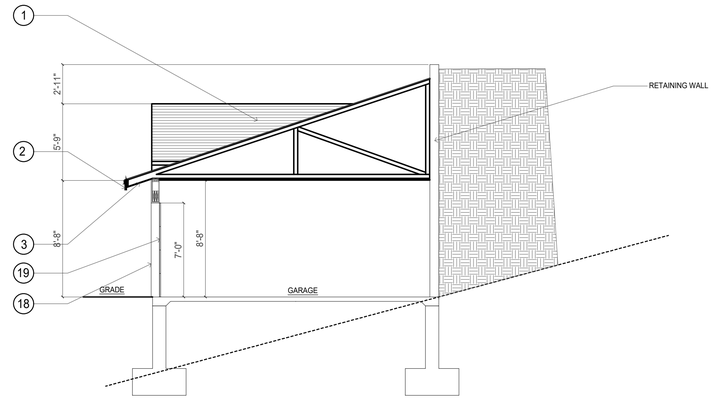
GARAGE - NORTH ELEVATION
3/16" = 1'-0"



GARAGE - EAST ELEVATION
3/16" = 1'-0"



GARAGE - WEST ELEVATION
3/16" = 1'-0"



GARAGE - SECTION
3/16" = 1'-0"

GARAGE ELEVATION FOR BUILDING TYPE I, II, III

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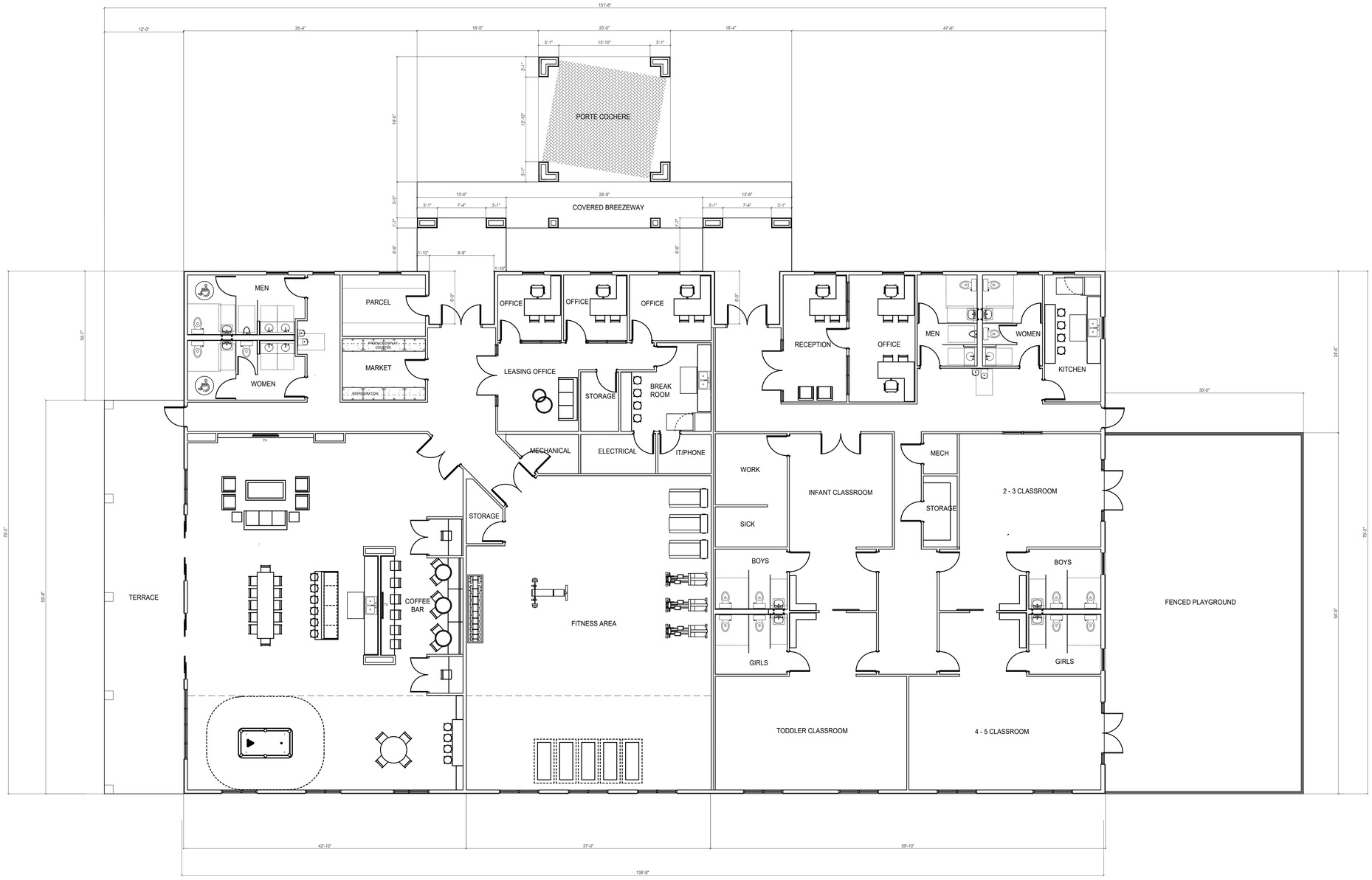
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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV:	DATE:	COMMENT
2	07/26/2021	
	BY:	RC
	DATE:	12/26/2020
	SCALE:	1/4" = 1'-0"

GARAGE ELEVATIONS

A-30



CLUBHOUSE **DAYCARE CENTER**

CLUBHOUSE & DAYCARE CENTER

1/8" = 1'-0"

CLUBHOUSE & DAYCARE				
LEVEL	AREA	COVERED ENTRANCE	TERRACE	TOTAL AREA
CLUBHOUSE	6,284	187	716	7187
DAYCARE	4,629	187	-	4816
BREEZEWAY	364	-	-	364
PORTE COCHERE	380	-	-	380
TOTAL FOR CLUBHOUSE	**11,657**	**374**	**716**	**12,747**

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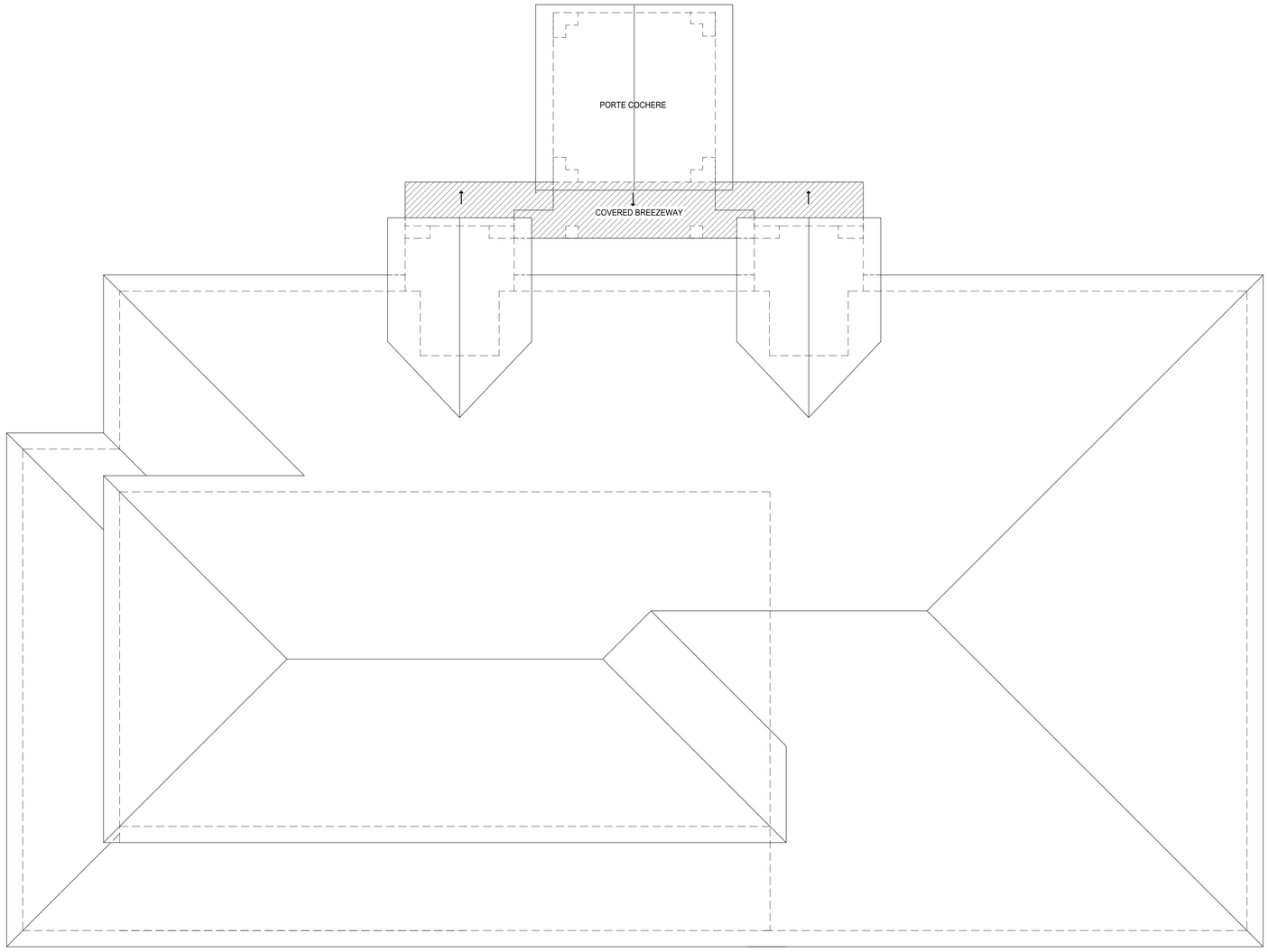
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PROJECT: GLENWOOD SPRINGS COLORADO

REV	Comment	DATE
BY: RC		
DATE: 12/26/2020		
SCALE: 1/8" = 1'-0"		

CLUBHOUSE FLOOR PLAN

A-31



CLUBHOUSE & DAYCARE CENTER - ROOF PLAN

1/8" = 1'-0"

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PROJECT:
GLENWOOD SPRINGS
COLORADO

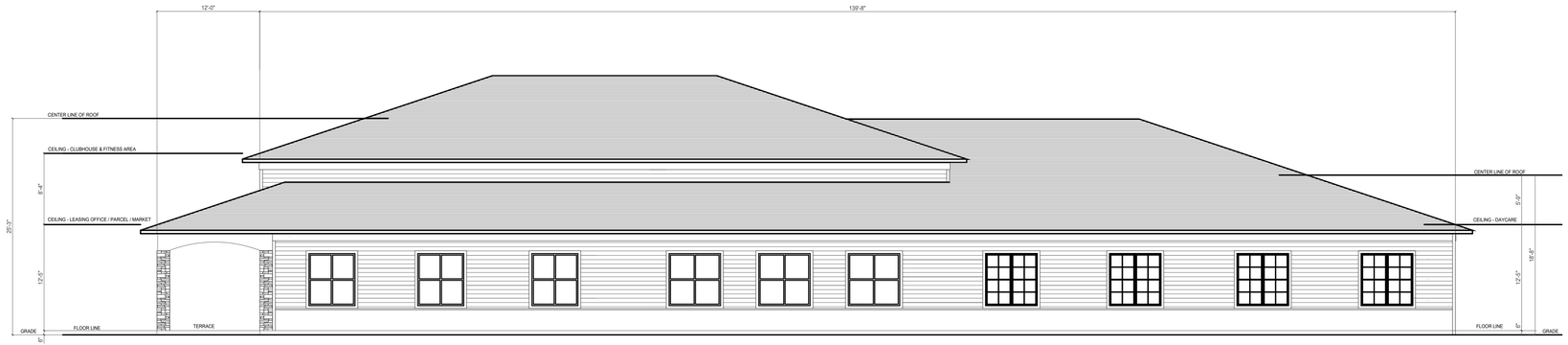
REV	COMMENT	DATE

BY: RC
DATE: 12/26/2020
SCALE: 1/8" = 1' - 0"

CLUBHOUSE
ROOF PLAN

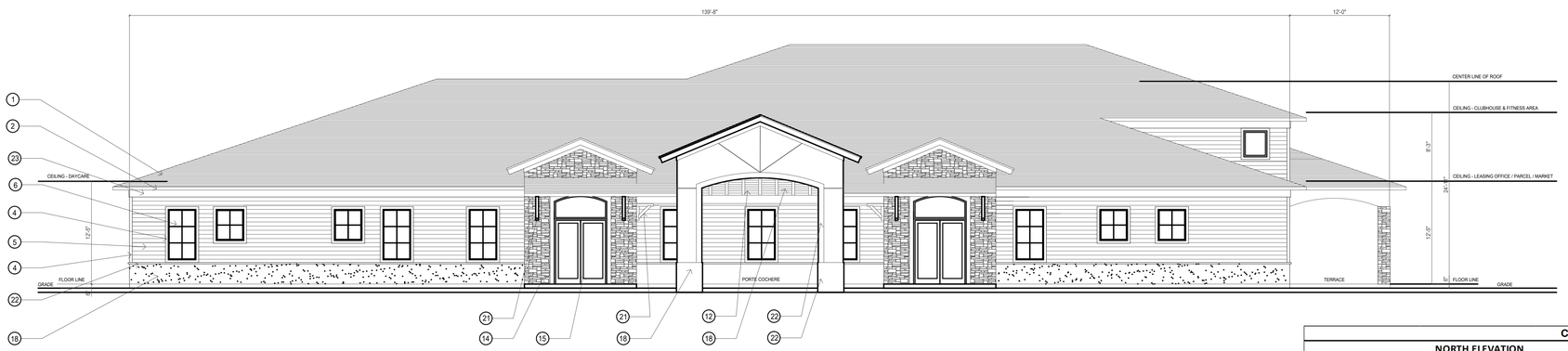
A-32

EXTERIOR FINISH SCHEDULE - CLUBHOUSE			
LABEL	ITEM	PRODUCT	COLOR
1	ROOFING	CERTAINTEED ASPHALT SHINGLES- LANDMARK PRO SOLARIS	CINDER BLACK
2	FASCIA	HARDIE BOARD - 5/4 BOARD 7.25" WIDE	ARTIC WHITE
3	SOFFIT	HARDIETRIM BOARD - 24" WIDE	ARTIC WHITE
4	TRIM	HARDIE TRIM BOARD - 6" WIDE	ARTIC WHITE
5	SIDING	HARDIE PLANK LAP SIDING - CEDAR MILL- 7" HIGH	BOOTHBAY BLUE
6	WINDOW	ALUMINUM - SINGLE HUNG	WHITE
7	STONE SILL	CERTAINTEED - STONE FAÇADE	APALACHIAN TWILIGHT
8	STONE CLADDING	CERTAINTEED - STONE FAÇADE	APALACHIAN TWILIGHT
9	STUCCO - BUILDINGS	HARDIE PANEL VERTICAL SIDING STUCCO	COBBLE STONE
10	BUIDING ENTRANCE CANOPY	HEAVY TIMER FRAMING	MINWAX JACOBEEAN #2750
11	ENTRANCE DOOR	ALUMINUM GLASS DOOR	WHITE
12	STONE COLUMN CAP	CERTAINTEED - STONE FAÇADE	APALACHIAN TWILIGHT
13	STUCCO	3 - COAT SMOOTH CEMENT STUCCO FINISH	COBBLE STONE
14	WALL BRACKET SUPPORT	HEABY TIMBER	MINWAX JACOBEEAN #2750
15	STUCCO MOLDING - CLUBHOUSE	STYROTRIM MOLDING 3.5" X 3.5"	COBBLE STONE
16	TRIM - CLUBHOUSE	HARDIE BOARD - 5/4 BOARD 9.25" WIDE	ARTIC WHITE
17	CARPORT AND BREZEWAY CEILING	T&G WOOD	BROWN TINT



CLUBHOUSE & DAYCARE - NORTH ELEVATION

1/8" = 1'-0"



CLUBHOUSE & DAYCARE - SOUTH ELEVATION

1/8" = 1'-0"

CLUBHOUSE & DAYCARE CENTER		
NORTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	2337.84	NA
NET STONE CLADDING	14	0.6%
NET SIDING	1113.7	47.6%
NET STUCCO FINISH	651.48	27.9%
NET GLAZING	558.66	23.9%

SOUTH ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	1683.19	NA
NET STONE CLADDING	263.22	15.6%
NET SIDING	751.57	44.7%
NET STUCCO FINISH	345.06	20.5%
NET GLAZING	323.34	19.2%

EAST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	2143.88	NA
NET STONE CLADDING	70	3.3%
NET SIDING	1,416.30	66.1%
NET STUCCO FINISH	321.65	15.0%
NET GLAZING	335.93	15.7%

WEST ELEVATION		
	SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	1014.67	NA
NET STONE CLADDING	32.95	3.2%
NET SIDING	600.13	59.1%
NET STUCCO FINISH	169.7	16.7%
NET GLAZING	211.89	20.9%

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV:	DATE:	BY:
COMMENT	12/28/2020	RC
	SCALE:	1/8" = 1'-0"

CLUBHOUSE ELEVATIONS

A – 33



CLUBHOUSE & DAYCARE - WEST ELEVATION

1/8" = 1'-0"



CLUBHOUSE & DAYCARE - EAST ELEVATION

1/8" = 1'-0"

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PROJECT:
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COLORADO

REV:	DATE	COMMENT
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DATE:	12/28/2020	
SCALE:	1/8" = 1'-0"	

CLUBHOUSE ELEVATIONS

A-34



BUILDING TYPE I - SOUTH FACADE ELEVATION

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PROJECT:
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COLORADO

REV	COMMENT	DATE
BY:		RC
DATE:		08/14/2021
SCALE:		NTS

BLDG TYPE I
ELEVATION

A-36



BUILDING TYPE II - SOUTH FACADE ELEVATION

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PROJECT:
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COLORADO

REV	COMMENT	DATE
BY:		RC
DATE:		08/14/2021
SCALE:		NTS

BLDG TYPE II
ELEVATION

A-39



BUILDING TYPE III - SOUTH FACADE ELEVATION

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PROJECT:
GLENWOOD SPRINGS
COLORADO

REV	COMMENT	DATE

BY: RC
DATE: 08/14/2021
SCALE: NTS

BLDG TYPE III
ELEVATION

A-42

CITY OF GLENWOOD SPRINGS

Engineering Department

Engineering Department **Jessica Bowser** **Asst. City Engineer**	**Date:** February 19, 2021 **To:** Community Development **Re:** Lot 11C-C

Please see the following engineering comments for the Lot 11C-C. Responses to these comments should be provided with the next submittal.

General comments:

1. These plans are insufficient and do not comply with CDPHS or the City of Glenwood springs Engineering Standards in many instances. See plan markup for more information.

Geotechnical Report Comments:

2. On page 20 of 30, under surface drainage the report states under bullet point 2 that landscaping of gravel adjacent to buildings should have a minimum slope of 6 inches in 5 feet (or 10%), but in bullet point 5, it states that landscaped areas within 10 feet of the foundation should be sloped at a minimum of 8%. This is inconsistent.
3. In general full-depth asphalt is not recommended in this area. As you can see from the meadows Development, it has not performed well over time and meeting subgrade requirements with the native soil is challenging. As these roadways are private and will remain private, the city does not have a requirement for the asphalt within the development, but will require any patches in City ROW to meet the requirements of the City's Engineering Standards.
    a. The report provides a recommendation for a full-depth asphalt section, but Figure 17 does not provide an exhibit of that section.

Drainage Report:

4. Include the original report referenced in the Appendix.
5. The original study was completed analyzing the development with Type C and D soils, while this analysis uses Type A soils. Please address this within the report.
6. The access road to the west is not fully considered in the analysis.

Traffic Report Comments:

7. A memo is not acceptable. A TIS will be required for this development. The original study was completed over 20 years ago and only provided a 10-year projection. Additionally, it was not stamped by a Colorado Licensed Engineer.

General Requirements:

At the time of Construction Document Submittal:

8. All final/stamped reports shall be submitted.

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(970) 384-6434
jessica.bowser@cogs.us

a. Landscaping plans should include utilities and proposed contours on a background layer for verification of clearances. Often these items are completed after the civil work is completed and they fill in drainage areas or plan directly on top of utilizes.

b. Landscape plans should also include sight triangles to verify sight distances.

9. Any proposed retaining walls greater than 4' from the bottom of footer to top of wall will require engineered design and structural calculations. The City may refer these documents out for review as necessary.
10. Stormwater facilities will require a maintenance agreement and plan.
11. Plan and Profiles should be supplied for the private utility mains.
12. Provide S.U.E. plan per Colorado Law CRS 9-1.5-102 requirements or provide a stamped letter determining why this is not a Subsurface Utility Engineering-Required Project.

Before Construction:

13. Any work within the Right of Way shall require appropriate ROW permitting though the City. With the ROW permit, the following documents should be submitted:
    a. Any SUE documents necessary.
    b. A plan of work to take place in the ROW, with patching shown that meets the requirements of the jurisdiction.
    c. Traffic Control Plans, as appropriate.
14. The site will require a Grading Permit. With the grading permit, the following documents should be submitted:
    d. Any SUE documents necessary.
    e. Final Stamped Drainage Report.
    f. Final Stamped Civil Documents.
    g. Final Geotechnical Report.
    h. Disturbance over one (1) acre will require a CDPHE Construction Stormwater Discharges Permit. As this development is over one acre, this permit is required, and any State approval should be submitted prior to the issuance of a Grading Permit.

Permit Closeout and Issuance of Certificate of Occupancy Requirements:

15. Before engineering completes a walk-though of the subject property
    a. Draft As-Built plans should be submitted.
    a. Applicable Stamped Certification Letters:
        i. Any engineered retaining walls. Letter certifying that the walls were constructed per plan or that address any changes to the design during construction, stamped by a Colorado Licensed Professional Engineer.
        i. Drainage improvements. Letter certifying that the drainage was constructed per plan or that addresses any site changed, stamped by a Colorado Licensed Professional Engineer.
    b. Test results for all improvements in the ROW shall be submitted. These should include all testing/backfill associated with any walls that support public facilities.
16. Engineering Approval to release the CO will not be provided until the final documents/files are supplied.
    b. Final As-builts with and Improvement Survey Plat (ISP) should be provided in an AutoCAD, PDF, and Mylar form.

c. Certification Letters can be supplied electronically (PDF).

d. All easement dedications shall be completed.

e. Maintenance Agreement for any water quality and detention facilities.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

WULFSOHN RD.

EXISTING CURB CUT TO BE REMOVED.
INSTALL 74–LF, 24–IN STANDARD
CURB & GUTTER.
EXISTING UTILITY STUBS TO REMAIN

Where will this drainage go?

Appears that the legend doesn't match the plans (typ all sheets)

Technically no grading throw R bldg (typ)

Is this curve practical w/ allowable pipe material deflection?

LEGEND

EXISTING	PROPOSED
STORM MANHOLE	WATER SHUTOFF VALVE
SANITARY CLEAN–OUT	WATER VALVE
SANITARY MANHOLE	TEE W/THRUST BLOCK
FIRE HYDRANT	BEND W/THRUST BLOCK
WATER VALVE	FIRE HYDRANT
WATER MANHOLE	INLET
GAS METER	CURB INLET
TELEPHONE PEDESTAL	STORM MANHOLE
LIGHT POLE	SANITARY MANHOLE
UTILITY POLE	SANITARY CLEANOUT
SIGN	CABLE MANHOLE
	ELECTRIC MANHOLE
	ELECTRIC TRANSFORMER

BOUNDARY
RIGHT–OF–WAY
EASEMENT
STRUCTURE
ASPHALT
GRAVEL
CONCRETE
RETAINING WALL
CENTERLINE ROAD
CURB AND GUTTER
FLOWLINE
PAVEMENT STRIPING
WATER MAIN
WATER SERVICE
SEWER MAIN
SEWER SERVICE
OVERHEAD ELECTRIC
ELECTRIC
CATV
TELEPHONE
GAS
STORM SEWER
CONTOUR 6158

NOTES

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PRELIMINARY NOT FOR CONSTRUCTION

COLORADO 811 CALL BEFORE YOU DIG
Utility Notification Center of Colorado

NO.	DATE	REVISION	BY
1	12/11/20	MAJOR SITE / ARCH. REVIEW	MGG
2	1/22/21	MAJOR SITE / ARCH. REVIEW #2	MGG

DRAWN BY: MGG
CHECKED BY: MGG
DATE: 1/21/2021
FILE:
SCALE 1" = 40'

HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 · FAX (970) 945-2555
WWW.HCENG.COM

BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

PRELIMINARY GRADING PLAN
SHEET 1

PROJECT NO.
2201044.00

GR1

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

PRELIMINARY NOT FOR CONSTRUCTION

Curve is fairly sharp.

Grading not practical thrugh parking

Intersections should be T, how will they be controlled

FLAT TOPS VIEW DR.

LEGEND

	EXISTING	PROPOSED
	STORM MANHOLE	WATER SHUTOFF VALVE
	SANITARY CLEAN–OUT	WATER VALVE
	SANITARY MANHOLE	TEE W/THRUST BLOCK
	FIRE HYDRANT	BEND W/THRUST BLOCK
	WATER VALVE	FIRE HYDRANT
	WATER MANHOLE	INLET
	GAS METER	CURB INLET
	TELEPHONE PEDESTAL	STORM MANHOLE
	LIGHT POLE	SANITARY MANHOLE
	UTILITY POLE	SANITARY CLEANOUT
	SIGN	CABLE MANHOLE
		ELECTRIC MANHOLE
		ELECTRIC TRANSFORMER
BOUNDARY		
RIGHT–OF–WAY		
EASEMENT		
STRUCTURE		
ASPHALT		
GRAVEL		
CONCRETE		
RETAINING WALL		
CENTERLINE ROAD		
CURB AND GUTTER		
FLOWLINE		
PAVEMENT STRIPING		
WATER MAIN	W	W
WATER SERVICE		WS
SEWER MAIN	SS	S
SEWER SERVICE	SS SS	SS SS
OVERHEAD ELECTRIC	OE	
ELECTRIC	E	E
CATV	CTV	C
TELEPHONE	T	T
GAS	G	G
STORM SEWER		
CONTOUR	6158	6158

NOTES

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SCALE 1" = 40'

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BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

PRELIMINARY GRADING PLAN

SHEET 2

PROJECT NO.
2201044.00

GR2

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

PRELIMINARY
NOT FOR
CONSTRUCTION

Gas + electric should have appropriate separation.

Storm/irrigation/sanitary considered the same + should maintain appropriate separation from potable water

WULFSOHN RD.

EXISTING CURB CUT TO BE REMOVED

CONNECT TO EXISTING WATERMAIN STUB PER CITY OF GLENWOOD SPRINGS STANDARDS

EXISTING 24" STORM PIPE "1B"

INSTALL MANHOLE ON EXISTING STORM SEWER

144.48

14.00'–12" HDPE @ 2.00%

229.99'–12" HDPE @ 0.75%

14.00'–12" HDPE @ 2.00%

229.98'–12" HDPE @ 0.75%

14.00'–12" HDPE @ 5.70%

134.80'–12" HDPE @ 11.27%

333.20'–12" HDPE @ 1.00%

8" D.I.P. WATER MAIN

399.94'–8" PVC @ 1.09%

227.80'–8" PVC @ 1.09%

SAN–MH7

SAN–MH6

63.43'–12" HDPE @ 2.24%

57.58

6" PVC SANITARY SERVICE, TYP.

24.00'–12" HDPE @ 1.00%

141.55'–12" HDPE @ 5.37%

6" D.I.P. WATER SERVICE, TYP.

8" D.I.P. WATER MAIN

52.92'–12" HDPE @ 4.13%

316.86'–8" PVC @ 1.63%

SAN–MH13

62.32'–12" HDPE @ 3.62%

135.95'–12" HDPE @ 9.03%

24.00'–12" HDPE

118.56'–12" HDPE @ 10.77%

EXISTING STORM SEWER TO BE ABANDONED/REMOVED

8" D.I.P. WATER MAIN

INSTALL MANHOLE ON EXISTING STORM SEWER

LEGEND

EXISTING	PROPOSED
STORM MANHOLE	WATER SHUTOFF VALVE
SANITARY CLEAN–OUT	WATER VALVE
SANITARY MANHOLE	TEE W/THRUST BLOCK
FIRE HYDRANT	BEND W/THRUST BLOCK
WATER VALVE	FIRE HYDRANT
WATER MANHOLE	INLET
GAS METER	CURB INLET
TELEPHONE PEDESTAL	STORM MANHOLE
LIGHT POLE	SANITARY MANHOLE
UTILITY POLE	SANITARY CLEANOUT
SIGN	CABLE MANHOLE
	ELECTRIC MANHOLE
	ELECTRIC TRANSFORMER

BOUNDARY
RIGHT–OF–WAY
EASEMENT
STRUCTURE
ASPHALT
GRAVEL
CONCRETE
RETAINING WALL
CENTERLINE ROAD
CURB AND GUTTER
FLOWLINE
PAVEMENT STRIPING
WATER MAIN
WATER SERVICE
SEWER MAIN
SEWER SERVICE
OVERHEAD ELECTRIC
ELECTRIC
CATV
TELEPHONE
GAS
STORM SEWER

NOTES

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BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

PRELIMINARY UTILITY PLAN
SHEET 1

PROJECT NO.
2201044.00

UT1

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

PRELIMINARY NOT FOR CONSTRUCTION

CONNECT TO WATERMAIN STUB PER CITY OF GLENWOOD SPRINGS STANDARDS

EXISTING 24" STORM PIPE "1C"

INSTALL MANHOLE ON EXISTING STORM SEWER

8.45'–12" HDPE @ 2.00%

157.17'–12" HDPE @ 1.00%

38.12'–12" HDPE @ 1.00%

8" D.I.P. WATER MAIN

258.95'–12" HDPE @ 1.73%

172.95'–8" PVC @ 1.09%

258.22'–8" PVC @ 1.09%

62.91'–12" HDPE @ 1.00%

SAN–MH5

SAN–MH4

SAN–MH3

42.51'–8" PVC @ 6.65%

SAN–MH8

Do these X's work in the inlet?

67.50'–8" PVC @ 1.00%

SAN–MH1

266.85'–8" PVC @ 6.50%

SAN–MH2

24.00'–12" HDPE @ –1.00%

194.55'–8" PVC @ 9.45%

CONNECT TO EXISTING SANITARY MANHOLE PER CITY OF GLENWOOD SPRINGS STANDARDS

FLAT TOPS VIEW DR.

60.25'–12" HDPE @ –8.63%

CONNECT TO EXISTING STORM INLET PER CITY OF GLENWOOD SPRINGS STANDARDS

38.36'–12" HDPE @ 1.00%

187.37'–8" PVC @ 7.70%

24.00'–12" HDPE @ –1.00%

60.44'–8" PVC @ 4.50%

SAN–MH9

216.16'–12" HDPE @ 8.53%

70.74'–12" HDPE @ 0.98%

Cleanout?

8" D.I.P. WATER MAIN

216.91'–12" HDPE @ 5.65%

258.60'–8" PVC @ 1.63%

214.10'–8" PVC @ 6.10%

SAN–MH12

SAN–MH11

SAN–MH10

6" PVC SANITARY SERVICE, TYP.

181.46'–12" HDPE @ 9.74%

24.00'–12" HDPE @ 1.00%

EXISTING STORM PIPE TO BE ABANDONED/REMOVED

6" D.I.P. WATER SERVICE, TYP.

8" D.I.P. WATER MAIN

224.00'–12" HDPE @ –4.25%

45.18'–12" HDPE @ 1.00%

200.51'–12" HDPE @ 9.10%

48.69'–12" HDPE @ 2.00%

28.24'–12" HDPE @ 2.00%

60.33'–12" HDPE @ 12.31%

93.82'–12" HDPE @ 14.88%

Will this slope be prone to sediment separation?

recommend Conc pan

INSTALL MANHOLE ON EXISTING STORM SEWER

EXISTING 12" STORM PIPE

EXISTING 12" STORM PIPE "1C"

Storm should maintain same separation requirements as Sanitary

Easements around hydrants & transformers

LEGEND

EXISTING	PROPOSED
STORM MANHOLE	WATER SHUTOFF VALVE
SANITARY CLEAN–OUT	WATER VALVE
SANITARY MANHOLE	TEE W/THRUST BLOCK
FIRE HYDRANT	BEND W/THRUST BLOCK
WATER VALVE	FIRE HYDRANT
WATER MANHOLE	INLET
GAS METER	CURB INLET
TELEPHONE PEDESTAL	STORM MANHOLE
LIGHT POLE	SANITARY MANHOLE
UTILITY POLE	SANITARY CLEANOUT
SIGN	CABLE MANHOLE
	ELECTRIC MANHOLE
	ELECTRIC TRANSFORMER
BOUNDARY	
RIGHT–OF–WAY	
EASEMENT	
STRUCTURE	
ASPHALT	
GRAVEL	
CONCRETE	
RETAINING WALL	
CENTERLINE ROAD	
CURB AND GUTTER	
FLOWLINE	
PAVEMENT STRIPING	
WATER MAIN	W
WATER SERVICE	WS
SEWER MAIN	S
SEWER SERVICE	SS
OVERHEAD ELECTRIC	OE
ELECTRIC	E
CATV	CTV
TELEPHONE	T
GAS	G
STORM SEWER	

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FILE: SCALE 1" = 40'

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BLD GROUP, LLC
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

PRELIMINARY UTILITY PLAN
SHEET 2

PROJECT NO.
2201044.00

UT2

From:	Dan Roper
To:	Trent Hyatt; Brian Smith
Cc:	Nathan Mohrmann; Lisa DiNardo; Adrian J. Brown
Subject:	Glenwood Meadows Development Review Comments
Date:	Friday, February 19, 2021 1:33:53 PM
Attachments:	L1.3 sheet.JPG L1.8 sheet.JPG image001.png

Trent,
Our comments for the Glenwood Meadows Development are below and the attached documents supports those. If you have any questions please let me know. Thanks.
Dan

Landscaping and Irrigation

~ Please provide an updated plant list with species, locations and quantities.
~ Please provide a detailed permanent irrigation plan.

Plant species not suited to our semi-arid climate or unsuitable selection.
~ Red Maple *Acer rubrum* - Colorado soils are alkaline (7.0 to 8.3) and the Red Maple prefers soils with a soil Ph of 7.4 and less. It also does not grow well in hot/dry locations.

~ Thinleaf Alder *Alnus tenuifolia* - prefers moist and wet sies. Ideal for wetland and riparian areas however, not suitable to upland landscapes.

~ Water Birch *Betula occidentalis* - Requires acidic and moist soils, not suitable for upland landscapes.

~ Many communities are not planting Ash trees (Fraxinus spp.) due to an exotic pest, the Emerald Ash Borer. This invasive insect has killed hundreds of millions of ash trees in North America and cost municipalities, property owners, nursery operators and forest products industries hundreds of millions of dollars. Let's substitute with a Linden, Expresso Kentucky Coffeetree, or an Elm variety or other suitable species.
~ Narrowleaf Cottonwood *Populus angustifolia* - Not appropriate for residential or commercial landscapes. This suckering Colorado native is found along streambanks and wet areas. It's profuse suckering (to hold riverbanks) causes havoc to water and sewer lines and building foundations.
~ Pagoda Dogwood *Cornus alternifolia* - prefers an acidic and organically rich with consistent soil moisture whose best performance occurs in cool summer climates. Substitute with Eastern Redbud *Cercis canadensis*, Wasatch maple *Acer grandidentatum,* 'Autumn Brilliance' Serviceberry *Amelanchier x grandiflora.*

Playground and Recreation Facilities:
With the close proximity of the Community Center we would recommend not building tennis courts.
We strongly recommend inclusion of appropriate outdoor spaces to support the residential needs of the proposed density level. Evaluation of formal complaints to the City demonstrates a necessity for a smaller park with a dog run area, playground, small turf and picnic area.
For any playground installations we would recommend separate playgrounds that are suited to specific age ranges. (Ages 2-5, 5-12)
Fenced dog runs with appropriate bear proof trash cans and dog waste bags.

Stairway Connection to Glenwood Meadows:
Due to the north facing aspect of the stairs they should be heated for safe winter maintenance.

Trails & Open Space:

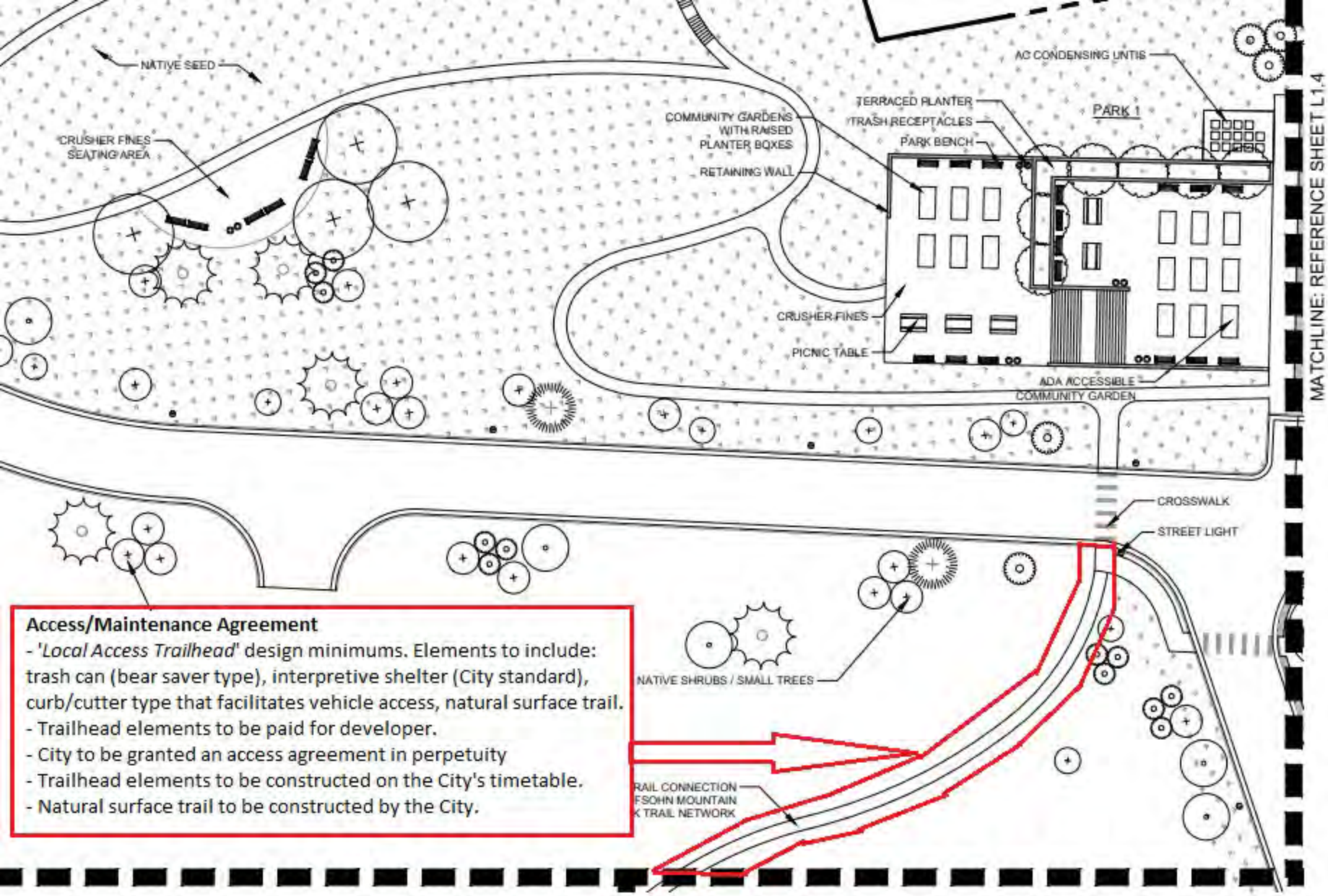
The attached documents reference the Trials & Open Space aspect of the plans.

Access/Maintenance Agreement.

"Local Access Trailhead" design minimums. Elements to include" trash can (bear saver type), interpretive shelter (City standard), cur/gutters that facilitates vehicle access, natural surface trail.
Trailhead elements to be paid for by the developer
City to be granted an access agreement in perpetuity
Trailhead elements to be constructed on the City's timetable.
Natural surface trail to be constructed by the City.

Daniel Roper
Parks Superintendent
Office: 970-384-6366
Cell: 970-471-6394

CITY OF GLENWOOD SPRINGS
PARKS AND RECREATION



Access/Maintenance Agreement

- '*Local Access Trailhead*' design minimums. Elements to include: trash can (bear saver type), interpretive shelter (City standard), curb/cutter type that facilitates vehicle access, natural surface trail.
- Trailhead elements to be paid for developer.
- City to be granted an access agreement in perpetuity
- Trailhead elements to be constructed on the City's timetable.
- Natural surface trail to be constructed by the City.

GLENWOOD MEADOWS MULTI FAMILY HO

LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER:
DATE: 2020.12.28

REVISIONS:
SUBMITTAL #2: 2021.01.22

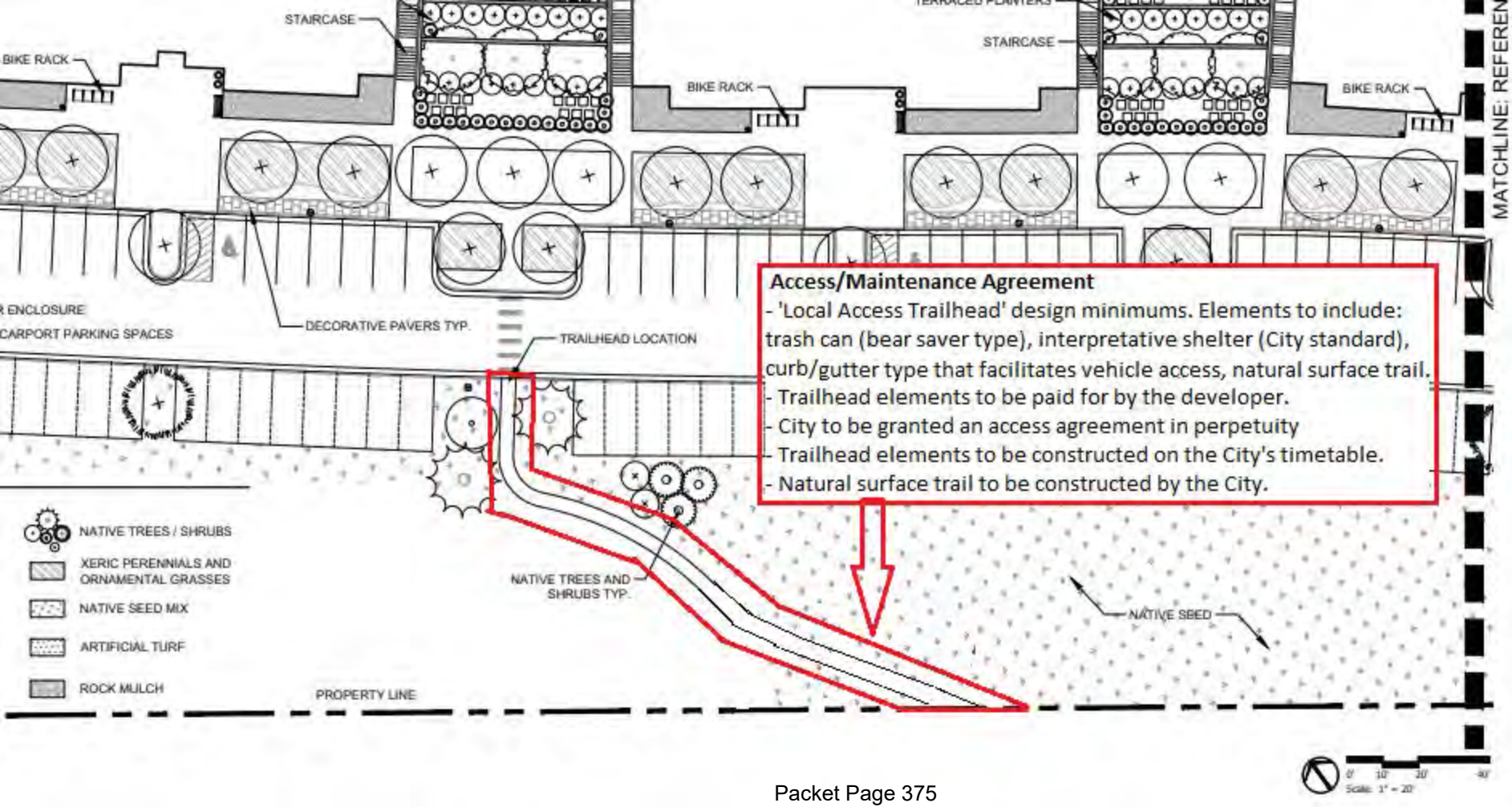
JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

SHEET NUMBER:
L1.3

SHEET OF



GLENWOOD MEADOWS
LOT 11C-B & LOT 11C-C
GLENWOOD SPRINGS, COLORADO

PROJECT NUMBER: DATE: 2020.12.28

REVISIONS:
SUBMITTAL #2: 2021.01.22

JOB DESCRIPTION:
MAJOR SITE / ARCHITECTURE REVIEW

SHEET TITLE:
SITE PLAN ENLARGEMENT

SCALE:

SHEET NUMBER:
L1.8

SHEET OF

Matthew Langhorst DPW
(970) 384-6438 (o)

CITY OF GLENWOOD SPRINGS PUBLIC WORKS

101 West 8th Street
Glenwood Springs, CO 81601

Planning Item:	**60-20 BLD Major Site/Architectural Plan Review and Minor Subdivision**
Applicant:	**BLD Group**
Owner:	**Glenwood Meadows, LLC**
Location:	**Lot 11C-B and 11 C-C, Glenwood Meadows Sub. No. 6**
Parcel:	**2185-081-41-002 and 2185-081-41-003**
Date of Comments:	**02/19/2021**

The following are W/WW Department comments based on the application package dated 1-21-2021.

W/WW Department Comments

- All water and wastewater utilities proposed for this project outside of public ROWs will be considered private and not maintained by the City. Water valves, manhole connections and sewer wyes will be considered private/public delineation points.
- All sanitary sewer, sewer laterals, water mains and water services shall have a tracer wire installed.
- The water, sewer and electric details need to follow city standards details at the City of Glenwood Springs Engineering Department website, Engineering Standards.
- There is no irrigation detail. The Glenwood Meadows area is irrigated by a raw water system. Please show how this development proposes to incorporate that system for its use. There is a raw water main stub out located next to the proposed water and sewer main connection points on flat tops drive. There is also smaller service location on Wulfsohn Rd.
- All Fire hydrants must have a 15' easement centered on the hydrant. Leads, valves and access to the hydrant will also need to have an easement for access and maintenance. The City will own and maintain all fire hydrants, leads and valves. The City will require access easements to each 15' hydrant easement if they are not adjacent to a public ROW.
- All services that are to be used for combined Fire/Domestic water must be designed and constructed to NFPA24 requirements and will be considered private. Needs to be shown in detail…thrust block calculations, restrains.
- Provide riser room details for the fire/domestic water services and how the proposed buildings are intended to be metered.
- All wet utilities will require restrained joints/bells within the entire project area.
- Water and Sanitary/Storm Sewer Crossings will need to be shown in future plans in a profile plan. All water and sewer crossings must have 10' horizontal separation or 18" vertical. If these distances can't be maintained encasement or sleeving will be required.

- Water and storm crossings may require insulation if proper bury depth can't be maintained.

W/WW Department Contact Information:

- Mike Hoffman – 384-6343 (W/WW Information)
- Utility Billing – 384-6400 (Account setup; Water Meter Purchase)
- Community Development Department – 384-6411 (Improvements Fees)

The following are Electric Department comments based on the application package dated 1-21-2021.

Electric Department Comments

- Owner will be responsible for cost associated with the line extension and or relocation through the ROW/property and all infrastructure for the new development.
- Owner will be responsible for all work involving new construction, final service layout and site planning will need to be coordinated with the City of Glenwood Springs Electric Department.
- A new switch gear will need to be set at the new intersection with Wulfsohn Road to supply electric back to the development. A connection from the switch gear vault at the lofts will need to be made back to the electric vault on Flat Top Roads, this line could be run with the 24" storm sewer that is being proposed to tie into Lofts system. Internal transformer locations and line looping to be coordinate with GWSE.
- Owners GC/excavation company will be responsible for all trenching, including the line extension trenches to new transformer locations, electric primary and secondary conduit installation, electric pull vaults and transformer vaults.
- The Costing Proposal will be paid in full prior to any work commencing. Any additions to the proposal will be due at time of completion of work or any saving will be refunded at time of completion of work.
- Contractor to install a 2" electrical conduit adjacent to the main electrical run to be slept up at pedestal locations for Broadband installation. Fiber to be brought to builds at service locations shown on plans.
- Developer to supply a Load Calculation form to the City of Glenwood Springs Electric Department for review and planning.
- Any work done outside of the owners needs for this property will be the responsibility of the City of Glenwood Springs Electric Department. City will coordinate with the GC with any city needs.
- Any street lightings outside of a Public ROW will need to be a part of the HOA electric system and power paid for be the HOA.
- Xcel is not the power or gas supplier in this location per the Utility Report, City of Glenwood Springs Electric and Black Hills Energy are the correct contacts.

- The Electric design, details and clearances need to follow City Engineering Standards details located at the City of Glenwood Springs Engineering Department website, Engineering Standards.
- If the developer has any information on the additional 175 units noted on within the reports, it would be advisable to plan for electric layouts/conduits for the possible expansion at this time.

Electric Department Contact Information:

- Doug Hazzard – 384-6353 (Electric Information)
- Utility Billing – 384-6400 (Account setup; Water Meter Purchase)

The following are Public Works Department comments based on the application package dated 1-25-2021.

PW Department Comments

- The storm sewer system within the Glenwood Meadows development is owned and operated by the Metro District. The district should be a review agency for these plan sets.
- The City's broadband department can add another communications option to the residents of this development if the developer would like to work with CBN to plan for high-speed fiber connections to the buildings.
- The City would like to have a discussion with the developer on Public ROWs and what the developer's intentions are for dedications. The City can see a small benefit to taking ROW along the main Flat Top View Drive roadway alignment from the connection with existing Flat Top View Drive all the way back to its new connection at Wulfsohn Road. The City would not maintain the parking areas along this roadway nor shovel sidewalks along this segment of road. The City would be looking at ROW that encompasses the area from Top back of roadway curb to top back of roadway curb, not parking area curb. It would be desirable to have snow storage locations at either end of the building areas and possibly down the center of the roadway for easy of plowing and snow removal.
- The City would suggest some form of velocity reducing manhole at the debris pond storm sewer connection.
- After review of the soils report it seems that there are risks associated with the site that the report did not review in detail due to those risks not being part of the consultant's scope of services. See comments in the inherent risks section that are labelled "outside scope of services" and owner is completely responsible for taking all risks associated with any future potential for instability at the site or in the site vicinity area type comments.
- No topographic slopes were labeled thus these comments are generic. Geotech report calls for no structures within 25' of a crest of a slope that is 2.5:1. The lower row of structures appears to be within 25' of a crest of a slope, but the slopes below are not labeled for verification of the report note.
- The slopes to the south of the development that lead to the proposed roadway appear to be quite steep and will be an erosion and revegeation issue for the development. These

roadways lead directly to storm water intake structures and piping that could be clogged with excess material flowing them, thus causing downstream issues.

- The Geotech report notes that the soils are highly susceptible to water erosion and moderately susceptible to wind erosion. During construction dust mitigation will be a significant issue with the site as the City has learned with other projects in this area. Excessive dust from the working face will not be acceptable and must be properly mitigated.
- The Geotech report notes that plantings around the structures should eb either Xeriscaping, landscaping gravel or plants with low moisture requirements.
- The Geotech report notes that slopes away from the buildings should be a minimum of 6' in 5' for landscaping areas or 2% for hardscape areas. This cannot be verified on the current drawing set, engineer of record to confirm slopes away from structures.
- Contractor should confirm the trenching backfill material that is acceptable in this area, previous potions of the development have utilized gravel materials, which has caused underground water to use the trenches as river passages and flood manhole locations during certain times of the year.
- Full depth pavement will not be accepted in any areas that are deemed public ROW and possibly maintained by the City. Full depth asphalt is not recommended, it has shown not to be successful in other areas of the Glenwood Meadows Development.
- 4.5 " of asphalt over 6" of ABC for heavy traffic areas is not recommended, it has sown not to be successful in other areas of the Glenwood Meadows Development. Thicker asphalt and base course sections have shown promise in stability and longevity.
- The Geotech report notes that asphalt overlays should be completed every 5-6 years on asphalt sections of pavement. What does the Geotech considered an appropriate overlay material and thickness being that overlay is a generic term.

Public Works Contact Information:

- Matthew Langhorst – 384-6438 (PW Director)

Development Review Comments

Linda DuPriest, AICP

02/21/2021

60-20 BLD; Glenwood Meadows

My review of this application concerns access to transit, accessible pedestrian routes and sidewalk requirements, and bicycling.

Access to transit – With the project proposing hundreds of multifamily units situated along a primary transit route for not just Glenwood Springs but for our entire Colorado and Roaring Fork valleys, this development has an opportunity to do it right by making it easy for residents to get to bus stops, not just for able bodied folks but for mobility impaired, too. Plus, with the potential housing located close to shopping at the Meadows plus Downtown, this development needs a roadway or a street, with direct sidewalks from one end to the other (not the proposed meandering walkways among the buildings) and ultimately some bike route signage and markings.

RFTA and Ride Glenwood stops at west end of Lofts development – This stop serves the RFTA Valley Local, VelociRFTA BRT and Ride Glenwood, yet there is no reasonably direct ADA compliant pedestrian route from the majority of the proposed housing development. There are no sidewalks along Wulfsohn included, no sidewalk along the access road at the far west end of the site and no hard-surface sidewalk or path from either of the two levels of buildings. The switchback soft surface path through the small park at the west end is the only pedestrian facility from this entire development that does not include multiple levels of stairs, and as is it soft surface does not comply with ADA.

The middle and east section are similarly cut off from access to the Bus Stop, unless people walked all the way past the Glenwood Greens housing development to East Meadows Drive, then doubled back in front of the Lofts to the bus stop.

While this is a very hilly site, it seems that the designers could come up with better access to the key transit stops already provided by the Meadows, to help Glenwood's goals toward reducing traffic and maintaining quality of life.

Comments:

- Require sidewalk along Wulfsohn from the west end of the property to existing sidewalk at Meadows/Lofts (access to transit stop)
- Require sidewalk along access road at west end of the site
- Provide direct sidewalk along the entire length of both sections if roadways are not to be built; in other words, make it possible to walk the length of this property without having to meander behind all the head-in parking bays
- Provide ADA compliant elevators within this property to get mobility impaired residents from up the hills down to Wulfsohn Rd and the transit stops.

July 2, 2021

Trent L. Hyatt
Senior Planner
City of Glenwood Springs
101 W. Eighth Street
Glenwood Springs, CO 81601
trent.hyatt@cogs.us

RE: Glenwood Meadows Multifamily Housing, Response to City Comments

Trent,

The following letter is submitted on behalf of the applicant, BLD Group, in response comments received from City staff and referral departments related to the current Major Architectural Review application as submitted to the City of Glenwood Springs Community Development Department. Comments and the applicant's responses are compiled by department, presented in the order received, and each comment received is addressed herein. We believe that these items have been adequately addressed with this additional information.

We have also refined an important component of the programming related to the clubhouse operations and access to and from the child care operation (on-site) and the RFTA transit station on Wulfsohn Road, west of the project. The child care operation will be available for the general public to access and reserve available classroom spaces. A shuttle, operated by the owner, will circulate from the clubhouse to the Wulfsohn Road RFTA park and ride, providing convenient access between the project to the public transit system.

Community Development, General

1. Additional information regarding anticipated traffic impacts and necessary mitigation is needed as outlined in various comments from other departments.

   Response: *Please review the letter from Balcomb & Green to Trent Hyatt dated January 8, 2021, which discussed that the ADA and associated documents accounted for all traffic-related impacts at the time of annexation, and that only a traffic impact statement is necessary. Nonetheless, recently Applicant voluntarily agreed to contribute a traffic impact fee to further offset any impacts of Applicant's development. This fee was memorialized in the May 2021 Memorandum of Understanding with the City.*

2. The City may wish to accept the Flat Tops View Drive extension into our road system. Further conversations with Public Works are necessary to determine feasibility. Doing so may encourage compliance with the "hierarchy of streets" intended by Section V.F of the *Glenwood Meadows Zoning and Development Plan* (GMZDP). Currently, it seems that only one access type is provided which serves mainly as a parking lot for the specific development. Please provide a typical cross section for proposed roads/driveways.

***Response**: At this time the applicant's intent, as coordinated with City staff, is to maintain the internal driveway network in private ownership and provide easements as necessary for access to publicly-owner infrastructure. Should the Applicant and City agree to a dedication of public right-of-way, a variance for specific dimensional standards may be necessary given the current roadway configuration within the property.*

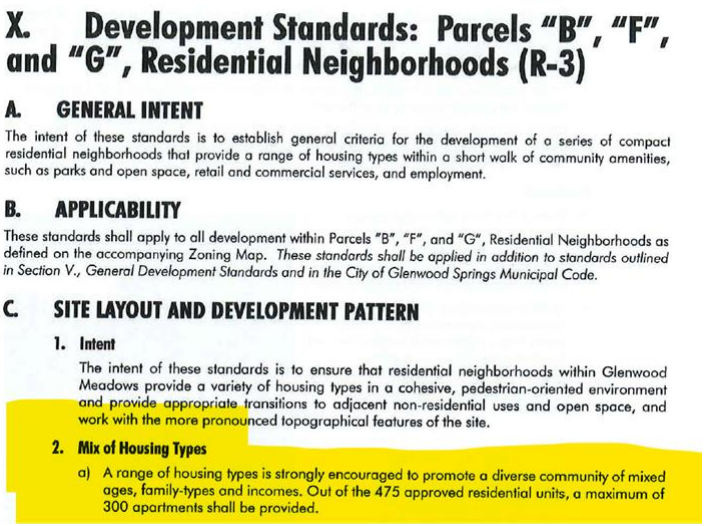
3. Sidewalks are required along internal and external project streets (i.e. Flat Tops View Drive extension and Wulfsohn Road.) Please clarify.

   ***Response:** Sidewalks have been added along Flat Tops View Drive extension and Wulfsohn Road. See revised sheet set.*

4. Please clarify if the project is to be completed in multiple phases and provide related information, if applicable.

   ***Response**: The applicant's intent is to complete construction of the proposed improvements in a single phase, with individual buildings or groups of buildings occupied as they are completed.*

5. The GMZDP outlines the following regarding multiple housing types.



X. Development Standards: Parcels "B", "F", and "G", Residential Neighborhoods (R-3)

A. GENERAL INTENT

The intent of these standards is to establish general criteria for the development of a series of compact residential neighborhoods that provide a range of housing types within a short walk of community amenities, such as parks and open space, retail and commercial services, and employment.

B. APPLICABILITY

These standards shall apply to all development within Parcels "B", "F", and "G", Residential Neighborhoods as defined on the accompanying Zoning Map. *These standards shall be applied in addition to standards outlined in Section V., General Development Standards and in the City of Glenwood Springs Municipal Code.*

C. SITE LAYOUT AND DEVELOPMENT PATTERN

1. Intent

The intent of these standards is to ensure that residential neighborhoods within Glenwood Meadows provide a variety of housing types in a cohesive, pedestrian-oriented environment and provide appropriate transitions to adjacent non-residential uses and open space, and work with the more pronounced topographical features of the site.

2. Mix of Housing Types

a) A range of housing types is strongly encouraged to promote a diverse community of mixed ages, family-types and incomes. Out of the 475 approved residential units, a maximum of 300 apartments shall be provided.

***Response:** Applicant understands the ADA encourages a diversity of housing types within the Meadows Development. The ADA also expressly allows up to 300 commercial apartment units. Diversity in housing types proposed for this specific application includes a range of unit types from studio to 3 bedrooms. In addition, three different building types are proposed in this application. Diversity in income levels is provided in aggregate between the Red Mountain Lofts (market rate) and the Glenwood Green Apartments (40/60/80% AMI units). The approvals provide for another 115 units to be developed on the fathering parcel(s); these units are envisioned as free market units of a zero-lot line or townhome format, further increasing the diversity of housing in the Meadows.*

Community Development, Cover Sheet

6. Please call out the project basis of bearings & benchmarks.

   Response: *ALTA/ACSM Land Title Survey contains this information and has been added to the submittal. See revised sheet set.*

7. Please add a FEMA floodplain statement outlining the applicable community map number and date and the designated flood zone.

   Response: *ALTA/ACSM Land Title Survey contains this information and has been added to the submittal. The applicable FEMA FIRM maps are: 0802051432B, effective on 01/03/1986 (Zone D); and 0802051431B, effective on 01/03/1986 (Zone D). See revised sheet set.*

8. Please add a geologic hazards disclosure similar to the following: "This property is subject to geologic hazards per the adopted mapping by the City of Glenwood Springs. Hazards to note are _____. A final Geologic Hazard Report will be submitted upon application of a building permit.

   Response: *Off-site geological hazards have been mitigated in accordance with the Glenwood Meadows Debris Flow Mitigation Plan. As an entitled property within the Glenwood Meadows Metropolitan District(s), the subject parcel will participate in the maintenance of the debris flow and drainage structures designed and built to mitigate the off-site geologic hazards. The debris mitigation structure was built by the Glenwood Meadows Metropolitan Districts on land donated to the City and Glenwood Meadows Metropolitan District No. 1. The metro district is responsible for maintenance. Expenses are paid by all properties protected by the structure. This assessment also applies to certain City of Glenwood Springs and Roaring Fork Transportation District sites. The subject parcel is in Glenwood Meadows Metropolitan District No. 2 and subject to this assessment. On site geological conditions are identified, with preliminary recommendations, in the current preliminary geotechnical report. These recommendations will be finalized for permit submittal.*

9. Please add a note outlining proposed public facilities or contributions related to the development.

   Response: Please review Applicant's prior letters to staff detailing the extensive public contributions related to the Glenwood Meadows development at the time of annexation, including off site traffic improvements, and extensive public dedications of open space. The ADA was clear that no further exactions were allowed as a result of future development applications. Nonetheless, Applicant collaborated with the City to voluntarily enter into the May 2021 MOU, which contributes additional funds toward water and sewer infrastructure, in addition to traffic impact fees.

10. Please project a project summary table similar to that depicted below. Please call out required (as opposed to existing)/provided numbers, where applicable. It does not appear that 40% of the site is proposed as open space. Please clarify. Please call out the area/percentage (which is a portion of the overall open

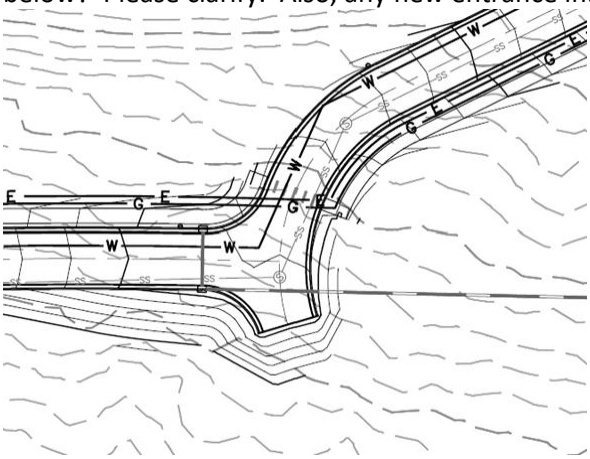
space) proposed as common open space per Section V.J.4.a of the *Glenwood Meadows Zoning and Development Plan*. Sheet L1.1 provides details relative to site amenities. Please expand this information to include a list of amenities and the areas associated with each.

Project Description					
Lot Size Information	Acres	Square feet	**Lot Coverage**	Existing (Sq Ft & %)	Proposed (Sq. Ft. & %)
Limits of Disturbance	Existing (Sq & %)	Proposed (Sq. Ft. & %)	**Average Slope within Limits of Disturbance**	Percentage %	
Off-street Parking Spaces	Existing # Vehicle Spaces	Proposed # Vehicle Spaces	**Bicycle Parking**	Existing # Spaces	Proposed # Spaces
Residential Units	# Existing Units	# Proposed Units	**Non-residential Uses**	Type of Use(s)	Gross Floor Area (Sq. Ft.)
Open Space	Existing (Sq ft & %)	Proposed (Sq Ft & %)	**Total Landscaped area**	Existing (Sq Ft & %)	Proposed (Sq Ft & %)
Building Height	Existing	Proposed	**Total Impervious Area**	Existing (Sq Ft & %)	Proposed (Sq Ft & %)
Snow Storage	Required (sq ft)	Proposed (sq ft)	**Other**		

Response: *Please see project summary table provided in the revised planset.*

Community Development, Site Plan (Sheet L1.0)

11. Can a smaller, gentler curve be provided along the extension of Flat Tops View Drive depicted below? Please clarify. Also, any new entrance into the adjacent property shall occur at a 90 degree angle.



Response: The layout of the extension of Flat Tops View has been modified to eliminate the three-way intersection and to accommodate the future access to Lot 3 via a perpendicular intersection. See plan set for modified alignment and grading.

12. Sidewalks are required along internal and external project streets (i.e. Flat Tops View Drive extension and Wulfsohn Road.) Please clarify.

Response: *Sidewalks have been added along Flat Tops View Drive extension and Wulfsohn Road. See revised sheet set.*

13. Section X.C.3 of the GMZDP outlines the need for blocks within the residential parcels having a maximum length of 500 feet or 800 feet with midblock pedestrian crossings. Please clarify.

    Response: *The arrangement of the site plan is responsive to the intent of section X.C, with the neighborhood arranged "in a pattern of blocks and interconnecting streets…defined by buildings, streetscape, sidewalks and trails." The site plan provides for clear pedestrian circulation along streets, between buildings, and to trails and adjacent pedestrian network. The site plan is also directly responsive to the challenges presented by the existing topography of the site.*

14. Section X.C.7.a of the GMZDP states that each residential parcel shall be considered its own neighborhood that includes a mix of housing types. Please clarify.

    Response: *This project is located on a portion of what was originally Parcel K, which was 17 acres, and also includes the Glenwood Green Apartments. The ADA also expressly permits up to 300 commercial apartment units on this parcel. The project encompasses a portion of one development parcel. Diversity in housing types proposed for this application includes a range of unit types from studio to 3 bedrooms. In addition, three different building types are proposed in this application. Diversity in income levels is provided in aggregate between the Red Mountain Lofts (market rate) and the Glenwood Green Apartments (40/60/80% AMI units). The approvals provide for another 115 units to be developed on the fathering parcel(s); these units are envisioned as free market units of a zero-lot line or townhome format, further increasing the diversity of housing in the Meadows.*

15. Section X.D.2.b of the GMZDP requires that a maximum of 50 percent of the street frontage is occupied by parking. Please clarify.

    Response: *The internal vehicle network will not be dedicated road right-of-way, but will be private driveways. Because of the topographic constraints of the site, there are limited areas where parking can be located. In order for the plans to comply with the minimum parking requirements, parking must occupy the driveway frontage in the level areas between the buildings. The site plan locates parking away from Wulfsohn Road, the nearest public right-of-way, and the topography of the site further conceals parking from view from adjacent public streets.*

Community Development, Architectural Elevations

16. It is difficult to gain an understanding of the mass, bulk, and scale of the total project via the drawings submitted. Please provide colored 3D perspective drawings of the proposal from all cardinal directions. Additionally, please provide typical cross sections for the entirety of the project.

    Response: *3D perspective drawings are not required for a major architectural site plan review and are not included in the formal submittal package. The project team is developing perspective drawings to be included*

in the Planning Commission packet; these will be available for review during Planning Commission and Council hearings.

17. Please provide and call out both the existing and proposed grade on each elevation.

    ***Response**: This information has been added to the elevations. See revised sheet set.*

18. Please call out the maximum height of each side of the proposed buildings from the lowest proposed grade to the midpoint of the highest roof midpoint at the proposed adjacent grade. Please see examples below and call out the greatest heights in the example with multiple lines.

    ***Response**: This information has been added to the elevations. See revised sheet set.*



19. Please provide an elevation that explains typical materials and colors proposed for the various building types.

Response: *This information has been added to the elevations. See revised sheet set.*

20. In addition to the dimensions provided, please call out the dimensions of various wall and roof sections along each elevation per the example below.



Response: *This information has been added to the elevations. See revised sheet set.*

21. Wall material coverage details are provided for all building elevations on one sheet as shown below. Please provide the applicable information on each sheet accordingly. Similarly, please provide a materials schedule on each sheet.

BUILDING TYPE II					
	NORTH ELEVATION			SOUTH ELEVATION	
	SURFACE AREA	PERCENTAGE OF NET		SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	4071	NA	GROSS WALL	3856.00	NA
NET STONE CLADDING	212.56	-	NET STONE CLADDING	#REF!	#REF!
NET SIDING	1720.9	42.3%	NET SIDING	#REF!	#REF!
NET STUCCO FINISH	1126.73	27.7%	NET STUCCO FINISH	1259.10	32.8%
NET GLAZING	1010.81	24.8%	NET GLAZING	1037.68	26.8%
	EAST ELEVATION			WEST ELEVATION	
	SURFACE AREA	PERCENTAGE OF NET		SURFACE AREA	PERCENTAGE OF NET
GROSS WALL	3270.19	NA	GROSS WALL	3270.19	NA
NET STONE CLADDING	-	-	NET STONE CLADDING	-	-
NET SIDING	2759.89	84.4%	NET SIDING	2759.89	84.4%
NET STUCCO FINISH	377.67	11.5%	NET STUCCO FINISH	377.67	11.5%
NET GLAZING	132.63	4.1%	NET GLAZING	132.63	4.1%

Response: *This information has been added to the drawing package. See revised sheet set.*

22. Please provide the following note on each elevation sheet: “These elevations are conceptual in nature. Individual building elevations may vary but will be evaluated for compliance with design standards contained within the Glenwood Meadows Zoning and Development Plan or Title 070 of the Glenwood Springs Municipal Code, where applicable, at the time of submitting a building permit application.”

Response: *This information has been added to the elevations. See revised sheet set.*

23. Each multi-family building shall provide a minimum wall offset of five feet every 50 linear feet per Section V.D.3.b of the GMZDP. It does not appear the east nor west elevations of any of the proposed buildings meet this requirement. Please clarify. Additionally, said sides severely lack glazing. Please provide additional windows.

Response: *The east and west elevations have been modified to comply with this requirement. See revised sheet set.*

24. As per Section V.D.3.c of the GMZDP, no multi-family building shall exceed 125 feet in length. It appears the clubhouse building exceeds the maximum length permitted. Please clarify.

    Response: *This code section applies to multifamily residential buildings. The clubhouse is not a multifamily residential building; it is a non-residential building.*

25. Section V.E.3.a of the GMZDP requires inclusion of one of the materials outlined below. Please clarify.

    3. Residential

    a) One or more of the following building materials shall be incorporated into a structure's design:

    (1) Split shakes;
    (2) Rough-sawn wood; or
    (3) Board and batten wood.

    Response: *This information has been added to the drawing package. See revised sheet set.*

26. Are the proposed shingles for each building high profile? Please clarify.

    Response: *Asphalt roofing shingles are identified in the materials schedules as "Certainteed Landmark Pro Solaris", a 30-year rated architectural shingle and are defined as a "dimensional" shingle..*

27. Please provide details for the dumpster enclosures.

    Response: *Representative imagery has been added to illustrate the intent for the dumpster enclosures. See revised sheet set.*

28. Please clarify the surface materials and/or amenities proposed atop the parking garages for building type 1.

    Response: *The garage designs have been modified to include a sloping roof and no longer have amenity spaces on the roof. Amenity spaces are provided between the buildings, at the clubhouse, and within the park areas.*

29. Assuming that the adjacent residual residential parcels will include lower density residential, you will likely need to consider of the transitional development standards outlined in Section X.C.8 of the GMZDP.

    Response: *Plans for the remaining development have not been developed and the density for this remainder of the parcel has not been studied in detail. This request cannot be addressed with specificity based on a theoretical future development. However, the Applicant has created conceptual layout and program studies for Lot 3 which does comply with the intent of X.C.8. Regardless of the future arrangement and format of the future development, the open space areas, pedestrian walkways, and vehicular circulation will provide buffering between housing types to meet the intent of section X.C.8.*

30. Section X.E.3.b of the GMZDP outlines the need to emphasize building entrances by extending the front façade and with materials and detailing. Please clarify.

    Response: *Additional articulation and detailing of materials is included to emphasize building entrances. See revised sheet set.*

31. Section X.E.3.c of the GMZDP states that garages shall not be a prominent streetscape element. Please clarify.

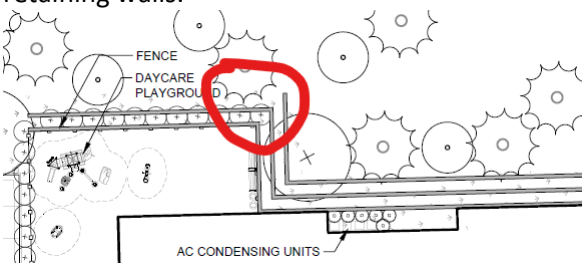
    Response: *The Garages are located at the back of the buildings and do not face any public street or right-of-way. They are built into the slope of the site and serve to retain grade between building levels.*

Community Development, Landscaping

32. I recommend providing a colorized landscaping sheet (or one of the existing representative sheets in color) to the plan set. Also, it may be helpful to see some landscaping typical sections for various areas within the project.

    Response: *Our understanding is that we have provided all of the required plans for a major architectural site plan review. The project team is developing additional illustrative drawings to be included in the Planning Commission packet; these will be available for review during Planning Commission and Council hearings.*

33. Please call out the lines features circled below as shown on sheet L1.5 (and other applicable grading sheets). If these are retaining walls, please call out the maximum height at various locations. Please note, Section V.H.6 of the GMZDP limits wall heights to a maximum of six feet, 50 feet in length without a 12 inch offset, and to three in any given area. Please clarify. Please provide design typical/details for proposed retaining walls.



    Response: *This information has been added to the site grading plans, and images depicting the materials envisioned for these walls. Final material selection and assembly details will be provided at permit submittal. See revised sheet set.*

34. Please call out proposed maximum fence heights and provide a design typical/details.

    Response: *Representative imagery has been added to illustrate the intent for internal fences. See revised sheet set.*

35. Please call out the width of parking spaces and islands or provide a typical call outs in various locations.

    Response: *This information has been added to the site plans. See revised sheet set.*

36. Is any existing landscaping proposed for preservation. Please clarify.

    Response: *Notes regarding existing landscape have been added to the sheet set.*

37. Please depict the limits of disturbance on all applicable landscaping plan sheets.

    Response: *This information has been added to the sheet set.*

38. Please depict and call out sight distance triangles for each and every intersection on various sheets.

    Response: *This information has been added to the sheet set.*

39. Please provide a chart (Sheet L1.2 may be the best location) which details/calls out the total amount of landscape and hardscape areas expressed in square feet and as a percentage of the total lot area. For parking areas, please note square footage of landscaped area and as a percentage of the parking area; include total number of required and provided trees, shrubs, and perennials. Landscaping shall be provided at the minimum rates required for the residential neighborhood district by Section V.H.9 of the GMZDP outlined below.

Use	Residential Neighborhood	A
Required Open Space	40%	
Open Space Planting	▪ 1 tree/1200 s.f. ▪ 4-shrubs/1200 s.f.	▪ ▪
Setbacks Buffers Screens	▪ 1 tree/25 l.f. ▪ 1/3 deciduous 2/3 evergreen ▪ 10 shrubs/25 l.f	▪ ▪ ▪
Midland Avenue ROW	N/A	▪ ▪
Wulfson Road ROW	▪ 1tree/35 l.f. ▪ Irregular spacing	▪ ▪
Internal Neighborhood Streets	1 deciduous tree/35 l.f. Evenly spaced	▪

    Response: *This information has been added to the sheet set.*

<u>Public Works, Water/Wastewater</u>

40. All water and wastewater utilities proposed for this project outside of public ROWs will be considered private and not maintained by the City. Water valves, manhole connections and sewer wyes will be

considered private/public delineation points.

Response: *Noted.*

41. The water, sewer and electric details need to follow city standards details at the City of Glenwood Springs Engineering Department website, Engineering Standards.

    Response: *Noted; details will comply and will be reflected in permit submittal.*

42. There is no irrigation detail. The Glenwood Meadows area is irrigated by a raw water system. Please show how this development proposes to incorporate that system for its use. There is a raw water main stub out located next to the proposed water and sewer main connection points on flat tops drive. There is also smaller service location on Wulfsohn Rd.

    Response: *Noted; connection to raw water system has been identified in the sheet set. The point of connection will be at the west end of Flat Tops View right-of-way.*

43. All Fire hydrants must have a 15' easement centered on the hydrant. Leads, valves and access to the hydrant will also need to have an easement for access and maintenance. The City will own and maintain all fire hydrants, leads and valves. The City will require access easements to each 15' hydrant easement if they are not adjacent to a public ROW.

    Response: *Noted.*

44. All services that are to be used for combined Fire/Domestic water must be designed and constructed to NFPA24 requirements and will be considered private. Needs to be shown in detail…thrust block calculations, restrains.

    Response: *Noted. Details complying with NFPA24 will be provided as required for permit submittal. The project team has developed preliminary riser room allocations within each building with the flexibility to adjust the square footage of these rooms without affecting overall building design.*

45. Provide riser room details for the fire/domestic water services and how the proposed buildings are intended to be metered.

    Response: *Noted. Details for fire/domestic service and metering will be provided as required for permit submittal. The riser room location in the lower level of the building provides flexibility to adjust non-bearing wall layout to accommodate changes in riser room dimensional requirements*

46. All wet utilities will require restrained joints/bells within the entire project area.

    Response: *Noted. This will be reflected in the permit submittal.*

47. Water and Sanitary/Storm Sewer Crossings will need to be shown in future plans in a profile plan. All water and sewer crossings must have 10' horizontal separation or 18" vertical. If these distances can't be maintained encasement or sleeving will be required.

    Response: *Noted. This will be reflected in the permit submittal.*

48. Water and storm crossings may require insulation if proper bury depth can't be maintained.

    Response: *Noted. This will be reflected in the permit submittal.*

Public Works, Electric

49. Owner will be responsible for cost associated with the line extension and or relocation through the ROW/property and all infrastructure for the new development.

    Response: *Noted; applicant assumes the division of responsibility will be memorialized in the ordinance/development agreement following project approval.*

50. Owner will be responsible for all work involving new construction, final service layout and site planning will need to be coordinated with the City of Glenwood Springs Electric Department.

    Response: *Noted; applicant assumes the division of responsibility will be memorialized in the ordinance/development agreement following project approval.*

51. A new switch gear will need to be set at the new intersection with Wulfsohn Road to supply electric back to the development. A connection from the switch gear vault at the lofts will need to be made back to the electric vault on Flat Top Roads, this line could be run with the 24" storm sewer that is being proposed to tie into Lofts system. Internal transformer locations and line looping to be coordinate with GWSE.

    Response: *This has been added to the utility plan; see revised sheet set.*

52. Owners GC/excavation company will be responsible for all trenching, including the line extension trenches to new transformer locations, electric primary and secondary conduit installation, electric pull vaults and transformer vaults.

    Response: *Noted; applicant assumes the division of responsibility will be memorialized in the ordinance/development agreement following project approval.*

53. The Costing Proposal will be paid in full prior to any work commencing. Any additions to the proposal will be due at time of completion of work or any saving will be refunded at time of completion of work

    Response: *Noted; applicant assumes the timing of financial instruments due for utility improvements will be memorialized in the ordinance/development agreement following project approval.*

54. Contractor to install a 2" electrical conduit adjacent to the main electrical run to be swept up at pedestal locations for Broadband installation. Fiber to be brought to builds at service locations shown on plans.

    Response: *Noted; applicant assumes the division of responsibility will be memorialized in the ordinance/development agreement following project approval.*

55. Developer to supply a Load Calculation form to the City of Glenwood Springs Electric Department for review and planning.

    Response: *The applicant has provided preliminary load calculations and coordinated preliminary transformer locations with City staff for planning purposes. Final load calculations will be developed by the project's MEP Engineer for permit submittal.*

56. Any work done outside of the owners needs for this property will be the responsibility of the City of Glenwood Springs Electric Department. City will coordinate with the GC with any city needs.

    Response: *Noted.*

57. Any street lightings outside of a Public ROW will need to be a part of the HOA electric system and power paid for be the HOA.

    Response: *Noted.*

58. Xcel is not the power or gas supplier in this location per the Utility Report, City of Glenwood Springs Electric and Black Hills Energy are the correct contacts.

    Response: *Noted.*

59. The Electric design, details and clearances need to follow City Engineering Standards details located at the City of Glenwood Springs Engineering Department website, Engineering Standards.

    Response: *Noted. Standards will be reflected in the permit submittal.*

60. If the developer has any information on the additional 175 units noted on within the reports, it would be advisable to plan for electric layouts/conduits for the possible expansion at this time.

    Response: *Noted.*

Public Works, General

61. The storm sewer system within the Glenwood Meadows development is owned and operated by the Metro District. The district should be a review agency for these plan sets.

Response: *Noted.*

62. The City's broadband department can add another communications option to the residents of this development if the developer would like to work with CBN to plan for high-speed fiber connections to the buildings.

    Response: *Noted. The applicant will review options as the project advances.*

63. The City would like to have a discussion with the developer on Public ROWs and what the developer's intentions are for dedications. The City can see a small benefit to taking ROW along the main Flat Top View Drive roadway alignment from the connection with existing Flat Top View Drive all the way back to its new connection at Wulfsohn Road. The City would not maintain the parking areas along this roadway nor shovel sidewalks along this segment of road. The City would be looking at ROW that encompasses the area from Top back of roadway curb to top back of roadway curb, not parking area curb. It would be desirable to have snow storage locations at either end of the building areas and possibly down the center of the roadway for easy of plowing and snow removal.

    Response: *See item #2 of this document.*

64. The City would suggest some form of velocity reducing manhole at the debris pond storm sewer connection.

    Response: *The drainage plans have been modified in response to this suggestion. See revised sheet set.*

65. After review of the soils report it seems that there are risks associated with the site that the report did not review in detail due to those risks not being part of the consultant's scope of services. See comments in the inherent risks section that are labelled "outside scope of services" and owner is completely responsible for taking all risks associated with any future potential for instability at the site or in the site vicinity area type comments.

    Response: *This item will be addressed fully in a revised geotechnical report. The project team's geotechnical engineer is preparing a summary memorandum addressing all geotechnical comments. This memo will be provided to staff by July 9, 2021.*

66. No topographic slopes were labeled thus these comments are generic. Geotech report calls for no structures within 25' of a crest of a slope that is 2.5:1. The lower row of structures appears to be within 25' of a crest of a slope, but the slopes below are not labeled for verification of the report note.

    Response: *The project geotechnical engineer has confirmed that the current plans comply with this recommendation. The project team's geotechnical engineer is preparing a summary memorandum addressing all geotechnical comments. This memo will be provided to staff by July 9, 2021.*

67. The slopes to the south of the development that lead to the proposed roadway appear to be quite steep and will be an erosion and revegetation issue for the development. These roadways lead directly to storm water intake structures and piping that could be clogged with excess material flowing them, thus causing

downstream issues.

Response: *Noted. Project team will evaluate the temporary erosion control needs and provide specific plans as required for permit submittal.*

68. The Geotech report notes that the soils are highly susceptible to water erosion and moderately susceptible to wind erosion. During construction dust mitigation will be a significant issue with the site as the City has learned with other projects in this area. Excessive dust from the working face will not be acceptable and must be properly mitigated.

    Response: *Noted. Project team will evaluate the construction management planning related to dust mitigation needs, as well as geotechnical recommendations related to wetting of soils, and provide specific plans as required for permit submittal.*

69. The Geotech report notes that plantings around the structures should be either Xeriscaping, landscaping gravel or plants with low moisture requirements.

    Response: *Noted. The landscape plans include notes requiring compliance with geotechnical recommendations.*

70. The Geotech report notes that slopes away from the buildings should be a minimum of 6' in 5' for landscaping areas or 2% for hardscape areas. This cannot be verified on the current drawing set, engineer of record to confirm slopes away from structures.

    Response: *The design team will follow the recommendations of the geotech report; detailed grading (including slopes away from buildings) will be developed for permit submittal and construction drawings.*

71. Contractor should confirm the trenching backfill material that is acceptable in this area, previous portions of the development have utilized gravel materials, which has caused underground water to use the trenches as river passages and flood manhole locations during certain times of the year.

    Response: *The applicant is willing to coordinate with City staff to evaluate specifications that are acceptable to the City and meet the recommendations of the project's geotechnical engineer. The project team's geotechnical engineer is preparing a summary memorandum addressing all geotechnical comments, including backfill and bedding recommendations. This memo will be provided to staff by July 9, 2021. Revised trenching backfill recommendations will be included in an updated geotechnical report.*

72. Full depth pavement will not be accepted in any areas that are deemed public ROW and possibly maintained by the City. Full depth asphalt is not recommended, it has shown not to be successful in other areas of the Glenwood Meadows Development.

    Response: *The geotechnical engineer is in agreement that full depth asphalt is not recommended, and is developing updating paving recommendations. The project team's geotechnical engineer is preparing a summary memorandum addressing all geotechnical comments. This memo will be provided to staff by July 9,*

2021, and will include updated paving section recommendations.

73. 4.5 " of asphalt over 6" of ABC for heavy traffic areas is not recommended, it has sown not to be successful in other areas of the Glenwood Meadows Development. Thicker asphalt and base course sections have shown promise in stability and longevity.

    Response: *The project team's geotechnical engineer is reviewing this recommendation. The project team's geotechnical engineer is preparing a summary memorandum addressing all geotechnical comments. This memo will be provided to staff by July 9, 2021, and will include full response to paving section comments and refined paving section recommendations.*

74. The Geotech report notes that asphalt overlays should be completed every 5-6 years on asphalt sections of pavement. What does the Geotech considered an appropriate overlay material and thickness being that overlay is a generic term.

    Response: *The project team's geotechnical engineer is preparing a summary memorandum addressing all geotechnical comments. This memo will be provided to staff by July 9, 2021, and will include full response to paving comments.*

Transportation

75. Require sidewalk along Wulfsohn from the west end of the property to existing sidewalk at Meadows/Lofts (access to transit stop)

    Response: *Sidewalks have been added along Flat Tops View Drive extension and Wulfsohn Road. See revised sheet set.*

76. Require sidewalk along access road at west end of the site

    Response: *Sidewalks have been added along Flat Tops View Drive extension and Wulfsohn Road. See revised sheet set.*

77. Provide direct sidewalk along the entire length of both sections if roadways are not to be built; in other words, make it possible to walk the length of this property without having to meander behind all the head-in parking bays

    Response: *Sidewalks are provided along streets and internal driveways to allow pedestrian circulation to and throughout the site. The project will be built in on phase, with complete infrastructure (including sidewalks) sequenced with the implementation of the buildings.*

78. Provide ADA compliant elevators within this property to get mobility impaired residents from up the hills down to Wulfsohn Rd and the transit stops.

    Response: *(*Note: In this case ADA relates to the Americans with Disabilities Act, not the Amended*

Development Agreement.) The plans as originally submitted comply with the requirements of the ADA related to accessible routes. The original elements supporting accessibility included accessible routes from designated accessible parking into all buildings and elevators within buildings. Additional modifications have been made to the site plans to enhance accessibility beyond the requirements of the ADA, including an accessible route from the development to Wulfsohn Road and a publicly-available shuttle that will circulate from the development to transit. The shuttle will also be available to non-resident users of the child care facility (and other guests) who may use transit and require a last-mile connection from RFTA to the child care facility.

Parks, Trails & Open Space

79. "Local Access Trailhead" design minimums. Elements to include: trash can (bear saver type, interpretive shelter (City standard), curb/gutter type that facilitates vehicle access, natural surface trail.

Response*: Trash can, dog waste station, and interpretive shelter have been added in two locations of public access to the Wulfsohn Trail network. Vehicle access has not been provided beyond the trail access point as the trail system is singletrack/natural soil surface.*

80. Trailhead elements to be paid for by the developer

Response: *Though not legally required, Applicant is will to work with this City in this regard.*

81. City to be granted an access agreement in perpetuity

Response: *Noted. The applicant will work with Parks and Community Development staff to provide the appropriate public pedestrian access easement to the adjacent open space.*

82. Trailhead elements to be construction on the City's timetable

Response: *Noted. The applicant will work with Parks staff to identify the appropriate time to implement trailhead elements related to overall construction schedule, project closeout, and overall public safety related to active construction operations.*

83. Natural surface trail to be constructed by the City

Response: *Noted.*

Parks, Landscaping and Irrigation

84. Please provide an updated plant list with species, locations and quantities

Response: *A fully annotated planting plan will be provided at permit. The applicant has updated the suggested plant list based on information provided by the Parks Department related to species known to be successful in this development. See revised sheet set.*

85. Please provide a detailed permanent irrigation plan.

    Response: *A detailed irrigation plan will be provided at permit submittal.*

86. Plant species not suited to our semi-arid climate or unsuitable selection

    Response: *The suggested species list included in the original submittal is as provided in the GMZDP. The applicant will work with Parks staff to refine the species list based on staff's experience with streetscape and landscape in the overall Meadows development.*

87. With the close proximity of the Community Center we would recommend not building tennis courts

    Response: *The two pickleball courts are included as an amenity for the residents of this complex, and complement the publicly-available facilities at the Community Center.*

88. We strongly recommend inclusion of appropriate outdoor spaces to support the residential needs of the proposed density level. Evaluation of formal complaints to the City demonstrates a necessity for a smaller park with a dog run area, playground, small turf and picnic area.

    Response: *As required by the GMZDP two one acre 1 acre parks have been provided. The parks have been designed to the required standards. The project is also adjacent to a large amount of open space, and is in close proximity to recreation center amenities. The applicant's project team is evaluating opportunities to include a dedicated dog run zone, and additional amenity areas between the buildings will provide a variety of picnic, small turf, and other gathering spaces for the residents of the complex.*

89. For any playground installations we would recommend separate playgrounds that are suited to specific age ranges. (Ages 2-5, 5-12)

    Response: *Noted; the applicant will consider the division of age-appropriate playgrounds as the amenity spaces are designed in greater detail moving forward.*

Parks, Stairway Connections to Glenwood Meadows

90. Due to the north facing aspect of the stairs they should be heated for safe winter maintenance

    Response: *The applicant wishes to avoid the energy input and long-term maintenance of heated stairs, and is studying other methods to accomplish the intent of safe and maintainable stairway (e.g. steel stairs with treads that do not allow for accumulation of snow and ice).*

Engineering, Civil Sheet Set

91. Appears that the legend doesn't match the plans

Response: *Noted and corrected in the updated sheet set.*

92. Question of where drainage will be located (Note: relates to existing swale along the west edge of the project)

    Response: *Drainage plan has been modified to capture the swale. See revised sheet set.*

93. Question if curve is practical with allowable pipe material deflection.

    Response: *Pipe deflection as designed is within specified tolerances from manufacturer; information has been added to utility sheets to illustrate compliance.*

94. Grading not practical through parking

    Response: *Grading as shown is conceptual in nature, with critical slopes along driveways, at the edges of the site, and between building levels identified and evaluated, but with contour information developed at an 'overlot grading' level. Detailed grading will be developed as the project advances.*

95. Curve is sharp (Note: relates to tie-in at Flat Tops View Drive).

    Response: *This intersection has been reconfigured to increase the centerline radius. The tie-in point to Flat Tops View is constrained by the existing storm inlet (on Glenwood Greens), the existing soil nail wall (on Lofts at Red Mountain), and the subject property topography. See revised sheet set. Related: see note 11, this memo.*

96. Question on how intersections should be controlled

    Response: *This intersection has been reconfigured. See note 11, this memo, and revised sheet set.*

97. Gas and electric should have appropriate separation

    Response: *Utility layout has been reconfigured to provide the appropriate separations.*

98. Storm/irrigation/sanitary considered the same and should maintain appropriate separation from potable water

    Response: *Utility layout has been reconfigured to provide the appropriate separations.*

99. Storm should maintain same separation requirements as sanitary. Easements around hydrants and transformers

    Response: *Utility layout has been reconfigured to provide the appropriate separations.*

100. These plans are insufficient and do not comply with CDPHS or the City of Glenwood springs Engineering Standards in many instances. See plan markup for more information

Response: *Plans have been modified to respond to markups; additional detail as required to illustrate compliance with standards will be provided at permit.*

Engineering, Geotechnical Report

101. On page 20 of 30, under surface drainage the report states under bullet point 2 that landscaping of gravel adjacent to buildings should have a minimum slope of 6 inches in 5 feet (or 10%), but in bullet point 5, it states that landscaped areas within 10 feet of the foundation should be sloped at a minimum of 8%. This is inconsistent.

Response: *The project team's geotechnical engineer is preparing a summary memorandum addressing all geotechnical comments. This memo will be provided to staff by July 9, 2021, and will include a clarification of the slope recommendations.*

102. In general full-depth asphalt is not recommended in this area. As you can see from the meadows Development, it has not performed well over time and meeting subgrade requirements with the native soil is challenging. As these roadways are private and will remain private, the city does not have a requirement for the asphalt within the development, but will require any patches in City ROW to meet the requirements of the City's Engineering Standards. a. The report provides a recommendation for a full-depth asphalt section, but Figure 17 does not provide an exhibit of that section.

Response: *The geotechnical engineer is in agreement that full depth asphalt is not recommended, and is developing updating paving recommendations. The project team's geotechnical engineer is preparing a summary memorandum addressing all geotechnical comments. This memo will be provided to staff by July 9, 2021, and will include updated paving section recommendations.*

Engineering, Drainage

103. Include the original report referenced in the Appendix.

Response: *The original drainage report has been appended to the application materials.*

104. The original study was completed analyzing the development with Type C and D soils, while this analysis uses Type A soils. Please address this within the report.

Response: *This has been addressed in the updated drainage report.*

105. The access road to the west is not fully considered in the analysis.

Response: *The analysis has been updated to include the access road to the west.*

Engineering, Traffic

106. A memo is not acceptable. A TIS will be required for this development. The original study was completed over 20 years ago and only provided a 10-year projection. Additionally, it was not stamped by a Colorado Licensed Engineer.

Response: *The ADA expressly states that a TIS is all that is required of this development application. Please also see our response to comment 1.*

107. **(5/17 Departmental meeting)** CDOT access control plan 8th Street/SH82 and/or Midland/I-70 at exit 114. May exceed capacity of access control permit.

Response: *The City is the holder of the CDOT access control permit. All obligations of the developer were satisfied at the time of annexation.*

December 28, 2020

RE: Glenwood Meadows Multi Family Housing Development

Response to ADA Site Related Design Standards:

1. **Site Layout and development pattern works creatively within the site's natural constraints such as slope, geologic hazards and significant vegetation.**
    - *The primary approach to site layout and grading was to work with the existing natural slope and grading conditions to the greatest extent possible. Several adjustments were made during the design process to ensure that the site grading (cut and fill) was as balanced as possible.*
    - *The existing steep slope from Wulfsohn Rd. up to the project site will be undisturbed.*
    - *Grades around the perimeter of the property, adjacent to the Wulfsohn Mountain Park open space meet existing grade at or before the property line and areas of disturbance will be re-vegetated with native plant material to blend with the open space.*

2. **Parking- counts to be no less than the city of Glenwood Springs standard.**
    - *The development includes a total of 538 parking spaces. 537 spaces are required based on City of Glenwood Springs standards.*
    - *See table on sheet L 1.1 for a more detailed breakdown of the parking requirements and counts.*

3. **Landscaping and Screening: ADA standards meet or exceed City standards. Use ADA standards.**
    - **Required open space 40%**
        - *The total phase 1 area is 27 acres. The total area of the site that will be developed (buildings, roads, parking) is 8.43 Acres. This leaves 18.57 acres of open space on the site equating to 69% open space.*
    - **Open Space Planting**
        - **1 Tree/1200 SF**
        - **4 Shrubs/ 1200 SF**
            - *These calculations have been applied to all disturbed areas of open space in the development and are reflected in the landscape plans.*
    - **Setbacks, Buffers, Screens**
        - **1 tree/ 25LF**
        - **1/3 deciduous**
        - **2/3 evergreen**
        - **10 shrubs/ 25 LF**

            - *These calculations have been applied to relevant areas in the development and are reflected in the landscape plans.*

- **Internal Neighborhood Streets**
    - **1 deciduous tree/ 35 LF evenly spaced.**
    - *The minimum planting standards have been applied to all internal neighborhood streets as you enter the neighborhood. The areas adjacent to open space are designed to meet the natural character and blend with the native vegetation. A formal row of street trees would look out of character and create a contrast with the natural landscape, therefore rows of street trees have not been added in these areas.*
    - *Street trees have also been omitted from areas that are adjacent to the phase 2 property. It is anticipated that this area will be disturbed and developed in the future and that landscaping will be added as a part of the phase 2 development.*
    - *The character of the planting in the native areas for the hillside above Wulfsohn Rd. will be similar to planting found in other parts of the Glenwood Meadows development, in particular the native hillside zone in between Midland Ave and the Glenwood Meadows Shopping center.*

- **Building foundations shall be planted with ornamental plant materials such as ornamental trees, flowering shrubs and perennials, a ground covers and provide variety and year round interest.**
    - *The geotechnical report advises against irrigated plant material within 10' of the building foundations. The landscape plans reflect a "dry zone" at the foundation of the buildings to comply with this recommendation. Flowering shrubs, perennials and ground covers have been located in areas adjacent to the buildings outside of the 10' zone and will be drip irrigated to comply with the geotechnical recommendations.*
- **Development entryways shall be planted with ornamental plant material such as ornamental trees, flowering shrub and perennials and ground covers.**
    - *Planting beds with ornamental plant material have been included at both of the main entries to the development.*
- **Turf areas shall be established by sodding. Un-manicured natural areas may be seeded when adjacent to open space.**
    - *The geotechnical report advises against turf grass due to the higher watering needs. Artificial turf grass is being proposed as an alternative in select areas in the development along with a native seed mix for other areas which has a lower water requirement.*
- **Use xeriscape principles.**
    - *The intent of the planting design is to use xeriscape principles and to use low water plant material to reduce the amount of irrigation needed for the site. The proposed plant list was taken from the Glenwood Meadows ADA design guidelines and will be refined during the design development and construction document phases. The Irrigation plan will be designed by a professional irrigation designer with the intent of creating the most efficient system possible to reduce the amount of watering across the site. The geotechnical engineers will also be asked to review, make recommendations and sign off*

on each iteration of the proposed landscape design to ensure that the planting and irrigation complies with the geotechnical requirements.

4. **No areas for outdoor storage, trash collection or compaction, loading, or other such uses shall be located within 20' of any public street, public sidewalk, or internal walkway.**
    - *A total of 7 trash storage/ collection areas have been provided in the plans. The dumpsters will be enclosed and screened with planting and will not be visible from view. They will be located between parking areas within a reasonable walking distance from the residential buildings. Locations for trash storage and collection areas are limited due to the natural topography and slope of the site.*

5. **Mechanical/ Utility Screening required. – shall be an integral part of the building, not tacked on.**
    - *Condensing units for the buildings will be located within landscape areas and screened from view with shrubs and /or fencing to match the architecture, depending on location.*
6. **Open Space- desire to create an interconnected network of open spaces and parks within residential areas of Glenwood Meadows and provide visual interest and access to a variety of recreational and leisure opportunities.**
    - *An interconnected network of parks and open spaces has been provided throughout the neighborhood.*
    - *There is an internal network of sidewalks connecting the streets and buildings that provides circulation throughout the residential areas.*
    - *Park 1 creates a direct soft surface trail connection to the Wulfsohn Mountain park trails and a second connection to this public trail network is located at the south end of the property.*
    - *A pedestrian/ stair connection has been provided adjacent to W. Meadows drive leading up to the development.*
    - *Walking access from the residential units to the two parks and the open space areas is a primary component of the design.*
7. **Each 1 acre park shall contain at least 1 or more of the following features:**
    - **Multi- use areas**
    - **Community gardens**
    - **Walking paths**
    - **Plazas**
    - **Picnic tables**
    - **Benches**
        - *The plans include (2) one acre parks as required by the Glenwood Meadows ADA*
        - *Park 1 includes walking paths, benches, picnic tables, a community garden and multi-use areas*
        - *Park 2 includes two pickle ball courts, picnic tables, benches, a multi-use area and a children's play area with play equipment.*
8. **Site layout – Residential Specific**
    - *20' setback from front property line*

- *The buildings are set back more than 20' from the property lines.*

- ***Layout shall respect and follow the natural topography of the site to the extent possible.***
  - *The neighborhood has been designed to work with the existing topography of the site to the greatest extent possible.*
  - *The design intent was to meet existing grade at the south end of the site to avoid the need for large areas of cut and associated site retaining walls and to connect the development to the Wulfsohn Mountain Park Open Space.*

- **To the maximum extent practicable, multi- family buildings shall be oriented or arranged in a manner to enclose common open space.**
  - *Common open space is located throughout the neighborhood with common amenity and gathering space area adjacent to the buildings.*
- **Common open space should include**
  - **Gardens**
  - **Courtyards**
  - **Recreation or play areas and at least 3 of the following**
    - **Seasonal planting areas**
    - **Large flowering trees**
    - **Seating**
    - **Pedestrian scaled lighting**
    - **Gazebos or other decorative shelters**
    - **Play structures for children or**
    - **Natural features or areas**
  - *The common open space in the proposed development includes gardens, courtyard areas between buildings, recreation and play areas, seasonal planting areas, seating, pedestrian scaled bollard lighting, play structures for children and natural areas.*

- **Residential neighborhoods adjacent to open space shall incorporate one of more of the following techniques to create a visual transition between development and surrounding open space:**
  - **Staggering building setbacks to create a softer development edge**
  - **Establishing a landscape buffer along the rear or visible edge(s) of the property to create a soft visual edge of the development**
  - **Utilizing a variety of native plant species and planting forms similar to those found on the adjoining open space to create the appearance of a natural transition in the landscape.**
  - *The development includes a native buffer around the perimeter with native plant species to soften the visual edge of the development and transition to the existing native landscape beyond the property line.*

- **The area between the curb an adjacent property line shall be landscaped**

- *The area between the curb and the adjacent property line has been landscaped to match the character of the adjacent property to create a natural transition.*

9. Community Amenities:

- **Minimum ratio of 200 sf/ dwelling unit of internal open space/ outdoor leisure space.**
- **These open spaces/ outdoor leisure spaces shall be improved with a variety of community amenities including, but not limited to the following:**
  - **Community garden**
  - **Grove of trees**
  - **Village green**
  - **Pocket park**
  - **Swimming pool**
  - **Resident clubhouse**
  - **Tots lots**
  - **Basketball, volleyball or sports courts**
  - **Picnic areas**
- *60,000 sf of common amenity space is required for this 300 unit development. A total of 119,400 sf common amenity space has been provided.*
- *Common amenities for this development include a community garden, swimming pool, resident club house with fitness center and daycare, a play ground and two pickleball courts.*

10. Parking (location and layout – page 40 of ADA)

- **Parking areas and freestanding parking structures (detached garages and carports) shall not occupy more than 50% of each perimeter street.**
  - *Due to the natural sloping topography of the site, level areas for parking are limited. The proposed parking for this development are located in the available level areas in between buildings and along the perimeter of the streets and exceeds the 50% threshold due to the limitations of the site.*
- **Carports shall be limited to 72' in length, with a maximum of 8 spaces per car port structure.**
  - *A total of 20 garage structures are proposed for this development.*
  - *The 10 garage structures located along the upper road at the south of the development are 72' in length with a maximum of 8 parking spaces.*
  - *The 10 garage structures at the middle and lower roads relate directly to the architecture and are 125' in length with 10 parking space and two bicycle storage areas each. These structures are built into the slope of the hillside with the roof functioning as an outdoor patio and common amenity space for the adjacent residential buildings.*
- **No more than 2 detached garage structures or carport structures shall be located adjacent to each other end to end.**

- *Due to the natural sloping topography of the site, level areas for garages are limited. The proposed garage structures align with the layout of the residential buildings and streets and are located adjacent to each other with a minimum of 10' spacing between structures.*

- **The minimum separation between these structures shall be 10' and the separation area shall be landscaped with at least 1 deciduous tree and ground cover or sod**
  - *The garage structures are separated at least 10' from each other and the separation area is landscaped with at least one tree and ground cover.*

City Site Related Code Standards:

Parking requirements:

- **Clubhouse Building – 1/ 400 square feet for the clubhouse/building area, plus 1 /10,000 square feet site/pool/outdoor area.**
  - *27 spaces are required for the Clubhouse and 28 have been provided.*
- **Residential Units- 1.5 spaces for multi-family, plus 1 guest space per each 5 dwelling units (essentially 1.7 total but confirm count)**
  - *510 spaces are required for the residences and 510 have been provided.*
- **Required number of ADA spaces (National Standards)**
  - *The total number of proposed ADA spaces meets the national standards.*

Bike parking requirements:

- **For developments with more than 150 parking spaces- 9 bike parking spaces plus 1 space for each 50 vehicle spaces provided after the first 150 spaces.**
  - *17 bike parking space are required based on these calculations. 160 bike parking spaces have been provided in the plans for the development.*
- **Distribute evenly among buildings**
  - *Bike parking has been distributed evenly among the buildings.*
- **Must have adequate lighting**
  - *Bike parking is located adjacent to the main entry to the buildings and will be adequately lit.*
- **Bicycle parking spaces shall maintain an access aisle of at least 5 feet and clear of all obstructions.**
  - *Bike parking spaces maintain an access aisle of at least 5' and are clear of obstructions.*

Residential Architecture:

1. **A buildings special architectural features and treatments shall not be restricted to a single façade. All sides of a multi-family building open to view by the public, whether viewed from public or private property, shall display a similar level of quality and architectural interest.**

- *All sides of the multi-family residential buildings include special architectural features and treatment. The buildings are visible from all four sides and each façade displays a similar level of quality and interest.*
- *Three building types have been provided to create variety and interest.*

2. **All multi-family buildings shall be designed to provide complex massing configurations with a variety of different wall planes and roof planes. Plain, monolithic structures with long, monotonous, unbroken wall and roof plane surfaces are prohibited. At least every 50 linear feet, wall planes shall contain offsets or setbacks with a differential in horizontal plane of at least 5 feet.**
    - *A variety of different wall and roof planes have been provided in the design of the buildings.*
    - *Bike parking is located adjacent to the main entry to the buildings and will be adequately lit.*
    - *Wall planes have a setback or offset of at least 5' for every 50 linear feet.*

3. **The maximum length of a multi-family building is 125'**
    - *The building design meets this criteria*

4. **All elevations on multi-family buildings shall contain windows. An eave or an overhang of at least 12" shall be provided on the perimeter of all residential buildings, except gable roof ends, where an 8" overhang shall be required.**

    - *The roof design meets this criteria*

Architectural Detail:

1. **The incorporation of porches, balconies and patio's shall be strongly encouraged for all residential types.**
    - *Balconies and patios have been incorporated into the design of the residential buildings.*
2. **Building entries shall be called out as a prominent streetscape feature for all residential types by extending the front of the main façade and emphasizing with materials and detailing**
    - *The building entries are prominent features in the building design, they extend from the front of the main facades and are emphasized with materials and detailing.*

3. **Garages shall not be a prominent streetscape element. They shall be recessed and/ or oriented towards the rear of the lot.**
    - *The garage structures are located at the rear of the buildings and are not a prominent streetscape element.*

4. **Fronts of buildings shall be articulated through the use of bays, insets, balconies, porches or stoops related to entrances and windows.**
    - *The front of the proposed buildings are articulated though the use of insets, bays, balconies and front stoops related to the entrances.*

MEMORANDUM

To: City of Glenwood Springs Planning Staff

From: Michael Grzesiak, PE

CC: Mike Fellner – BLD Group

Date: 12/2/20

Subject: Glenwood Meadows Multi-Family – Phase 1 – Traffic Impact Statement

This memo shall address the estimated daily traffic trips for the proposed Glenwood Meadows Multi-Family Phase 1 project located in Glenwood Meadows development.

The proposed Glenwood Meadows Multi-Family project is located within Lot 11C-C of the Glenwood Meadows development on the south side of Wulfsohn Road. Proposed construction for phase 1 includes 300 apartment dwelling units and a club house. Access to the development is provided by a proposed extension of Flat Tops View Drive, and an existing curb cut provided on the south side of Wulfsohn Road approximately 1,120 feet northwest of the West Meadows Drive intersection.

Earlier traffic studies for both the Glenwood Meadows PUD project and the Glenwood Meadows Transportation Improvements Plan were completed by The Mobility Group, dated July 27, 2000 and September 14, 2001 respectively. The Glenwood Meadows PUD project traffic study included detailed analysis of existing traffic conditions along with proposed traffic conditions with for the overall PUD development.

The September 2001 Transportation Improvements Plan traffic study focused on a revised, smaller development scope than was originally proposed in the PUD traffic study. The reduced size and number of land uses for the Glenwood Meadows project was analyzed for trip generation and both on-site and off-site transportation improvements. The revised project scope from the original traffic study reduced daily trips by approximately 25% and would have less traffic impacts on the roadway system.

The September 2001 Transportation Improvements Plan traffic study included an apartment land use that accounted for 300 dwelling units and produced a trip generation of 1,546 net external daily trips. The dwelling unit count assumed under that traffic study is concurrent with the proposed 300 dwelling units for the Glenwood Meadows Multi-Family development.

A trip generation analysis was performed using standard rates from Trip Generation, 10th Edition, Institute of Transportation Engineers, 2017 (ITE) and produced approximately 1,306 daily trips. The trip generation analysis can be referenced in the attached Exhibit A.

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The discrepancy of 240 daily trips between the 2001 traffic study and this analysis is due to the average rate used. The 2001 traffic study used an average rate of 6.44 versus 5.44 for this study. The difference in average rates reflects the difference from the older Trip Generation edition and the 2017 10th Edition used for this analysis, specifically updates to the land use data.

Additionally as a check, the other Glenwood Meadows land uses from the 2001 traffic study were analyzed under the 2017 10th Edition. The total weekday daily trips generated by the development total 14,848. This is a net reduction of 769 daily trips. This discrepancy is also attributed to the updated data in the ITE Trip Generation 10th Edition.

An Annexation and Development Agreement (ADA) was drafted and recorded in 2002 which outlined the terms and conditions of the annexation, zoning and development of the Glenwood Meadows development to the City.

Section 3.a. of the ADA: "Non-Specific Assessments/Credits/Fees-in-Lieu of School Land Dedication; Non-Specific Assessments/Credit" states that "Glenwood Meadows, its successor and assigns, shall not be required to pay any future Traffic/Transportation Impact Fee established by the City subsequent to the execution and recordation of this Agreement."

Section 12 of the ADA: "Off-Site Traffic Improvements Obligations" details the required on-site and off-site traffic/transportation improvements and financial contribution obligations of Glenwood Meadows which are listed in subsections 12.(a)-(f).

A Memorandum of Understanding (MOU) for the Glenwood Meadows project was recorded in 2013 that outlined and memorialized the acknowledgements, understandings and agreements between the Glenwood Meadows Owner and City to address the status of provisions of the original ADA.

Section 2 of the MOU identifies that: "At the time of re-subdivision and/or development application with respect to future developments, Owner, or its assignee, shall, as the sole remaining and ongoing obligation under said Section 12 of the ADA, remain responsible for providing to City site-specific development proposal calculations of estimated daily traffic trips for such development, as set forth by sub-section (a) of Section 12. Of the ADA."

This traffic impact statement addresses the site-specific estimated daily traffic trips for the Glenwood Meadows Multi-Family development as detailed above and in the attached Exhibit A. The proposed 300 apartment dwelling units for this project pairs with the approved 300 units under the original 2001 Transportation Improvements Plan traffic study and ADA.

Please feel free to contact us with any questions or comments you may have.

Sincerely,

Michael G. Grzesiak, P.E.

Enc.
Exhibit A –Trip Generation Analysis

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Land Use	ITE Code	Proposed Size	Average Vehicle Trip Ends vs:	Weekday Avg Rate	Weekday Daily	Trip Rate	AM Peak In	AM Peak Out	AM Peak Total	Trip Rate	PM Peak In	PM Peak Out	PM Peak Total
Multifamily Housing (Mid-Rise) (Apartments)	221	300	Dwelling Units	5.44	1632	0.36	28	80	108	0.44	81	51	132
Multifamily Housing (Mid-Rise) (Townhomes)	221	175	Dwelling Units	5.44	952	0.36	16	47	63	0.44	47	30	77
Office	710	90	1000 SF/GLA	9.74	877	1.16	90	15	104	1.14	16	86	103
Shopping Center	820	400	1000 SF/GLA	37.75	15100	0.94	233	143	376	0.44	84	92	176
Total Trips					18561		367	284	651		228	259	132
Minus Linked Trips		20%			-3712		-73	-57	-130		-46	-52	-26
Total Driveway Trips					14848		294	227	521		183	207	106
Minus Pass-by Trips		0%			0		0	0	0		0	0	0
Total New Trips					**14848**		**294**	**227**	**521**		**183**	**207**	**106**

Notes
Data from ITE Trip Generation Manual 10th Edition

AMERICAN GEOSERVICES

Initial Geotechnical Evaluation Report

Glenwood Meadows No.6 Housing, Wulfsohn Rd and West Meadows, Glenwood Springs, CO

Date: July 22, 2020; Project No: 0280-WS2020



AMERICAN GEOSERVICES

GEOTECHNICAL & MATERIALS
ENVIRONMENTAL
STRUCTURAL
CIVIL
ENGINEERING AND SCIENCE

888-276-4027

July 22, 2020

PROJECT NO: 0280-WS20

Client: Mr. Gregg Baumann
BLDGROUP
1500 Cordova Road Suite 300
Ft. Lauderdale, FL 33316

Ref: Initial Geotechnical Evaluation Report, Glenwood Meadows No.6 Housing, Wulfsohn Rd and West Meadows, Glenwood Springs, CO

Dear Mr. Baumann,

At your request, we have completed the initial geotechnical evaluation for the referenced project. Results of our evaluation and design recommendations are summarized below.

PROJECT INFORMATION

The subject property consists of parcels as shown in attached figures. The property is gently to moderately sloping downwards to the north-northeast (NNE) with elevations in the range of approximately 5840-5980 feet above mean sea level (MSL). General vicinity area has a gentle northerly downward slope. Access to the site is via Wulfsohn Rd and the property is located south of it. See attached Figure 1 and Figure 2, aerial photographs, and site photographs for illustrations and visual information on existing site conditions.

The site is currently vacant, undeveloped, and without any residential, commercial, or industrial structures. The adjacent and surrounding area consists of a low density commercial/residential structures. We understand, the proposed development may consist of building multistory residential structures, most likely less than ten stories high. Considering the site topography, we anticipate significant site grading for this project. As discussed below in this report, the site is located in the moderate soil hazard zone and landslide hazard zone or in proximity of geologic

hazards. Therefore, it is imperative that the project team works closely with AGS to assure site stability especially during construction as well as after construction. We anticipate proposed structures will be constructed with moderate foundation loads. High foundation loads (>5000 psf bearing pressures) are not anticipated. If these proposed conditions change, we should be contacted to modify our report.

SCOPE OF WORK

During May through July 2020, several site visits were made, as well as, a total of eleven (11) Standard Penetration Test (SPT) equivalent borings (B1 through B11) were drilled at locations shown in Figure 2. Borehole locations and depths were chosen based on soil conditions, the presence or absence of boulders, accessibility, proposed construction, and the results of our desk study.

Using Standard Penetration Test (SPT) drill rigs, SPT borings were extended to the maximum exploration depth of approximately 50 feet below the existing ground surface where refusal to drilling was noted. The drill rig was equipped with solid-stem and/or hollow-stem continuous-flight augers. The augers were used to advance the boreholes and samples were obtained using standard split-spoon sampler and a California ring sampler. The sampler was driven using an automatic hammer weighing 140 pounds falling a distance of 30 inches. The sampler was first seated into the bottom of the borehole, and then driven 12 inches. The number of blows required driving the sampler 12 inches, or a fraction thereof, constitutes a penetration test and is similar to the SPT testing standards as per American Society for Testing and Materials ASTM D1586. The penetration tests, when evaluated, provide an index to the soil strength and density of the material tested. The penetration test results are shown on the individual borehole log included in an appendix. The Legend and Notes necessary to interpret our borehole logs are also included in an appendix.

After the completion of drilling, boreholes were backfilled with soil cuttings. Samples of subsurface soil materials were collected at regular intervals during drilling. The samples were visually inspected, logged, placed in a sealed container, and transported to testing laboratory for further visual evaluation. Groundwater level measurements were taken during drilling and after the completion of drilling. Data obtained from site observations, subsurface exploration, laboratory evaluation, and previous experience in the area was used to perform engineering analyses. Results of engineering analyses were then used to reach conclusions and recommendations presented in this report.

In addition, Williamson Drive Probe (WDP) apparatus along with soil augers were used to perform soil explorations in some areas based on accessibility issues. The WDP is a “relative density”

exploration device which is used to determine the distribution and to estimate strength of the subsurface soil and decomposed rock units. The resistance to penetration is measured in blows-per-1/2 foot of an 11-pound hammer which free falls roughly 3.5 feet driving the ½ inch diameter pipe into the ground. This measure of resistance to penetration can be used to estimate relative density of soils. For a more detailed description of this geotechnical exploration method, please refer to the Slope Stability Reference Guide for National Forests in the United States, Volume I, EM-7170-13, August 1994, p. 317-321. A representative schematic of WDP is included in appendix along with the published data on correlation between WDP and SPT. The penetration test results are shown on the individual Borehole Log included in the appendix. The Legend and Notes necessary to interpret our Borehole Logs are also included in the appendix.

SUBSURFACE SOIL/BEDROCK CONDITIONS

Subsurface conditions encountered in our boreholes are described in detail in the Borehole Logs provided in an Appendix. Soil classification and identification is based on commonly accepted methods employed in the practice of geotechnical engineering. In some cases, the stratigraphic boundaries shown on Borehole Logs represent transitions between soil types rather than distinct lithological boundaries. It should be recognized that subsurface conditions often vary both with depth and laterally between individual borehole locations. The following is a summary of the subsurface conditions encountered at the site:

Topsoil: Site is underlain by roughly up to 6 inches of topsoil.

Native Debris Fan Deposit: Below topsoil, the site is primarily underlain by generally medium dense to dense mixtures of sands, silt, gravel, cobble, and occasional boulders (ML/GM, GM-ML GM), extending to the maximum depth of exploration. Based on the results of our explorations, our review of available geologic literature, water well logs, and available geotechnical data from past projects in the site vicinity, and our local experience, in our opinion, the debris fan deposit extends to depths of 100-125 feet. These soils exhibit extremely low plasticity or considered non-plastic with minimal expansive/heave potential.

Based on the results of our lab testing and our local experience, these soils have a low to moderate potential for collapse and may results in excessive differential foundation settlements, if proper mitigation and foundation design are not performed as per the geotechnical engineer's recommendations.

Completely to Partially Weathered Eagle Valley Formation: Below the upper debris fan deposit, the site is underlain by completely weathered evaporite sequences interbedded with mudstone, sandstone, and shale extending to several tens of feet. This bedrock material is not

known to cause any sinkholes in the site vicinity area. At the time of our site visits, there was no visual evidence of sinkholes. The site and the immediate vicinity area is not known or mapped as having evaporite-related sinkhole hazards.

GROUNDWATER

Groundwater was not encountered below the ground surface during or after exploration. Based on our experience in the project vicinity area, the stable groundwater table is not expected to be encountered within the anticipated project excavation depths. Groundwater table is not a concern for the proposed development.

These observations may not be indicative of other times or at locations other than the site. Some variations in the groundwater level may be experienced in the future. The magnitude of the variation will largely depend upon the duration and intensity of precipitation, temperature, and the surface and subsurface drainage characteristics of the surrounding area.

LABORATORY EVALUATION

During drilling, SPT soil samples and California Ring samples were collected at strategic depths, sealed in air-tight containers, and transported to the laboratory for visual evaluation and testing. Laboratory tests included the following.

Soil Index Properties: Soil index properties including in-situ moisture content and natural dry density, Atterberg Limits, and the percent of soil passing the U.S. No. 200 sieve or gradations were performed. These results were used for classifying soils into categories of similar engineering properties in general accordance with the Unified Soil Classification System (USCS).

Moisture content tests were performed in general accordance with ASTM D 2216. Test procedure included weighing before and after over-drying, and calculation of water content. Dry density was determined from the select California Ring samples in general accordance with ASTM D2937 procedure. Sample dimensions were determined to calculate volume, the sample was weighed, and moist unit weight was calculated. Dry density was then estimated based on moist unit weight and moisture content. Atterberg Limits were determined in general accordance with ASTM D4318. Tests included the determination of Liquid Limit, Plastic Limit, and the estimation of Plasticity Index.

Swell-Consolidation Tests: One-dimensional swell-consolidation tests were performed in general accordance with ASTM D 4546 Method B. California Ring samples were extruded and loaded in a fixed ring consolidometer which measures vertical change in volume for different

loading conditions. Pore water was allowed to drain from the top and bottom of the sample. Samples were inundated with water at a particular loading condition and then allowed to swell. The swelled sample was loaded down to reach the original volume. Each sample was prepared and placed in a confining ring between porous discs, then subjected to a surcharge pressure of up to 1,000 psf and allowed to consolidate before being submerged. The sample height was monitored until sample deformation was minimal under the given load increment. Results of the swell-consolidation tests are plotted as a curve of the final strain at each increment of pressure against the log of the pressure. The results of all the laboratory tests are mentioned on the borehole logs.

LANDSLIDE HAZARDS CONSIDERATIONS

Based on the results of our site reconnaissance, geologic literature review, and limited subsurface exploration, we have performed a preliminary geologic hazards evaluation for the site. The site should be developed considering the geologic hazards discussed below, and a final detailed geologic hazards evaluation should be performed after the project design is made available for review.

Landslides: Our review of available geologic maps and landslide hazard maps did not indicate that landslides had occurred at the site or in the site vicinity area, and the site is not located within the existing known landslide area. During our site reconnaissance and in the available geologic and geologic hazards maps, landslide features were not mapped within the site boundary area. Our site reconnaissance did not reveal any significant potential for slope failures at the site. At present, there are no visual signs of slope failures such as tension cracks, several bent trees, unusual drainage patterns and vegetation, deep ground cracks, headscarp areas, leaning retaining walls, or significant settlements or movements in any existing structures, etc.

However, in general, the site vicinity area to the south of the subject site is close to or within the zone designated as having landslide potential. The site itself has not been subjected to the deep-seated landslides or slope failures. However, the closest landslide hazard area of concern is located just a few hundred feet to the south and uphill of the site boundaries as shown in Figure 6.

Evaluation of ancient landslide analysis was beyond our scope of services. In general, any ancient landslide mass (If present) or landslide deposit (if present) or mapped geologic hazard areas are more likely to become unstable, relatively, compared to the areas that are not mapped as geologically hazardous. It is possible that there have been historic landslides, deep-seated landslides, or recently developed landslides (however inactive) present within or in the immediate vicinity of the site boundaries, or in the site vicinity area. Historically, for sites located within such

critical slope areas next to lakes on steep slopes, there is an inherent higher risk associated with future ground movement and associated structural distress. The owner/client should be aware of this inherent risk and should assume the entire risk.

Inherent Risk: Considering the site topography, site geologic conditions, and current surface and subsurface conditions, it is our opinion that the immediate site and the vicinity area have some 'inherent' risk associated with slope instability and structural impact from local slope movements. Moreover, historically, with construction in such areas, there is always an inherent risk associated with ground movement and/or settlements and related structural damage. The owner should understand these inherent risks. If the owner wants to better understand the risks and to eliminate the site-specific landslide hazard risks, then a detailed and comprehensive geotechnical evaluation including deep drilling, inclinometer installations, detailed slope stability modeling, and a detailed geologic hazards assessment (including global landslide hazards evaluation) should be performed to quantify the abovementioned risks and to provide detailed geotechnical design recommendations for comprehensive mitigation measures. Unless these recommended studies are performed, the owner is completely responsible for taking all risks associated with any future potential for instability at the site or in the site vicinity.

Life Safety Risk: We evaluated available historic aerial photographs and published maps including geologic maps, USGS quadrangles and topographic maps, and City/County GIS data. The landslide terrain and the vicinity area are such that, under normal conditions, there exists some potential for a future shallow slope failure, based on the slopes, distance to the fault zones, local geology, and especially if excessive cuts or grading or roads or extensively modifications of the terrain by anthropogenic activity, and forest loss occurs. However, in our opinion, the life safety risk to the occupants from such a shallow slide is extremely low provided all our recommendations given in this report are strictly followed.

There is a likelihood of the occurrence of an event of a size and in a location that would cause casualties, damage, or disruption to an existing standard of safety at the site, especially during a seismic event; although a detailed slope stability analyses under seismic conditions was beyond our scope of services. The project site vicinity conditions are landslide-prone area during seismic event, and thus the expected location and extent of the effects of the activation of any slides within site vicinity area exists under poor construction practices and especially under the absence of geotechnical oversight. The anticipated severity of the landslide activation effects on the on-site structures and future structures can be determined only by performing extensive subsurface explorations and detailed slope stability analyses under static and seismic conditions for the site vicinity area including the site area.

Historically, with construction in such areas, there is always an inherent high risk associated with ground movement and/or settlements and related structural damage. Again, it is important that the owner understands these inherent high risks. The owner is completely responsible for taking all risks associated with any future potential for instability at the site or in the site vicinity.

Limitation of Liability: There has been a certain amount of variability in legal interpretations of liability of geotechnical engineers and geologists in regard to landslide-related losses; but the conclusions reached are general in nature and not necessarily valid in any specific court. Liability of geotechnical engineers and engineering geologists for landslide damages to home sites is based most often on the theory of negligence and occasionally on negligent misrepresentation. Although allegations seeking to recover damages from geotechnical engineers and geologists on the basis of strict liability, breach of warranty, or intentional misrepresentation are often included in a complaint, they are not usually applicable or valid under normal circumstances. All private property owners should make a note of this.

The conclusions and recommendations given in this report are valid only if AGS services are retained to provide a detailed landslide and rockfall hazard evaluation and detailed geotechnical design report, and only if AGS performs construction observations and testing services during construction. It is our assumption that the current client will retain this project for at least 10 years. If the project and/or property ownership changes, AGS must be contacted to evaluate the limitations of liability and project consulting limitations. It should also be noted that a detailed rockfall hazard evaluation or 'global' landslide hazard evaluation was not part of the current scope of work. Moreover, **AGS has not reviewed or approved any landslide hazard or rockfall hazard mitigation or drainage improvements completed for the uphill properties to the south. We understand these improvements were completed in the recent past (<50 years) after rockfall and/or landslides had occurred in steep slope area present to the south of the site as shown in Figure 6. The stability of the subject property depends upon the stability of the uphill properties. At your request, AGS can perform an extensive review, evaluation, and approval of all the improvements made uphill of this subject property and confirm whether additional mitigation is required or not to protect the subject property from landslide hazards and rockfall hazards.**

ROCKFALL HAZARD CONSIDERATIONS

Site is not located within high rockfall hazard zone, however, the area immediately adjacent to the southern site boundaries, there is a high rockfall hazard potential. **At the time of our site visit, we noted several erratic boulders, up to 5 feet in diameter in areas adjacent to the southern site boundary but not within the subject property. Some of these boulders might have crossed the earthen berm that was constructed in the recent past (<50 years) to**

mitigate the landslide and rockfall hazards present in the steep to extremely steep slopes present adjacent to the south of the property boundary. Therefore, unless a detailed rockfall hazard evaluation is performed for the subject property in consideration of the presence of extremely steep slopes and erratic bounders, in our opinion, a low to moderate potential for rockfall hazard exists. For planning purposes, a rockfall hazard mitigation fence/barrier wall may be considered along the southern property boundary.

A detailed rockfall hazard assessment was not performed; therefore, in order to completely eliminate the rockfall hazards, we should be contacted to perform a detailed rockfall hazard study of the site and the adjacent steep to extremely steep slope areas. Following procedures will be used by AGS to assess rockfall hazards at the site.

- Climbing techniques will be utilized to scale the rock faces and to evaluate problem areas through field observations which will include:

    a. Identifying source areas for rock falls,

    b. Recording the degree of weathering, jointing, faulting, dipping, folding, and deformations of rockmass in source areas,

    c. Noting the freshness of talus deposits, and

    d. Identifying visual indications of recent rockfalls (tree scars, roadway damage, etc).

- Digital pictures of potential problem areas will be taken and evaluated by AGS for potential rockfall hazards.
- Available geologic literature and rockfall hazard literature will be reviewed.
- Relative rock-fall susceptibility will be evaluated using an engineering rock-classification scheme known as Rock-Mass Quality. This scheme is based on the characteristics of rock discontinuities such as joints, fractures, and bedding planes.
- Preliminary digital simulations will be conducted using the Colorado Rockfall Simulation Program (CSRP-3D) to understand the mechanics of potential rockfalls.

Preliminary Slope Stability: Using the results of limited subsurface exploration, laboratory evaluation, and site reconnaissance data, we analyzed on-site slopes by performing preliminary slope stability analyses. We used the software SLOPE/W to model on-site slopes, subsurface soil conditions, and the impact of proposed construction on the stability of the site. Based on the results of our preliminary evaluation, we make following recommendations.

- There is a low potential for shallow slumps or slope failures provided proper geotechnical design and well-monitored construction activities are used to develop the site. Provided proper geotechnical design is done, and all our recommendations are strictly followed, the site will remain stable after proposed construction. Although the potential is low, minor localized and shallow slumps may occur in areas steeper than 2.5H(Horizontal):1V(Vertical); however, their occurrence will not impact the stability of the proposed structures provided they are properly located and designed in accordance with our recommendations given in the following paragraphs.
- All proposed structures should be located **at least 25 feet** from the crest of any slope areas steeper than 2.5H:1V. At the time of construction, AGS should inspect the foundation location and confirm the presence of adequate slope setback.
- Storm water disposal regulations of the local county and the city, and general drainage recommendations given in following sections should be strictly followed.
- In general, areas with moderate to steep slopes present greater construction difficulties. These areas can easily become unstable as the result of poorly planned or non-engineered construction activities such as cuts and fill. Therefore, these areas should not be considered for development or disturbed without a detailed review of site grading plans and house plans by the project geotechnical engineer, and slope stability analysis and foundation design as required once the site grading plans and house plans are completed.

Results of our preliminary slope stability analyses are included in the appendix. However, these results must be confirmed by performing a detailed geotechnical evaluation, extensive laboratory testing program, soil strength parameter determination and confirmation, and risk analysis. The given slope stability results are meant to be used only for planning purposes and not for the project design purposes.

Earthquakes: Based on site geology, topography, and our preliminary evaluation, in our opinion, the site is generally not considered to be located within highly active seismic area. Therefore, anticipated ground motions in the region due to seismic activity are relatively low and do not pose a significant hazard. Ground accelerations more than 0.1g to -0.2g are not anticipated to occur at the site.

Based on the results of our subsurface explorations and review of available literature (Current international Building Code), in our opinion, a site classification “D” may be used for this project. However, this site classification may be revised by performing a site-specific shear wave velocity study.

Subsurface soil conditions at the site are not susceptible to liquefaction. Seismically induced slope instability may occur on a localized scale in the steep slope areas; however, such an evaluation was beyond our scope of services. A detailed seismic hazards evaluation of the site was beyond our scope of services

Expansive Soils and Bedrock: The site is not underlain by expansive clayey soils or clayey sedimentary bedrock materials. In any case, if expansive soil pockets are encountered, mitigation of expansive soils will require over-excavation and replacement with non-expansive soils placed and compacted at a minimum of 95% of its maximum Standard Proctor Dry Density, ASTM D-698. As an option, the use of drilled pier foundation may be considered. Floor slabs on expansive soils should be expected to experience movement. Over-excavation and replacement has been successful in minimizing slab movements. The use of structural floors should be considered for basement construction on highly expansive clays. Final recommendations should be determined after an open-hole inspection is performed by AGS during construction.

Collapsible Soils: The site is most likely underlain by collapsible soils at random locations. In any case, if collapsible soil pockets are encountered, they will require surficial densification or over-excavation and replacement with non-collapsible soils placed and compacted a minimum of 95% of its maximum Standard Proctor Dry Density, ASTM D-698. Refer to geotechnical discussion given in this report regarding collapsible soil potential and recommended mitigation options.

Man-made soils or Artificial Fill: These consist of man-made fill deposits associated with erosion berms and earthen dams. These areas were not present at the time of site reconnaissance. Any earthen dam should be avoided during development unless significant grading is required in the drainage areas. Mitigation of drainage areas is discussed in the following paragraphs.

Seasonal & Potentially Seasonal Shallow Groundwater Areas: These areas have periodically high subsurface moisture conditions and frost-heave potential. In general, these areas lie within the drainages and low-lying areas. These areas are not present at the site. The site is not located within any mapped floodplain zones according to the FEMA Maps. A detailed flood hazard evaluation, or the determination of exact locations of floodplain and specific drainage studies were beyond our scope of services. In any case, as a minimum, finished floor elevations must be at least one foot above the 100-year floodplain elevations. If seasonal shallow groundwater areas are noted during construction, following mitigation measures should be implemented.

Foundations should be placed at least 36 inches below the finished exterior grade for frost protection. In areas where high subsurface moisture conditions are anticipated periodically,

subsurface perimeter drains should be installed to mitigate water intrusion into areas below grade. Proper grading (minimum 2%) should be done to direct surface water run-off around construction to avoid soil saturation or ponding.

Any organic material (including topsoil) should be completely removed from the construction area prior to the placement of fill.

Any potentially seasonal shallow groundwater areas may experience high subsurface moisture conditions and frost-heave potential. These lie within the drainages and low-lying areas and should be avoided using proper development methods or properly mitigated as discussed above. At the site, the potential does not exist for high groundwater during high moisture periods.

Flooding: Our review of available flood hazards map and literature did not indicate that the site is susceptible to flooding due to river, or due to any perennial and intermittent tributaries across the project area. Notwithstanding, a detailed flood hazard evaluation was beyond our scope of services.

Erosion & Gullying: The areas that are undergoing severe erosion by water and sheetwash producing gullies and rill erosion were noted during reconnaissance. Only minor areas of erosion were observed on site at random isolated locations such as the debris flow or drainage fans or gullies. Notwithstanding, due to the nature of on-site soils, majority of the site is subject to erosion by wind and water, unless proper geotechnical measures are implemented during construction. The presence of vegetation generally reduces the potential for erosion. Prior to or during construction, if eroding areas are identified, they should be mitigated using check dams, regrading, and revegetation using channel lining mats and erosion mats to anchor vegetation and promote vegetation. Specific recommendations pertaining to revegetation should be provided by a qualified landscape architect and/or the Natural Resource Conservation Service (previously Soil Conservation Service) officials.

Erosion Control: On-site soils are mildly to moderately susceptible to wind erosion, and moderately to highly susceptible to water erosion. During and immediately after construction, minor wind erosion and dust may occur. This minor hazard may be mitigated by watering exposed and cut areas or the use of a chemical palliative may be considered to control dust. In our opinion, after the completion of construction and re-vegetation at the site, the wind erosion hazard will be significantly reduced.

Any exposed or loosely compacted soils will be the most susceptible to water erosion. In general, residually weathered soils and weathered bedrock materials are significantly less susceptible to water erosion than alluvial soils. For on-site alluvial soils, water erosion hazard can be minimized

by limiting velocities for unvegetated and unlined earth channels to 3 to 4 feet/second, depending upon the sediment load carried by water. Allowable velocities can be increased to 4 to 7 feet/second provided adequate vegetation is used; final numbers depending upon the type of vegetation established. If anticipated velocities exceed these values, channel lining material or conventional riprap may be used to reduce erosion potential. In areas where ditch-lining materials are inadequate to control erosion, small check dams or sediment traps may be used. Check dams generally reduce flow velocities as well as provide small traps for containing sediment. A drainage engineer or civil engineer should determine the amount and location for the placement of ditch linings, check dams, and any special erosion control features.

We anticipate sheetwash and rill erosion in the proposed cut and fill slope areas unless these areas are properly re-vegetated. It should be noted that the unchecked rill erosion eventually leads to concentrated flows of water, which result in gully erosion. Therefore, adequate re-vegetation of cut and fill slope area is important. Cut and fill slope areas steeper than 3H:1V are increasingly more difficult to revegetate. Such areas should be revegetated based on the specific recommendations given by a qualified landscape architect and/or the Soil Conservation Service official.

SEISMIC CONSIDERATIONS

Based on the results of our subsurface explorations and review of available literature (current International Building Code), in our opinion, a site classification “D” may be used for this project. However, this site classification may be revised by performing a site-specific shear wave velocity study. We do not anticipate seismically induced significant liquefaction potential at the site. However, seismically induced slope stability and rockfall hazards may be present and can be fully evaluated only by performing a detailed site-specific seismic hazards evaluation.

GEOTECHNICAL CONSIDERATIONS

Following site conditions pose geotechnical concerns for the proposed construction.

- The presence of potentially collapsible soils in the upper 10-15 feet which are not suitable for foundation support without soil modifications.
- The need for soil modifications, the presence of moderate slopes, and the presence of debris fan deposit, requiring extensive geotechnical oversight during project civil and structural design and during earthwork/construction.
- The presence of erratic boulders north of the existing and recently built rockfall barrier/berm, suggesting that there is a possibility of some boulders to reach the southern site boundary.

These site conditions can lead to significant differential movements (geotechnical risk) or structural distress unless proper geotechnical design and construction methods are implemented. In order to address the geotechnical risk, following geotechnical considerations must be considered.

Basement or Below-Grade Construction: Due to the presence of unsuitable potentially collapsible soils in upper 10-15 feet, basement or below-grade construction will facilitate the automatic removal of unsuitable soils and optimize the foundation costs. If below-grade construction is not proposed, then following ground improvements should be considered for site development. Without value engineering and significant involvement of a geotechnical engineer during the design and construction process, below-grade construction is not recommended.

Ground Improvements: If basement or below-grade construction is not proposed, then ground improvement would be necessary for soils present in the upper 10-15 feet. We suggest following options for ground improvement.

a. No over-excavation option: Use rammed aggregate piers, stone columns, geopiers, or similar methods which compact the soils during installation. We do not anticipate or recommend the depth of these special foundation systems to exceed 50 feet without a detailed value engineering analysis.

b. Shallow over-excavation and backfilling option: Over-excavation of unsuitable soils in upper 5-10 feet (depending upon the building location) and backfilling with geogrid-reinforced structural fill prism. The use of geogrid reinforced structural fill prism is recommended to minimize differential settlements and to significantly improve bearing capacity, while reducing the depth of over-excavation.

c. Deep over-excavation and backfilling option (no geogrid): Over-excavation of unsuitable soils in upper 15 feet and backfilling with compacted structural fill is another viable option, however it may prove to be costly, due to required shoring and excavation related costs. The depth of over-excavation can be reduced after the completion of additional analyses and the review of project plans, including grading plans.

d. Geopolymer (such as **URETEK** or equivalent) injection option: This option may be used in conjunction with shallow over-excavation to further improve bearing capacity and reduce differential settlement potential.

Once a particular ground improvement method or a combination of methods is chosen, and the project plans are made available for review, at your request, we can provide detail design and construction recommendations for ground improvements. A specialty contractor must evaluate the applicability of their ground improvement technology for subsurface soil conditions described earlier.

Conventional Shallow Footings or Post-tensioned Mat Foundation Considerations: After ground improvement, proposed building can be supported on conventional shallow footings or post-tensioned mat foundation. Provided ground improvements are made as stated above, a post-tensioned mat foundation (instead of a conventional mat foundation) is a preferred option. Designer should pay attention to possible settlements in areas adjacent to the site due to mat foundation. It should be noted that the bearing capacity value and all other design values for the mat foundation design will depend upon the location of the mat foundation and the type of ground improvement chosen.

Deep Foundation Considerations: We do not recommend the use of deep foundations such as drilled piers or driven piles or augercast piles for the following reasons:

- Due to the presence of collapsible soils, there will be significant negative skin friction, as well as the use of casing may become necessary, thus increasing the costs significantly.
- Due to the possibility of the presence of boulders at random depths, drilling or driving the piles will be difficult and very costly.
- The end bearing strata for conventional deep foundation systems is expected to be at least 100 feet below the ground surface, thus making the use of conventional deep foundations not only the costliest but also the least effective foundation choice.

Geotechnical Design Parameters: AGS will provide various geotechnical design parameters after the review of proposed civil drawings during the design phase of the project.

CONVENTIONAL SHALLOW SPREAD FOOTINGS

This option can be used provided the owner is willing to take low risk of future differential movement related structural damage due to the presence of potential collapsible soils. In order to manage the risk to some level, following recommendations may be used for construction:

- Foundation subgrades should be prepared as follows assuming favorable weather conditions:
    a. Over-excavate the foundation areas to a depth determined by AGS for each building during the design phase of the project. AGS will provide detailed recommendations on slopes of over-excavation, depth of over-excavation, and backfilling with structural fill using on-site soils to reduce earthwork costs. As a minimum, all the structural fill should be compacted to at least 95% and up to 100 of ASTM D698 maximum dry density as discussed in the fill compaction section of this report. Any non-soil materials encountered in the foundation subgrade level should be removed and backfilled with structural fill.
    b. AGS will perform detailed geogrid-reinforced soil prism analysis and make specific recommendations on the type and number of geogrid layers to be placed within the

structural backfill to minimize the collapsible soils hazards and to improve soil bearing capacity at the same time.

c. Over-excavation recommendation may be modified based on the results of an open-hole inspection to be performed by AGS during construction to evaluate subgrade soil moisture conditions, soil consistency, and soil uniformity.

d. If specific soil conditions are encountered at the foundation level throughout the site during an open hole inspection, AGS may be able to eliminate the above over-excavation requirement and recommend other procedures such as uniformly wetting the subgrade to obtain certain soil moisture content range and surficial compaction/kneading with a kneading compactor. In any case, if recommended, subject to open hole inspection, all subgrade wetting work should be done in the presence of AGS in order to avoid over-saturation of soils and foundation subgrades.

- Foundations bearing upon properly prepared and approved subgrade may be designed for a maximum allowable bearing pressure of **3,000 - 5,000 pounds per square foot (psf)** based on the geotechnical design during the design phase of the project.
- Estimated final structural loads will dictate the final form and size of foundations to be constructed. However, as a minimum, we recommend bearing walls be supported by continuous footings of at least 16 inches in width. Isolated columns should be supported on pads with minimum dimensions of 24 inches square.
- Continuous foundation walls should be reinforced in the top and bottom to span an unsupported length of at least 8 feet to further aid in resisting differential movement. As a minimum, additional reinforcement as shown in Figure 13 should be placed.
- Exterior footings and footings in unheated areas should extend below design frost depth of 36 inches.
- Foundation/basement walls (if used) should be adequately designed as retaining walls and adequate drainage measures as illustrated in Figure 14.

We estimate total movement/heave for foundations designed and constructed as discussed in this section will be 1.0 inch – 1.5 inch, with differential settlements on the order of one-half to three-fourths of the total settlement.

POST-TENSIONED MAT FOUNDATION

Provided ground improvements are made as stated above, a post-tensioned mat foundation may be used to further reduce to potential for differential movement.

Allowable Bearing Capacity and Settlements: It should be noted that the allowable bearing capacity value for the mat foundation design will depend upon the location of the mat foundation and ground improvement techniques. Following bearing capacity values may be considered for preliminary design:

Case 1(Preferred): Post-tensioned mat underlain by 5-foot thick geogrid reinforced fill prism (base layer), which in turn, is underlain by recompacted on-site structural fill…… …..**Up to 5,000 psf***

Case 2: After ground improvement is completed using rammed aggregate piers, stone columns, or geopiers; no over-excavation……..…..**Up to 3,250 psf***

Case 3: Basement or below grade construction; no ground improvements, allowable bearing capacity at 10-15 feet below existing grade……..……**4,000-5,000 psf**

*Ground improvement design to be done by AGS or reviewed and approved by AGS.

The above recommended allowable bearing pressures may be increased by 1/3rd for transient loads. Provided these recommendations are followed, we have estimated total settlements may be in the range of 0.75-1.25 inches for an assumed rigid mat of 150 FT X 250 FT plan dimensions for the given maximum bearing pressures resulting from symmetrically distributed column loads. Differential settlements between the center of the mat and edges and corner of the mat are estimated to be approximately 1/2 to 3/4th of the maximum total settlements. Given estimates must be confirmed after the review of foundation plans including project loading data.

The above settlements are based on elastic theory and the assumption that the mat will be rigid for all practical purposes. The rigidity of mat foundation is a function of soil-structure interaction. It depends upon the modulus of subgrade reaction of soil, mat dimensions, column spacing, and the rigidity of the superstructure. Therefore, AGS should perform settlement analyses after the review of foundation plan and structural design data, to confirm given settlement estimates. If the mat cannot be considered rigid, AGS will compute the soil pressure distribution using soil-structure interaction model such as 'the beam on an elastic foundation' and evaluate the settlement pattern of the proposed foundation using an iterative process.

For preliminary settlement analyses by others, a modulus of vertical subgrade reaction value (K) of 300 pci may be used for structural fill to be placed underneath the mat. This modulus value is based on a 1-Foot square plate, therefore, it must be corrected for the mat shape and size as per the project plans. In addition, the K value may be modified by AGS depending upon the chosen soil modification technique.

The bottom of mat foundation should be placed at least 3 feet below the finished exterior grade. Prepared mat foundation subgrades should be inspected and approved by AGS prior to the placement of concrete.

At your request, AGS will provide detailed design parameters and recommendations for a post-tensioned mat foundation.

SLAB-ON-GRADE

As per the CAGE (Colorado Association of Geotechnical Engineers) guidelines, the "Slab Performance Risk" associated with heaving of native soils is "Low" due to the absence of expansive soils near the surface. Slab-on-grade is a viable option; however, the owner should be aware that there is always some potential risk associated with slab movement, especially if the site is underlain by fill and/or if site modifications as described earlier are not completed. In order to minimize the risk of slab movement, we recommend over-excavation of existing potentially collapsible soils to a depth of at least 5 feet and backfilling with structural fill reinforced with geogrid. Depth of over excavation will depend upon site grading and slab loading. The use of geogrid reinforcement may also become necessary due to the possibility of the presence of variable fill depths. AGS should review the final project plans including slab loading and confirm that excessive settlements will not occur.

A slab-on-grade supported on subgrades after the completion of ground improvements as described earlier, a structural slab, or a post-tensioned slab (PTS) slab is always a more reliable option, especially if the owner is not willing to assume any risk associated with excessive differential slab movement.

For design of floor slabs, a modulus of subgrade reaction of 300 pounds per cubic inch (pci) may be used provided slab-on-grade is placed on properly prepared subgrades. This value can be modified after the project plans are finalized.

We recommend that the construction measures outlined in the following paragraphs be followed to reduce potential damage to floor slabs, should wetting of the subsurface soils occur:

- Prior to the placement of any structural fill, scarify the slab subgrade to a depth of 8 inches, surficially compact it to 95% of the Standard Proctor (ASTM D698) maximum dry density at moisture content within 2% of the optimum, and then proof-roll the subgrade in the presence of AGS representative. Place the structural fill as per the fill placement recommendations given in this report, after the subgrade is approved by AGS representative. Proof-rolling may be performed using a full water truck or a front-end loader with a loaded large bucket.

- Separate floor slab from all bearing walls and columns with expansion joints to allow unrestrained vertical movement. Under any circumstances, floor slab should not extend beneath exterior doors or over foundation grade beams without saw cutting the slab at the beam after construction.

- Frequent control joints should be provided at appropriate spacing to reduce problems with shrinkage and cracking according to ACI specifications. Control joint spacing is a function of slab thickness, aggregate size, slump and curing conditions. The requirements for concrete slab thickness, joint spacing, and reinforcement should be established by the project designer, based on experience, recognized design guidelines and the intended slab use. Placement and curing conditions will have a strong impact on the final concrete slab integrity.

- Floor slabs should be adequately reinforced for given loading and to control cracking.

- The need for a vapor barrier will depend on the sensitivity of floor coverings to moisture. If moisture sensitive floor coverings are proposed for portions of the proposed structure, a capillary break material, typically consisting of a "clean" gravel, should be considered. We can provide additional recommendations if this is the case.

- Provided gravel is desired below the slab, a layer of 4 to 6 inches can be used. Plumbing passing through slabs should be isolated from the slabs and provided with flexible connections to allow for movement. A positive bond break should be provided where plumbing lines enter through the slab. Under slab, plumbing should be avoided if possible and should be brought above the slab as soon as possible. Any drain lines and plumbing lines should be tested before operations.

- Where mechanical equipment and HVAC equipment are supported on slabs, we recommend provision of a flexible connection between the furnace and ductwork with a minimum of 1.5 inches of vertical movement.

- Sidewalks and other exterior flatwork should be separated from the slab and the slab should be designed as an independent unit.

RETAINING WALLS

Foundation walls and basement walls (if used) should be designed to be rigid (unyielding), and not free to rotate. Retaining walls such as elevator pit walls or other similar structures extending below ground floor level that are not supposed to have deflection should be designed for at-rest conditions in accordance with soil design parameters to be provided by AGS during the design phase of the project. If needed, only imported granular backfill meeting CDOT Class 1 structural backfill may be used. Attached Figure 15 and Figure 16 may be used to assist in estimating for

lateral pressure calculations. We should be contacted to provide additional recommendations for any specific site retaining conditions. In addition, we highly recommend AGS reviews retaining structure designs performed by others to facilitate design optimization and value engineering.

Retaining wall backfill should be placed in strict accordance with our earthwork recommendations given below. Backfill should not be over-compacted in order to minimize excessive lateral pressures on the walls. As a precautionary measure, a drainage collection system (drains or geosynthetic drains) should be included in the wall design in order to minimize hydrostatic pressures. A prefabricated drainage composite or drain board such as the MiraDrain 2000 or an engineer-approved equivalent may be installed along the backfilled side of the basement foundation wall.

For preliminary design, foundation walls and basement walls, if used, should be designed to be rigid (unyielding), and not free to rotate. Retaining walls for at-rest conditions can be designed to resist an equivalent fluid density of 55 pcf for on-site materials. Retaining walls for unrestrained conditions (free lateral movement) can be designed to resist an equivalent fluid density of 45 pcf for on-site fill materials and 35 pcf for imported granular backfill or CDOT Class 1 structural backfill. For passive resistance of unrestrained walls, we recommend passive resistance of 300 psf per foot of wall height. A coefficient of friction value of 0.35 may be used for contact between the prepared soil surface and concrete base.

The above recommended values do not include a factor of safety or allowances for surcharge loads such as adjacent foundations, sloping backfill, vehicle traffic, or hydrostatic pressure. The above recommended values do not include hydrostatic pressures as they are based on drained conditions. We should be contacted to provide additional recommendations for any specific site retaining conditions.

SUBSURFACE DRAINAGE

High groundwater table was not encountered during or after the completion of drilling. Nonetheless, proper subsurface drainage is important for long-term performance of the proposed structures.

- A perimeter drain/dewatering system should be installed to reduce the potential for groundwater entering into foundation and slab areas. The lot-specific perimeter dewatering systems should be meticulously designed and connected to the suitable discharge from the lot.

- The subgrade beneath a structural floor system (if any) should be graded so that water does not pond. In addition, drain laterals that span the crawl space are recommended to prevent ponding of water within the crawlspace.
- As a minimum, the subsurface drainage system should consist typically of 4-inch minimum diameter perforated rigid PVC pipe surrounded by at least one pipe diameter of free draining gravel. The pipe should be wrapped in a geosynthetic to prevent fine soils from clogging the system in the future. The pipe should drain by gravity to a suitable all-weather outlet or to a meticulously designed area underdrain system. If an outlet or area underdrain is not available, the subsurface drainage system should be sloped to sump pits with sump pumps having standby capacity in the event of pump failure.
- Surface cleanouts of the perimeter drain should be installed at minimum serviceability distances around the addition. A properly constructed drain system can result in a reduction of moisture infiltration of the subsurface soils. Drains which are improperly installed can introduce settlement or heave of the subsurface soils and could result in improper surface grading only compounding the potential issues.
- The entire design and construction team should evaluate, within their respective field of expertise, the current and potential sources of water throughout the life of the structure and provide any design/construction criteria to alleviate the potential for moisture changes. If recommended drain systems are used, the actual design/layout, outlets, and location should be designed by AGS. The construction means and methods should be observed by a representative of AGS.

SURFACE DRAINAGE

Proper surface drainage should be maintained at the site during and after completion of construction operations. Based on the intended use of the proposed facility, all drainage recommendations provided local, state, and federal regulatory agencies should be strictly followed.

- It is important to follow these recommendations to minimize wetting or drying of the foundation elements throughout the life of the facility. Construction means and methods should also be utilized which minimize improper increases/decreases in the moisture contents of the soils during construction.
- The ground surface adjacent to buildings should be sloped to promote rapid run-off of surface water. We recommend a minimum slope of six inches in the first five horizontal feet for landscaped or graveled areas. These slopes should be maintained during the service life of buildings.

- Landscaping should be limited around building areas to either xeri-scaping, landscaping gravel, or plants with low moisture requirements. Irrigation should be minimal and limited to maintain plants. Roof downspouts should discharge on splash-blocks or other impervious surfaces and directed away from the building. Ponding of water should not be allowed immediately adjacent to the building.
- Upper 2 feet of exterior grading or landscaping fill placed immediately adjacent to the building (within 10ft) should be relatively impervious to minimize water infiltration adjacent to the building. Do not use plastic membrane in lieu of impervious fill to cover the ground surface.
- Again, positive drainage away from the new structures is essential to the successful performance of foundations and flatwork and should be provided during the life of the structure. Paved areas within 10 feet of structures should slope at a minimum of 2 percent away from foundations, and landscape areas within 10 feet of structures should slope away at a minimum of 8 percent.
- Downspouts from all roof drains, if any, should cross all backfilled areas such that they discharge all water away from the backfill zones and structures. Drainage should be created such that water is diverted away from building sites and away from backfill areas of adjacent buildings.

See Figure 14 for typical drainage details for shallow footings, which may be used wherever applicable. At your request, we can provide specific drainage recommendations after the review of detailed project plans, including civil engineering drawings. For any underground retention/detention structures, we should be contacted to review and approve the civil drawings and to evaluate leakage criteria, if any.

GENERAL EARTHWORK

At the time of report preparation, grading plans were not available. If cuts and fills will exceed 4 feet of depth, we must be contacted for specific earthwork recommendations, especially stability of adjacent structures, shoring requirements, cut slopes, oversite site slope stability, and construction dewatering. In any case, site grading should be carefully planned so that positive drainage away from all structures is achieved. Following earthwork recommendations should be followed for all aspects of the project.

Shoring and/or slope stability may become an important element of project planning for this site, if below-grade construction is planned. In general, proper shoring design and slope/cut stabilization should be performed and a shoring system or retaining walls installed in order to maintain on-site and off-site stability during construction.

EXCAVATIONS

Materials encountered at this site may be excavated with conventional mechanical excavating equipment including some specialized equipment for boulder removal. Although our borings did not encounter “buried” foundation elements or other structures or debris, these materials will most likely be encountered during excavation activities. In older urban areas, it is highly likely to have miscellaneous underground structures, facilities, and debris materials such as brick, wood, concrete, abandoned utility lines, cisterns, buried fuel tanks. If encountered, these non-soil materials should be removed from the site and all cavities and voids should be backfilled with compacted structural fill.

Temporary excavations should comply with OSHA and other applicable federal, state, and local safety regulations. In our opinion, OSHA Type B/C soils will be encountered at this site during excavations. We recommend maximum allowable unbraced temporary excavation slopes of 1.25:1(H:V) for Type B/C soils for excavations up to 15 feet deep, only after cut stability analyses are performed. The cut stability analyses are recommended due to the presence of upslopes and debris fan deposit which may become unstable if they are not properly excavated or supported. Permanent cut slopes are anticipated to be stable at slope ratios as steep as 2H:1V (horizontal to vertical) under dry conditions. New slopes should be revegetated as soon as possible after completion to minimize erosion.

We recommend a minimum of 10 feet of clearance between the top of excavation slopes and soil stockpiles or heavy equipment or adjacent structures (subject to approval of AGS). If braced excavations are to be used, they should be reviewed and designed by AGS. It should be noted that near-surface soils encountered at the site will be susceptible to some sloughing and excavations should be periodically monitored by AGS.

If excavation is performed under water table, or excavation is made steeper than OSHA recommendations, proper shoring should be provided. It is contractor’s responsibility to assure safety during excavation and earthwork operations.

CONSTRUCTION DEWATERING

Due to the absence of high-water table, construction dewatering may not be critical for this project, as long as excavations do not exceed 15 feet below existing site grades. As a minimum, an

interceptor drain outside the entire uphill perimeter of proposed buildings may be considered with proper discharge and proper maintenance during construction.

During construction in wet or cold weather, grade the site such that surface water can drain readily away from the building areas. Promptly pump out or otherwise remove any water that may accumulate in excavations or on subgrade surfaces and allow these areas to dry before resuming construction. Berms, ditches, and similar means may be used to prevent storm water from entering the work area and to convey any water off-site efficiently.

FILL MATERIAL SPECIFICATIONS AND PLACEMENT

Following fill material specifications may be used, however, AGS should evaluate the suitability of all proposed fill materials prior to placement. In general, fill material should be a non- expansive soil free of vegetation, brush, sod, trash and debris, and other deleterious substances, and should not contain rocks or lumps having a diameter of more than 5 inches. A fill material should be considered non-expansive if the swell potential under a 200 psf surcharge pressure does not exceed 0.5%. Swell potential should be confirmed by performing a swell test on a remolded sample (95% ASTM D698 maximum dry density at optimum moisture content). We anticipate on-site soils, including existing fill will generally meet the requirements for non-expansive fill.

On-site fill materials: Excavated on-site fill materials may be reused in the non-foundation areas such as slabs, pavements, and landscape areas, provided they are free from organics and any non-soil materials. Highly plastic clays or weathered sandstone/claystone bedrock should not be re-used on-site except in landscaped areas.

Structural fill materials: Structural fill under the foundations should be non-expansive and free from organics and non-soil materials. Imported structural fill should consist of sand or gravel material with a maximum particle size of 2 inches or less. In addition, this material shall have a liquid limit less than 35 and a plasticity index of 10 or less. Structural fill should also have a percent fine less than 20 percent passing the No. 200 sieve. Colorado Department of Transportation (CDOT) Class 1 structure backfill meets these requirements.

Subslab Fill materials: Structural fill placed beneath floor slabs, pavements, and exterior flatwork areas may consist of moisture-conditioned on-site granular soils or non-expansive imported soil materials. Imported non-expansive fill materials should have a maximum of 30% passing the No. 200 sieve, a maximum Liquid Limit of 35, and a maximum Plasticity Index of 15.

Utility Trench Backfill: Materials excavated from the utility trenches may be used for trench backfill above the pipe zone fill provided they do not contain unsuitable material or particles larger than 4 inches and are outside of areas requiring structural fill or subslab fill.

Pipe Bedding Material: Pipe bedding material should be a free-draining, coarse-grained sand and/or fine gravel. Some of the on-site sand and gravel mixtures may be suitable as pipe bedding fill materials.

Fill Compaction Criteria: In general, we recommend the following fill compaction criteria, which may be modified as deemed necessary after the review of project plans and project team discussions.

Fill Location	Minimum % of ASTM D698 Standard Proctor Maximum Dry Density	Moisture Content
All areas sensitive to differential settlement	100	Within 2% of OMC
Underneath mat foundation	98	Within 2% of OMC
Area within 10ft of the edges of mat foundation	98	Within 2% of OMC
Floor slabs, garage slabs, and pavements	95	Within 2% of OMC
Retaining wall foundations	95	Within 2% of OMC
Retaining wall backfill	90	Within 2% of OMC
Landscape and other non-structural areas	85	Within 2% of OMC

Fill Placement: All fill subgrades should be prepared uniformly and scarified to a depth of at least 8 inches and recompacted to at least 95% of the standard Proctor (ASTM D698) maximum dry density at moisture contents recommended above. Fill material should then be placed under proper moisture control, in uniform horizontal layers (lifts) not exceeding 8 inches, before compacting to the required density and before successive layers are placed. If the contractor's equipment is not capable of properly moisture conditioning and compacting 8-inch lifts, then the lift thickness shall be reduced until satisfactory results are achieved.

Permanent fill slopes are anticipated to be stable at slope ratios as steep as 2H:1V (horizontal to vertical) under dry conditions. New slopes should be revegetated as soon as possible after completion to minimize erosion.

AGA representative should observe prepared fill subgrades and fill placement on a full-time basis.

PAVEMENT DESIGN & CONSTRUCTION

Pavement design assumes pavement structure as a layered system that is used to adequately distribute concentrated vehicular traffic loading to subgrade soils. Therefore, the performance of the pavement structure is related to proper characterization of the physical properties of subgrade soils as well as traffic loading.

Subgrade Soil Improvement: Unless the owner is willing to assume a low to moderate risk for differential movement associated with collapsible soils, subgrade soils may be over-excavated and backfilled with structural fill as per the recommendations given for the proposed foundations. The use of geogrids may also be considered to minimize the over-excavation depths. Once the project is finalized and traffic data is made available to us, we can provide specific subgrade improvement recommendations including geogrid specifications and depth of over-excavation for different areas.

Subgrade Soil Characterization: Based on the results of our subsurface exploration, we anticipate sandy-silty soil subgrades for pavements, which is equivalent to soil classification A-2, in accordance with American Association of State Highway and Transportation Officials (AASHTO). All pavement subgrades should be proof-rolled and approved by a registered geotechnical engineer from our office prior to the placement of base rock or pavement materials.

Based on the results of our laboratory testing and the engineering evaluation, we have estimated a Hveem Stabilometer “R’ value of 10 for the subgrade soils.

Pavement Section: We used the modified AASHTO pavement design method for the preliminary design of pavements and assumed standard Equivalent Daily Load Application (EDLA) or Equivalent Single Axle Load (ESAL) values for automobile parking, access driveways, and fire lanes for a typical 6-7 multistory residential project with 15-20 buildings and a design life of 20 years. Results of our design are summarized below and illustrated in Figure 17.

Pavement Area	Full-depth AC (Inches)	AC + ABC (Inches)	PCC (Inches)
Parking	5.0	3.5 AC + 6.0 ABC	5.5
Driveways, Fire Lanes, and Heavy Traffic / Loading Areas	6.5	4.5 AC + 6.0 ABC	6.0
AC: Asphaltic Concrete; ABC: Aggregate Base Course; PCC: Portland Cement Concrete			

If specific pavement loading is planned or if some of our recommendations given here cannot be followed, we should be contacted immediately. We recommend the use of PCC (instead of AC) in areas of loading/unloading, concentrated loading, and turning movements by heavy vehicles. These areas typically include delivery zones, entrances, and trash collection/dumpster locations.

Pavement Construction: Pavement areas should be over-excavated as per the recommendations given for the soil modifications. A minimum of 4 feet of over-excavation and the placement of geogrid is anticipated for the pavement area; however, final over-excavation depths will be determined during the geotechnical design phase of the project. Over-excavated and re-compacted subgrade should be inspected and approved by AGS, prior to the placement of structural fill. This recommendation can be modified based on the chosen ground modification method and final grading plans.

All pavement subgrades should be proof-rolled with a full water truck or a heavily loaded pneumatic-tired vehicle. All pumping areas and heavily deformed subgrades should be removed and replaced with structural fill. AGS representative should inspect and approve the final pavement subgrades prior to the placement of base layer.

All PCC pavement should have adequate construction joints, including longitudinal and transverse joints. All joints should be formed during construction or sawed into freshly setting concrete prior to uncontrolled cracking. All formed joints should be properly sealed. Proper curing procedures should be used to protect PCC pavements from moisture loss, freezing, rapid temperature change, and mechanical injury. Traffic should not be allowed during the first week after pavement construction.

Pavement areas should be properly graded, and adequate drainage provided to assure quick removal of water or surface run-off from pavement areas. Ponding of water should not be allowed. All joints and curb areas should be properly sealed to minimize water infiltration. Proper and routine maintenance including annual crack repair and 5-6 year overlays should be performed to assure long-term performance of AC pavements. Similarly, regular maintenance and sealing of concrete joints should be done for PCC pavements. Deicing salts should not be used during the first year after pavement construction.

All pavement materials and placement methods should conform to the requirements given in the most current Colorado Department of Transportation's (CDOT) "Standard Specifications for Road and Bridge Construction." In addition, all applicable specifications and requirements of the local City should be followed. Pavement materials should be submitted for our review and tested for conformance with CDOT and local City specifications.

COLD WEATHER CONSTRUCTION

If earthwork is performed during the winter months when freezing is a factor, no grading fill, structural fill, or other fill should be placed on frosted or frozen ground, nor should frozen material be placed as fill. Frozen ground should be allowed to thaw or be completely removed prior to placement of fill. A good practice is to cover the compacted fill with a "blanket" of loose fill to help prevent the compacted fill from freezing overnight. The "blanket" of loose fill should be removed the next morning prior to resuming fill placement.

During cold weather, foundations, concrete slabs-on-grade, or other concrete elements should not be constructed on frozen soil. Frozen soil should be completely removed from beneath the concrete elements, or thawed, scarified and re-compacted. The amount of time passing between excavation or subgrade preparation and placing concrete should be minimized during freezing conditions to prevent the prepared soils from freezing. Blankets, soil cover or heating as required may be utilized to prevent the subgrade from freezing.

CONCRETE & STEEL CONSTRUCTION

Concrete sidewalks and any other exterior concrete flatwork around the proposed structure may experience some differential movement and cracking. While it is not likely that the exterior flatworks can be economically protected from distress, we recommend following techniques to reduce the potential long-term movement:

- Scarify and re-compact at least 8 inches of subgrade material located immediately beneath structures.
- Avoid landscape irrigation and moisture holding plants adjacent to structures.
- Thicken or structurally reinforce the structures.

Based on our experience, for this site, we anticipate Class 0 severity exposure to sulphate attach on concrete as per ACI 201 standards for all concrete in contact with the soil on this site. Calcium chloride should not be added. Concrete should not be placed on frost or frozen soil. Concrete must be protected from low temperatures and properly cured.

We anticipate corrosive potential for on-site soils. A qualified corrosion professional should evaluate site conditions and provide proper recommendations for buried metal structures.

ADDITIONAL SERVICES

We recommend retaining AGS services to provide value engineering for ground modifications, retaining structures and foundation structural design review due to soil-structure interaction complexities and ground modification requirements involved due to the presence of collapsible soils.

We recommend that AGS services are retained to provide a detailed geotechnical design report after the project design data is available, and construction observation/testing services to document and confirm that our recommendations are properly followed. This will facilitate easy modifications of recommendations provided in this report, in case variations and unknown soil/geotechnical conditions are encountered during construction. AGS will not be responsible for the implementation of all the recommendations provided in this report if these services are not performed by AGS.

It should also be noted that a detailed rockfall hazard evaluation and/or 'global' landslide hazard evaluation was not part of the current scope of work. Moreover, AGS has not reviewed or approved any rockfall hazard or drainage improvements completed in the recent past for the uphill properties located to the south of the subject site. The stability of the subject site depends upon the stability of the adjacent uphill properties. At your request, AGS can perform a detailed rockfall hazards evaluation of the uphill properties and the subject property, as well as an extensive review, evaluation, and approval of all the improvements made on the uphill properties located to the south of the subject site. This evaluation is critical to confirm whether additional mitigation is required or not to protect the subject site from future rockfall or global landslide events occurring on the adjacent southern properties located in proximity of the site.

PROJECT ASSUMPTIONS and LIMITATIONS

The recommendations given in this report are valid only if AGS services are retained to provide a detailed geotechnical design report and if AGS performs construction observations and testing services during construction. It is our assumption that the current client will retain this project for at least 10 years. If the project and/or property ownership changes, AGS must be contacted to evaluate the limitations of liability and project consulting limitations. It should also be noted that a detailed rockfall hazard evaluation or 'global' landslide hazard evaluation was not part of the current scope of work. Moreover, AGS has not reviewed or approved any rockfall hazard or drainage improvements completed for the uphill properties to the south. The stability of the subject property depends upon the stability of the uphill properties. At your request, AGS can perform an extensive review, evaluation, and approval of all the improvement made uphill of the subject site and confirm whether additional mitigation is required or not.

Evaluation of any kind of existing structures was beyond our scope of services. Recommendations contained in this report are based on our field observations and subsurface explorations, limited laboratory evaluation, and our present knowledge of the proposed construction. It is possible that soil conditions could vary between or beyond the points explored. If soil conditions are encountered during construction that differ from those described herein, we should be notified so that we can review and make any supplemental recommendations necessary. If the scope of the proposed construction, including the proposed loads or structural locations, changes from that described in this report, our recommendations should also be reviewed and revised by AGS.

Our Scope of Work for this project did not include research, testing, or assessment relative to past or present contamination of the site by any source. If such contamination were present, it is highly likely that the exploration and testing conducted for this report would not reveal its existence. If the Owner is concerned about the potential for such contamination, additional studies should be undertaken. We are available to discuss the scope of such studies with you. No tests were performed to detect the existence of mold or other environmental hazards as it was beyond Scope of Work.

Local regulations regarding land or facility use, on and off-site conditions, or other factors may change over time, and additional work may be required with the passage of time. Based on the intended use of the report within one year from the date of report preparation, AGS may recommend additional work and report updates. Non-compliance with any of these requirements by the client or anyone else will release AGS from any liability resulting from the use of this report by any unauthorized party. Client agrees to defend, indemnify, and hold harmless AGS from any claim or liability associated with such unauthorized use or non-compliance.

In this report, we have presented judgments based partly on our understanding of the proposed construction and partly on the data we have obtained. This report meets professional standards expected for reports of this type in this area. Our company is not responsible for the conclusions, opinions or recommendations made by others based on the data we have presented. Refer to American Society of Foundation Engineers (ASFE) general conditions included in an appendix. This report has been prepared exclusively for the client, its' engineers, and subcontractors for the purpose of design and construction of the proposed structure. No other engineer, consultant, or contractor shall be entitled to rely on information, conclusions or recommendations presented in this document without the prior written approval of AGS.

We appreciate the opportunity to be of service to you on this project. If we can provide additional assistance or observation and testing services during design and construction phases, please call us at 1 888 276 4027.

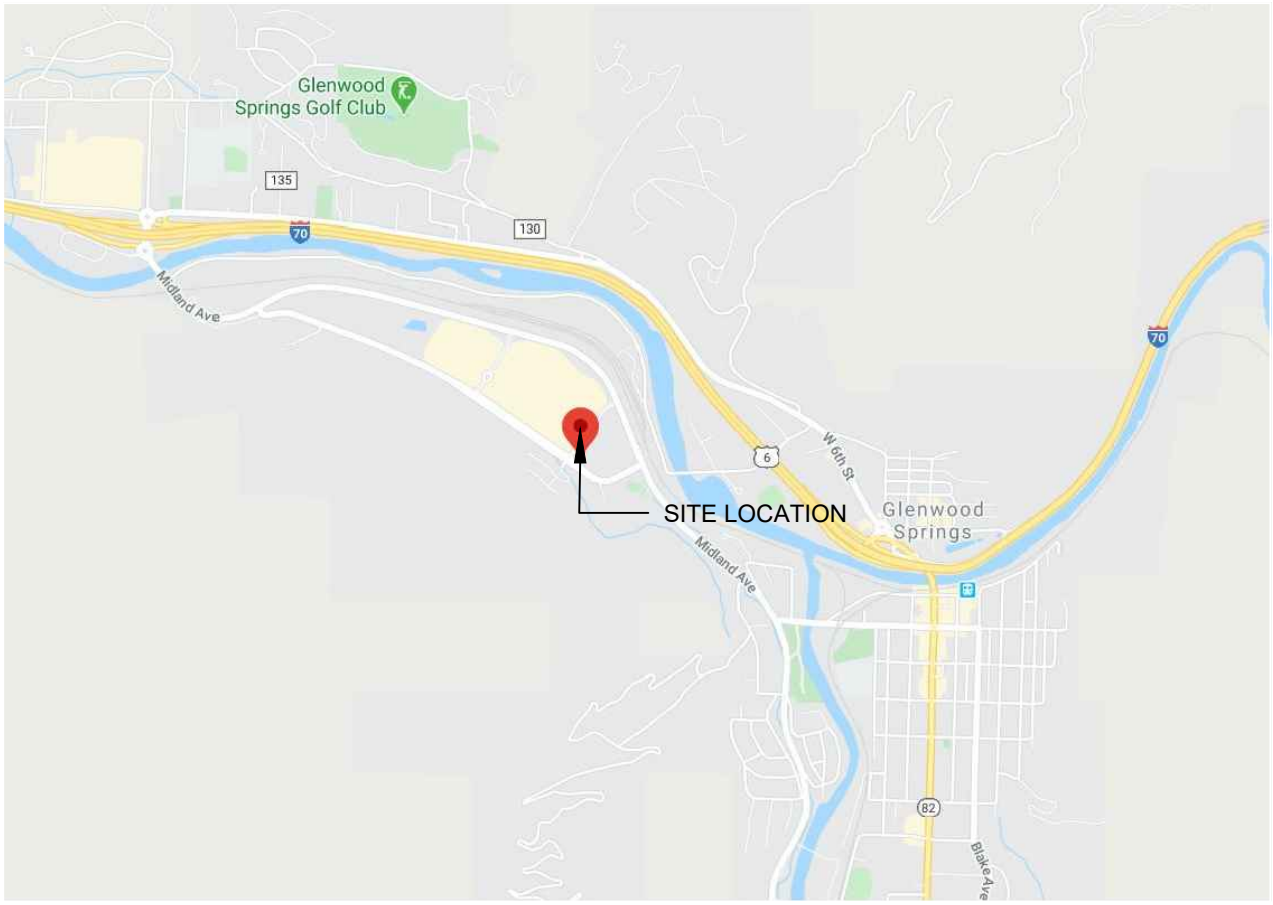
Sincerely,

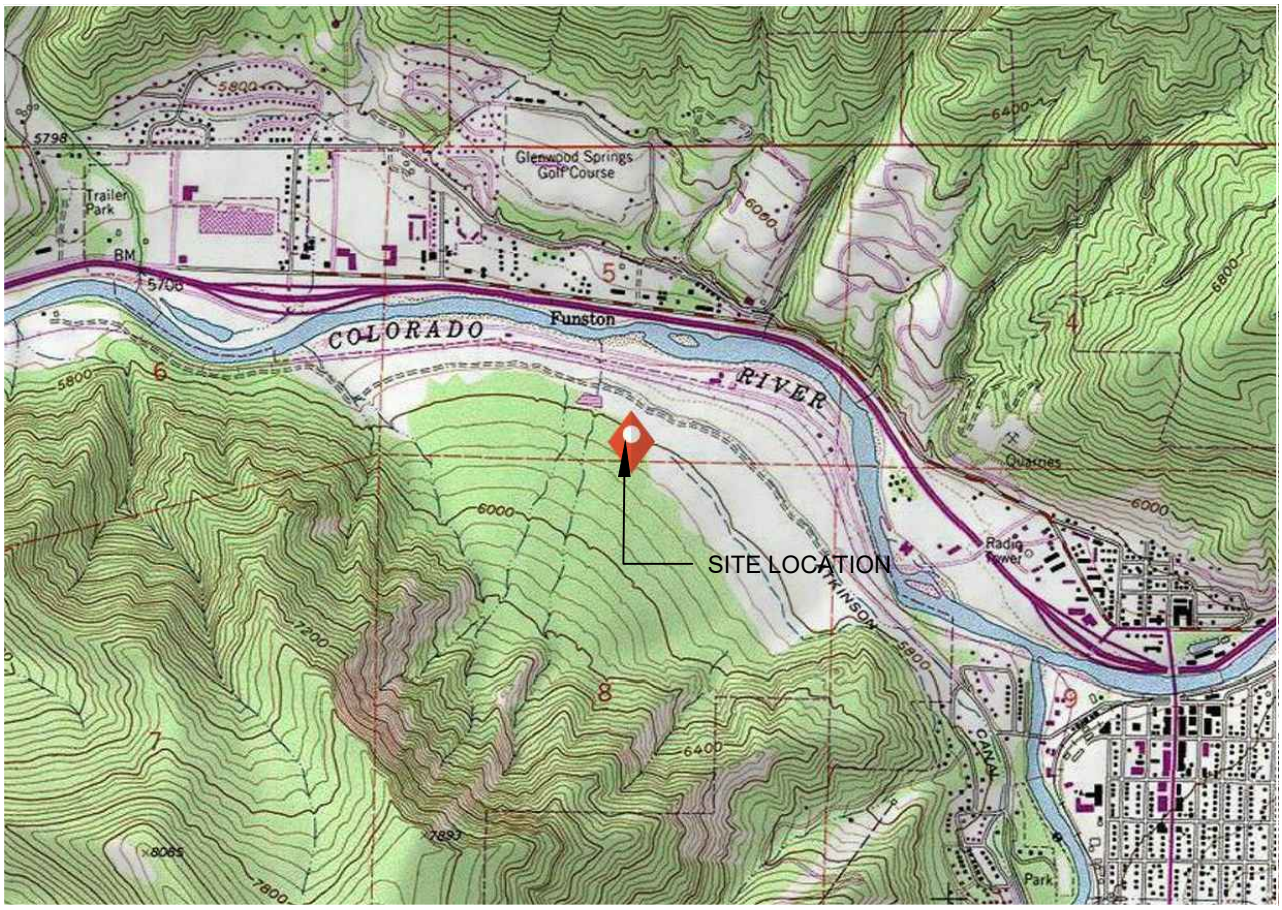


Sam Adettiwar, MS, PE, GE, P.Eng, M.ASCE
Senior Engineer

Attachments

FIGURES



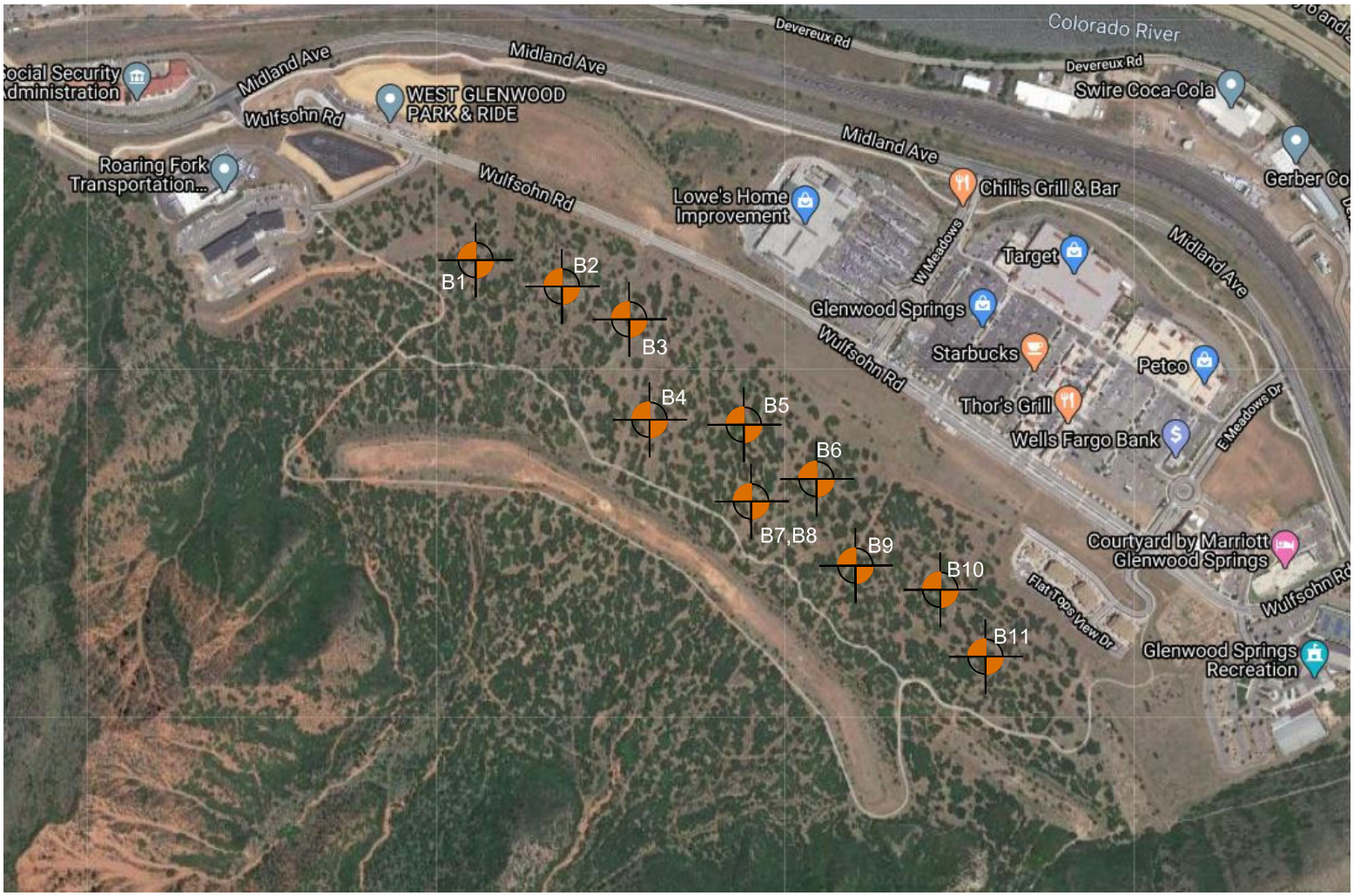


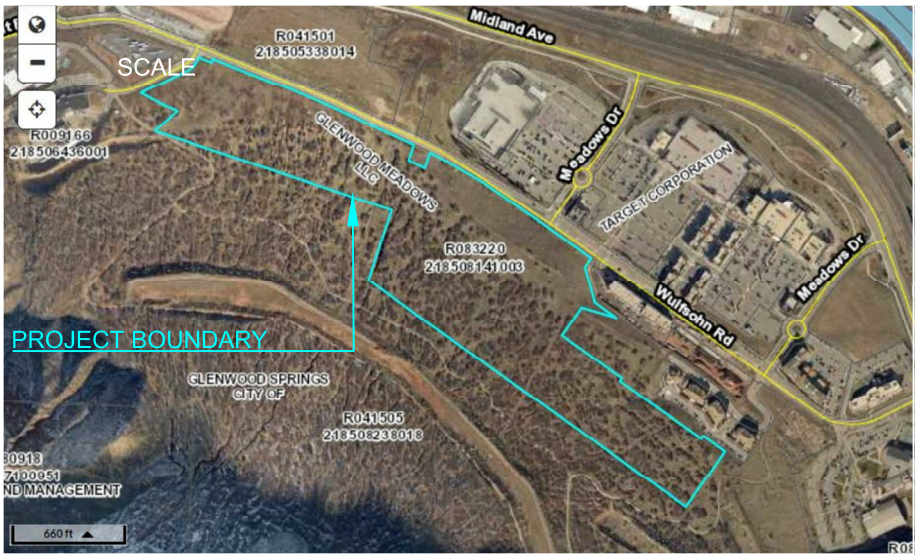
REFERENCE:
GOOGLE MAPS
USGS TOPOGRAPHIC MAPS

N

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

FIGURE 1: SITE LOCATION MAP





NOTE:
SCHEMATIC PLAN TO SHOW APPROXIMATE SUBSURFACE EXPLORATION LOCATION ONLY; NOT SURVEYED.

N

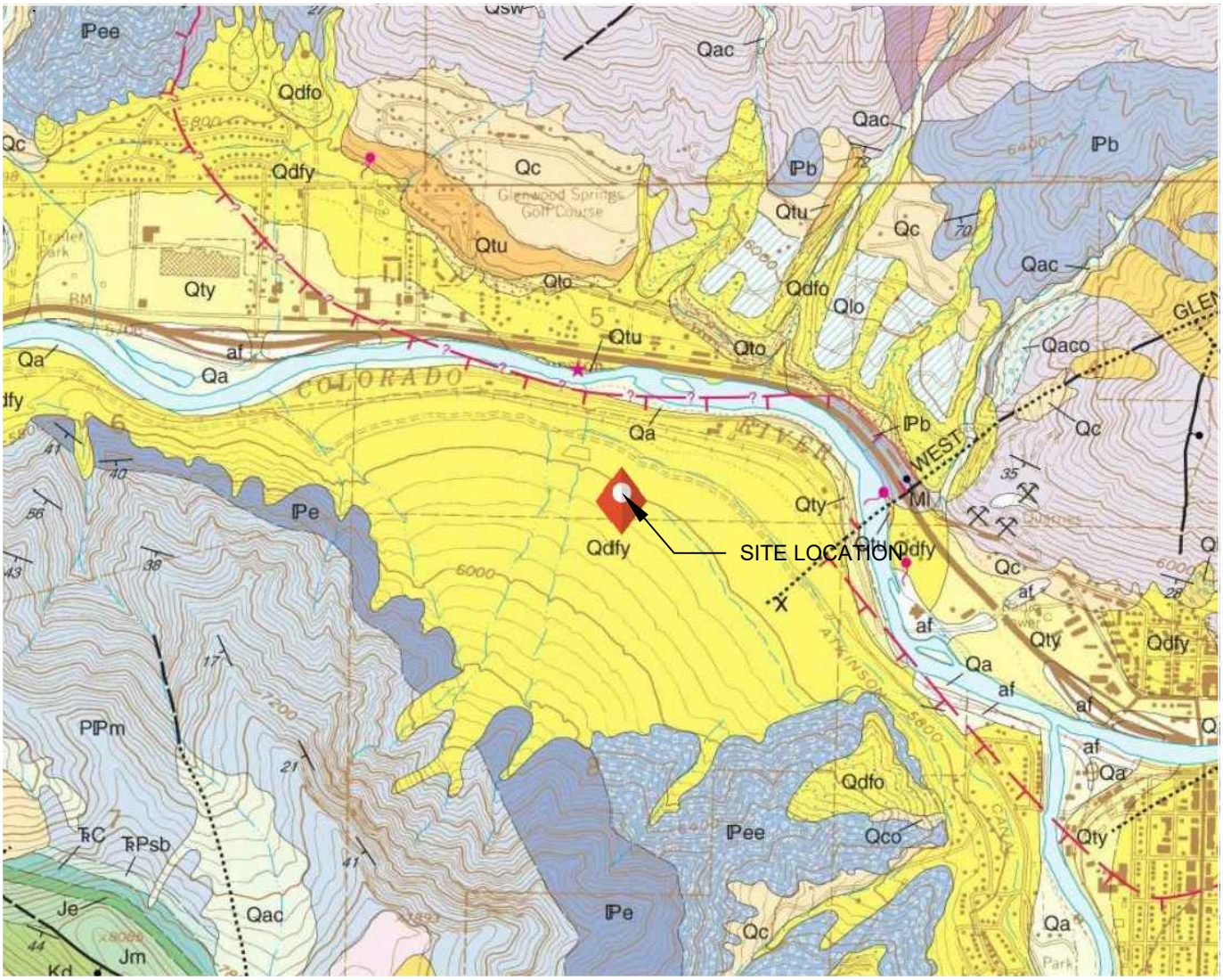
LEGEND:

DESIGNATES SUBSURFACE EXPLORATION LOCATION, BY AMERICAN GEOSERVICES, LLC. ,JUNE 2020 SEE EXPLORATION LOG IN APPENDIX FOR FURTHER DETAILS.

REFERENCE:
GARFIELD COUNTY
COLORADO GIS

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

FIGURE 2: SCHEMATIC SITE PLAN



LEGEND

ALLUVIAL AND MASS-WASTING DEPOSITS

Qdfy — **Younger debris-flow deposits (Holocene)**—Poorly sorted to moderately well-sorted matrix- and clast-supported, pebble, boulder, and cobble gravel in a sandy silt or silty sand matrix. Distal fan areas are finer grained. Deposited on active fans

PPm — **Maroon Formation (Permian and Pennsylvanian)**—Mainly reddish-brown sandstone, conglomerate, mudstone, siltstone, and claystone with minor, thin beds of gray limestone. Includes Schoolhouse Member at top of formation

Pe — **Eagle Valley Formation (Middle Pennsylvanian)**—Intertonguing sequence of Maroon Formation and Eagle Valley Evaporite

Pee — **Eagle Valley Evaporite (Middle Pennsylvanian)**—Evaporitic sequence of gypsum, halite, and anhydrite interbedded with mudstone, fine-grained sandstone, thin carbonate beds, and black shale. Commonly intensely folded, faulted, and plastically deformed

N

REFERENCE:
U.S. GEOLOGICAL MAPS

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

FIGURE 3: GEOLOGIC MAP



LEGEND

Rifle Area, Colorado, Parts of Garfield and Mesa Counties (CO683)

Rifle Area, Colorado, Parts of Garfield and Mesa Counties (CO683)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Arle-Ansari-Rock outcrop complex, 12 to 65 percent slopes	200.0	15.5%
7	Ascalon-Pena complex, 6 to 25 percent slopes	40.9	3.2%
8	Atencio-Azeltine complex, 1 to 3 percent slopes	202.7	15.7%
9	Badland	60.1	4.7%
11	Begay sandy loam, 6 to 12 percent slopes	204.8	15.9%
15	Chilton channery loam, 12 to 25 percent slopes	220.4	17.1%
26	Farlow-Rock outcrop association, steep	0.8	0.1%
34	Ildefonso stony loam, 25 to 45 percent slopes	68.4	5.3%
39	Jerry loam, 12 to 50 percent slopes	10.7	0.8%
42	Lamphier loam, 15 to 50 percent slopes	15.7	1.2%
58	Potts-Ildefonso complex, 12 to 25 percent slopes	71.9	5.6%
59	Potts-Ildefonso complex, 25 to 45 percent slopes	19.3	1.5%
66	Torriorthents-Camborthids-Rock outcrop complex, steep	62.0	4.8%
67	Torriorthents-Rock outcrop complex, steep	61.3	4.7%
73	Water	52.5	4.1%
Totals for Area of Interest		**1,291.5**	**100.0%**

N

REFERENCE:

WEB SOIL SURVEY

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

FIGURE 4: SOIL SURVEY MAP



Legend

Collapsable_Soils_withMeeker

EG-14 Eolian (wind-blown) deposits

EG-14 Dune and sheet sand deposits

EG-14 Cretaceous and Tertiary Formations

EG-14 Evaporite Formations

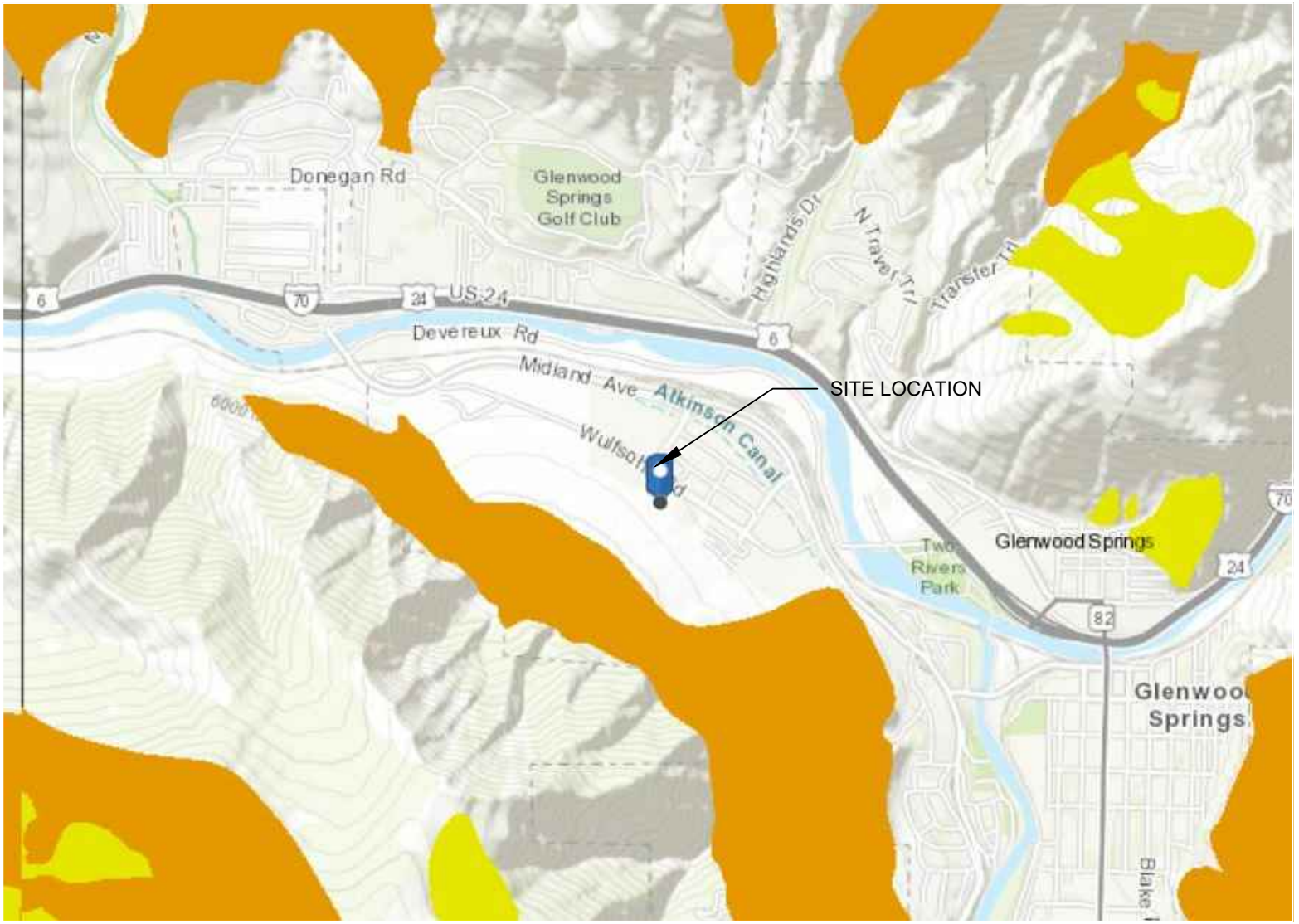
N

REFERENCE:

COLORADO GEOLOGICAL SURVEY

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

FIGURE 5: COLLAPSIBLE SOILS MAP



REFERENCE:

COLORADO LANDSLIDES INVENTORY

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

FIGURE 6: LANDSLIDES HAZARD



Slope Hazard

Major

Moderate

N

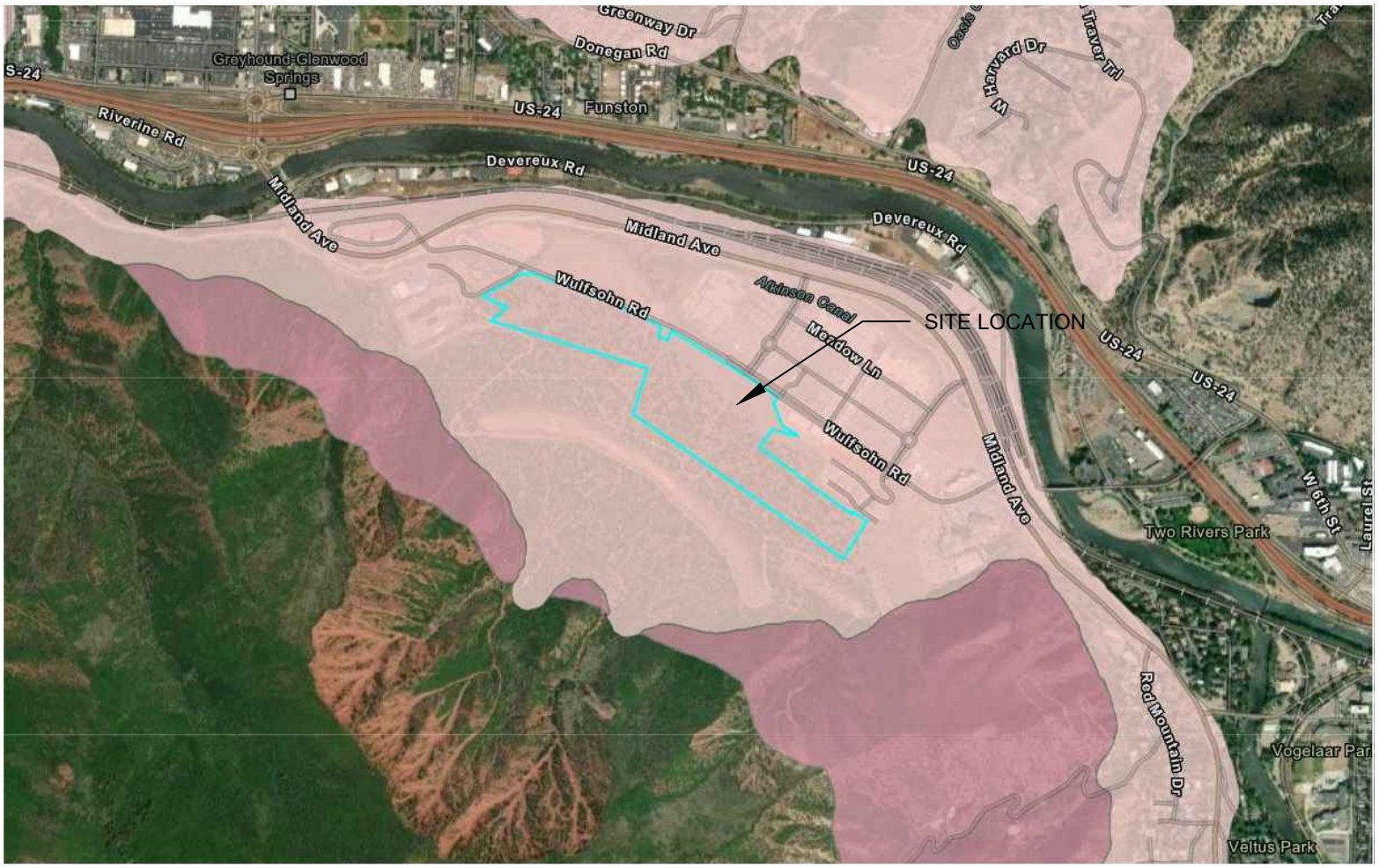
REFERENCE:

GLENWOOD GIS

AMERICAN GEOSERVICES

888.276.4027 - americangeoservices.com

FIGURE 7: SLOPES HAZARD



Soil Hazard

- Coal Mine
- Moderate
- Major

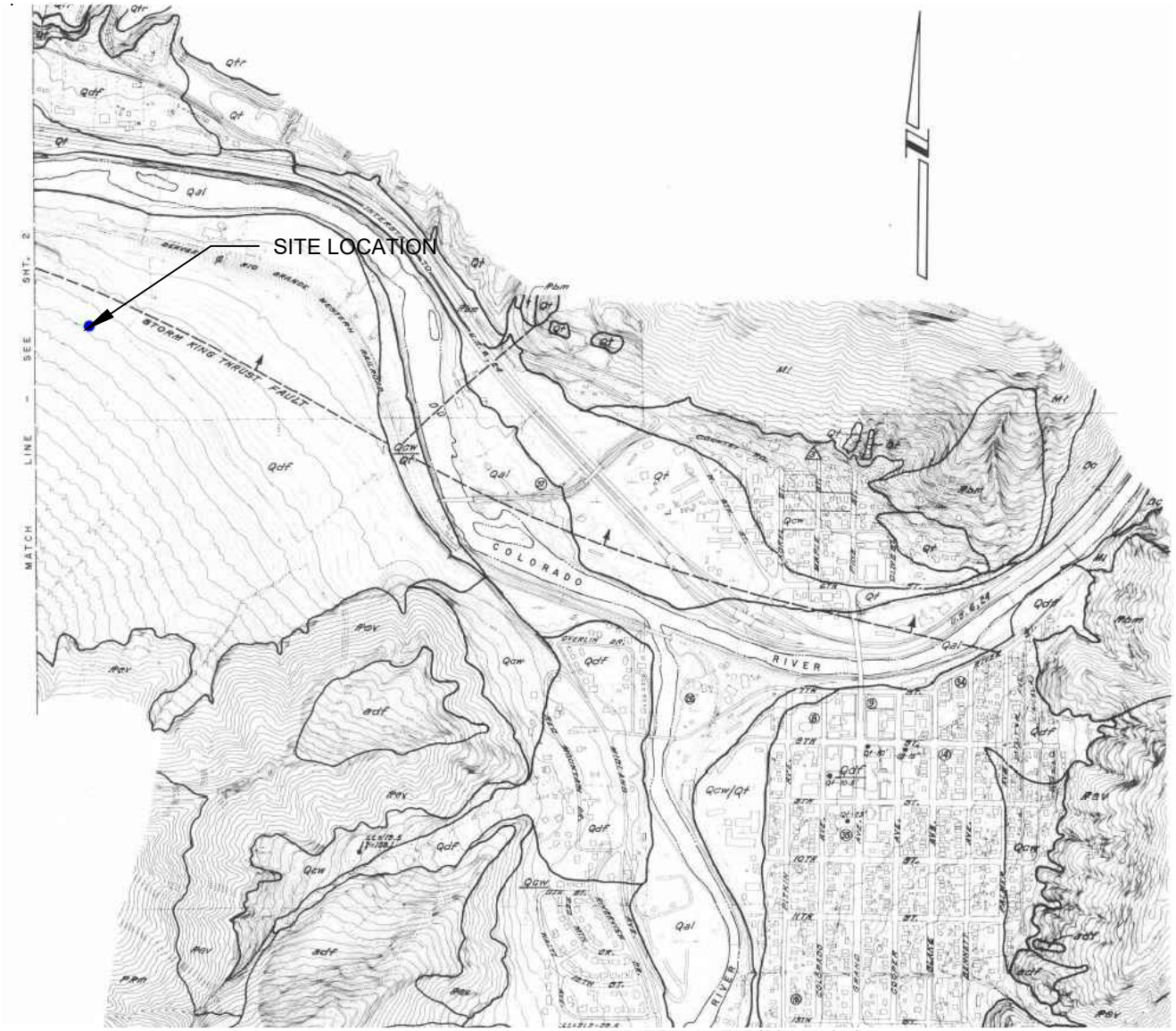
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REFERENCE:

GLENWOOD GIS

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

FIGURE 8: SOILS HAZARD

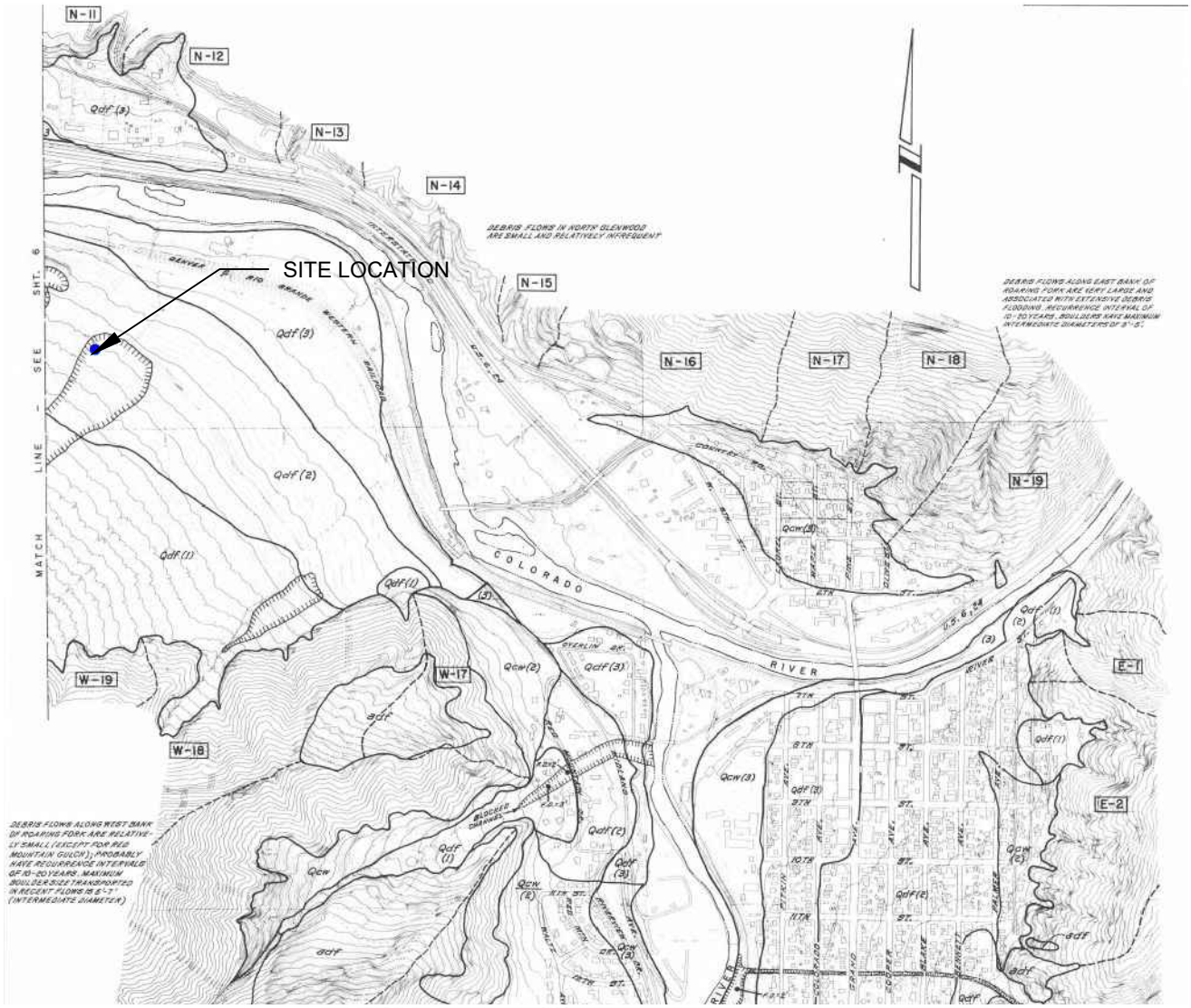


REFERENCE:

COLORADO GEOLOGICAL SURVEY

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

FIGURE 9: SURFICIAL GEOLOGY AND DATA INDEX MAP



EXPLANATION:

Qdf ... MAPPED DEBRIS FANS
Qcw ... MAPPED COLLUVIAL WEDGE AND COLLUVIAL DEPOSITS
adf ... MAPPED ANCIENT DEBRIS FLOW, MUD FLOW AND LANDSLIDE DEPOSITS
(1) ... SEVERE HAZARD ZONE: POSSIBLE SERIOUS DAMAGE TO STRUCTURES AND RISK TO LIFE. MITIGATION NECESSARY.
(2) ... MODERATE HAZARD ZONE: POSSIBLE MINOR DAMAGE TO STRUCTURES AND RISK TO LIFE. MITIGATION RECOMMENDED. MAJOR CLEANUP PROBABLE.
(3) ... SLIGHT HAZARD ZONE: CLEANUP REQUIRED; LIMITED RISK TO STRUCTURES AND LIFE
AREA COVERED BY RECENT DEBRIS FLOWS (7-24-77, UNLESS OTHERWISE INDICATE)
F.D. FLOW DEPTH DATA POINT
DRAINAGE BASIN BOUNDARY (SEE PROJECT BOUNDARY AND BASIN INDEX MAP)
DRAINAGE BASIN INDEX NUMBER

NOTE: THESE MAPS ARE INTENDED FOR USE IN CONJUNCTION WITH THE REPORT, "DEBRIS FLOWS, HYDROCOMPACTION, AND GEOLOGIC HAZARDS IN GLENWOOD SPRINGS, COLORADO."

SEE SHEET NO. 6 FOR EXPLANATION OF SYMBOLS AND NOTE.

PREPARED FOR
THE COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR
DEPARTMENT OF NATURAL RESOURCES
STATE OF COLORADO

IN CO-OPERATION WITH
THE CITY OF GLENWOOD SPRINGS, COLORADO AND THE COUNTY OF GARFIELD, COLORADO

LINCOLN DeVORE TESTING LABORATORY
COLORADO: Colorado Springs, Pueblo, Glenwood Springs, Montrose, Gunnison, Grand Junction – WYO. Rock Springs

400 0 400 800
SCALE IN FEET
CONTOUR INTERVAL = 5 FEET

MAP OF DEBRIS FAN DEPOSITS AND HAZARDS

GEOLOGIC HAZARDS OF THE GLENWOOD SPRINGS METROPOLITAN AREA

GARFIELD COUNTY, COLORADO

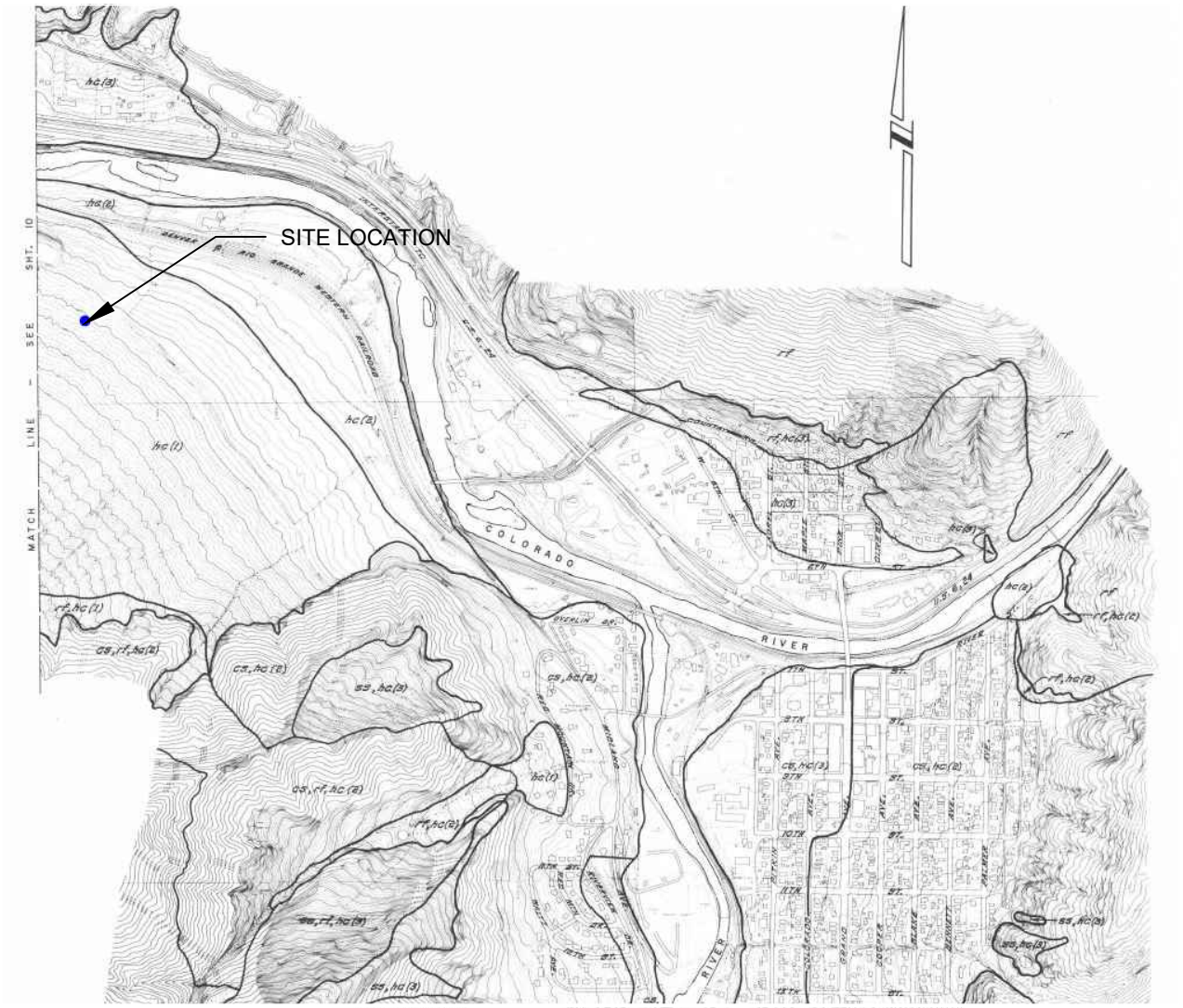
DECEMBER 1977

REFERENCE:

COLORADO GEOLOGICAL SURVEY

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

FIGURE 10: DEBRIS FAN DEPOSIT AND HAZARDS

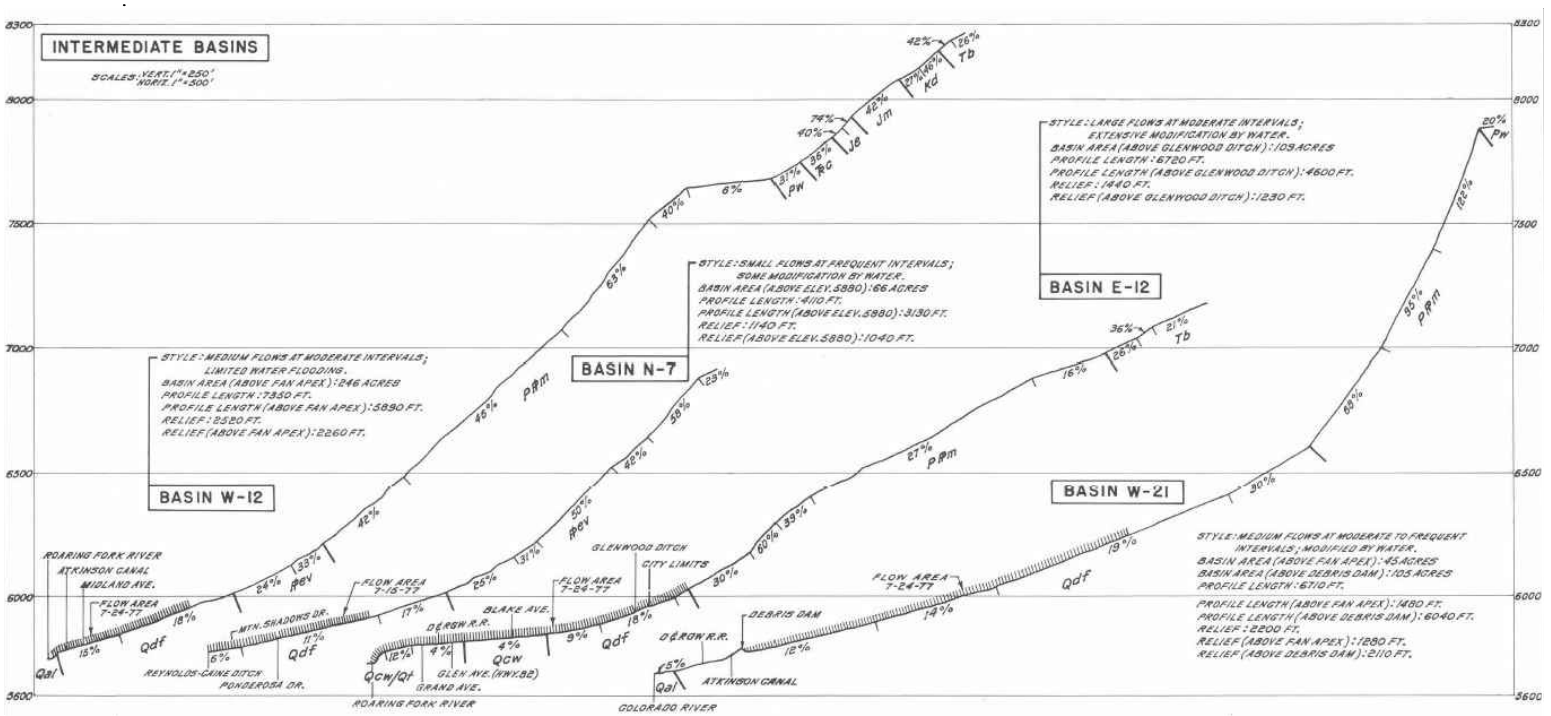


REFERENCE:

COLORADO GEOLOGICAL SURVEY

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FIGURE 11: GENERAL GEOLOGIC HAZARD MAP



PREPARED FOR
THE COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR
DEPARTMENT OF NATURAL RESOURCES
STATE OF COLORADO

IN CO-OPERATION WITH
THE CITY OF GLENWOOD SPRINGS, COLORADO AND THE COUNTY OF GARFIELD COLORADO

LINCOLN DeVORE TESTING LABORATORY
COLORADO: Colorado Springs, Pueblo, Glenwood Springs, Montrose, Gunnison, Grand Junction – WYO. Rock Springs

EXPLANATION:

VERTICAL EXAGGERATION = 2X
BREAK IN SLOPE
GEOLOGIC CONTACT
FAULT
DEBRIS FLOW AREA

SURFICIAL DEPOSIT SYMBOLS:

Qal.....ALLUVIUM
Qt.....STREAM TERRACE
Qcw....COLLUVIUM & COLLUVIAL WEDGE
Qdf.....DEBRIS FAN
Qls.....ANCIENT LANDSLIDE

FOR EXPLANATION OF BEDROCK SYMBOLS, SEE SHEET NO. 1

COMPARATIVE STREAM PROFILES SHEET

GEOLOGIC HAZARDS
OF THE
GLENWOOD SPRINGS METROPOLITAN AREA
GARFIELD COUNTY, COLORADO

REFERENCE:

COLORADO GEOLOGICAL SURVEY

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

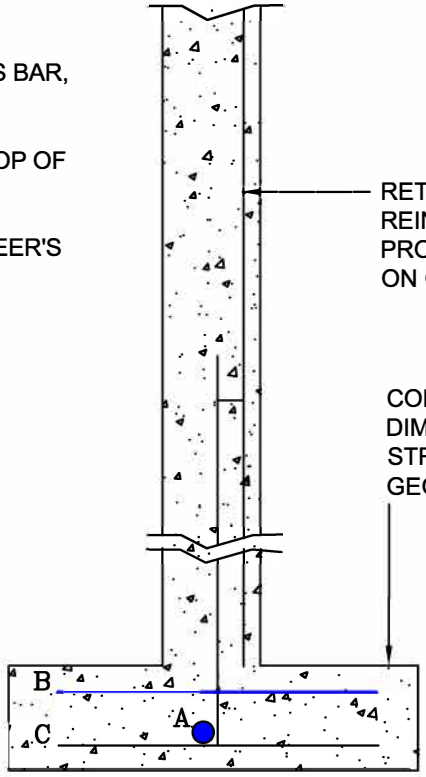
FIGURE 12: COMPARATIVE STREAM PROFILE SHEET

NOTES:

A. ADDITIONAL REINFORCEMENT, #4 CONTINUOUS BAR, BOTTOM OF FOOTING.

B. ADDITIONAL REINFORCEMENT, #4 AT 48" C/C, TOP OF FOOTING.

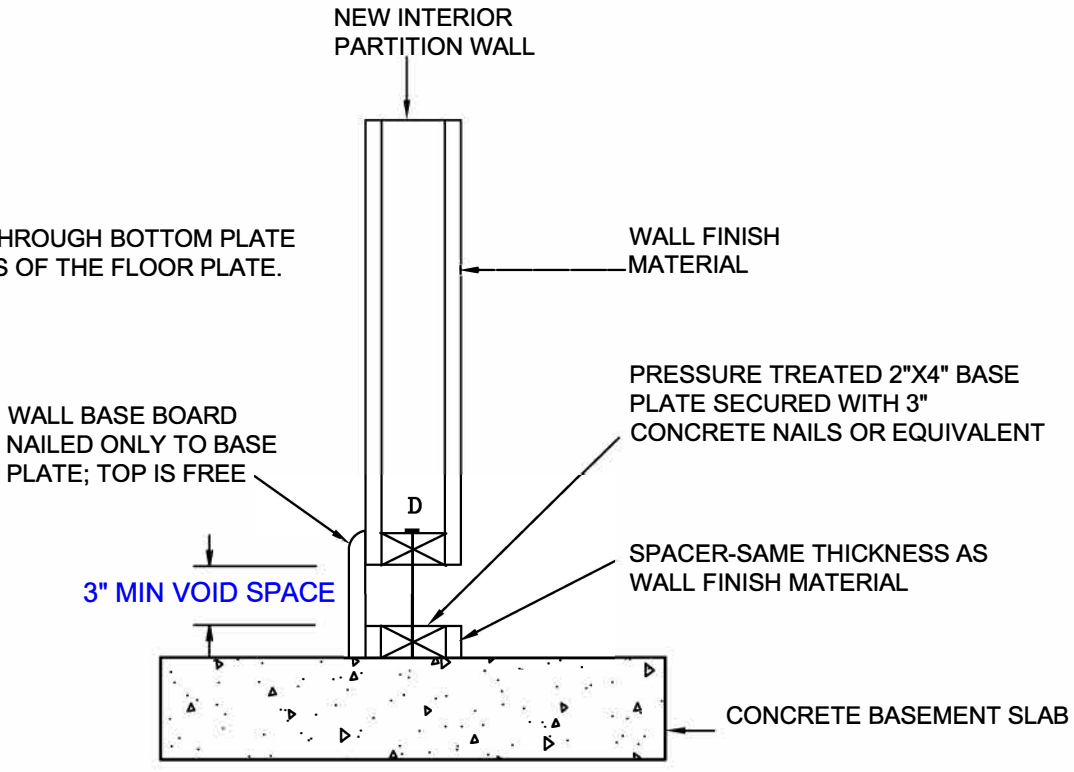
C. REINFORCEMENT AS PER STRUCTURAL ENGINEER'S DESIGN. AS A MINIMUM, USE #4 AT 48" C/C.



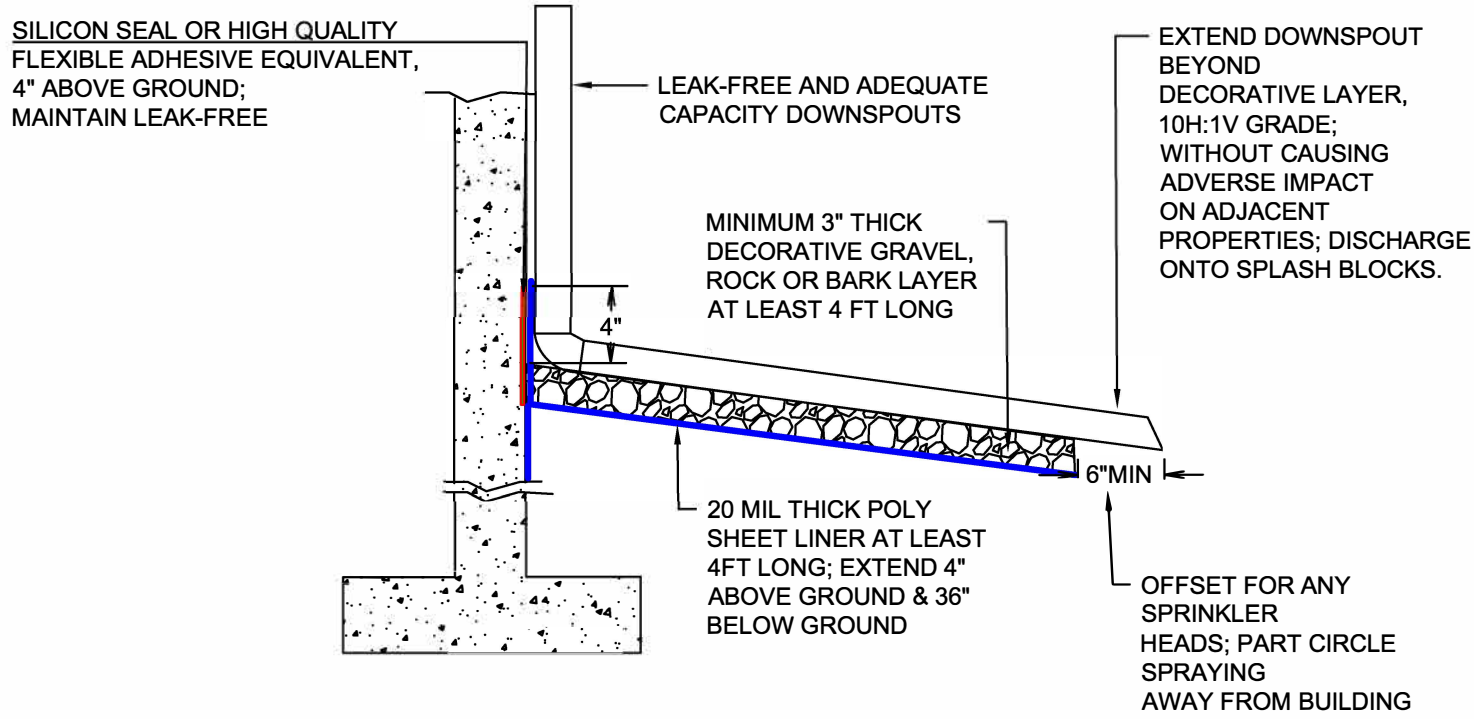
ADDITIONAL FOOTING REINFORCEMENT DETAIL

NOTES:

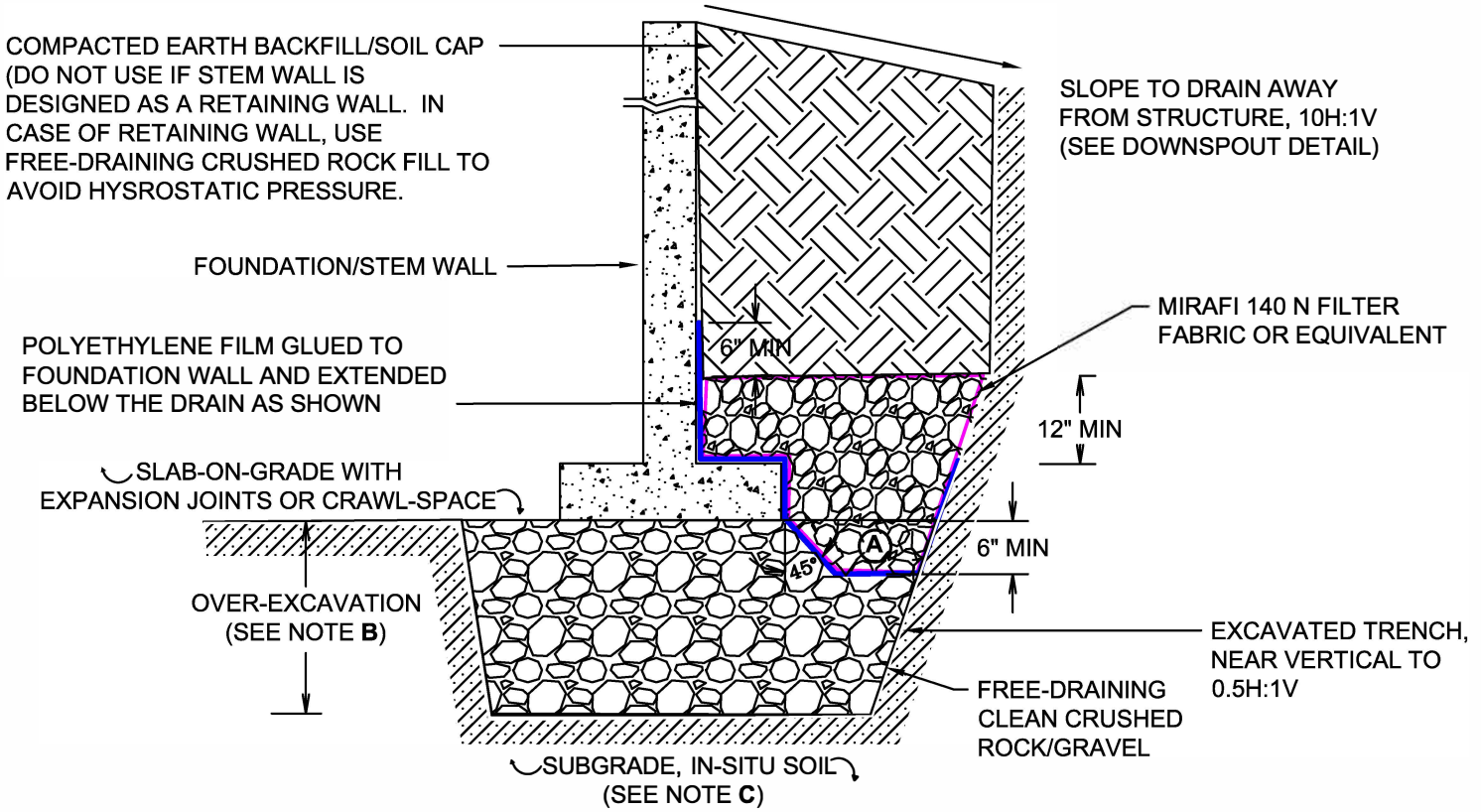
D. 40d NAILS EVERY 24" THROUGH BOTTOM PLATE INTO PRE-DRILLED HOLES OF THE FLOOR PLATE.



"FLOAT" (FLOATING WALL DETAIL)

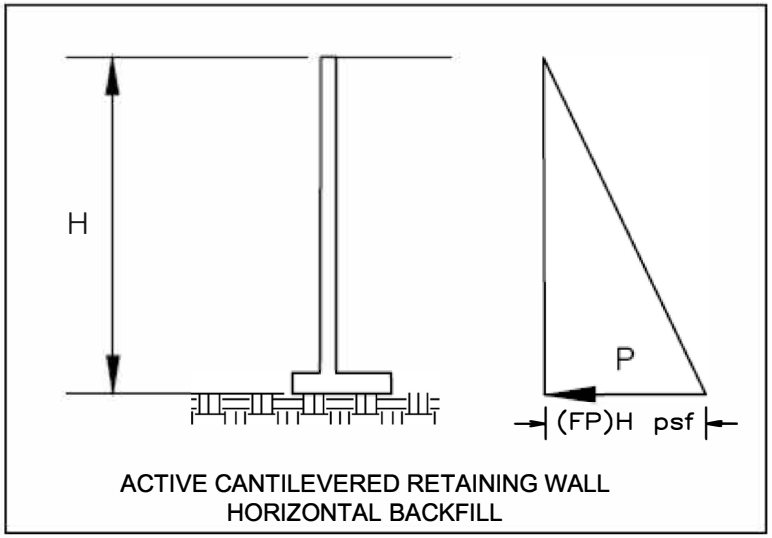


DOWNSPOUT & MOISTURE BARRIER DETAIL

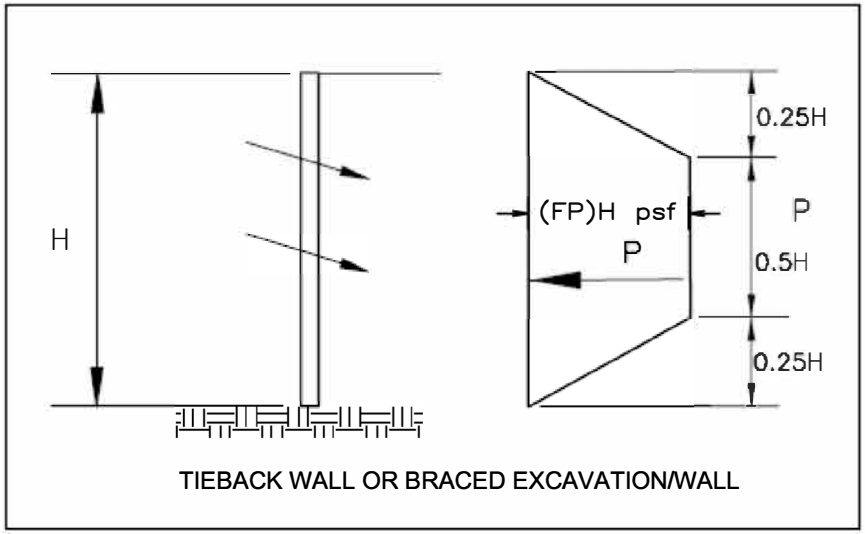


PERIMETER OR FOUNDATION DRAIN DETAIL

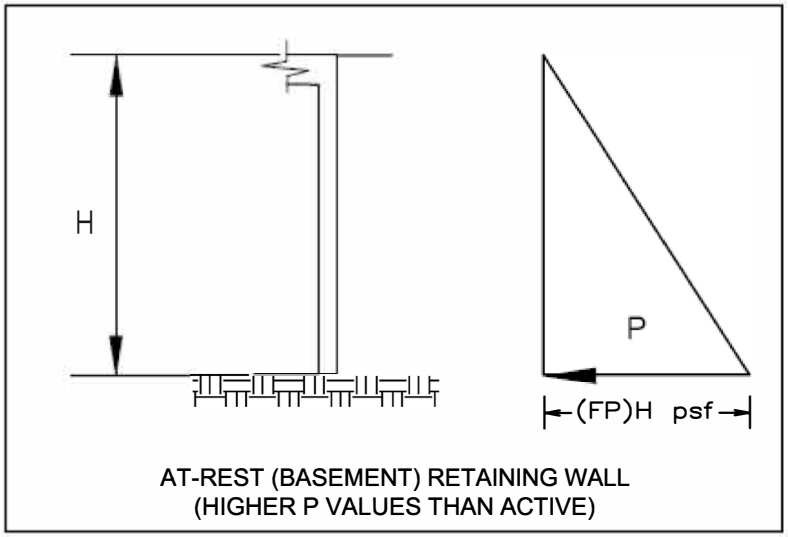
NOTES: **A**. 4-INCH DIAMETER PERFORATED PIPE PLACED 2" ABOVE DRAIN SUBGRADE EMBEDDED IN FREE-DRAINING GRAVEL OR CRUSHED ROCK ENVELOPE WITH 2% GRADE TO SUMP PIT OR DISCHARGED TO A SUITABLE RECEPTACLE SUCH THAT ON-SITE AS WELL AS OFF-SITE STABILITY IS NOT ADVERSELY IMPACTED. **B**. DEPTH BASED ON OPEN HOLE INSPECTION, FOR SHALLOW FOUNDATION OPTION. **C**. ALL FOUNDATION OR OVER-EXCAVATED SUBGRADES MUST BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER.



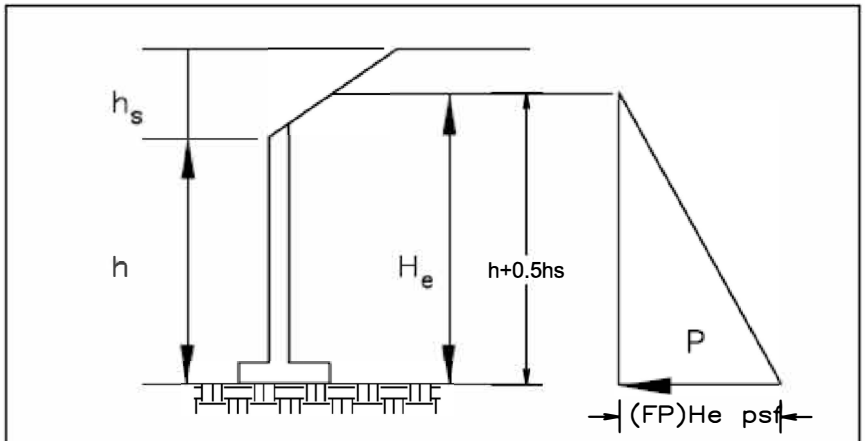
ACTIVE CANTILEVERED RETAINING WALL
HORIZONTAL BACKFILL



TIEBACK WALL OR BRACED EXCAVATION/WALL



AT-REST (BASEMENT) RETAINING WALL
(HIGHER P VALUES THAN ACTIVE)



ACTIVE CANTILEVERED RETAINING WALL
SLOPING BACKFILL

LEGEND:

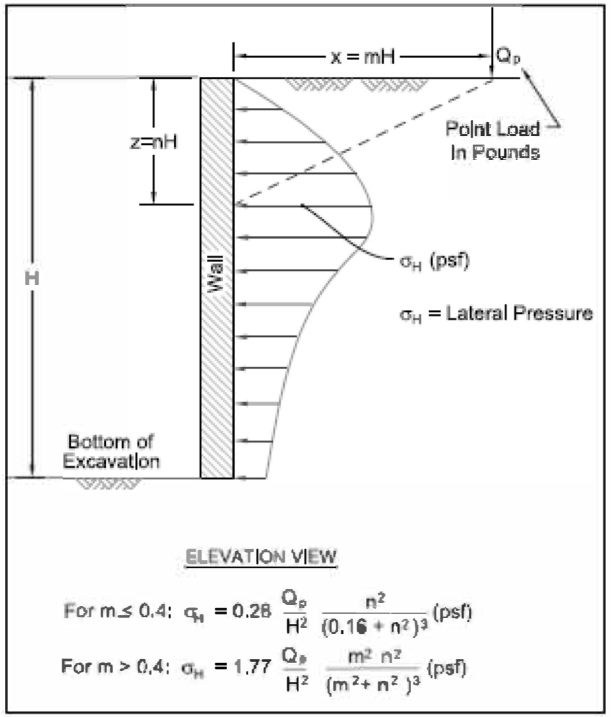
H: DESIGN WALL HEIGHT
HE: EQUIVALENT DESIGN WALL HEIGHT
H: WALL HEIGHT
HS: BROKEN BACKSLOPE HEIGHT
FP: EQUIVALENT FLUID PRESSURE
P: LATERAL EARTH PRESSURE BASED ON SOIL CONDITIONS AT THE SITE. SEE TABLE 1.0 FOR COEFF. OF LATERAL EARTH PRESSURES (K) OR FP VALUES

REFERENCES:

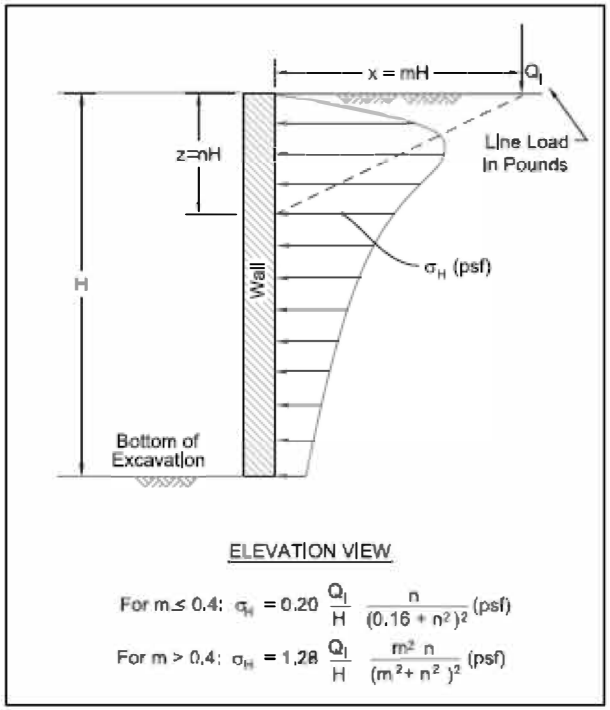
NAVFAC DM 7.2, 1974, 1986
POULOUS & DAVIS, 1974
TERZAGHI & PECK, 1967
BOWELS, 2001

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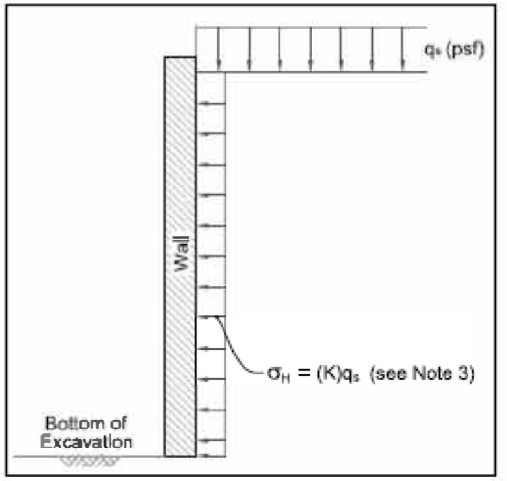
FIGURE 15: EARTH PRESSURES



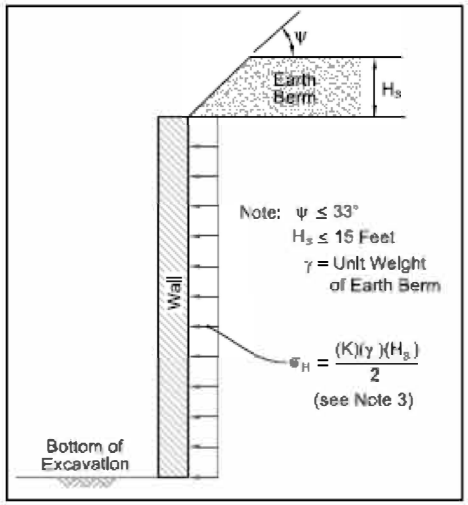
POINT SURCHARGE LOAD
(WHEEL OR ISOLATED FOOTING/COLUMN)



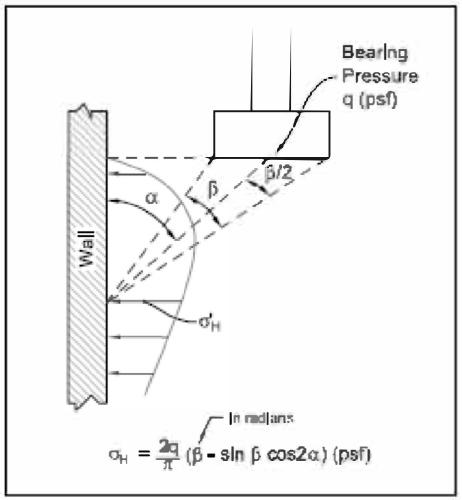
LINE SURCHARGE LOAD
(NARROW FOOTING)



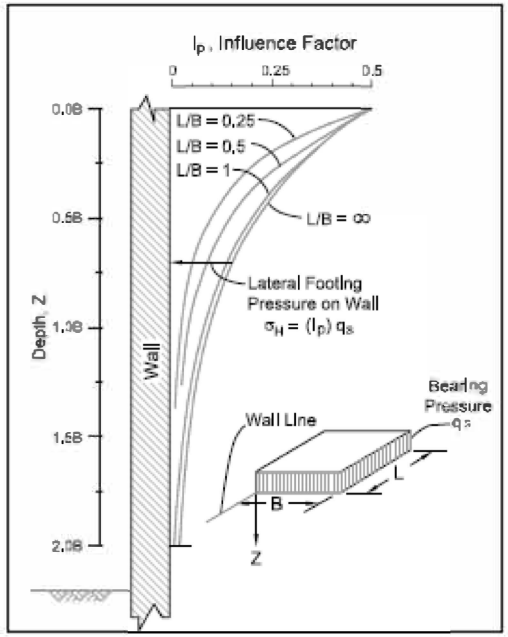
UNIFORM SURCHARGE LOAD



BACKSLOPE/BERM SURCHARGE LOAD



STRIP FOOTING SURCHARGE LOAD



CORNER FOOTING SURCHARGE LOAD

NOTES:

1.NOT TO SCALE.
SCHEMATICS ONLY.

2.ADD APPROPRIATE SURCHARGE LOADING TO LATERAL EARTH PRESSURE & HYSROSTATIC PRESSURE ON THE WALL.

3.DESIGN VALUES ARE GIVEN IN THE REPORT.

4.WALL DESIGNS SHOULD BE REVIEWED AND APPROVIDED BY US TO CONFIRM PROPER USE OF SOIL DESIGN PARAMETERS.

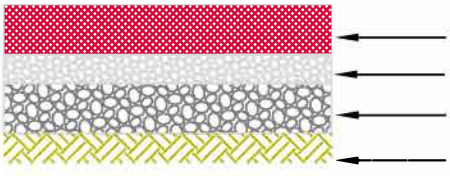
REFERENCES:
NAVFAC DM 7.2, 1974, 1986
FANG, 1991
POULOUS & DAVIS, 1974
TERZAGHI & PECK, 1967

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FIGURE 16: LATERAL PRESSURES

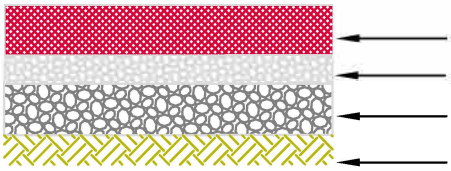
BITUMINOUS PAVEMENT SECTIONS

PARKING AREA
(LIGHTLY LOADED)



3.5" AC
2" 3/4"-0" BASE ROCK W/95% COMPACTION
4" 1 1/2"-0" BASE ROCK W/95% COMPACTION
SUBGRADE TO BE AT 95% COMPACTION (ASTM D698)

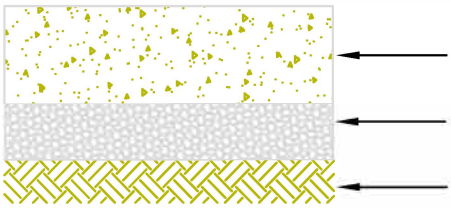
DRIVEWAYS, ETC
(HEAVILY LOADED)



4.5" AC CLASS 'C'
2" 3/4"-0" BASE ROCK W/95% COMPACTION
4" 1 1/2"-0" BASE ROCK W/95% COMPACTION
SUBGRADE TO BE AT 95% COMPACTION (ASTM D698)

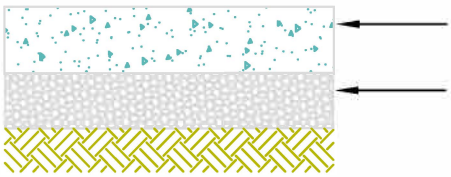
CONCRETE PAVEMENT SECTIONS

PARKING AREA
(LIGHTLY LOADED)



5.5" REINFORCED CONCRETE. 3500 PSI @ 28 DAYS
6X6W1.4X1.4WWM
4" OF 3/4"-0" BASE ROCK W/95% COMPACTION
SUBGRADE TO BE AT 95% COMPACTION (ASTM D698)

DRIVEWAYS, ETC
(HEAVILY LOADED)



6" REINFORCED CONCRETE. 3500 PSI @ 28 DAYS
6X6W1.4X1.4WWM
4" OF 3/4"-0" BASE ROCK W/95% COMPACTION
SUBGRADE TO BE AT 95% COMPACTION (ASTM D698)

SUBSURFACE EXPLORATION DATA

B1

Glennwood Medows #6, Glennwood Springs, CO

Project Number	0280-WS20	Drill Rig: SPT Drill Rig / WDP / Soil Auger	
Geologist/Engineer	SMA	Ground Elevation	See Figures
Date Drilled	6-26-2020	Total Depth of Borehole	25 Feet
Borehole Diameter	4 OD Inches	Depth to Water	Not Encountered

Graphic Log	Description / Lithology	Depth (feet)	Sample	SPT Blow Count	%Passing #200	Moisture (%)	DD (pcf)	LL (%), PL (%)	Swell (%)	Completion
OL	TOPSOIL: 3.0" thick, sand and organics									
ML/ GM	SANDY SILT with GRAVEL, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	5		7-5-8	20	4.5	107	NP		
GM/ ML	SANDY GRAVEL AND SILT, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	10		7-12-11	30	5.5	115	NP		
GM-ML	SANDY GRAVEL AND SILT, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	15		15-12-14	35	8	104	NP		
		20		10-22-14	29					
	End of Borehole. Refusal to augering. Groundwater was not encountered during or at the completion of drilling. At completion, borehole was backfilled with soil cuttings. Soil descriptions/log are based on field explorations, soils/geologic research, lab testing, and local experience.	25		50+	30	2.5	125	NP		

B2

Glennwood Medows #6, Glennwood Springs, CO

Project Number	0280-WS20	Drill Rig: SPT Drill Rig / WDP / Soil Auger	
Geologist/Engineer	SMA	Ground Elevation	See Figures
Date Drilled	6-26-2020	Total Depth of Borehole	15 Feet
Borehole Diameter	4 OD Inches	Depth to Water	Not Encountered

Graphic Log		Description / Lithology	Depth (feet)	Sample	SPT Blow Count	%Passing #200	Moisture (%)	DD (pcf)	LL (%), PL (%)	Swell (%)	Completion
	OL	TOPSOIL: 6.0" thick, sand and organics									
		SANDY SILT with GRAVEL, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder			15-10-14		2.0			-2.0 @ 1000 psf	
	ML GM		5		8-10-10	35	5.0				
			10		10-10-34	25					
		End of Borehole at 15 feet. Groundwater was not encountered during or at the completion of drilling. At completion, borehole was backfilled with soil cuttings. Soil descriptions/log are based on field explorations, soils/geologic research, lab testing, and local experience.	15								
			20								
			25								

B3

Glennwood Medows #6, Glennwood Springs, CO

Project Number	0280-WS20	Drill Rig: SPT Drill Rig / WDP / Soil Auger	
Geologist/Engineer	SMA	Ground Elevation	See Figures
Date Drilled	6-26-2020	Total Depth of Borehole	15 Feet
Borehole Diameter	4 OD Inches	Depth to Water	Not Encountered

Graphic Log		Description / Lithology	Depth (feet)	Sample	SPT Blow Count	%Passing #200	Moisture (%)	DD (pcf)	LL (%), PL (%)	Swell (%)	Completion
	OL	TOPSOIL: 6.0" thick, sand and organics									
	GM/ ML	SANDY SILT AND GRAVEL, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	5		5-8-12						
			10		50+						
			15		15-12-14						
		End of Borehole at 15 feet. Groundwater was not encountered during or at the completion of drilling. At completion, borehole was backfilled with soil cuttings. Soil descriptions/log are based on field explorations, soils/geologic research, lab testing, and local experience.	20								
			25								

B4

Glennwood Medows #6, Glennwood Springs, CO

Project Number	0280-WS20	Drill Rig: SPT Drill Rig / WDP / Soil Auger	
Geologist/Engineer	SMA	Ground Elevation	See Figures
Date Drilled	6-26-2020	Total Depth of Borehole	50 Feet
Borehole Diameter	4 OD Inches	Depth to Water	Not Encountered

Graphic Log		Description / Lithology	Depth (feet)	Sample	SPT Blow Count	%Passing #200	Moisture (%)	DD (pcf)	LL (%), PL (%)	Swell (%)	Completion
	OL	TOPSOIL: 3.0" thick, sand and organics									
	ML/ GM	SANDY SILT with GRAVEL, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	5		11-10-9	40	3.5	105	NP	-1.5 @ 1000 psf	
	GM/ ML	SANDY GRAVEL AND SILT, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	10		9-10-13	30	6.5	110	NP		
			15		12-15-15	29	5.0	115	NP		
	GM-ML	SANDY GRAVEL AND SILT, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	20		17-20-19	32	6.0	120	NP		
			25		17-21-23	35					

B4

Glennwood Medows #6, Glennwood Springs, CO

Project Number	0280-WS20	Drill Rig: SPT Drill Rig / WDP / Soil Auger	
Geologist/Engineer	SMA	Ground Elevation	See Figures
Date Drilled	6-26-2020	Total Depth of Borehole	50 Feet
Borehole Diameter	4 OD Inches	Depth to Water	Not Encountered

Graphic Log		Description / Lithology	Depth (feet)	Sample	SPT Blow Count	%Passing #200	Moisture (%)	DD (pcf)	LL (%), PL (%)	Swell (%)	Completion
	OL	TOPSOIL: 3.0" thick, sand and organics									
	ML/ GM	SANDY SILT with GRAVEL, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	30		15-20-19						
	GM/ ML	SANDY GRAVEL AND SILT, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	35		50+						
	GM-ML	SANDY GRAVEL AND SILT, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	40		22-50+	35					
			45		50+	30	6.5	125	NP		
		End of Borehole. Refusal to augering. Groundwater was not encountered during or at the completion of drilling. At completion, borehole was backfilled with soil cuttings. Soil descriptions/log are based on field explorations, soils/geologic research, lab testing, and local experience.	50		50+						

B5

Glennwood Medows #6, Glennwood Springs, CO

Project Number	0280-WS20	Drill Rig: SPT Drill Rig / WDP / Soil Auger	
Geologist/Engineer	SMA	Ground Elevation	See Figures
Date Drilled	7-07-2020	Total Depth of Borehole	15 Feet
Borehole Diameter	4 OD Inches	Depth to Water	Not Encountered

Graphic Log		Description / Lithology	Depth (feet)	Sample	SPT Blow Count	%Passing #200	Moisture (%)	DD (pcf)	LL (%), PL (%)	Swell (%)	Completion
	OL	TOPSOIL: 6.0" thick, sand and organics									
	GM/ ML	SANDY SILT AND GRAVEL, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	5		11-12-11						
			10		50+						
		End of Borehole at 15 feet. Groundwater was not encountered during or at the completion of drilling. At completion, borehole was backfilled with soil cuttings. Soil descriptions/log are based on field explorations, soils/geologic research, lab testing, and local experience.	15								
			20								
			25								

B6

Glennwood Medows #6, Glennwood Springs, CO

Project Number	0280-WS20	Drill Rig: SPT Drill Rig / WDP / Soil Auger	
Geologist/Engineer	SMA	Ground Elevation	See Figures
Date Drilled	7-07-2020	Total Depth of Borehole	10 Feet
Borehole Diameter	4 OD Inches	Depth to Water	Not Encountered

Graphic Log		Description / Lithology	Depth (feet)	Sample	SPT Blow Count	%Passing #200	Moisture (%)	DD (pcf)	LL (%), PL (%)	Swell (%)	Completion
	OL	TOPSOIL: 6.0" thick, sand and organics									
	GM/ ML	SANDY SILT AND GRAVEL, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	5		50+						
		End of Borehole at 10 feet. Groundwater was not encountered during or at the completion of drilling. At completion, borehole was backfilled with soil cuttings. Soil descriptions/log are based on field explorations, soils/geologic research, lab testing, and local experience.	10 15 20 25								

B7-B8

Glennwood Medows #6, Glennwood Springs, CO

Project Number	0280-WS20	Drill Rig: SPT Drill Rig / WDP / Soil Auger	
Geologist/Engineer	SMA	Ground Elevation	See Figures
Date Drilled	6-26-2020	Total Depth of Borehole	25 Feet
Borehole Diameter	4 OD Inches	Depth to Water	Not Encountered

Graphic Log		Description / Lithology	Depth (feet)	Sample	SPT Blow Count	%Passing #200	Moisture (%)	DD (pcf)	LL (%), PL (%)	Swell (%)	Completion
	OL	TOPSOIL: 5.0" thick, sand and organics									
	ML/ GM	SANDY SILT with GRAVEL, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	5		10-15-10	25	4.0	105	NP		
			10		9-10-11						
			15		12-12-24	30	6	105	NP		
			20		24-50+	20					
		End of Borehole. Refusal to augering. Groundwater was not encountered during or at the completion of drilling. At completion, borehole was backfilled with soil cuttings. Soil descriptions/log are based on field explorations, soils/geologic research, lab testing, and local experience.	25		50+	35	5.5	120	NP		

B9

Glennwood Medows #6, Glennwood Springs, CO

Project Number	0280-WS20	Drill Rig: SPT Drill Rig / WDP / Soil Auger	
Geologist/Engineer	SMA	Ground Elevation	See Figures
Date Drilled	7-07-2020	Total Depth of Borehole	10 Feet
Borehole Diameter	4 OD Inches	Depth to Water	Not Encountered

Graphic Log		Description / Lithology	Depth (feet)	Sample	SPT Blow Count	%Passing #200	Moisture (%)	DD (pcf)	LL (%), PL (%)	Swell (%)	Completion
	OL	TOPSOIL: 6.0" thick, sand and organics									
	GM/ SM/ ML	SANDY SILT to SITY SAND and GRAVEL, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	5		10-10-12						
			10		12-14-15					-2.2 @ 1000 psf	
		End of Borehole at 10 feet. Groundwater was not encountered during or at the completion of drilling. At completion, borehole was backfilled with soil cuttings. Soil descriptions/log are based on field explorations, soils/geologic research, lab testing, and local experience.	15								
			20								
			25								

B10

Glennwood Medows #6, Glennwood Springs, CO

Project Number	0280-WS20	Drill Rig: SPT Drill Rig / WDP / Soil Auger	
Geologist/Engineer	SMA	Ground Elevation	See Figures
Date Drilled	6-26-2020	Total Depth of Borehole	40 Feet
Borehole Diameter	4 OD Inches	Depth to Water	Not Encountered

Graphic Log	Description / Lithology	Depth (feet)	Sample	SPT Blow Count	%Passing #200	Moisture (%)	DD (pcf)	LL (%), PL (%)	Swell (%)	Completion
OL	TOPSOIL: 3.0" thick, sand and organics									
ML/ GM	SANDY SILT with GRAVEL, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	5		5-8-10	23					
GM/ ML	SANDY GRAVEL AND SILT, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	10		10-10-10	35					
GM-ML	SANDY GRAVEL AND SILT, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	15		12-25-20	20	5.5	117	NP		
		20		15-50+						
		25		50+	25					

B10

Glennwood Medows #6, Glennwood Springs, CO

Project Number	0280-WS20	Drill Rig: SPT Drill Rig / WDP / Soil Auger	
Geologist/Engineer	SMA	Ground Elevation	See Figures
Date Drilled	6-26-2020	Total Depth of Borehole	40 Feet
Borehole Diameter	4 OD Inches	Depth to Water	Not Encountered

Graphic Log	Description / Lithology	Depth (feet)	Sample	SPT Blow Count	%Passing #200	Moisture (%)	DD (pcf)	LL (%), PL (%)	Swell (%)	Completion
GM	SANDY SILTY GRAVEL, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	30		5-8-10	23					
		35		10-10-10	35					
GM/ ML	SANDY GRAVEL AND SILT, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	40		12-25-50+	40	5.5	118	NP		
	End of Borehole. Refusal to augering. Groundwater was not encountered during or at the completion of drilling. At completion, borehole was backfilled with soil cuttings. Soil descriptions/log are based on field explorations, soils/geologic research, lab testing, and local experience.	45								
		50								

B11

Glennwood Medows #6, Glennwood Springs, CO

Project Number	0280-WS20	Drill Rig: SPT Drill Rig / WDP / Soil Auger	
Geologist/Engineer	SMA	Ground Elevation	See Figures
Date Drilled	7-07-2020	Total Depth of Borehole	15 Feet
Borehole Diameter	4 OD Inches	Depth to Water	Not Encountered

Graphic Log		Description / Lithology	Depth (feet)	Sample	SPT Blow Count	%Passing #200	Moisture (%)	DD (pcf)	LL (%), PL (%)	Swell (%)	Completion
	OL	TOPSOIL: 6.0" thick, sand and organics									
	GM/ ML	SANDY SILT AND GRAVEL, red-brown to brown, trace to some cobbles, medium dense to dense, damp to moist, possible occasional boulder	5		7-8-12						
			10		10-10-21						
			15		50+						
		End of Borehole at 15 feet. Groundwater was not encountered during or at the completion of drilling. At completion, borehole was backfilled with soil cuttings. Soil descriptions/log are based on field explorations, soils/geologic research, lab testing, and local experience.	20								
			25								

AMERICAN GEOSERVICES

DESCRIPTIVE TERMINOLOGY & SOIL CLASSIFICATION
UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

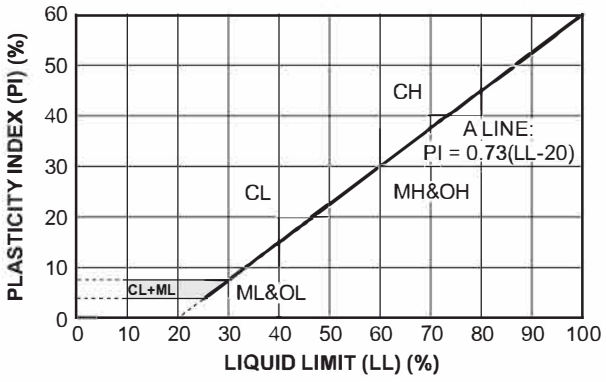
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

PLASTICITY CHART



DESCRIPTIVE TERMINOLOGY & SOIL CLASSIFICATION

LABORATORY/FIELD TESTING DEFINITIONS FOR EXPLORATION LOGS

DD = DRY DENSITY (PCF)

WD = WET DENSITY (PCF)

MC = MOISTURE CONTENT (%)

PL = PLASTIC LIMIT (%)

LL = LIQUID LIMIT (%)

PI = PLASTICITY INDEX

OC = ORGANIC CONTENT (%)

S = SATURATION PERCENT (%)

SG = SPECIFIC GRAVITY

C = COHESION

Φ = ANGLE OF INTERNAL FRICTION

QU = UNCONFINED COMPRESSION STRENGTH

#200 = PERCENT PASSING THE #200 SIEVE

CBR = CALIFORNIA BEARING RATIO

VS = VANE SHEAR

PP = POCKET PENETROMETER

DP = DRIVE PROBE

SPT = STANDARD PENETRATION TEST

BPF = BLOWS PER FOOT (N VALUE)

SH = SHELBY TUBE SAMPLE

GW = GROUND WATER

RQD = ROCK QUALITY DESIDNATION

TP = TEST PIT

B = BORING

HA = HAND AUGER



GROUNDWATER LEVEL/SEEPAGE ENCOUNTERED DURING EXPLORATION



STATIC GROUNDWATER LEVEL WITH DATE MEASURED

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	STP (BPF)	PP (TSF)
VERY SOFT	0-1	LESS THAN 0.25
SOFT	2 - 4	0.25 - 0.5
MEDIUM STIFF	5 - 8	0.5 - 1.0
STIFF	9 - 15	1.0 - 2.0
VERY STIFF	16 - 30	2.0 - 4.0
HARD	30+	OVER 4.0

RELATIVE DENSITY OF COHESIONLESS SOILS

DENSITY	SPT (BPF)
VERY LOOSE	0 – 4
LOOSE	5 – 10
MEDIUM DENSE	11 – 30
DENSE	31 – 50
VERY DENSE	50+

PARTICLE SIZE IDENTIFICATION

NAME	DIAMETER (INCHES)	SIEVE NO.
ROCK BLOCK	>120	
BOULDER	12-120	
COBBLE	3-12	
GRAVEL		
COURSE	3/4 - 3	
FINE	1/4 – 3/4	NO. 4
SAND		
COARSE	4.75 MM	NO. 10
MEDIUM	2.0MM	NO. 40
FINE	.425 MM	NO. 200
SILT	.075 MM	
CLAY	<0.005 MM	

GRAIN SIZE

FINE GRAINED	<0.04 INCH	FEW GRAINS ARE DISTINGUISHABLE IN THE FIELD OR WITH HAND LENS.
MEDIUM GRAINED	0.04-0.2 INCH	GRAINS ARE DISTINGUISHABLE WITH THE AID OF A HAND LENS.
COARSE GRAINED	0.04-0.2 INCH	MOST GRAINS ARE DISTINGUISHABLE WITH THE NAKED EYE.

DESCRIPTIVE TERMINOLOGY & SOIL CLASSIFICATION

SPT EXPLORATIONS:

STANDARD PENETRATION TESTING IS PERFORMED BY DRIVING A 2 – INCH O.D. SPLIT-SPOON INTO THE UNDISTURBED FORMATION AT THE BOTTOM OF THE BORING WITH REPEATED BLOWS OF A 140 – POUND PIN GUIDED HAMMER FALLING 30 INCHES. NUMBER OF BLOWS (N VALUE) REQUIRED TO DRIVE THE SAMPLER A GIVEN DISTANCE WAS CONSIDERED A MEASURE OF SOIL CONSISTENCY.

SH SAMPLING:

SHELBY TUBE SAMPLING IS PERFORMED WITH A THIN WALLED SAMPLER PUSHED INTO THE UNDISTURBED SOIL TO SAMPLE 2.0 FEET OF SOIL.

AIR TRACK EXPLORATION:

TESTING IS PERFORMED BY MEASURING RATE OF ADVANCEMENT AND SAMPLES ARE RETRIEVED FROM CUTTINGS.

HAND AUGUR EXPLORATION:

TESTING IS PREFORMED USING A 3.25" DIAMETER AUGUR TO ADVANCE INTO THE EARTH AND RETRIEVE SAMPLES.

DRIVE PROBE EXPLORATIONS:

THIS "RELATIVE DENSITY" EXPLORATION DEVICE IS USED TO DETERMINE THE DISTRIBUTION AND ESTIMATE STRENGTH OF THE SUBSURFACE SOIL AND DECOMPRESSED ROCK UNITS. THE RESISTANCE TO PENETRATION IS MEASURED IN BLOWS-PER-1/2 FOOT OF AN 11-POUND HAMMER WHICH FREE FALLS ROUGHLY 3.5 FEET DRIVING THE 0.5 INCH DIAMETER PIPE INTO THE GROUND. FOR A MORE DETAILED DESCRIPTION OF THIS GEOTECHNICAL EXPLORATION METHOD, THE SLOPE STABILITY REFERENCE GUIDE FOR NATIONAL FORESTS IN THE UNITED STATES, VOLUME I, UNITED STATES DEPARTMENT OF AGRICULTURE, EM-7170-13, AUGUST 1994, P. 317-321.

CPT EXPLORATION:

CONE PENETROMETER EXPLORATIONS CONSIST OF PUSHING A PROBE CONE INTO THE EARTH USING THE REACTION OF A 20-TON TRUCK. THE CONE RESISTANCE (QC) AND SLEEVE FRICTION (FS) ARE MEASURED AS THE PROBE WAS PUSHED INTO THE EARTH. THE VALUES OF QC AND FS (IN TSF) ARE NOTED AS THE LOCALIZED INDEX OF SOIL STRENGTH.

ANGULARITY OF GRAVEL & COBBLES

ANGULAR	COARSE PARTICLES HAVE SHARP EDGES AND RELATIVELY PLANE SIDES WITH UNPOLISHED SURFACES.
SUBANGULAR	COARSE GRAINED PARTICLES ARE SIMILAR TO ANGULAR BUT HAVE ROUNDED EDGES.
SUBROUNDED	COARSE GRAINED PARTICLES HAVE NEARLY PLANE SIDES BUT HAVE WELL ROUNDED CORNERS AND EDGES.
ROUNDED	COARSE GRAINED PARTICLES HAVE SMOOTHLY CURVED SIDES AND NO EDGES.

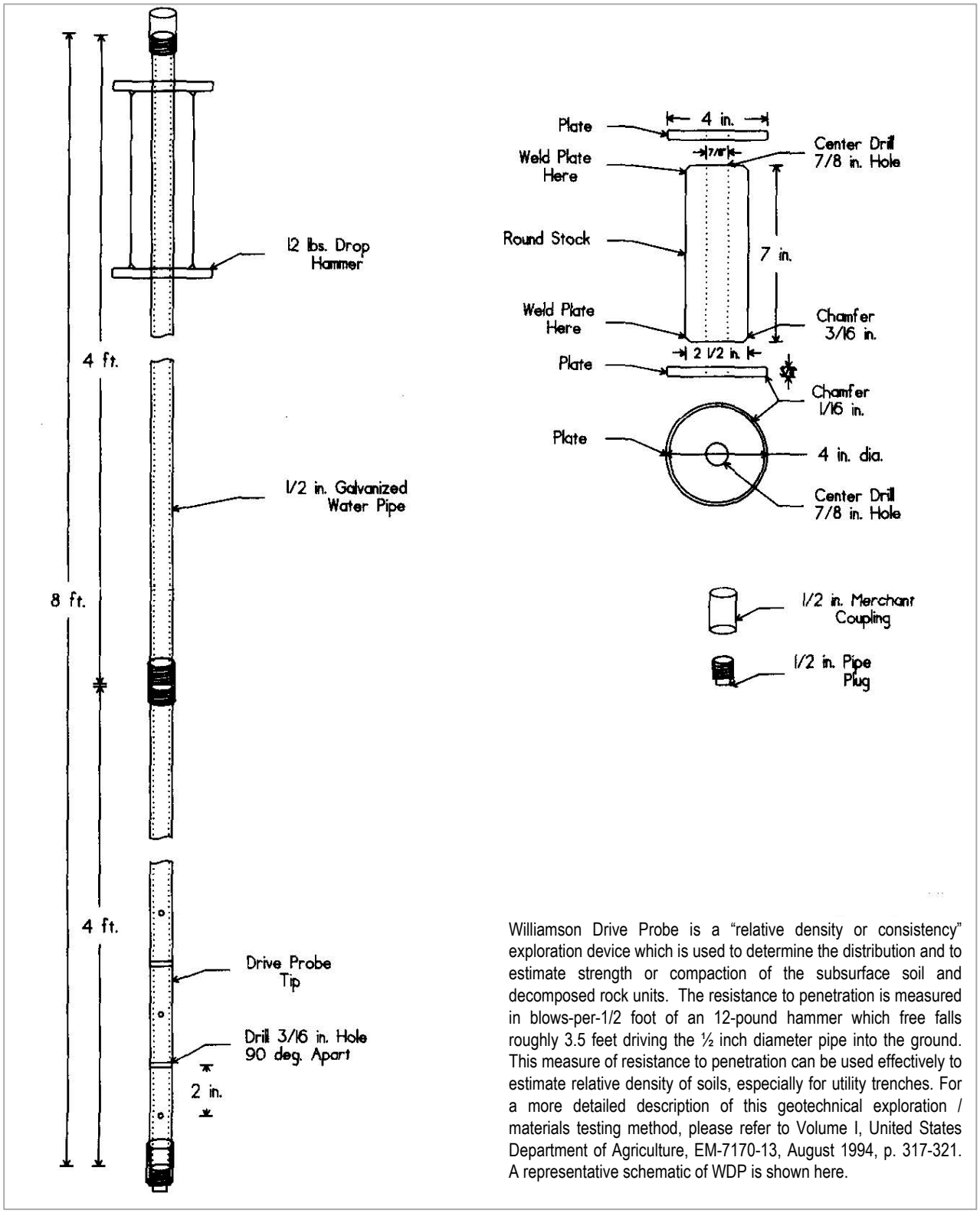
SOIL MOISTURE MODIFIER

DRY	ABSENCE OF MOISTURE; DUSTY, DRY TO TOUCH
MOIST	DAMP BUT NO VISIBLE WATER
WET	VISIBLE FREE WATER

WEATHERED STATE

FRESH	NO VISIBLE SIGN OF ROCK MATERIAL WEATHERING; PERHAPS SLIGHT DISCOLORATION IN MAJOR DISCONTINUITY SURFACES.
SLIGHTLY WEATHERED	DISCOLORATION INDICATES WEATHERING OF ROCK MATERIAL AND DISCONTINUITY SURFACES. ALL THE ROCK MATERIAL MAY BE DISCOLORED BY WEATHERING AND MAY BE SOMEWHAT WEAKER EXTERNALLY THAN ITS FRESH CONDITION.
MODERATELY WEATHERED	LESS THAN HALF OF THE ROCK MATERIAL IS DECOMPOSED AND/OR DISINTEGRATED TO SOIL. FRESH OR DISCOLORED ROCK IS PRESENT EITHER AS A CONTINUOUS FRAMEWORK OR AS CORE STONES.
HIGHLY WEATHERED	MORE THAN HALF OF THE ROCK MATERIAL IS DECOMPOSED AND/OR DISINTEGRATED TO SOIL. FRESH OR DISCOLORED ROCK IS PRESENT EITHER AS DISCONTINUOUS FRAMEWORK OR AS CORE STONE.
COMPLETELY WEATHERED	ALL ROCK MATERIAL IS DECOMPOSED AND/OR DISINTEGRATED TO SOIL. THE ORIGINAL MASS STRUCTURE IS STILL LARGELY INTACT.
RESIDUAL SOIL	ALL ROCK MATERIAL IS CONVERTED TO SOIL. THE MASS STRUCTURE AND MATERIAL FABRIC IS DESTROYED. THERE IS A LARGE CHANGE IN VOLUME, BUT THE SOIL HAS NOT BEEN SIGNIFICANTLY TRANSPORTED.

Drive Prove Schematic

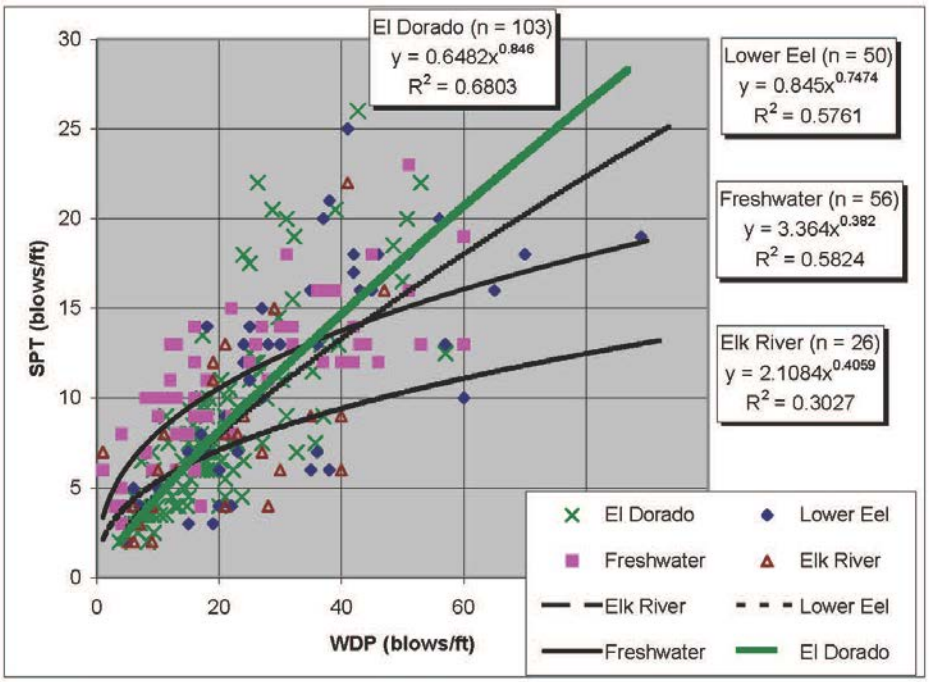


Williamson Drive Probe is a "relative density or consistency" exploration device which is used to determine the distribution and to estimate strength or compaction of the subsurface soil and decomposed rock units. The resistance to penetration is measured in blows-per-1/2 foot of an 12-pound hammer which free falls roughly 3.5 feet driving the ½ inch diameter pipe into the ground. This measure of resistance to penetration can be used effectively to estimate relative density of soils, especially for utility trenches. For a more detailed description of this geotechnical exploration / materials testing method, please refer to Volume I, United States Department of Agriculture, EM-7170-13, August 1994, p. 317-321. A representative schematic of WDP is shown here.

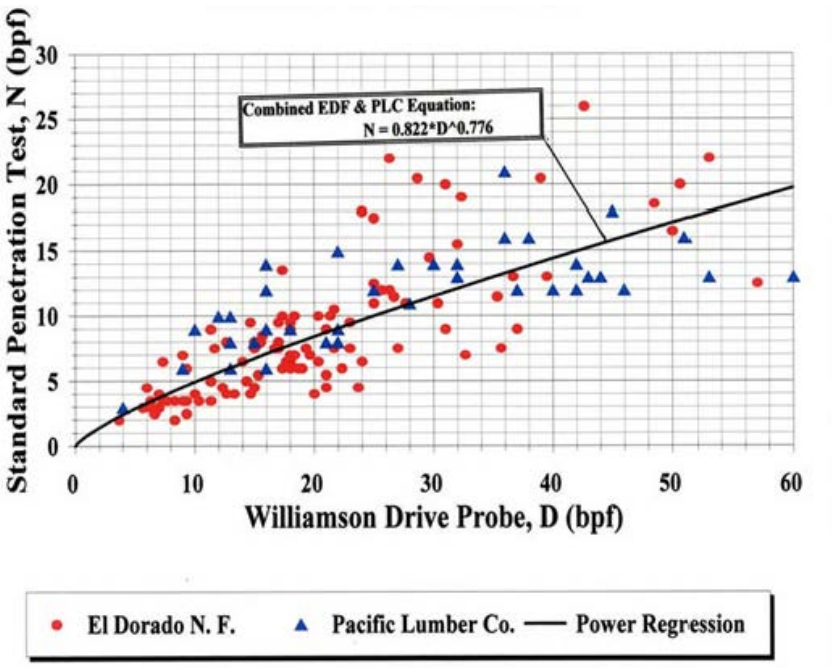
Reference: Figure 3.6.1, Appendix 3.6, Page No. 321, USDA EM-7170-13, August 1994, Volume I

CORRELATION

WILLIAMSON DRIVE PROBE (WDP)
STANDARD PENETRATION TEST (SPT)



SOURCE: Published literature by W.C. Adams (Hart Crowser, Inc.), R.W. Prellwitz (Bitterroot Geotechnical) & T.E. Koler (El Dorado National Forest).



SOURCE: United States Forest Service, Technology Development Program Website (http://www.fs.fed.us/t-d/programs/im/williamson_drive/correlation.shtml)

GEOPHYSICAL SETTING

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

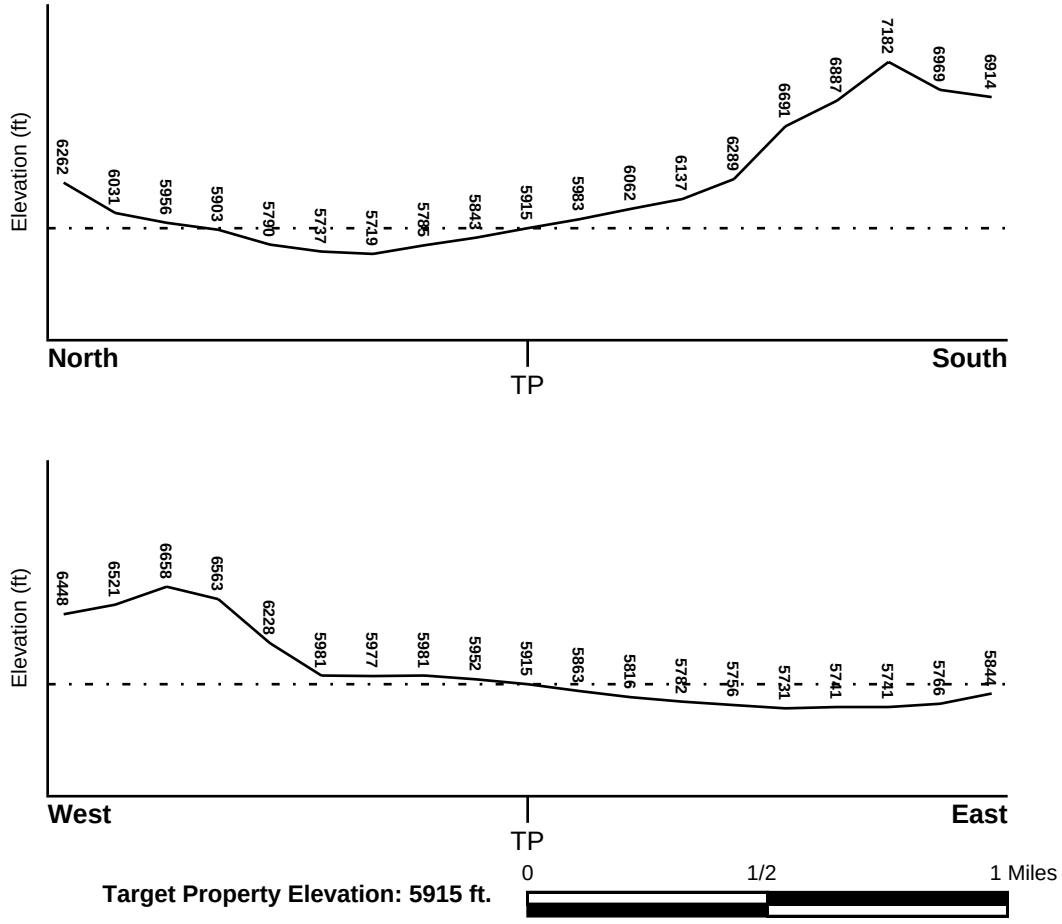
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

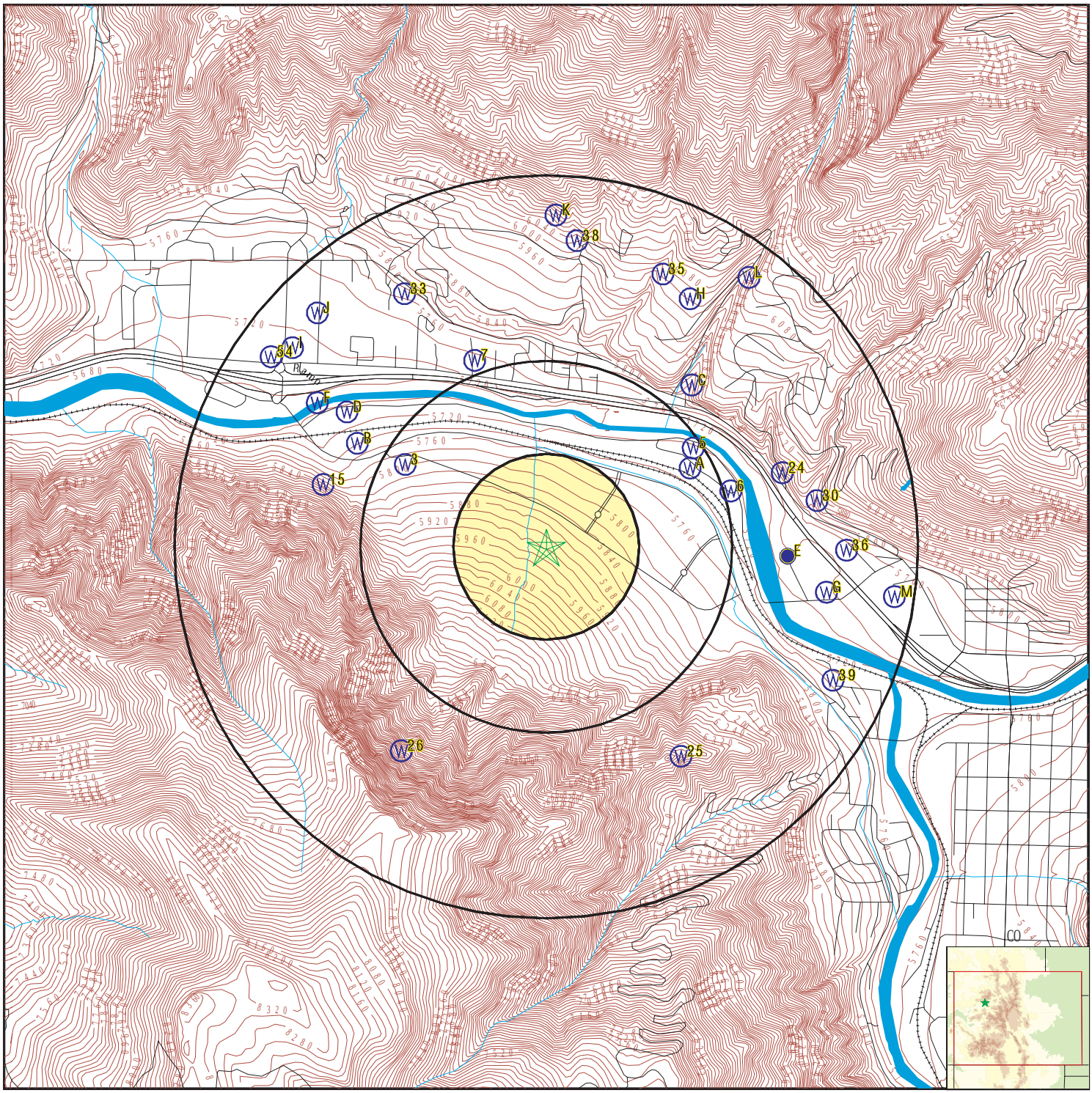
General Topographic Gradient: General NNE

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

PHYSICAL SETTING SOURCE MAP - 6118520.2s



0 1/4 1/2 1 Miles

County Boundary
Major Roads
Contour Lines
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

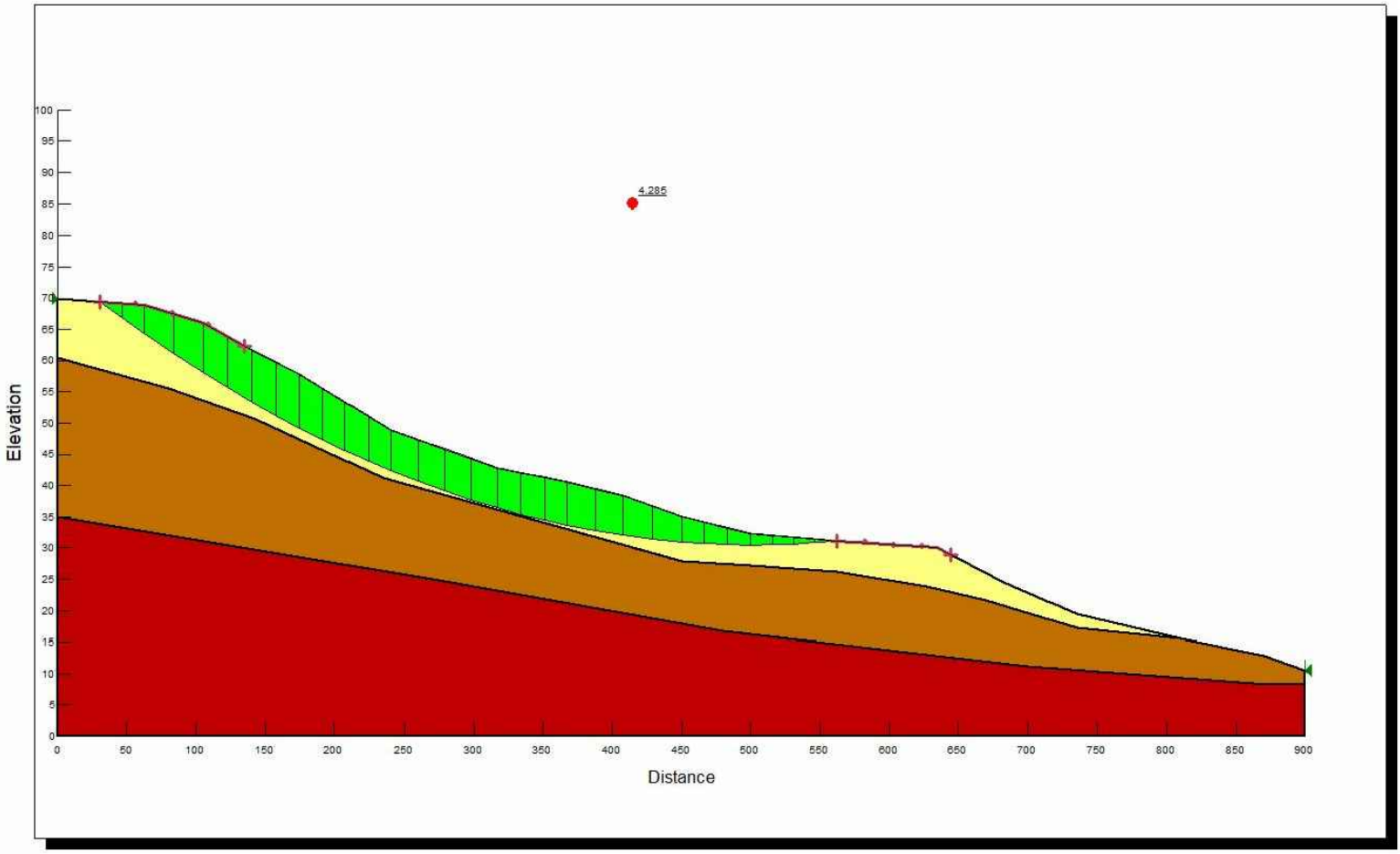
Groundwater Flow Direction
GI Indeterminate Groundwater Flow at Location
GV Groundwater Flow Varies at Location
Oil, gas or related wells

N

SITE NAME:	Glenwood Meadows Housing	CLIENT:	American Geoservices, LLC
ADDRESS:	Wulfsohn Road Glenwood Springs CO 81601	CONTACT:	SAM ADETTIWAR
LAT/LONG:	39.554395 / 107.348062	INQUIRY #:	6118520.2s
		DATE:	July 13, 2020 2:19 pm

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SLOPE STABILITY ANALYSIS RESULTS

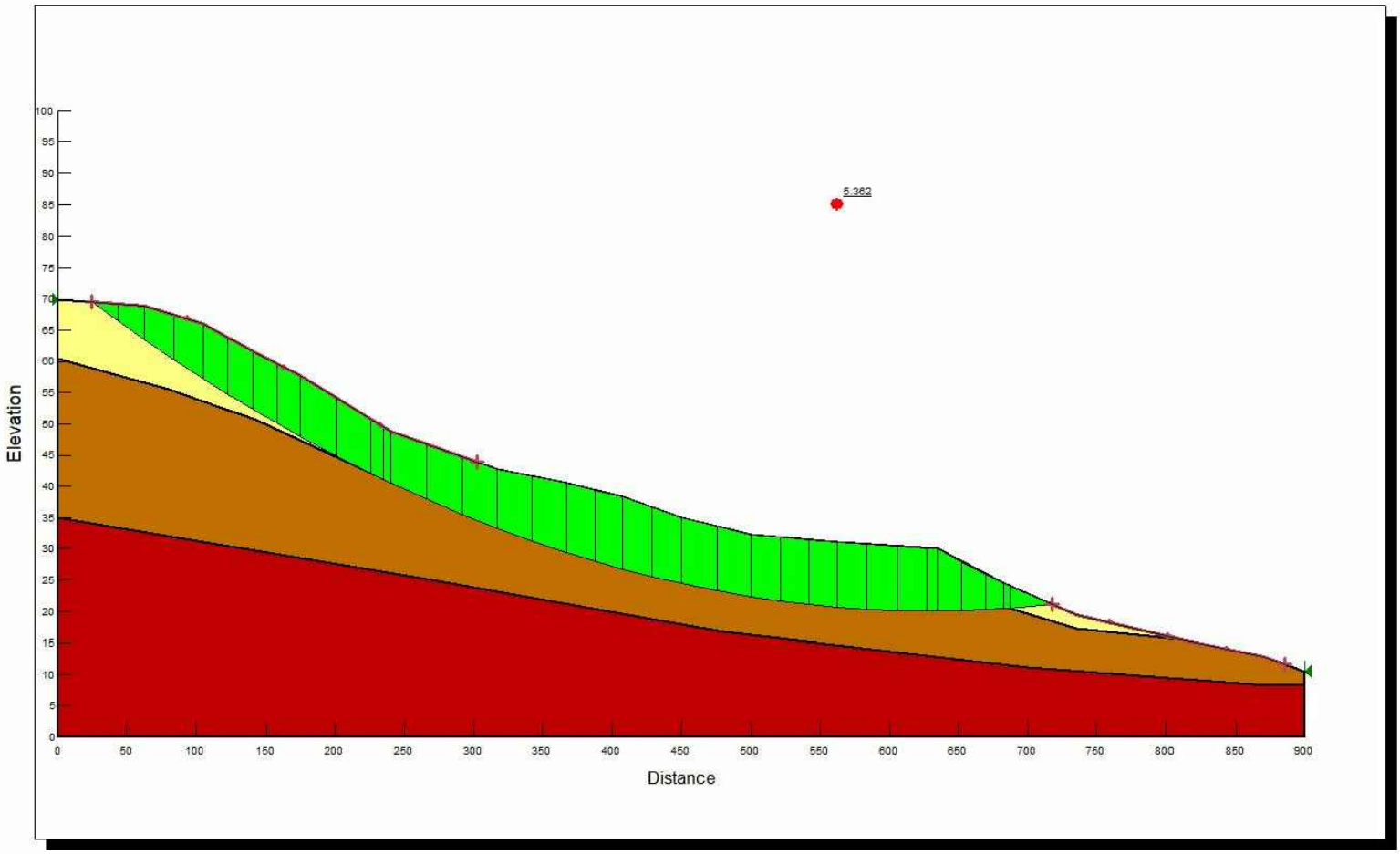


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITHOUT WATER TABLE (STATIC)

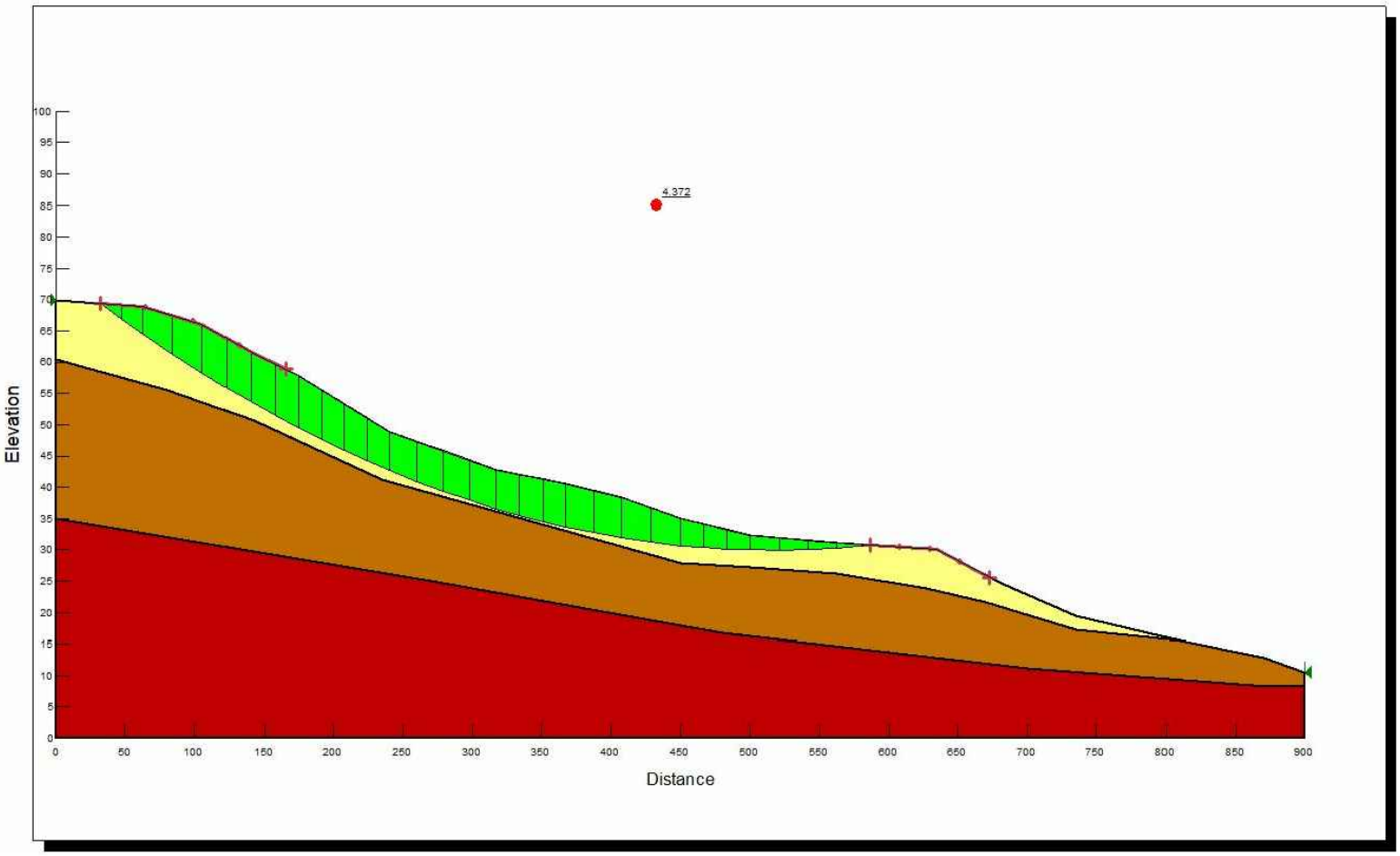


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SLOPE STABILITY ANALYSIS WITHOUT WATER TABLE (STATIC)

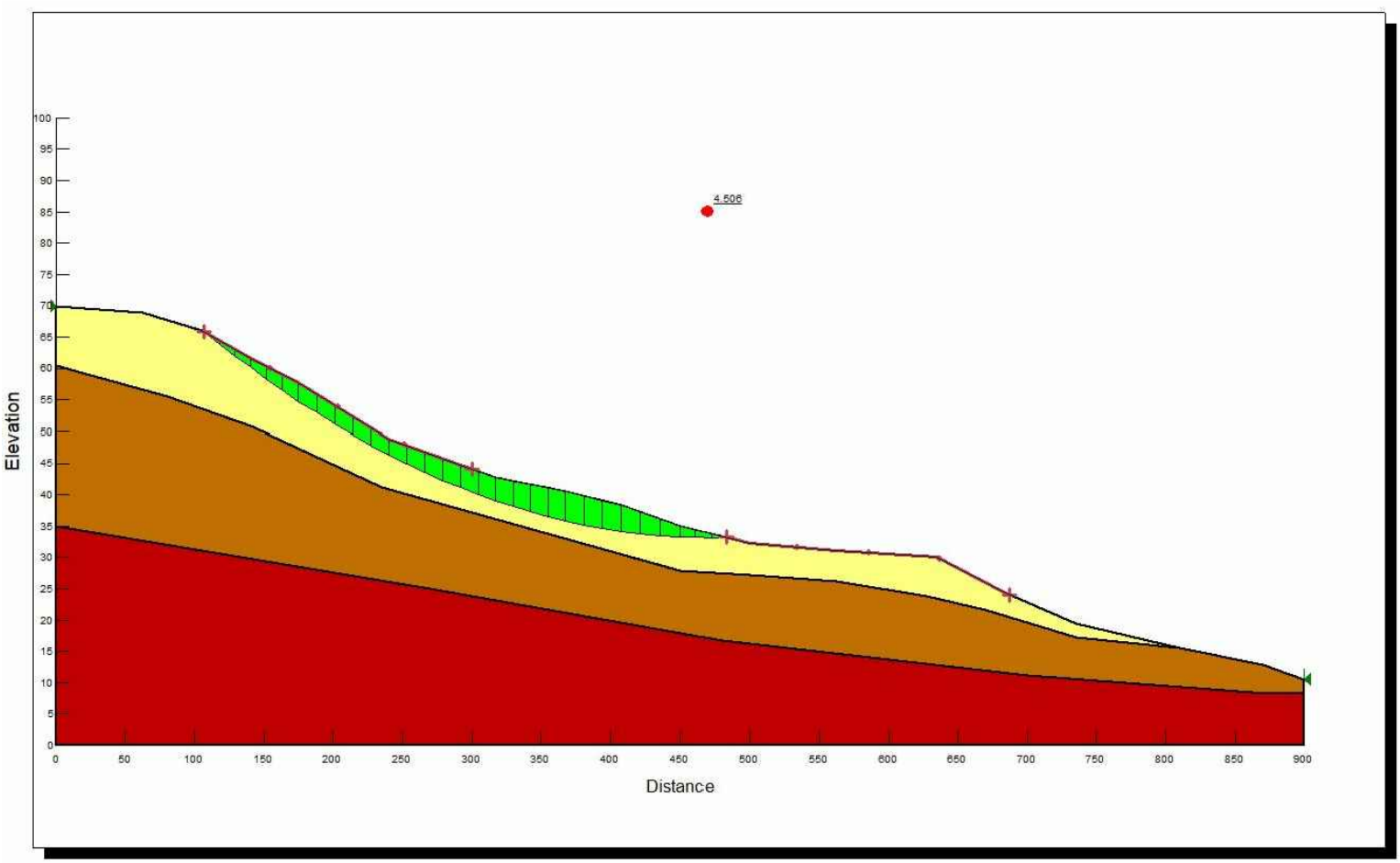


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SLOPE/W SOFTWARE

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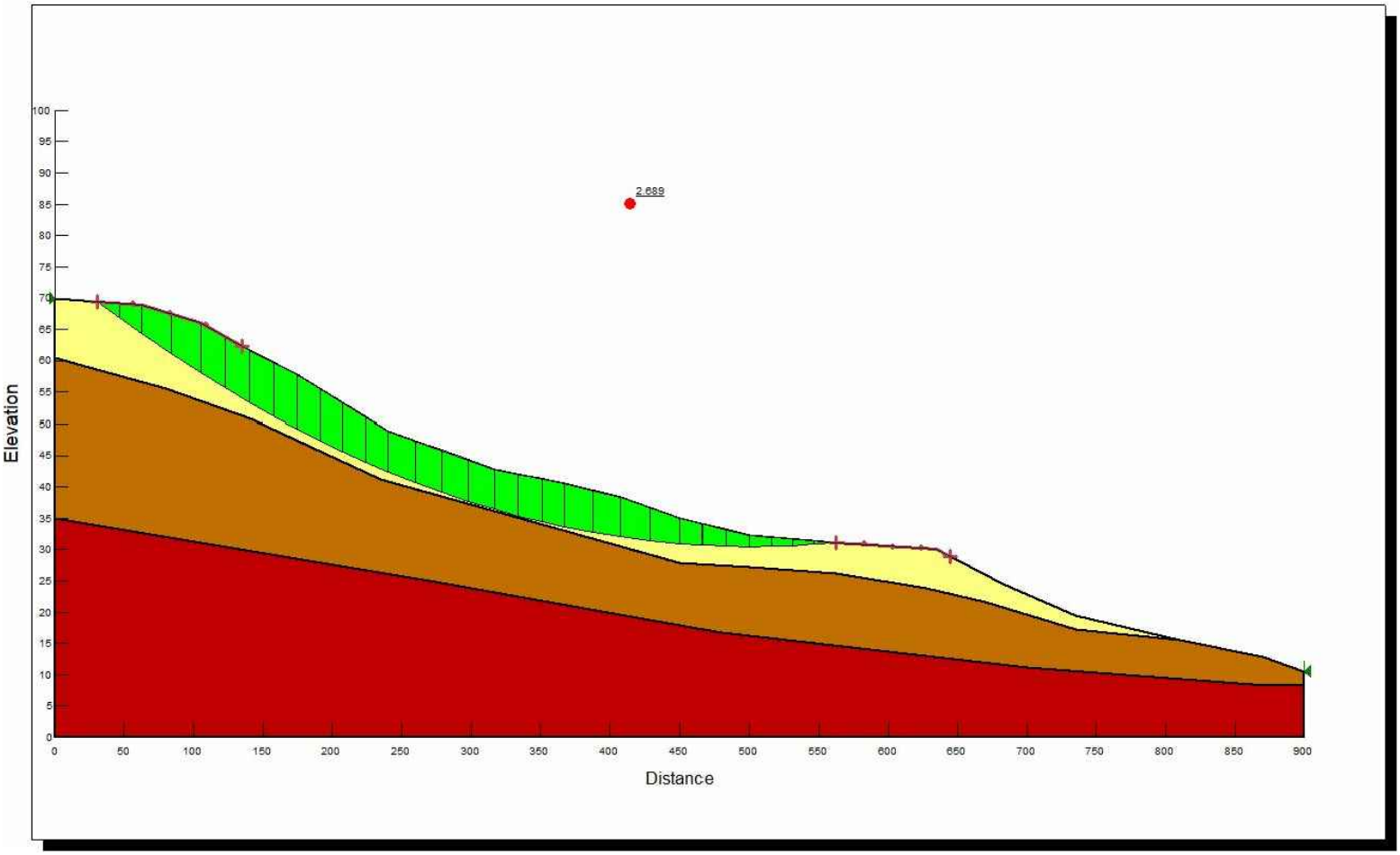


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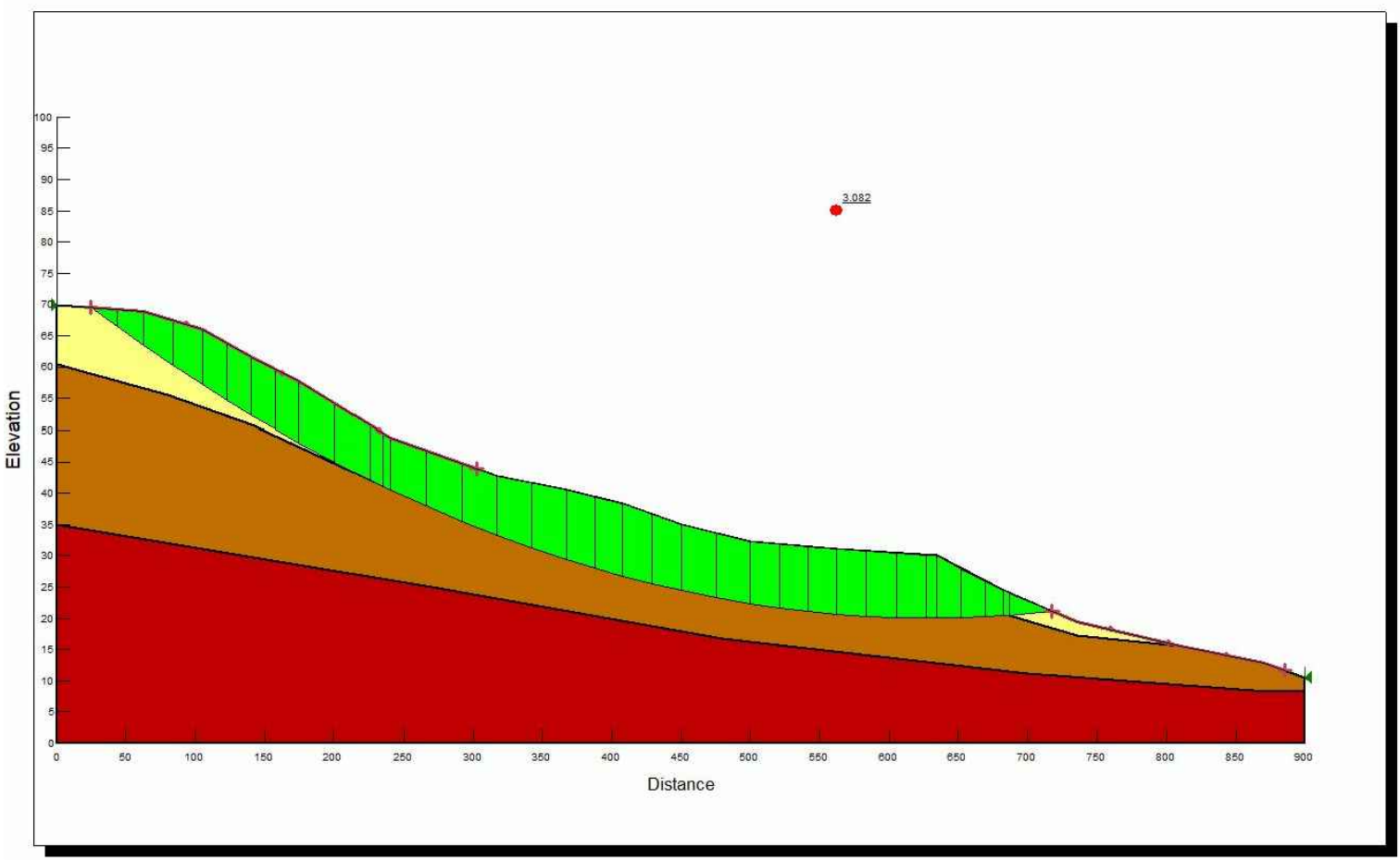


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
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SLOPE STABILITY ANALYSIS WITHOUT WATER TABLE (SEISMIC Kh=0.05g)

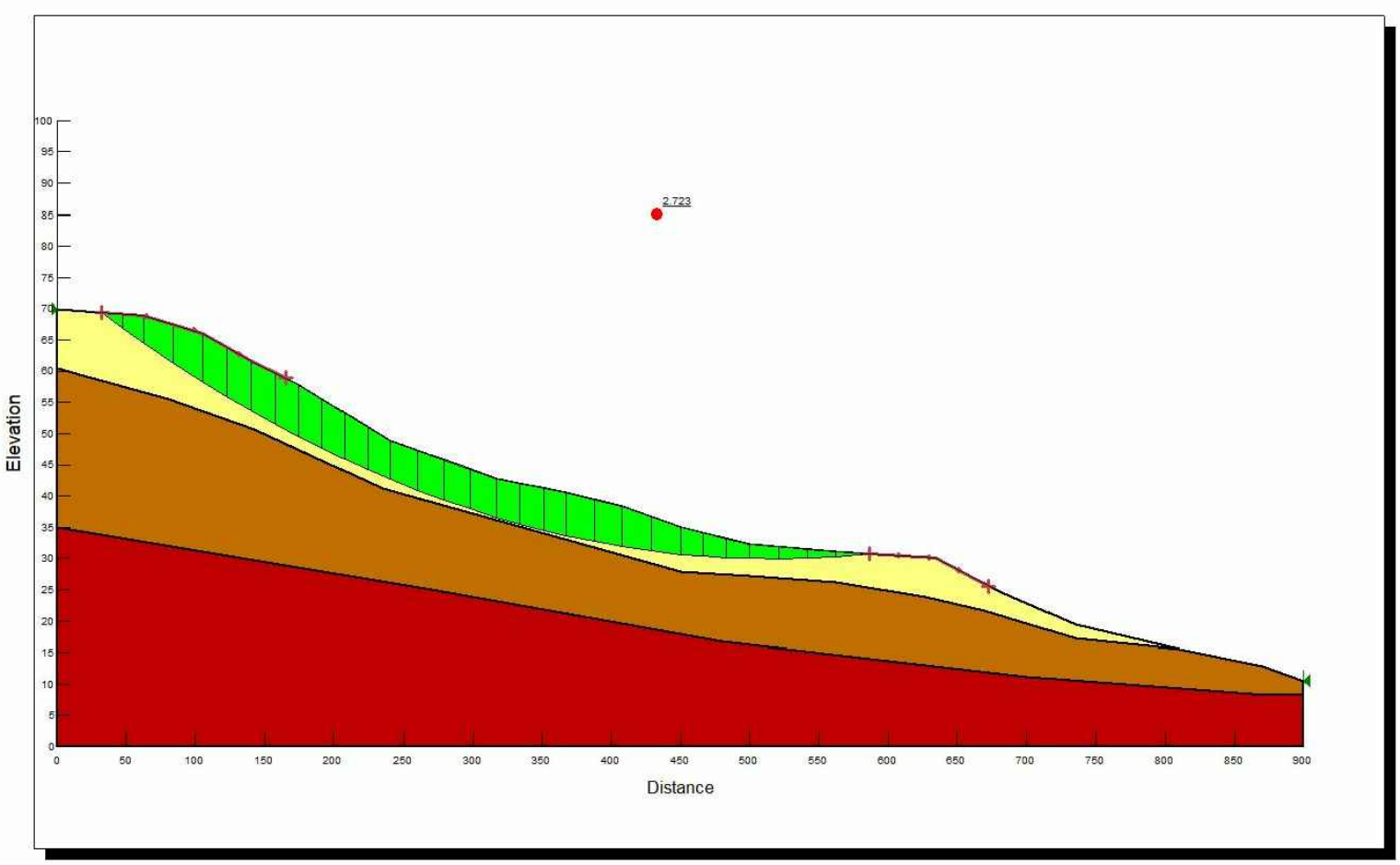


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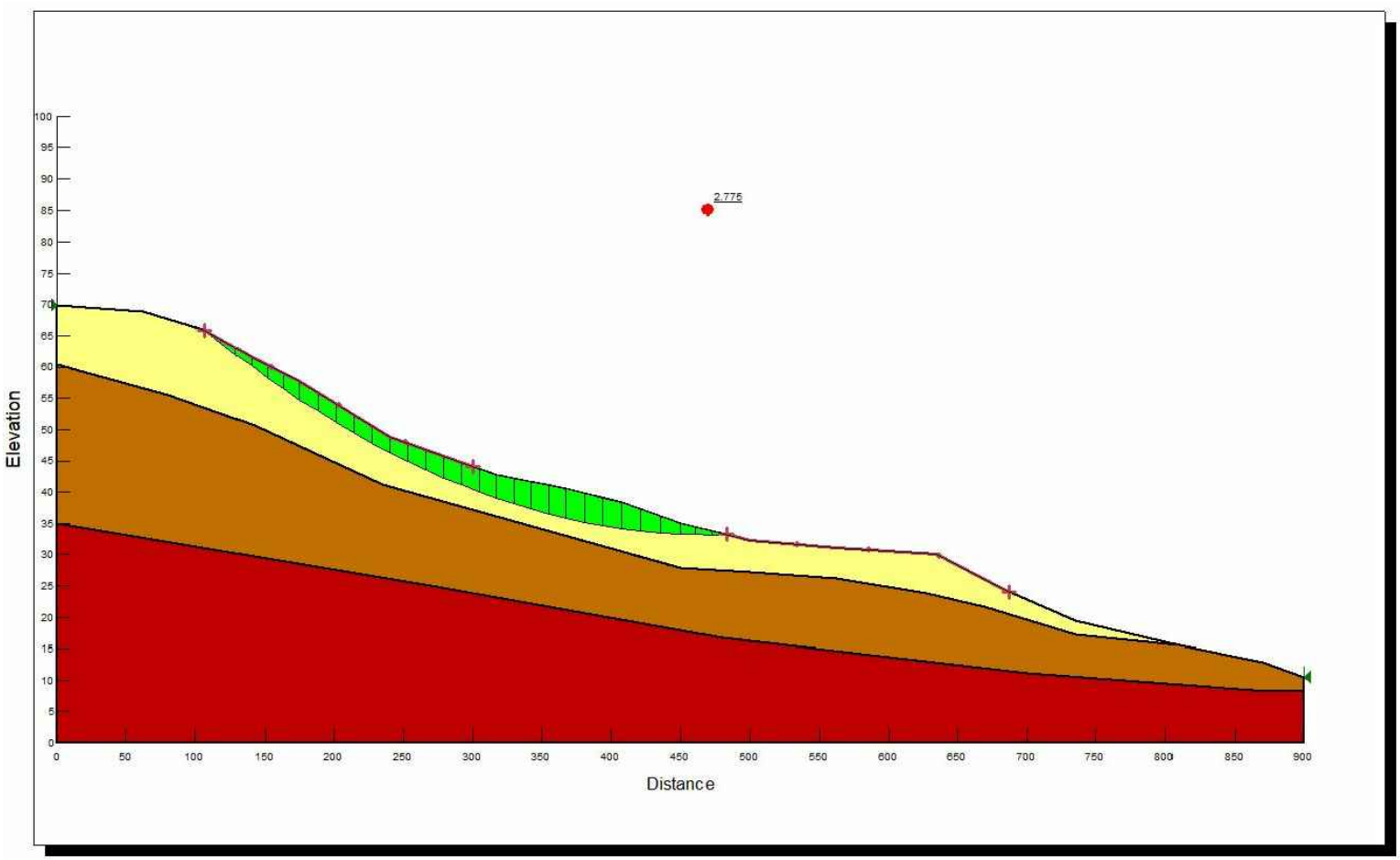


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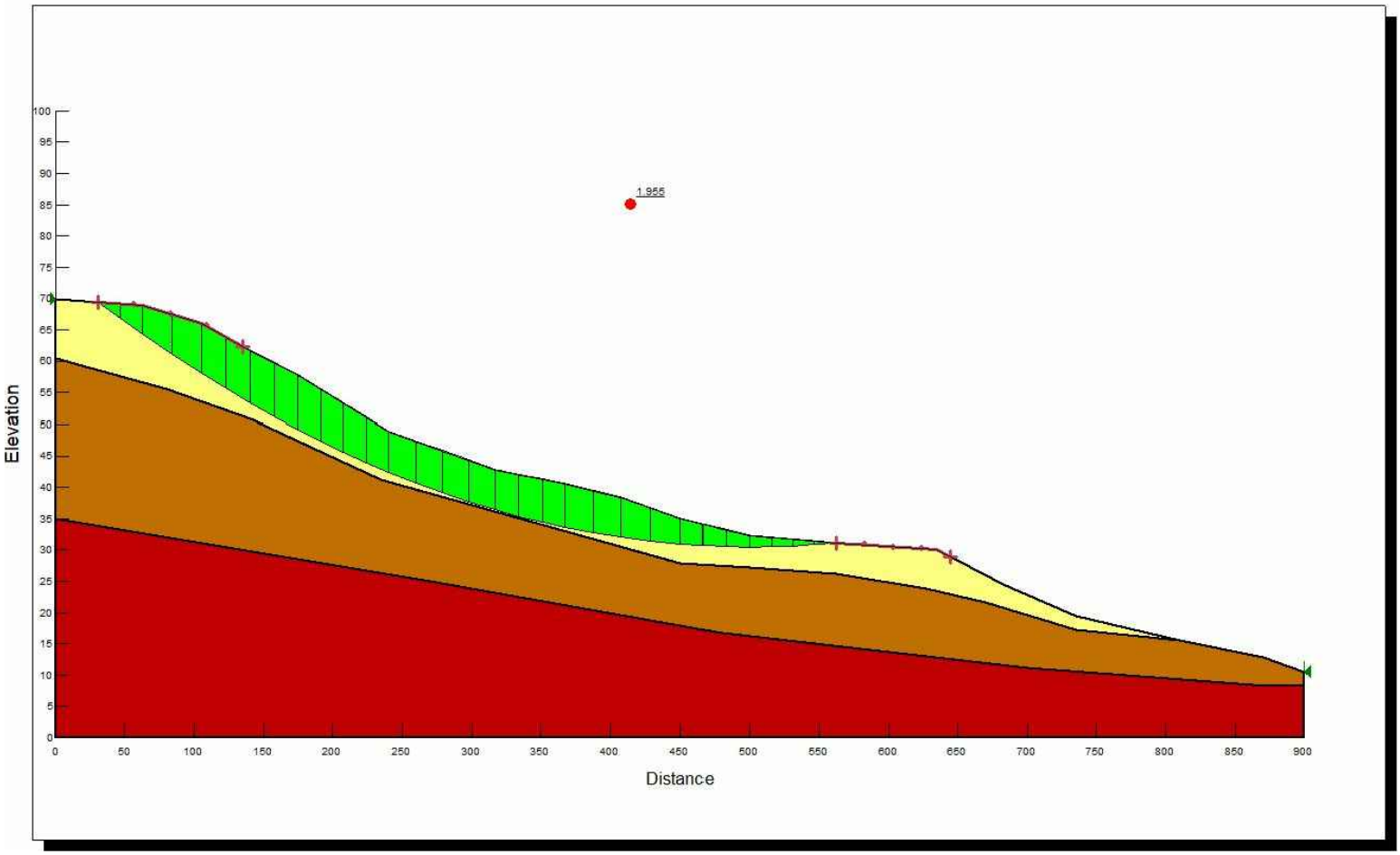


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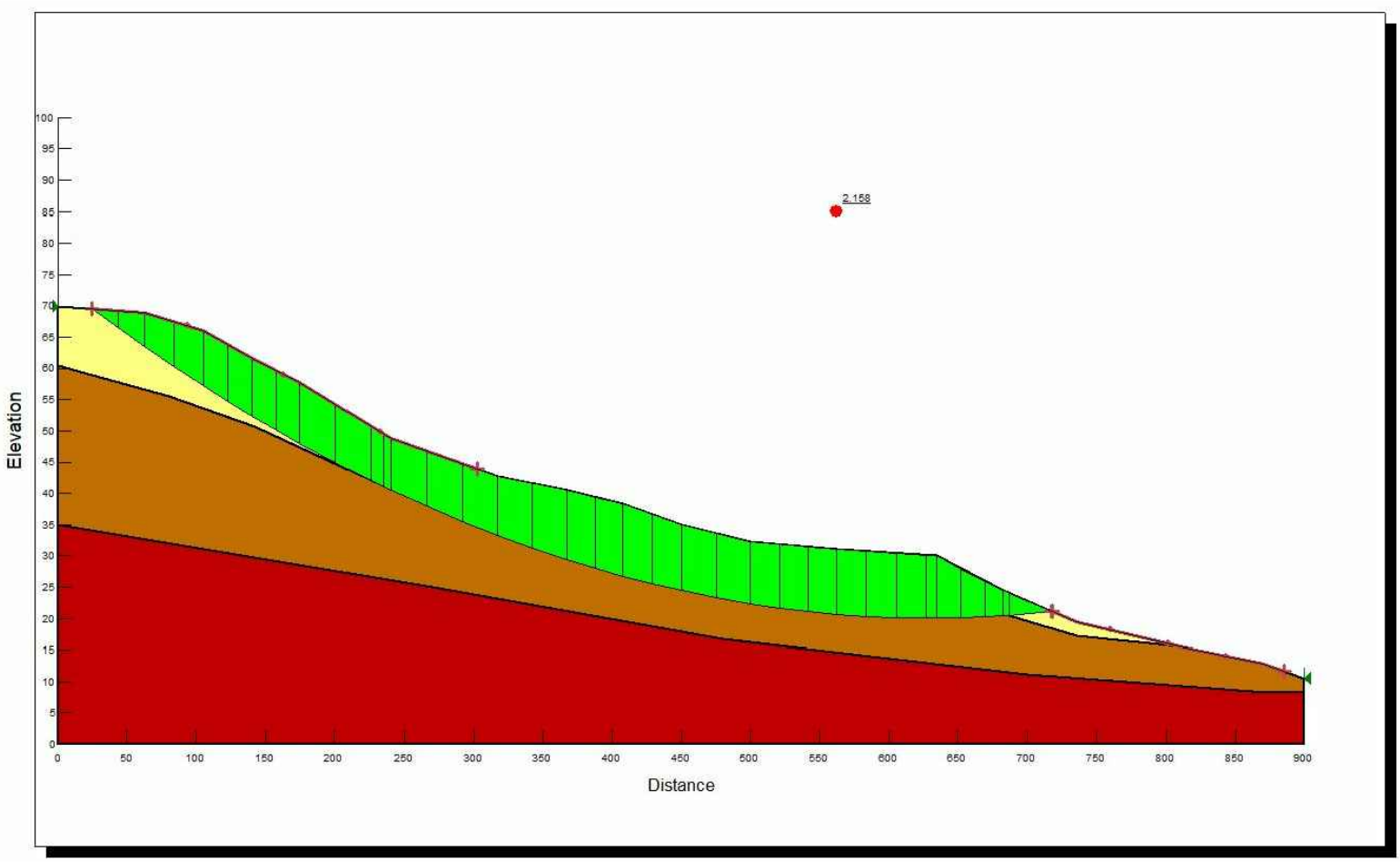


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REFERENCE:
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AMERICAN GEOSERVICES
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SLOPE STABILITY ANALYSIS WITHOUT WATER TABLE (SEISMIC Kh=0.1g)

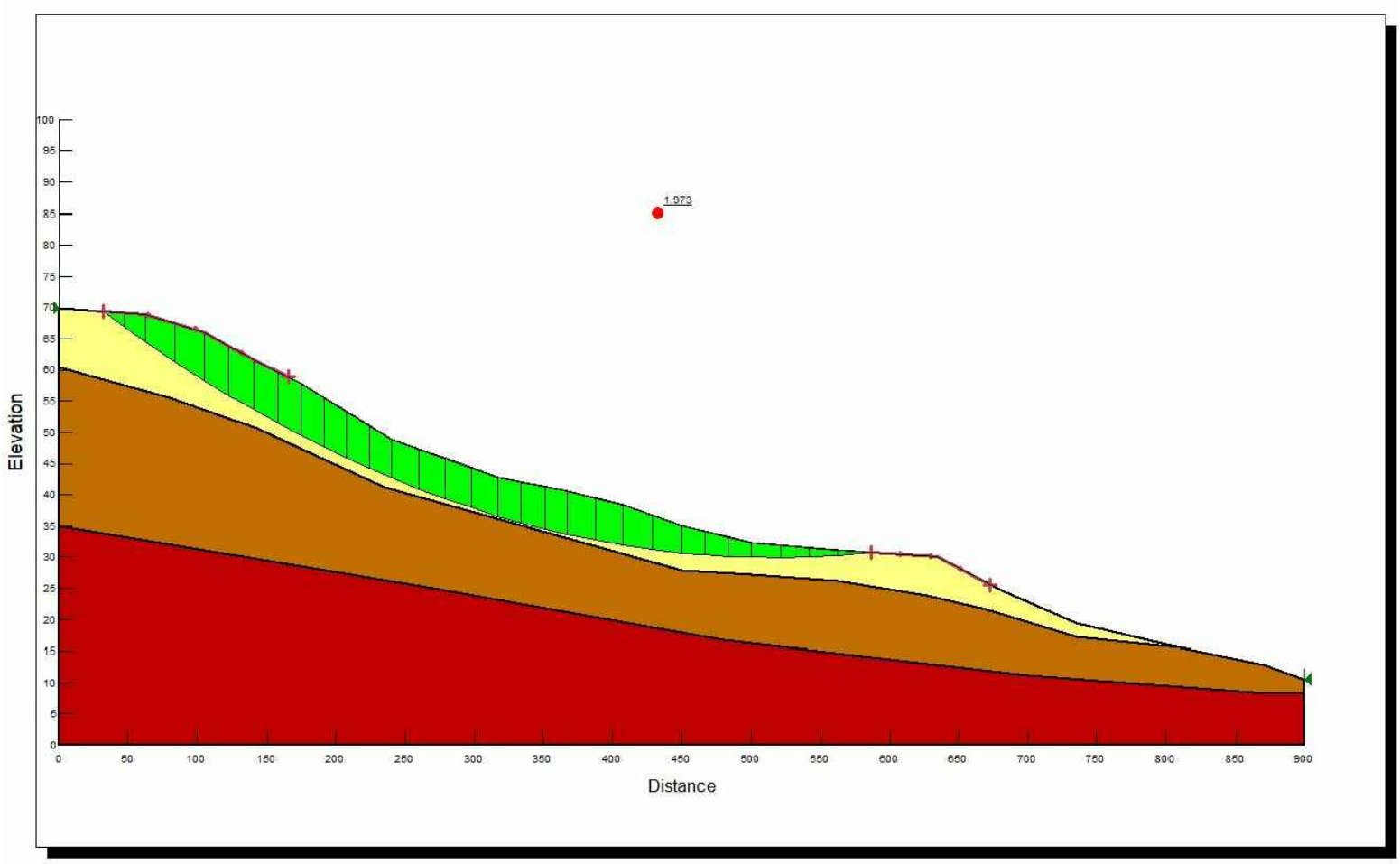


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REFERENCE:
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SLOPE STABILITY ANALYSIS WITHOUT WATER TABLE (SEISMIC Kh=0.1g)

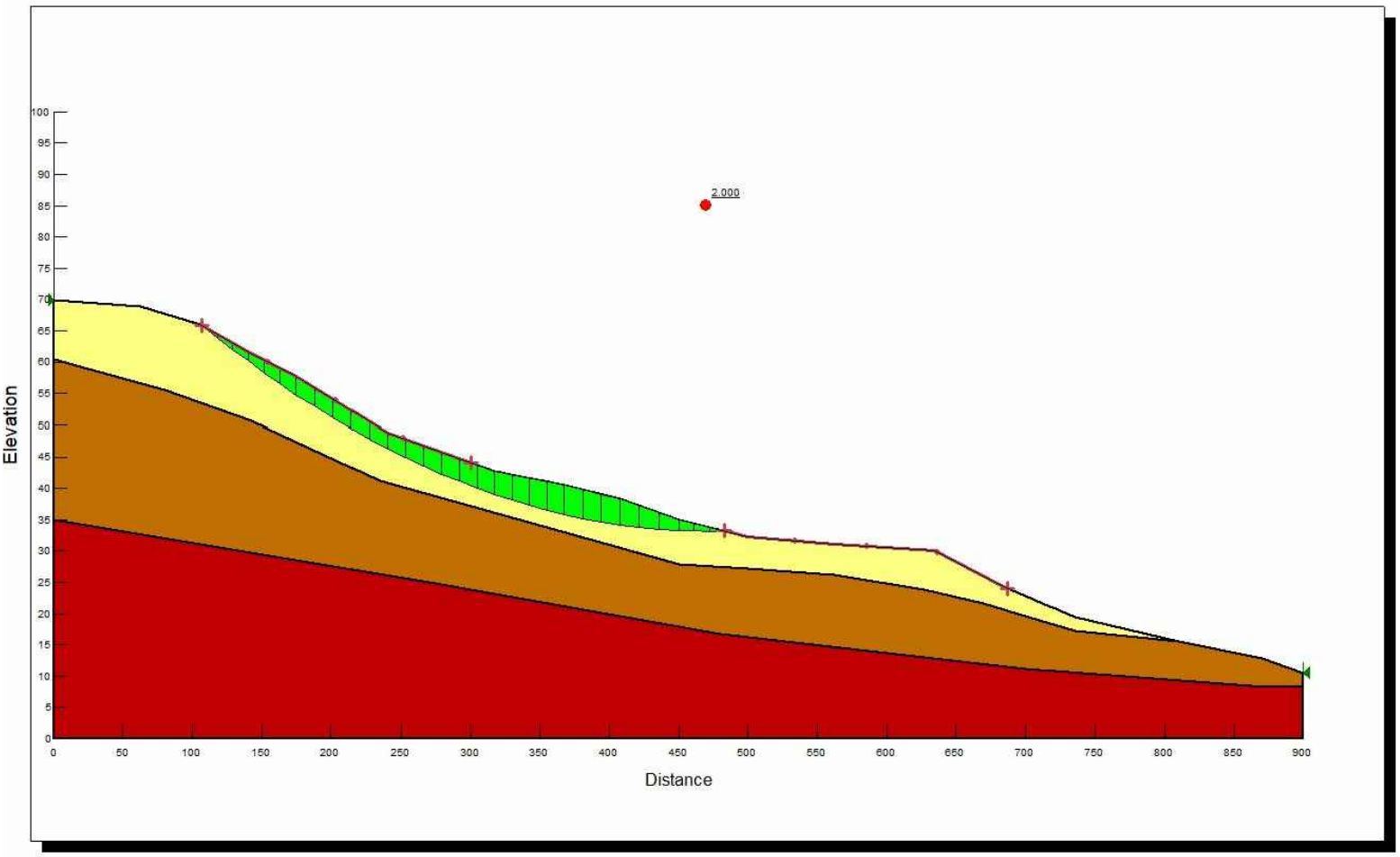


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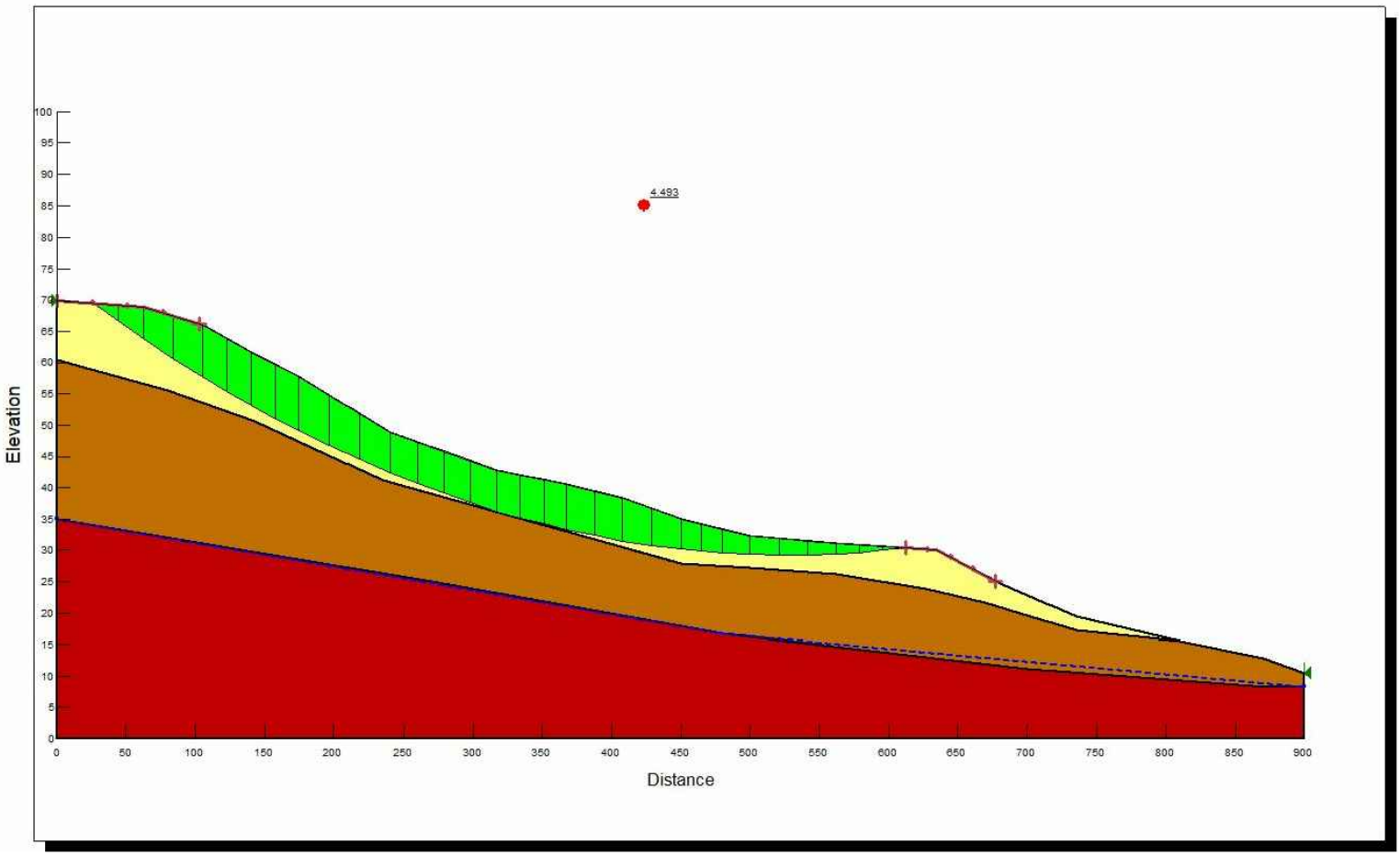


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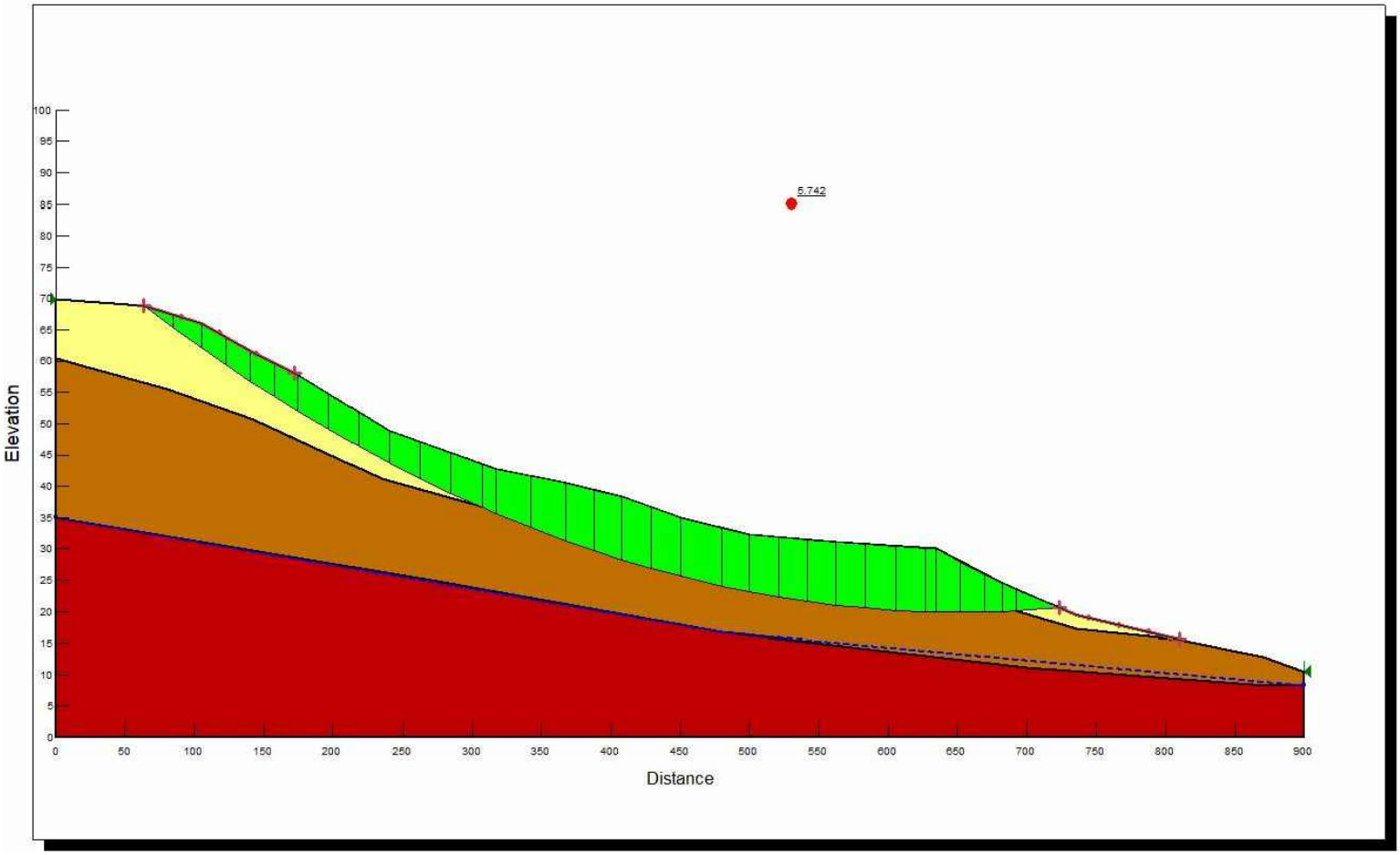


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SLOPE STABILITY ANALYSIS WITH WATER TABLE (STATIC)

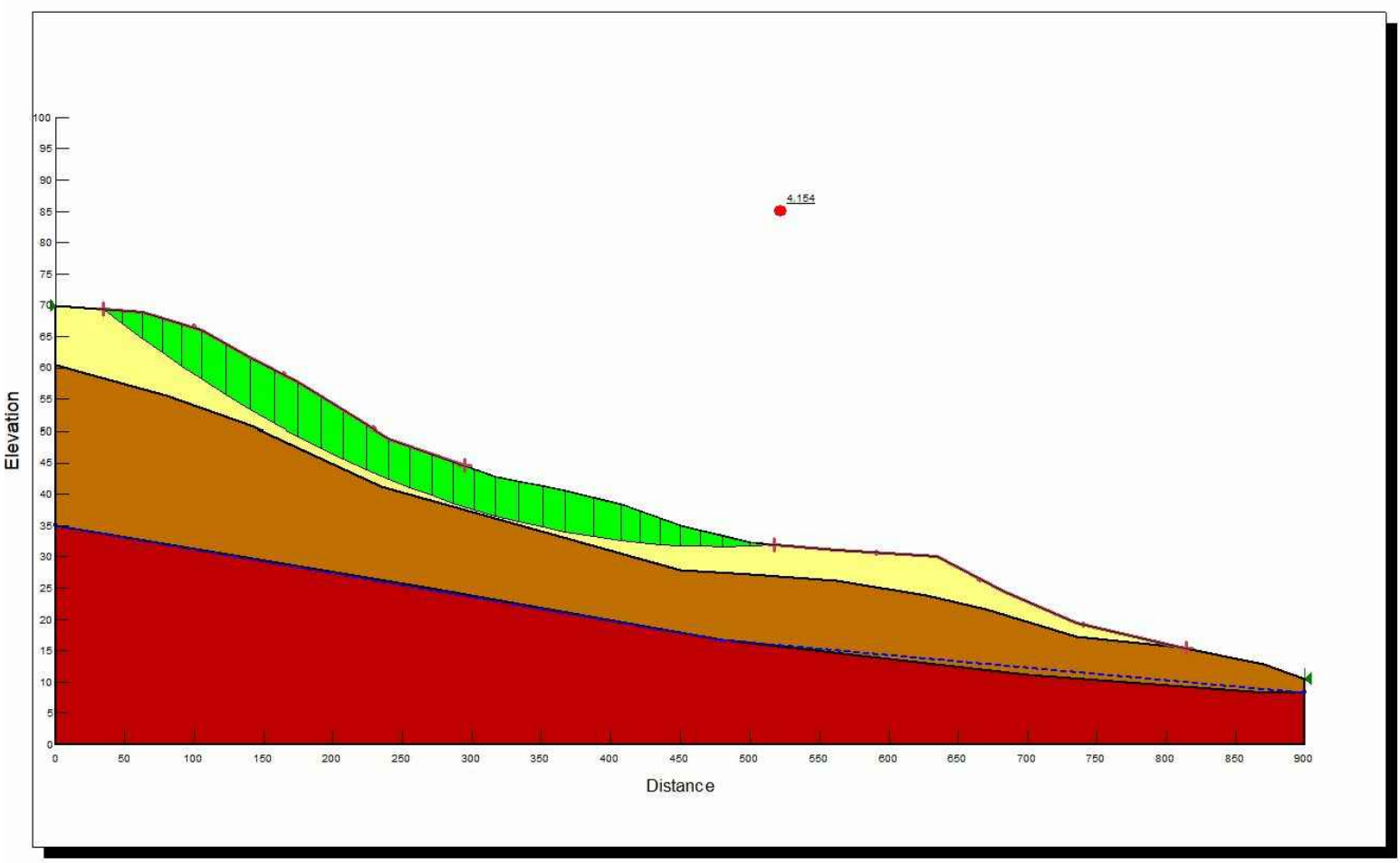


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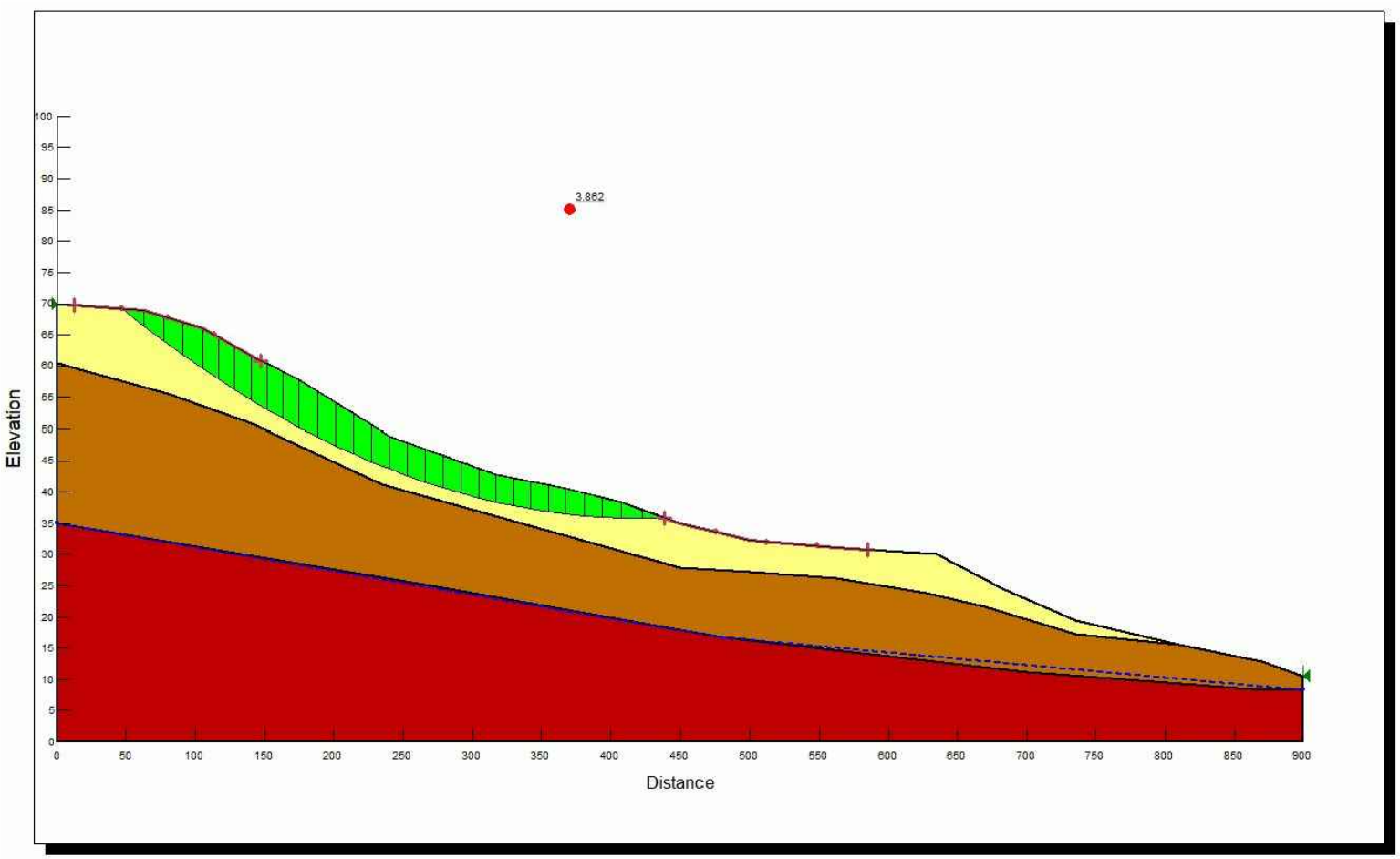


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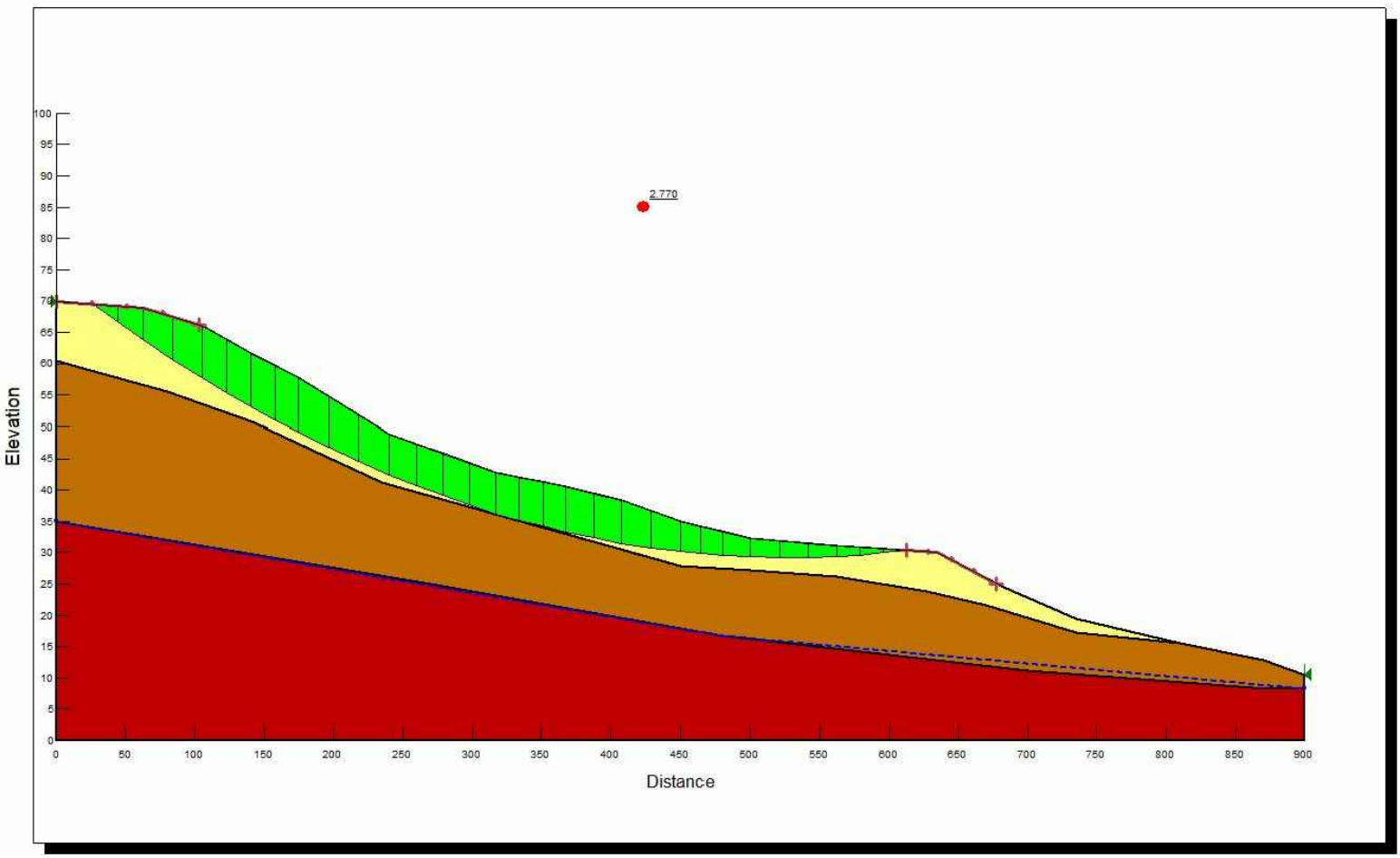


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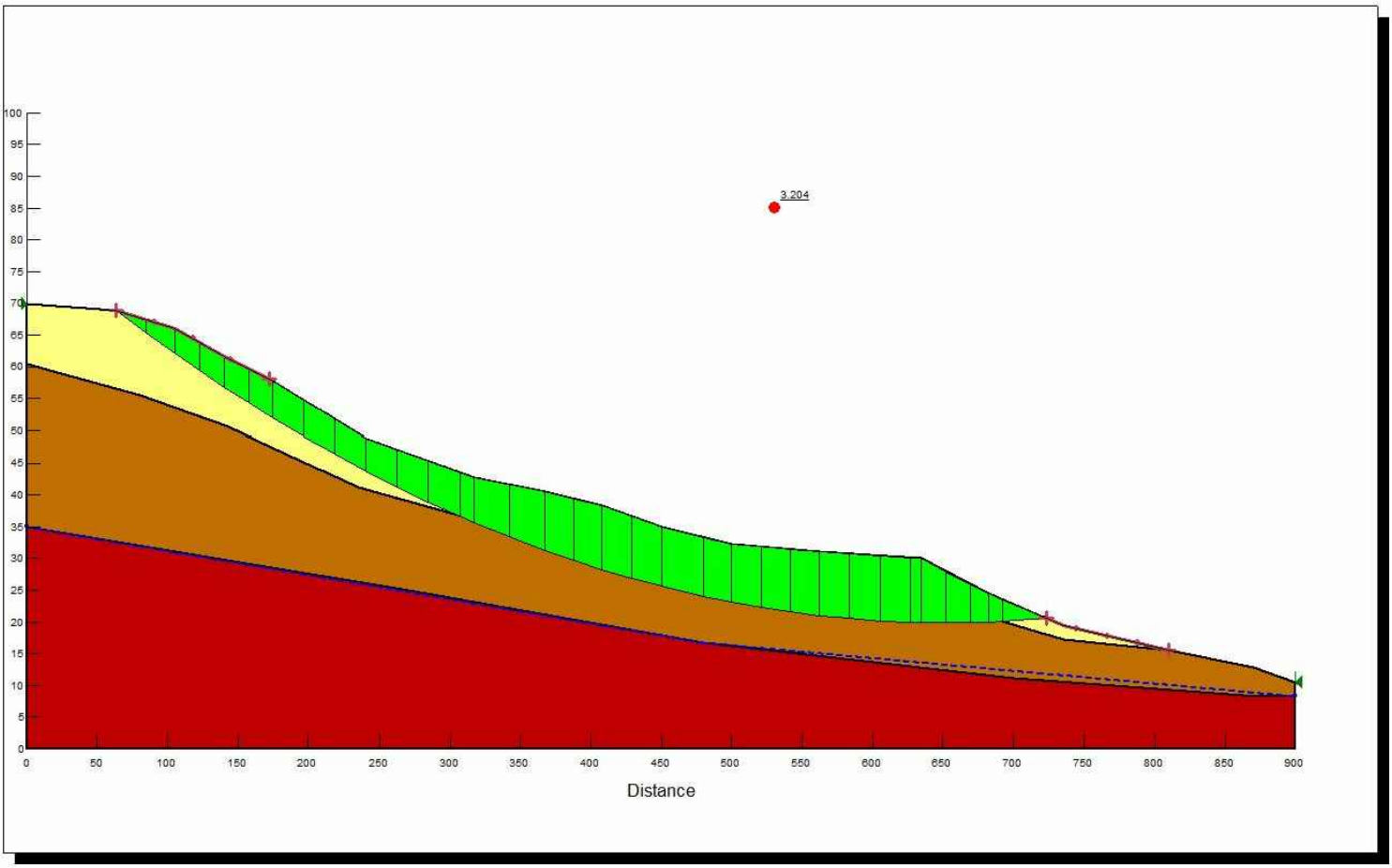


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SLOPE/W SOFTWARE

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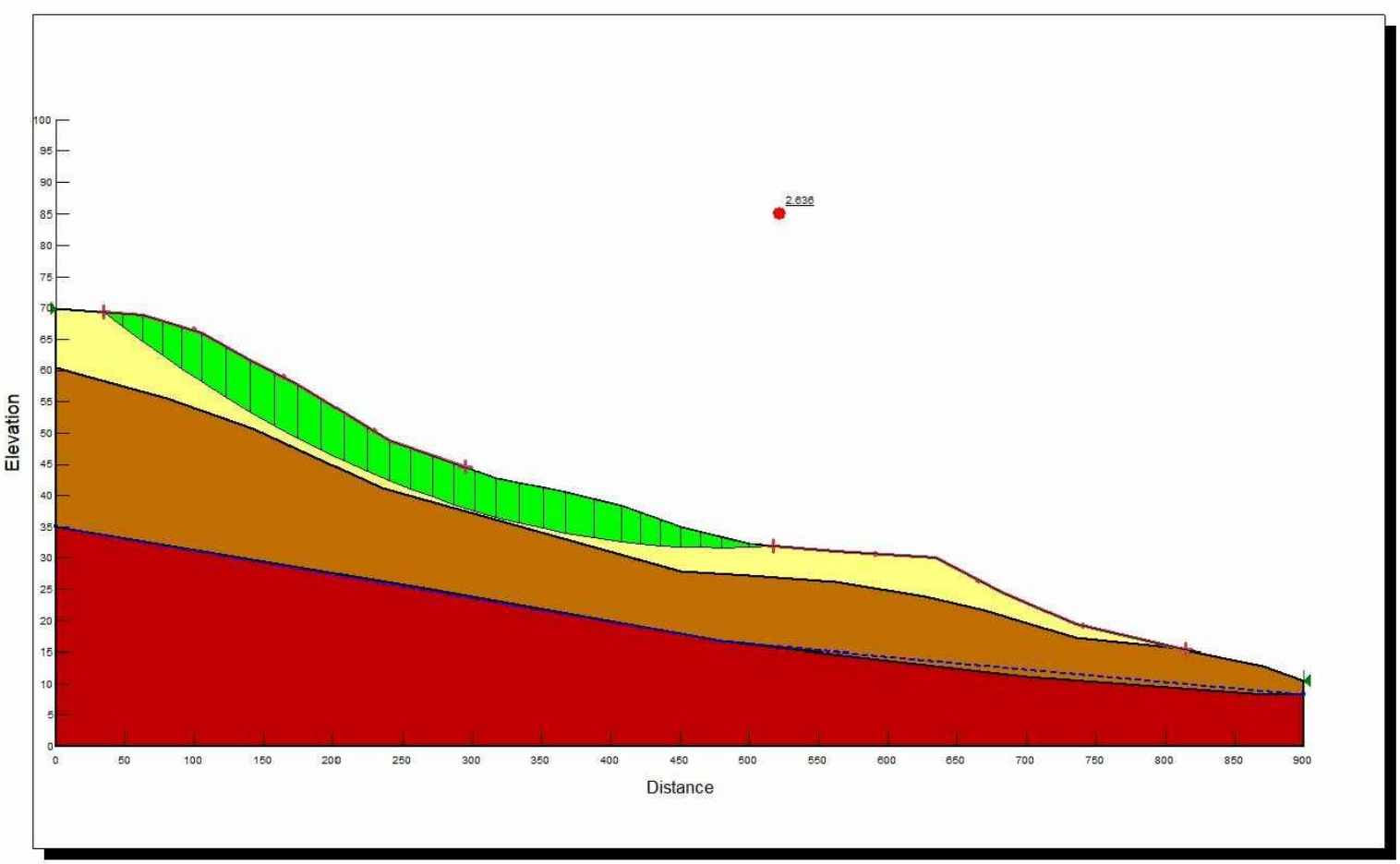


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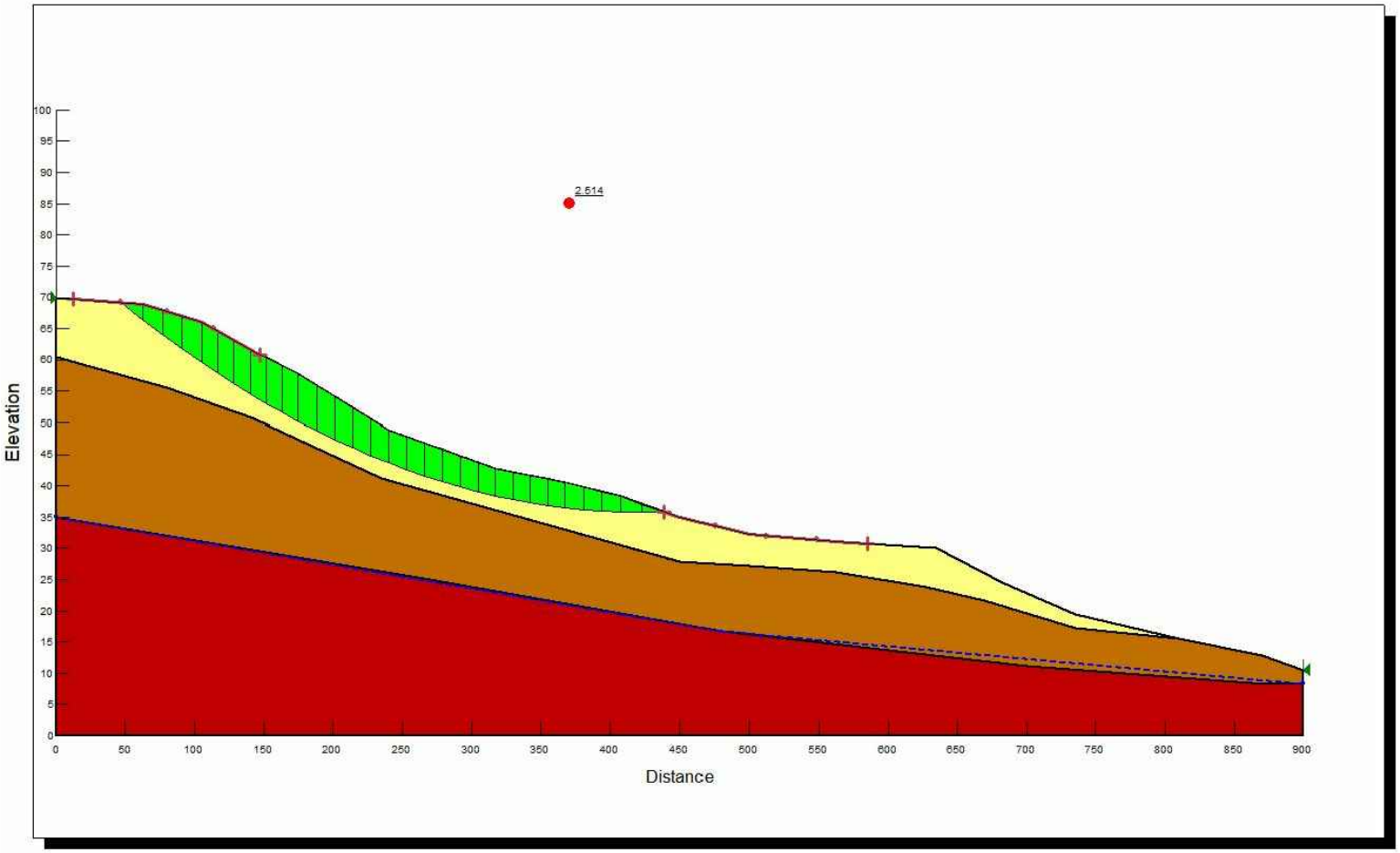


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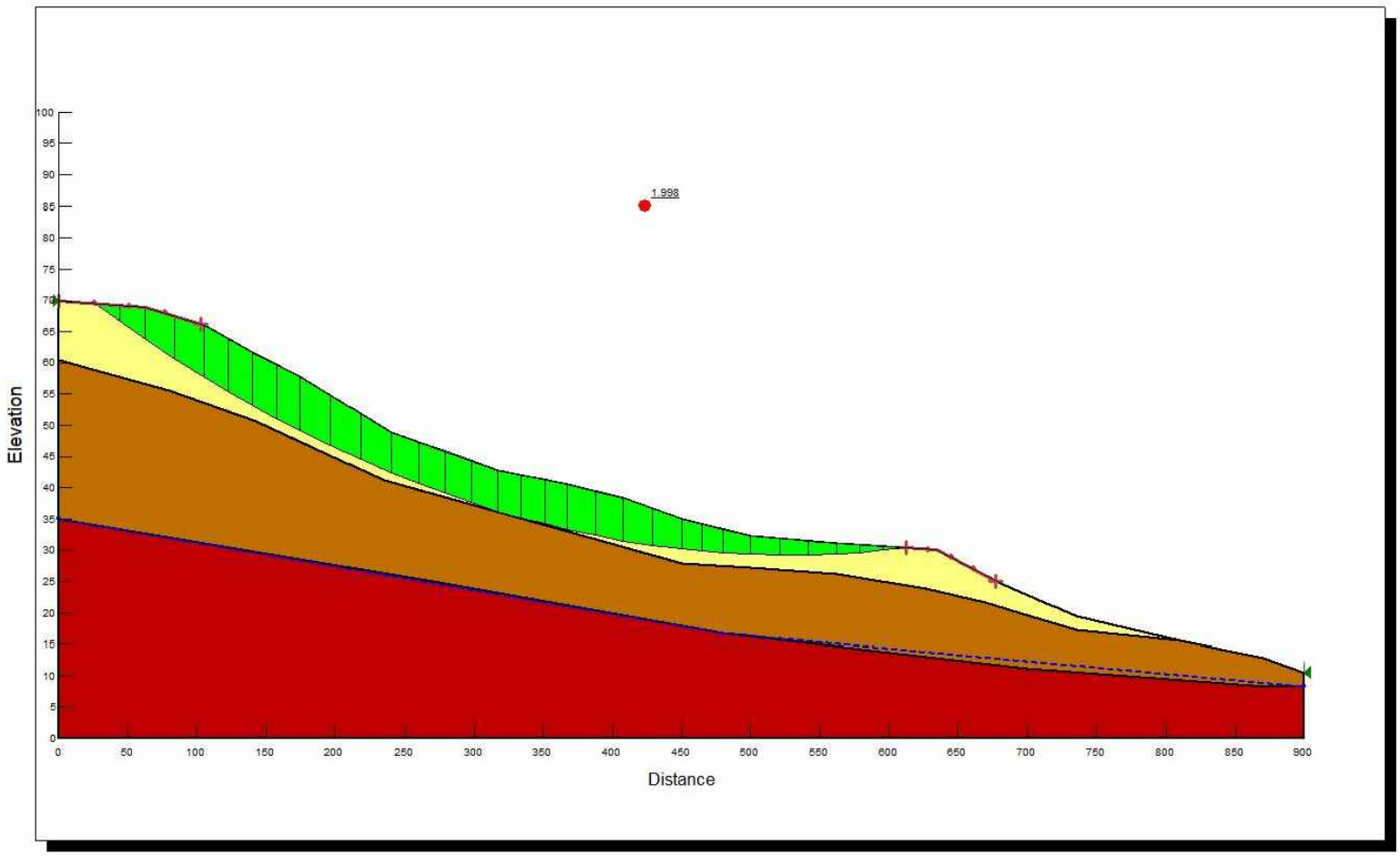


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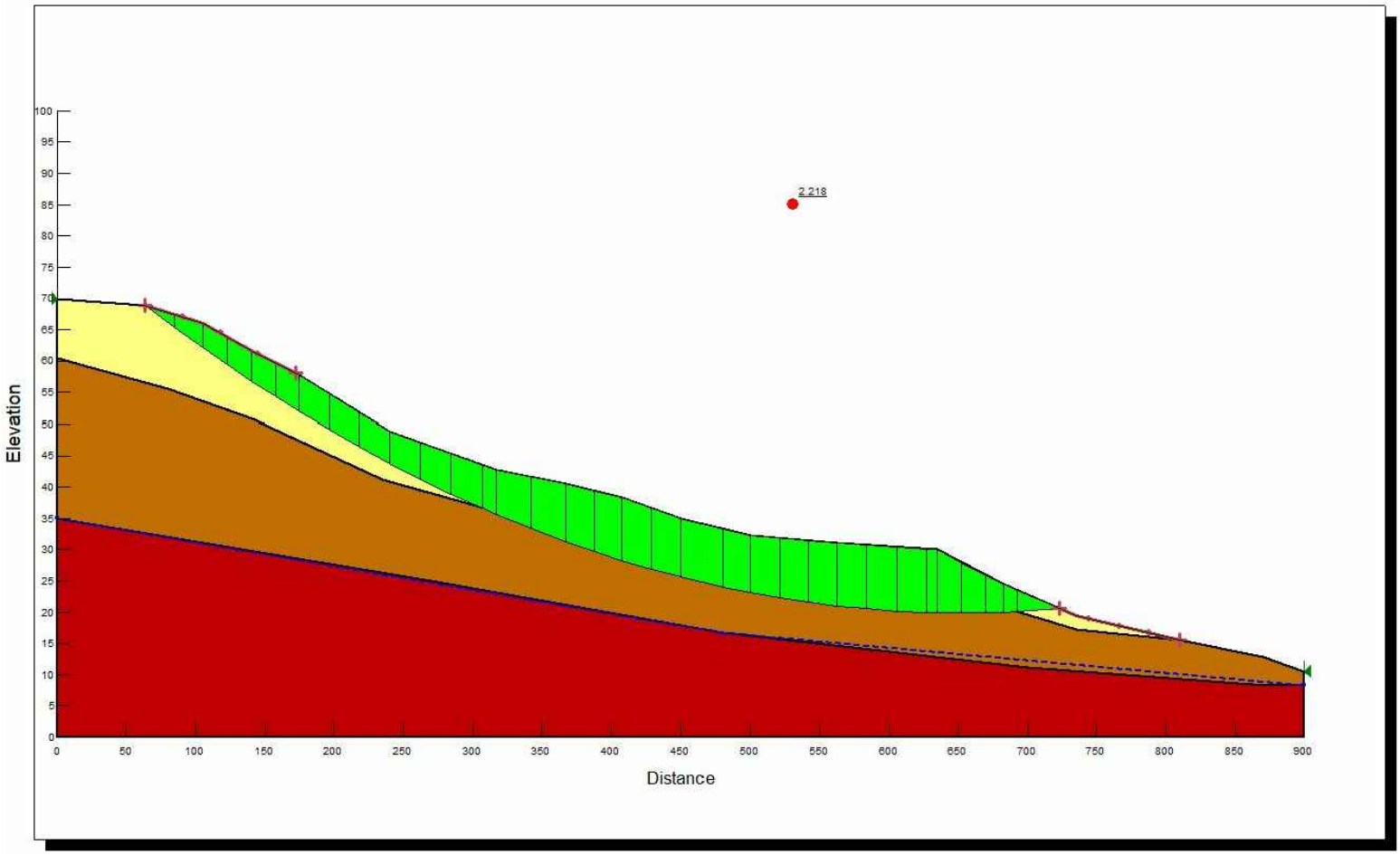


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SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)

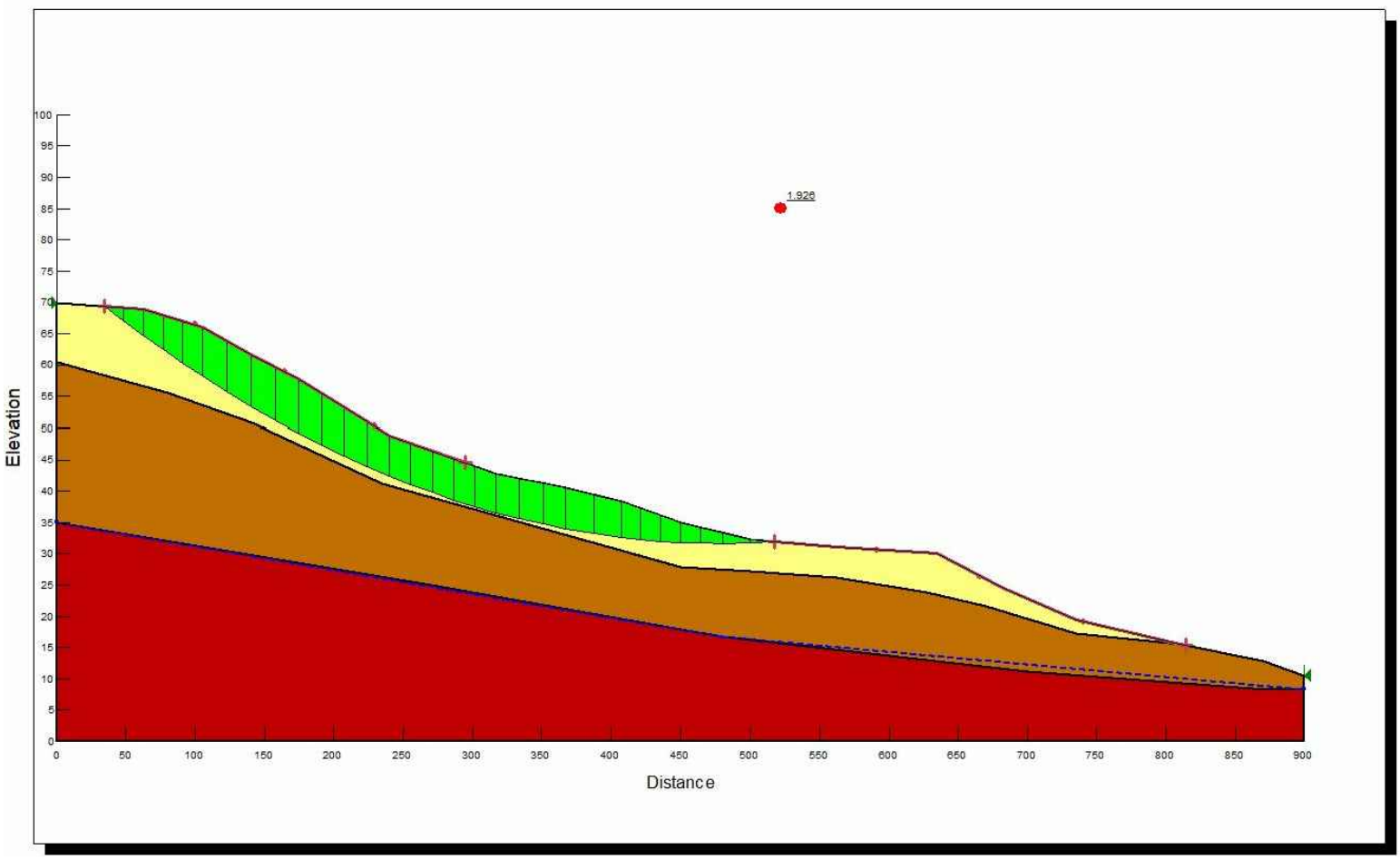


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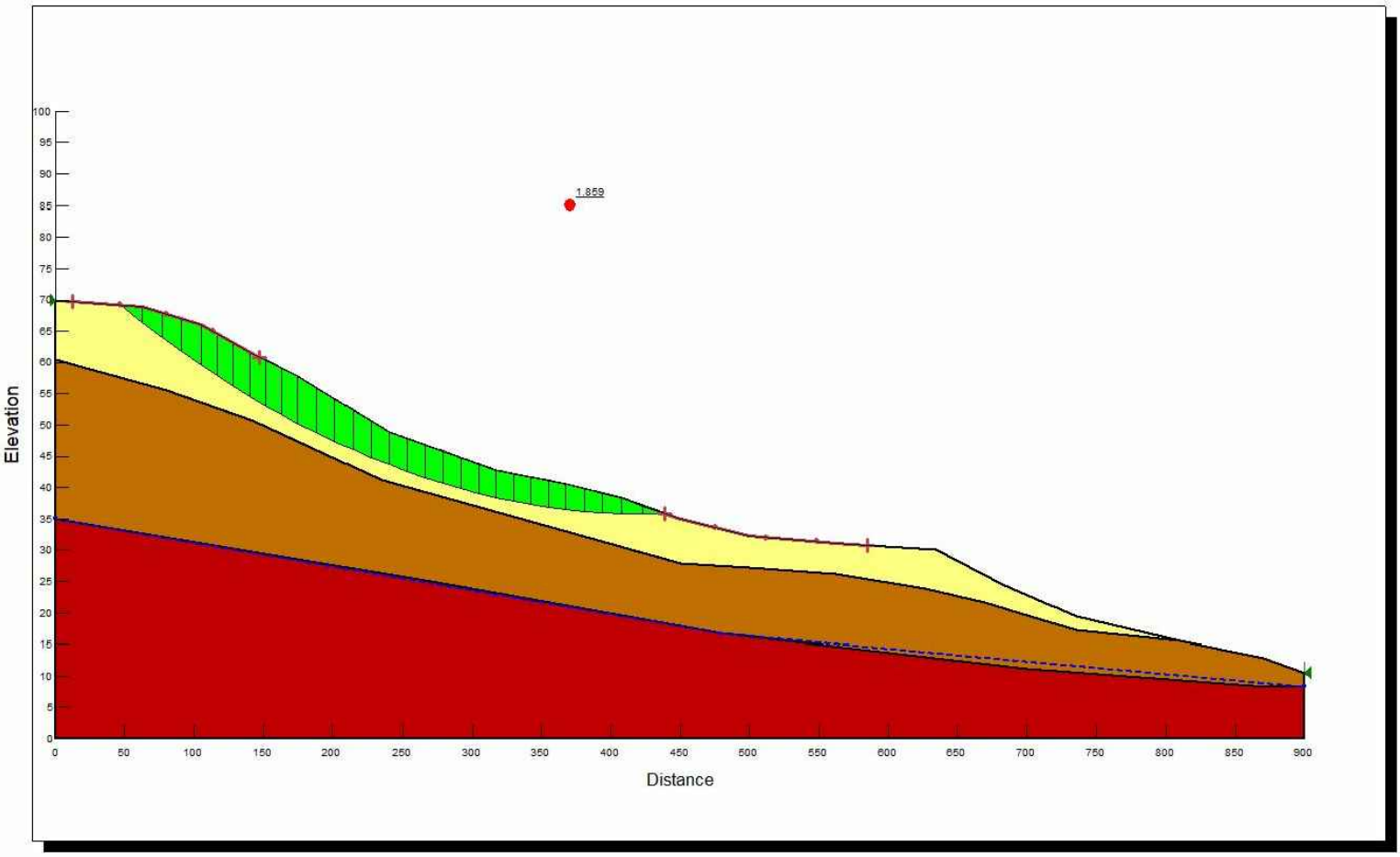


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SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)

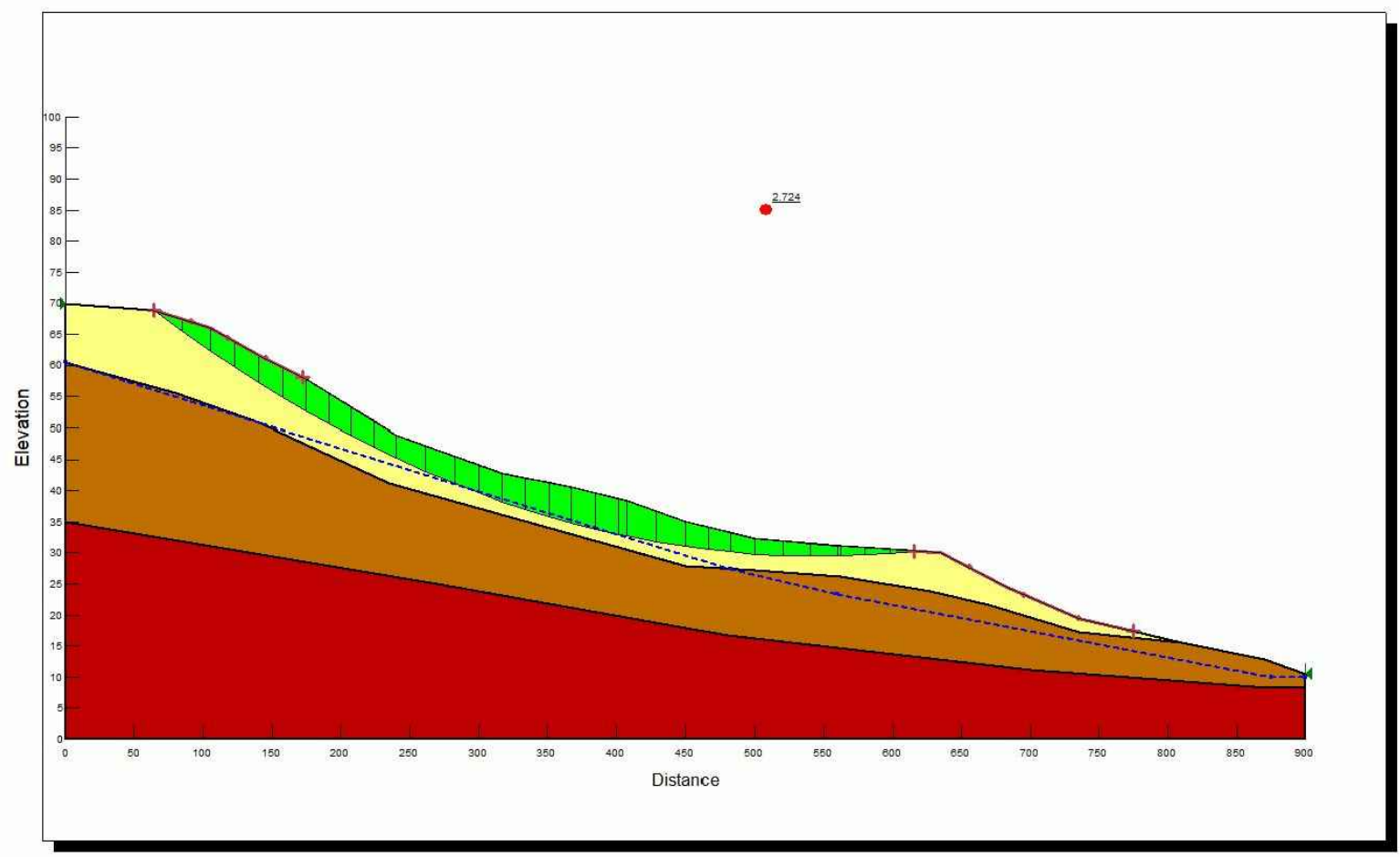


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SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)

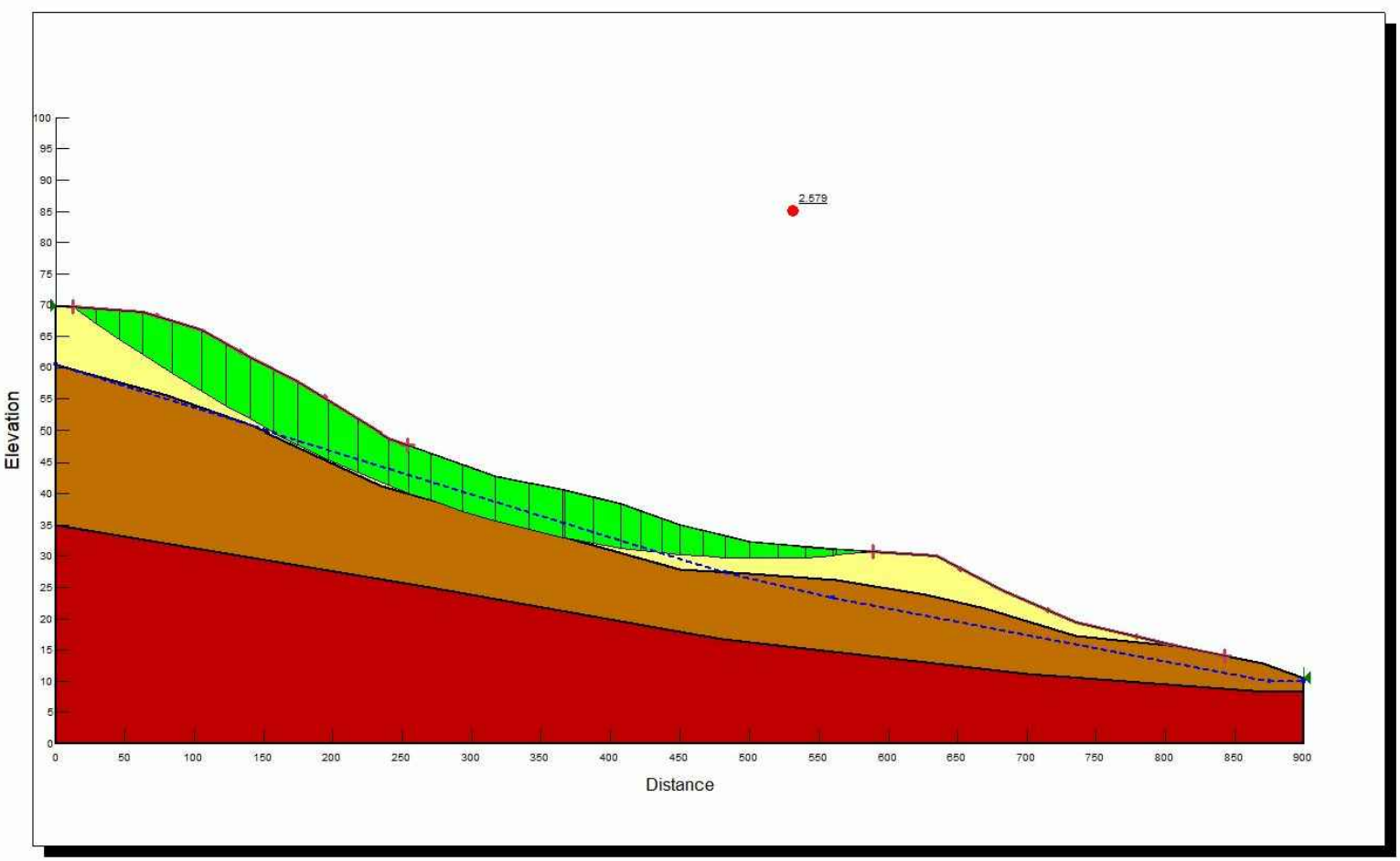


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SLOPE STABILITY ANALYSIS WITH WATER TABLE (STATIC)

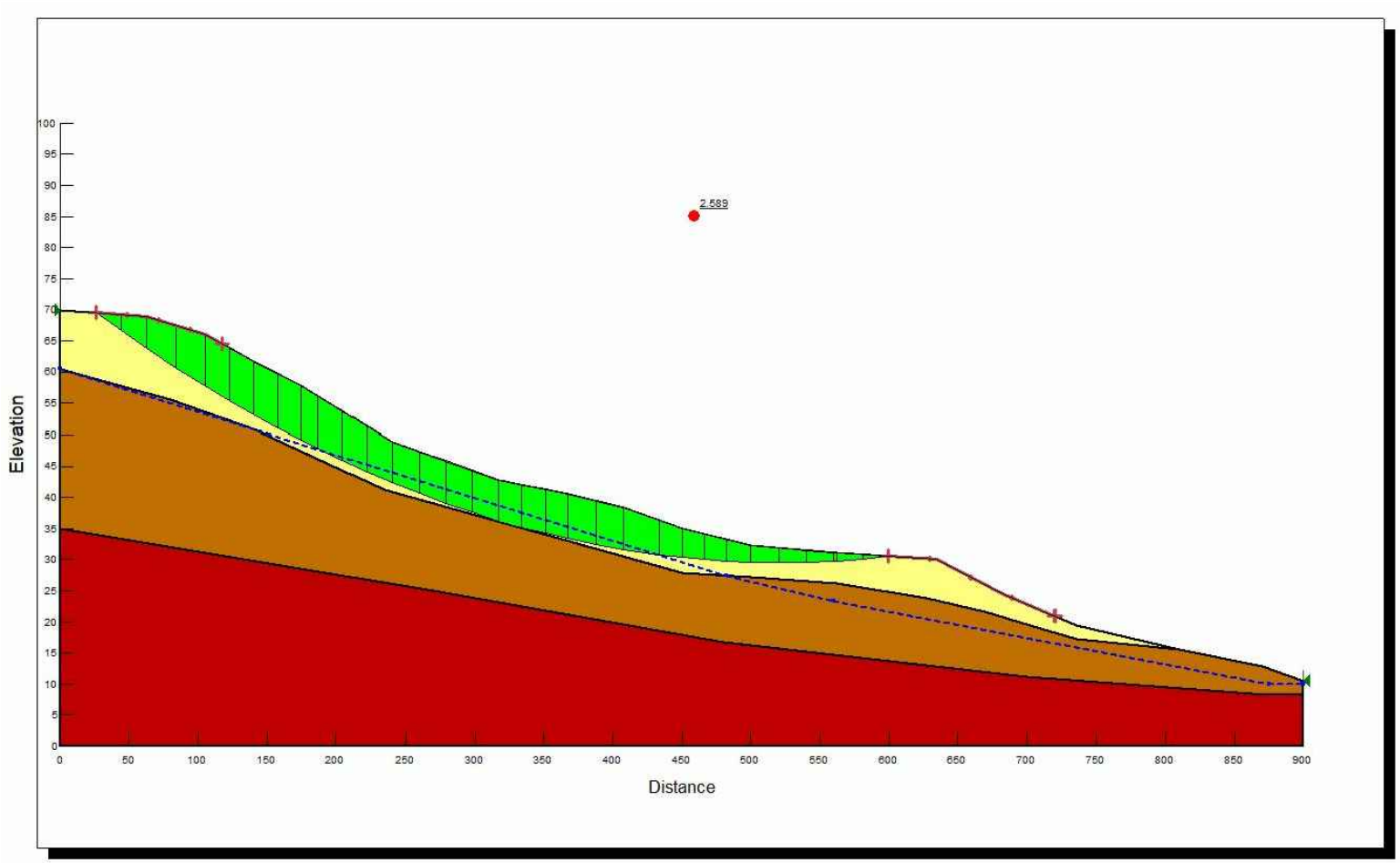


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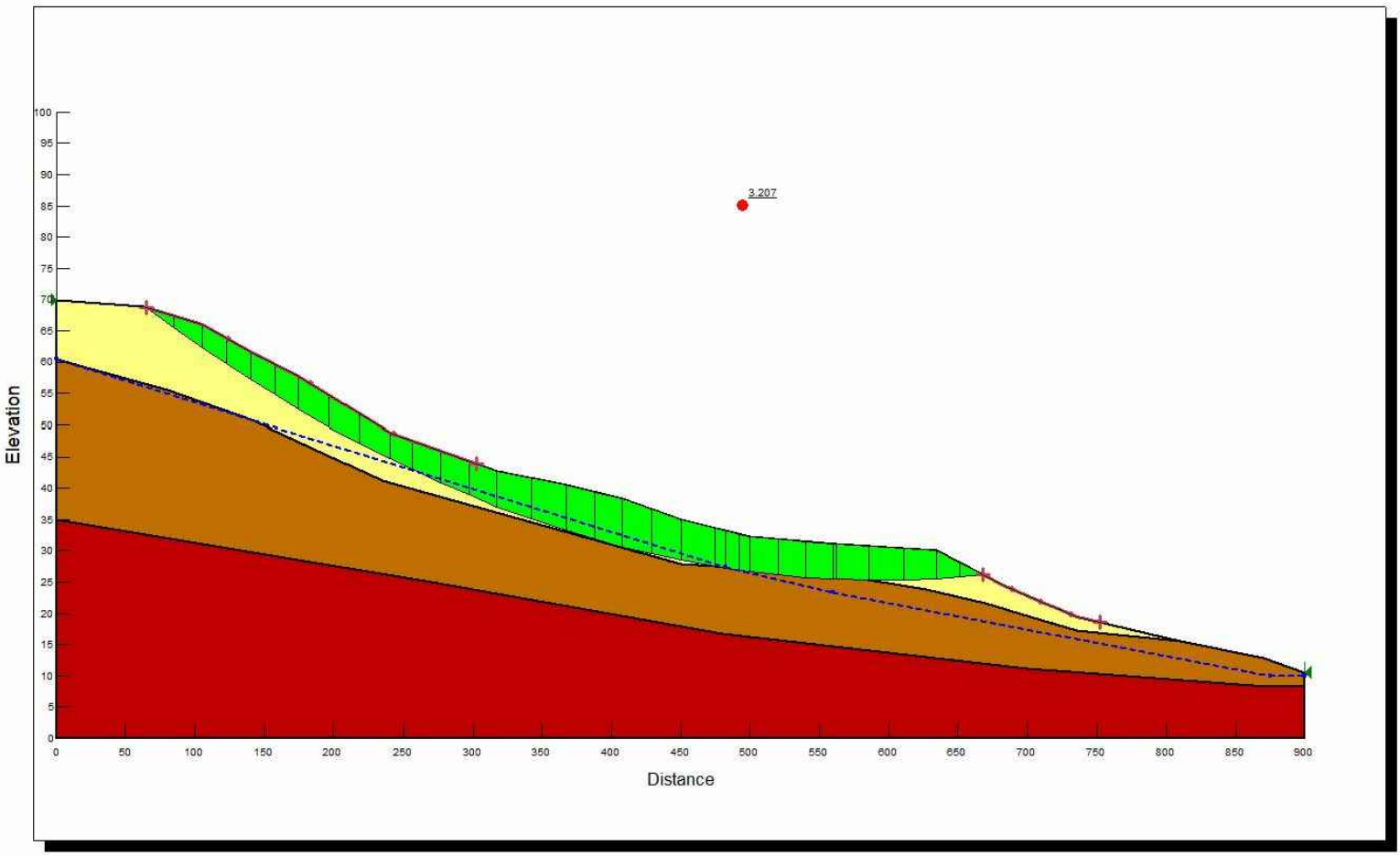


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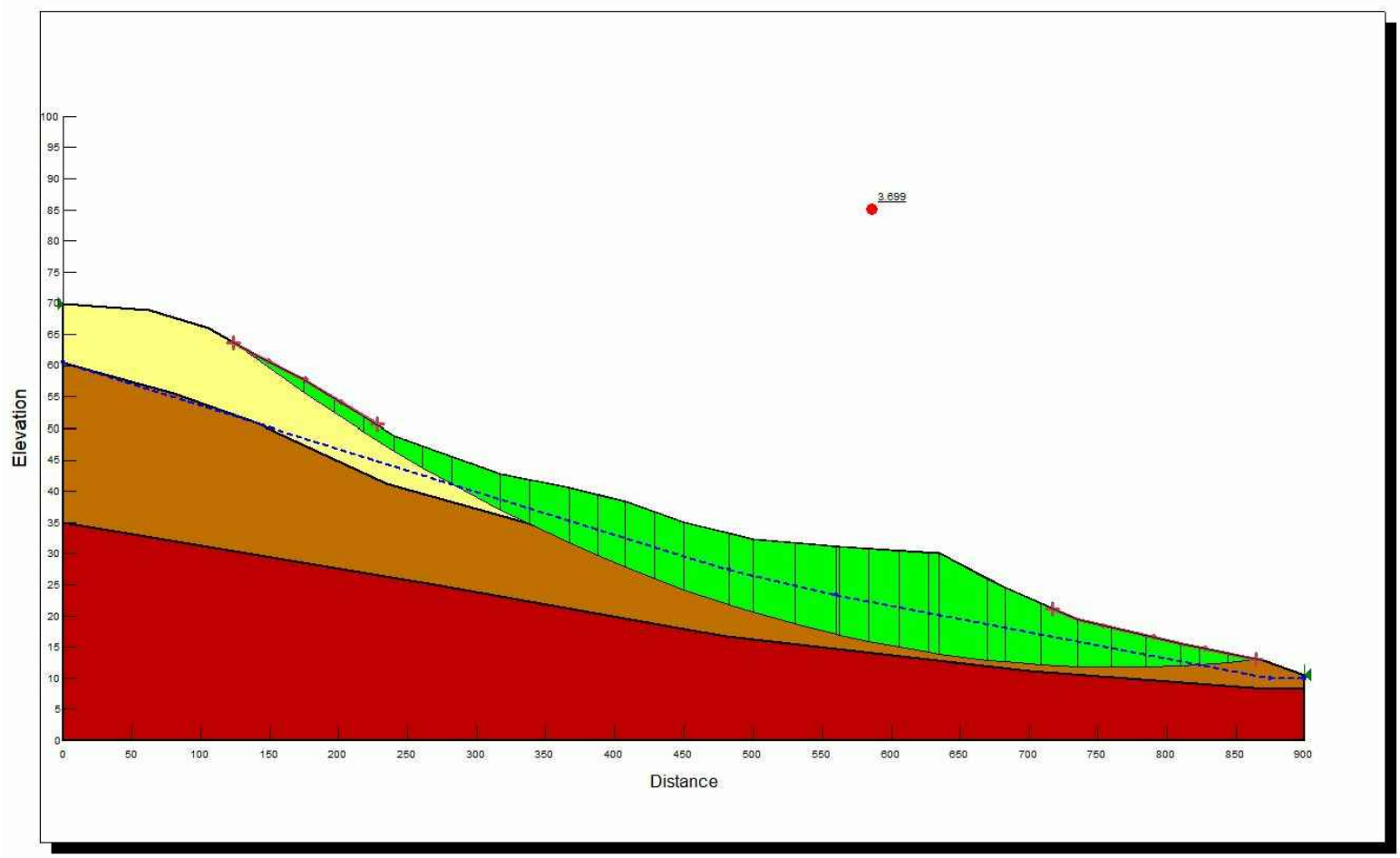


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SLOPE STABILITY ANALYSIS WITH WATER TABLE (STATIC)

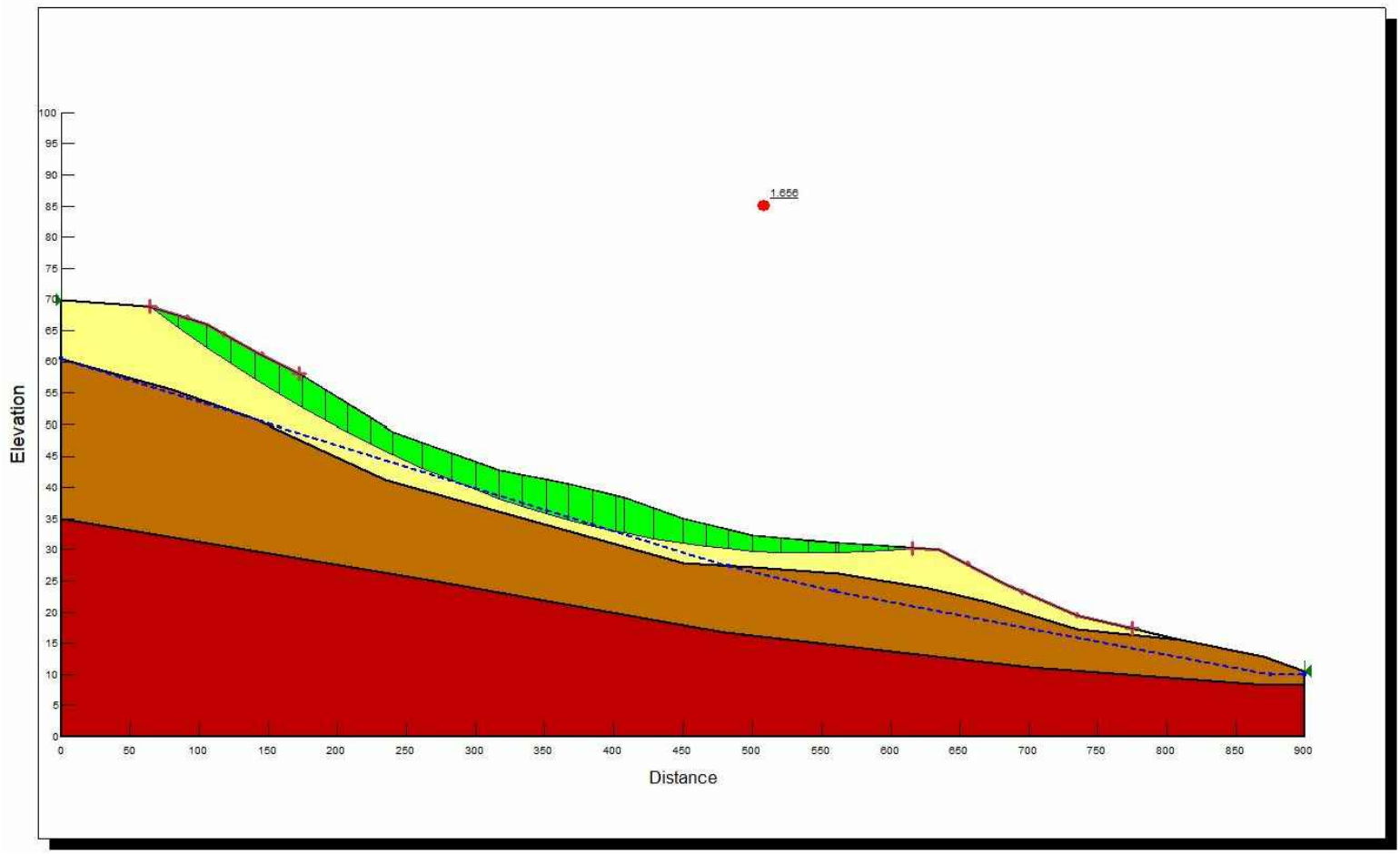


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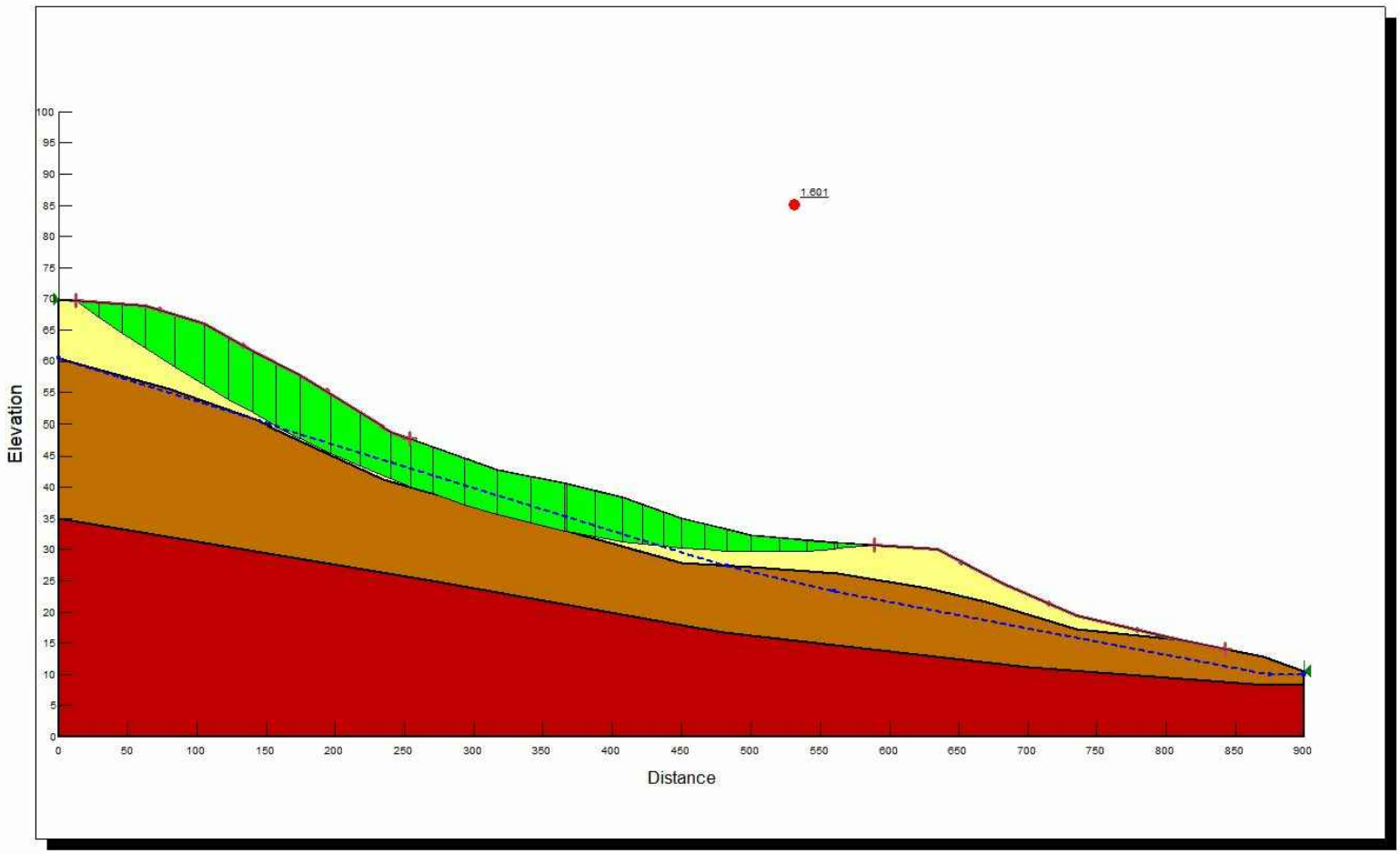


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SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.05g)

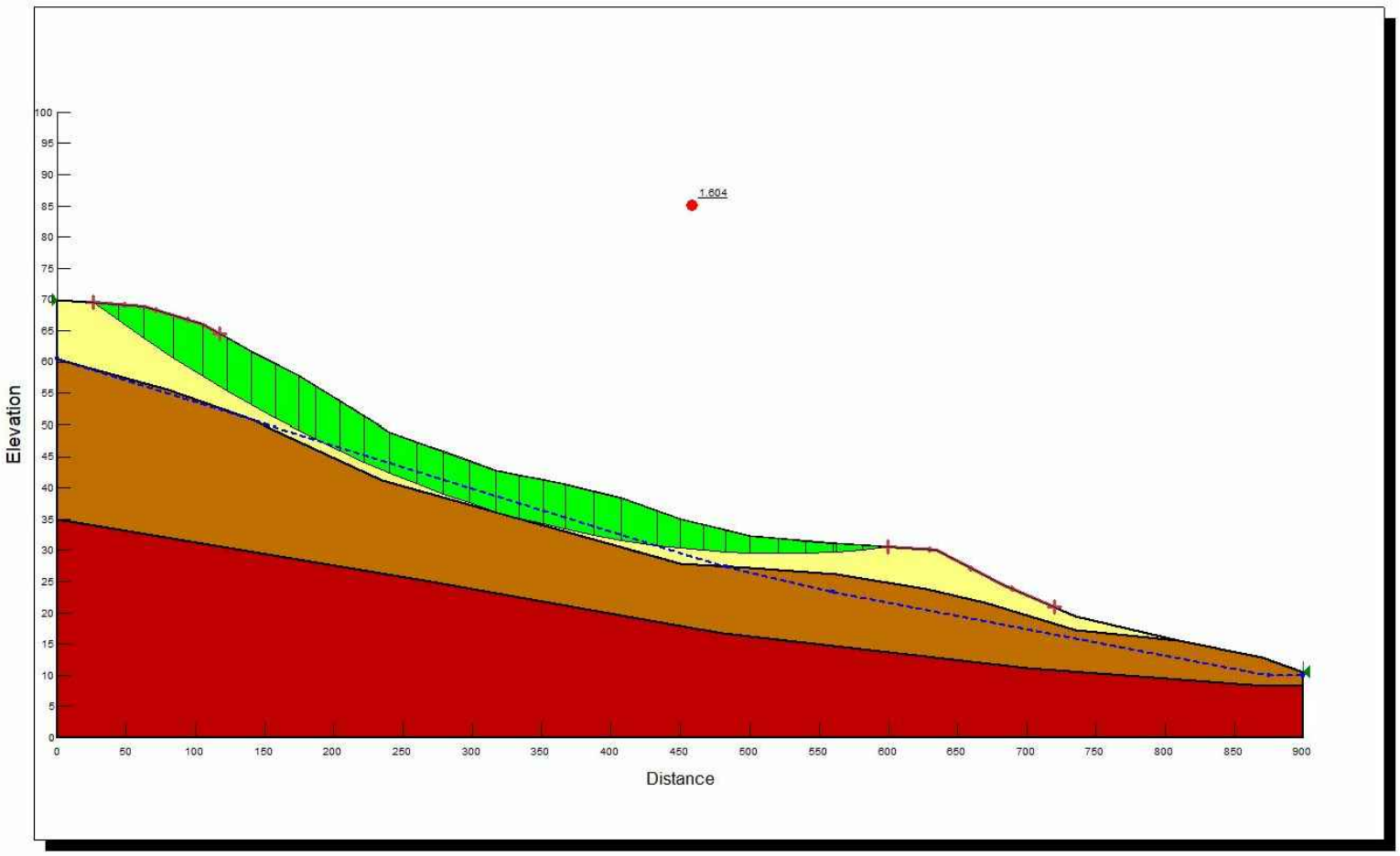


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888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.05g)

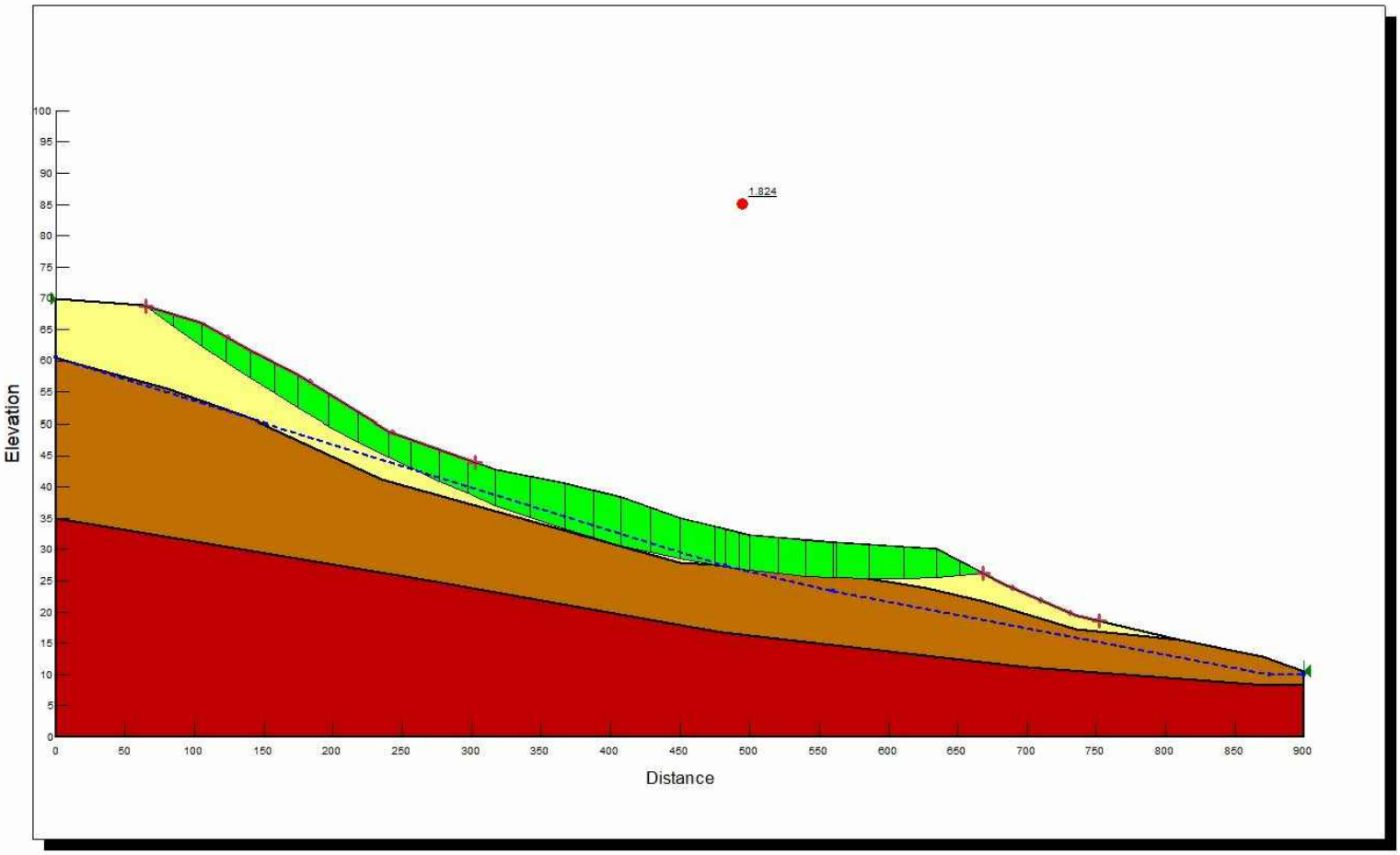


N

REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.05g)

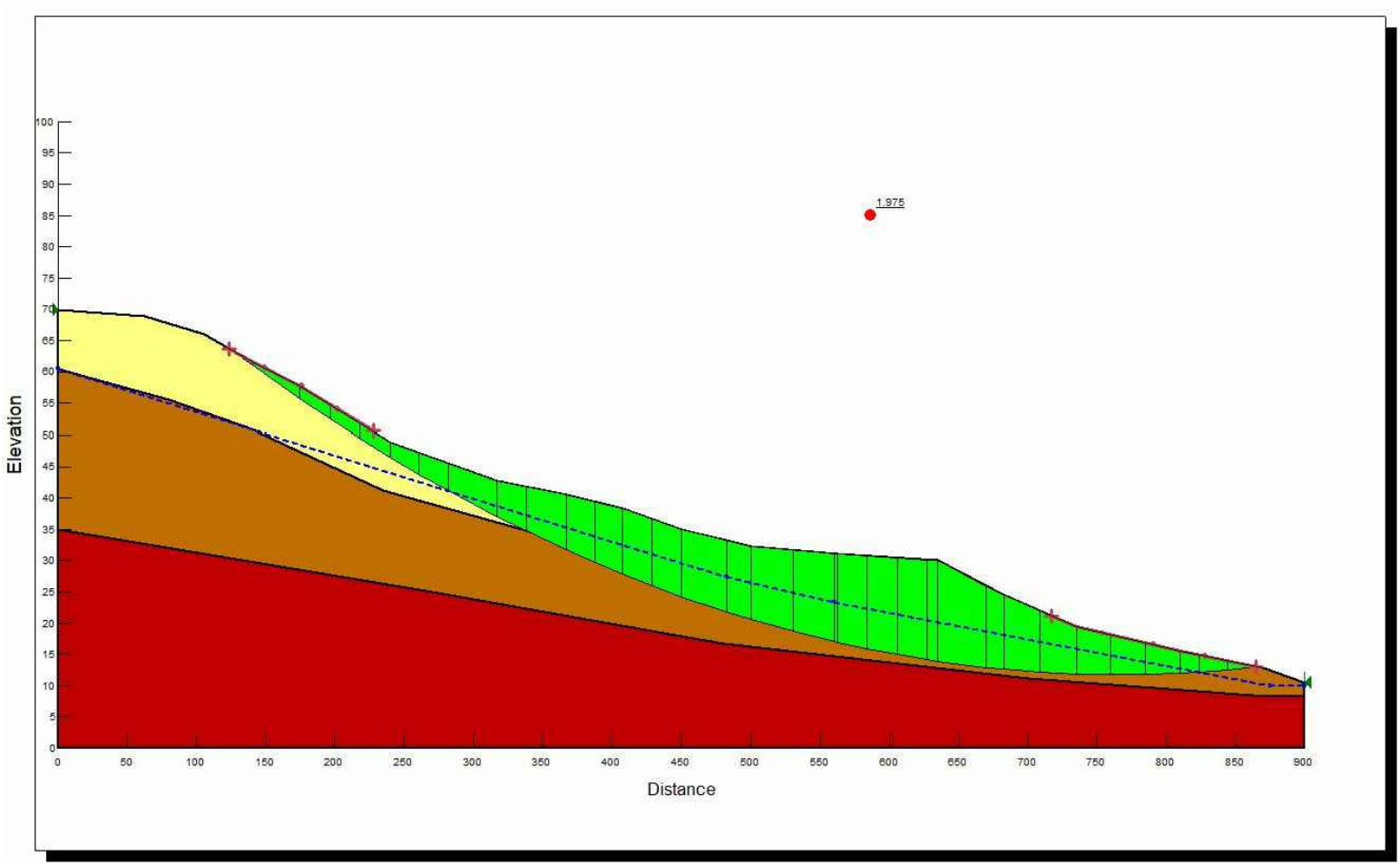


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.05g)

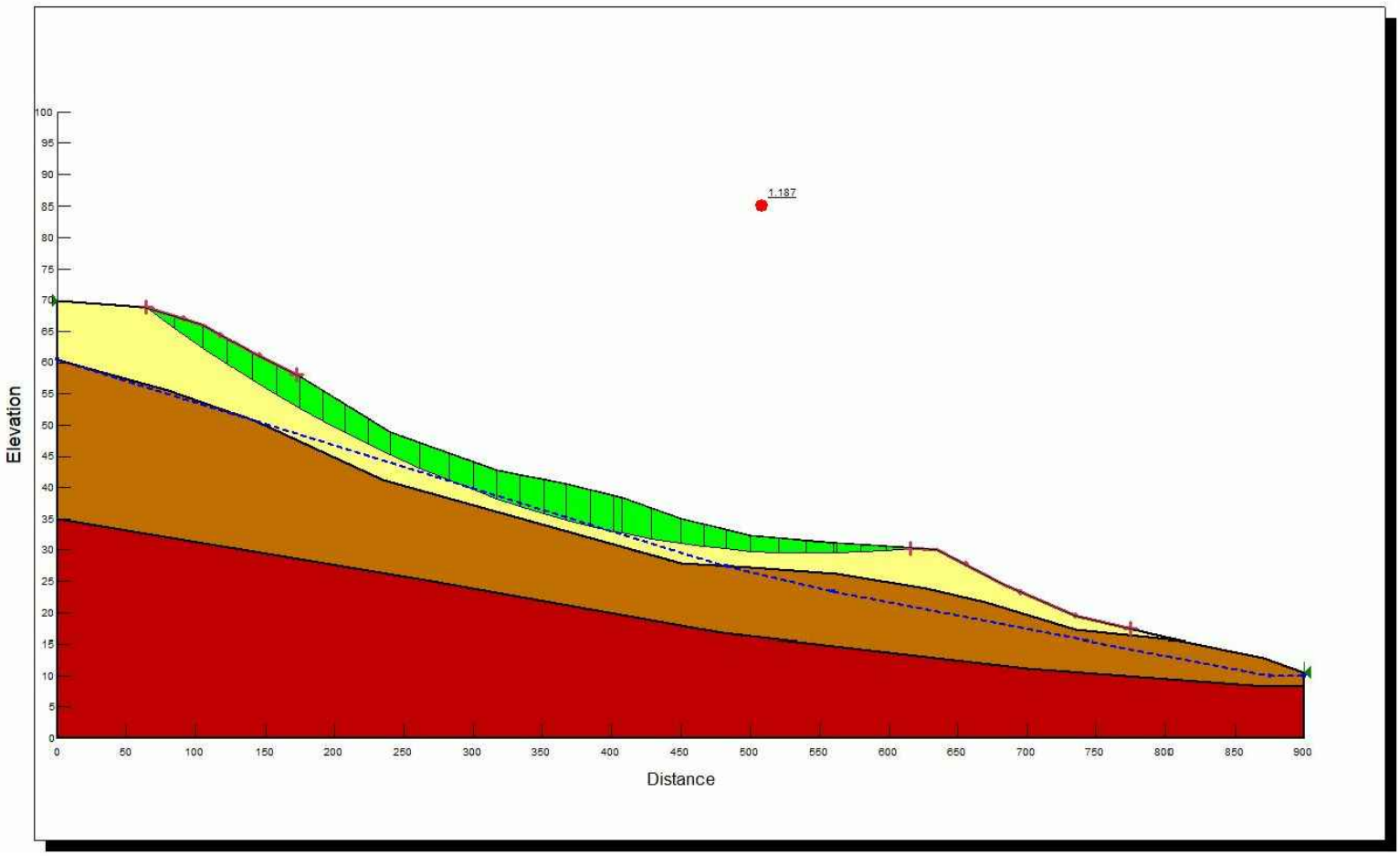


N

REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.05g)

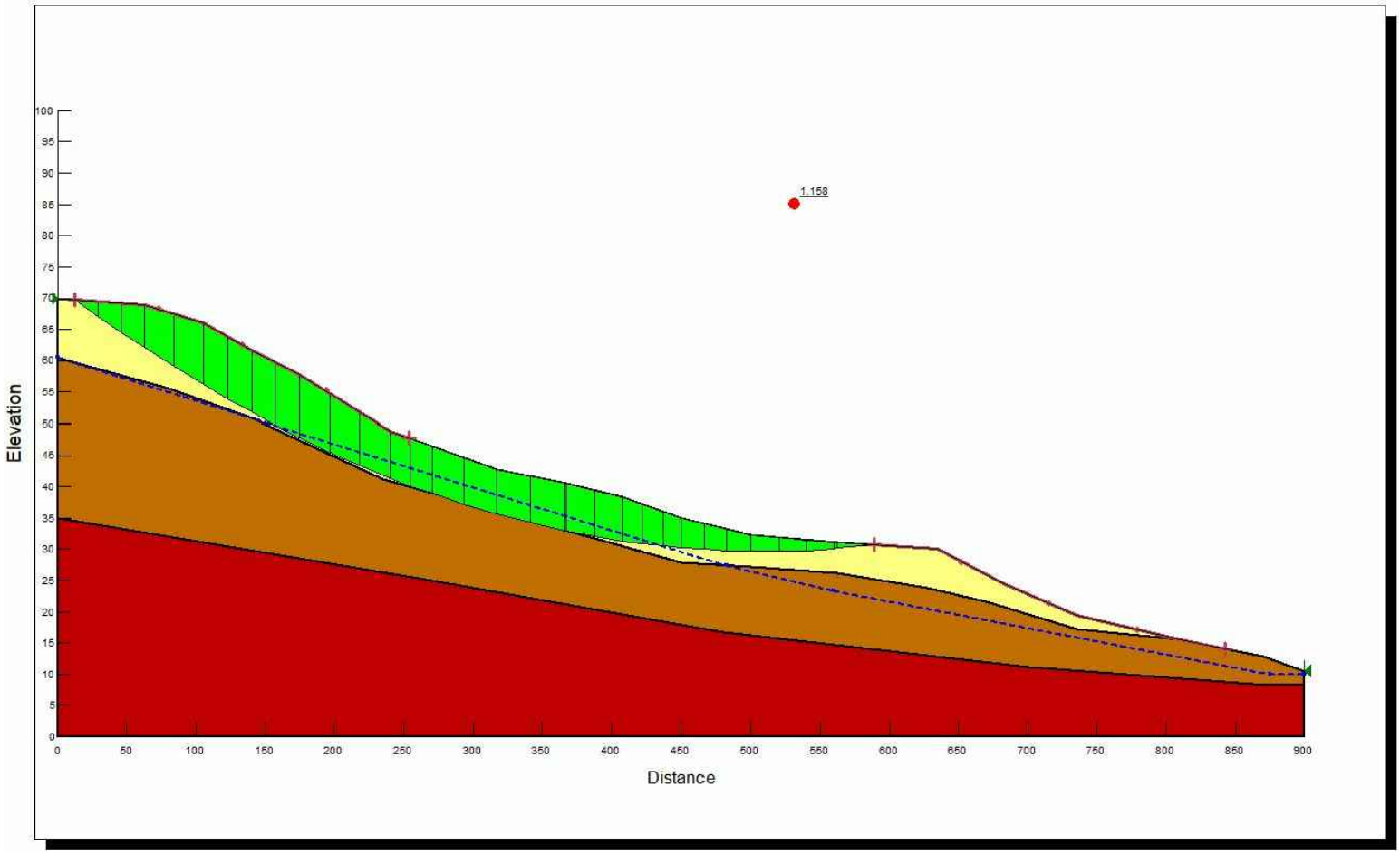


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)

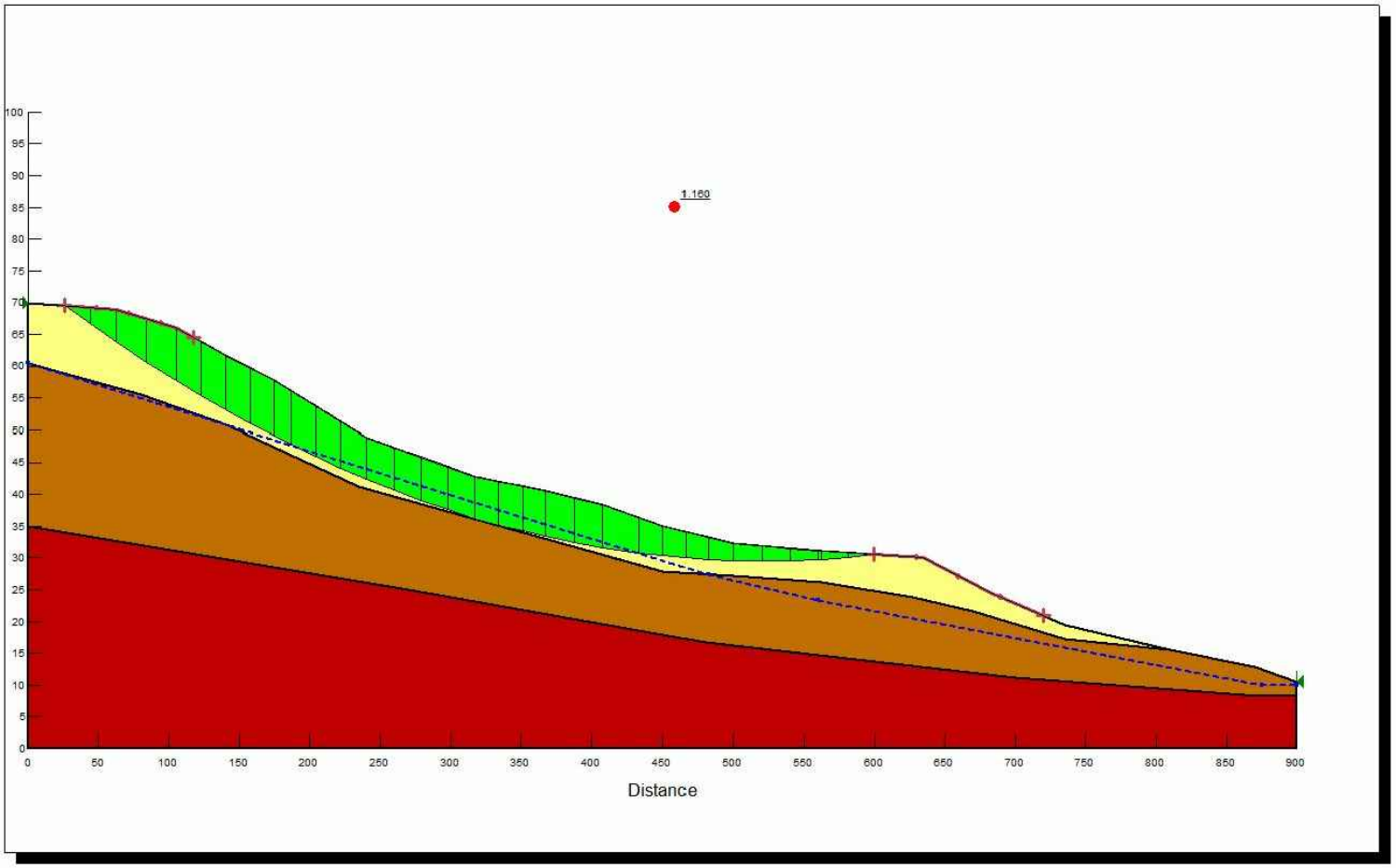


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)

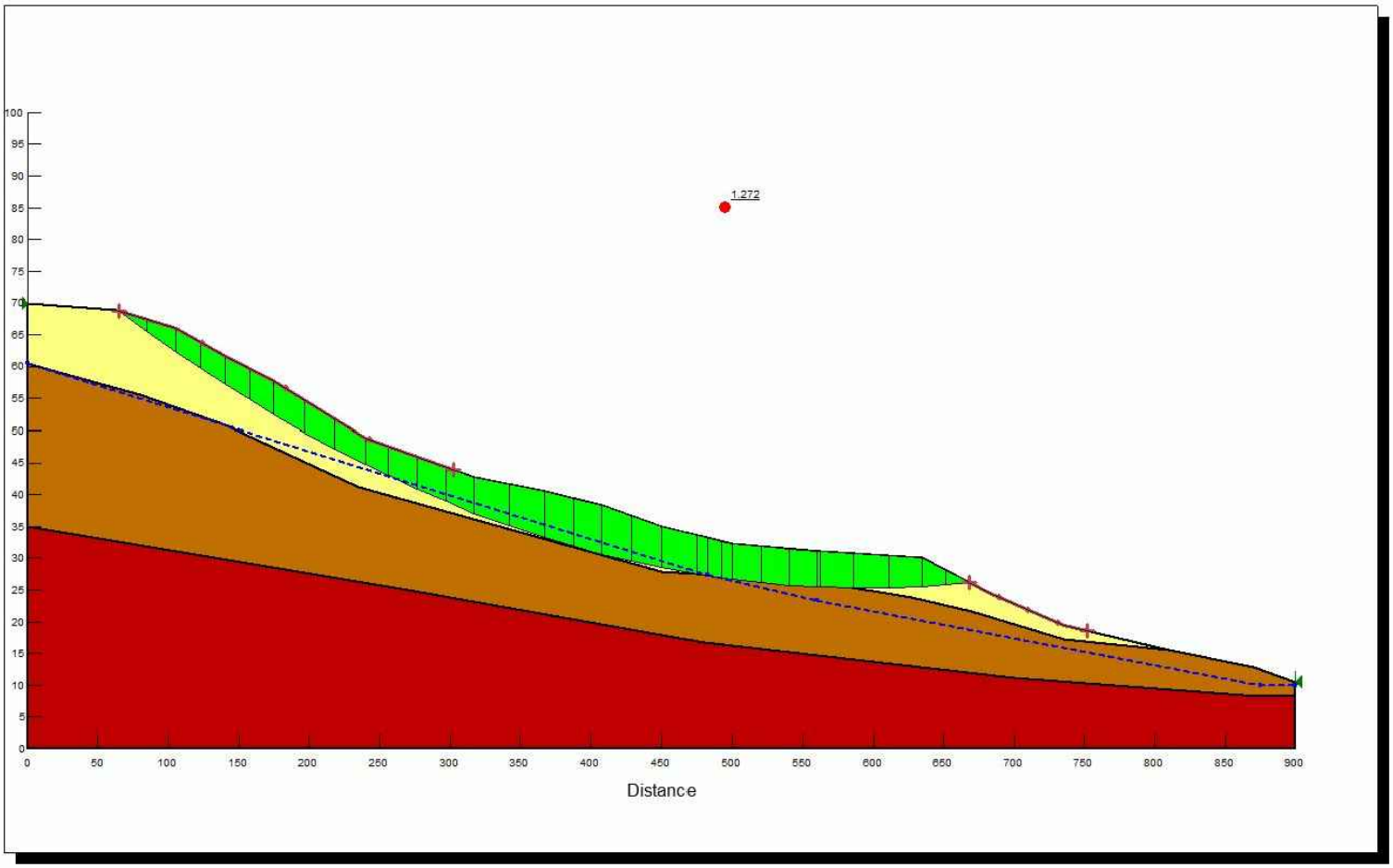


N

REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)

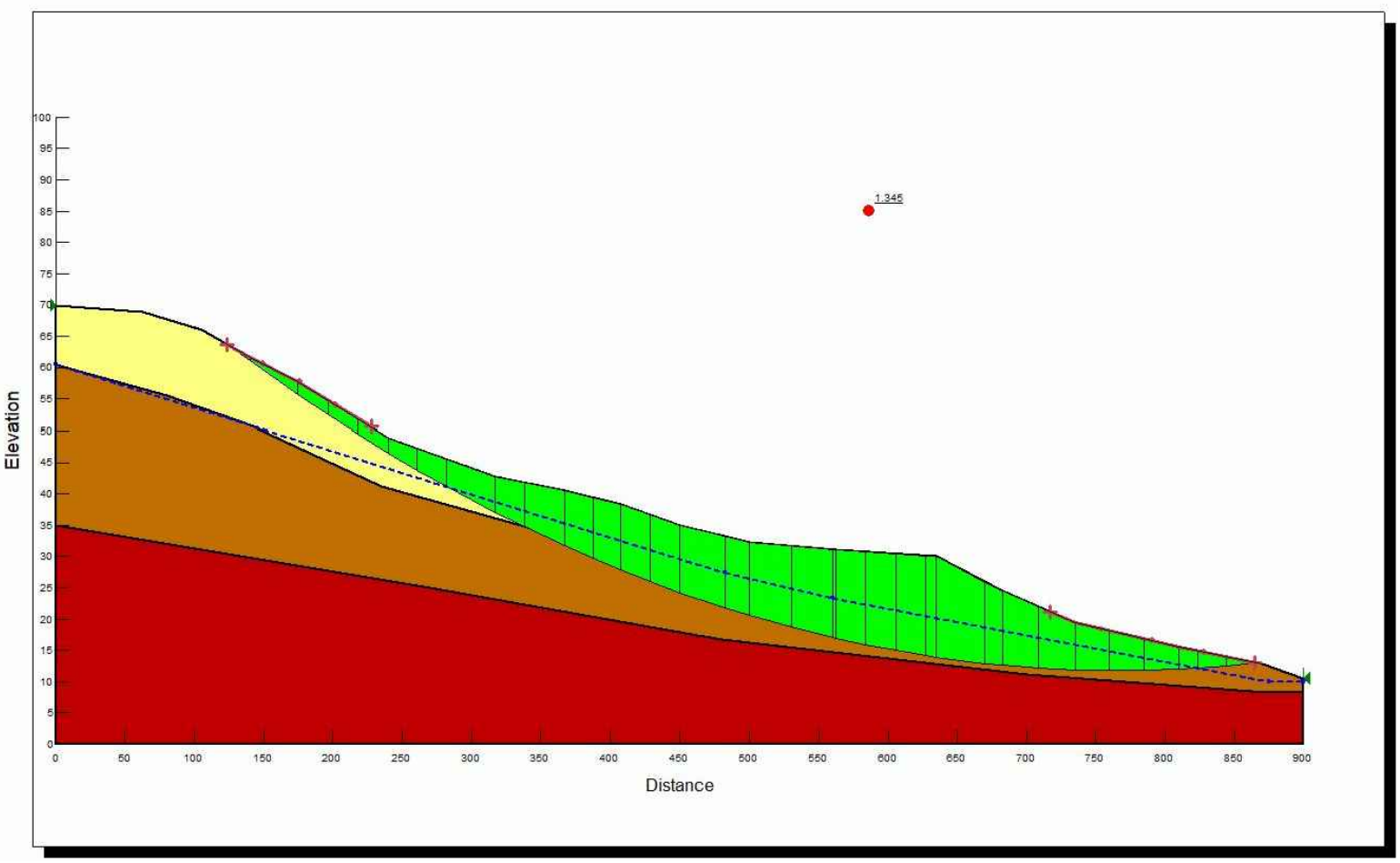


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REFERENCE:
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AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)

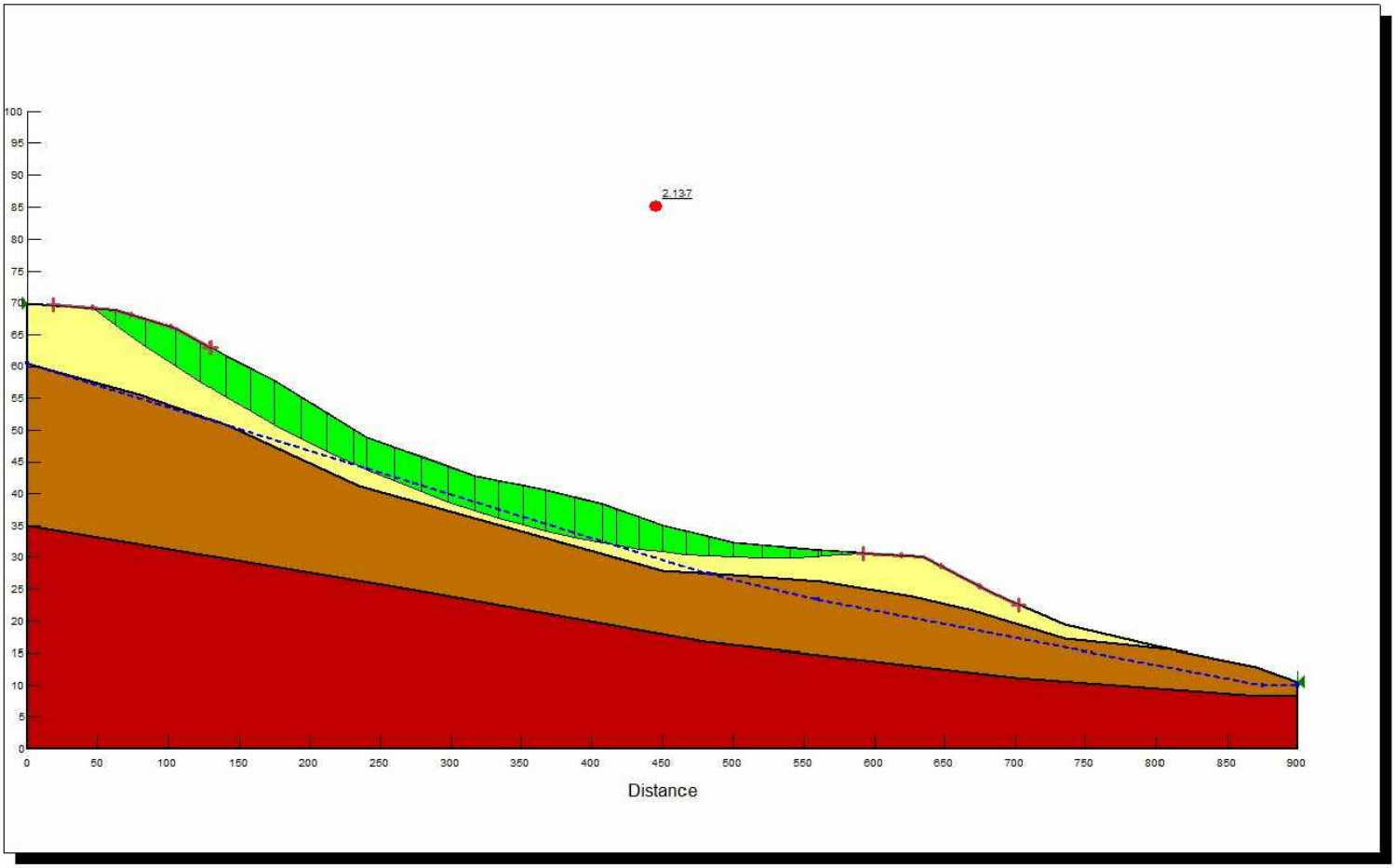


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REFERENCE:
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AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)

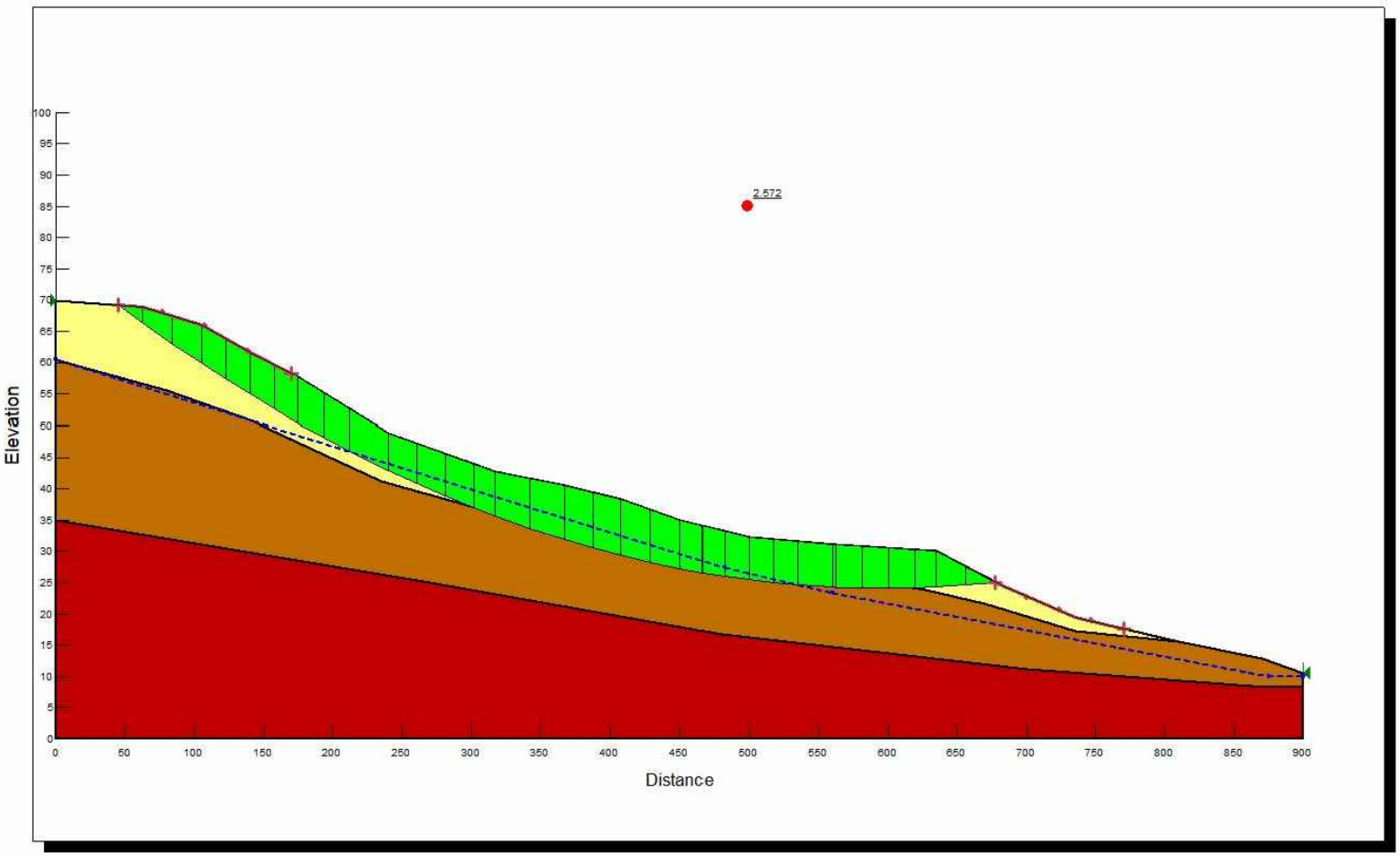


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (STATIC)

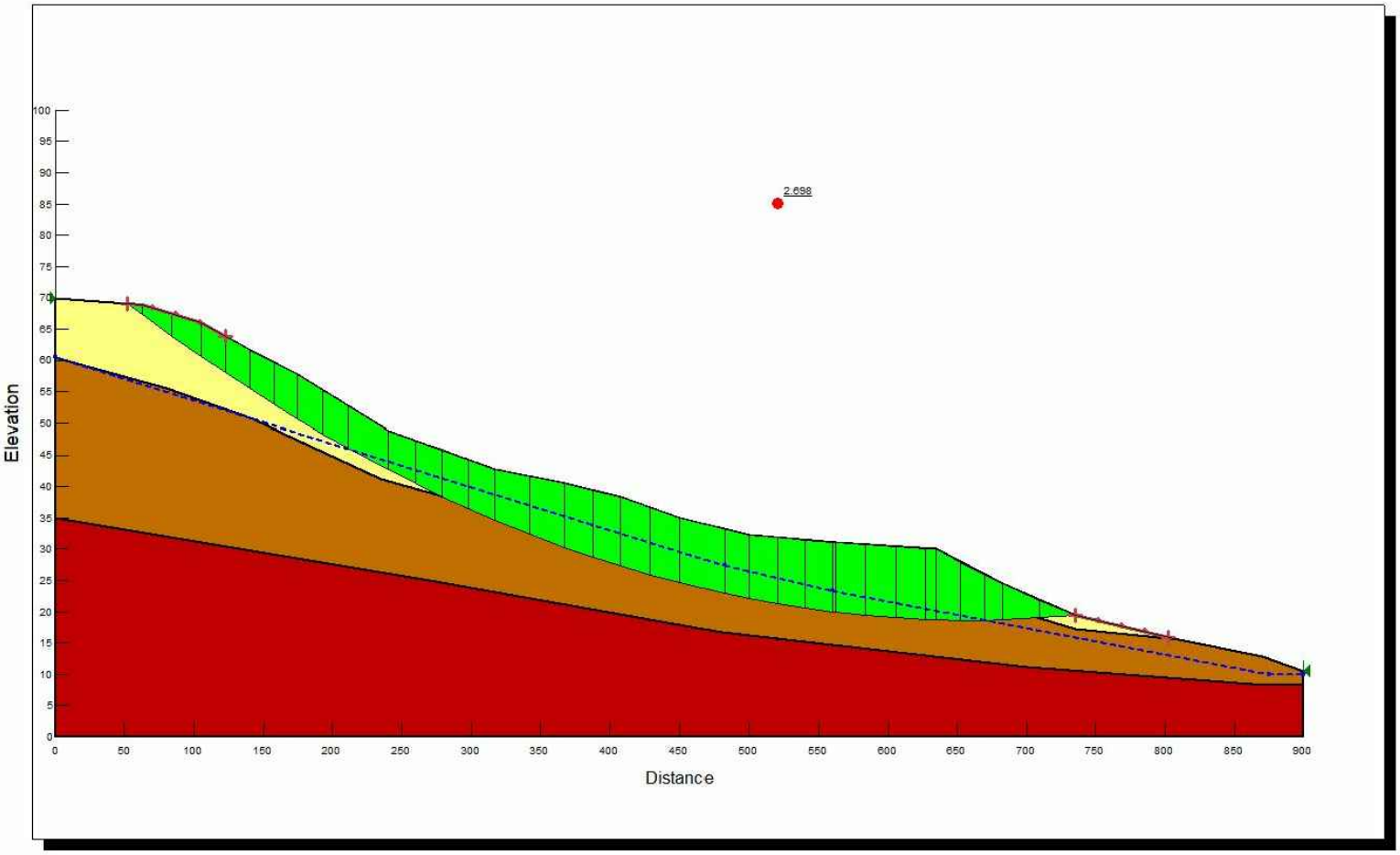


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (STATIC)

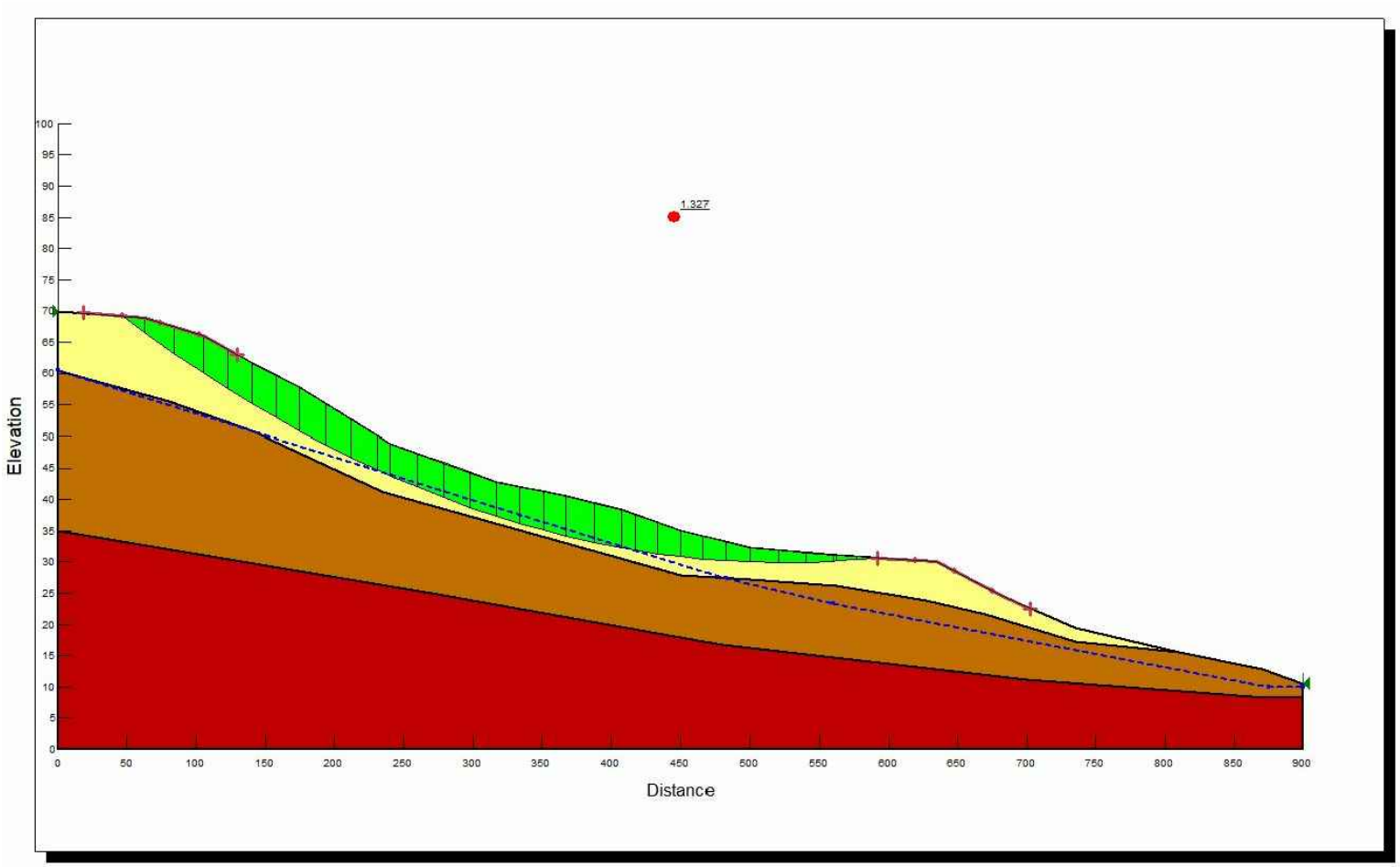


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (STATIC)

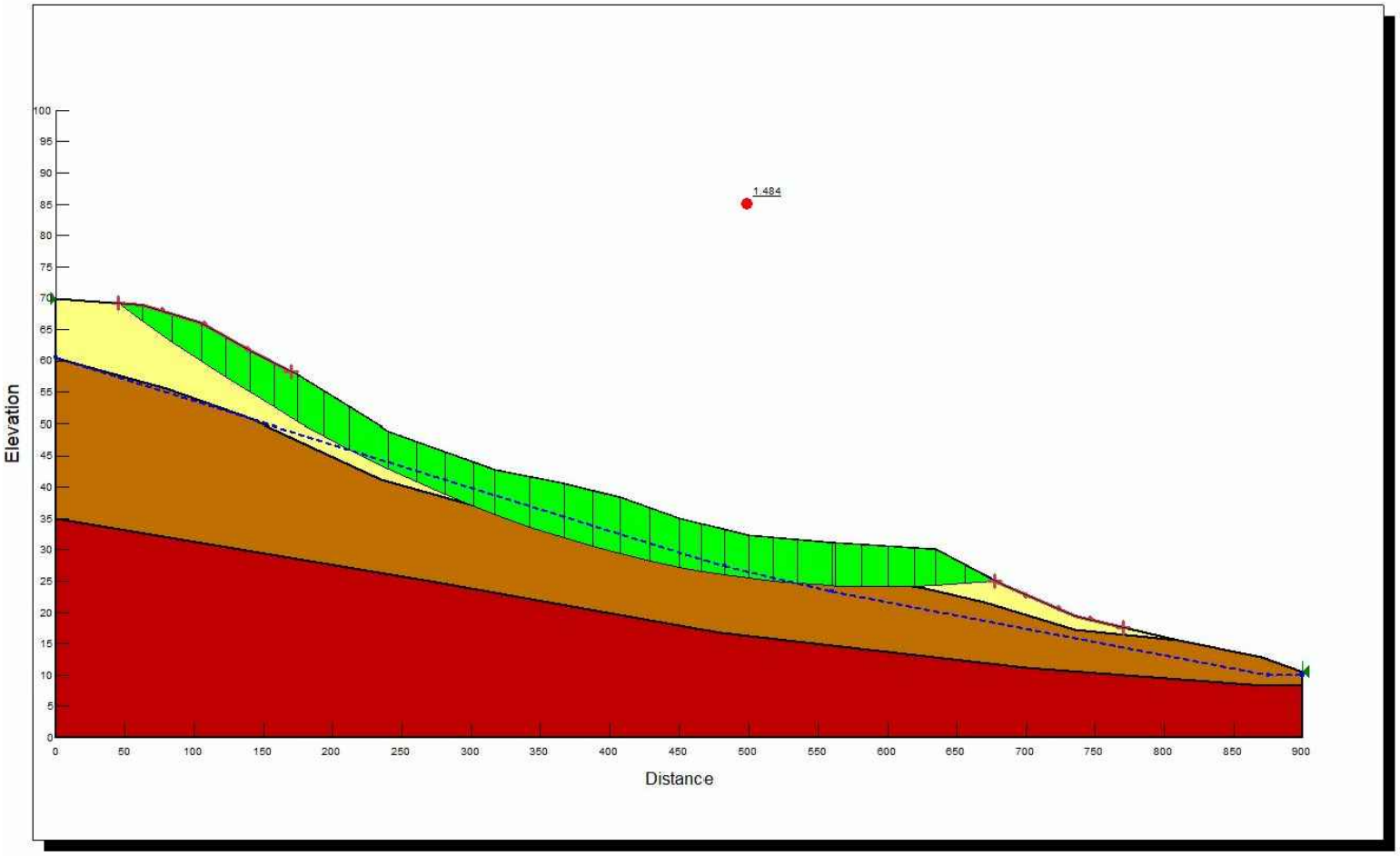


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.05g)

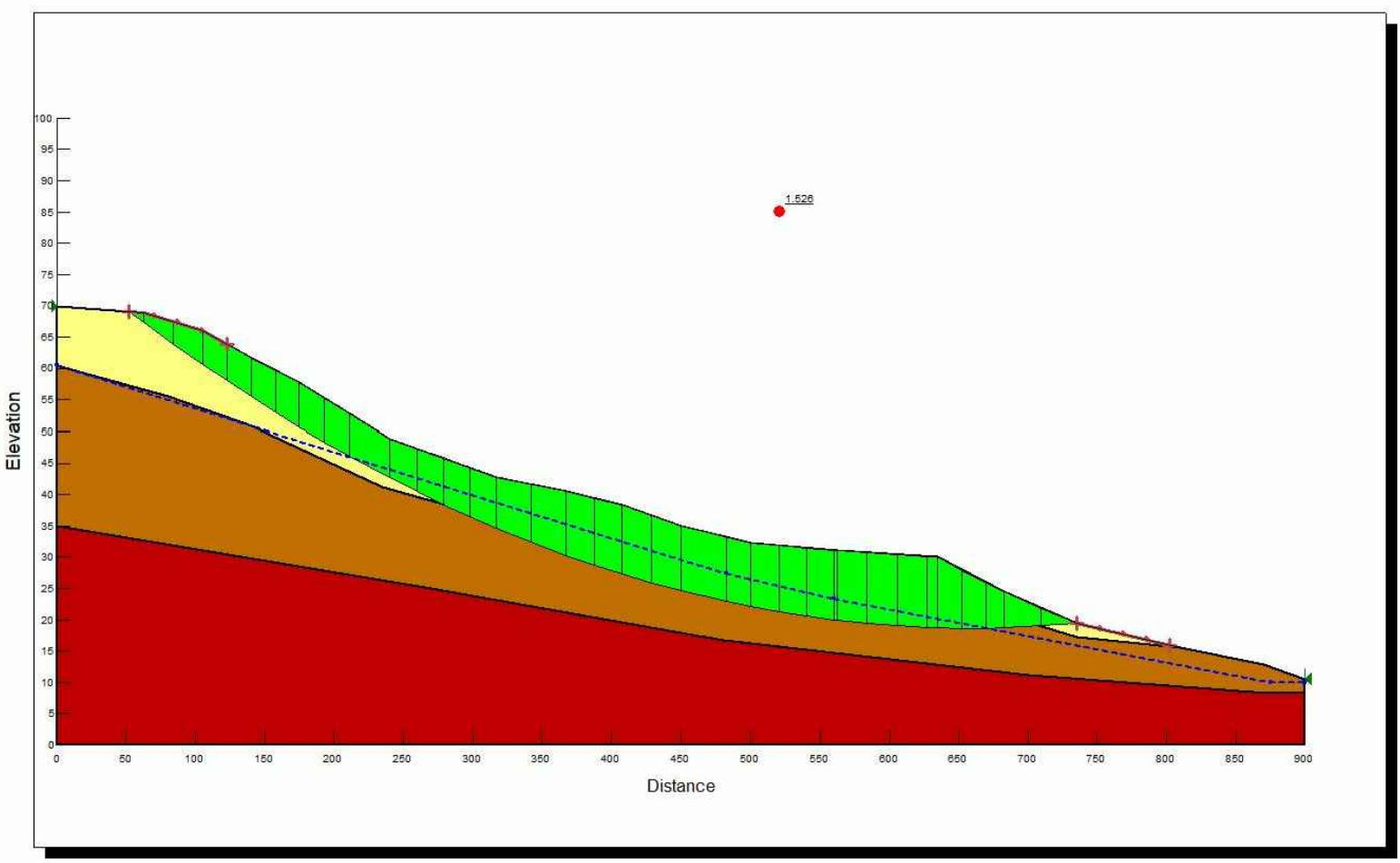


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.05g)

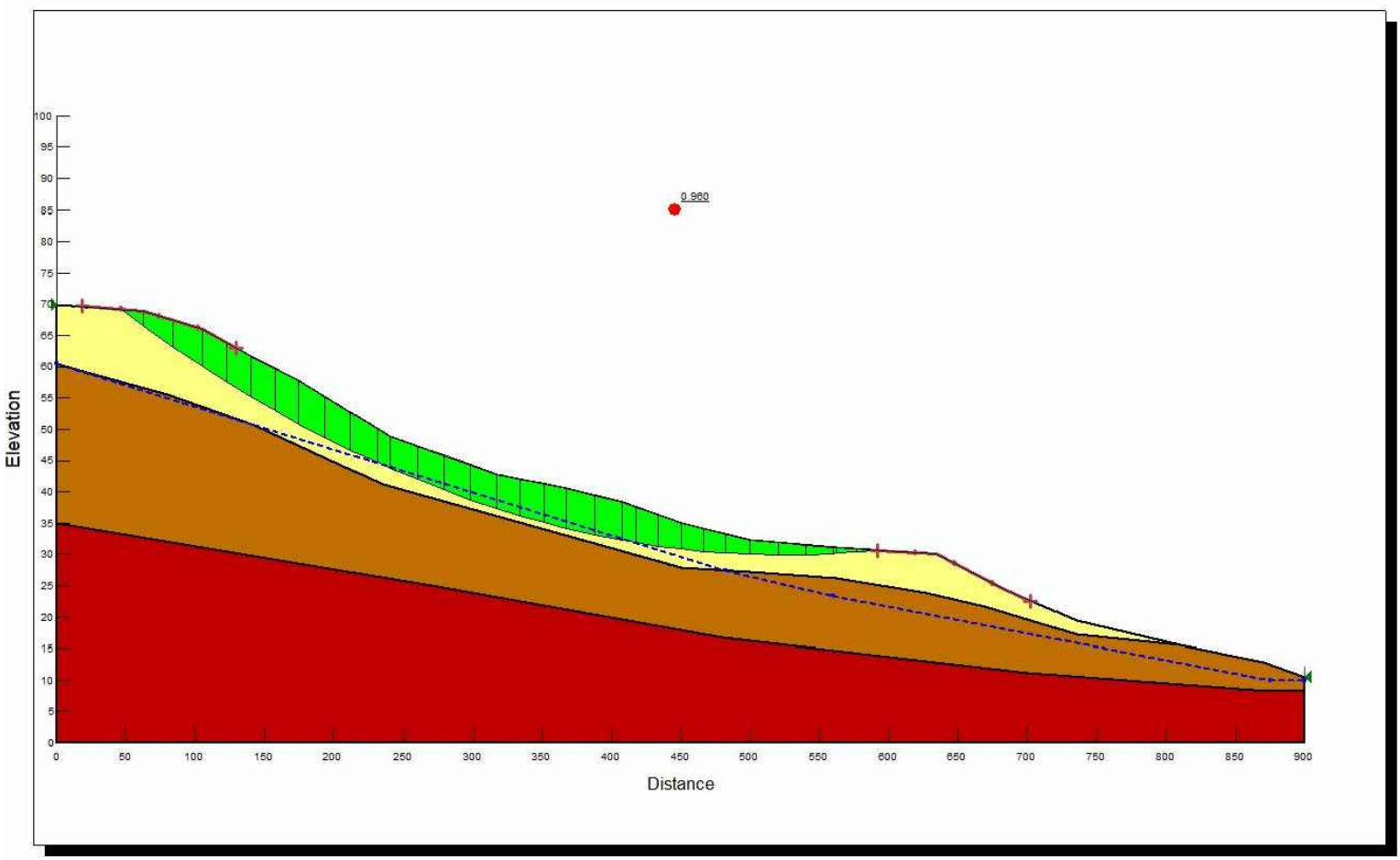


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.05g)

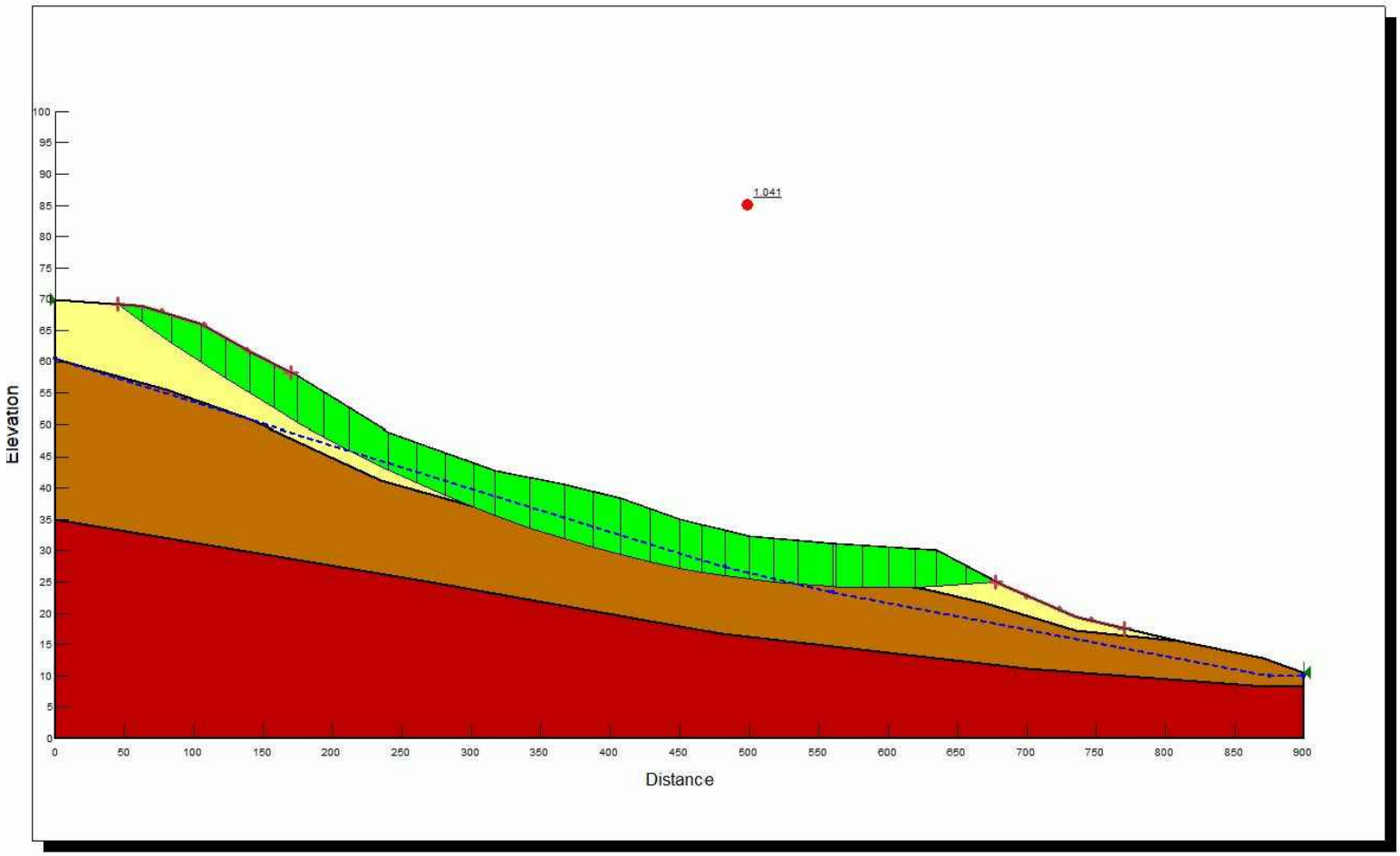


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)

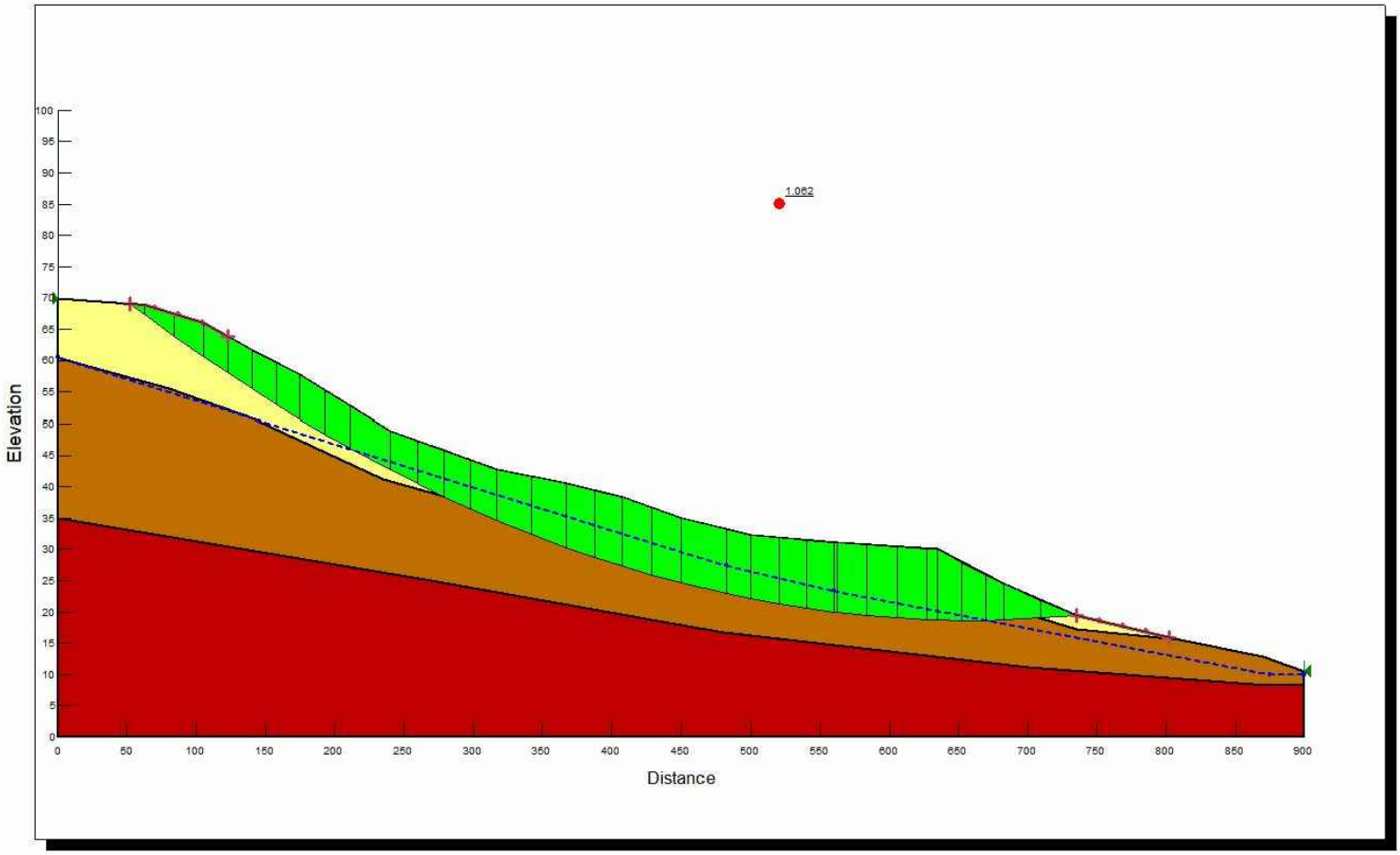


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)

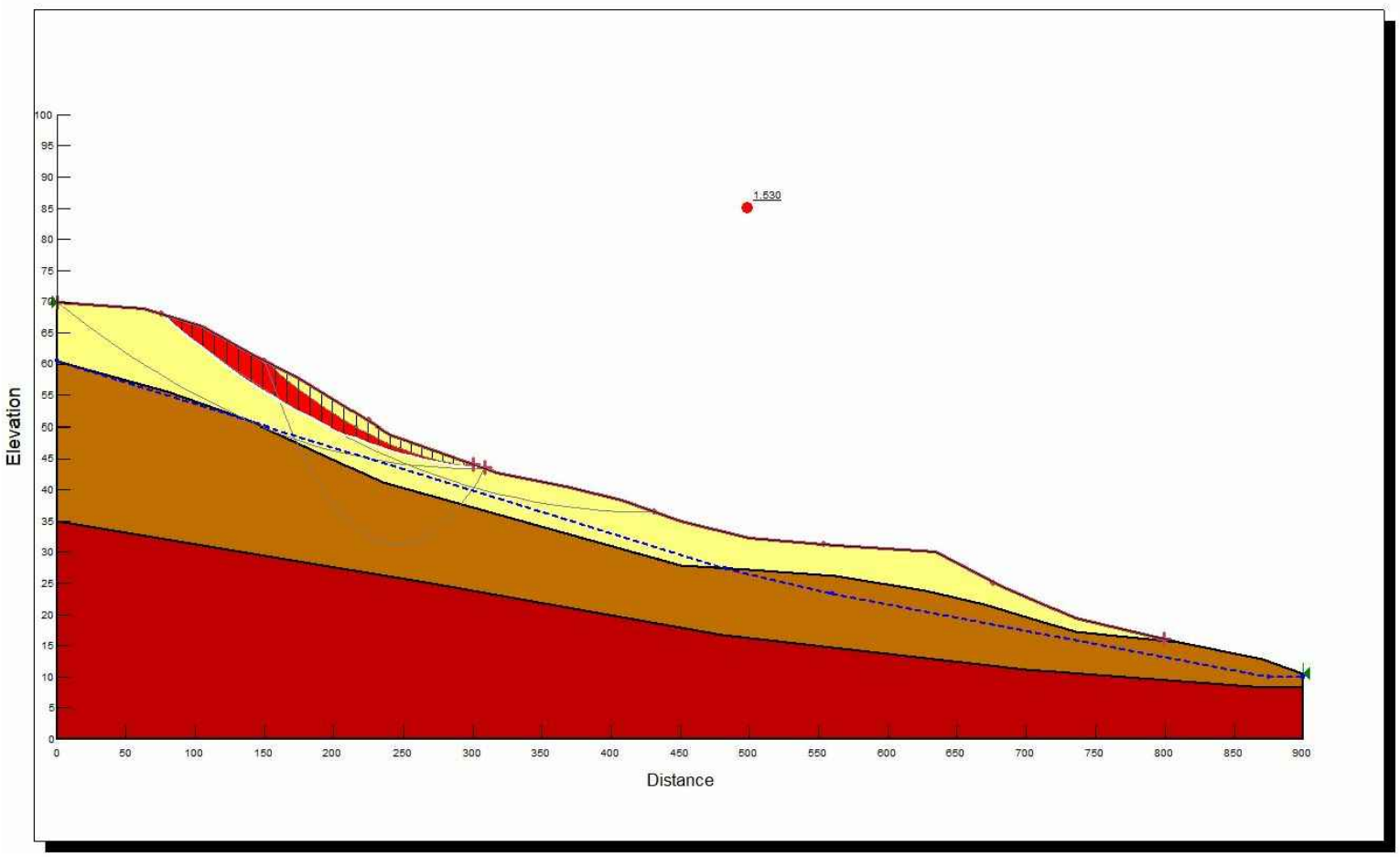


N

REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)

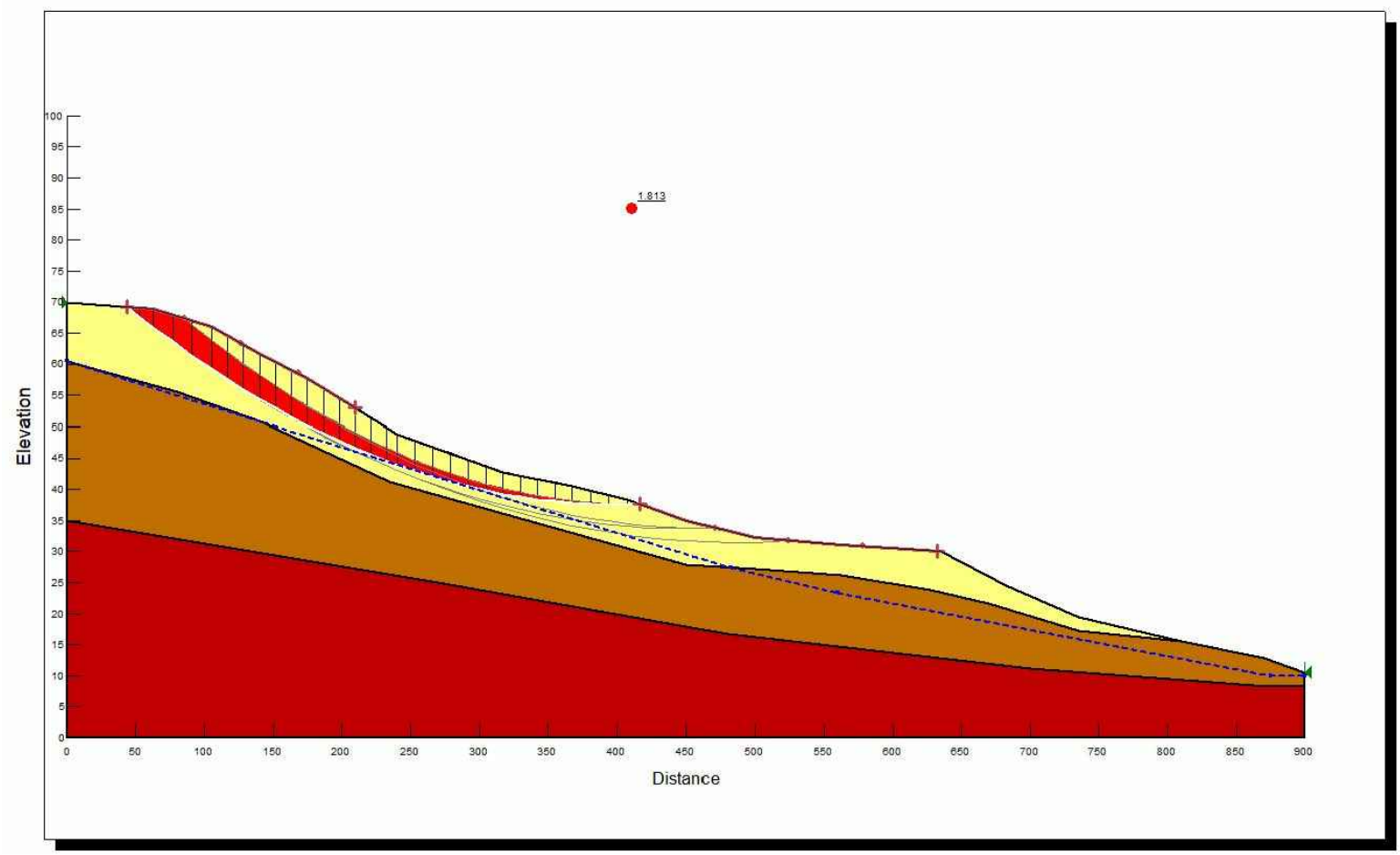


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (STATIC)

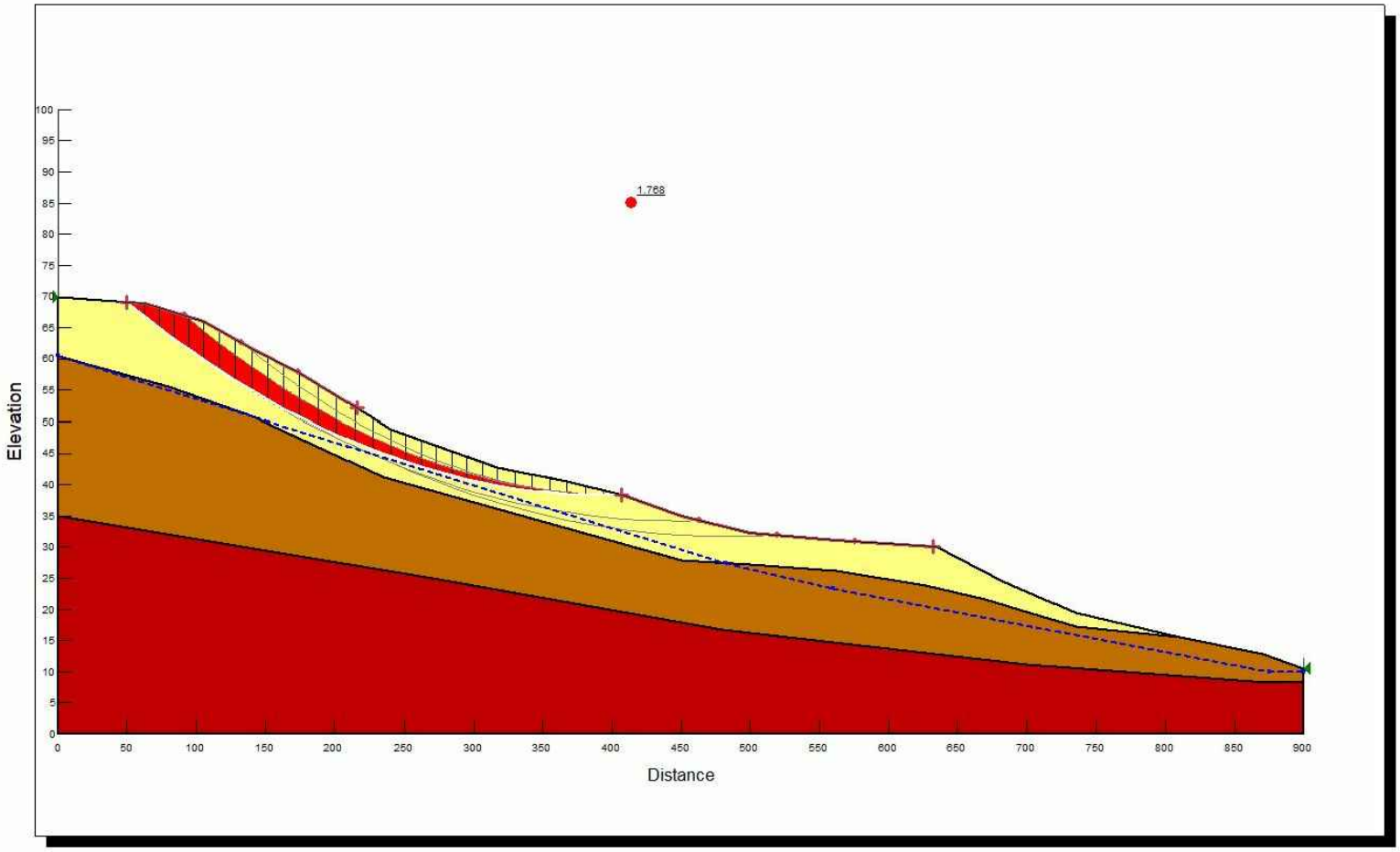


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (STATIC)

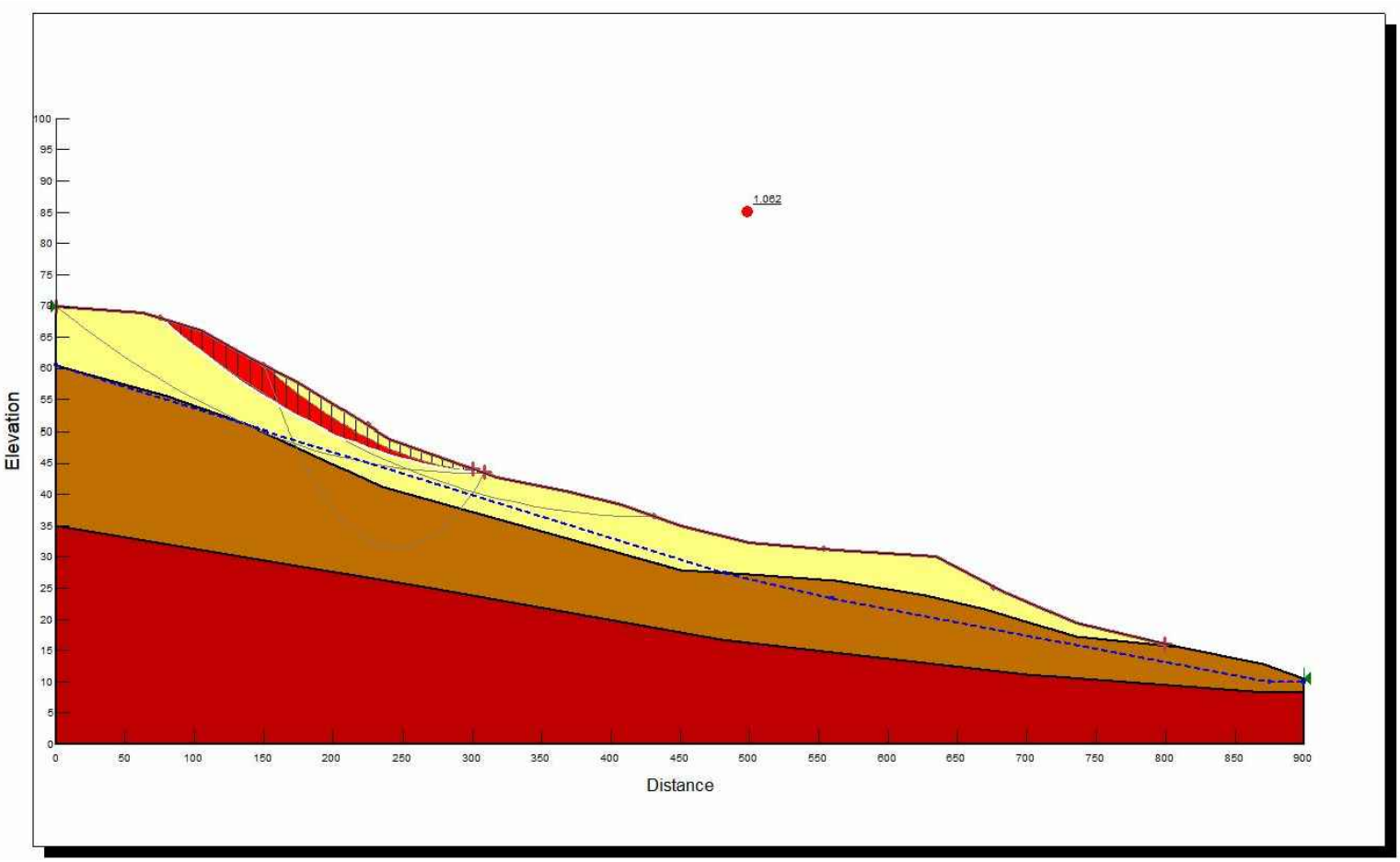


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (STATIC)

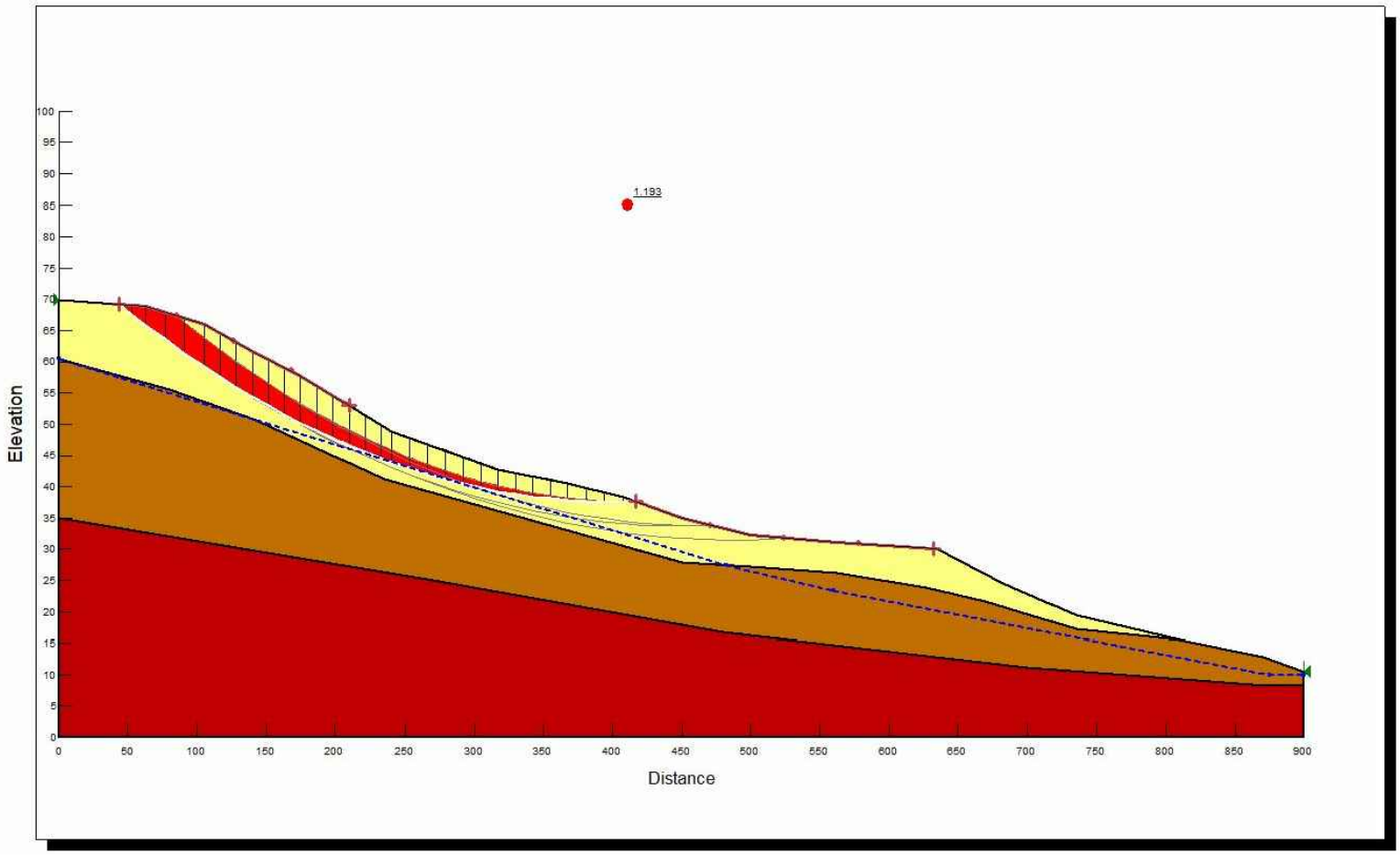


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.05g)

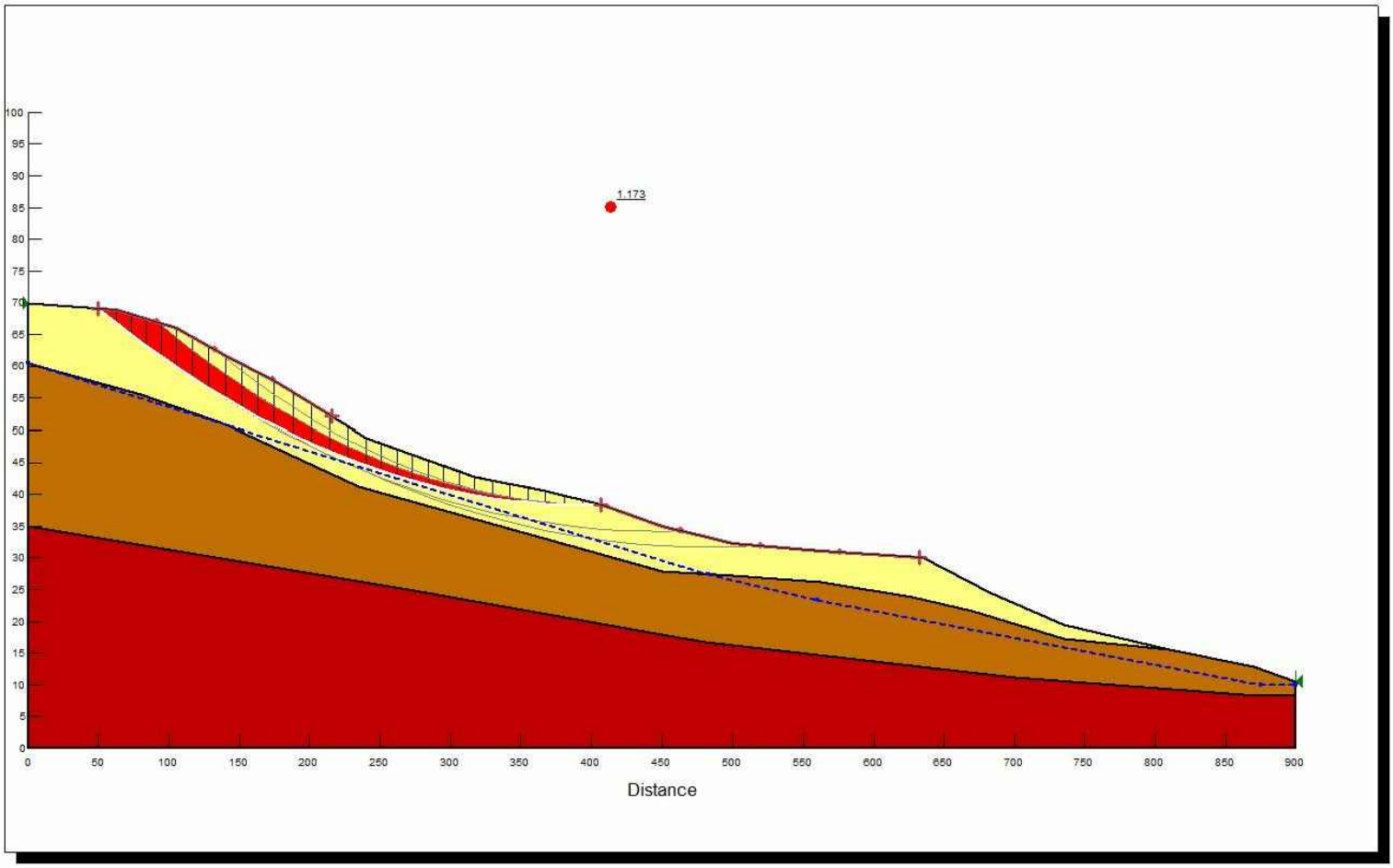


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.05g)

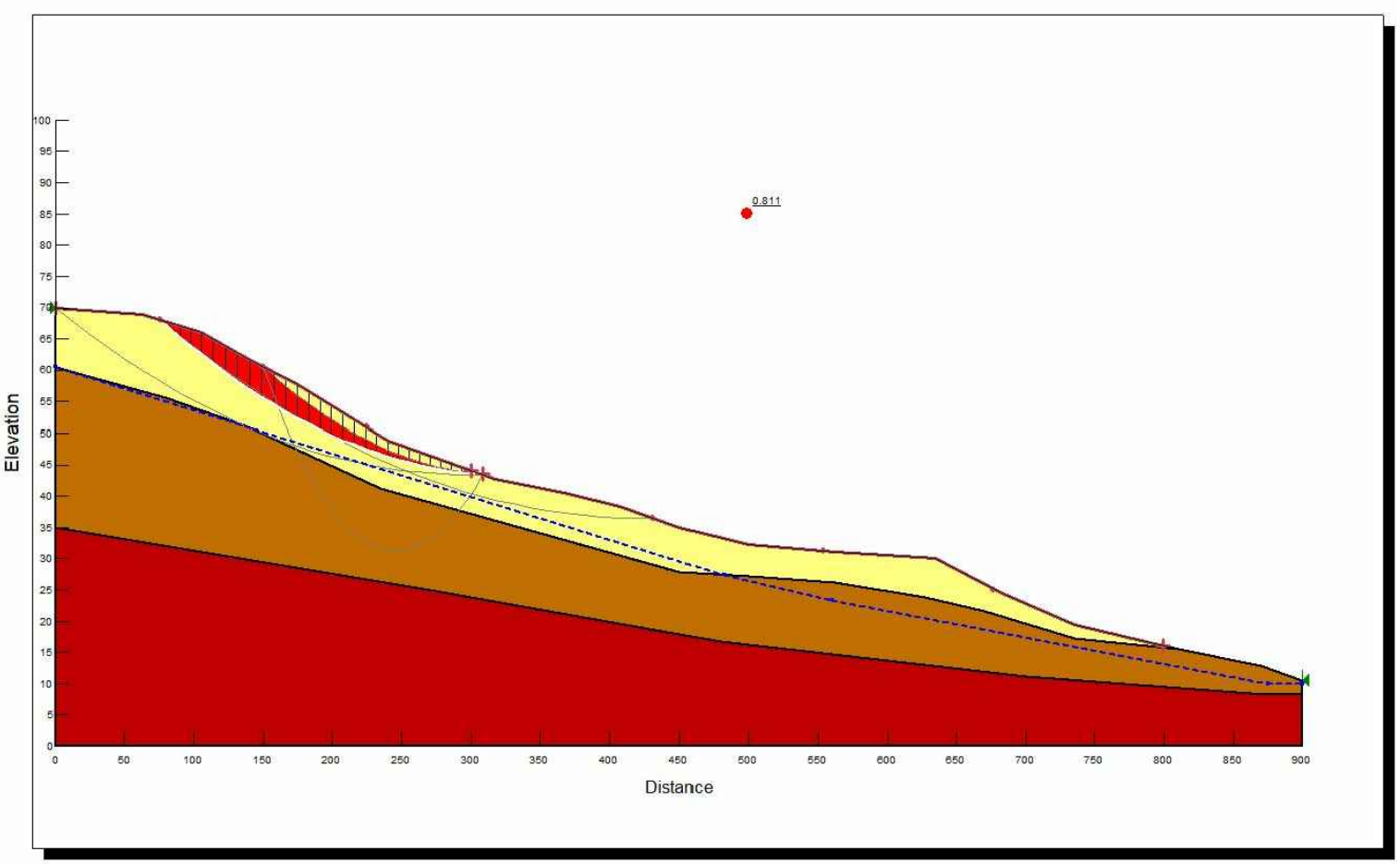


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.05g)

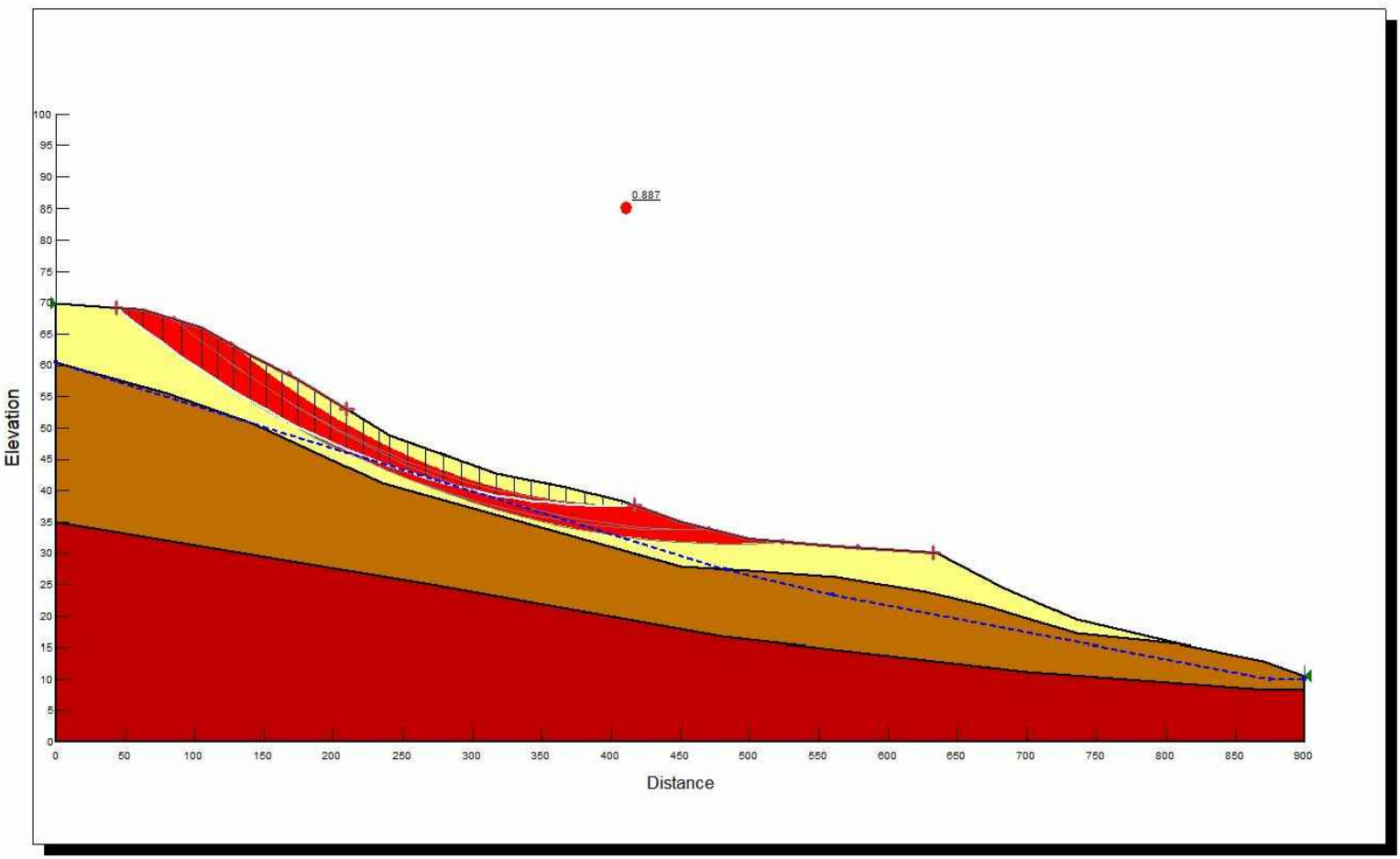


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REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)

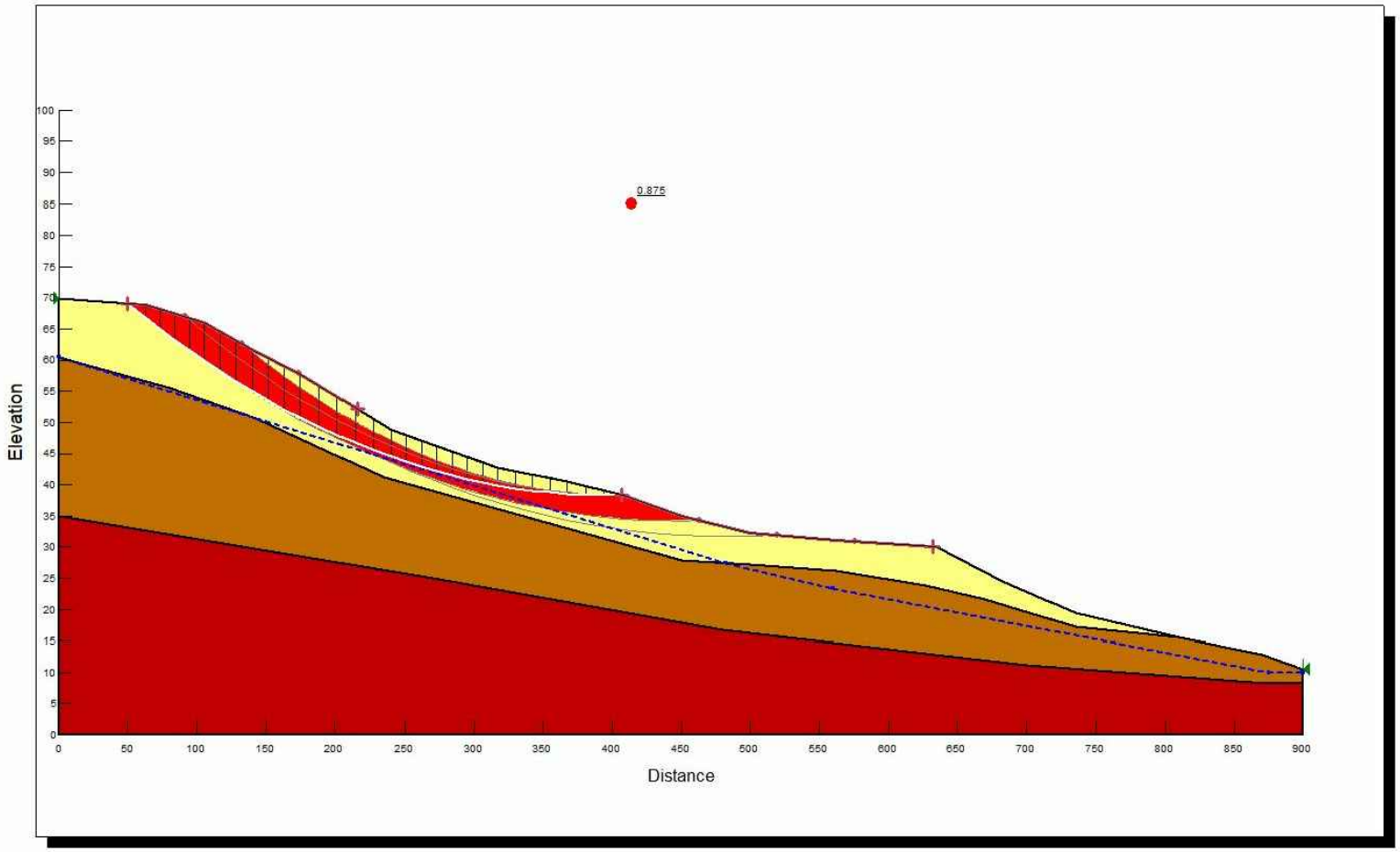


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REFERENCE:
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AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)



N

REFERENCE:
SLOPE/W SOFTWARE

AMERICAN GEOSERVICES
888.276.4027 - americangeoservices.com

SLOPE STABILITY ANALYSIS WITH WATER TABLE (SEISMIC Kh=0.1g)

AERIAL PHOTOS

EDR Aerial Photo Decade Package

07/13/20

Site Name:

Glenwood Meadows Housing
Wulfsohn Road
Glenwood Springs, CO 81601
EDR Inquiry # 6118520.5

Client Name:

American Geoservices, LLC
2663 Cinnabar Rd
Colorado Springs, CO 80921
Contact: SAM ADETTIWAR

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2017	1"=500'	Flight Year: 2017	USDA/NAIP
2013	1"=500'	Flight Year: 2013	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2006	1"=500'	Flight Year: 2006	USDA/NAIP
1999	1"=500'	Flight Date: September 07, 1999	USGS
1993	1"=500'	Acquisition Date: September 03, 1993	USGS/DOQQ
1989	1"=500'	Flight Date: July 19, 1989	USGS
1983	1"=500'	Flight Date: September 10, 1983	USDA
1979	1"=500'	Flight Date: September 07, 1979	USGS
1960	1"=500'	Flight Date: August 18, 1960	USGS
1955	1"=500'	Flight Date: October 16, 1955	USGS

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INQUIRY #: 6118520.5

YEAR: 2017

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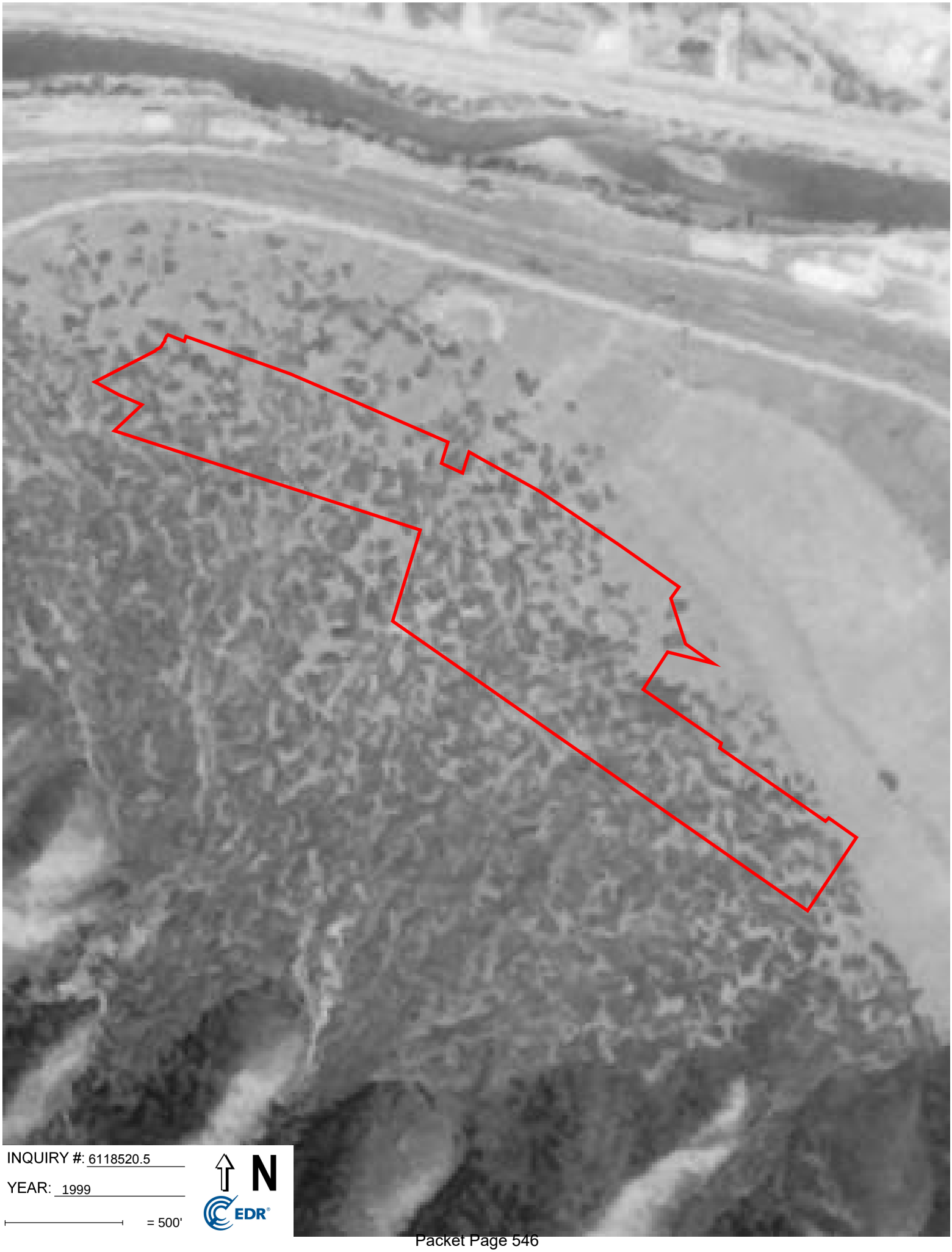
N

EDR


INQUIRY #: 6118520.5
YEAR: 2013
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EDR


INQUIRY #: 6118520.5
YEAR: 2009
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N
EDR


INQUIRY #: 6118520.5
YEAR: 2006
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N
EDR



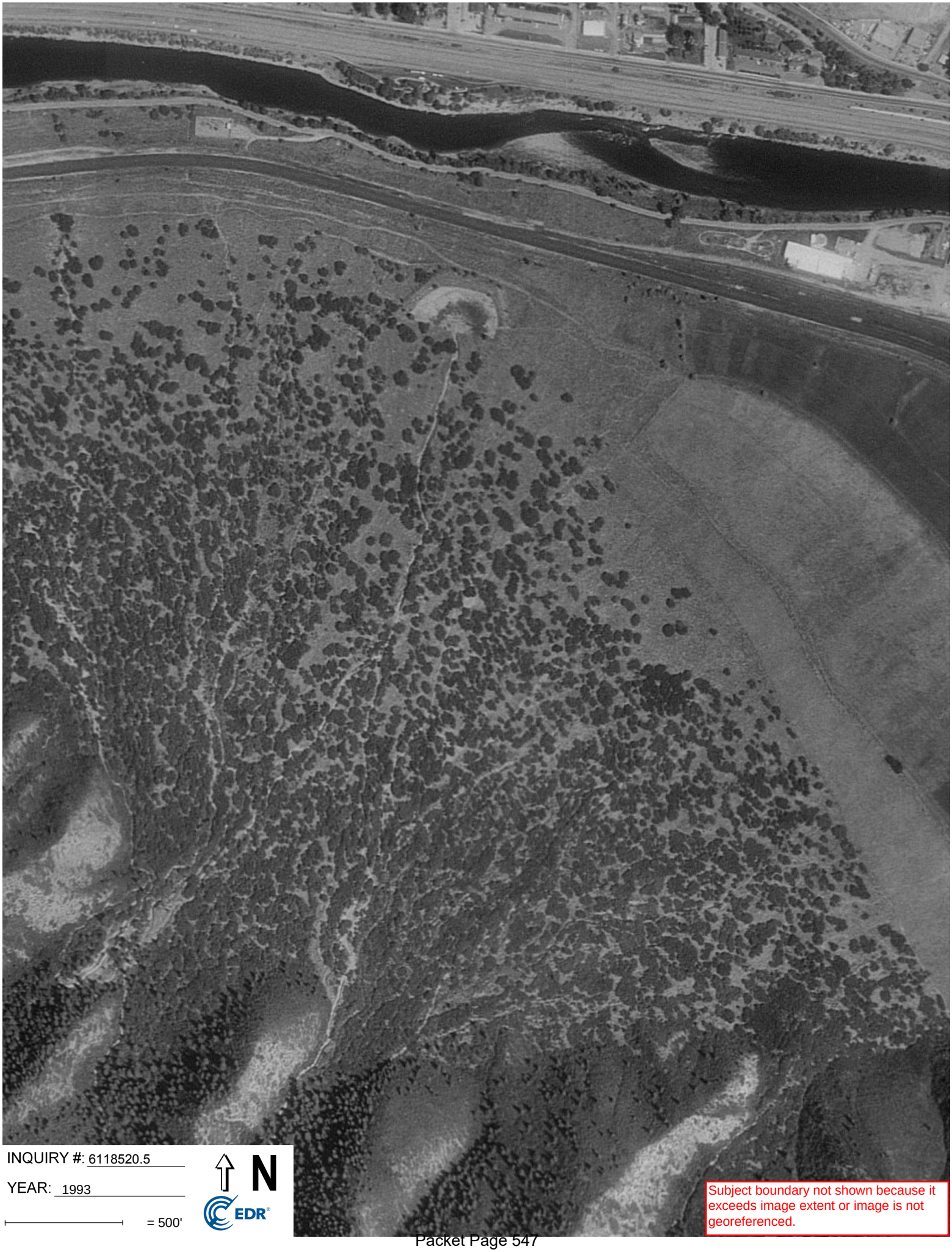
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YEAR: 1999

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EDR



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YEAR: 1993

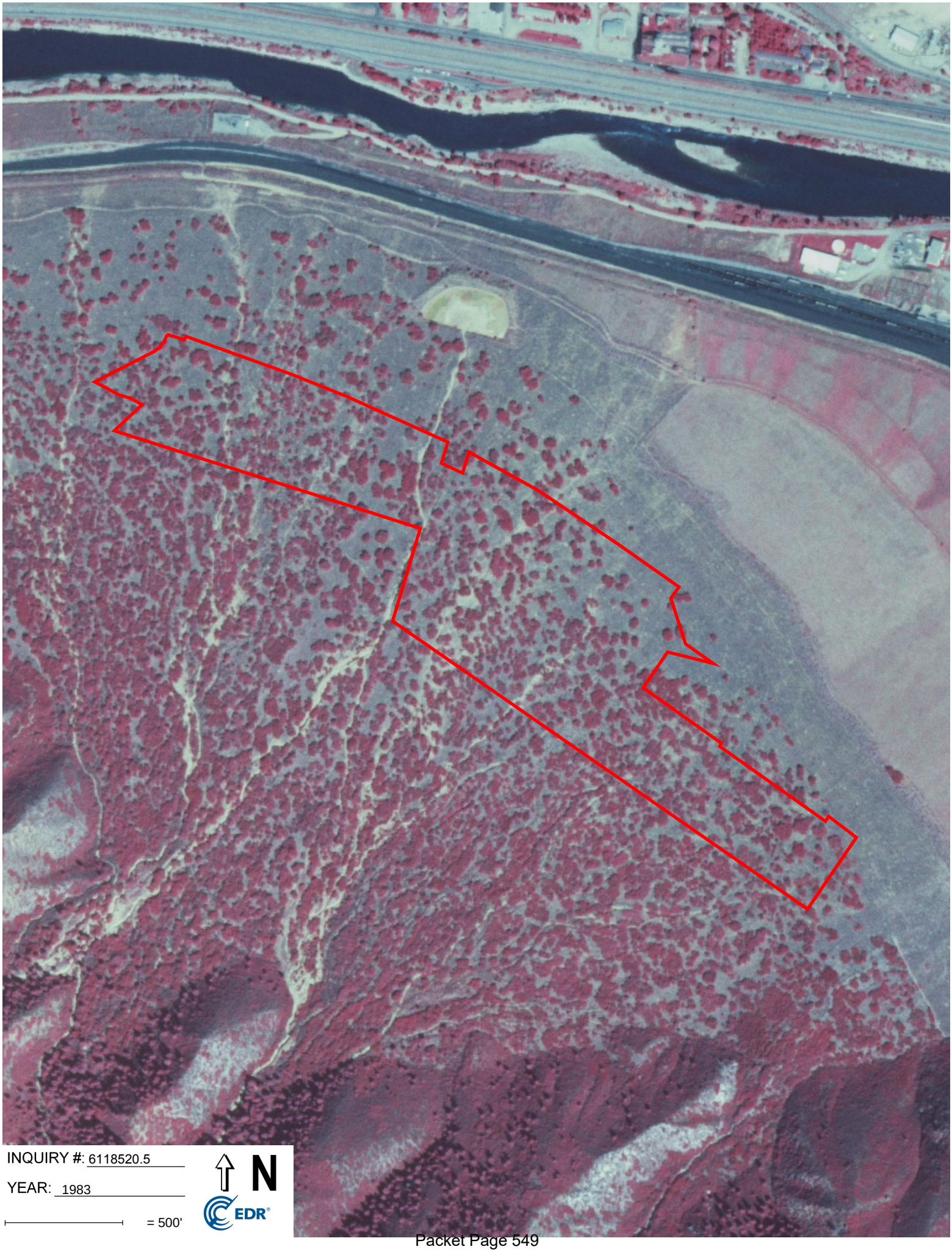
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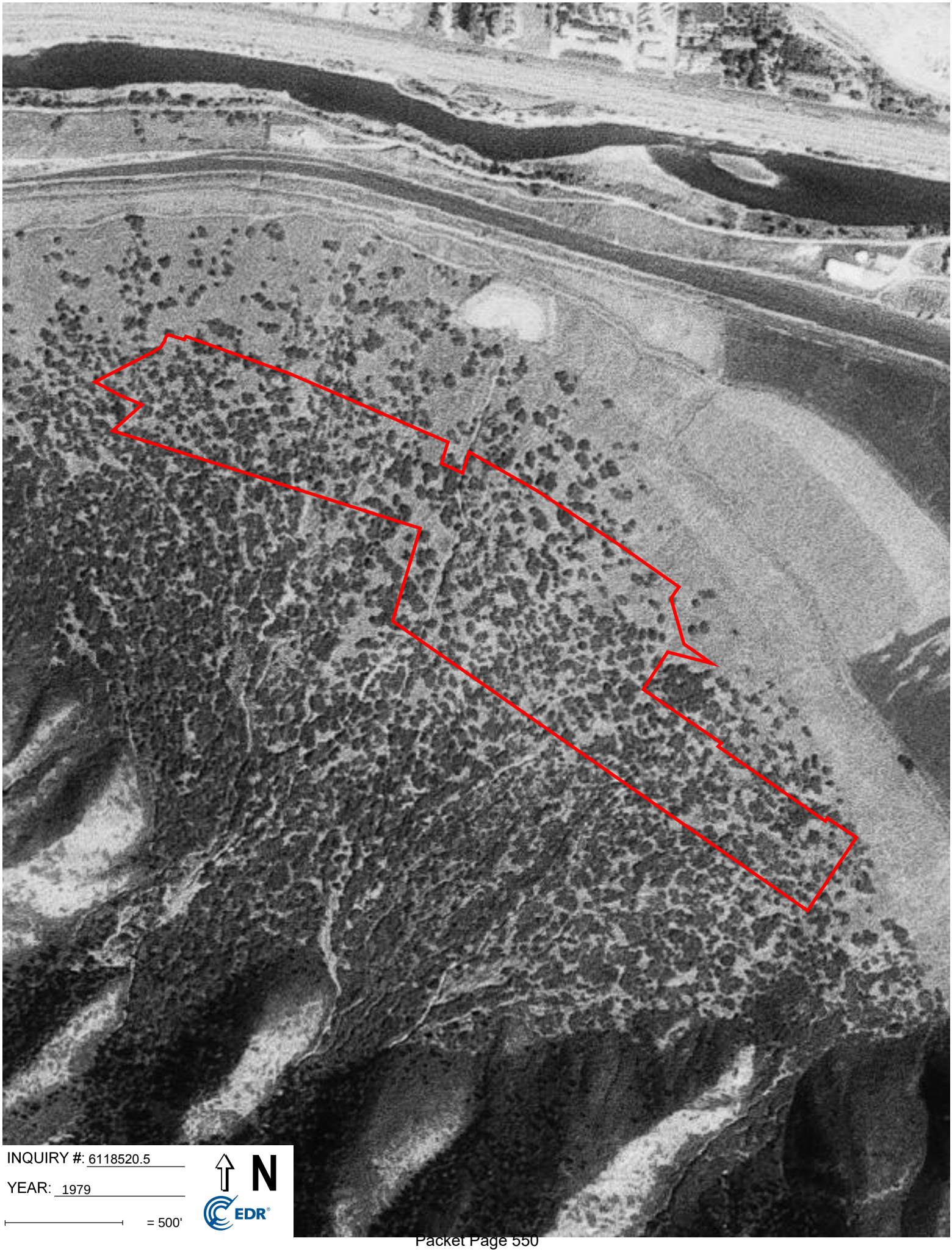
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EDR

Subject boundary not shown because it exceeds image extent or image is not georeferenced.


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YEAR: 1989
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EDR


INQUIRY #: 6118520.5
YEAR: 1983
= 500'
N
EDR



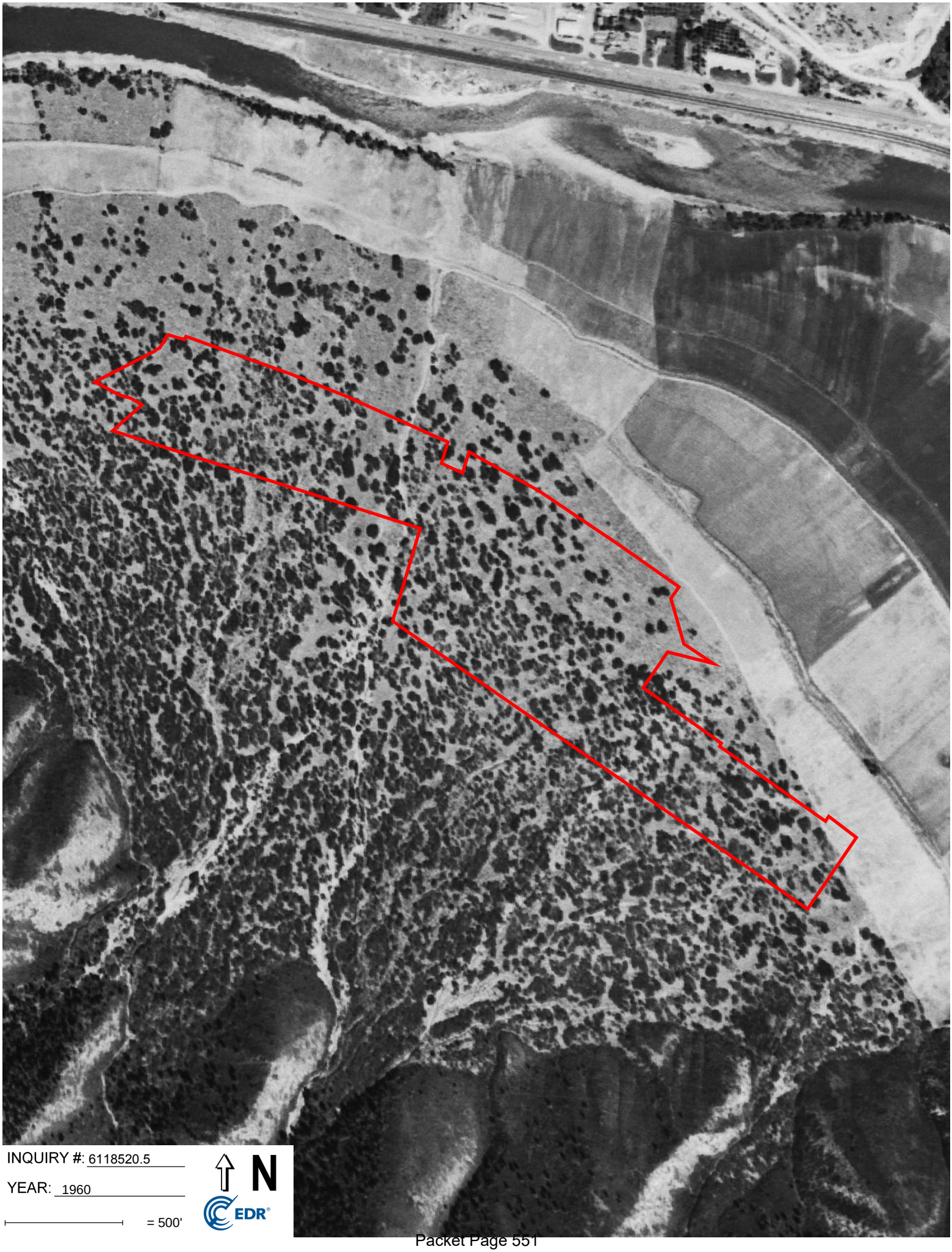
INQUIRY #: 6118520.5

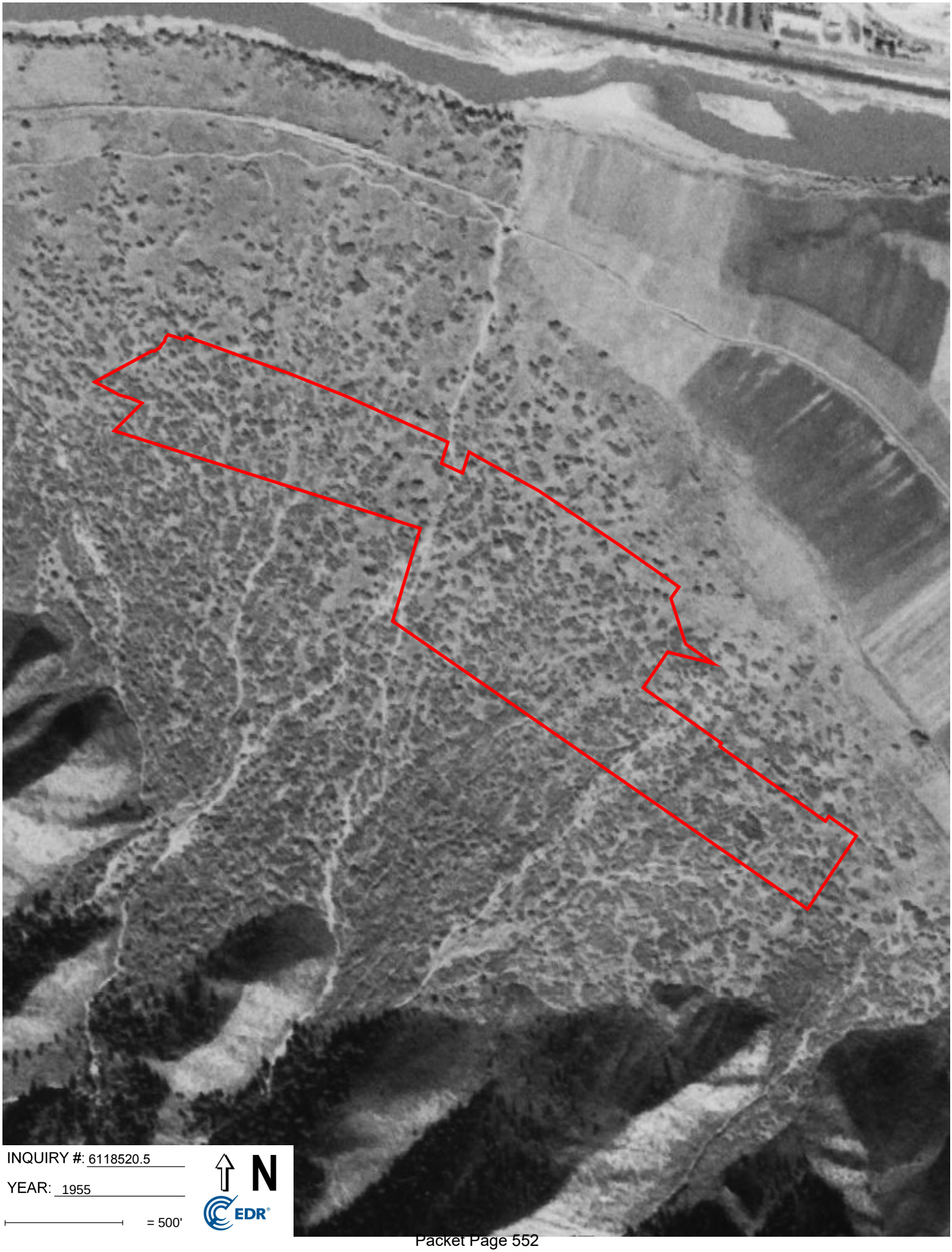
YEAR: 1979

= 500'

N

EDR


INQUIRY #: 6118520.5
YEAR: 1960
= 500'
N
EDR


INQUIRY #: 6118520.5
YEAR: 1955
= 500'
N
EDR

SITE PHOTOS

















































































































































SLOPE STABILITY ANALYSIS WITHOUT WATERTABLE (STATIC)

SLOPE/W Analysis

Report generated using GeoStudio 2012. Copyright © 1991-2016 GEO-SLOPE International Ltd.

File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 79
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 11:44:59
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\
Last Solved Date: 29-06-2020
Last Solved Time: 11:45:00

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (30.79374, 69.45256) ft
Left-Zone Right Coordinate: (135, 62.30159) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (562.27681, 31.11508) ft
Right-Zone Right Coordinate: (644.49999, 28.88889) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8

Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 4.285
Volume: 2,954.1635 ft³
Weight: 3,10,187.17 lbs
Resisting Moment: 3.2312006e+008 lbs-ft
Activating Moment: 7,54,12,295 lbs-ft
Resisting Force: 1,12,090.06 lbs
Activating Force: 26,160.608 lbs
F of S Rank: 1
Exit: (562.27681, 31.115078) ft
Entry: (30.79374, 69.452556) ft
Radius: 2,869.6254 ft
Center: (502.10181, 2,900.1095) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	38.720305	68.155564	0	119.63948	43.545209	0
Slice 2	54.573435	65.607077	0	354.08517	128.87646	0
Slice 3	73.125	62.749203	0	563.0916	204.94858	0
Slice 4	94.375	59.617701	0	743.14432	270.48241	0
Slice 5	113.75	56.897424	0	837.72803	304.90807	0
Slice 6	131.25	54.561908	0	849.56314	309.2157	0
Slice 7	148.74016	52.337036	0	864.54412	314.66833	0
Slice 8	166.22047	50.222431	0	882.71298	321.28125	0
Slice 9	183.09055	48.282906	0	868.48111	316.10127	0
Slice 10	199.35039	46.510935	0	822.5252	299.37469	0
Slice 11	215.61024	44.832658	0	766.87937	279.12126	0
Slice 12	231.87008	43.247909	0	701.49906	255.32478	0
Slice 13	249.6875	41.623456	0	676.46651	246.21368	0
Slice 14	269.0625	39.978692	0	689.86235	251.08936	0
Slice 15	288.4375	38.466053	0	689.51356	250.96241	0
Slice 16	307.8125	37.085328	0	675.35098	245.80766	0
Slice 17	325.83333	35.915068	0	680.18446	247.5669	0

Slice 18	342.5	34.938017	0	705.86504	256.91387	0
Slice 19	359.16667	34.058217	0	721.29716	262.5307	0
Slice 20	377.5	33.207997	0	714.15477	259.93108	0
Slice 21	397.5	32.408617	0	682.0831	248.25794	0
Slice 22	418.125	31.732793	0	607.56014	221.13381	0
Slice 23	439.375	31.189419	0	489.58318	178.1937	0
Slice 24	458.33333	30.829994	0	390.97215	142.30222	0
Slice 25	475	30.624169	0	315.0633	114.67366	0
Slice 26	491.66667	30.515158	0	228.90485	83.314551	0
Slice 27	507.7846	30.50027	0	167.0069	60.785539	0
Slice 28	523.3538	30.57334	0	130.03691	47.329565	0
Slice 29	538.92301	30.730889	0	84.198809	30.64586	0
Slice 30	554.49221	30.972931	0	29.529675	10.747923	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 82
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 11:53:34
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\
Last Solved Date: 29-06-2020
Last Solved Time: 11:53:37

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (24.40773, 69.56609) ft
Left-Zone Right Coordinate: (302.5, 43.96058) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (717.92524, 21.07061) ft
Right-Zone Right Coordinate: (885, 11.66667) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8

Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 5.362
Volume: 6,122.6541 ft³
Weight: 6,50,658.16 lbs
Resisting Moment: 8.8365152e+008 lbs-ft
Activating Moment: 1.6479033e+008 lbs-ft
Resisting Force: 2,35,734.13 lbs
Activating Force: 43,961.841 lbs
F of S Rank: 1
Exit: (717.92524, 21.070608) ft
Entry: (24.40773, 69.566085) ft
Radius: 3,735.7164 ft
Center: (630.62637, 3,755.7668) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	33.930797	68.025204	0	142.35368	51.812503	0
Slice 2	52.976932	64.99385	0	421.62645	153.45948	0
Slice 3	73.125	61.899787	0	652.64841	237.54459	0
Slice 4	94.375	58.75504	0	834.32978	303.67121	0
Slice 5	113.75	55.991468	0	933.32016	339.70076	0
Slice 6	131.25	53.588788	0	951.78232	346.42043	0
Slice 7	148.74016	51.271593	0	975.92237	355.20669	0
Slice 8	166.22047	49.039629	0	1,005.7755	366.07234	0
Slice 9	187.65476	46.428656	0	996.0067	362.51679	0
Slice 10	213.04303	43.48479	0	941.8843	342.81785	0
Slice 11	230.36858	41.557766	0	896.67663	326.3636	0
Slice 12	237.5	40.794111	0	875.64269	318.70787	0
Slice 13	252.91667	39.216846	0	901.86148	328.25074	0
Slice 14	278.75	36.682043	0	959.42008	349.20035	0
Slice 15	304.58333	34.328293	0	997.49744	363.05938	0
Slice 16	330	32.187438	0	1,060.9222	386.14409	0
Slice 17	355	30.253447	0	1,150.3828	418.70508	0

Slice 18	377.5	28.649506	0	1,204.5149	438.40757	0
Slice 19	397.5	27.34509	0	1,226.5035	446.41075	0
Slice 20	418.125	26.11445	0	1,211.1688	440.82939	0
Slice 21	439.375	24.96441	0	1,157.6321	421.34361	0
Slice 22	462.5	23.856605	0	1,116.5256	406.3821	0
Slice 23	487.5	22.814201	0	1,085.2652	395.00422	0
Slice 24	510.41667	21.999567	0	1,081.8518	393.76187	0
Slice 25	531.25	21.386999	0	1,109.1931	403.71327	0
Slice 26	552.08333	20.890741	0	1,123.5463	408.93741	0
Slice 27	573.33333	20.505516	0	1,126.5491	410.03033	0
Slice 28	595	20.23603	0	1,117.6518	406.792	0
Slice 29	616.66667	20.092228	0	1,094.6577	398.42282	0
Slice 30	631.25	20.052372	0	1,072.4402	390.33631	0
Slice 31	643.75	20.083737	0	951.6792	346.3829	0
Slice 32	661.25	20.186207	0	719.98407	262.05277	0
Slice 33	676.25	20.334274	0	514.28485	187.18438	0
Slice 34	684.9204	20.445791	0	397.68931	144.74707	0
Slice 35	702.63302	20.77579	0	184.30993	67.083329	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 87
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:00:58
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\
Last Solved Date: 29-06-2020
Last Solved Time: 12:01:00

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (32.06557, 69.42995) ft
Left-Zone Right Coordinate: (164.9719, 58.88889) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (586.522, 30.74296) ft
Right-Zone Right Coordinate: (672.99997, 25.55556) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8

Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 4.372
Volume: 2,968.2288 ft³
Weight: 3,11,664.02 lbs
Resisting Moment: 3.3789285e+008 lbs-ft
Activating Moment: 7,72,79,986 lbs-ft
Resisting Force: 1,12,655.76 lbs
Activating Force: 25,765.824 lbs
F of S Rank: 1
Exit: (586.522, 30.742957) ft
Entry: (32.06557, 69.429946) ft
Radius: 2,986.1639 ft
Center: (516.24486, 3,016.0798) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	39.674177	68.199896	0	113.35419	41.257552	0
Slice 2	54.891392	65.780049	0	335.78672	122.21637	0
Slice 3	73.125	62.995937	0	537.8709	195.769	0
Slice 4	94.375	59.885358	0	715.84683	260.54694	0
Slice 5	113.75	57.178846	0	809.01819	294.45854	0
Slice 6	131.25	54.850993	0	820.00916	298.45893	0
Slice 7	148.74016	52.629501	0	834.5627	303.75598	0
Slice 8	166.22047	50.514016	0	852.72018	310.36476	0
Slice 9	183.09055	48.569695	0	838.8614	305.32058	0
Slice 10	199.35039	46.789313	0	793.64681	288.86382	0
Slice 11	215.61024	45.098986	0	739.12182	269.01834	0
Slice 12	231.87008	43.49856	0	675.24923	245.77062	0
Slice 13	249.6875	41.852587	0	652.32826	237.42807	0
Slice 14	269.0625	40.179713	0	668.51657	243.32013	0
Slice 15	288.4375	38.633855	0	671.5186	244.41278	0
Slice 16	307.8125	37.214817	0	661.27612	240.68482	0
Slice 17	325.83333	36.004521	0	670.24163	243.948	0

Slice 18	342.5	34.986379	0	700.19152	254.84887	0
Slice 19	359.16667	34.061734	0	720.32675	262.1775	0
Slice 20	377.5	33.157644	0	718.8899	261.65452	0
Slice 21	397.5	32.294546	0	693.62186	252.45771	0
Slice 22	418.125	31.54727	0	626.77682	228.1281	0
Slice 23	439.375	30.92436	0	517.36236	188.3045	0
Slice 24	458.33333	30.489117	0	426.88674	155.37407	0
Slice 25	475	30.212364	0	358.55402	130.50299	0
Slice 26	491.66667	30.028661	0	280.3344	102.03338	0
Slice 27	510.41667	29.939738	0	221.3179	80.553129	0
Slice 28	531.25	29.971751	0	178.76554	65.065334	0
Slice 29	552.08333	30.14912	0	120.90717	44.006611	0
Slice 30	574.511	30.508551	0	44.070687	16.040418	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 90
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:06:20
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\
Last Solved Date: 29-06-2020
Last Solved Time: 12:06:22

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (106.92331, 65.86688) ft
Left-Zone Right Coordinate: (300, 44.15771) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (483.19428, 33.15587) ft
Right-Zone Right Coordinate: (687.5, 23.96825) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8

Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 4.506
Volume: 1,117.1407 ft³
Weight: 1,17,299.78 lbs
Resisting Moment: 8,79,19,662 lbs-ft
Activating Moment: 1,95,11,912 lbs-ft
Resisting Force: 42,416.87 lbs
Activating Force: 9,413.5477 lbs
F of S Rank: 1
Exit: (483.19428, 33.155872) ft
Entry: (106.92331, 65.86688) ft
Radius: 2,064.0739 ft
Center: (473.07445, 2,097.205) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	112.43609	64.888627	0	28.77401	10.472883	0
Slice 2	123.46165	62.962925	0	83.081131	30.239059	0
Slice 3	134.48722	61.098748	0	130.96402	47.667003	0
Slice 4	145.82677	59.246378	0	182.95568	66.590422	0
Slice 5	157.48031	57.409228	0	238.7304	86.89076	0
Slice 6	169.13386	55.64025	0	287.48772	104.63697	0
Slice 7	181.46457	53.844599	0	314.1759	114.35068	0
Slice 8	194.47244	52.030423	0	317.97793	115.7345	0
Slice 9	207.48031	50.300519	0	313.16095	113.98126	0
Slice 10	220.48819	48.654671	0	299.72731	109.09182	0
Slice 11	233.49606	47.092678	0	277.66658	101.06237	0
Slice 12	246.45833	45.61924	0	285.84482	104.03901	0
Slice 13	259.375	44.233593	0	324.41207	118.07634	0
Slice 14	272.29167	42.930096	0	354.5648	129.05103	0
Slice 15	285.20833	41.708593	0	376.28448	136.95635	0
Slice 16	298.125	40.568938	0	389.5436	141.78228	0
Slice 17	311.04167	39.510994	0	394.30866	143.51661	0

Slice 18	323.75	38.54909	0	413.20713	150.3951	0
Slice 19	336.25	37.680528	0	446.54645	162.52962	0
Slice 20	348.75	36.88817	0	471.91805	171.76412	0
Slice 21	361.25	36.171927	0	489.28252	178.08427	0
Slice 22	374.16667	35.512996	0	490.87043	178.66223	0
Slice 23	387.5	34.916536	0	476.07836	173.27835	0
Slice 24	400.83333	34.406431	0	452.06728	164.53903	0
Slice 25	414.58333	33.972151	0	400.48469	145.76451	0
Slice 26	428.75	33.619198	0	320.74927	116.74319	0
Slice 27	442.91667	33.363548	0	230.69263	83.965251	0
Slice 28	455.53238	33.213023	0	155.66893	56.658857	0
Slice 29	466.59714	33.148641	0	97.721936	35.567876	0
Slice 30	477.6619	33.143576	0	33.595989	12.22794	0

SLOPE STABILITY ANALYSIS WITHOUT WATERTABLE (SEISMIC Kh=0.05g)

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 80
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 11:49:56
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\
Last Solved Date: 29-06-2020
Last Solved Time: 11:50:01

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (30.79374, 69.45256) ft
Left-Zone Right Coordinate: (135, 62.30159) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (562.27681, 31.11508) ft
Right-Zone Right Coordinate: (644.49999, 28.88889) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8

1			
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 2.689
Volume: 2,954.1635 ft³
Weight: 3,10,187.17 lbs
Resisting Moment: 3.2175468e+008 lbs-ft
Activating Moment: 1.196644e+008 lbs-ft
Resisting Force: 1,11,617.77 lbs
Activating Force: 41,512.295 lbs
F of S Rank: 1
Exit: (562.27681, 31.115078) ft
Entry: (30.79374, 69.452556) ft
Radius: 2,869.6254 ft
Center: (502.10181, 2,900.1095) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	38.720305	68.155564	0	118.64264	43.182391	0
Slice 2	54.573435	65.607077	0	351.12311	127.79836	0
Slice 3	73.125	62.749203	0	558.35994	203.2264	0
Slice 4	94.375	59.617701	0	736.93543	268.22256	0
Slice 5	113.75	56.897424	0	830.82555	302.39577	0
Slice 6	131.25	54.561908	0	842.69166	306.71468	0
Slice 7	148.74016	52.337036	0	857.76545	312.20109	0
Slice 8	166.22047	50.222431	0	876.0918	318.87134	0
Slice 9	183.09055	48.282906	0	862.29638	313.85022	0
Slice 10	199.35039	46.510935	0	817.00354	297.36497	0
Slice 11	215.61024	44.832658	0	762.08753	277.37718	0
Slice 12	231.87008	43.247909	0	697.47799	253.86123	0
Slice 13	249.6875	41.623456	0	673.0428	244.96755	0
Slice 14	269.0625	39.978692	0	686.92224	250.01925	0
Slice 15	288.4375	38.466053	0	687.13036	250.095	0
Slice 16	307.8125	37.085328	0	673.55796	245.15505	0
Slice	325.83333	35.915068	0	678.86742	247.08753	0

17						
Slice 18	342.5	34.938017	0	704.92806	256.57283	0
Slice 19	359.16667	34.058217	0	720.74046	262.32807	0
Slice 20	377.5	33.207997	0	713.99702	259.87366	0
Slice 21	397.5	32.408617	0	682.28891	248.33285	0
Slice 22	418.125	31.732793	0	608.02496	221.30299	0
Slice 23	439.375	31.189419	0	490.15948	178.40346	0
Slice 24	458.33333	30.829994	0	391.538	142.50818	0
Slice 25	475	30.624169	0	315.56546	114.85644	0
Slice 26	491.66667	30.515158	0	229.29645	83.457084	0
Slice 27	507.7846	30.50027	0	167.2955	60.890583	0
Slice 28	523.3538	30.57334	0	130.24569	47.405553	0
Slice 29	538.92301	30.730889	0	84.319939	30.689948	0
Slice 30	554.49221	30.972931	0	29.567353	10.761636	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 84
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 11:56:02
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\
Last Solved Date: 29-06-2020
Last Solved Time: 11:56:06

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (24.40773, 69.56609) ft
Left-Zone Right Coordinate: (302.5, 43.96058) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (717.92524, 21.07061) ft
Right-Zone Right Coordinate: (885, 11.66667) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8

1			
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 3.082
Volume: 6,122.6541 ft³
Weight: 6,50,658.16 lbs
Resisting Moment: 8.8067076e+008 lbs-ft
Activating Moment: 2.8575098e+008 lbs-ft
Resisting Force: 2,34,941.84 lbs
Activating Force: 76,232.157 lbs
F of S Rank: 1
Exit: (717.92524, 21.070608) ft
Entry: (24.40773, 69.566085) ft
Radius: 3,735.7164 ft
Center: (630.62637, 3,755.7668) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	33.930797	68.025204	0	141.17953	51.385146	0
Slice 2	52.976932	64.99385	0	418.11538	152.18155	0
Slice 3	73.125	61.899787	0	647.15117	235.54376	0
Slice 4	94.375	58.75504	0	827.25485	301.09614	0
Slice 5	113.75	55.991468	0	925.38878	336.81397	0
Slice 6	131.25	53.588788	0	943.69201	343.4758	0
Slice 7	148.74016	51.271593	0	967.68716	352.20932	0
Slice 8	166.22047	49.039629	0	997.41495	363.02935	0
Slice 9	187.65476	46.428656	0	987.92064	359.57371	0
Slice 10	213.04303	43.48479	0	934.5149	340.13561	0
Slice 11	230.36858	41.557766	0	889.8886	323.89296	0
Slice 12	237.5	40.794111	0	869.1178	316.33301	0
Slice 13	252.91667	39.216846	0	895.48117	325.92849	0
Slice 14	278.75	36.682043	0	953.30371	346.97417	0
Slice 15	304.58333	34.328293	0	991.8807	361.01505	0
Slice 16	330	32.187438	0	1,055.7828	384.27353	0
Slice	355	30.253447	0	1,145.7185	417.00744	0

17						
Slice 18	377.5	28.649506	0	1,200.4734	436.93658	0
Slice 19	397.5	27.34509	0	1,223.1395	445.18638	0
Slice 20	418.125	26.11445	0	1,208.6042	439.89597	0
Slice 21	439.375	24.96441	0	1,155.9227	420.72145	0
Slice 22	462.5	23.856605	0	1,115.6145	406.05047	0
Slice 23	487.5	22.814201	0	1,085.0854	394.9388	0
Slice 24	510.41667	21.999567	0	1,082.2199	393.89584	0
Slice 25	531.25	21.386999	0	1,109.968	403.99532	0
Slice 26	552.08333	20.890741	0	1,124.6596	409.34261	0
Slice 27	573.33333	20.505516	0	1,127.9179	410.52852	0
Slice 28	595	20.23603	0	1,119.1762	407.34683	0
Slice 29	616.66667	20.092228	0	1,096.2241	398.99294	0
Slice 30	631.25	20.052372	0	1,073.9744	390.89471	0
Slice 31	643.75	20.083737	0	953.05455	346.88349	0
Slice 32	661.25	20.186207	0	721.02914	262.43315	0
Slice 33	676.25	20.334274	0	515.01757	187.45107	0
Slice 34	684.9204	20.445791	0	398.24345	144.94876	0
Slice 35	702.63302	20.77579	0	184.5673	67.177004	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 88
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:02:43
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\
Last Solved Date: 29-06-2020
Last Solved Time: 12:02:49

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (32.06557, 69.42995) ft
Left-Zone Right Coordinate: (164.9719, 58.88889) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (586.522, 30.74296) ft
Right-Zone Right Coordinate: (672.99997, 25.55556) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8

1			
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 2.723
Volume: 2,968.2288 ft³
Weight: 3,11,664.02 lbs
Resisting Moment: 3.3649354e+008 lbs-ft
Activating Moment: 1.2355877e+008 lbs-ft
Resisting Force: 1,12,190.52 lbs
Activating Force: 41,196.137 lbs
F of S Rank: 1
Exit: (586.522, 30.742957) ft
Entry: (32.06557, 69.429946) ft
Radius: 2,986.1639 ft
Center: (516.24486, 3,016.0798) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	39.674177	68.199896	0	112.42494	40.919333	0
Slice 2	54.891392	65.780049	0	333.03044	121.21317	0
Slice 3	73.125	62.995937	0	533.44654	194.15866	0
Slice 4	94.375	59.885358	0	709.99963	258.41873	0
Slice 5	113.75	57.178846	0	802.49952	292.08594	0
Slice 6	131.25	54.850993	0	813.51383	296.09482	0
Slice 7	148.74016	52.629501	0	828.13513	301.41654	0
Slice 8	166.22047	50.514016	0	846.40836	308.06745	0
Slice 9	183.09055	48.569695	0	832.93069	303.16198	0
Slice 10	199.35039	46.789313	0	788.31694	286.9239	0
Slice 11	215.61024	45.098986	0	734.45596	267.32011	0
Slice 12	231.87008	43.49856	0	671.28896	244.3292	0
Slice 13	249.6875	41.852587	0	648.89083	236.17695	0
Slice 14	269.0625	40.179713	0	665.47773	242.21409	0
Slice 15	288.4375	38.633855	0	668.95961	243.48139	0
Slice 16	307.8125	37.214817	0	659.24455	239.94539	0
Slice	325.83333	36.004521	0	668.63582	243.36354	0

17						
Slice 18	342.5	34.986379	0	698.92601	254.38826	0
Slice 19	359.16667	34.061734	0	719.42003	261.84748	0
Slice 20	377.5	33.157644	0	718.38639	261.47126	0
Slice 21	397.5	32.294546	0	693.51811	252.41995	0
Slice 22	418.125	31.54727	0	627.00476	228.21107	0
Slice 23	439.375	30.92436	0	517.80138	188.46429	0
Slice 24	458.33333	30.489117	0	427.40203	155.56162	0
Slice 25	475	30.212364	0	359.07293	130.69186	0
Slice 26	491.66667	30.028661	0	280.80081	102.20314	0
Slice 27	510.41667	29.939738	0	221.71208	80.696597	0
Slice 28	531.25	29.971751	0	179.07518	65.178036	0
Slice 29	552.08333	30.14912	0	121.10156	44.077362	0
Slice 30	574.511	30.508551	0	44.135367	16.06396	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 91
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:07:43
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\
Last Solved Date: 29-06-2020
Last Solved Time: 12:07:46

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (106.92331, 65.86688) ft
Left-Zone Right Coordinate: (300, 44.15771) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (483.19428, 33.15587) ft
Right-Zone Right Coordinate: (687.5, 23.96825) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8

1			
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 2.775
Volume: 1,117.1407 ft³
Weight: 1,17,299.78 lbs
Resisting Moment: 8,75,66,106 lbs-ft
Activating Moment: 3,15,56,524 lbs-ft
Resisting Force: 42,246.793 lbs
Activating Force: 15,224.718 lbs
F of S Rank: 1
Exit: (483.19428, 33.155872) ft
Entry: (106.92331, 65.86688) ft
Radius: 2,064.0739 ft
Center: (473.07445, 2,097.205) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	112.43609	64.888627	0	28.516029	10.378986	0
Slice 2	123.46165	62.962925	0	82.335348	29.967616	0
Slice 3	134.48722	61.098748	0	129.78715	47.23866	0
Slice 4	145.82677	59.246378	0	181.31862	65.994582	0
Slice 5	157.48031	57.409228	0	236.61595	86.121163	0
Slice 6	169.13386	55.64025	0	284.97884	103.72381	0
Slice 7	181.46457	53.844599	0	311.48516	113.37133	0
Slice 8	194.47244	52.030423	0	315.32084	114.7674	0
Slice 9	207.48031	50.300519	0	310.62974	113.05998	0
Slice 10	220.48819	48.654671	0	297.40508	108.2466	0
Slice 11	233.49606	47.092678	0	275.62418	100.319	0
Slice 12	246.45833	45.61924	0	283.89488	103.32929	0
Slice 13	259.375	44.233593	0	322.40088	117.34432	0
Slice 14	272.29167	42.930096	0	352.58563	128.33067	0
Slice 15	285.20833	41.708593	0	374.41735	136.27677	0
Slice 16	298.125	40.568938	0	387.85296	141.16693	0
Slice	311.04167	39.510994	0	392.84193	142.98277	0

17						
Slice 18	323.75	38.54909	0	411.91275	149.92398	0
Slice 19	336.25	37.680528	0	445.38559	162.1071	0
Slice 20	348.75	36.88817	0	470.92519	171.40275	0
Slice 21	361.25	36.171927	0	488.47498	177.79035	0
Slice 22	374.16667	35.512996	0	490.26925	178.44342	0
Slice 23	387.5	34.916536	0	475.68037	173.13349	0
Slice 24	400.83333	34.406431	0	451.83586	164.45481	0
Slice 25	414.58333	33.972151	0	400.39224	145.73086	0
Slice 26	428.75	33.619198	0	320.75112	116.74386	0
Slice 27	442.91667	33.363548	0	230.73446	83.980477	0
Slice 28	455.53238	33.213023	0	155.71128	56.674273	0
Slice 29	466.59714	33.148641	0	97.751169	35.578516	0
Slice 30	477.6619	33.143576	0	33.606708	12.231842	0

SLOPE STABILITY ANALYSIS WITHOUT WATERTABLE (SEISMIC Kh=0.1g)

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 81
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 11:51:35
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\
Last Solved Date: 29-06-2020
Last Solved Time: 11:51:37

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (30.79374, 69.45256) ft
Left-Zone Right Coordinate: (135, 62.30159) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (562.27681, 31.11508) ft
Right-Zone Right Coordinate: (644.49999, 28.88889) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8

1			
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.955
Volume: 2,954.1635 ft³
Weight: 3,10,187.17 lbs
Resisting Moment: 3.203944e+008 lbs-ft
Activating Moment: 1.639165e+008 lbs-ft
Resisting Force: 1,11,147.29 lbs
Activating Force: 56,864.207 lbs
F of S Rank: 1
Exit: (562.27681, 31.115078) ft
Entry: (30.79374, 69.452556) ft
Radius: 2,869.6254 ft
Center: (502.10181, 2,900.1095) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	38.720305	68.155564	0	117.65384	42.822495	0
Slice 2	54.573435	65.607077	0	348.18351	126.72843	0
Slice 3	73.125	62.749203	0	553.65967	201.51564	0
Slice 4	94.375	59.617701	0	730.75815	265.97421	0
Slice 5	113.75	56.897424	0	823.94613	299.89187	0
Slice 6	131.25	54.561908	0	835.8305	304.21742	0
Slice 7	148.74016	52.337036	0	850.98411	309.73289	0
Slice 8	166.22047	50.222431	0	869.45589	316.45606	0
Slice 9	183.09055	48.282906	0	856.08721	311.59026	0
Slice 10	199.35039	46.510935	0	811.45129	295.34411	0
Slice 11	215.61024	44.832658	0	757.26268	275.62107	0
Slice 12	231.87008	43.247909	0	693.42518	252.38612	0
Slice 13	249.6875	41.623456	0	669.59174	243.71146	0
Slice 14	269.0625	39.978692	0	683.96246	248.94198	0
Slice 15	288.4375	38.466053	0	684.73817	249.22431	0
Slice 16	307.8125	37.085328	0	671.7683	244.50367	0
Slice	325.83333	35.915068	0	677.56549	246.61367	0

17						
Slice 18	342.5	34.938017	0	704.01654	256.24106	0
Slice 19	359.16667	34.058217	0	720.21814	262.13796	0
Slice 20	377.5	33.207997	0	713.8804	259.83122	0
Slice 21	397.5	32.408617	0	682.53879	248.4238	0
Slice 22	418.125	31.732793	0	608.53135	221.4873	0
Slice 23	439.375	31.189419	0	490.76995	178.62565	0
Slice 24	458.33333	30.829994	0	392.12991	142.72362	0
Slice 25	475	30.624169	0	316.08664	115.04613	0
Slice 26	491.66667	30.515158	0	229.70044	83.604121	0
Slice 27	507.7846	30.50027	0	167.59162	60.998361	0
Slice 28	523.3538	30.57334	0	130.45873	47.483095	0
Slice 29	538.92301	30.730889	0	84.442972	30.734728	0
Slice 30	554.49221	30.972931	0	29.605497	10.77552	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 85
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 11:57:36
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\
Last Solved Date: 29-06-2020
Last Solved Time: 11:57:39

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (24.40773, 69.56609) ft
Left-Zone Right Coordinate: (302.5, 43.96058) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (717.92524, 21.07061) ft
Right-Zone Right Coordinate: (885, 11.66667) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8

1			
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 2.158
Volume: 6,122.6541 ft³
Weight: 6,50,658.16 lbs
Resisting Moment: 8.7770586e+008 lbs-ft
Activating Moment: 4.0671162e+008 lbs-ft
Resisting Force: 2,34,153.81 lbs
Activating Force: 1,08,503.11 lbs
F of S Rank: 1
Exit: (717.92524, 21.070608) ft
Entry: (24.40773, 69.566085) ft
Radius: 3,735.7164 ft
Center: (630.62637, 3,755.7668) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	33.930797	68.025204	0	140.01664	50.961888	0
Slice 2	52.976932	64.99385	0	414.63689	150.91548	0
Slice 3	73.125	61.899787	0	641.70151	233.56025	0
Slice 4	94.375	58.75504	0	820.23424	298.54085	0
Slice 5	113.75	55.991468	0	917.5092	333.94604	0
Slice 6	131.25	53.588788	0	935.64445	340.54673	0
Slice 7	148.74016	51.271593	0	959.48426	349.22371	0
Slice 8	166.22047	49.039629	0	989.07535	359.99399	0
Slice 9	187.65476	46.428656	0	979.8398	356.63252	0
Slice 10	213.04303	43.48479	0	927.13342	337.44897	0
Slice 11	230.36858	41.557766	0	883.07897	321.41446	0
Slice 12	237.5	40.794111	0	862.56812	313.94912	0
Slice 13	252.91667	39.216846	0	889.0707	323.59527	0
Slice 14	278.75	36.682043	0	947.15128	344.73487	0
Slice 15	304.58333	34.328293	0	986.22708	358.9573	0
Slice 16	330	32.187438	0	1,050.6106	382.39098	0
Slice	355	30.253447	0	1,141.0295	415.30079	0

17						
Slice 18	377.5	28.649506	0	1,196.4184	435.46068	0
Slice 19	397.5	27.34509	0	1,219.7744	443.96159	0
Slice 20	418.125	26.11445	0	1,206.0525	438.96721	0
Slice 21	439.375	24.96441	0	1,154.2403	420.10913	0
Slice 22	462.5	23.856605	0	1,114.7437	405.73354	0
Slice 23	487.5	22.814201	0	1,084.9571	394.8921	0
Slice 24	510.41667	21.999567	0	1,082.6459	394.05089	0
Slice 25	531.25	21.386999	0	1,110.8033	404.29934	0
Slice 26	552.08333	20.890741	0	1,125.832	409.76934	0
Slice 27	573.33333	20.505516	0	1,129.3411	411.04655	0
Slice 28	595	20.23603	0	1,120.7474	407.91869	0
Slice 29	616.66667	20.092228	0	1,097.8276	399.57655	0
Slice 30	631.25	20.052372	0	1,075.5387	391.46407	0
Slice 31	643.75	20.083737	0	954.45324	347.39257	0
Slice 32	661.25	20.186207	0	722.08877	262.81882	0
Slice 33	676.25	20.334274	0	515.75892	187.7209	0
Slice 34	684.9204	20.445791	0	398.80356	145.15263	0
Slice 35	702.63302	20.77579	0	184.82721	67.271603	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 89
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:04:25
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\
Last Solved Date: 29-06-2020
Last Solved Time: 12:04:28

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (32.06557, 69.42995) ft
Left-Zone Right Coordinate: (164.9719, 58.88889) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (586.522, 30.74296) ft
Right-Zone Right Coordinate: (672.99997, 25.55556) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8

1			
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.973
Volume: 2,968.2288 ft³
Weight: 3,11,664.02 lbs
Resisting Moment: 3.3509943e+008 lbs-ft
Activating Moment: 1.6983756e+008 lbs-ft
Resisting Force: 1,11,727.04 lbs
Activating Force: 56,626.691 lbs
F of S Rank: 1
Exit: (586.522, 30.742957) ft
Entry: (32.06557, 69.429946) ft
Radius: 2,986.1639 ft
Center: (516.24486, 3,016.0798) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	39.674177	68.199896	0	111.50311	40.583814	0
Slice 2	54.891392	65.780049	0	330.295	120.21755	0
Slice 3	73.125	62.995937	0	529.05197	192.55917	0
Slice 4	94.375	59.885358	0	704.18385	256.30196	0
Slice 5	113.75	57.178846	0	796.00576	289.7224	0
Slice 6	131.25	54.850993	0	807.03261	293.73585	0
Slice 7	148.74016	52.629501	0	821.7105	299.07816	0
Slice 8	166.22047	50.514016	0	840.08873	305.76729	0
Slice 9	183.09055	48.569695	0	826.98295	300.99718	0
Slice 10	199.35039	46.789313	0	782.96348	284.9754	0
Slice 11	215.61024	45.098986	0	729.76291	265.61198	0
Slice 12	231.87008	43.49856	0	667.30093	242.87767	0
Slice 13	249.6875	41.852587	0	645.42763	234.91644	0
Slice 14	269.0625	40.179713	0	662.41779	241.10036	0
Slice 15	288.4375	38.633855	0	666.38702	242.54504	0
Slice 16	307.8125	37.214817	0	657.20889	239.20448	0
Slice	325.83333	36.004521	0	667.03557	242.78109	0

17						
Slice 18	342.5	34.986379	0	697.67514	253.93298	0
Slice 19	359.16667	34.061734	0	718.53653	261.52591	0
Slice 20	377.5	33.157644	0	717.91382	261.29926	0
Slice 21	397.5	32.294546	0	693.45067	252.3954	0
Slice 22	418.125	31.54727	0	627.27008	228.30764	0
Slice 23	439.375	30.92436	0	518.27433	188.63643	0
Slice 24	458.33333	30.489117	0	427.94605	155.75962	0
Slice 25	475	30.212364	0	359.61526	130.88925	0
Slice 26	491.66667	30.028661	0	281.28484	102.37931	0
Slice 27	510.41667	29.939738	0	222.11841	80.84449	0
Slice 28	531.25	29.971751	0	179.39212	65.293392	0
Slice 29	552.08333	30.14912	0	121.29936	44.149355	0
Slice 30	574.511	30.508551	0	44.200899	16.087812	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 92
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:09:13
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\
Last Solved Date: 29-06-2020
Last Solved Time: 12:09:15

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (106.92331, 65.86688) ft
Left-Zone Right Coordinate: (300, 44.15771) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (483.19428, 33.15587) ft
Right-Zone Right Coordinate: (687.5, 23.96825) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8

1			
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 2.000
Volume: 1,117.1407 ft³
Weight: 1,17,299.78 lbs
Resisting Moment: 8,72,13,787 lbs-ft
Activating Moment: 4,36,01,136 lbs-ft
Resisting Force: 42,077.317 lbs
Activating Force: 21,036 lbs
F of S Rank: 1
Exit: (483.19428, 33.155872) ft
Entry: (106.92331, 65.86688) ft
Radius: 2,064.0739 ft
Center: (473.07445, 2,097.205) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	112.43609	64.888627	0	28.260513	10.285985	0
Slice 2	123.46165	62.962925	0	81.596205	29.69859	0
Slice 3	134.48722	61.098748	0	128.61974	46.813757	0
Slice 4	145.82677	59.246378	0	179.69294	65.402881	0
Slice 5	157.48031	57.409228	0	234.51352	85.355942	0
Slice 6	169.13386	55.64025	0	282.48076	102.81459	0
Slice 7	181.46457	53.844599	0	308.8017	112.39463	0
Slice 8	194.47244	52.030423	0	312.66616	113.80117	0
Slice 9	207.48031	50.300519	0	308.09635	112.1379	0
Slice 10	220.48819	48.654671	0	295.07695	107.39923	0
Slice 11	233.49606	47.092678	0	273.57352	99.572616	0
Slice 12	246.45833	45.61924	0	281.93561	102.61617	0
Slice 13	259.375	44.233593	0	320.38015	116.60884	0
Slice 14	272.29167	42.930096	0	350.59786	127.60719	0
Slice 15	285.20833	41.708593	0	372.54379	135.59485	0
Slice 16	298.125	40.568938	0	386.15918	140.55045	0
Slice	311.04167	39.510994	0	391.37612	142.44926	0

17						
Slice 18	323.75	38.54909	0	410.62346	149.45472	0
Slice 19	336.25	37.680528	0	444.23387	161.68791	0
Slice 20	348.75	36.88817	0	469.94511	171.04603	0
Slice 21	361.25	36.171927	0	487.68302	177.5021	0
Slice 22	374.16667	35.512996	0	489.68521	178.23084	0
Slice 23	387.5	34.916536	0	475.29945	172.99485	0
Slice 24	400.83333	34.406431	0	451.61988	164.37619	0
Slice 25	414.58333	33.972151	0	400.3121	145.70169	0
Slice 26	428.75	33.619198	0	320.76133	116.74758	0
Slice 27	442.91667	33.363548	0	230.78099	83.99741	0
Slice 28	455.53238	33.213023	0	155.75587	56.690501	0
Slice 29	466.59714	33.148641	0	97.781284	35.589477	0
Slice 30	477.6619	33.143576	0	33.617599	12.235806	0

SLOPE STABILITY ANALYSIS WITH WATERTABLE (STATIC)

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 96
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:21:12
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\With Water Table\
Last Solved Date: 29-06-2020
Last Solved Time: 12:21:13

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0.17917, 69.99681) ft
Left-Zone Right Coordinate: (102.5, 66.27451) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (612.4616, 30.34542) ft
Right-Zone Right Coordinate: (677.5, 25.02924) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	35
Coordinate 2	480	16.66667
Coordinate 3	900	8.33333

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35

Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 26
F of S: 4.493
Volume: 3,255.2947 ft^3
Weight: 3,41,805.94 lbs
Resisting Moment: 3.9095275e+008 lbs-ft
Activating Moment: 8,70,21,874 lbs-ft
Resisting Force: 1,23,595.95 lbs
Activating Force: 27,511.307 lbs
F of S Rank: 1
Exit: (612.4616, 30.345416) ft
Entry: (25.779131, 69.541705) ft
Radius: 3,149.7994 ft
Center: (528.17393, 3,179.0169) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	34.959348	68.086251	0	133.8733	48.725897	0
Slice 2	53.319783	65.230808	0	395.74588	144.03972	0
Slice 3	73.125	62.279552	0	612.36757	222.88357	0
Slice 4	94.375	59.250893	0	782.00326	284.62591	0
Slice 5	113.75	56.612151	0	868.24564	316.01557	0
Slice 6	131.25	54.339297	0	873.56134	317.95033	0
Slice 7	148.74016	52.167204	0	883.00414	321.38722	0
Slice 8	166.22047	50.095551	0	896.60968	326.33924	0
Slice 9	185.80052	47.899197	0	870.52656	316.84576	0
Slice 10	207.48031	45.60448	0	801.95577	291.88803	0

Slice 11	229.1601	43.461338	0	717.65952	261.2067	0
Slice 12	249.6875	41.567738	0	682.02333	248.23619	0
Slice 13	269.0625	39.90822	0	696.75739	253.59895	0
Slice 14	288.4375	38.369105	0	698.99535	254.4135	0
Slice 15	307.8125	36.950214	0	688.6883	250.66204	0
Slice 16	325.83333	35.734368	0	698.20077	254.1243	0
Slice 17	342.5	34.705842	0	729.21643	265.41308	0
Slice 18	359.16667	33.765968	0	750.94583	273.32193	0
Slice 19	377.5	32.839273	0	751.91119	273.67329	0
Slice 20	397.5	31.945138	0	729.97685	265.68984	0
Slice 21	418.125	31.158464	0	667.39693	242.91262	0
Slice 22	439.375	30.487355	0	563.21406	204.99315	0
Slice 23	457.5	30.01937	0	481.19088	175.13916	0
Slice 24	472.5	29.718459	0	425.25923	154.7817	0
Slice 25	490	29.464668	0	349.6528	127.26321	0
Slice 26	510.41667	29.284737	0	290.53856	105.74739	0
Slice 27	531.25	29.236184	0	256.50996	93.36199	0
Slice 28	552.08333	29.32543	0	207.91263	75.674008	0
Slice 29	570.82693	29.517273	0	154.5854	56.264485	0
Slice 30	587.4808	29.786858	0	99.189597	36.102061	0
Slice 31	604.13467	30.144544	0	34.588516	12.58919	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 99
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:25:52
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\With Water Table\
Last Solved Date: 29-06-2020
Last Solved Time: 12:25:55

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (63.53878, 68.821) ft
Left-Zone Right Coordinate: (172.5, 58.05149) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (723.00849, 20.58649) ft
Right-Zone Right Coordinate: (810, 15.55556) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	35
Coordinate 2	480	16.66667
Coordinate 3	900	8.33333

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35

Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 5.742
Volume: 4,730.2192 ft^3
Weight: 5,02,241.83 lbs
Resisting Moment: 6.5095824e+008 lbs-ft
Activating Moment: 1.1337376e+008 lbs-ft
Resisting Force: 1,82,069.45 lbs
Activating Force: 31,710.138 lbs
F of S Rank: 1
Exit: (723.00849, 20.586489) ft
Entry: (63.53878, 68.820996) ft
Radius: 3,564.4879 ft
Center: (652.16965, 3,584.3704) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	73.904085	67.116854	0	106.59779	38.798421	0
Slice 2	94.634695	63.771225	0	313.08505	113.95364	0
Slice 3	113.75	60.792695	0	436.27236	158.79015	0
Slice 4	131.25	58.163033	0	478.23616	174.06373	0
Slice 5	148.74016	55.623496	0	525.30219	191.19436	0
Slice 6	166.22047	53.173794	0	577.51804	210.19938	0
Slice 7	185.80052	50.540438	0	596.01688	216.9324	0
Slice 8	207.48031	47.746877	0	578.41415	210.52553	0
Slice 9	229.1601	45.088318	0	546.94129	199.07035	0
Slice 10	251.11123	42.534575	0	567.59581	206.58798	0

Slice 11	273.33369	40.088758	0	640.11846	232.98406	0
Slice 12	295.55615	37.78387	0	698.19979	254.12394	0
Slice 13	312.08369	36.147486	0	734.33581	267.27638	0
Slice 14	330	34.493911	0	807.61243	293.94688	0
Slice 15	355	32.313705	0	923.35907	336.07522	0
Slice 16	377.5	30.495065	0	1,000.5289	364.16273	0
Slice 17	397.5	29.005895	0	1,042.4576	379.42353	0
Slice 18	418.125	27.590447	0	1,047.2058	381.15172	0
Slice 19	439.375	26.255864	0	1,013.8608	369.01516	0
Slice 20	465	24.831693	0	992.92533	361.39527	0
Slice 21	490	23.587522	0	983.87931	358.10278	0
Slice 22	510.41667	22.717508	0	1,001.2319	364.4186	0
Slice 23	531.25	21.949353	0	1,045.7857	380.63486	0
Slice 24	552.08333	21.303176	0	1,076.787	391.91843	0
Slice 25	573.33333	20.77091	0	1,096.1652	398.97152	0
Slice 26	595	20.357472	0	1,103.3305	401.57945	0
Slice 27	616.66667	20.075789	0	1,095.7361	398.81531	0
Slice 28	631.25	19.945872	0	1,083.5766	394.38961	0
Slice 29	643.75	19.903195	0	971.12196	353.45949	0
Slice 30	661.25	19.904817	0	750.73112	273.24378	0
Slice 31	676.25	19.969331	0	554.36026	201.77063	0
Slice 32	687.60994	20.062363	0	411.95082	149.93784	0
Slice 33	707.86418	20.34983	0	176.6404	64.291846	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 102
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:32:27
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\With Water Table\
Last Solved Date: 29-06-2020
Last Solved Time: 12:32:28

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (34.18753, 69.39222) ft
Left-Zone Right Coordinate: (295, 44.55197) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (517.22354, 31.91602) ft
Right-Zone Right Coordinate: (815, 15.32408) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	35
Coordinate 2	480	16.66667
Coordinate 3	900	8.33333

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35

Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 4.154
Volume: 2,773.5066 ft^3
Weight: 2,91,218.2 lbs
Resisting Moment: 2.77261e+008 lbs-ft
Activating Moment: 6,67,48,992 lbs-ft
Resisting Force: 1,05,187.13 lbs
Activating Force: 25,323.334 lbs
F of S Rank: 1
Exit: (517.22354, 31.916024) ft
Entry: (34.18753, 69.392222) ft
Radius: 2,623.2665 ft
Center: (477.75402, 2,654.8856) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	41.265648	68.197832	0	110.4818	40.212088	0
Slice 2	55.421883	65.848835	0	327.2023	119.0919	0
Slice 3	69.583333	63.578496	0	500.79981	182.27623	0
Slice 4	83.75	61.386663	0	631.41385	229.81585	0
Slice 5	97.916667	59.274001	0	753.92447	274.40606	0
Slice 6	113.75	57.011422	0	825.05548	300.29564	0
Slice 7	131.25	54.619406	0	842.76929	306.74294	0
Slice 8	148.74016	52.348471	0	862.60485	313.96249	0
Slice 9	166.22047	50.198171	0	884.61003	321.97172	0
Slice 10	183.09055	48.233775	0	873.15226	317.80143	0

Slice 11	199.35039	46.447023	0	828.95494	301.71492	0
Slice 12	215.61024	44.762784	0	774.15781	281.7704	0
Slice 13	231.87008	43.180861	0	708.7005	257.94589	0
Slice 14	247.75	41.733316	0	681.23044	247.9476	0
Slice 15	263.25	40.415329	0	692.34198	251.99187	0
Slice 16	278.75	39.189855	0	693.81788	252.52905	0
Slice 17	294.25	38.056764	0	685.61067	249.54188	0
Slice 18	309.75	37.015936	0	667.67401	243.01346	0
Slice 19	325.83333	36.035153	0	668.58117	243.34364	0
Slice 20	342.5	35.121496	0	687.60992	250.26954	0
Slice 21	359.16667	34.314156	0	695.359	253.08998	0
Slice 22	377.5	33.554598	0	678.51224	246.95826	0
Slice 23	397.5	32.866066	0	634.49946	230.93892	0
Slice 24	414.58333	32.389365	0	567.89307	206.69617	0
Slice 25	428.75	32.086398	0	482.82191	175.7328	0
Slice 26	442.91667	31.859978	0	389.5884	141.79858	0
Slice 27	457.5	31.707992	0	303.07376	110.30983	0
Slice 28	472.5	31.635062	0	222.83562	81.105531	0
Slice 29	490	31.666724	0	116.99931	42.584267	0
Slice 30	508.61177	31.814715	0	26.770323	9.7436006	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 105
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:40:36
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\With Water Table\
Last Solved Date: 29-06-2020
Last Solved Time: 12:40:37

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (12.5127, 69.77755) ft
Left-Zone Right Coordinate: (147.5, 60.8324) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (438.98291, 35.86408) ft
Right-Zone Right Coordinate: (585, 30.76628) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	35
Coordinate 2	480	16.66667
Coordinate 3	900	8.33333

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35

Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 26
F of S: 3.862
Volume: 1,912.0951 ft^3
Weight: 2,00,769.99 lbs
Resisting Moment: 1.5649502e+008 lbs-ft
Activating Moment: 4,05,21,197 lbs-ft
Resisting Force: 72,430.986 lbs
Activating Force: 18,754.626 lbs
F of S Rank: 1
Exit: (438.98291, 35.864085) ft
Entry: (46.36065, 69.175811) ft
Radius: 2,148.9251 ft
Center: (423.5778, 2,184.734) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	54.430325	67.768656	0	130.40052	47.461909	0
Slice 2	69.583333	65.178487	0	334.93838	121.9076	0
Slice 3	83.75	62.861046	0	478.27018	174.07611	0
Slice 4	97.916667	60.640617	0	611.66443	222.62765	0
Slice 5	110.83333	58.696521	0	688.03228	250.42327	0
Slice 6	122.5	57.012994	0	708.98346	258.04888	0
Slice 7	134.16667	55.39472	0	723.36201	263.28224	0
Slice 8	145.82677	53.842387	0	740.6662	269.58045	0
Slice 9	157.48031	52.355779	0	760.92117	276.95266	0
Slice 10	169.13386	50.933851	0	774.64441	281.94751	0

Slice 11	181.46457	49.501562	0	764.68091	278.32109	0
Slice 12	194.47244	48.066694	0	730.14825	265.75223	0
Slice 13	207.48031	46.71193	0	687.31187	250.16106	0
Slice 14	220.48819	45.437116	0	636.11863	231.52825	0
Slice 15	233.49606	44.242111	0	576.51589	209.83462	0
Slice 16	246.45833	43.130412	0	547.67429	199.33714	0
Slice 17	259.375	42.10134	0	549.75154	200.0932	0
Slice 18	272.29167	41.150594	0	543.59112	197.85099	0
Slice 19	285.20833	40.27807	0	529.15283	192.59588	0
Slice 20	298.125	39.483671	0	506.40263	184.31548	0
Slice 21	311.04167	38.767312	0	475.31539	173.00065	0
Slice 22	323.75	38.137975	0	459.21499	167.14059	0
Slice 23	336.25	37.59312	0	458.40295	166.84503	0
Slice 24	348.75	37.121158	0	449.8011	163.71421	0
Slice 25	361.25	36.72204	0	433.40521	157.7466	0
Slice 26	374.16667	36.387356	0	400.36259	145.72006	0
Slice 27	387.5	36.122084	0	350.15992	127.44779	0
Slice 28	400.83333	35.939577	0	291.17673	105.97966	0
Slice 29	415.37073	35.838952	0	197.58718	71.915852	0
Slice 30	431.11218	35.836489	0	67.827144	24.687061	0

SLOPE STABILITY ANALYSIS WITH WATERTABLE (SEISMIC Kh=0.05g)

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 97
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:22:51
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\With Water Table\
Last Solved Date: 29-06-2020
Last Solved Time: 12:22:53

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0.17917, 69.99681) ft
Left-Zone Right Coordinate: (102.5, 66.27451) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (612.4616, 30.34542) ft
Right-Zone Right Coordinate: (677.5, 25.02924) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	35
Coordinate 2	480	16.66667
Coordinate 3	900	8.33333

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889

Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 26
F of S: 2.770
Volume: 3,255.2947 ft³
Weight: 3,41,805.94 lbs
Resisting Moment: 3.8937718e+008 lbs-ft
Activating Moment: 1.405678e+008 lbs-ft
Resisting Force: 1,23,099.22 lbs
Activating Force: 44,440.03 lbs
F of S Rank: 1
Exit: (612.4616, 30.345416) ft
Entry: (25.779131, 69.541705) ft
Radius: 3,149.7994 ft
Center: (528.17393, 3,179.0169) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	34.959348	68.086251	0	132.79311	48.332739	0
Slice 2	53.319783	65.230808	0	392.55425	142.87806	0
Slice 3	73.125	62.279552	0	607.43466	221.08813	0
Slice 4	94.375	59.250893	0	775.76108	282.35394	0
Slice 5	113.75	56.612151	0	861.41693	313.53012	0
Slice 6	131.25	54.339297	0	866.80988	315.49299	0
Slice 7	148.74016	52.167204	0	876.3641	318.97045	0
Slice 8	166.22047	50.095551	0	890.1181	323.9765	0
Slice 9	185.80052	47.899197	0	864.53602	314.66538	0
Slice	207.48031	45.60448	0	796.79875	290.01103	0

10						
Slice 11	229.1601	43.461338	0	713.42008	259.66367	0
Slice 12	249.6875	41.567738	0	678.41222	246.92186	0
Slice 13	269.0625	39.90822	0	693.53299	252.42537	0
Slice 14	288.4375	38.369105	0	696.2366	253.4094	0
Slice 15	307.8125	36.950214	0	686.44482	249.84548	0
Slice 16	325.83333	35.734368	0	696.37342	253.4592	0
Slice 17	342.5	34.705842	0	727.72191	264.86911	0
Slice 18	359.16667	33.765968	0	749.80992	272.90849	0
Slice 19	377.5	32.839273	0	751.19163	273.41139	0
Slice 20	397.5	31.945138	0	729.68839	265.58485	0
Slice 21	418.125	31.158464	0	667.49331	242.9477	0
Slice 22	439.375	30.487355	0	563.59273	205.13098	0
Slice 23	457.5	30.01937	0	481.70592	175.32662	0
Slice 24	472.5	29.718459	0	425.83061	154.98967	0
Slice 25	490	29.464668	0	350.22701	127.47221	0
Slice 26	510.41667	29.284737	0	291.07976	105.94437	0
Slice 27	531.25	29.236184	0	257.00032	93.540467	0
Slice 28	552.08333	29.32543	0	208.30431	75.81657	0
Slice 29	570.82693	29.517273	0	154.86174	56.365064	0
Slice 30	587.4808	29.786858	0	99.354152	36.161954	0
Slice 31	604.13467	30.144544	0	34.641607	12.608514	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 100
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:27:47
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\With Water Table\
Last Solved Date: 29-06-2020
Last Solved Time: 12:27:49

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (63.53878, 68.821) ft
Left-Zone Right Coordinate: (172.5, 58.05149) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (723.00849, 20.58649) ft
Right-Zone Right Coordinate: (810, 15.55556) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	35
Coordinate 2	480	16.66667
Coordinate 3	900	8.33333

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889

Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 3.204
Volume: 4,730.2192 ft³
Weight: 5,02,241.83 lbs
Resisting Moment: 6.4890622e+008 lbs-ft
Activating Moment: 2.0250949e+008 lbs-ft
Resisting Force: 1,81,497.56 lbs
Activating Force: 56,641.814 lbs
F of S Rank: 1
Exit: (723.00849, 20.586489) ft
Entry: (63.53878, 68.820996) ft
Radius: 3,564.4879 ft
Center: (652.16965, 3,584.3704) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	73.904085	67.116854	0	105.69922	38.471371	0
Slice 2	94.634695	63.771225	0	310.41268	112.98098	0
Slice 3	113.75	60.792695	0	432.49592	157.41564	0
Slice 4	131.25	58.163033	0	474.042	172.53718	0
Slice 5	148.74016	55.623496	0	520.67412	189.50988	0
Slice 6	166.22047	53.173794	0	572.44809	208.35407	0
Slice 7	185.80052	50.540438	0	590.81855	215.04037	0
Slice 8	207.48031	47.746877	0	573.42617	208.71006	0
Slice 9	229.1601	45.088318	0	542.3183	197.38772	0
Slice	251.11123	42.534575	0	563.01629	204.92117	0

10						
Slice 11	273.33369	40.088758	0	635.31151	231.23448	0
Slice 12	295.55615	37.78387	0	693.36399	252.36385	0
Slice 13	312.08369	36.147486	0	729.58452	265.54705	0
Slice 14	330	34.493911	0	802.82938	292.206	0
Slice 15	355	32.313705	0	918.6066	334.34546	0
Slice 16	377.5	30.495065	0	996.07231	362.54067	0
Slice 17	397.5	29.005895	0	1,038.457	377.96743	0
Slice 18	418.125	27.590447	0	1,043.8554	379.93229	0
Slice 19	439.375	26.255864	0	1,011.2899	368.07941	0
Slice 20	465	24.831693	0	991.17689	360.75888	0
Slice 21	490	23.587522	0	982.84279	357.72552	0
Slice 22	510.41667	22.717508	0	1,000.6835	364.21901	0
Slice 23	531.25	21.949353	0	1,045.6646	380.59078	0
Slice 24	552.08333	21.303176	0	1,077.0608	392.01807	0
Slice 25	573.33333	20.77091	0	1,096.7802	399.19536	0
Slice 26	595	20.357472	0	1,104.2086	401.89908	0
Slice 27	616.66667	20.075789	0	1,096.7761	399.19385	0
Slice 28	631.25	19.945872	0	1,084.6677	394.78676	0
Slice 29	643.75	19.903195	0	972.15723	353.8363	0
Slice 30	661.25	19.904817	0	751.5807	273.553	0
Slice 31	676.25	19.969331	0	554.99991	202.00345	0
Slice 32	687.60994	20.062363	0	412.42428	150.11016	0
Slice 33	707.86418	20.34983	0	176.8482	64.367481	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 103
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:33:49
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\With Water Table\
Last Solved Date: 29-06-2020
Last Solved Time: 12:33:50

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (34.18753, 69.39222) ft
Left-Zone Right Coordinate: (295, 44.55197) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (517.22354, 31.91602) ft
Right-Zone Right Coordinate: (815, 15.32408) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	35
Coordinate 2	480	16.66667
Coordinate 3	900	8.33333

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889

Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 2.636
Volume: 2,773.5066 ft³
Weight: 2,91,218.2 lbs
Resisting Moment: 2.7605273e+008 lbs-ft
Activating Moment: 1.0471379e+008 lbs-ft
Resisting Force: 1,04,730.15 lbs
Activating Force: 39,727.077 lbs
F of S Rank: 1
Exit: (517.22354, 31.916024) ft
Entry: (34.18753, 69.392222) ft
Radius: 2,623.2665 ft
Center: (477.75402, 2,654.8856) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	41.265648	68.197832	0	109.53161	39.866248	0
Slice 2	55.421883	65.848835	0	324.36605	118.05959	0
Slice 3	69.583333	63.578496	0	496.42513	180.68397	0
Slice 4	83.75	61.386663	0	625.88287	227.80274	0
Slice 5	97.916667	59.274001	0	747.35516	272.01503	0
Slice 6	113.75	57.011422	0	817.94555	297.70783	0
Slice 7	131.25	54.619406	0	835.65258	304.15267	0
Slice 8	148.74016	52.348471	0	855.57664	311.40443	0
Slice 9	166.22047	50.198171	0	877.76815	319.48148	0
Slice	183.09055	48.233775	0	866.80792	315.49228	0

10						
Slice 11	199.35039	46.447023	0	823.35424	299.67644	0
Slice 12	215.61024	44.762784	0	769.37689	280.03029	0
Slice 13	231.87008	43.180861	0	704.78117	256.51937	0
Slice 14	247.75	41.733316	0	677.95199	246.75434	0
Slice 15	263.25	40.415329	0	689.5273	250.96741	0
Slice 16	278.75	39.189855	0	691.51355	251.69035	0
Slice 17	294.25	38.056764	0	683.83616	248.89601	0
Slice 18	309.75	37.015936	0	666.42225	242.55786	0
Slice 19	325.83333	36.035153	0	667.78345	243.0533	0
Slice 20	342.5	35.121496	0	687.21123	250.12443	0
Slice 21	359.16667	34.314156	0	695.32413	253.07729	0
Slice 22	377.5	33.554598	0	678.80993	247.06661	0
Slice 23	397.5	32.866066	0	635.03933	231.13541	0
Slice 24	414.58333	32.389365	0	568.52268	206.92533	0
Slice 25	428.75	32.086398	0	483.43621	175.95639	0
Slice 26	442.91667	31.859978	0	390.12547	141.99406	0
Slice 27	457.5	31.707992	0	303.49899	110.4646	0
Slice 28	472.5	31.635062	0	223.13262	81.213634	0
Slice 29	490	31.666724	0	117.14194	42.636178	0
Slice 30	508.61177	31.814715	0	26.798082	9.7537042	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 106
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:42:48
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\With Water Table\
Last Solved Date: 29-06-2020
Last Solved Time: 12:42:55

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (12.5127, 69.77755) ft
Left-Zone Right Coordinate: (147.5, 60.8324) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (438.98291, 35.86408) ft
Right-Zone Right Coordinate: (585, 30.76628) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	35
Coordinate 2	480	16.66667
Coordinate 3	900	8.33333

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889

Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 26
F of S: 2.514
Volume: 1,912.0951 ft³
Weight: 2,00,769.99 lbs
Resisting Moment: 1.5576157e+008 lbs-ft
Activating Moment: 6,19,47,934 lbs-ft
Resisting Force: 72,092.574 lbs
Activating Force: 28,672.126 lbs
F of S Rank: 1
Exit: (438.98291, 35.864085) ft
Entry: (46.36065, 69.175811) ft
Radius: 2,148.9251 ft
Center: (423.5778, 2,184.734) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	54.430325	67.768656	0	129.22892	47.035481	0
Slice 2	69.583333	65.178487	0	331.90425	120.80327	0
Slice 3	83.75	62.861046	0	473.91379	172.49051	0
Slice 4	97.916667	60.640617	0	606.12343	220.61089	0
Slice 5	110.83333	58.696521	0	681.86994	248.18036	0
Slice 6	122.5	57.012994	0	702.72788	255.77203	0
Slice 7	134.16667	55.39472	0	717.13069	261.01423	0
Slice 8	145.82677	53.842387	0	734.50183	267.3368	0
Slice 9	157.48031	52.355779	0	754.86882	274.74978	0
Slice	169.13386	50.933851	0	768.81548	279.82595	0

10						
Slice 11	181.46457	49.501562	0	759.30856	276.36572	0
Slice 12	194.47244	48.066694	0	725.43842	264.03799	0
Slice 13	207.48031	46.71193	0	683.31433	248.70608	0
Slice 14	220.48819	45.437116	0	632.85537	230.34052	0
Slice 15	233.49606	44.242111	0	573.98116	208.91206	0
Slice 16	246.45833	43.130412	0	545.68993	198.61489	0
Slice 17	259.375	42.10134	0	548.17867	199.52072	0
Slice 18	272.29167	41.150594	0	542.43479	197.43012	0
Slice 19	285.20833	40.27807	0	528.3961	192.32045	0
Slice 20	298.125	39.483671	0	506.00926	184.17231	0
Slice 21	311.04167	38.767312	0	475.23353	172.97086	0
Slice 22	323.75	38.137975	0	459.35872	167.1929	0
Slice 23	336.25	37.59312	0	458.70318	166.9543	0
Slice 24	348.75	37.121158	0	450.20966	163.86292	0
Slice 25	361.25	36.72204	0	433.86867	157.91528	0
Slice 26	374.16667	36.387356	0	400.82513	145.88842	0
Slice 27	387.5	36.122084	0	350.56524	127.59531	0
Slice 28	400.83333	35.939577	0	291.48403	106.09151	0
Slice 29	415.37073	35.838952	0	197.76079	71.979042	0
Slice 30	431.11218	35.836489	0	67.872502	24.70357	0

SLOPE STABILITY ANALYSIS WITH WATERTABLE (SEISMIC Kh=0.1g)

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 98
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:24:27
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\With Water Table\
Last Solved Date: 29-06-2020
Last Solved Time: 12:24:29

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0.17917, 69.99681) ft
Left-Zone Right Coordinate: (102.5, 66.27451) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (612.4616, 30.34542) ft
Right-Zone Right Coordinate: (677.5, 25.02924) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	35
Coordinate 2	480	16.66667
Coordinate 3	900	8.33333

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889

Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 26
F of S: 1.998
Volume: 3,255.2947 ft³
Weight: 3,41,805.94 lbs
Resisting Moment: 3.878076e+008 lbs-ft
Activating Moment: 1.9411373e+008 lbs-ft
Resisting Force: 1,22,604.41 lbs
Activating Force: 61,369.021 lbs
F of S Rank: 1
Exit: (612.4616, 30.345416) ft
Entry: (25.779131, 69.541705) ft
Radius: 3,149.7994 ft
Center: (528.17393, 3,179.0169) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	34.959348	68.086251	0	131.72149	47.9427	0
Slice 2	53.319783	65.230808	0	389.38633	141.72504	0
Slice 3	73.125	62.279552	0	602.53408	219.30447	0
Slice 4	94.375	59.250893	0	769.55173	280.09392	0
Slice 5	113.75	56.612151	0	854.61424	311.05415	0
Slice 6	131.25	54.339297	0	860.07384	313.04128	0
Slice 7	148.74016	52.167204	0	869.72865	316.55534	0
Slice 8	166.22047	50.095551	0	883.62074	321.61165	0
Slice 9	185.80052	47.899197	0	858.5294	312.47915	0
Slice	207.48031	45.60448	0	791.61786	288.12534	0

10						
Slice 11	229.1601	43.461338	0	709.15376	258.11086	0
Slice 12	249.6875	41.567738	0	674.77505	245.59803	0
Slice 13	269.0625	39.90822	0	690.28582	251.24349	0
Slice 14	288.4375	38.369105	0	693.46106	252.39918	0
Slice 15	307.8125	36.950214	0	684.19265	249.02576	0
Slice 16	325.83333	35.734368	0	694.54592	252.79404	0
Slice 17	342.5	34.705842	0	726.23563	264.32815	0
Slice 18	359.16667	33.765968	0	748.69067	272.50112	0
Slice 19	377.5	32.839273	0	750.49702	273.15858	0
Slice 20	397.5	31.945138	0	729.43178	265.49146	0
Slice 21	418.125	31.158464	0	667.62511	242.99567	0
Slice 22	439.375	30.487355	0	564.00632	205.28151	0
Slice 23	457.5	30.01937	0	482.25326	175.52583	0
Slice 24	472.5	29.718459	0	426.43114	155.20824	0
Slice 25	490	29.464668	0	350.8255	127.69004	0
Slice 26	510.41667	29.284737	0	291.6397	106.14817	0
Slice 27	531.25	29.236184	0	257.50423	93.723876	0
Slice 28	552.08333	29.32543	0	208.70451	75.962231	0
Slice 29	570.82693	29.517273	0	155.14281	56.467366	0
Slice 30	587.4808	29.786858	0	99.520991	36.222678	0
Slice 31	604.13467	30.144544	0	34.695323	12.628065	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 101
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:29:09
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\With Water Table\
Last Solved Date: 29-06-2020
Last Solved Time: 12:29:10

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (63.53878, 68.821) ft
Left-Zone Right Coordinate: (172.5, 58.05149) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (723.00849, 20.58649) ft
Right-Zone Right Coordinate: (810, 15.55556) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	35
Coordinate 2	480	16.66667
Coordinate 3	900	8.33333

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889

Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 2.218
Volume: 4,730.2192 ft³
Weight: 5,02,241.83 lbs
Resisting Moment: 6.4686483e+008 lbs-ft
Activating Moment: 2.9164521e+008 lbs-ft
Resisting Force: 1,80,928.66 lbs
Activating Force: 81,573.964 lbs
F of S Rank: 1
Exit: (723.00849, 20.586489) ft
Entry: (63.53878, 68.820996) ft
Radius: 3,564.4879 ft
Center: (652.16965, 3,584.3704) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	73.904085	67.116854	0	104.80992	38.14769	0
Slice 2	94.634695	63.771225	0	307.76672	112.01792	0
Slice 3	113.75	60.792695	0	428.75425	156.05379	0
Slice 4	131.25	58.163033	0	469.88268	171.02331	0
Slice 5	148.74016	55.623496	0	516.07933	187.83752	0
Slice 6	166.22047	53.173794	0	567.4082	206.5197	0
Slice 7	185.80052	50.540438	0	585.64268	213.15651	0
Slice 8	207.48031	47.746877	0	568.44987	206.89883	0
Slice 9	229.1601	45.088318	0	537.6965	195.70552	0
Slice	251.11123	42.534575	0	558.42976	203.25181	0

10						
Slice 11	273.33369	40.088758	0	630.49071	229.47985	0
Slice 12	295.55615	37.78387	0	688.50858	250.59663	0
Slice 13	312.08369	36.147486	0	724.81067	263.80951	0
Slice 14	330	34.493911	0	798.02202	290.45626	0
Slice 15	355	32.313705	0	913.82999	332.60692	0
Slice 16	377.5	30.495065	0	991.59543	360.91122	0
Slice 17	397.5	29.005895	0	1,034.4426	376.5063	0
Slice 18	418.125	27.590447	0	1,040.5005	378.7112	0
Slice 19	439.375	26.255864	0	1,008.7255	367.14606	0
Slice 20	465	24.831693	0	989.44808	360.12965	0
Slice 21	490	23.587522	0	981.83719	357.35951	0
Slice 22	510.41667	22.717508	0	1,000.1731	364.03323	0
Slice 23	531.25	21.949353	0	1,045.5862	380.56227	0
Slice 24	552.08333	21.303176	0	1,077.3793	392.13399	0
Slice 25	573.33333	20.77091	0	1,097.4386	399.43499	0
Slice 26	595	20.357472	0	1,105.1258	402.2329	0
Slice 27	616.66667	20.075789	0	1,097.8483	399.58409	0
Slice 28	631.25	19.945872	0	1,085.7856	395.19364	0
Slice 29	643.75	19.903195	0	973.21359	354.22078	0
Slice 30	661.25	19.904817	0	752.44382	273.86715	0
Slice 31	676.25	19.969331	0	555.64782	202.23927	0
Slice 32	687.60994	20.062363	0	412.90299	150.2844	0
Slice 33	707.86418	20.34983	0	177.05797	64.443831	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 104
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:35:14
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\With Water Table\
Last Solved Date: 29-06-2020
Last Solved Time: 12:35:16

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (34.18753, 69.39222) ft
Left-Zone Right Coordinate: (295, 44.55197) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (517.22354, 31.91602) ft
Right-Zone Right Coordinate: (815, 15.32408) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	35
Coordinate 2	480	16.66667
Coordinate 3	900	8.33333

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889

Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.926
Volume: 2,773.5066 ft³
Weight: 2,91,218.2 lbs
Resisting Moment: 2.748491e+008 lbs-ft
Activating Moment: 1.4267858e+008 lbs-ft
Resisting Force: 1,04,274.96 lbs
Activating Force: 54,131.027 lbs
F of S Rank: 1
Exit: (517.22354, 31.916024) ft
Entry: (34.18753, 69.392222) ft
Radius: 2,623.2665 ft
Center: (477.75402, 2,654.8856) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	41.265648	68.197832	0	108.58931	39.523278	0
Slice 2	55.421883	65.848835	0	321.55206	117.03538	0
Slice 3	69.583333	63.578496	0	492.08137	179.10297	0
Slice 4	83.75	61.386663	0	620.38498	225.80167	0
Slice 5	97.916667	59.274001	0	740.81642	269.63512	0
Slice 6	113.75	57.011422	0	810.85624	295.12754	0
Slice 7	131.25	54.619406	0	828.54109	301.56429	0
Slice 8	148.74016	52.348471	0	848.53822	308.84265	0
Slice 9	166.22047	50.198171	0	870.90234	316.98253	0
Slice	183.09055	48.233775	0	860.42972	313.17081	0

10						
Slice 11	199.35039	46.447023	0	817.71491	297.62389	0
Slice 12	215.61024	44.762784	0	764.55765	278.27623	0
Slice 13	231.87008	43.180861	0	700.82856	255.08074	0
Slice 14	247.75	41.733316	0	674.64823	245.55188	0
Slice 15	263.25	40.415329	0	686.69727	249.93737	0
Slice 16	278.75	39.189855	0	689.20583	250.85041	0
Slice 17	294.25	38.056764	0	682.07112	248.25358	0
Slice 18	309.75	37.015936	0	665.19252	242.11028	0
Slice 19	325.83333	36.035153	0	667.01943	242.77522	0
Slice 20	342.5	35.121496	0	686.85611	249.99518	0
Slice 21	359.16667	34.314156	0	695.33915	253.08275	0
Slice 22	377.5	33.554598	0	679.15913	247.19371	0
Slice 23	397.5	32.866066	0	635.62637	231.34908	0
Slice 24	414.58333	32.389365	0	569.19144	207.16874	0
Slice 25	428.75	32.086398	0	484.08096	176.19106	0
Slice 26	442.91667	31.859978	0	390.68422	142.19743	0
Slice 27	457.5	31.707992	0	303.9381	110.62442	0
Slice 28	472.5	31.635062	0	223.43727	81.324514	0
Slice 29	490	31.666724	0	117.28734	42.689099	0
Slice 30	508.61177	31.814715	0	26.826236	9.7639514	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 107
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 29-06-2020
Time: 12:44:55
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\With Water Table\
Last Solved Date: 29-06-2020
Last Solved Time: 12:44:57

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (12.5127, 69.77755) ft
Left-Zone Right Coordinate: (147.5, 60.8324) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (438.98291, 35.86408) ft
Right-Zone Right Coordinate: (585, 30.76628) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	35
Coordinate 2	480	16.66667
Coordinate 3	900	8.33333

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556
Point 30	25	58.88889

Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 26
F of S: 1.859
Volume: 1,912.0951 ft³
Weight: 2,00,769.99 lbs
Resisting Moment: 1.5503083e+008 lbs-ft
Activating Moment: 8,33,74,671 lbs-ft
Resisting Force: 71,755.441 lbs
Activating Force: 38,589.77 lbs
F of S Rank: 1
Exit: (438.98291, 35.864085) ft
Entry: (46.36065, 69.175811) ft
Radius: 2,148.9251 ft
Center: (423.5778, 2,184.734) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	54.430325	67.768656	0	128.06694	46.612554	0
Slice 2	69.583333	65.178487	0	328.89253	119.70709	0
Slice 3	83.75	62.861046	0	469.58409	170.91463	0
Slice 4	97.916667	60.640617	0	600.60736	218.6032	0
Slice 5	110.83333	58.696521	0	675.72457	245.94363	0
Slice 6	122.5	57.012994	0	696.47844	253.49742	0
Slice 7	134.16667	55.39472	0	710.89422	258.74434	0
Slice 8	145.82677	53.842387	0	728.32166	265.0874	0
Slice 9	157.48031	52.355779	0	748.79142	272.53779	0
Slice	169.13386	50.933851	0	762.95443	277.6927	0

10						
Slice 11	181.46457	49.501562	0	753.90006	274.39718	0
Slice 12	194.47244	48.066694	0	720.6926	262.31065	0
Slice 13	207.48031	46.71193	0	679.28521	247.2396	0
Slice 14	220.48819	45.437116	0	629.5685	229.14419	0
Slice 15	233.49606	44.242111	0	571.43332	207.98472	0
Slice 16	246.45833	43.130412	0	543.70388	197.89203	0
Slice 17	259.375	42.10134	0	546.61582	198.95189	0
Slice 18	272.29167	41.150594	0	541.29983	197.01703	0
Slice 19	285.20833	40.27807	0	527.6707	192.05643	0
Slice 20	298.125	39.483671	0	505.65477	184.04328	0
Slice 21	311.04167	38.767312	0	475.19509	172.95687	0
Slice 22	323.75	38.137975	0	459.54763	167.26166	0
Slice 23	336.25	37.59312	0	459.04777	167.07972	0
Slice 24	348.75	37.121158	0	450.65887	164.02642	0
Slice 25	361.25	36.72204	0	434.36675	158.09657	0
Slice 26	374.16667	36.387356	0	401.31434	146.06648	0
Slice 27	387.5	36.122084	0	350.98855	127.74938	0
Slice 28	400.83333	35.939577	0	291.80161	106.2071	0
Slice 29	415.37073	35.838952	0	197.93847	72.043713	0
Slice 30	431.11218	35.836489	0	67.918539	24.720326	0

SLOPE STABILITY ANALYSIS WITH WATERTABLE (STATIC) ADDITIONAL TRAILS

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 110
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 11:23:56
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 11:25:15

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (63.93757, 68.79493) ft
Left-Zone Right Coordinate: (172.5, 58.05149) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (615.86238, 30.2933) ft
Right-Zone Right Coordinate: (775, 17.37037) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556

Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 2.724
Volume: 2,042.6351 ft³
Weight: 2,14,476.68 lbs
Resisting Moment: 1.3523224e+008 lbs-ft
Activating Moment: 4,96,40,335 lbs-ft
Resisting Force: 45,312.572 lbs
Activating Force: 16,633.194 lbs
F of S Rank: 1
Exit: (615.86238, 30.293297) ft
Entry: (63.93757, 68.794931) ft
Radius: 2,972.4794 ft
Center: (545.85626, 3,001.9482) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	74.203178	67.145142	0	101.41441	21.556299	0
Slice 2	94.734393	63.919113	0	296.48278	63.019361	0
Slice 3	113.75	61.057232	0	408.1283	86.750349	0
Slice 4	131.25	58.539073	0	438.60743	93.228887	0
Slice 5	148.74016	56.128323	0	472.4428	100.42082	0
Slice 6	166.22047	53.824605	0	509.69408	108.33882	0
Slice 7	183.09055	51.699453	0	514.14526	109.28495	0
Slice 8	199.35039	49.745565	0	486.51322	103.41158	0
Slice 9	215.61024	47.882465	0	449.52116	95.548672	0

Slice 10	231.87008	46.109984	0	403.15163	85.692525	0
Slice 11	250.68978	44.179605	0	401.16465	85.270178	0
Slice 12	272.06934	42.124017	0	440.28087	93.584587	0
Slice 13	291.44434	40.389099	0	462.53344	98.314519	0
Slice 14	308.81478	38.948176	0	470.61673	100.03267	0
Slice 15	325.83333	37.634821	0	498.24106	105.90441	0
Slice 16	342.5	36.444839	0	545.88477	116.03139	0
Slice 17	359.16667	35.348969	0	583.75762	124.08151	0
Slice 18	376.04636	34.335516	0	602.10783	127.98197	0
Slice 19	393.13908	33.406816	0	600.61431	127.66451	0
Slice 20	404.59272	32.828825	0	594.92601	126.45543	0
Slice 21	418.125	32.233509	0	553.44111	117.63754	0
Slice 22	439.375	31.395654	0	466.93593	99.250295	0
Slice 23	458.125	30.774884	0	397.46548	84.483896	0
Slice 24	474.375	30.339528	0	348.47397	74.07043	0
Slice 25	491.25	29.983313	0	287.40123	61.089016	0
Slice 26	510	29.701905	0	247.15761	52.534972	0
Slice 27	530	29.527924	0	227.97961	48.458561	0
Slice 28	550	29.48852	0	194.56711	41.356516	0
Slice 29	561.25	29.508934	0	171.27105	36.404785	0
Slice 30	571.39373	29.591819	0	145.77599	30.985643	0
Slice 31	589.18119	29.797875	0	95.259804	20.248096	0
Slice 32	606.96865	30.110407	0	33.600333	7.1419712	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 114
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 11:30:23
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 11:30:25

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (12.50934, 69.77761) ft
Left-Zone Right Coordinate: (254.09093, 47.77778) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (589.08127, 30.70373) ft
Right-Zone Right Coordinate: (842.5, 14.05093) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556

Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 2.579
Volume: 3,610.7035 ft³
Weight: 3,79,123.86 lbs
Resisting Moment: 2.4909419e+008 lbs-ft
Activating Moment: 9,65,76,317 lbs-ft
Resisting Force: 80,041.66 lbs
Activating Force: 31,033.157 lbs
F of S Rank: 1
Exit: (589.08127, 30.703735) ft
Entry: (12.50934, 69.777612) ft
Radius: 3,098.6679 ft
Center: (509.39642, 3,128.3469) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	20.841117	68.447329	0	122.4369	26.024767	0
Slice 2	37.50467	65.833232	0	362.38853	77.028061	0
Slice 3	54.168223	63.311957	0	592.61415	125.96403	0
Slice 4	73.125	60.563509	0	789.75022	167.86659	0
Slice 5	94.375	57.61651	0	951.00079	202.14146	0
Slice 6	113.75	55.054051	0	1,029.4985	218.82666	0
Slice 7	131.25	52.851749	0	1,027.6918	218.44264	0
Slice 8	148.6073	50.76685	0	1,029.842	218.89967	0
Slice 9	166.08761	48.768648	0	1,036.0714	220.22378	0

Slice 10	185.80052	46.641243	0	1,001.5733	212.89098	0
Slice 11	207.48031	44.441763	0	923.3792	196.27031	0
Slice 12	229.1601	42.396156	0	829.17221	176.24599	0
Slice 13	247.4981	40.775767	0	783.1478	166.4632	0
Slice 14	262.49429	39.540396	0	789.59495	167.83359	0
Slice 15	281.86929	38.066583	0	785.19362	166.89806	0
Slice 16	305.6231	36.409382	0	764.11759	162.41821	0
Slice 17	329.43801	34.932148	0	766.58908	162.94354	0
Slice 18	353.31404	33.635561	0	792.56648	168.46521	0
Slice 19	366.37603	32.981533	0	800.93405	170.24379	0
Slice 20	377.5	32.503556	0	788.04279	167.50367	0
Slice 21	397.5	31.716164	0	754.79198	160.43599	0
Slice 22	414.9679	31.127132	0	697.22937	148.20068	0
Slice 23	429.90371	30.707806	0	618.40627	131.44631	0
Slice 24	443.68581	30.382232	0	539.0809	114.58518	0
Slice 25	458.125	30.113845	0	467.76468	99.426452	0
Slice 26	474.375	29.887552	0	396.53312	84.285716	0
Slice 27	491.25	29.744473	0	312.79462	66.486549	0
Slice 28	510	29.695178	0	247.92797	52.698716	0
Slice 29	530	29.76362	0	203.09081	43.168283	0
Slice 30	550	29.961161	0	144.65435	30.747232	0
Slice 31	561.25	30.113129	0	107.49558	22.848892	0
Slice 32	575.79063	30.418892	0	51.457781	10.937689	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 122
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 11:52:24
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 11:52:26

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (26.11806, 69.53568) ft
Left-Zone Right Coordinate: (117.5, 64.52381) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (599.7058, 30.54091) ft
Right-Zone Right Coordinate: (720, 20.87301) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556

Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 2.589
Volume: 3,200.073 ft³
Weight: 3,36,007.66 lbs
Resisting Moment: 2.1968382e+008 lbs-ft
Activating Moment: 8,48,50,372 lbs-ft
Resisting Force: 70,942.476 lbs
Activating Force: 27,400.903 lbs
F of S Rank: 1
Exit: (599.7058, 30.540907) ft
Entry: (26.11806, 69.535679) ft
Radius: 3,083.3321 ft
Center: (521.13552, 3,112.8718) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	35.213545	68.084118	0	133.58955	28.395335	0
Slice 2	53.404515	65.236642	0	394.87458	83.933184	0
Slice 3	73.125	62.280337	0	612.10991	130.10798	0
Slice 4	94.375	59.235052	0	783.42088	166.52125	0
Slice 5	113.75	56.583832	0	870.9436	185.12478	0
Slice 6	131.25	54.302118	0	877.19589	186.45374	0
Slice 7	148.74016	52.123329	0	887.36102	188.61441	0
Slice 8	166.22047	50.047136	0	901.4755	191.61453	0
Slice 9	180.80571	48.38521	0	890.64073	189.31153	0

Slice 10	195.54233	46.791868	0	847.54433	180.15111	0
Slice 11	213.3254	44.955553	0	786.6037	167.19778	0
Slice 12	231.10847	43.223356	0	714.83771	151.94344	0
Slice 13	249.6875	41.527075	0	686.34462	145.88705	0
Slice 14	269.0625	39.876235	0	700.23037	148.83856	0
Slice 15	288.4375	38.348378	0	701.34342	149.07515	0
Slice 16	307.8125	36.94332	0	689.63007	146.5854	0
Slice 17	325.83333	35.74256	0	697.59348	148.27807	0
Slice 18	342.5	34.730039	0	726.95465	154.51898	0
Slice 19	359.16667	33.808066	0	746.81594	158.74063	0
Slice 20	377.5	32.903351	0	745.4632	158.45309	0
Slice 21	397.5	32.035692	0	720.71125	153.1919	0
Slice 22	420.45956	31.211006	0	642.86937	136.6461	0
Slice 23	441.70956	30.573994	0	534.98095	113.71371	0
Slice 24	458.125	30.194286	0	459.17509	97.600678	0
Slice 25	474.375	29.904974	0	394.65319	83.886125	0
Slice 26	491.25	29.696925	0	317.82104	67.554947	0
Slice 27	510	29.575995	0	260.54603	55.380769	0
Slice 28	530	29.568629	0	223.71934	47.553015	0
Slice 29	550	29.690998	0	173.19844	36.814464	0
Slice 30	561.25	29.800881	0	140.45789	29.855245	0
Slice 31	571.80145	29.97001	0	105.2213	22.365478	0
Slice 32	590.40435	30.331891	0	37.019489	7.8687352	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 126
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 11:59:44
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 11:59:46

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (64.7782, 68.73999) ft
Left-Zone Right Coordinate: (302.5, 43.96058) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (668.1743, 26.11996) ft
Right-Zone Right Coordinate: (752.5, 18.53703) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556

Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 3.207
Volume: 3,141.7559 ft³
Weight: 3,29,884.37 lbs
Resisting Moment: 2.2783092e+008 lbs-ft
Activating Moment: 7,10,40,461 lbs-ft
Resisting Force: 69,812.513 lbs
Activating Force: 21,768.484 lbs
F of S Rank: 1
Exit: (668.1743, 26.119962) ft
Entry: (64.7782, 68.739988) ft
Radius: 3,252.7096 ft
Center: (594.66289, 3,277.9988) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	74.83365	67.112052	0	100.75767	21.416704	0
Slice 2	94.94455	63.920716	0	295.4001	62.789229	0
Slice 3	113.75	61.049247	0	409.59271	87.061618	0
Slice 4	131.25	58.481716	0	445.15385	94.620371	0
Slice 5	148.74016	56.012616	0	484.9731	103.08421	0
Slice 6	166.22047	53.641614	0	529.10344	112.46441	0
Slice 7	185.80052	51.106784	0	537.48381	114.24571	0
Slice 8	207.48031	48.433757	0	507.48399	107.86905	0
Slice 9	229.1601	45.908359	0	462.279	98.260434	0

Slice 10	247.92316	43.83307	0	459.37525	97.643225	0
Slice 11	266.12194	41.940383	0	507.3726	107.84538	0
Slice 12	286.67316	39.919787	0	549.58201	116.81726	0
Slice 13	307.22439	38.030807	0	578.23328	122.90728	0
Slice 14	330	36.098713	0	638.16174	135.64547	0
Slice 15	355	34.154706	0	726.22153	154.36315	0
Slice 16	377.5	32.562044	0	777.66126	165.297	0
Slice 17	397.5	31.285641	0	795.97691	169.19012	0
Slice 18	418.125	30.100856	0	775.63338	164.86596	0
Slice 19	439.375	29.015508	0	715.6697	152.12029	0
Slice 20	462.32605	28.005771	0	663.21078	140.9698	0
Slice 21	478.57605	27.363733	0	636.35291	135.26099	0
Slice 22	487.40164	27.061877	0	616.80001	131.10489	0
Slice 23	496.15164	26.783548	0	595.18247	126.50994	0
Slice 24	510	26.406569	0	593.91603	126.24075	0
Slice 25	530	25.947359	0	605.09242	128.61636	0
Slice 26	550	25.611198	0	603.19342	128.21272	0
Slice 27	561.25	25.461033	0	597.97186	127.10284	0
Slice 28	574.36061	25.374161	0	585.60328	124.47382	0
Slice 29	598.41592	25.314199	0	552.89914	117.52234	0
Slice 30	622.8053	25.433783	0	500.59625	106.40502	0
Slice 31	643.29358	25.663306	0	354.35448	75.32037	0
Slice 32	659.88073	25.953639	0	119.55081	25.411309	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 131
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 12:07:51
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 12:07:52

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (123.479, 63.76457) ft
Left-Zone Right Coordinate: (227.80513, 50.55556) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (717.08249, 21.15087) ft
Right-Zone Right Coordinate: (865, 13.00926) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556

Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 21
F of S: 3.699
Volume: 5,909.8163 ft³
Weight: 6,20,530.71 lbs
Resisting Moment: 5.2552436e+008 lbs-ft
Activating Moment: 1.420671e+008 lbs-ft
Resisting Force: 1,31,463.81 lbs
Activating Force: 35,539.208 lbs
F of S Rank: 1
Exit: (865, 13.009262) ft
Entry: (123.479, 63.764573) ft
Radius: 3,988.0222 ft
Center: (765.38773, 3,999.7873) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	131.7395	62.435189	0	29.15993	6.1981345	0
Slice 2	157.48031	58.409689	0	136.3781	28.98806	0
Slice 3	185.80052	54.121277	0	225.85295	48.006526	0
Slice 4	207.48031	50.997461	0	242.42141	51.528261	0
Slice 5	229.1601	47.995049	0	246.40629	52.375274	0
Slice 6	250.41474	45.167945	0	300.82542	63.942416	0
Slice 7	271.24423	42.511246	0	406.19408	86.339216	0
Slice 8	299.57949	39.103164	0	528.23649	112.28013	0
Slice 9	327.8456	35.853613	0	671.58137	142.74903	0

Slice 10	352.8456	33.187542	0	833.70807	177.21012	0
Slice 11	377.5	30.686157	0	969.0041	205.96818	0
Slice 12	397.5	28.782454	0	1,052.1501	223.64141	0
Slice 13	418.125	26.927301	0	1,101.4846	234.12779	0
Slice 14	439.375	25.127091	0	1,116.2875	237.27424	0
Slice 15	466.25	23.033248	0	1,154.867	245.47457	0
Slice 16	491.25	21.207992	0	1,201.7109	255.43154	0
Slice 17	515	19.661445	0	1,285.9803	273.34355	0
Slice 18	545	17.887591	0	1,417.5046	301.2999	0
Slice 19	561.25	16.993312	0	1,481.858	314.97863	0
Slice 20	573.33333	16.406926	0	1,524.2704	323.99367	0
Slice 21	595	15.421331	0	1,594.0008	338.81532	0
Slice 22	616.66667	14.553775	0	1,651.3091	350.99658	0
Slice 23	631.25	14.023293	0	1,684.2291	357.99394	0
Slice 24	652.5	13.401519	0	1,529.4341	325.09124	0
Slice 25	676.25	12.766217	0	1,305.0715	277.4015	0
Slice 26	695.625	12.396853	0	1,136.0532	241.47555	0
Slice 27	721.875	12.024006	0	912.65968	193.9918	0
Slice 28	747.5	11.824724	0	734.02048	156.02087	0
Slice 29	772.5	11.790949	0	601.10435	127.76867	0
Slice 30	797.5	11.913898	0	451.61222	95.993141	0
Slice 31	816.67491	12.100402	0	331.1365	70.385236	0
Slice 32	833.76236	12.364801	0	219.99001	46.760321	0
Slice 33	854.58745	12.776306	0	75.213231	15.987066	0

SLOPE STABILITY ANALYSIS WITH WATERTABLE (SEISMIC Kh=0.05g) ADDITIONAL TRIALS

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 111
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 11:27:20
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 11:27:22

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (63.93757, 68.79493) ft
Left-Zone Right Coordinate: (172.5, 58.05149) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (615.86238, 30.2933) ft
Right-Zone Right Coordinate: (775, 17.37037) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.656
Volume: 2,042.6351 ft^3
Weight: 2,14,476.68 lbs
Resisting Moment: 1.3470706e+008 lbs-ft
Activating Moment: 8,13,65,296 lbs-ft
Resisting Force: 45,137.059 lbs
Activating Force: 27,263.753 lbs
F of S Rank: 1
Exit: (615.86238, 30.293297) ft
Entry: (63.93757, 68.794931) ft
Radius: 2,972.4794 ft
Center: (545.85626, 3,001.9482) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	74.203178	67.145142	0	100.58904	21.380861	0
Slice 2	94.734393	63.919113	0	294.10063	62.513019	0
Slice 3	113.75	61.057232	0	404.8872	86.061431	0
Slice 4	131.25	58.539073	0	435.16594	92.497377	0
Slice 5	148.74016	56.128323	0	468.8087	99.648366	0
Slice 6	166.22047	53.824605	0	505.88167	107.52847	0
Slice 7	183.09055	51.699453	0	510.41591	108.49225	0
Slice 8	199.35039	49.745565	0	483.09726	102.68549	0
Slice	215.61024	47.882465	0	446.48359	94.903018	0

9						
Slice 10	231.87008	46.109984	0	400.54474	85.138412	0
Slice 11	250.68978	44.179605	0	398.75964	84.758979	0
Slice 12	272.06934	42.124017	0	437.92117	93.083018	0
Slice 13	291.44434	40.389099	0	460.32364	97.84481	0
Slice 14	308.81478	38.948176	0	468.61724	99.607668	0
Slice 15	325.83333	37.634821	0	496.38819	105.51057	0
Slice 16	342.5	36.444839	0	544.13286	115.65901	0
Slice 17	359.16667	35.348969	0	582.17008	123.74407	0
Slice 18	376.04636	34.335516	0	600.7581	127.69508	0
Slice 19	393.13908	33.406816	0	599.54734	127.43772	0
Slice 20	404.59272	32.828825	0	594.04697	126.26858	0
Slice 21	418.125	32.233509	0	552.81686	117.50485	0
Slice 22	439.375	31.395654	0	466.65974	99.191591	0
Slice 23	458.125	30.774884	0	397.40506	84.471053	0
Slice 24	474.375	30.339528	0	348.53923	74.084299	0
Slice 25	491.25	29.983313	0	287.55323	61.121327	0
Slice 26	510	29.701905	0	247.35994	52.577979	0
Slice 27	530	29.527924	0	228.20815	48.50714	0
Slice 28	550	29.48852	0	194.78791	41.403448	0
Slice 29	561.25	29.508934	0	171.47319	36.447751	0
Slice 30	571.39373	29.591819	0	145.95326	31.023322	0
Slice 31	589.18119	29.797875	0	95.378136	20.273249	0
Slice 32	606.96865	30.110407	0	33.642882	7.1510153	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 115
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 11:32:42
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 11:32:44

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (12.50934, 69.77761) ft
Left-Zone Right Coordinate: (254.09093, 47.77778) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (589.08127, 30.70373) ft
Right-Zone Right Coordinate: (842.5, 14.05093) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.601
Volume: 3,610.7035 ft^3
Weight: 3,79,123.86 lbs
Resisting Moment: 2.4807322e+008 lbs-ft
Activating Moment: 1.5498909e+008 lbs-ft
Resisting Force: 79,714.528 lbs
Activating Force: 49,803.763 lbs
F of S Rank: 1
Exit: (589.08127, 30.703735) ft
Entry: (12.50934, 69.777612) ft
Radius: 3,098.6679 ft
Center: (509.39642, 3,128.3469) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	20.841117	68.447329	0	121.43922	25.812704	0
Slice 2	37.50467	65.833232	0	359.41665	76.396367	0
Slice 3	54.168223	63.311957	0	587.73322	124.92655	0
Slice 4	73.125	60.563509	0	783.24751	166.4844	0
Slice 5	94.375	57.61651	0	943.25372	200.49477	0
Slice 6	113.75	55.054051	0	1,021.2639	217.07633	0
Slice 7	131.25	52.851749	0	1,019.6537	216.73409	0
Slice 8	148.6073	50.76685	0	1,022.0563	217.24478	0
Slice	166.08761	48.768648	0	1,028.5977	218.63518	0

9						
Slice 10	185.80052	46.641243	0	994.7987	211.45099	0
Slice 11	207.48031	44.441763	0	917.6533	195.05323	0
Slice 12	229.1601	42.396156	0	824.56799	175.26734	0
Slice 13	247.4981	40.775767	0	779.30338	165.64605	0
Slice 14	262.49429	39.540396	0	786.18448	167.10867	0
Slice 15	281.86929	38.066583	0	782.4084	166.30604	0
Slice 16	305.6231	36.409382	0	762.13303	161.99638	0
Slice 17	329.43801	34.932148	0	765.30513	162.67063	0
Slice 18	353.31404	33.635561	0	791.90233	168.32404	0
Slice 19	366.37603	32.981533	0	800.59909	170.17259	0
Slice 20	377.5	32.503556	0	787.97719	167.48972	0
Slice 21	397.5	31.716164	0	755.14228	160.51045	0
Slice 22	414.9679	31.127132	0	697.8513	148.33287	0
Slice 23	429.90371	30.707806	0	619.16948	131.60854	0
Slice 24	443.68581	30.382232	0	539.90138	114.75958	0
Slice 25	458.125	30.113845	0	468.59155	99.60221	0
Slice 26	474.375	29.887552	0	397.31634	84.452194	0
Slice 27	491.25	29.744473	0	313.4712	66.63036	0
Slice 28	510	29.695178	0	248.48252	52.81659	0
Slice 29	530	29.76362	0	203.52281	43.260108	0
Slice 30	550	29.961161	0	144.93461	30.806802	0
Slice 31	561.25	30.113129	0	107.68553	22.889267	0
Slice 32	575.79063	30.418892	0	51.544724	10.956169	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 123
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 11:55:25
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 11:55:26

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (26.11806, 69.53568) ft
Left-Zone Right Coordinate: (117.5, 64.52381) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (599.7058, 30.54091) ft
Right-Zone Right Coordinate: (720, 20.87301) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.604
Volume: 3,200.073 ft^3
Weight: 3,36,007.66 lbs
Resisting Moment: 2.1878664e+008 lbs-ft
Activating Moment: 1.3637152e+008 lbs-ft
Resisting Force: 70,653.557 lbs
Activating Force: 44,039.309 lbs
F of S Rank: 1
Exit: (599.7058, 30.540907) ft
Entry: (26.11806, 69.535679) ft
Radius: 3,083.3321 ft
Center: (521.13552, 3,112.8718) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	35.213545	68.084118	0	132.50316	28.164415	0
Slice 2	53.404515	65.236642	0	391.66073	83.250058	0
Slice 3	73.125	62.280337	0	607.12759	129.04895	0
Slice 4	94.375	59.235052	0	777.09794	165.17727	0
Slice 5	113.75	56.583832	0	864.01748	183.65258	0
Slice 6	131.25	54.302118	0	870.34417	184.99736	0
Slice 7	148.74016	52.123329	0	880.6249	187.1826	0
Slice 8	166.22047	50.047136	0	894.89887	190.21663	0
Slice	180.80571	48.38521	0	884.39263	187.98346	0

9						
Slice 10	195.54233	46.791868	0	841.85836	178.94252	0
Slice 11	213.3254	44.955553	0	781.65635	166.14619	0
Slice 12	231.10847	43.223356	0	710.67792	151.05926	0
Slice 13	249.6875	41.527075	0	682.76031	145.12518	0
Slice 14	269.0625	39.876235	0	697.06466	148.16567	0
Slice 15	288.4375	38.348378	0	698.67344	148.50762	0
Slice 16	307.8125	36.94332	0	687.50102	146.13285	0
Slice 17	325.83333	35.74256	0	695.90237	147.91862	0
Slice 18	342.5	34.730039	0	725.61516	154.23426	0
Slice 19	359.16667	33.808066	0	745.84735	158.53475	0
Slice 20	377.5	32.903351	0	744.91349	158.33625	0
Slice 21	397.5	32.035692	0	720.58211	153.16446	0
Slice 22	420.45956	31.211006	0	643.13061	136.70163	0
Slice 23	441.70956	30.573994	0	535.46702	113.81703	0
Slice 24	458.125	30.194286	0	459.74378	97.721558	0
Slice 25	474.375	29.904974	0	395.24592	84.012114	0
Slice 26	491.25	29.696925	0	318.37825	67.673386	0
Slice 27	510	29.575995	0	261.0434	55.486487	0
Slice 28	530	29.568629	0	224.14523	47.643539	0
Slice 29	550	29.690998	0	173.51449	36.881644	0
Slice 30	561.25	29.800881	0	140.70113	29.906949	0
Slice 31	571.80145	29.97001	0	105.39587	22.402584	0
Slice 32	590.40435	30.331891	0	37.075311	7.8806006	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 127
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 12:03:52
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 12:03:53

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (64.7782, 68.73999) ft
Left-Zone Right Coordinate: (302.5, 43.96058) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (668.1743, 26.11996) ft
Right-Zone Right Coordinate: (752.5, 18.53703) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.824
Volume: 3,141.7559 ft^3
Weight: 3,29,884.37 lbs
Resisting Moment: 2.2707994e+008 lbs-ft
Activating Moment: 1.2446673e+008 lbs-ft
Resisting Force: 69,583.046 lbs
Activating Force: 38,140.08 lbs
F of S Rank: 1
Exit: (668.1743, 26.119962) ft
Entry: (64.7782, 68.739988) ft
Radius: 3,252.7096 ft
Center: (594.66289, 3,277.9988) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	74.83365	67.112052	0	99.93027	21.240835	0
Slice 2	94.94455	63.920716	0	292.98414	62.275701	0
Slice 3	113.75	61.049247	0	406.24977	86.351055	0
Slice 4	131.25	58.481716	0	441.52825	93.849727	0
Slice 5	148.74016	56.012616	0	481.05974	102.2524	0
Slice 6	166.22047	53.641614	0	524.90419	111.57183	0
Slice 7	185.80052	51.106784	0	533.3083	113.35818	0
Slice 8	207.48031	48.433757	0	503.64987	107.05408	0
Slice	229.1601	45.908359	0	458.91012	97.544357	0

9						
Slice 10	247.92316	43.83307	0	456.19187	96.966575	0
Slice 11	266.12194	41.940383	0	504.09792	107.14932	0
Slice 12	286.67316	39.919787	0	546.3351	116.12711	0
Slice 13	307.22439	38.030807	0	575.14288	122.25039	0
Slice 14	330	36.098713	0	635.17521	135.01066	0
Slice 15	355	34.154706	0	723.35494	153.75384	0
Slice 16	377.5	32.562044	0	775.09251	164.751	0
Slice 17	397.5	31.285641	0	793.79618	168.72659	0
Slice 18	418.125	30.100856	0	773.9553	164.50928	0
Slice 19	439.375	29.015508	0	714.54692	151.88164	0
Slice 20	462.32605	28.005771	0	662.57607	140.83489	0
Slice 21	478.57605	27.363733	0	636.00039	135.18606	0
Slice 22	487.40164	27.061877	0	616.58861	131.05995	0
Slice 23	496.15164	26.783548	0	595.10024	126.49246	0
Slice 24	510	26.406569	0	593.98945	126.25636	0
Slice 25	530	25.947359	0	605.35521	128.67222	0
Slice 26	550	25.611198	0	603.61083	128.30144	0
Slice 27	561.25	25.461033	0	598.45831	127.20624	0
Slice 28	574.36061	25.374161	0	586.14611	124.5892	0
Slice 29	598.41592	25.314199	0	553.49179	117.64831	0
Slice 30	622.8053	25.433783	0	501.16181	106.52523	0
Slice 31	643.29358	25.663306	0	354.76124	75.406829	0
Slice 32	659.88073	25.953639	0	119.69243	25.441412	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 132
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 12:09:07
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 12:09:08

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (123.479, 63.76457) ft
Left-Zone Right Coordinate: (227.80513, 50.55556) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (717.08249, 21.15087) ft
Right-Zone Right Coordinate: (865, 13.00926) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 21
F of S: 1.975
Volume: 5,909.8163 ft^3
Weight: 6,20,530.71 lbs
Resisting Moment: 5.24022e+008 lbs-ft
Activating Moment: 2.6533903e+008 lbs-ft
Resisting Force: 1,31,089.15 lbs
Activating Force: 66,377.43 lbs
F of S Rank: 1
Exit: (865, 13.009262) ft
Entry: (123.479, 63.764573) ft
Radius: 3,988.0222 ft
Center: (765.38773, 3,999.7873) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	131.7395	62.435189	0	28.917203	6.1465412	0
Slice 2	157.48031	58.409689	0	135.17541	28.73242	0
Slice 3	185.80052	54.121277	0	223.77008	47.5638	0
Slice 4	207.48031	50.997461	0	240.09656	51.034099	0
Slice 5	229.1601	47.995049	0	243.97193	51.857836	0
Slice 6	250.41474	45.167945	0	297.87852	63.316034	0
Slice 7	271.24423	42.511246	0	402.3366	85.519284	0
Slice 8	299.57949	39.103164	0	523.40875	111.25396	0
Slice	327.8456	35.853613	0	665.77327	141.51448	0

9						
Slice 10	352.8456	33.187542	0	826.9567	175.77507	0
Slice 11	377.5	30.686157	0	961.71939	204.41977	0
Slice 12	397.5	28.782454	0	1,044.7786	222.07456	0
Slice 13	418.125	26.927301	0	1,094.3894	232.61965	0
Slice 14	439.375	25.127091	0	1,109.7939	235.89397	0
Slice 15	466.25	23.033248	0	1,149.1507	244.25952	0
Slice 16	491.25	21.207992	0	1,196.7773	254.38286	0
Slice 17	515	19.661445	0	1,281.7412	272.4425	0
Slice 18	545	17.887591	0	1,414.2231	300.60239	0
Slice 19	561.25	16.993312	0	1,479.1795	314.40931	0
Slice 20	573.33333	16.406926	0	1,522.0623	323.52432	0
Slice 21	595	15.421331	0	1,592.6575	338.5298	0
Slice 22	616.66667	14.553775	0	1,650.8196	350.89255	0
Slice 23	631.25	14.023293	0	1,684.2883	358.00653	0
Slice 24	652.5	13.401519	0	1,530.2386	325.26226	0
Slice 25	676.25	12.766217	0	1,306.4275	277.68973	0
Slice 26	695.625	12.396853	0	1,137.6294	241.81059	0
Slice 27	721.875	12.024006	0	914.27691	194.33556	0
Slice 28	747.5	11.824724	0	735.4929	156.33384	0
Slice 29	772.5	11.790949	0	602.34529	128.03244	0
Slice 30	797.5	11.913898	0	452.51966	96.186024	0
Slice 31	816.67491	12.100402	0	331.75786	70.517311	0
Slice 32	833.76236	12.364801	0	220.36917	46.840914	0
Slice 33	854.58745	12.776306	0	75.327264	16.011304	0

SLOPE STABILITY ANALYSIS WITH WATERTABLE (SEISMIC Kh=0.1g) ADITIONAL TRAILS

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 112
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 11:28:57
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 11:28:58

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (63.93757, 68.79493) ft
Left-Zone Right Coordinate: (172.5, 58.05149) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (615.86238, 30.2933) ft
Right-Zone Right Coordinate: (775, 17.37037) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.187
Volume: 2,042.6351 ft^3
Weight: 2,14,476.68 lbs
Resisting Moment: 1.3418374e+008 lbs-ft
Activating Moment: 1.1309026e+008 lbs-ft
Resisting Force: 44,962.173 lbs
Activating Force: 37,894.569 lbs
F of S Rank: 1
Exit: (615.86238, 30.293297) ft
Entry: (63.93757, 68.794931) ft
Radius: 2,972.4794 ft
Center: (545.85626, 3,001.9482) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	74.203178	67.145142	0	99.770603	21.206896	0
Slice 2	94.734393	63.919113	0	291.73698	62.01061	0
Slice 3	113.75	61.057232	0	401.66861	85.377298	0
Slice 4	131.25	58.539073	0	431.74496	91.770224	0
Slice 5	148.74016	56.128323	0	465.19208	98.879629	0
Slice 6	166.22047	53.824605	0	502.08286	106.72101	0
Slice 7	183.09055	51.699453	0	506.69501	107.70135	0
Slice 8	199.35039	49.745565	0	479.68444	101.96008	0
Slice	215.61024	47.882465	0	443.44466	94.257073	0

9						
Slice 10	231.87008	46.109984	0	397.93307	84.583286	0
Slice 11	250.68978	44.179605	0	396.34762	84.246287	0
Slice 12	272.06934	42.124017	0	435.55319	92.579689	0
Slice 13	291.44434	40.389099	0	458.10562	97.373356	0
Slice 14	308.81478	38.948176	0	466.6107	99.181165	0
Slice 15	325.83333	37.634821	0	494.53013	105.11562	0
Slice 16	342.5	36.444839	0	542.37813	115.28603	0
Slice 17	359.16667	35.348969	0	580.58265	123.40665	0
Slice 18	376.04636	34.335516	0	599.41174	127.4089	0
Slice 19	393.13908	33.406816	0	598.487	127.21234	0
Slice 20	404.59272	32.828825	0	593.17653	126.08356	0
Slice 21	418.125	32.233509	0	552.20296	117.37436	0
Slice 22	439.375	31.395654	0	466.39544	99.135411	0
Slice 23	458.125	30.774884	0	397.35669	84.460771	0
Slice 24	474.375	30.339528	0	348.61595	74.100607	0
Slice 25	491.25	29.983313	0	287.71542	61.1558	0
Slice 26	510	29.701905	0	247.57082	52.622801	0
Slice 27	530	29.527924	0	228.44344	48.557152	0
Slice 28	550	29.48852	0	195.01344	41.451387	0
Slice 29	561.25	29.508934	0	171.67896	36.49149	0
Slice 30	571.39373	29.591819	0	146.13329	31.06159	0
Slice 31	589.18119	29.797875	0	95.49794	20.298714	0
Slice 32	606.96865	30.110407	0	33.68589	7.1601569	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 116
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 11:34:48
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 11:34:50

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (12.50934, 69.77761) ft
Left-Zone Right Coordinate: (254.09093, 47.77778) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (589.08127, 30.70373) ft
Right-Zone Right Coordinate: (842.5, 14.05093) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.158
Volume: 3,610.7035 ft^3
Weight: 3,79,123.86 lbs
Resisting Moment: 2.4705623e+008 lbs-ft
Activating Moment: 2.1340186e+008 lbs-ft
Resisting Force: 79,388.695 lbs
Activating Force: 68,574.668 lbs
F of S Rank: 1
Exit: (589.08127, 30.703735) ft
Entry: (12.50934, 69.777612) ft
Radius: 3,098.6679 ft
Center: (509.39642, 3,128.3469) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	20.841117	68.447329	0	120.44961	25.602355	0
Slice 2	37.50467	65.833232	0	356.46803	75.769618	0
Slice 3	54.168223	63.311957	0	582.88767	123.8966	0
Slice 4	73.125	60.563509	0	776.78514	165.11078	0
Slice 5	94.375	57.61651	0	935.5426	198.85572	0
Slice 6	113.75	55.054051	0	1,013.0533	215.33113	0
Slice 7	131.25	52.851749	0	1,011.625	215.02753	0
Slice 8	148.6073	50.76685	0	1,014.2657	215.58884	0
Slice	166.08761	48.768648	0	1,021.106	217.04278	0

9						
Slice 10	185.80052	46.641243	0	987.99473	210.00476	0
Slice 11	207.48031	44.441763	0	911.89127	193.82847	0
Slice 12	229.1601	42.396156	0	819.92759	174.28099	0
Slice 13	247.4981	40.775767	0	775.42675	164.82204	0
Slice 14	262.49429	39.540396	0	782.7471	166.37803	0
Slice 15	281.86929	38.066583	0	779.60609	165.71039	0
Slice 16	305.6231	36.409382	0	760.1463	161.57408	0
Slice 17	329.43801	34.932148	0	764.03496	162.40064	0
Slice 18	353.31404	33.635561	0	791.26702	168.189	0
Slice 19	366.37603	32.981533	0	800.30026	170.10907	0
Slice 20	377.5	32.503556	0	787.95221	167.48441	0
Slice 21	397.5	31.716164	0	755.53843	160.59465	0
Slice 22	414.9679	31.127132	0	698.51969	148.47494	0
Slice 23	429.90371	30.707806	0	619.97653	131.78008	0
Slice 24	443.68581	30.382232	0	540.76156	114.94242	0
Slice 25	458.125	30.113845	0	469.45295	99.785304	0
Slice 26	474.375	29.887552	0	398.12767	84.624649	0
Slice 27	491.25	29.744473	0	314.16885	66.778651	0
Slice 28	510	29.695178	0	249.05151	52.937533	0
Slice 29	530	29.76362	0	203.96363	43.353807	0
Slice 30	550	29.961161	0	145.21926	30.867306	0
Slice 31	561.25	30.113129	0	107.87799	22.930176	0
Slice 32	575.79063	30.418892	0	51.632713	10.974872	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 124
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 11:58:00
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 11:58:02

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (26.11806, 69.53568) ft
Left-Zone Right Coordinate: (117.5, 64.52381) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (599.7058, 30.54091) ft
Right-Zone Right Coordinate: (720, 20.87301) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.160
Volume: 3,200.073 ft^3
Weight: 3,36,007.66 lbs
Resisting Moment: 2.1789286e+008 lbs-ft
Activating Moment: 1.8789268e+008 lbs-ft
Resisting Force: 70,365.746 lbs
Activating Force: 60,678.037 lbs
F of S Rank: 1
Exit: (599.7058, 30.540907) ft
Entry: (26.11806, 69.535679) ft
Radius: 3,083.3321 ft
Center: (521.13552, 3,112.8718) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	35.213545	68.084118	0	131.42553	27.935358	0
Slice 2	53.404515	65.236642	0	388.47158	82.572184	0
Slice 3	73.125	62.280337	0	602.17975	127.99726	0
Slice 4	94.375	59.235052	0	770.81095	163.84093	0
Slice 5	113.75	56.583832	0	857.12082	182.18665	0
Slice 6	131.25	54.302118	0	863.51111	183.54495	0
Slice 7	148.74016	52.123329	0	873.8962	185.75237	0
Slice 8	166.22047	50.047136	0	888.31882	188.81799	0
Slice	180.80571	48.38521	0	878.13272	186.65287	0

9						
Slice 10	195.54233	46.791868	0	836.15371	177.72996	0
Slice 11	213.3254	44.955553	0	776.68496	165.08949	0
Slice 12	231.10847	43.223356	0	706.49221	150.16955	0
Slice 13	249.6875	41.527075	0	679.151	144.358	0
Slice 14	269.0625	39.876235	0	693.8774	147.48819	0
Slice 15	288.4375	38.348378	0	695.98812	147.93684	0
Slice 16	307.8125	36.94332	0	685.3649	145.67881	0
Slice 17	325.83333	35.74256	0	694.2128	147.55949	0
Slice 18	342.5	34.730039	0	724.28543	153.95162	0
Slice 19	359.16667	33.808066	0	744.89653	158.33264	0
Slice 20	377.5	32.903351	0	744.38912	158.22479	0
Slice 21	397.5	32.035692	0	720.48413	153.14363	0
Slice 22	420.45956	31.211006	0	643.42522	136.76425	0
Slice 23	441.70956	30.573994	0	535.98451	113.92702	0
Slice 24	458.125	30.194286	0	460.34063	97.848421	0
Slice 25	474.375	29.904974	0	395.86274	84.143223	0
Slice 26	491.25	29.696925	0	318.95458	67.79589	0
Slice 27	510	29.575995	0	261.55487	55.595204	0
Slice 28	530	29.568629	0	224.58062	47.736084	0
Slice 29	550	29.690998	0	173.83602	36.949987	0
Slice 30	561.25	29.800881	0	140.94796	29.959414	0
Slice 31	571.80145	29.97001	0	105.57273	22.440177	0
Slice 32	590.40435	30.331891	0	37.131759	7.8925989	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 128
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 12:05:03
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 12:05:05

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (64.7782, 68.73999) ft
Left-Zone Right Coordinate: (302.5, 43.96058) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (668.1743, 26.11996) ft
Right-Zone Right Coordinate: (752.5, 18.53703) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.272
Volume: 3,141.7559 ft^3
Weight: 3,29,884.37 lbs
Resisting Moment: 2.2633254e+008 lbs-ft
Activating Moment: 1.7789301e+008 lbs-ft
Resisting Force: 69,354.772 lbs
Activating Force: 54,512.07 lbs
F of S Rank: 1
Exit: (668.1743, 26.119962) ft
Entry: (64.7782, 68.739988) ft
Radius: 3,252.7096 ft
Center: (594.66289, 3,277.9988) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	74.83365	67.112052	0	99.110755	21.066641	0
Slice 2	94.94455	63.920716	0	290.58962	61.76673	0
Slice 3	113.75	61.049247	0	402.93378	85.64622	0
Slice 4	131.25	58.481716	0	437.92842	93.084559	0
Slice 5	148.74016	56.012616	0	477.16993	101.4256	0
Slice 6	166.22047	53.641614	0	520.72531	110.68358	0
Slice 7	185.80052	51.106784	0	529.14701	112.47367	0
Slice 8	207.48031	48.433757	0	499.82206	106.24046	0
Slice	229.1601	45.908359	0	455.54064	96.828152	0

9						
Slice 10	247.92316	43.83307	0	453.00369	96.288906	0
Slice 11	266.12194	41.940383	0	500.81558	106.45164	0
Slice 12	286.67316	39.919787	0	543.07801	115.43479	0
Slice 13	307.22439	38.030807	0	572.04107	121.59108	0
Slice 14	330	36.098713	0	632.17746	134.37347	0
Slice 15	355	34.154706	0	720.47911	153.14256	0
Slice 16	377.5	32.562044	0	772.51829	164.20383	0
Slice 17	397.5	31.285641	0	791.61466	168.26289	0
Slice 18	418.125	30.100856	0	772.28212	164.15363	0
Slice 19	439.375	29.015508	0	713.43494	151.64528	0
Slice 20	462.32605	28.005771	0	661.95747	140.7034	0
Slice 21	478.57605	27.363733	0	635.66693	135.11518	0
Slice 22	487.40164	27.061877	0	616.39746	131.01933	0
Slice 23	496.15164	26.783548	0	595.0392	126.47949	0
Slice 24	510	26.406569	0	594.08492	126.27665	0
Slice 25	530	25.947359	0	605.64027	128.73281	0
Slice 26	550	25.611198	0	604.04938	128.39466	0
Slice 27	561.25	25.461033	0	598.96479	127.3139	0
Slice 28	574.36061	25.374161	0	586.70719	124.70846	0
Slice 29	598.41592	25.314199	0	554.09879	117.77733	0
Slice 30	622.8053	25.433783	0	501.7374	106.64758	0
Slice 31	643.29358	25.663306	0	355.17395	75.494554	0
Slice 32	659.88073	25.953639	0	119.8361	25.471949	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 133
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 30-06-2020
Time: 12:10:32
File Name: Analysis.gsz
Directory: F:\LD\Project 2020\Project 0280\Additional trails\Without water table\
Last Solved Date: 30-06-2020
Last Solved Time: 12:10:34

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 12 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (123.479, 63.76457) ft
Left-Zone Right Coordinate: (227.80513, 50.55556) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (717.08249, 21.15087) ft
Right-Zone Right Coordinate: (865, 13.00926) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 21
F of S: 1.345
Volume: 5,909.8163 ft^3
Weight: 6,20,530.71 lbs
Resisting Moment: 5.2252713e+008 lbs-ft
Activating Moment: 3.8861096e+008 lbs-ft
Resisting Force: 1,30,716.39 lbs
Activating Force: 97,215.898 lbs
F of S Rank: 1
Exit: (865, 13.009262) ft
Entry: (123.479, 63.764573) ft
Radius: 3,988.0222 ft
Center: (765.38773, 3,999.7873) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	131.7395	62.435189	0	28.677133	6.0955129	0
Slice 2	157.48031	58.409689	0	133.98624	28.479656	0
Slice 3	185.80052	54.121277	0	221.70946	47.1258	0
Slice 4	207.48031	50.997461	0	237.79418	50.544713	0
Slice 5	229.1601	47.995049	0	241.55751	51.344633	0
Slice 6	250.41474	45.167945	0	294.95096	62.693762	0
Slice 7	271.24423	42.511246	0	398.49839	84.703447	0
Slice 8	299.57949	39.103164	0	518.59373	110.2305	0
Slice	327.8456	35.853613	0	659.9672	140.28036	0

9						
Slice 10	352.8456	33.187542	0	820.19501	174.33783	0
Slice 11	377.5	30.686157	0	954.41062	202.86624	0
Slice 12	397.5	28.782454	0	1,037.3732	220.50049	0
Slice 13	418.125	26.927301	0	1,087.2533	231.10283	0
Slice 14	439.375	25.127091	0	1,103.2572	234.50456	0
Slice 15	466.25	23.033248	0	1,143.3949	243.0361	0
Slice 16	491.25	21.207992	0	1,191.8133	253.32774	0
Slice 17	515	19.661445	0	1,277.4845	271.53772	0
Slice 18	545	17.887591	0	1,410.9446	299.90554	0
Slice 19	561.25	16.993312	0	1,476.5171	313.8434	0
Slice 20	573.33333	16.406926	0	1,519.8797	323.06041	0
Slice 21	595	15.421331	0	1,591.3563	338.25321	0
Slice 22	616.66667	14.553775	0	1,650.3862	350.80042	0
Slice 23	631.25	14.023293	0	1,684.4109	358.0326	0
Slice 24	652.5	13.401519	0	1,531.1107	325.44763	0
Slice 25	676.25	12.766217	0	1,307.8492	277.99193	0
Slice 26	695.625	12.396853	0	1,139.2651	242.15828	0
Slice 27	721.875	12.024006	0	915.94156	194.68939	0
Slice 28	747.5	11.824724	0	736.99956	156.65409	0
Slice 29	772.5	11.790949	0	603.60858	128.30096	0
Slice 30	797.5	11.913898	0	453.43941	96.381521	0
Slice 31	816.67491	12.100402	0	332.38578	70.650779	0
Slice 32	833.76236	12.364801	0	220.75165	46.922211	0
Slice 33	854.58745	12.776306	0	75.442184	16.035731	0

SLOPE STABILITY ANALYSIS WITH WATERTABLE (STATIC) ADDITIONAL TRAILS

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 139
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 01-07-2020
Time: 16:09:12
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Trail New\
Last Solved Date: 01-07-2020
Last Solved Time: 16:09:15

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (18.45686, 69.67188) ft
Left-Zone Right Coordinate: (130, 62.93651) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (592.06419, 30.65802) ft
Right-Zone Right Coordinate: (702.5, 22.53968) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556

Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 26
F of S: 2.137
Volume: 2,523.7124 ft³
Weight: 2,64,989.8 lbs
Resisting Moment: 1.370977e+008 lbs-ft
Activating Moment: 6,41,63,250 lbs-ft
Resisting Force: 46,408.804 lbs
Activating Force: 21,719.967 lbs
F of S Rank: 1
Exit: (592.06419, 30.658019) ft
Entry: (46.412826, 69.174884) ft
Radius: 2,941.2866 ft
Center: (525.44766, 2,971.1901) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	54.456413	67.870013	0	120.30106	21.212323	0
Slice 2	73.125	64.911505	0	339.75145	59.907348	0
Slice 3	94.375	61.683668	0	529.85058	93.426952	0
Slice 4	113.75	58.87253	0	633.74298	111.74599	0
Slice 5	131.25	56.452217	0	654.16915	115.34767	0
Slice 6	148.74016	54.140139	0	677.93354	119.53797	0
Slice 7	166.22047	51.93592	0	705.08795	124.32603	0
Slice 8	184.24265	49.776316	0	697.06822	122.91194	0
Slice 9	202.8067	47.66786	0	653.13487	115.1653	0

Slice 10	221.37075	45.678721	0	596.87821	105.24573	0
Slice 11	235.32639	44.250697	0	547.59414	96.555622	0
Slice 12	249.6875	42.875169	0	545.37752	96.164771	0
Slice 13	269.0625	41.115226	0	570.44418	100.5847	0
Slice 14	288.4375	39.484384	0	582.1521	102.64912	0
Slice 15	307.8125	37.982427	0	580.44939	102.34889	0
Slice 16	325.83333	36.696782	0	597.19578	105.30173	0
Slice 17	342.5	35.61058	0	634.1903	111.82486	0
Slice 18	359.16667	34.619371	0	661.25414	116.59695	0
Slice 19	377.5	33.643859	0	667.3018	117.66331	0
Slice 20	397.5	32.704795	0	650.04339	114.62019	0
Slice 21	412.4357	32.079592	0	617.18428	108.82624	0
Slice 22	425.52855	31.612539	0	558.67569	98.509597	0
Slice 23	441.84285	31.103312	0	477.9564	84.27661	0
Slice 24	458.125	30.685332	0	407.28899	71.816038	0
Slice 25	474.375	30.358206	0	346.75685	61.142589	0
Slice 26	491.25	30.11536	0	273.60106	48.243249	0
Slice 27	510	29.961097	0	219.84854	38.765229	0
Slice 28	530	29.924054	0	186.16164	32.825321	0
Slice 29	550	30.023009	0	138.13253	24.356492	0
Slice 30	561.25	30.121704	0	106.59098	18.794866	0
Slice 31	569.89105	30.248614	0	78.915313	13.914899	0
Slice 32	584.67314	30.509163	0	27.592527	4.865307	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 145
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 01-07-2020
Time: 16:15:10
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Trail New\
Last Solved Date: 01-07-2020
Last Solved Time: 16:15:12

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (45.24923, 69.19557) ft
Left-Zone Right Coordinate: (169.96628, 58.33333) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (677.57683, 25.02025) ft
Right-Zone Right Coordinate: (770, 17.62963) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556

Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 2.572
Volume: 4,124.0179 ft³
Weight: 4,33,021.88 lbs
Resisting Moment: 2.5973905e+008 lbs-ft
Activating Moment: 1.0098199e+008 lbs-ft
Resisting Force: 75,996.411 lbs
Activating Force: 29,546.216 lbs
F of S Rank: 1
Exit: (677.57683, 25.02025) ft
Entry: (45.24923, 69.19557) ft
Radius: 3,405.8728 ft
Center: (597.74378, 3,429.9573) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	53.874615	67.800311	0	128.88347	22.725633	0
Slice 2	73.125	64.748668	0	357.38648	63.016879	0
Slice 3	94.375	61.504526	0	549.4937	96.890565	0
Slice 4	113.75	58.660589	0	656.84654	115.81977	0
Slice 5	131.25	56.19454	0	681.86995	120.23207	0
Slice 6	148.74016	53.822285	0	711.68291	125.4889	0
Slice 7	166.22047	51.543526	0	746.3297	131.59806	0
Slice 8	184.24422	49.291645	0	747.54301	131.812	0
Slice 9	202.8114	47.072334	0	714.72156	126.0247	0

Slice 10	226.0475	44.456674	0	657.00729	115.84811	0
Slice 11	250.28661	41.869901	0	644.0154	113.55729	0
Slice 12	270.85984	39.823126	0	688.88754	121.46946	0
Slice 13	291.43306	37.902363	0	720.80651	127.09764	0
Slice 14	309.60984	36.303552	0	738.88581	130.2855	0
Slice 15	330	34.647936	0	789.75893	139.25581	0
Slice 16	355	32.769045	0	871.30975	153.63542	0
Slice 17	377.5	31.227848	0	917.59553	161.79685	0
Slice 18	397.5	29.990872	0	931.95462	164.32874	0
Slice 19	418.125	28.840789	0	908.11764	160.12564	0
Slice 20	439.375	27.785078	0	845.16369	149.02516	0
Slice 21	458.125	26.957138	0	798.06945	140.72118	0
Slice 22	474.375	26.329284	0	769.81571	135.73928	0
Slice 23	491.25	25.761056	0	731.5532	128.99257	0
Slice 24	508.66276	25.260675	0	717.29025	126.47762	0
Slice 25	525.98829	24.851471	0	728.2317	128.4069	0
Slice 26	547.32553	24.481275	0	727.47693	128.27381	0
Slice 27	561.25	24.280235	0	722.63225	127.41956	0
Slice 28	572.03456	24.194866	0	713.8704	125.87461	0
Slice 29	591.10368	24.104304	0	692.48914	122.10452	0
Slice 30	610.17281	24.12051	0	659.73883	116.32976	0
Slice 31	627.35368	24.221783	0	621.0177	109.50218	0
Slice 32	645.64421	24.437977	0	454.53858	80.147416	0
Slice 33	666.93262	24.803972	0	153.76752	27.113362	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 153
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 01-07-2020
Time: 16:22:09
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Trail New\
Last Solved Date: 01-07-2020
Last Solved Time: 16:22:11

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (52.05023, 69.07466) ft
Left-Zone Right Coordinate: (122.5, 63.88889) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (735.31065, 19.42833) ft
Right-Zone Right Coordinate: (802.5, 15.94445) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556

Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 2.698
Volume: 5,514.8279 ft³
Weight: 5,79,056.93 lbs
Resisting Moment: 3.7647837e+008 lbs-ft
Activating Moment: 1.3955841e+008 lbs-ft
Resisting Force: 1,01,669.12 lbs
Activating Force: 37,688.274 lbs
F of S Rank: 1
Exit: (735.31065, 19.428332) ft
Entry: (52.05023, 69.074664) ft
Radius: 3,691.1885 ft
Center: (660.02613, 3,709.8491) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	57.275115	68.209859	0	80.150472	14.132691	0
Slice 2	73.125	65.633898	0	265.70381	46.85075	0
Slice 3	94.375	62.275059	0	469.80507	82.839309	0
Slice 4	113.75	59.318001	0	588.88164	103.83572	0
Slice 5	131.25	56.742089	0	625.22704	110.2444	0
Slice 6	148.74016	54.253121	0	667.03419	117.61613	0
Slice 7	166.22047	51.850824	0	714.34633	125.95853	0
Slice 8	184.01766	49.493146	0	729.57315	128.64343	0
Slice 9	202.13171	47.183051	0	712.41665	125.61828	0

Slice 10	225.59437	44.343432	0	674.53211	118.93821	0
Slice 11	249.72982	41.54782	0	681.12688	120.10105	0
Slice 12	269.18945	39.423492	0	742.91327	130.99565	0
Slice 13	288.56445	37.411839	0	793.84641	139.97654	0
Slice 14	307.85482	35.511788	0	834.02077	147.06036	0
Slice 15	330	33.465219	0	911.10112	160.65171	0
Slice 16	355	31.306599	0	1,021.6365	180.14208	0
Slice 17	377.5	29.502432	0	1,095.3307	193.13635	0
Slice 18	397.5	28.021738	0	1,135.2487	200.17497	0
Slice 19	418.125	26.610896	0	1,138.9426	200.82631	0
Slice 20	439.375	25.276807	0	1,105.5642	194.9408	0
Slice 21	466.25	23.786266	0	1,081.5113	190.69961	0
Slice 22	491.25	22.531498	0	1,068.8524	188.46752	0
Slice 23	510	21.724211	0	1,084.816	191.28232	0
Slice 24	530	20.964949	0	1,128.0501	198.90567	0
Slice 25	550	20.314256	0	1,159.7598	204.49694	0
Slice 26	561.25	19.982583	0	1,173.9282	206.99521	0
Slice 27	573.33333	19.694614	0	1,184.6797	208.891	0
Slice 28	595	19.249229	0	1,196.9107	211.04764	0
Slice 29	616.66667	18.931087	0	1,195.5096	210.80059	0
Slice 30	631.25	18.774585	0	1,188.367	209.54116	0
Slice 31	643.75	18.706767	0	1,081.6286	190.72031	0
Slice 32	661.2862	18.671183	0	869.28421	153.27826	0
Slice 33	676.2862	18.701555	0	681.22016	120.11749	0
Slice 34	695.83931	18.858357	0	454.28368	80.10247	0
Slice 35	722.08931	19.204897	0	154.56341	27.253699	0
Slice 36	735.15533	19.42517	0	1.1792786	0.20793863	0

SLOPE STABILITY ANALYSIS WITH WATERTABLE (SEISMIC Kh=0.05g) ADDITIONAL TRAILS

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 140
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 01-07-2020
Time: 16:11:16
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Trail New\
Last Solved Date: 01-07-2020
Last Solved Time: 16:11:19

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (18.45686, 69.67188) ft
Left-Zone Right Coordinate: (130, 62.93651) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (592.06419, 30.65802) ft
Right-Zone Right Coordinate: (702.5, 22.53968) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 26
F of S: 1.327
Volume: 2,523.7124 ft^3
Weight: 2,64,989.8 lbs
Resisting Moment: 1.3653473e+008 lbs-ft
Activating Moment: 1.0292743e+008 lbs-ft
Resisting Force: 46,218.752 lbs
Activating Force: 34,842.529 lbs
F of S Rank: 1
Exit: (592.06419, 30.658019) ft
Entry: (46.412826, 69.174884) ft
Radius: 2,941.2866 ft
Center: (525.44766, 2,971.1901) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	54.456413	67.870013	0	119.31337	21.038166	0
Slice 2	73.125	64.911505	0	336.96649	59.416283	0
Slice 3	94.375	61.683668	0	525.53726	92.666398	0
Slice 4	113.75	58.87253	0	628.64414	110.84692	0
Slice 5	131.25	56.452217	0	648.97925	114.43255	0
Slice 6	148.74016	54.140139	0	672.68201	118.61199	0
Slice 7	166.22047	51.93592	0	699.80989	123.39537	0
Slice 8	184.24265	49.776316	0	692.06489	122.02971	0
Slice	202.8067	47.66786	0	648.67893	114.3796	0

9						
Slice 10	221.37075	45.678721	0	593.05174	104.57102	0
Slice 11	235.32639	44.250697	0	544.27121	95.969698	0
Slice 12	249.6875	42.875169	0	542.31444	95.624667	0
Slice 13	269.0625	41.115226	0	567.62308	100.08726	0
Slice 14	288.4375	39.484384	0	579.67005	102.21147	0
Slice 15	307.8125	37.982427	0	578.37435	101.983	0
Slice 16	325.83333	36.696782	0	595.44258	104.99259	0
Slice 17	342.5	35.61058	0	632.68659	111.55972	0
Slice 18	359.16667	34.619371	0	660.03832	116.38256	0
Slice 19	377.5	33.643859	0	666.44155	117.51163	0
Slice 20	397.5	32.704795	0	649.56482	114.5358	0
Slice 21	412.4357	32.079592	0	616.96644	108.78783	0
Slice 22	425.52855	31.612539	0	558.66054	98.506927	0
Slice 23	441.84285	31.103312	0	478.12619	84.306548	0
Slice 24	458.125	30.685332	0	407.56953	71.865504	0
Slice 25	474.375	30.358206	0	347.09122	61.201547	0
Slice 26	491.25	30.11536	0	273.93804	48.302667	0
Slice 27	510	29.961097	0	220.16013	38.820171	0
Slice 28	530	29.924054	0	186.433	32.873167	0
Slice 29	550	30.023009	0	138.3306	24.391418	0
Slice 30	561.25	30.121704	0	106.73744	18.820691	0
Slice 31	569.89105	30.248614	0	79.02119	13.933568	0
Slice 32	584.67314	30.509163	0	27.627716	4.8715117	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 146
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 01-07-2020
Time: 16:16:32
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Trail New\
Last Solved Date: 01-07-2020
Last Solved Time: 16:16:35

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (45.24923, 69.19557) ft
Left-Zone Right Coordinate: (169.96628, 58.33333) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (677.57683, 25.02025) ft
Right-Zone Right Coordinate: (770, 17.62963) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.484
Volume: 4,124.0179 ft^3
Weight: 4,33,021.88 lbs
Resisting Moment: 2.5885386e+008 lbs-ft
Activating Moment: 1.7438882e+008 lbs-ft
Resisting Force: 75,738.174 lbs
Activating Force: 51,024.966 lbs
F of S Rank: 1
Exit: (677.57683, 25.02025) ft
Entry: (45.24923, 69.19557) ft
Radius: 3,405.8728 ft
Center: (597.74378, 3,429.9573) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	53.874615	67.800311	0	127.82865	22.539639	0
Slice 2	73.125	64.748668	0	354.45369	62.499749	0
Slice 3	94.375	61.504526	0	544.98142	96.094928	0
Slice 4	113.75	58.660589	0	651.46597	114.87103	0
Slice 5	131.25	56.19454	0	676.30318	119.2505	0
Slice 6	148.74016	53.822285	0	705.93471	124.47534	0
Slice 7	166.22047	51.543526	0	740.41113	130.55446	0
Slice 8	184.24422	49.291645	0	741.74659	130.78994	0
Slice	202.8114	47.072334	0	709.32697	125.07348	0

9						
Slice 10	226.0475	44.456674	0	652.26154	115.01131	0
Slice 11	250.28661	41.869901	0	639.68039	112.79291	0
Slice 12	270.85984	39.823126	0	684.63002	120.71874	0
Slice 13	291.43306	37.902363	0	716.76445	126.38491	0
Slice 14	309.60984	36.303552	0	735.12962	129.62319	0
Slice 15	330	34.647936	0	786.2348	138.63441	0
Slice 16	355	32.769045	0	868.08391	153.06662	0
Slice 17	377.5	31.227848	0	914.81012	161.30571	0
Slice 18	397.5	29.990872	0	929.6664	163.92527	0
Slice 19	418.125	28.840789	0	906.42407	159.82702	0
Slice 20	439.375	27.785078	0	844.09931	148.83748	0
Slice 21	458.125	26.957138	0	797.47142	140.61573	0
Slice 22	474.375	26.329284	0	769.55198	135.69278	0
Slice 23	491.25	25.761056	0	731.59525	128.99998	0
Slice 24	508.66276	25.260675	0	717.57927	126.52859	0
Slice 25	525.98829	24.851471	0	728.71736	128.49253	0
Slice 26	547.32553	24.481275	0	728.15436	128.39326	0
Slice 27	561.25	24.280235	0	723.40509	127.55583	0
Slice 28	572.03456	24.194866	0	714.69184	126.01945	0
Slice 29	591.10368	24.104304	0	693.35534	122.25725	0
Slice 30	610.17281	24.12051	0	660.59145	116.4801	0
Slice 31	627.35368	24.221783	0	621.81145	109.64214	0
Slice 32	645.64421	24.437977	0	455.11675	80.249363	0
Slice 33	666.93262	24.803972	0	153.96378	27.147968	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 154
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 01-07-2020
Time: 16:23:05
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Trail New\
Last Solved Date: 01-07-2020
Last Solved Time: 16:23:08

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (52.05023, 69.07466) ft
Left-Zone Right Coordinate: (122.5, 63.88889) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (735.31065, 19.42833) ft
Right-Zone Right Coordinate: (802.5, 15.94445) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.526
Volume: 5,514.8279 ft^3
Weight: 5,79,056.93 lbs
Resisting Moment: 3.7525493e+008 lbs-ft
Activating Moment: 2.45955e+008 lbs-ft
Resisting Force: 1,01,339.8 lbs
Activating Force: 66,422.069 lbs
F of S Rank: 1
Exit: (735.31065, 19.428332) ft
Entry: (52.05023, 69.074664) ft
Radius: 3,691.1885 ft
Center: (660.02613, 3,709.8491) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	57.275115	68.209859	0	79.483726	14.015125	0
Slice 2	73.125	65.633898	0	263.45475	46.454181	0
Slice 3	94.375	62.275059	0	465.76483	82.126907	0
Slice 4	113.75	59.318001	0	583.75495	102.93175	0
Slice 5	131.25	56.742089	0	619.72548	109.27432	0
Slice 6	148.74016	54.253121	0	661.1491	116.57843	0
Slice 7	166.22047	51.850824	0	708.07671	124.85303	0
Slice 8	184.01766	49.493146	0	723.22133	127.52343	0
Slice	202.13171	47.183051	0	706.2814	124.53647	0

9						
Slice 10	225.59437	44.343432	0	668.85901	117.93789	0
Slice 11	249.72982	41.54782	0	675.66642	119.13822	0
Slice 12	269.18945	39.423492	0	737.315	130.00853	0
Slice 13	288.56445	37.411839	0	788.26308	138.99205	0
Slice 14	307.85482	35.511788	0	828.59428	146.10353	0
Slice 15	330	33.465219	0	905.77926	159.71332	0
Slice 16	355	31.306599	0	1,016.4626	179.22978	0
Slice 17	377.5	29.502432	0	1,090.5443	192.29238	0
Slice 18	397.5	28.021738	0	1,130.988	199.4237	0
Slice 19	418.125	26.610896	0	1,135.3934	200.20048	0
Slice 20	439.375	25.276807	0	1,102.8484	194.46193	0
Slice 21	466.25	23.786266	0	1,079.7263	190.38488	0
Slice 22	491.25	22.531498	0	1,067.8396	188.28893	0
Slice 23	510	21.724211	0	1,084.2886	191.18933	0
Slice 24	530	20.964949	0	1,127.9721	198.89191	0
Slice 25	550	20.314256	0	1,160.0978	204.55654	0
Slice 26	561.25	19.982583	0	1,174.4799	207.0925	0
Slice 27	573.33333	19.694614	0	1,185.4293	209.02316	0
Slice 28	595	19.249229	0	1,197.9502	211.23093	0
Slice 29	616.66667	18.931087	0	1,196.7337	211.01643	0
Slice 30	631.25	18.774585	0	1,189.6553	209.76832	0
Slice 31	643.75	18.706767	0	1,082.8681	190.93886	0
Slice 32	661.2862	18.671183	0	870.34226	153.46482	0
Slice 33	676.2862	18.701555	0	682.06759	120.26692	0
Slice 34	695.83931	18.858357	0	454.8488	80.202116	0
Slice 35	722.08931	19.204897	0	154.74713	27.286095	0
Slice 36	735.15533	19.42517	0	1.1804711	0.20814891	0

SLOPE STABILITY ANALYSIS WITH WATERTABLE (SEISMIC Kh=0.1g) ADDITIONAL TRAILS

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 141
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 01-07-2020
Time: 16:12:28
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Trail New\
Last Solved Date: 01-07-2020
Last Solved Time: 16:12:31

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (18.45686, 69.67188) ft
Left-Zone Right Coordinate: (130, 62.93651) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (592.06419, 30.65802) ft
Right-Zone Right Coordinate: (702.5, 22.53968) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 26
F of S: 0.960
Volume: 2,523.7124 ft^3
Weight: 2,64,989.8 lbs
Resisting Moment: 1.3597378e+008 lbs-ft
Activating Moment: 1.416916e+008 lbs-ft
Resisting Force: 46,029.391 lbs
Activating Force: 47,965.383 lbs
F of S Rank: 1
Exit: (592.06419, 30.658019) ft
Entry: (46.412826, 69.174884) ft
Radius: 2,941.2866 ft
Center: (525.44766, 2,971.1901) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	54.456413	67.870013	0	118.33373	20.86543	0
Slice 2	73.125	64.911505	0	334.20291	58.928991	0
Slice 3	94.375	61.683668	0	521.25306	91.910977	0
Slice 4	113.75	58.87253	0	623.57368	109.95286	0
Slice 5	131.25	56.452217	0	643.8113	113.5213	0
Slice 6	148.74016	54.140139	0	667.44493	117.68855	0
Slice 7	166.22047	51.93592	0	694.53833	122.46585	0
Slice 8	184.24265	49.776316	0	687.05952	121.14713	0
Slice	202.8067	47.66786	0	644.21352	113.59223	0

9						
Slice 10	221.37075	45.678721	0	589.21092	103.89378	0
Slice 11	235.32639	44.250697	0	540.93207	95.380919	0
Slice 12	249.6875	42.875169	0	539.23465	95.081617	0
Slice 13	269.0625	41.115226	0	564.78626	99.587056	0
Slice 14	288.4375	39.484384	0	577.17549	101.77161	0
Slice 15	307.8125	37.982427	0	576.29191	101.61581	0
Slice 16	325.83333	36.696782	0	593.68768	104.68316	0
Slice 17	342.5	35.61058	0	631.18692	111.29528	0
Slice 18	359.16667	34.619371	0	658.83238	116.16993	0
Slice 19	377.5	33.643859	0	665.59699	117.36271	0
Slice 20	397.5	32.704795	0	649.10665	114.45502	0
Slice 21	412.4357	32.079592	0	616.771	108.75337	0
Slice 22	425.52855	31.612539	0	558.66802	98.508246	0
Slice 23	441.84285	31.103312	0	478.31744	84.340271	0
Slice 24	458.125	30.685332	0	407.86931	71.918364	0
Slice 25	474.375	30.358206	0	347.44196	61.263391	0
Slice 26	491.25	30.11536	0	274.28783	48.364345	0
Slice 27	510	29.961097	0	220.48098	38.876746	0
Slice 28	530	29.924054	0	186.71042	32.922084	0
Slice 29	550	30.023009	0	138.53199	24.426928	0
Slice 30	561.25	30.121704	0	106.88595	18.846876	0
Slice 31	569.89105	30.248614	0	79.128403	13.952472	0
Slice 32	584.67314	30.509163	0	27.663293	4.8777849	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 147
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 01-07-2020
Time: 16:17:52
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Trail New\
Last Solved Date: 01-07-2020
Last Solved Time: 16:17:54

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (45.24923, 69.19557) ft
Left-Zone Right Coordinate: (169.96628, 58.33333) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (677.57683, 25.02025) ft
Right-Zone Right Coordinate: (770, 17.62963) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.041
Volume: 4,124.0179 ft^3
Weight: 4,33,021.88 lbs
Resisting Moment: 2.5797306e+008 lbs-ft
Activating Moment: 2.4779565e+008 lbs-ft
Resisting Force: 75,481.342 lbs
Activating Force: 72,504.233 lbs
F of S Rank: 1
Exit: (677.57683, 25.02025) ft
Entry: (45.24923, 69.19557) ft
Radius: 3,405.8728 ft
Center: (597.74378, 3,429.9573) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	53.874615	67.800311	0	126.78367	22.355382	0
Slice 2	73.125	64.748668	0	351.54673	61.987174	0
Slice 3	94.375	61.504526	0	540.50507	95.305627	0
Slice 4	113.75	58.660589	0	646.12289	113.9289	0
Slice 5	131.25	56.19454	0	670.76907	118.27469	0
Slice 6	148.74016	53.822285	0	700.21329	123.46649	0
Slice 7	166.22047	51.543526	0	734.51258	129.51438	0
Slice 8	184.24422	49.291645	0	735.9616	129.76989	0
Slice	202.8114	47.072334	0	703.93467	124.12267	0

9						
Slice 10	226.0475	44.456674	0	647.50851	114.17322	0
Slice 11	250.28661	41.869901	0	635.33137	112.02606	0
Slice 12	270.85984	39.823126	0	680.35486	119.96492	0
Slice 13	291.43306	37.902363	0	712.70299	125.66877	0
Slice 14	309.60984	36.303552	0	731.35428	128.95749	0
Slice 15	330	34.647936	0	782.69353	138.00999	0
Slice 16	355	32.769045	0	864.84569	152.49563	0
Slice 17	377.5	31.227848	0	912.01907	160.81357	0
Slice 18	397.5	29.990872	0	927.37994	163.5221	0
Slice 19	418.125	28.840789	0	904.74056	159.53017	0
Slice 20	439.375	27.785078	0	843.05322	148.65303	0
Slice 21	458.125	26.957138	0	796.8978	140.51458	0
Slice 22	474.375	26.329284	0	769.31678	135.6513	0
Slice 23	491.25	25.761056	0	731.6688	129.01295	0
Slice 24	508.66276	25.260675	0	717.90147	126.5854	0
Slice 25	525.98829	24.851471	0	729.23653	128.58408	0
Slice 26	547.32553	24.481275	0	728.86367	128.51833	0
Slice 27	561.25	24.280235	0	724.20789	127.69739	0
Slice 28	572.03456	24.194866	0	715.54115	126.16921	0
Slice 29	591.10368	24.104304	0	694.24506	122.41413	0
Slice 30	610.17281	24.12051	0	661.46274	116.63373	0
Slice 31	627.35368	24.221783	0	622.61949	109.78461	0
Slice 32	645.64421	24.437977	0	455.70411	80.352929	0
Slice 33	666.93262	24.803972	0	154.16311	27.183117	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 155
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 01-07-2020
Time: 16:24:17
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Trail New\
Last Solved Date: 01-07-2020
Last Solved Time: 16:24:19

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (52.05023, 69.07466) ft
Left-Zone Right Coordinate: (122.5, 63.88889) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (735.31065, 19.42833) ft
Right-Zone Right Coordinate: (802.5, 15.94445) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.062
Volume: 5,514.8279 ft^3
Weight: 5,79,056.93 lbs
Resisting Moment: 3.7403789e+008 lbs-ft
Activating Moment: 3.523516e+008 lbs-ft
Resisting Force: 1,01,012.36 lbs
Activating Force: 95,156.45 lbs
F of S Rank: 1
Exit: (735.31065, 19.428332) ft
Entry: (52.05023, 69.074664) ft
Radius: 3,691.1885 ft
Center: (660.02613, 3,709.8491) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	57.275115	68.209859	0	78.823669	13.898739	0
Slice 2	73.125	65.633898	0	261.22776	46.061501	0
Slice 3	94.375	62.275059	0	461.76168	81.421043	0
Slice 4	113.75	59.318001	0	578.67091	102.03529	0
Slice 5	131.25	56.742089	0	614.26406	108.31133	0
Slice 6	148.74016	54.253121	0	655.29998	115.54707	0
Slice 7	166.22047	51.850824	0	701.83729	123.75285	0
Slice 8	184.01766	49.493146	0	716.89088	126.4072	0
Slice	202.13171	47.183051	0	700.15692	123.45656	0

9						
Slice 10	225.59437	44.343432	0	663.18358	116.93716	0
Slice 11	249.72982	41.54782	0	670.19291	118.17309	0
Slice 12	269.18945	39.423492	0	731.69678	129.01788	0
Slice 13	288.56445	37.411839	0	782.65409	138.00303	0
Slice 14	307.85482	35.511788	0	823.13835	145.1415	0
Slice 15	330	33.465219	0	900.42605	158.76941	0
Slice 16	355	31.306599	0	1,011.2586	178.31217	0
Slice 17	377.5	29.502432	0	1,085.7327	191.44398	0
Slice 18	397.5	28.021738	0	1,126.7101	198.66939	0
Slice 19	418.125	26.610896	0	1,131.8376	199.57351	0
Slice 20	439.375	25.276807	0	1,100.1389	193.98418	0
Slice 21	466.25	23.786266	0	1,077.9637	190.07408	0
Slice 22	491.25	22.531498	0	1,066.8625	188.11664	0
Slice 23	510	21.724211	0	1,083.805	191.10406	0
Slice 24	530	20.964949	0	1,127.9441	198.88697	0
Slice 25	550	20.314256	0	1,160.4892	204.62556	0
Slice 26	561.25	19.982583	0	1,175.0858	207.19934	0
Slice 27	573.33333	19.694614	0	1,186.2323	209.16476	0
Slice 28	595	19.249229	0	1,199.0397	211.42305	0
Slice 29	616.66667	18.931087	0	1,198.0012	211.23994	0
Slice 30	631.25	18.774585	0	1,190.9815	210.00217	0
Slice 31	643.75	18.706767	0	1,084.1396	191.16306	0
Slice 32	661.2862	18.671183	0	871.42391	153.65555	0
Slice 33	676.2862	18.701555	0	682.93213	120.41936	0
Slice 34	695.83931	18.858357	0	455.42434	80.303599	0
Slice 35	722.08931	19.204897	0	154.93412	27.319065	0
Slice 36	735.15533	19.42517	0	1.1816948	0.20836468	0

SLOPE STABILITY ANALYSIS WITH WATERTABLE (STATIC) ADDITIONAL TRAILS

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 172
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 13-07-2020
Time: 10:35:07
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Additional Trails\
Last Solved Date: 13-07-2020
Last Solved Time: 10:35:09

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0, 70) ft
Left-Zone Right Coordinate: (300, 44.15771) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (308.88565, 43.45705) ft
Right-Zone Right Coordinate: (799.28578, 16.11111) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556

Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 26
F of S: 1.530
Volume: 769.23933 ft³
Weight: 80,770.13 lbs
Resisting Moment: 1,85,08,366 lbs-ft
Activating Moment: 1,20,93,145 lbs-ft
Resisting Force: 14,055.392 lbs
Activating Force: 9,183.6472 lbs
F of S Rank: 1
Exit: (308.88565, 43.457048) ft
Entry: (75.309816, 68.051646) ft
Radius: 1,307.1235 ft
Center: (328.42237, 1,350.4345) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	79.021089	67.330274	0	49.12296	8.6617032	0
Slice 2	86.443635	65.909772	0	145.00986	25.569151	0
Slice 3	93.866181	64.533683	0	236.26325	41.659585	0
Slice 4	101.28873	63.201866	0	322.97174	56.948632	0
Slice 5	109.375	61.803326	0	384.47161	67.792718	0
Slice 6	118.125	60.346474	0	419.97984	74.053777	0
Slice 7	126.875	58.950548	0	449.43447	79.247423	0
Slice 8	135.625	57.61535	0	472.8654	83.378929	0
Slice 9	144.37008	56.341375	0	497.36479	87.698831	0

Slice 10	153.11024	55.128376	0	522.95815	92.211632	0
Slice 11	161.85039	53.975434	0	542.55932	95.667847	0
Slice 12	170.59055	52.882388	0	556.13459	98.061533	0
Slice 13	179.02559	51.883151	0	552.86798	97.485542	0
Slice 14	187.15551	50.973573	0	533.06759	93.994199	0
Slice 15	195.28543	50.11546	0	507.84933	89.547539	0
Slice 16	203.41535	49.308712	0	477.16711	84.137436	0
Slice 17	211.54528	48.553233	0	440.98184	77.756996	0
Slice 18	219.6752	47.848933	0	399.26449	70.401102	0
Slice 19	227.80512	47.19573	0	351.99871	62.06687	0
Slice 20	235.93504	46.593547	0	299.18287	52.754012	0
Slice 21	243.82698	46.057002	0	265.86692	46.879511	0
Slice 22	251.48094	45.583143	0	252.43473	44.511054	0
Slice 23	259.1349	45.154337	0	234.17371	41.291144	0
Slice 24	266.78886	44.77054	0	211.09557	37.221845	0
Slice 25	274.44282	44.431712	0	183.22162	32.306915	0
Slice 26	282.09679	44.137818	0	150.58222	26.551709	0
Slice 27	289.75075	43.888829	0	113.21571	19.962985	0
Slice 28	297.40471	43.684717	0	71.166778	12.548623	0
Slice 29	305.05867	43.525463	0	24.484331	4.3172481	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 175
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 13-07-2020
Time: 10:40:48
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Additional Trails\
Last Solved Date: 13-07-2020
Last Solved Time: 10:40:51

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (43.54898, 69.2258) ft
Left-Zone Right Coordinate: (210, 52.98897) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (416.88264, 37.59744) ft
Right-Zone Right Coordinate: (632.5, 30.03831) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556

Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.813
Volume: 1,747.6993 ft³
Weight: 1,83,508.42 lbs
Resisting Moment: 6,58,59,865 lbs-ft
Activating Moment: 3,63,32,093 lbs-ft
Resisting Force: 32,054.192 lbs
Activating Force: 17,683.03 lbs
F of S Rank: 1
Exit: (416.88264, 37.597437) ft
Entry: (43.54898, 69.225797) ft
Radius: 2,043.0776 ft
Center: (401.9584, 2,080.6205) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	48.286735	68.393083	0	77.218457	13.615697	0
Slice 2	57.762245	66.750626	0	229.20709	40.415395	0
Slice 3	69.583333	64.772975	0	376.56411	66.398413	0
Slice 4	83.75	62.488205	0	516.50209	91.073255	0
Slice 5	97.916667	60.305356	0	646.07031	113.91963	0
Slice 6	110.83333	58.399585	0	718.59766	126.70816	0
Slice 7	122.5	56.754326	0	735.74049	129.7309	0
Slice 8	134.16667	55.177603	0	745.98955	131.53808	0
Slice 9	145.82677	53.670066	0	758.8407	133.80409	0

Slice 10	157.48031	52.231487	0	774.31419	136.53248	0
Slice 11	169.13386	50.860834	0	782.91256	138.04861	0
Slice 12	180.68479	49.568851	0	769.54899	135.69225	0
Slice 13	192.13312	48.354227	0	734.26248	129.47029	0
Slice 14	203.58145	47.204784	0	692.17995	122.05	0
Slice 15	215.02978	46.120411	0	643.2585	113.42383	0
Slice 16	226.47811	45.101003	0	587.45729	103.58457	0
Slice 17	236.10113	44.289969	0	535.65796	94.450951	0
Slice 18	246.47002	43.478574	0	512.25106	90.323683	0
Slice 19	259.41007	42.532211	0	505.41312	89.11797	0
Slice 20	272.35011	41.668409	0	489.82685	86.369689	0
Slice 21	285.29016	40.887064	0	465.45619	82.072485	0
Slice 22	298.19514	40.189752	0	432.39003	76.242028	0
Slice 23	311.06505	39.575945	0	390.66581	68.884923	0
Slice 24	323.75	39.049954	0	363.66291	64.123584	0
Slice 25	336.25	38.609415	0	351.67034	62.008969	0
Slice 26	348.75	38.245475	0	331.49992	58.452381	0
Slice 27	361.25	37.958092	0	303.16742	53.456596	0
Slice 28	374.16667	37.74284	0	257.41939	45.389984	0
Slice 29	387.5	37.604965	0	193.75366	34.163998	0
Slice 30	400.83333	37.554114	0	120.97798	21.331682	0
Slice 31	412.19132	37.57394	0	41.157755	7.2572226	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 169
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 13-07-2020
Time: 10:29:44
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Additional Trails\
Last Solved Date: 13-07-2020
Last Solved Time: 10:29:45

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (49.50489, 69.11991) ft
Left-Zone Right Coordinate: (215.61025, 52.22222) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (407.08425, 38.35643) ft
Right-Zone Right Coordinate: (632.5, 30.03831) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556
Point 29	80	55.55556

Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft²)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.768
Volume: 1,508.5209 ft³
Weight: 1,58,394.69 lbs
Resisting Moment: 5,45,10,253 lbs-ft
Activating Moment: 3,08,28,219 lbs-ft
Resisting Force: 27,654.252 lbs
Activating Force: 15,639.912 lbs
F of S Rank: 1
Exit: (407.08425, 38.356427) ft
Entry: (49.50489, 69.119914) ft
Radius: 1,959.6326 ft
Center: (395.56064, 1,997.9552) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	56.002445	67.976742	0	105.94307	18.680621	0
Slice 2	67.8125	65.932357	0	268.89561	47.413552	0
Slice 3	78.4375	64.159948	0	379.85681	66.979005	0
Slice 4	89.0625	62.447488	0	484.66607	85.459704	0
Slice 5	99.6875	60.794818	0	583.40159	102.86944	0
Slice 6	110.83333	59.126754	0	643.27503	113.42674	0
Slice 7	122.5	57.449253	0	663.69766	117.0278	0
Slice 8	134.16667	55.843285	0	676.92522	119.36018	0
Slice 9	145.82677	54.309495	0	692.45069	122.09774	0

Slice 10	157.48031	52.847634	0	710.29769	125.24465	0
Slice 11	169.13386	51.45664	0	720.97632	127.12758	0
Slice 12	181.46457	50.06398	0	707.05563	124.67299	0
Slice 13	194.47244	48.678173	0	667.54224	117.70571	0
Slice 14	207.48031	47.380095	0	618.86271	109.12219	0
Slice 15	220.48819	46.169572	0	560.94991	98.910603	0
Slice 16	233.49606	45.04644	0	493.74264	87.060149	0
Slice 17	245.53571	44.081652	0	456.9594	80.574271	0
Slice 18	256.60714	43.263083	0	451.9877	79.697626	0
Slice 19	267.67857	42.507541	0	440.34126	77.644045	0
Slice 20	278.75	41.814953	0	421.99556	74.409203	0
Slice 21	289.82143	41.185252	0	396.93286	69.989973	0
Slice 22	300.89286	40.618377	0	365.14377	64.384699	0
Slice 23	311.96429	40.114274	0	326.62843	57.593404	0
Slice 24	323.75	39.648722	0	300.62017	53.007447	0
Slice 25	336.25	39.230285	0	286.22966	50.470011	0
Slice 26	348.75	38.891693	0	263.33243	46.432612	0
Slice 27	361.25	38.632907	0	231.95334	40.899632	0
Slice 28	374.09738	38.451196	0	183.07928	32.281816	0
Slice 29	387.29212	38.351095	0	116.30234	20.507241	0
Slice 30	400.48687	38.339842	0	40.289457	7.1041184	0

SLOPE STABILITY ANALYSIS WITH WATERTABLE (SEISMIC Kh=0.05g) ADDITIONAL TRAILS

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 173
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 13-07-2020
Time: 10:37:18
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Additional Trails\
Last Solved Date: 13-07-2020
Last Solved Time: 10:37:20

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0, 70) ft
Left-Zone Right Coordinate: (300, 44.15771) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (308.88565, 43.45705) ft
Right-Zone Right Coordinate: (799.28578, 16.11111) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 26
F of S: 1.062
Volume: 769.23933 ft^3
Weight: 80,770.13 lbs
Resisting Moment: 1,84,02,265 lbs-ft
Activating Moment: 1,73,24,760 lbs-ft
Resisting Force: 13,975.063 lbs
Activating Force: 13,156.797 lbs
F of S Rank: 1
Exit: (308.88565, 43.457048) ft
Entry: (75.309816, 68.051646) ft
Radius: 1,307.1235 ft
Center: (328.42237, 1,350.4345) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	79.021089	67.330274	0	48.631196	8.5749919	0
Slice 2	86.443635	65.909772	0	143.52278	25.306938	0
Slice 3	93.866181	64.533683	0	233.79033	41.223542	0
Slice 4	101.28873	63.201866	0	319.55317	56.345846	0
Slice 5	109.375	61.803326	0	380.38071	67.071382	0
Slice 6	118.125	60.346474	0	415.5343	73.269908	0
Slice 7	126.875	58.950548	0	444.78047	78.426797	0
Slice 8	135.625	57.61535	0	468.15515	82.548385	0
Slice	144.37008	56.341375	0	492.68874	86.874318	0

9						
Slice 10	153.11024	55.128376	0	518.40819	91.409351	0
Slice 11	161.85039	53.975434	0	538.27598	94.912578	0
Slice 12	170.59055	52.882388	0	552.23746	97.374363	0
Slice 13	179.02559	51.883151	0	549.49247	96.890348	0
Slice 14	187.15551	50.973573	0	530.29242	93.504862	0
Slice 15	195.28543	50.11546	0	505.67105	89.16345	0
Slice 16	203.41535	49.308712	0	475.55588	83.853333	0
Slice 17	211.54528	48.553233	0	439.88471	77.563542	0
Slice 18	219.6752	47.848933	0	398.61024	70.28574	0
Slice 19	227.80512	47.19573	0	351.7041	62.014922	0
Slice 20	235.93504	46.593547	0	299.1599	52.749962	0
Slice 21	243.82698	46.057002	0	266.00205	46.903338	0
Slice 22	251.48094	45.583143	0	252.64724	44.548525	0
Slice 23	259.1349	45.154337	0	234.41809	41.334234	0
Slice 24	266.78886	44.77054	0	211.33014	37.263206	0
Slice 25	274.44282	44.431712	0	183.41322	32.340698	0
Slice 26	282.09679	44.137818	0	150.71046	26.57432	0
Slice 27	289.75075	43.888829	0	113.27663	19.973725	0
Slice 28	297.40471	43.684717	0	71.175519	12.550164	0
Slice 29	305.05867	43.525463	0	24.476779	4.3159165	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 176
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 13-07-2020
Time: 10:42:35
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Additional Trails\
Last Solved Date: 13-07-2020
Last Solved Time: 10:42:37

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (43.54898, 69.2258) ft
Left-Zone Right Coordinate: (210, 52.98897) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (416.88264, 37.59744) ft
Right-Zone Right Coordinate: (632.5, 30.03831) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.193
Volume: 1,747.6993 ft^3
Weight: 1,83,508.42 lbs
Resisting Moment: 6,55,41,247 lbs-ft
Activating Moment: 5,49,46,524 lbs-ft
Resisting Force: 31,899.585 lbs
Activating Force: 26,743.183 lbs
F of S Rank: 1
Exit: (416.88264, 37.597437) ft
Entry: (43.54898, 69.225797) ft
Radius: 2,043.0776 ft
Center: (401.9584, 2,080.6205) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	48.286735	68.393083	0	76.529024	13.494132	0
Slice 2	57.762245	66.750626	0	227.13937	40.0508	0
Slice 3	69.583333	64.772975	0	373.11949	65.791032	0
Slice 4	83.75	62.488205	0	511.75244	90.235763	0
Slice 5	97.916667	60.305356	0	640.17947	112.88091	0
Slice 6	110.83333	58.399585	0	712.1508	125.5714	0
Slice 7	122.5	56.754326	0	729.2779	128.59137	0
Slice 8	134.16667	55.177603	0	739.64454	130.41929	0
Slice	145.82677	53.670066	0	752.67029	132.71608	0

9						
Slice 10	157.48031	52.231487	0	768.37519	135.48528	0
Slice 11	169.13386	50.860834	0	777.32172	137.06279	0
Slice 12	180.68479	49.568851	0	764.49197	134.80056	0
Slice 13	192.13312	48.354227	0	729.88171	128.69784	0
Slice 14	203.58145	47.204784	0	688.50138	121.40137	0
Slice 15	215.02978	46.120411	0	640.28431	112.8994	0
Slice 16	226.47811	45.101003	0	585.16664	103.18067	0
Slice 17	236.10113	44.289969	0	533.90893	94.14255	0
Slice 18	246.47002	43.478574	0	510.92917	90.090599	0
Slice 19	259.41007	42.532211	0	504.51889	88.960293	0
Slice 20	272.35011	41.668409	0	489.33206	86.282445	0
Slice 21	285.29016	40.887064	0	465.31068	82.046828	0
Slice 22	298.19514	40.189752	0	432.52633	76.266062	0
Slice 23	311.06505	39.575945	0	391.00703	68.945089	0
Slice 24	323.75	39.049954	0	364.12578	64.205199	0
Slice 25	336.25	38.609415	0	352.19146	62.100858	0
Slice 26	348.75	38.245475	0	332.02297	58.544609	0
Slice 27	361.25	37.958092	0	303.63997	53.53992	0
Slice 28	374.16667	37.74284	0	257.79174	45.455639	0
Slice 29	387.5	37.604965	0	193.99351	34.206289	0
Slice 30	400.83333	37.554114	0	121.08999	21.351432	0
Slice 31	412.19132	37.57394	0	41.183146	7.2616997	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 170
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 13-07-2020
Time: 10:32:28
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Additional Trails\
Last Solved Date: 13-07-2020
Last Solved Time: 10:32:29

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (49.50489, 69.11991) ft
Left-Zone Right Coordinate: (215.61025, 52.22222) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (407.08425, 38.35643) ft
Right-Zone Right Coordinate: (632.5, 30.03831) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.05
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 1.173
Volume: 1,508.5209 ft^3
Weight: 1,58,394.69 lbs
Resisting Moment: 5,42,39,840 lbs-ft
Activating Moment: 4,62,36,724 lbs-ft
Resisting Force: 27,517.461 lbs
Activating Force: 23,457.375 lbs
F of S Rank: 1
Exit: (407.08425, 38.356427) ft
Entry: (49.50489, 69.119914) ft
Radius: 1,959.6326 ft
Center: (395.56064, 1,997.9552) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	56.002445	67.976742	0	104.98545	18.511768	0
Slice 2	67.8125	65.932357	0	266.44173	46.980867	0
Slice 3	78.4375	64.159948	0	376.36104	66.362605	0
Slice 4	89.0625	62.447488	0	480.20422	84.672961	0
Slice 5	99.6875	60.794818	0	578.0717	101.92964	0
Slice 6	110.83333	59.126754	0	637.47479	112.40401	0
Slice 7	122.5	57.449253	0	657.83478	115.99402	0
Slice 8	134.16667	55.843285	0	671.13507	118.33922	0
Slice	145.82677	54.309495	0	686.79245	121.10004	0

9						
Slice 10	157.48031	52.847634	0	704.83098	124.28072	0
Slice 11	169.13386	51.45664	0	715.8214	126.21863	0
Slice 12	181.46457	50.06398	0	702.4463	123.86023	0
Slice 13	194.47244	48.678173	0	663.67082	117.02307	0
Slice 14	207.48031	47.380095	0	615.75555	108.57432	0
Slice 15	220.48819	46.169572	0	558.59697	98.495717	0
Slice 16	233.49606	45.04644	0	492.09984	86.770478	0
Slice 17	245.53571	44.081652	0	455.81271	80.37208	0
Slice 18	256.60714	43.263083	0	451.17291	79.553958	0
Slice 19	267.67857	42.507541	0	439.83954	77.555579	0
Slice 20	278.75	41.814953	0	421.77352	74.370051	0
Slice 21	289.82143	41.185252	0	396.94562	69.992223	0
Slice 22	300.89286	40.618377	0	365.33873	64.419076	0
Slice 23	311.96429	40.114274	0	326.94954	57.650025	0
Slice 24	323.75	39.648722	0	301.01338	53.076781	0
Slice 25	336.25	39.230285	0	286.64718	50.543632	0
Slice 26	348.75	38.891693	0	263.72476	46.50179	0
Slice 27	361.25	38.632907	0	232.27818	40.956911	0
Slice 28	374.09738	38.451196	0	183.30213	32.32111	0
Slice 29	387.29212	38.351095	0	116.41258	20.526679	0
Slice 30	400.48687	38.339842	0	40.315806	7.1087644	0

SLOPE STABILITY ANALYSIS WITH WATERTABLE (SEISMIC Kh=0.1g) ADDITIONAL TRAILS

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 174
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 13-07-2020
Time: 10:39:29
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Additional Trails\
Last Solved Date: 13-07-2020
Last Solved Time: 10:39:31

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0, 70) ft
Left-Zone Right Coordinate: (300, 44.15771) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (308.88565, 43.45705) ft
Right-Zone Right Coordinate: (799.28578, 16.11111) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 26
F of S: 0.811
Volume: 769.23933 ft^3
Weight: 80,770.13 lbs
Resisting Moment: 1,82,96,473 lbs-ft
Activating Moment: 2,25,56,376 lbs-ft
Resisting Force: 13,894.975 lbs
Activating Force: 17,130.193 lbs
F of S Rank: 1
Exit: (308.88565, 43.457048) ft
Entry: (75.309816, 68.051646) ft
Radius: 1,307.1235 ft
Center: (328.42237, 1,350.4345) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	79.021089	67.330274	0	48.144316	8.489142	0
Slice 2	86.443635	65.909772	0	142.05249	25.047687	0
Slice 3	93.866181	64.533683	0	231.34681	40.792684	0
Slice 4	101.28873	63.201866	0	316.17445	55.750086	0
Slice 5	109.375	61.803326	0	376.33351	66.357752	0
Slice 6	118.125	60.346474	0	411.12845	72.493038	0
Slice 7	126.875	58.950548	0	440.15729	77.611606	0
Slice 8	135.625	57.61535	0	463.46382	81.721176	0
Slice	144.37008	56.341375	0	488.01899	86.050915	0

9						
Slice 10	153.11024	55.128376	0	513.85286	90.606124	0
Slice 11	161.85039	53.975434	0	533.97796	94.154722	0
Slice 12	170.59055	52.882388	0	548.31993	96.683598	0
Slice 13	179.02559	51.883151	0	546.09514	96.291307	0
Slice 14	187.15551	50.973573	0	527.49786	93.012106	0
Slice 15	195.28543	50.11546	0	503.47844	88.776834	0
Slice 16	203.41535	49.308712	0	473.93682	83.567849	0
Slice 17	211.54528	48.553233	0	438.78643	77.369886	0
Slice 18	219.6752	47.848933	0	397.96063	70.171197	0
Slice 19	227.80512	47.19573	0	351.4183	61.964528	0
Slice 20	235.93504	46.593547	0	299.14803	52.747869	0
Slice 21	243.82698	46.057002	0	266.14796	46.929066	0
Slice 22	251.48094	45.583143	0	252.86794	44.58744	0
Slice 23	259.1349	45.154337	0	234.66718	41.378156	0
Slice 24	266.78886	44.77054	0	211.56585	37.304768	0
Slice 25	274.44282	44.431712	0	183.60305	32.374172	0
Slice 26	282.09679	44.137818	0	150.83536	26.596343	0
Slice 27	289.75075	43.888829	0	113.33419	19.983876	0
Slice 28	297.40471	43.684717	0	71.182187	12.55134	0
Slice 29	305.05867	43.525463	0	24.468739	4.3144989	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 177
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 13-07-2020
Time: 10:44:04
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Additional Trails\
Last Solved Date: 13-07-2020
Last Solved Time: 10:44:06

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (43.54898, 69.2258) ft
Left-Zone Right Coordinate: (210, 52.98897) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (416.88264, 37.59744) ft
Right-Zone Right Coordinate: (632.5, 30.03831) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 0.887
Volume: 1,747.6993 ft^3
Weight: 1,83,508.42 lbs
Resisting Moment: 6,52,23,754 lbs-ft
Activating Moment: 7,35,60,955 lbs-ft
Resisting Force: 31,745.541 lbs
Activating Force: 35,803.439 lbs
F of S Rank: 1
Exit: (416.88264, 37.597437) ft
Entry: (43.54898, 69.225797) ft
Radius: 2,043.0776 ft
Center: (401.9584, 2,080.6205) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	48.286735	68.393083	0	75.845158	13.373548	0
Slice 2	57.762245	66.750626	0	225.0877	39.689034	0
Slice 3	69.583333	64.772975	0	369.69883	65.187879	0
Slice 4	83.75	62.488205	0	507.02881	89.402859	0
Slice 5	97.916667	60.305356	0	634.30973	111.84592	0
Slice 6	110.83333	58.399585	0	705.71409	124.43644	0
Slice 7	122.5	56.754326	0	722.81251	127.45135	0
Slice 8	134.16667	55.177603	0	733.28407	129.29777	0
Slice	145.82677	53.670066	0	746.47333	131.62339	0

9						
Slice 10	157.48031	52.231487	0	762.4011	134.43188	0
Slice 11	169.13386	50.860834	0	771.69066	136.06988	0
Slice 12	180.68479	49.568851	0	759.39393	133.90164	0
Slice 13	192.13312	48.354227	0	725.46351	127.91879	0
Slice 14	203.58145	47.204784	0	684.79267	120.74742	0
Slice 15	215.02978	46.120411	0	637.29007	112.37143	0
Slice 16	226.47811	45.101003	0	582.86775	102.77531	0
Slice 17	236.10113	44.289969	0	532.16208	93.834533	0
Slice 18	246.47002	43.478574	0	509.62031	89.85981	0
Slice 19	259.41007	42.532211	0	503.6504	88.807154	0
Slice 20	272.35011	41.668409	0	488.87365	86.201615	0
Slice 21	285.29016	40.887064	0	465.20898	82.028895	0
Slice 22	298.19514	40.189752	0	432.70998	76.298445	0
Slice 23	311.06505	39.575945	0	391.39516	69.013527	0
Slice 24	323.75	39.049954	0	364.63232	64.294516	0
Slice 25	336.25	38.609415	0	352.75088	62.199498	0
Slice 26	348.75	38.245475	0	332.57679	58.642261	0
Slice 27	361.25	37.958092	0	304.13476	53.627165	0
Slice 28	374.16667	37.74284	0	258.17773	45.523699	0
Slice 29	387.5	37.604965	0	194.23984	34.249724	0
Slice 30	400.83333	37.554114	0	121.20406	21.371545	0
Slice 31	412.19132	37.57394	0	41.20885	7.2662321	0

SLOPE/W Analysis

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File Information

Created By: Admin
Last Edited By: Admin
Revision Number: 171
File Version: 8.3
Tool Version: 8.13.4.13430
Date: 13-07-2020
Time: 10:33:33
File Name: Analysis.gsz
Directory: G:\My Drive\AGS ENGINEERING\AGS 2020 ENG PROJECTS\0280-WS20 Richard Coba 39.553792, -107.345697 Glenwood Springs, CO\Slope Stability Analysis\Additional trails\Additional Trails\
Last Solved Date: 13-07-2020
Last Solved Time: 10:33:36

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface

Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2,000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Silty gravel

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Clayey Silty Sand

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 10 °
Phi-B: 0 °

Bedrock

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 500 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (49.50489, 69.11991) ft
Left-Zone Right Coordinate: (215.61025, 52.22222) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (407.08425, 38.35643) ft
Right-Zone Right Coordinate: (632.5, 30.03831) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 70) ft
Right Coordinate: (900, 10.55556) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	60.55556
Coordinate 2	482.5	27.41667
Coordinate 3	560	23.33333
Coordinate 4	875	10
Coordinate 5	900	10

Seismic Coefficients

Horz Seismic Coef.: 0.1
Ignore seismic load in strength: No

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	174.96063	57.77778
Point 3	240	48.88889
Point 4	317.5	42.77778
Point 5	367.5	40.55556
Point 6	407.5	38.33333
Point 7	450	35
Point 8	500	32.22222
Point 9	562.5	31.11111
Point 10	635	30
Point 11	682.5	24.44444
Point 12	735	19.44444
Point 13	810	15.55556
Point 14	870	12.77778
Point 15	900	10.55556
Point 16	140	61.66667
Point 17	0	70
Point 18	62.5	68.88889
Point 19	105	66.11111
Point 20	0	60.55556
Point 21	735	17.22222
Point 22	670	21.66667
Point 23	627.5	23.88889
Point 24	562.5	26.11111
Point 25	500	27.22222
Point 26	450	27.77778
Point 27	235	41.11111
Point 28	142.5	50.55556

Point 29	80	55.55556
Point 30	25	58.88889
Point 31	0	35
Point 32	270	25
Point 33	480	16.66667
Point 34	700	11.11111
Point 35	872.5	8.33333
Point 36	900	8.33333
Point 37	900	0

Regions

	Material	Points	Area (ft^2)
Region 1	Silty gravel	20,17,18,19,16,2,3,4,5,6,7,8,9,10,11,12,13,21,22,23,24,25,26,27,28,29,30	5,676.8
Region 2	Clayey Silty Sand	31,32,33,34,35,36,15,14,13,21,22,23,24,25,26,27,28,29,30,20	11,492
Region 3	Bedrock	1,31,32,33,34,35,36,37	17,437

Current Slip Surface

Slip Surface: 1
F of S: 0.875
Volume: 1,508.5209 ft^3
Weight: 1,58,394.69 lbs
Resisting Moment: 5,39,70,327 lbs-ft
Activating Moment: 6,16,45,229 lbs-ft
Resisting Force: 27,381.141 lbs
Activating Force: 31,274.924 lbs
F of S Rank: 1
Exit: (407.08425, 38.356427) ft
Entry: (49.50489, 69.119914) ft
Radius: 1,959.6326 ft
Center: (395.56064, 1,997.9552) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	56.002445	67.976742	0	104.03539	18.344247	0
Slice 2	67.8125	65.932357	0	264.00577	46.551341	0
Slice 3	78.4375	64.159948	0	372.88757	65.75014	0
Slice 4	89.0625	62.447488	0	475.76532	83.890262	0
Slice 5	99.6875	60.794818	0	572.76135	100.99328	0
Slice 6	110.83333	59.126754	0	631.68551	111.3832	0
Slice 7	122.5	57.449253	0	651.97096	114.96007	0
Slice 8	134.16667	55.843285	0	665.33207	117.31599	0
Slice	145.82677	54.309495	0	681.11081	120.09821	0

9						
Slice 10	157.48031	52.847634	0	699.33272	123.31123	0
Slice 11	169.13386	51.45664	0	710.63008	125.30326	0
Slice 12	181.46457	50.06398	0	697.80013	123.04099	0
Slice 13	194.47244	48.678173	0	659.76741	116.33479	0
Slice 14	207.48031	47.380095	0	612.62559	108.02242	0
Slice 15	220.48819	46.169572	0	556.23331	98.07894	0
Slice 16	233.49606	45.04644	0	490.45947	86.481238	0
Slice 17	245.53571	44.081652	0	454.68024	80.172394	0
Slice 18	256.60714	43.263083	0	450.38237	79.414564	0
Slice 19	267.67857	42.507541	0	439.3705	77.472874	0
Slice 20	278.75	41.814953	0	421.59026	74.337737	0
Slice 21	289.82143	41.185252	0	397.00048	70.001895	0
Slice 22	300.89286	40.618377	0	365.57618	64.460943	0
Slice 23	311.96429	40.114274	0	327.3108	57.713724	0
Slice 24	323.75	39.648722	0	301.44247	53.152441	0
Slice 25	336.25	39.230285	0	287.09453	50.622512	0
Slice 26	348.75	38.891693	0	264.13938	46.5749	0
Slice 27	361.25	38.632907	0	232.61757	41.016754	0
Slice 28	374.09738	38.451196	0	183.53256	32.361741	0
Slice 29	387.29212	38.351095	0	116.52549	20.546587	0
Slice 30	400.48687	38.339842	0	40.342574	7.1134843	0

GEOPHYSICAL

SETTING &

WATER WELL DETAILS

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

GLENWOOD MEADOWS HOUSING
WULFSOHN ROAD
GLENWOOD SPRINGS, CO 81601

TARGET PROPERTY COORDINATES

Latitude (North):	39.554395 - 39° 33' 15.82''
Longitude (West):	107.348062 - 107° 20' 53.02''
Universal Tranverse Mercator:	Zone 13
UTM X (Meters):	298257.4
UTM Y (Meters):	4380725.5
Elevation:	5915 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5957205 GLENWOOD SPRINGS, CO
Version Date:	2013
West Map:	5957249 STORM KING MOUNTAIN, CO
Version Date:	2013

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
Not Reported	

Additional Panels in search area:	FEMA Source Type
Not Reported	

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
NOT AVAILABLE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

Era:	Paleozoic
System:	Ordovician
Series:	Lower Paleozoic
Code:	lPz *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Chilton

Soil Surface Texture: channery loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	12 inches	channery loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 42.34 Min: 14.11	Max: 8.4 Min: 7.9
2	12 inches	22 inches	very channery sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 42.34 Min: 14.11	Max: 8.4 Min: 7.9
3	22 inches	59 inches	very cobbly sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 42.34 Min: 14.11	Max: 8.4 Min: 7.9

Soil Map ID: 2

Soil Component Name: Begay

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42.34 Min: 14.11	Max: 8.4 Min: 7.9
2	9 inches	59 inches	stony sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42.34 Min: 14.11	Max: 8.4 Min: 7.9

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
E23	USGS40000208918	1/2 - 1 Mile East
G29	USGS40000208899	1/2 - 1 Mile East
G34	USGS40000208906	1/2 - 1 Mile East

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	CO7000000324417	1/4 - 1/2 Mile ENE
A2	CO7000000349413	1/4 - 1/2 Mile ENE
3	CO7000000166980	1/4 - 1/2 Mile WNW
A4	CO7000000258803	1/4 - 1/2 Mile ENE
5	CO7000000090604	1/4 - 1/2 Mile NE
6	CO7000000298041	1/2 - 1 Mile ENE
7	CO7000000150535	1/2 - 1 Mile NNW
B8	CO7000000365873	1/2 - 1 Mile WNW
B9	CO7000000133567	1/2 - 1 Mile WNW
B10	CO7000000313658	1/2 - 1 Mile WNW
B11	CO7000000393080	1/2 - 1 Mile WNW
C12	CO7000000150536	1/2 - 1 Mile NE
C13	CO7000000256265	1/2 - 1 Mile NE
B14	CO7000000256424	1/2 - 1 Mile WNW
15	CO7000000112971	1/2 - 1 Mile WNW
D16	CO7000000425543	1/2 - 1 Mile NW
E17	CO7000000299859	1/2 - 1 Mile East
D18	CO7000000011033	1/2 - 1 Mile NW
D19	CO7000000012473	1/2 - 1 Mile WNW
E20	CO7000000073001	1/2 - 1 Mile East
E21	CO7000000248384	1/2 - 1 Mile East
D22	CO7000000011034	1/2 - 1 Mile NW
24	CO7000000284603	1/2 - 1 Mile ENE

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
25	CO7000000009536	1/2 - 1 Mile SSE
26	CO7000000160074	1/2 - 1 Mile SW
F27	CO7000000183771	1/2 - 1 Mile WNW
F28	CO7000000091690	1/2 - 1 Mile WNW
30	CO7000000010345	1/2 - 1 Mile East
H31	CO7000000092945	1/2 - 1 Mile NNE
H32	CO7000000322929	1/2 - 1 Mile NNE
33	CO7000000348987	1/2 - 1 Mile NNW
35	CO7000000150553	1/2 - 1 Mile NNE
36	CO7000000097341	1/2 - 1 Mile East
I37	CO7000000352550	1/2 - 1 Mile NW
38	CO7000000104162	1/2 - 1 Mile North
39	CO7000000011413	1/2 - 1 Mile ESE
J40	CO7000000253039	1/2 - 1 Mile NW
I41	CO7000000122552	1/2 - 1 Mile NW
J42	CO7000000071993	1/2 - 1 Mile NW
J43	CO7000000395992	1/2 - 1 Mile NW
J44	CO7000000429147	1/2 - 1 Mile NW
J45	CO7000000104686	1/2 - 1 Mile NW
K46	CO7000000229226	1/2 - 1 Mile North
K47	CO7000000229225	1/2 - 1 Mile North
K48	CO7000000229224	1/2 - 1 Mile North
K49	CO7000000229227	1/2 - 1 Mile North
K50	CO7000000469712	1/2 - 1 Mile North
K51	CO7000000313945	1/2 - 1 Mile North
K52	CO7000000229228	1/2 - 1 Mile North
I53	CO7000000122553	1/2 - 1 Mile NW
54	CO7000000012620	1/2 - 1 Mile NW
L55	CO7000000076247	1/2 - 1 Mile NE
L56	CO7000000321216	1/2 - 1 Mile NE
M57	CO7000000010707	1/2 - 1 Mile East
M58	CO7000000010708	1/2 - 1 Mile East
M59	CO7000000010709	1/2 - 1 Mile East

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

A1
ENE
1/4 - 1/2 Mile
Lower

CO WELLS **CO7000000324417**

CO DWR ID #:	Not Reported	Permit #:	36945-MH
Well Name:	Not Reported		
Well Status:	Permit Issued; Completion Status Unknown		
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	09/10/1999
Expiration Date:	12/10/1999	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	UNKNOWN	Water District:	45
Division:	5	Comments:	Not Reported

A2
ENE
1/4 - 1/2 Mile
Lower

CO WELLS **CO7000000349413**

CO DWR ID #:	Not Reported	Permit #:	36139-MH
Well Name:	Not Reported		
Well Status:	Permit Issued; Completion Status Unknown		
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	05/19/1999
Expiration Date:	08/19/1999	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

3
WNW
1/4 - 1/2 Mile
Lower

CO WELLS **CO7000000166980**

CO DWR ID #:	Not Reported	Permit #:	24572-F
Well Name:	Not Reported	Well Status:	Not Reported
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Commercial	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	12/31/1979

Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

A4
ENE **CO WELLS** **CO7000000258803**
1/4 - 1/2 Mile
Lower

CO DWR ID #:	Not Reported	Permit #:	221874-
Well Name:	MW 2	Well Status:	Well Abandoned
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	11/12/1999
Expiration Date:	11/12/2001	Construction Date:	09/15/1999
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	02/16/2000	Surface Elevation (ft):	5720
Well Depth (ft):	20	Top of First Perf Casing:	10
Base of Last Perf Casing:	20	Yield (gal/min):	0
Static Water Depth (ft):	17	Groundwater Basin:	Not Reported
Mgmt District:	UNKNOWN	Water District:	45
Division:	5	Comments:	Not Reported

5
NE **CO WELLS** **CO7000000090604**
1/4 - 1/2 Mile
Lower

CO DWR ID #:	Not Reported	Permit #:	221873-
Well Name:	MW 1	Well Status:	Well Abandoned
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	11/12/1999
Expiration Date:	11/12/2001	Construction Date:	05/12/1999
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	02/16/2000	Surface Elevation (ft):	5720
Well Depth (ft):	24	Top of First Perf Casing:	14
Base of Last Perf Casing:	24	Yield (gal/min):	0
Static Water Depth (ft):	18	Groundwater Basin:	Not Reported
Mgmt District:	UNKNOWN	Water District:	45
Division:	5	Comments:	Not Reported

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

6
ENE
1/2 - 1 Mile
Lower

CO WELLS **CO7000000298041**

CO DWR ID #:	Not Reported	Permit #:	21029-F
Well Name:	WEST GLEN #1	Well Status:	Permit Expired
Water Court Case #:	W2997	Parcel Size:	0
Well Use:	Domestic	Addtl Well Use:	Commercial
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	05/25/1976
Expiration Date:	05/25/1978	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	39
Division:	5		
Comments:	X-refer case no. W2997, Abandoned by court 06/10/82. dmw 06/17/11		

7
NNW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000150535**

CO DWR ID #:	Not Reported	Permit #:	9992-AD
Well Name:	MITCHELL-COOPER WELL NO. 2		
Well Status:	Application Denied	Water Court Case #:	79CW0381
Parcel Size:	0	Well Use:	Municipal
Addtl Well Use:	Not Reported	Special Use:	Not Reported
Primary Aquifer:	All Unnamed Aquifers	Addtl Aquifer:	Not Reported
Irrigation Area:	0 acres	Yrly Appropriation:	0
Issue Date:	03/10/1983	Expiration Date:	Not Reported
Construction Date:	Not Reported	Start Use Date:	Not Reported
Pump Install Date:	Not Reported	Well Plug Date:	Not Reported
Surface Elevation (ft):	0	Well Depth (ft):	0
Top of First Perf Casing:	0	Base of Last Perf Casing:	0
Yield (gal/min):	0	Static Water Depth (ft):	0
Groundwater Basin:	Not Reported	Mgmt District:	Not Reported
Water District:	45	Division:	5
Comments:	APPLICATION DENIED! X-refer case no. 79CW0381, dismissed & not decreed. dmw 06/16/11		

B8
WNW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000365873**

CO DWR ID #:	Not Reported	Permit #:	53-GX
Well Name:	Not Reported	Well Status:	Well Constructed
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Geothermal	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	Not Reported

Expiration Date:	Not Reported	Construction Date:	06/26/2007
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	300	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	38
Division:	5		
Comments:	Well located at 0120 Midland Ave Glenwood Springs		

B9
WNW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000133567**

CO DWR ID #:	Not Reported	Permit #:	53-GX
Well Name:	Not Reported	Well Status:	Well Constructed
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Geothermal	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	Not Reported
Expiration Date:	Not Reported	Construction Date:	01/02/2008
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5		
Comments:	Property location: 0120 Midland Ave, Glenwood Springs, CO 81601		

B10
WNW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000313658**

CO DWR ID #:	Not Reported	Permit #:	1-GX
Well Name:	Not Reported	Well Status:	Well Constructed
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Geothermal	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	Not Reported
Expiration Date:	Not Reported	Construction Date:	07/21/2008
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	38
Division:	5	Comments:	Not Reported

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

B11
WNW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000393080**

CO DWR ID #:	Not Reported	Permit #:	53-GX
Well Name:	Not Reported	Well Status:	Well Constructed
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Geothermal	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	Not Reported
Expiration Date:	Not Reported	Construction Date:	01/02/2008
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	300	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	38
Division:	5		
Comments:	Well located at 0120 Midland Ave Glenwood Springs		

C12
NE
1/2 - 1 Mile
Lower

CO WELLS **CO7000000150536**

CO DWR ID #:	Not Reported	Permit #:	154190--A
Well Name:	MARTIN WATER WELL NO. 1	Well Status:	Well Constructed
Water Court Case #:	W1609	Parcel Size:	0
Well Use:	Domestic	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	05/23/1989
Expiration Date:	Not Reported	Construction Date:	05/25/1989
Start Use Date:	Not Reported	Pump Install Date:	06/07/1989
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	66	Top of First Perf Casing:	36
Base of Last Perf Casing:	66	Yield (gal/min):	10
Static Water Depth (ft):	53	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5		
Comments:	X-refer file no. 154190 & case no. W1609 (Martin Well no. 1), domestic an other beneficial purposes.		

C13
NE
1/2 - 1 Mile
Lower

CO WELLS **CO7000000256265**

CO DWR ID #:	Not Reported	Permit #:	154190-
Well Name:	MARTIN WATER WELL NO. 1	Well Status:	Well Abandoned
Water Court Case #:	W1609	Parcel Size:	0
Well Use:	Domestic	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	1.5	Issue Date:	05/23/1989

Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	03/03/1963	Pump Install Date:	Not Reported
Well Plug Date:	06/17/1989	Surface Elevation (ft):	0
Well Depth (ft):	20	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	15
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5		
Comments:	X-refer file no. 154190-A & case no. W1609 (Martin Well no. 1), domestic an other beneficial purposes.		

B14
WNW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000256424**

CO DWR ID #:	Not Reported	Permit #:	493-G
Well Name:	Not Reported	Well Status:	Well Constructed
Water Court Case #:	Not Reported	Parcel Size:	5.7399998
Well Use:	Geothermal	Addtl Well Use:	Not Reported
Special Use:	Closed Loop Geothermal	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	07/26/2004
Expiration Date:	07/26/2005	Construction Date:	11/06/2004
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	275	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

15
WNW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000112971**

CO DWR ID #:	Not Reported	Permit #:	2000026-AB
Well Name:	Not Reported	Well Status:	Well Abandoned
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	Not Reported
Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	04/01/1995	Surface Elevation (ft):	0
Well Depth (ft):	35	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

D16
NW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000425543**

CO DWR ID #:	Not Reported	Permit #:	166102-
Well Name:	MW-1	Well Status:	Well Abandoned
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	09/09/1992
Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	04/01/1995	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

E17
East
1/2 - 1 Mile
Lower

CO WELLS **CO7000000299859**

CO DWR ID #:	Not Reported	Permit #:	27676-MH
Well Name:	Not Reported		
Well Status:	Permit Issued; Completion Status Unknown		
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	03/26/1996
Expiration Date:	06/26/1996	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	38
Division:	5	Comments:	Not Reported

D18
NW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000011033**

CO DWR ID #:	Not Reported	Permit #:	166103-
Well Name:	MW-2	Well Status:	Well Abandoned
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	09/09/1992
Expiration Date:	Not Reported	Construction Date:	Not Reported

Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	04/01/1995	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

D19
WNW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000012473**

CO DWR ID #:	Not Reported	Permit #:	170892-
Well Name:	MW-4	Well Status:	Well Abandoned
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	07/01/1993
Expiration Date:	07/01/1995	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	04/01/1995	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	MONITORING AND OBSERVATION WELL

E20
East
1/2 - 1 Mile
Lower

CO WELLS **CO7000000073001**

CO DWR ID #:	Not Reported	Permit #:	17-G
Well Name:	Not Reported	Well Status:	Permit Expired
Water Court Case #:	83CW0150	Parcel Size:	0
Well Use:	Geothermal	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	01/21/1987
Expiration Date:	01/21/1988	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	2500
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	39
Division:	5	Comments:	SEE 87CW208

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

E21
East
1/2 - 1 Mile
Lower

CO WELLS **CO7000000248384**

CO DWR ID #:	Not Reported	Permit #:	460-G
Well Name:	REDSTONE WELL	Well Status:	Well Constructed
Water Court Case #:	83CW0150	Parcel Size:	13.41
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	03/19/2004
Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	155	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	39
Division:	5		
Comments:	Type A-OS. Also Case Nos. 00CW171, 01CW162, 94CW253		

D22
NW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000011034**

CO DWR ID #:	Not Reported	Permit #:	166104-
Well Name:	MW-3	Well Status:	Well Abandoned
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	09/09/1992
Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	04/01/1995	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

E23
East
1/2 - 1 Mile
Lower

FED USGS **USGS40000208918**

Organization ID:	USGS-CO	Organization Name:	USGS Colorado Water Science Center
Monitor Location:	SC00608909BBA USGS 393313107200401		
Type:	Well	Description:	Not Reported
HUC:	14010005	Drainage Area:	Not Reported
Drainage Area Units:	Not Reported	Contrib Drainage Area:	Not Reported
Contrib Drainage Area Unts:	Not Reported	Aquifer:	Not Reported
Formation Type:	Leadville Limestone	Aquifer Type:	Not Reported
Construction Date:	19810101	Well Depth:	Not Reported

Well Depth Units:	Not Reported	Well Hole Depth:	155
Well Hole Depth Units:	ft		

Ground water levels,Number of Measurements:	1	Level reading date:	1984-11-12
Feet below surface:	-13.20	Feet to sea level:	Not Reported
Note:	Other conditions existed that would affect the measured water level.		

24
ENE **CO WELLS** **CO7000000284603**
1/2 - 1 Mile
Lower

CO DWR ID #:	Not Reported	Permit #:	36-G
Well Name:	DUNNING NO. 03	Well Status:	Permit Expired
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Commercial	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	11/17/1987
Expiration Date:	11/17/1988	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

25
SSE **CO WELLS** **CO7000000009536**
1/2 - 1 Mile
Higher

CO DWR ID #:	Not Reported	Permit #:	19912-MH
Well Name:	Not Reported		
Well Status:	Permit Issued; Completion Status Unknown		
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	10/20/1992
Expiration Date:	01/18/1993	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	38
Division:	5	Comments:	Not Reported

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

26
SW
1/2 - 1 Mile
Higher

CO WELLS **CO7000000160074**

CO DWR ID #:	Not Reported	Permit #:	50760-MH
Well Name:	Not Reported		
Well Status:	Permit Issued; Completion Status Unknown		
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	06/27/2012
Expiration Date:	09/25/2012	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	37
Division:	5	Comments:	3 holes - Location based upon UTM

F27
WNW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000183771**

CO DWR ID #:	Not Reported	Permit #:	51379-MH
Well Name:	Not Reported	Well Status:	Well Abandoned
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	04/02/2013
Expiration Date:	07/01/2013	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	04/12/2013	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5		
Comments:	20 holes - 51171 Hwy 6 & 24 - Glenwood Springs, CO		

F28
WNW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000091690**

CO DWR ID #:	Not Reported	Permit #:	37534-MH
Well Name:	Not Reported		
Well Status:	Permit Issued; Completion Status Unknown		
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0

Yrly Appropriation:	0	Issue Date:	12/27/1999
Expiration Date:	03/27/2000	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	UNKNOWN	Water District:	45
Division:	5	Comments:	Not Reported

G29
East
1/2 - 1 Mile
Lower

FED USGS **USGS40000208899**

Organization ID:	USGS-CO	Organization Name:	USGS Colorado Water Science Center
Monitor Location:	SC00608909BBD	Type:	Well
Description:	Not Reported	HUC:	14010005
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Alluvium and Terrace Deposits
Aquifer Type:	Not Reported	Construction Date:	19821001
Well Depth:	Not Reported	Well Depth Units:	Not Reported
Well Hole Depth:	78	Well Hole Depth Units:	ft

Ground water levels,Number of Measurements:	1	Level reading date:	1984-11-12
Feet below surface:	12.11	Feet to sea level:	Not Reported
Note:	Not Reported		

30
East
1/2 - 1 Mile
Lower

CO WELLS **CO7000000010345**

CO DWR ID #:	Not Reported	Permit #:	37-G
Well Name:	DUNNING NO. 02	Well Status:	Permit Expired
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Commercial	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	11/17/1987
Expiration Date:	11/17/1989	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

H31
NNE
1/2 - 1 Mile
Higher

CO WELLS **CO7000000092945**

CO DWR ID #:	Not Reported	Permit #:	37727-MH
Well Name:	Not Reported	Well Status:	Well Constructed
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	02/09/2000
Expiration Date:	05/09/2000	Construction Date:	03/02/2000
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	436	Top of First Perf Casing:	136
Base of Last Perf Casing:	436	Yield (gal/min):	15
Static Water Depth (ft):	102	Groundwater Basin:	Not Reported
Mgmt District:	UNKNOWN	Water District:	45
Division:	5	Comments:	Not Reported

H32
NNE
1/2 - 1 Mile
Higher

CO WELLS **CO7000000322929**

CO DWR ID #:	Not Reported	Permit #:	36135-MH
Well Name:	Not Reported	Well Status:	Permit Expired
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	05/10/1999
Expiration Date:	08/10/1999	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5		
Comments:	Expired notice. Drillers log not submitted. dmw 04/17/11		

33
NNW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000348987**

CO DWR ID #:	Not Reported	Permit #:	39674-MH
Well Name:	Not Reported		
Well Status:	Permit Issued; Completion Status Unknown		
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	05/03/2001

Expiration Date:	08/03/2001	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

G34
East
1/2 - 1 Mile
Lower

FED USGS **USGS40000208906**

Organization ID:	USGS-CO	Organization Name:	USGS Colorado Water Science Center
Monitor Location:	SC00608909BAC	Type:	Well
Description:	Not Reported	HUC:	14010005
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Alluvium and Terrace Deposits
Aquifer Type:	Not Reported	Construction Date:	19821001
Well Depth:	Not Reported	Well Depth Units:	Not Reported
Well Hole Depth:	84	Well Hole Depth Units:	ft

Ground water levels,Number of Measurements:	1	Level reading date:	1984-11-12
Feet below surface:	8.05	Feet to sea level:	Not Reported
Note:	Not Reported		

35
NNE
1/2 - 1 Mile
Higher

CO WELLS **CO7000000150553**

CO DWR ID #:	Not Reported	Permit #:	131628-
Well Name:	Not Reported	Well Status:	Well Constructed
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Irrigation	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	1 acres
Yrly Appropriation:	0	Issue Date:	07/25/1983
Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	07/01/1948	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	140	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	15
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	39
Division:	5		
Comments:	Registration of existing well. Limit to historic use prior May 8, 1972. dmw 06/14/11		

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

36
East
1/2 - 1 Mile
Lower

CO WELLS **CO7000000097341**

CO DWR ID #:	Not Reported	Permit #:	108656-
Well Name:	Not Reported	Well Status:	Permit Expired
Water Court Case #:	Not Reported	Parcel Size:	5
Well Use:	Domestic	Addtl Well Use:	Stock
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 ACRES
Yrly Appropriation:	0	Issue Date:	Not Reported
Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	UNKNOWN	Water District:	45
Division:	5	Comments:	Not Reported

I37
NW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000352550**

CO DWR ID #:	Not Reported	Permit #:	52468-MH
Well Name:	Not Reported	Well Status:	Well Constructed
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	04/28/2014
Expiration Date:	07/27/2014	Construction Date:	05/07/2014
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	5719
Well Depth (ft):	34	Top of First Perf Casing:	14
Base of Last Perf Casing:	34	Yield (gal/min):	0
Static Water Depth (ft):	16	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5		
Comments:	OPS VARIANCE - 3 holes - 51171 Hwy 6 & 24 - Glenwood Springs, CO. Seven WCR received.		

38
North
1/2 - 1 Mile
Higher

CO WELLS **CO7000000104162**

CO DWR ID #:	Not Reported	Permit #:	236600-
Well Name:	Not Reported	Well Status:	Well Constructed
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Irrigation	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	1 ACRES
Yrly Appropriation:	2.5	Issue Date:	10/16/2001
Expiration Date:	10/16/2003	Construction Date:	Not Reported

Start Use Date:	01/01/1952	Pump Install Date:	05/24/2002
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	220	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	15
Static Water Depth (ft):	197	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	72
Division:	5	Comments:	registration of existing well

39
ESE
1/2 - 1 Mile
Lower

CO WELLS **CO7000000011413**

CO DWR ID #:	Not Reported	Permit #:	78338-
Well Name:	Not Reported	Well Status:	Well Constructed
Water Court Case #:	W2718	Parcel Size:	0
Well Use:	Domestic	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	1 acres
Yrly Appropriation:	0	Issue Date:	03/24/1975
Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	06/30/1953	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	40	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	15
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

J40
NW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000253039**

CO DWR ID #:	Not Reported	Permit #:	27302-F
Well Name:	Not Reported	Well Status:	Permit Expired
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Municipal	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	05/15/1984
Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

I41
NW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000122552**

CO DWR ID #:	Not Reported	Permit #:	262669-
Well Name:	SP-1	Well Status:	Well Constructed
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	04/06/2005
Expiration Date:	Not Reported	Construction Date:	10/30/2001
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	20	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

J42
NW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000071993**

CO DWR ID #:	Not Reported	Permit #:	27098-MH
Well Name:	Not Reported	Well Status:	Permit Expired
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	12/01/1995
Expiration Date:	03/01/1996	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	no data

J43
NW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000395992**

CO DWR ID #:	Not Reported	Permit #:	27686-MH
Well Name:	Not Reported	Well Status:	Permit Expired
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	03/26/1996
Expiration Date:	06/26/1996	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported

Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	no data

J44
NW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000429147**

CO DWR ID #:	Not Reported	Permit #:	36560-MH
Well Name:	Not Reported	Well Status:	Permit Expired
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	07/14/1999
Expiration Date:	10/08/1999	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	no data

J45
NW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000104686**

CO DWR ID #:	Not Reported	Permit #:	40184-MH
Well Name:	Not Reported	Well Status:	Well Constructed
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	10/23/2001
Expiration Date:	01/23/2002	Construction Date:	10/30/2001
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	no data

K46
North
1/2 - 1 Mile
Higher

CO WELLS **CO7000000229226**

CO DWR ID #:	Not Reported	Permit #:	285768-
Well Name:	CHARO IRRIGATION WELL NO 2		

Well Status:	Permit Extended	Water Court Case #:	Not Reported
Parcel Size:	12.51	Well Use:	Other
Addtl Well Use:	Not Reported	Special Use:	Monitoring Well
Primary Aquifer:	All Unnamed Aquifers	Addtl Aquifer:	Not Reported
Irrigation Area:	0	Yrly Appropriation:	0
Issue Date:	05/24/2011	Expiration Date:	05/24/2017
Construction Date:	Not Reported	Start Use Date:	Not Reported
Pump Install Date:	Not Reported	Well Plug Date:	Not Reported
Surface Elevation (ft):	0	Well Depth (ft):	0
Top of First Perf Casing:	0	Base of Last Perf Casing:	0
Yield (gal/min):	0	Static Water Depth (ft):	0
Groundwater Basin:	Not Reported	Mgmt District:	Not Reported
Water District:	39	Division:	5
Comments:	RULE 6.2.3 = LOCATION! Monitoring/Observation Hole. Tax #R530062 (totaling 12.51 acres). Phy address: 0325 Charo (aka Sunny Acres), GWS, CO 81601. dmw 05/14/13		

K47
North
1/2 - 1 Mile
Higher

CO WELLS **CO7000000229225**

CO DWR ID #:	Not Reported	Permit #:	285767-
Well Name:	CHARO IRRIGATION WELL NO 1		
Well Status:	Permit Extended	Water Court Case #:	Not Reported
Parcel Size:	12.51	Well Use:	Other
Addtl Well Use:	Not Reported	Special Use:	Monitoring Well
Primary Aquifer:	All Unnamed Aquifers	Addtl Aquifer:	Not Reported
Irrigation Area:	0	Yrly Appropriation:	0
Issue Date:	05/24/2011	Expiration Date:	05/24/2017
Construction Date:	Not Reported	Start Use Date:	Not Reported
Pump Install Date:	Not Reported	Well Plug Date:	Not Reported
Surface Elevation (ft):	0	Well Depth (ft):	0
Top of First Perf Casing:	0	Base of Last Perf Casing:	0
Yield (gal/min):	0	Static Water Depth (ft):	0
Groundwater Basin:	Not Reported	Mgmt District:	Not Reported
Water District:	39	Division:	5
Comments:	RULE 6.2.3 = LOCATION! Monitoring/Observation Hole. Tax #R530062 (totaling 12.51 acres). Phy address: 0325 Charo (aka Sunny Acres), GWS, CO 81601. dmw 05/14/13		

K48
North
1/2 - 1 Mile
Higher

CO WELLS **CO7000000229224**

CO DWR ID #:	Not Reported	Permit #:	285766-
Well Name:	CHARO DOMESTIC WELL	Well Status:	Permit Extended
Water Court Case #:	Not Reported	Parcel Size:	12.51
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	05/24/2011
Expiration Date:	05/24/2017	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	39

Division:	5
Comments:	RULE 6.2.3 = LOCATION! Monitoring/Observation Hole. Tax #R530062 (totaling 12.51 acres). Phy address: 0325 Charo (aka Sunny Acres), GWS, CO 81601. dmw 05/14/13

K49
North
1/2 - 1 Mile
Higher

CO WELLS **CO7000000229227**

CO DWR ID #:	Not Reported	Permit #:	285769-
Well Name:	CHARO GEOTHERMAL WELL NO 1		
Well Status:	Permit Extended	Water Court Case #:	Not Reported
Parcel Size:	12.51	Well Use:	Other
Addtl Well Use:	Not Reported	Special Use:	Monitoring Well
Primary Aquifer:	All Unnamed Aquifers	Addtl Aquifer:	Not Reported
Irrigation Area:	0	Yrly Appropriation:	0
Issue Date:	05/24/2011	Expiration Date:	05/24/2017
Construction Date:	Not Reported	Start Use Date:	Not Reported
Pump Install Date:	Not Reported	Well Plug Date:	Not Reported
Surface Elevation (ft):	0	Well Depth (ft):	0
Top of First Perf Casing:	0	Base of Last Perf Casing:	0
Yield (gal/min):	0	Static Water Depth (ft):	0
Groundwater Basin:	Not Reported	Mgmt District:	Not Reported
Water District:	39	Division:	5
Comments:	RULE 6.2.3 = LOCATION! Monitoring/Observation Hole. Tax #R530062 (totaling 12.51 acres). Phy address: 0325 Charo (aka Sunny Acres), GWS, CO 81601. dmw 05/14/13		

K50
North
1/2 - 1 Mile
Higher

CO WELLS **CO7000000469712**

CO DWR ID #:	Not Reported	Permit #:	285772-
Well Name:	CHARO GEO-REINJECTION WELL NO 2		
Well Status:	Permit Extended	Water Court Case #:	Not Reported
Parcel Size:	12.51	Well Use:	Other
Addtl Well Use:	Not Reported	Special Use:	Monitoring Well
Primary Aquifer:	All Unnamed Aquifers	Addtl Aquifer:	Not Reported
Irrigation Area:	0	Yrly Appropriation:	0
Issue Date:	05/24/2011	Expiration Date:	05/24/2017
Construction Date:	Not Reported	Start Use Date:	Not Reported
Pump Install Date:	Not Reported	Well Plug Date:	Not Reported
Surface Elevation (ft):	0	Well Depth (ft):	0
Top of First Perf Casing:	0	Base of Last Perf Casing:	0
Yield (gal/min):	0	Static Water Depth (ft):	0
Groundwater Basin:	Not Reported	Mgmt District:	Not Reported
Water District:	39	Division:	5
Comments:	RULE 6.2.3 = LOCATION! Monitoring/Observation Hole. Tax #R530062 (totaling 12.51 acres). Phy address: 0325 Charo (aka Sunny Acres), GWS, CO 81601. dmw 05/14/13		

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

K51
North
1/2 - 1 Mile
Higher

CO WELLS **CO7000000313945**

CO DWR ID #:	Not Reported	Permit #:	285770-
Well Name:	CHARO GEOTHERMAL WELL NO 2		
Well Status:	Permit Extended	Water Court Case #:	Not Reported
Parcel Size:	12.51	Well Use:	Other
Addtl Well Use:	Not Reported	Special Use:	Monitoring Well
Primary Aquifer:	All Unnamed Aquifers	Addtl Aquifer:	Not Reported
Irrigation Area:	0	Yrly Appropriation:	0
Issue Date:	05/24/2011	Expiration Date:	05/24/2017
Construction Date:	Not Reported	Start Use Date:	Not Reported
Pump Install Date:	Not Reported	Well Plug Date:	Not Reported
Surface Elevation (ft):	0	Well Depth (ft):	0
Top of First Perf Casing:	0	Base of Last Perf Casing:	0
Yield (gal/min):	0	Static Water Depth (ft):	0
Groundwater Basin:	Not Reported	Mgmt District:	Not Reported
Water District:	39	Division:	5
Comments:	RULE 6.2.3 = LOCATION! Monitoring/Observation Hole. Tax #R530062 (totaling 12.51 acres). Phy address: 0325 Charo (aka Sunny Acres), GWS, CO 81601. dmw 05/14/13		

K52
North
1/2 - 1 Mile
Higher

CO WELLS **CO7000000229228**

CO DWR ID #:	Not Reported	Permit #:	285771-
Well Name:	CHARO GEO-REINJECTION WELL NO 1		
Well Status:	Permit Extended	Water Court Case #:	Not Reported
Parcel Size:	12.51	Well Use:	Other
Addtl Well Use:	Not Reported	Special Use:	Monitoring Well
Primary Aquifer:	All Unnamed Aquifers	Addtl Aquifer:	Not Reported
Irrigation Area:	0	Yrly Appropriation:	0
Issue Date:	05/24/2011	Expiration Date:	05/24/2017
Construction Date:	Not Reported	Start Use Date:	Not Reported
Pump Install Date:	Not Reported	Well Plug Date:	Not Reported
Surface Elevation (ft):	0	Well Depth (ft):	0
Top of First Perf Casing:	0	Base of Last Perf Casing:	0
Yield (gal/min):	0	Static Water Depth (ft):	0
Groundwater Basin:	Not Reported	Mgmt District:	Not Reported
Water District:	39	Division:	5
Comments:	RULE 6.2.3 = LOCATION! Monitoring/Observation Hole. Tax #R530062 (totaling 12.51 acres). Phy address: 0325 Charo (aka Sunny Acres), GWS, CO 81601. dmw 05/14/13		

I53
NW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000122553**

CO DWR ID #:	Not Reported	Permit #:	262670-
Well Name:	MW-9	Well Status:	Well Constructed
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers

Addtl Aquifer:	Not Reported	Irrigation Area:	0
Yrly Appropriation:	0	Issue Date:	04/06/2005
Expiration Date:	Not Reported	Construction Date:	10/30/2001
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	20	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

54
NW
1/2 - 1 Mile
Lower

CO WELLS **CO7000000012620**

CO DWR ID #:	Not Reported	Permit #:	21470-MH
Well Name:	Not Reported		
Well Status:	Permit Issued; Completion Status Unknown		
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	09/10/1993
Expiration Date:	12/10/1993	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	45
Division:	5	Comments:	Not Reported

L55
NE
1/2 - 1 Mile
Higher

CO WELLS **CO7000000076247**

CO DWR ID #:	Not Reported	Permit #:	24229-F
Well Name:	Not Reported		
Well Status:	Permit Issued; Completion Status Unknown		
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Municipal	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	07/17/1979
Expiration Date:	07/17/1980	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	39
Division:	5	Comments:	Not Reported

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

L56
NE
1/2 - 1 Mile
Higher

CO WELLS **CO7000000321216**

CO DWR ID #:	Not Reported	Permit #:	133311-
Well Name:	Not Reported	Well Status:	Well Constructed
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Household Use Only	Addtl Well Use:	Not Reported
Special Use:	Not Reported	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	Not Reported
Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	12/31/1949	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	205	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	15
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	39
Division:	5	Comments:	Not Reported

M57
East
1/2 - 1 Mile
Lower

CO WELLS **CO7000000010707**

CO DWR ID #:	Not Reported	Permit #:	37725-M
Well Name:	MW-1		
Well Status:	Permit Issued; Completion Status Unknown		
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	10/04/1990
Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	38
Division:	5	Comments:	Not Reported

M58
East
1/2 - 1 Mile
Lower

CO WELLS **CO7000000010708**

CO DWR ID #:	Not Reported	Permit #:	37726-M
Well Name:	MW-2		
Well Status:	Permit Issued; Completion Status Unknown		
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	10/04/1990

Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	38
Division:	5	Comments:	Not Reported

M59
East
1/2 - 1 Mile
Lower

CO WELLS **CO7000000010709**

CO DWR ID #:	Not Reported	Permit #:	37727-M
Well Name:	MW-3		
Well Status:	Permit Issued; Completion Status Unknown		
Water Court Case #:	Not Reported	Parcel Size:	0
Well Use:	Other	Addtl Well Use:	Not Reported
Special Use:	Monitoring Well	Primary Aquifer:	All Unnamed Aquifers
Addtl Aquifer:	Not Reported	Irrigation Area:	0 acres
Yrly Appropriation:	0	Issue Date:	10/04/1990
Expiration Date:	Not Reported	Construction Date:	Not Reported
Start Use Date:	Not Reported	Pump Install Date:	Not Reported
Well Plug Date:	Not Reported	Surface Elevation (ft):	0
Well Depth (ft):	0	Top of First Perf Casing:	0
Base of Last Perf Casing:	0	Yield (gal/min):	0
Static Water Depth (ft):	0	Groundwater Basin:	Not Reported
Mgmt District:	Not Reported	Water District:	38
Division:	5	Comments:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CO Radon

Radon Test Results

Zip	Total Sites	Avg	% sites<=4 pCi/L	% sites>4&<10 pCi/L	% sites>=10&<20 pCi/L	% sites>20 pCi/L
81601	16	5.04	56.25	37.50	0.00	6.25

Federal EPA Radon Zone for GARFIELD County: 1

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 81601

Number of sites tested: 1

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	Not Reported	Not Reported	Not Reported	Not Reported
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	7.400 pCi/L	0%	100%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Riparian Vegetation Data
Source: Division of Wildlife
Telephone: 970-416-3360

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Colorado GIS Well Database
Source: Office of State Engineer, Division of Water Resources
Telephone: 303-866-3581
The GIS Well database includes all wells that the Division of Water Resources permits.

OTHER STATE DATABASE INFORMATION

Oil and Gas Well Locations
Source: Department of Natural Resources
Telephone: 303-894-2100

RADON

State Database: CO Radon
Source: Department of Public Health & Environment
Telephone: 303-692-3090
Radon Study in Colorado

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

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SOIL SURVEY

DATA

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

2—Arle-Ansari-Rock outcrop complex, 12 to 65 percent slopes

Map Unit Setting

National map unit symbol: jnxh
Elevation: 5,500 to 7,500 feet
Farmland classification: Not prime farmland

Map Unit Composition

Arle and similar soils: 45 percent
Ansari and similar soils: 35 percent
Rock outcrop: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arle

Setting

Landform: Alluvial fans, mountainsides
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 10 inches: very stony loam
H2 - 10 to 32 inches: very stony loam
H3 - 32 to 36 inches: weathered bedrock

Properties and qualities

Slope: 12 to 65 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 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: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: Loamy Slopes (R048AY303CO)

Hydric soil rating: No

Description of Ansari

Setting

Landform: Alluvial fans, mountainsides
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 18 inches: stony loam
H3 - 18 to 22 inches: unweathered bedrock

Properties and qualities

Slope: 12 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very 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: 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 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: Loamy Breaks (R048AY300CO)
Hydric soil rating: No

Description of Rock Outcrop

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 65 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 12, Sep 13, 2019

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

7—Ascalon-Pena complex, 6 to 25 percent slopes

Map Unit Setting

National map unit symbol: jnz8
Elevation: 5,000 to 6,500 feet
Farmland classification: Not prime farmland

Map Unit Composition

Ascalon and similar soils: 65 percent
Pena and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ascalon

Setting

Landform: Alluvial fans, valley sides
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 30 inches: sandy clay loam
H3 - 30 to 60 inches: sandy clay loam

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
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
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Deep Loam (R048AY292CO)
Hydric soil rating: No

Description of Pena

Setting

Landform: Valley sides, alluvial fans
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 6 inches: stony loam
H2 - 6 to 12 inches: very stony loam
H3 - 12 to 60 inches: very stony sandy loam

Properties and qualities

Slope: 6 to 25 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 (0.60 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: 35 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: Loamy Slopes (R048AY303CO)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 12, Sep 13, 2019

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

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 12, Sep 13, 2019

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

9—Badland

Map Unit Composition

Badland: 85 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Badland

Setting

Landform: Mountainsides, drainageways

Landform position (three-dimensional): Mountainflank, base slope

Down-slope shape: Convex, concave

Across-slope shape: Convex, concave

Parent material: Soft sandstone and shale and/or soft shale and siltstone

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 1 to 99 percent

Depth to restrictive feature: 0 to 3 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): 8e

Hydrologic Soil Group: D

Hydric soil rating: No

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 12, Sep 13, 2019

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

11—Begay sandy loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: jnx6
Elevation: 5,000 to 6,500 feet
Farmland classification: Not prime farmland

Map Unit Composition

Begay and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Begay

Setting

Landform: Valley sides, alluvial fans
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 10 inches: sandy loam
H2 - 10 to 60 inches: stony sandy loam

Properties and qualities

Slope: 6 to 12 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): High (2.00 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: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: Rolling Loam (R048AY298CO)

Hydric soil rating: No

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 12, Sep 13, 2019

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

15—Chilton channery loam, 12 to 25 percent slopes

Map Unit Setting

National map unit symbol: jnxb
Elevation: 5,000 to 6,500 feet
Farmland classification: Not prime farmland

Map Unit Composition

Chilton and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chilton

Setting

Landform: Valley sides, alluvial fans
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 13 inches: channery loam
H2 - 13 to 23 inches: very channery sandy loam
H3 - 23 to 60 inches: very cobbly sandy loam

Properties and qualities

Slope: 12 to 25 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 (0.60 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: 15 percent
Available water storage in profile: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: Rolling Loam (R048AY298CO)

Hydric soil rating: No

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 12, Sep 13, 2019

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

26—Farlow-Rock outcrop association, steep

Map Unit Setting

National map unit symbol: jnxq
Elevation: 8,000 to 10,500 feet
Farmland classification: Not prime farmland

Map Unit Composition

Farlow and similar soils: 65 percent
Rock outcrop: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Farlow

Setting

Landform: Mountainsides
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from limestone

Typical profile

H1 - 0 to 10 inches: channery loam
H2 - 10 to 35 inches: very channery loam
H3 - 35 to 42 inches: extremely flaggy loam
H4 - 42 to 46 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 50 percent
Depth to restrictive feature: 40 to 60 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: 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 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: Shallow Subalpine (R048AY251CO)

Hydric soil rating: No

Description of Rock Outcrop

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: 25 to 50 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

Minor Components

Dateman

Percent of map unit: 10 percent
Landform: Mountainsides
Landform position (three-dimensional): Mountainflank
Hydric soil rating: No

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 12, Sep 13, 2019

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

34—Ildefonso stony loam, 25 to 45 percent slopes

Map Unit Setting

National map unit symbol: jny0
Elevation: 5,000 to 6,500 feet
Farmland classification: Not prime farmland

Map Unit Composition

Ildefonso and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ildefonso

Setting

Landform: Alluvial fans, valley sides, breaks
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Mixed alluvium derived from basalt

Typical profile

H1 - 0 to 8 inches: stony loam
H2 - 8 to 60 inches: very stony loam

Properties and qualities

Slope: 25 to 45 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
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: 35 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Ascalon

Percent of map unit: 5 percent
Hydric soil rating: No

Potts

Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 12, Sep 13, 2019

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

39—Jerry loam, 12 to 50 percent slopes

Map Unit Setting

National map unit symbol: jny5
Elevation: 7,000 to 9,500 feet
Farmland classification: Not prime farmland

Map Unit Composition

Jerry and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jerry

Setting

Landform: Mountainsides
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from basalt and/or alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 3 inches: loam
H2 - 3 to 10 inches: clay loam
H3 - 10 to 40 inches: cobbly clay loam
H4 - 40 to 60 inches: cobbly clay

Properties and qualities

Slope: 12 to 50 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very 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
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Brushy Loam (R048AY238CO)

Hydric soil rating: No

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 12, Sep 13, 2019

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

42—Lamphier loam, 15 to 50 percent slopes

Map Unit Setting

National map unit symbol: jny9
Elevation: 7,500 to 10,000 feet
Farmland classification: Not prime farmland

Map Unit Composition

Lamphier and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lamphier

Setting

Landform: Mountainsides, fans
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex, concave
Across-slope shape: Convex, linear
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 30 inches: loam
H2 - 30 to 60 inches: loam

Properties and qualities

Slope: 15 to 50 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Almy

Percent of map unit: 10 percent
Hydric soil rating: No

Rock outcrop
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 12, Sep 13, 2019

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

58—Potts-Ildefonso complex, 12 to 25 percent slopes

Map Unit Setting

National map unit symbol: jnyv
Elevation: 5,000 to 6,500 feet
Farmland classification: Not prime farmland

Map Unit Composition

Potts and similar soils: 60 percent
Ildefonso and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Potts

Setting

Landform: Valley sides, alluvial fans, mesas
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Alluvium derived from basalt and/or alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 4 inches: loam
H2 - 4 to 28 inches: clay loam
H3 - 28 to 60 inches: loam

Properties and qualities

Slope: 12 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Rolling Loam (R048AY298CO)
Hydric soil rating: No

Description of Ildefonso

Setting

Landform: Mesas, valley sides, alluvial fans
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from basalt and/or alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 8 inches: stony loam
H2 - 8 to 60 inches: very stony loam

Properties and qualities

Slope: 12 to 25 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 (0.60 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: 35 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Hydric soil rating: No

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 12, Sep 13, 2019

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

59—Potts-Ildefonso complex, 25 to 45 percent slopes

Map Unit Setting

National map unit symbol: jnyw
Elevation: 5,000 to 6,500 feet
Farmland classification: Not prime farmland

Map Unit Composition

Potts and similar soils: 60 percent
Ildefonso and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Potts

Setting

Landform: Valley sides, alluvial fans
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Alluvium derived from basalt and/or alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 4 inches: loam
H2 - 4 to 28 inches: clay loam
H3 - 28 to 60 inches: loam

Properties and qualities

Slope: 25 to 40 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Rolling Loam (R048AY298CO)
Hydric soil rating: No

Description of Ildefonso

Setting

Landform: Alluvial fans, valley sides
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from basalt and/or alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 8 inches: stony loam
H2 - 8 to 60 inches: very stony loam

Properties and qualities

Slope: 25 to 45 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
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: 35 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Hydric soil rating: No

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 12, Sep 13, 2019

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

66—Torriorthents-Camborthids-Rock outcrop complex, steep

Map Unit Setting

National map unit symbol: jnz4
Elevation: 5,000 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: 45 percent
Camborthids, steep, and similar soils: 20 percent
Rock outcrop, steep: 15 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: Convex
Across-slope shape: 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 Camborthids, Steep

Setting

Landform: Mountainsides
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainflank, base slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Stony, basaltic alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 4 inches: variable
H2 - 4 to 30 inches: clay loam
H3 - 30 to 34 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 65 percent
Depth to restrictive feature: 15 to 60 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: 10 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
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 12, Sep 13, 2019

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

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 12, Sep 13, 2019

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

73—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 12, Sep 13, 2019

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

As the client of a consulting geotechnical engineer, you should know that site subsurface conditions cause more construction problems than any other factor. ASFE/the Association of Engineering Firms Practicing in the Geosciences offers the following suggestions and observations to help you manage your risks.

A GEOTECHNICAL ENG.NEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS Your geotechnical engineering report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. These factors typically include: the general nature of the structure involved, its size, and configuration; the location of the structure on the site; other improvements, such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask your geotechnical engineer to evaluate how factors that change subsequent to the date of the report may affect the report's recommendations.

Unless your geotechnical engineer indicates otherwise, do not use your geotechnical engineering report:

MOST GEOTECHNICAL FINDINGS ARE PROFESSIONAL JUDGMENTS
Site exploration identifies actual subsurface conditions only at those points where samples are taken. The data were extrapolated by your geotechnical engineer who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates, Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations. you and your geotechnical engineer can work together to help minimize their impact. Retaining your geotechnical engineer to observe construction can be particularly beneficial in this respect.

- when the nature of the proposed structure is changed. for example, if an office building will be erected instead of a parking garage, or a refrigerated warehouse will be built instead of an unrefrigerated one;
- when the size, elevation. or configuration of the proposed structure is altered;
- when the location or orientation of the proposed structure is modified;
- when there is a change of ownership; or .for application to an adjacent site.

Geotechnical engineers cannot accept responsibility for problems that may occur if they are not consulted after factors considered in their report's development have changed.

A REPORT'S RECOMMENDATIONS CAN ONLY BE PRELIMINARY
The construction recommendations included in your geotechnical engineer's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site.

Because actual subsurface conditions can be discerned only during earthwork, you should retain your geo- technical engineer to observe actual conditions and to finalize recommendations. Only the geotechnical engineer who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations are valid and whether or not the contractor is abiding by applicable recommendations. The geotechnical engineer who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

SUBSURFACE CONDITIONS CAN CHANGE A geotechnical engineering report is based on conditions that existed at the time of subsurface exploration. Do not base construction decisions on a geotechnical engineering report whose adequacy may have been affected by time. Speak with your geotechnical consult- ant to learn if additional tests are advisable before construction starts. Note, too, that additional tests may be required when subsurface conditions are affected by construction operations at or adjacent to the site, or by natural events such as floods, earthquakes, or ground water fluctuations. Keep your geotechnical consultant apprised of any such events.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS
Consulting geotechnical engineers prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your geotechnical engineer prepared your report expressly for you and expressly for purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the geotechnical engineer. No party should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.

GEOENVIRONMENTAL CONCERNS ARE NOT AT ISSUE
Your geotechnical engineering report is not likely to relate any findings, conclusions, or recommendations

about the potential for hazardous materials existing at the site. The equipment, techniques, and personnel used to perform a geoenvironmental exploration differ substantially from those applied in geotechnical engineering. Contamination can create major risks. If you have no information about the potential for your site being contaminated. you are advised to speak with your geotechnical consultant for information relating to geoenvironmental issues.

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION Costly problems can occur when other design profes- sionals develop their plans based on misinterpretations of a geotechnical engineering report. To help avoid misinterpretations, retain your geotechnical engineer to work with other project design professionals who are affected by the geotechnical report. Have your geotechnical engineer explain report implications to design professionals affected by them. and then review those design professionals' plans and specifications to see how they have incorporated geotechnical factors. Although certain other design professionals may be fam- iliar with geotechnical concerns, none knows 'as much about them as a competent geotechnical engineer.

BORING LOGS SHOULD NOT BE SEPARATED FROM THE REPORT Geotechnical engineers develop final boring logs based upon their interpretation of the field logs (assembled by site personnel) and laboratory evaluation of field samples. Geotechnical engineers customarily include only final boring logs in their reports. Final boring logs should not under any circumstances be redrawn for inclusion in architectural or other design drawings. because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to minimize the possibility of contractors misinterpreting the logs during bid preparation. When this occurs. delays. disputes. and unanticipated costs ara the all-too-frequent result.

To minimize the likelihood of boring log misinterpretation, give contractors ready access to the complete geotechnical engineering report prepared or authorized for their use. (If access is provided only to the report prepared for you, you should advise contractors of the report's limitations. assuming that a contractor was not one of the specific persons for whom the report was prepared and that developing construction cost estimates was not one of the specific purposes for which it was prepared. In other words. while a contractor may gain important knowledge from a report prepared for another party, the contractor would be well-advised to discuss the report with your geotechnical engineer and to perform the additional or alternative work that the contractor believes may be needed to obtain the data specifically appropriate for construction cost estimating purposes.) Some clients believe that it is unwise or unnecessary to give contractors access to their geo- technical engineering reports because they hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems. It also helps reduce the adversarial attitudes that can aggravate problems to disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY Because geotechnical engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against geotechnical engineers. To help prevent this problem, geotechnical engineers have developed a number of clauses for use in their contracts, reports, and other documents. Responsibility clauses are not exculpatory clauses designed to transfer geotechnical engineers' liabilities to other parties. Instead, they are definitive clauses that identify where geotechnical engineers' responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your geotechnical engineering report. Read them closely. Your geotechnical engineer will be pleased to give full and frank answers to any questions.

RELY ON THE GEOTECHNICAL ENGINEER FOR ADDITIONAL ASSISTANCE Most ASFE-member consulting geotechnical engineering firms are familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a construction project, from design through construction. Speak with your geotechnical engineer not only about geotechnical issues, but others as well, to learn about approaches that may be of genuine benefit. You may also wish to obtain certain ASFE publications. Contact a member of ASFE of ASFE for a complimentary directory of ASFE publications.

ASFE

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PARTNER

July 6, 2021

Alex Levin
BLD Group
1500 Codova Road, Suite 300
Ft. Lauerdale, Florida 33316

Subject: **Response to Community Comments**
Glenwood Meadow
Glenwood Springs, Colorado 81601
Partner Project No. 21-306905.1

Dear Alex Levin:

Partner Assessment Corporation (Partner) is pleased to submit this letter to respond to comments from the community for the subject property.

Scope of Work

Partner's services included the review of documents from publicly available sources pertaining to site geologic conditions, as well as the provided reports issued for the site. A general list of site-specific documents reviewed is shown below:

- American Geoservices (AGS), Initial Geotechnical Evaluation Report – Glenwood Meadows No. 6 Housing, Wulfsohn Road and West Meadows, Glenwood Spring, dated July 22, 2020.
- BLD Group, Preliminary Plan Set for Glenwood Meadows Multi-family Housing (including Civil, Landscape, Architecture Drawings), 54 Pages, dated December 28, 2020.
- City of Glenwood Springs, Colorado – Memorandum of understanding, dated July 16, 2013
- HCE – Master Drainage Report for Glenwood Meadows, Master Drainage Plan Submittal, Revised May 24, 2002
- Lincoln – Devore Engineering and Geologists, Open-File Report 7810 – Geologic Hazard of the Glenwood Springs Metropolitan Area – Garfield County, Colorado – Prepared by, dated 1978
- Numerous/Other Geotechnical Consultants, Geotechnical Reports for surrounding projects: Lofts, Target, Etc.
- Partner Engineering and Science, inc. – Limited Geotechnical Evaluation / Peer Review, dated March 4, 2021
- Unknown Author – Untitled, unsealed topographic survey overlaid on aerial of the area, undated provided by Client
- V3 Consultants – Final Drainage Report for Glenwood Meadows Lots 1-10 and Tracts A, B, and C, Revised July 30, 2004

Response to Community Comments

Partner is pleased to provide the below responses to the transcribed and lettered comments issued by Glenwood Springs:

2.3 Please add a geologic hazards disclosure similar to the following: "This property is subject to geologic hazards per the adopted mapping by the City of Glenwood Springs. Hazards to note are _____. A final Geologic Hazard Report will be submitted upon application of a building permit

RESPONSE: The following text can be placed used as the "geologic hazard disclosure" requested in the comment above:

Per the General Geologic hazard map of the Glenwood Springs Metropolitan Area prepared by the Colorado Geologic Survey (CGS) this property is located within a zone with severe potential for hydrocompaction and related settlement hazards. In addition, the Map of Debris Fan Deposits and Hazards Property prepared by CGS shows that the property is also located within a debris fan with moderate hazard potential for damage to structures. Mitigation is recommended or major cleanup is probable. It is our understanding that a Geologic Hazard Report was submitted as a part of the original Meadows application and the recommended mitigation completed within the first phase of development. Special care should be taken during construction to maintain the mitigations completed during the first phase of development.

3.12 Full depth pavement will not be accepted in any areas that are deemed public ROW and possibly maintained by the City. Full depth asphalt is not recommended, it has shown not to be successful in other areas of the Glenwood Meadows Development.

RESPONSE: Alternative pavement sections for areas to be dedicated into right of way, will be provided in our final design geotechnical report. These will be based on traffic loads provided by the City of Glenwood Springs. The below table provides alternate sections as stated in the report by American Geoservices for use in non-right of way areas.

Paving Structural Sections

Pavement Sections		
Roadway Type	**Subgrade Preparation [a]**	**Pavement Section [b]**
Asphalt Parking Spaces	Proof rolled/Compacted Subgrade	3.5 in. asphalt / 6.0 in. Aggregate base
Asphalt Driveways	Proof rolled/Compacted Subgrade	4.5 in. asphalt / 6.0 in. Aggregate base

3.13 4.5" of asphalt over 6" of ABC for heavy traffic areas is not recommended, it has shown not to be successful in other areas of the Glenwood Meadows Development. Thicker asphalt and base course sections have shown promise in stability and longevity.

RESPONSE: The response to comment 3.12 provides pavement sections as stated in the report by American Geoservices in our Response to Community Comments dated June 16, 2021 is for use in non-right of way areas and intended for initial planning purposes. Alternative pavement sections for areas to be dedicated into right of way and/or heavy traffic loading, will be provided in our final design geotechnical report. These will be based on the traffic loads provided by the City of Glenwood Springs.

3.14 The Geotech report notes that asphalt overlays should be completed every 5-6 years on asphalt sections of pavement. What does the Geotech considered an appropriate overlay material and thickness being that overlay is a generic term.

RESPONSE: As the new geotechnical engineer of record, we do not agree with the above statement. It is our experience that properly designed pavements should have a 20-year design life. We recommend regular maintenance consisting of cleaning and sealing cracks and re-coating paved surfaces on a roughly 5-year interval.

3.1 On page 20 of 30, under surface drainage the report states under bullet point 2 that landscaping of gravel adjacent to buildings should have a minimum slope of 6 inches in 5 feet (or 10%), but in bullet point 5, it states that landscaped areas within 10 feet of the foundation should be sloped at a minimum of 8%. This is inconsistent.

RESPONSE: As the new geotechnical engineer of record, we recommend that structures or site features that are not a part of the surface water drainage system should not be exposed to surface water flows, standing water, or water infiltration. In general, roof drains and scuppers, exterior slabs, pavements, landscaping, etc. should be constructed to drain water away from structures and foundations. The purpose of this is to reduce the opportunity for water damage, erosion, and/or altering of structural soil properties by wetting. In general, a 5 percent or more slope away from foundations, structural fills, slopes, structures, etc. should be maintained for 10 feet, per the International Building Code. 2% slopes can be used, where hardened surfaces, such as concrete or asphalt are placed up to the edge of structure. Our final design report for the project will update this information.

3.2 In general full-depth asphalt is not recommended in this area. As you can see from the meadows Development, it has not performed well over time and meeting subgrade requirements with the native soil is challenging. As these roadways are private and will remain private, the city does not have a requirement for the asphalt within the development, but will require any patches in City ROW to meet the requirements of the City's Engineering Standards. a. The report provides a recommendation for a full-depth asphalt section, but Figure 17 does not provide an exhibit of that section.

RESPONSE: We do not recommend the use of full depth asphalt for this project, please see updated pavement recommendations provided in our response to comment 3.12

3.5 After review of the soils report it seems that there are risks associated with the site that the report did not review in detail due to those risks not being part of the consultant's scope of services. See comments in the inherent risks section that are labelled "outside scope of services" and owner is completely responsible for taking all risks associated with any future potential for instability at the site or in the site vicinity area type comments.

RESPONSE: As the new engineer of record, we will fully address this in our updated report.

3.6 No topographic slopes were labeled thus these comments are generic. Geotech report calls for no structures within 25' of a crest of a slope that is 2.5:1. The lower row of structures appears to be within 25' of a crest of a slope, but the slopes below are not labeled for verification of the report note.

RESPONSE: Our review of the report indicates that no structures are to be within 25 feet of a crest of slope that is STEEPER than 2.5:1 (horizontal to vertical). Upon review, the slopes in that area are not steeper than 2.5:1.

3.11 Contractor should confirm the trenching backfill material that is acceptable in this area, previous potions of the development have utilized gravel materials, which has caused underground water to use the trenches as river passages and flood manhole locations during certain times of the year.

RESPONSE: Trenching backfill for City of Glenwood or private utility lines should be completed according to the specifications of the owner. In the even that the utility owner has specifications that differ from the preferences of the City of Glenwood, that matter should be addressed, directly between those parties. For private plumbing under the discretion of the geotechnical engineer, we recommend pipe bedding and shading consists of roadway aggregate base material, and that trench backfill consists of soil with less than 50% retained the No. 4 sieve and less than 35% retained on the ¾ inch sieve. Backfill soil should also contain 12 % to 75% fines and have a liquid limit less than 50. This information will be provided in our updated geotechnical design report.

Closing

Partner does not guarantee the future performance of the building, pavements, flatwork, or other site features related to geotechnical conditions. Soil samples were not obtained under this scope of work, and we have formulated our opinion based on our background research. Our document review and geologic research study made a good-faith effort to review readily available documents that we could access and were aware of at the time, as listed in this letter. We are not able to guarantee that we have discovered, observed, and reviewed all relevant site documents and conditions.

We appreciate the opportunity to be of service during this phase of the work.

Sincerely,

COLORADO LICENSED MATTHEW MARCUS 0053050 PROFESSIONAL ENGINEER

Matthew Marcus, PE, PG
Technical Director – Geotechnical Engineering

Andrew J. Atry, PE*
Project Engineer

**Licensed in California*

PRELIMINARY DRAINAGE REPORT

FOR

GLENWOOD MEADOWS MULTI-FAMILY PHASE 1

GLENWOOD SPRINGS, COLORADO

PREPARED FOR:

BLD Group, LLC.
1500 Cordova Rd. Suite 300
Fort Lauderdale, FL 33316

PREPARED BY:

High Country Engineering, Inc.
1517 Blake Avenue, Suite 101
Glenwood Springs, CO 81601
(970) 945-8676

December 8, 2020
Revised June 25, 2021

HCE JOB NUMBER: 2201044.00

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2. Soils Map
3. FEMA FIRM Maps

APPENDICES:

A. NOAA ATLAS 14 - Rainfall Data
B. Glenwood Meadows Master Drainage Study 2004
C. Proposed Conditions Drainage Map – Glenwood Meadows Multi-Family
D. Proposed Hydrologic Calculations

Engineers Certification

I hereby affirm that this report and the accompanying plans for the Phase 1 of Glenwood Meadows Multi-Family was prepared by me (or under my direct 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.



License No._____
Licensed Professional Engineer, State of Colorado

I. GENERAL LOCATION AND DESCRIPTION

A. Location

The site, located within the Glenwood Meadows development, is platted as Lots 11C-B and 11C-C of the Glenwood Meadows No. 6 Subdivision, which is located within Section 8, Township 6 South, Range 89 West, of the 6th Principal Meridian, in the City of Glenwood Springs, Colorado. The proposed site is located on the south side of Wulfsohn Road across from the existing Target and Lowe's commercial sites. The major drainage way downstream of the site is the Colorado River which is approximately 1,700 feet north of the site. A Vicinity Map has been included in **Exhibit 1**.

B. Description of Existing Property

The property is approximately 49.54 acres in size. The site slopes downward from southwest to northeast at approximately 15-pecrent towards Wulfsohn Road. The site receives offsite drainage from undeveloped drainage basins uphill to the southwest. The existing site is undeveloped consisting of scrub oak and juniper and native vegetation ground cover. There are existing debris flow ponds uphill of the development that serve to capture both offsite debris flow events and drainage attenuation in non-debris flow events.

C. Proposed Improvements

The proposed development consists of 13 multi-unit apartment buildings, a club house, roadways, parking areas, sidewalks and landscaping. Amenities include a playground, outdoor fitness area, basketball court, community patios, community garden, dog park and outdoor yoga area. Phase 1 consists of 13 apartment buildings, a club house and amenities.

D. Soils Description

Per the NRCS Web Soil Survey, there are two soil unit types within the property:
11 – Begay sandy loam, 6 to 12 percent slopes, well drained, low runoff, high permeability and low water storage capacity, hydrologic soil group (HSG) "A".
15 – Chilton channery loam, 12 to 25 percent slopes, well drained, low runoff, moderately high to high permeability and low water storage capacity, HSG "A".

Under the Glenwood Meadows Master Drainage Plan completed in 2004, the NRCS classified onsite soils to be HSG "C" and "D" at that time. The NRCS has subsequently reclassified onsite soils to HSG "A" since the Master Drainage Plan was completed. The upgraded soil types from HSG "C and "D" to "A" represents a conservative modeling for the regional drainage facilities in-place.

Additional soils information and a soils map can be referenced in **Exhibit 2**.

A site specific geotechnical investigation has been performed by Partner Engineering and Science. Generally subsurface conditions consist of a native debris fan deposit composed

of medium dense to dense mixtures of sands, silt, gravel, cobble and occasional boulders and extends to depths of 100-125 feet. Groundwater was not encountered during exploration. The geotechnical investigation may be referenced as a stand-alone document for reference as necessary.

E. Major Drainage Way Planning and Influential Parameters

The proposed site is located within FEMA's Flood Insurance Rate (FIRM) Maps 0802051431B, effective date January 3, 1986, and 0802051432B, effective date January 3, 1986. According to both maps, the site is located in Zone D which is designated as areas of undetermined, but possible flood hazards. Both FEMA FIRM Maps can be referenced in **Exhibit 4**.

F. Master Drainage Plan

The site is located within the Glenwood Meadows development and is subject to the requirements and recommendations of the Glenwood Meadows Master Drainage Plan completed by High Country Engineering, project no. 2000031.00-0316 dated May 6, 2004. The Master Drainage Plan can be referenced in **Appendix B**.

G. Effects of Adjacent Drainage Issues

The existing offsite debris flow ponds uphill of the site intercept drainage and debris flows prior to reaching the site. The debris pond outlet structures are currently piped through the proposed development and will be modified accordingly to accommodate the proposed grading and site improvements. There are small offsite drainage basins below the debris ponds that will produce limited offsite drainage onto the site.

All drainage from impervious areas of the proposed site will be collected and routed to Glenwood Meadows stormwater conveyance facilities. To our knowledge there are currently no adverse drainage impacts on adjacent properties from this site. There are no wetlands or irrigation ditches present on the site.

II. Drainage Basins and Sub-basins

B. Sub-Basin Description

The analyzed proposed drainage basins correspond to the proposed basins delineated in the project location within the Glenwood Meadows Master Drainage Study. The existing drainage pattern from the site is from southwest to northeast toward to Wulfsohn Road.

Runoff from proposed parking areas and roadways is to be routed to inlets via curb and gutter and collected with proposed storm sewer systems. Runoff from the proposed buildings is to be collected within roof drain leaders and piped to proposed storm sewer systems. Piping roof drainage instead of surface discharging will reduce the adverse effects of introducing surface drainage back onto the moderately sloped site where there's the potential for

scouring and erosion.

The proposed storm sewers will connect to the existing storm sewers serving the debris ponds and ultimately routing to existing Glenwood Meadows storm sewer at Wulfsohn Road. The existing debris pond outlet storm sewer will be modified to accommodate the proposed site plan and grade modifications and maintain conveyance of the debris pond discharge and proposed runoff.

III. DRAINAGE DESIGN CRITERIA

A. Criteria

This drainage study was prepared in conformance with Chapter 4 – Stormwater; of the City of Glenwood Springs engineering standards. Proposed improvements include development disturbance of approximately 17.3 acres, thus this site is subject to "Major Drainage Report" requirements.

This site is subject to the Glenwood Meadows Master Drainage Plan. This site is required to meet or exceed the post development drainage requirements of that study. The site improvements are located within drainage basins PR-J and PR-R of the master drainage plan, and shall not exceed the post development drainage conditions as summarized in Table 1. A copy of the Master Drainage Plan can be referenced in **Appendix B**.

Table 1 – Master Drainage Plan Post-Development Requirements

BASIN	AREA (AC)	CN	Q_{25}	Q_{100}
PR-J	20.96	86	24.1	33.19
PR-R	20.87	88	28.03	37.60
PR-B	18.49	85	22.05	30.85
PR-DD	3.37	84	3.73	5.29

The site has been analyzed for the post-development drainage conditions using HydroCAD. Post development drainage characteristics are summarized in Table 2 below. Proposed drainage basins correspond to the delineated drainage basins from the Master Drainage Study.

Table 2 –Post-Development Drainage Conditions

BASIN	AREA (AC)	CN	Q_{25}	Q_{100}
PR-J	20.96	68	3.28	8.83
PR-R	20.87	57	0.19	1.30
PR-B	18.49	49	0.00	0.10
PR-DD	3.37	49	0.00	0.02

Post-development hydrologic calculations can be referenced in **Appendix D**.

IV. DRAINAGE FACILITY DESIGN

A. General Concept

Runoff from the site shall be collected within a proposed storm sewer system and routed to the existing Glenwood Meadows storm sewer system. Stormwater management for the development is to be performed by the existing regional detention ponds located northwest and east of Target as outlined in the Master Drainage Plan.

B. Proposed Drainage Basin Description

The current drainage pattern onsite generally slopes from southwest to northeast and surface discharges to existing catch basins along the south side of Wulfsohn Road.

The site has been analyzed as four proposed basins; PR-B, PR-DD, PR-J and PR-R respectively. The proposed basin delineation is corresponds with the basin boundaries from the Master Drainage Plan. A proposed drainage conditions map, PRDR can be referenced in **Appendix C.**

Basin PR-B comprises the western portion of the access drive connection to Wulfsohn Road. Ground cover consists of asphalt road, concrete sidewalk and undisturbed open space. Runoff from the open space drains to the existing swale south of Wulfsohn road at design point 4. Runoff from the proposed road is collected within a proposed storm sewer and piped east to the existing regional storm sewer at design point 3.

Basin PR-DD consists of a portion of the west access drive connection to Wulfsohn Road. Ground cover consists of asphalt road, concrete sidewalk and undisturbed open space. Runoff from the open space drains to a proposed storm sewer south of the access road and is piped to the regional storm sewer at design point 3. Runoff from the proposed road is collected within a proposed storm sewer at Wulfsohn Road and piped east to the existing regional storm sewer at design point 3.

Basin PR-J comprises approximately the western half of the development. Ground cover consists of the asphalt roads and parking areas, proposed buildings, concrete sidewalks, developed park space, pervious landscaping and undisturbed open space areas. Runoff is split to the northwest and southeast via sheet flow and curb and gutter channel flow. A proposed storm sewer collects all development drainage from the basin and connects to the existing debris pond storm sewer "1B". The basin discharges at design point 1 within the existing storm sewer at Wulfsohn Road, and ultimately discharges to the regional detention pond located northwest of Target.

Basin PR-R comprises approximately the eastern half of the development. Ground cover consists of the asphalt roads and parking areas, proposed buildings, concrete sidewalks, pervious landscaping and undisturbed open space areas. Runoff drains to the southeast via sheet flow and curb and gutter channel flow. A proposed storm sewer collects all

development drainage from the basin and connects to the existing debris pond storm sewer "1C". The basin discharges at design point 2 within the existing storm sewer at Wulfsohn Road, and ultimately discharges to the regional detention pond located east of Target.

V. CONCLUSION

This drainage report has been prepared in accordance with the City of Glenwood Springs requirements, and the Glenwood Meadows Master Drainage Plan requirements. The proposed development shall utilize best management practices, (BMPs), both for construction and long-term to minimize erosion and promote stabilization. Temporary construction BMPs may include sediment control fence, straw bales, erosion control logs, inlet protection and vehicle tracking control. Long-term control includes the existing Glenwood Meadows stormwater management facilities. The proposed drainage design should be effective in providing the required conveyance for stormwater drainage to the existing facilities.

VI. REFERENCES

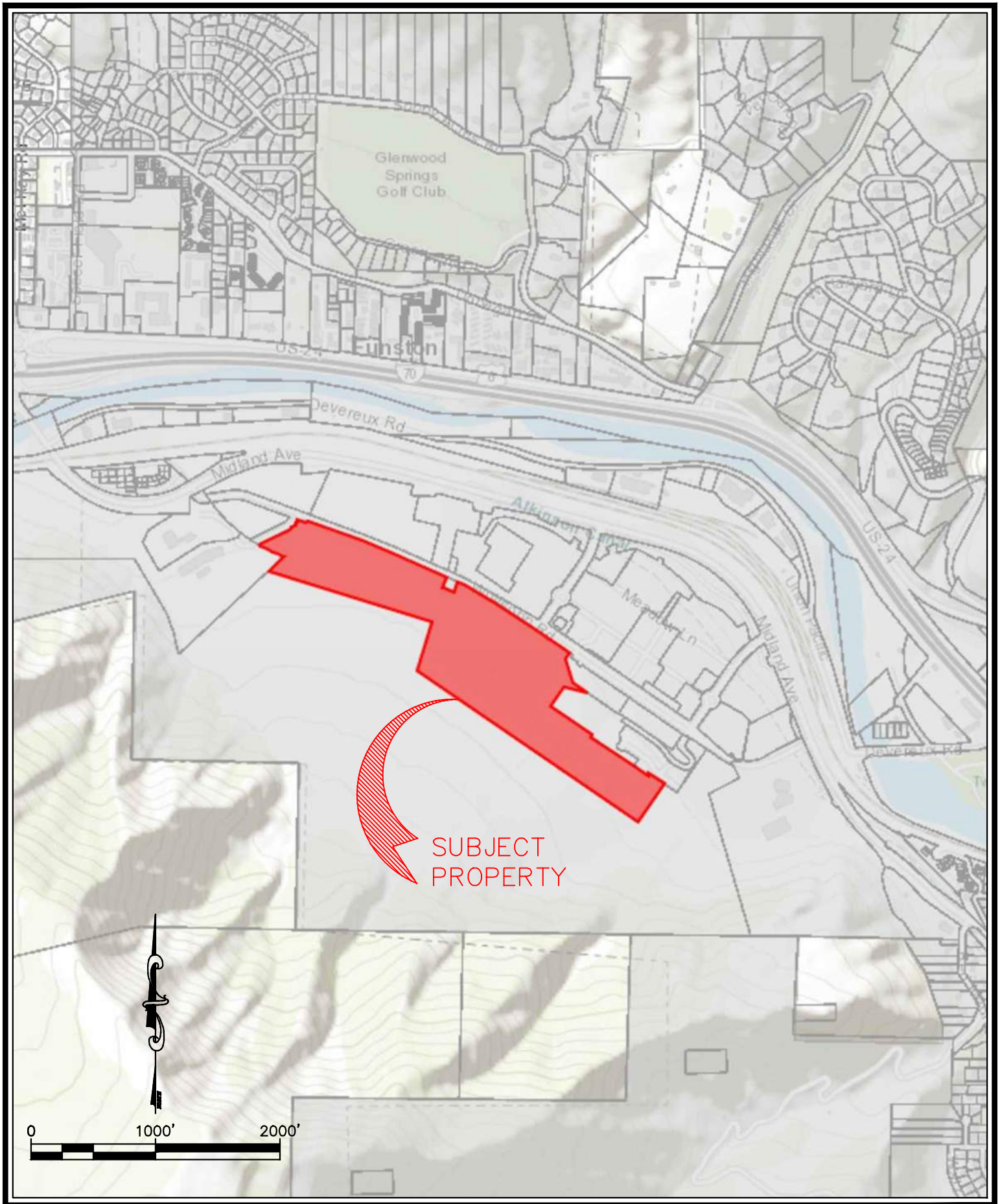
United States Department of Agriculture, Soil Conservation Service: Rifle Area, Colorado, Parts of Garfield and Mesa Counties

National Oceanic and Atmospheric Administration, Atlas of the Western United States, Volume 111, Precipitation-Frequency Atlas.

Natural Resources Conservation Service, Urban Hydrology for Small Watersheds, Technical Release 55 (TR-55) June 1986.

EXHIBIT 1

VICINITY MAP



HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101,
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 FAX (970) 945-2555
WWW.HCENG.COM

BLD GROUP LLC
GLENWOOD SPRINGS, CO

MEADOWS MULTI-FAMILY

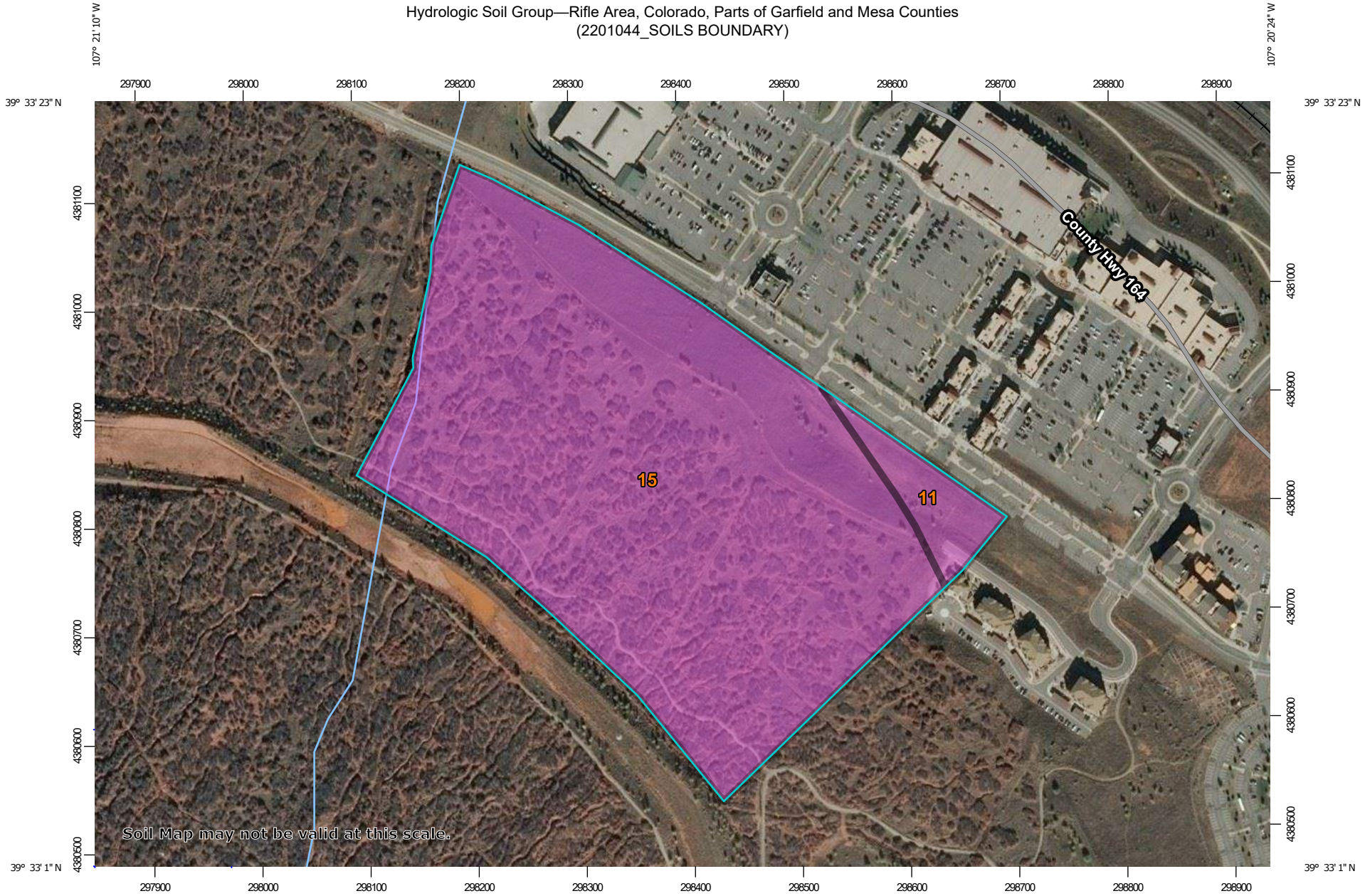
VICINITY MAP

DRAWN BY: MGG	SCALE: 1" = 1000'
CHECKED BY: MGG	PROJECT NO: 2201044.00
DATE:	PAGE:
FILE:	

EXHIBIT 2

SCS SOILS MAP

Hydrologic Soil Group—Rifle Area, Colorado, Parts of Garfield and Mesa Counties
(2201044_SOILS BOUNDARY)



Map Scale: 1:4,970 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

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 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.

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 13, Jun 5, 2020

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
11	Begay sandy loam, 6 to 12 percent slopes	A	2.1	4.9%
15	Chilton channery loam, 12 to 25 percent slopes	A	39.8	95.1%
Totals for Area of Interest			**41.8**	**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

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

11—Begay sandy loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: jnx6
Elevation: 5,000 to 6,500 feet
Farmland classification: Not prime farmland

Map Unit Composition

Begay and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Begay

Setting

Landform: Valley sides, alluvial fans
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 10 inches: sandy loam
H2 - 10 to 60 inches: stony sandy loam

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R048AY298CO - Rolling Loam

Hydric soil rating: No

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 13, Jun 5, 2020

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

15—Chilton channery loam, 12 to 25 percent slopes

Map Unit Setting

National map unit symbol: jnxb
Elevation: 5,000 to 6,500 feet
Farmland classification: Not prime farmland

Map Unit Composition

Chilton and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chilton

Setting

Landform: Valley sides, alluvial fans
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 13 inches: channery loam
H2 - 13 to 23 inches: very channery sandy loam
H3 - 23 to 60 inches: very cobbly sandy loam

Properties and qualities

Slope: 12 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: 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 content: 15 percent
Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R048AY298CO - Rolling Loam

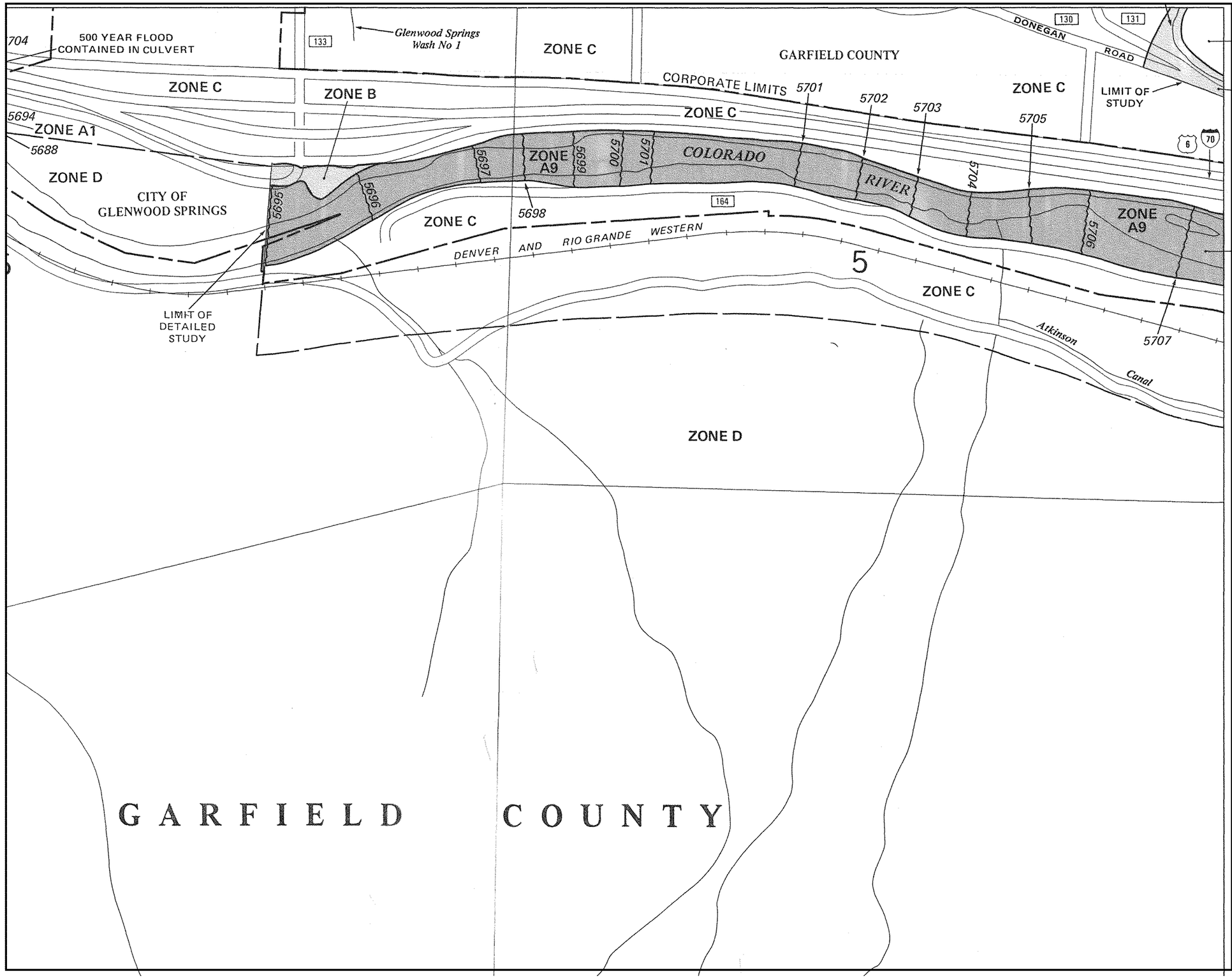
Hydric soil rating: No

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 13, Jun 5, 2020

EXHIBIT 3

FEMA FIRM MAPS



APPROXIMATE SCALE IN FEET

500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

GARFIELD COUNTY, COLORADO
(UNINCORPORATED AREAS)

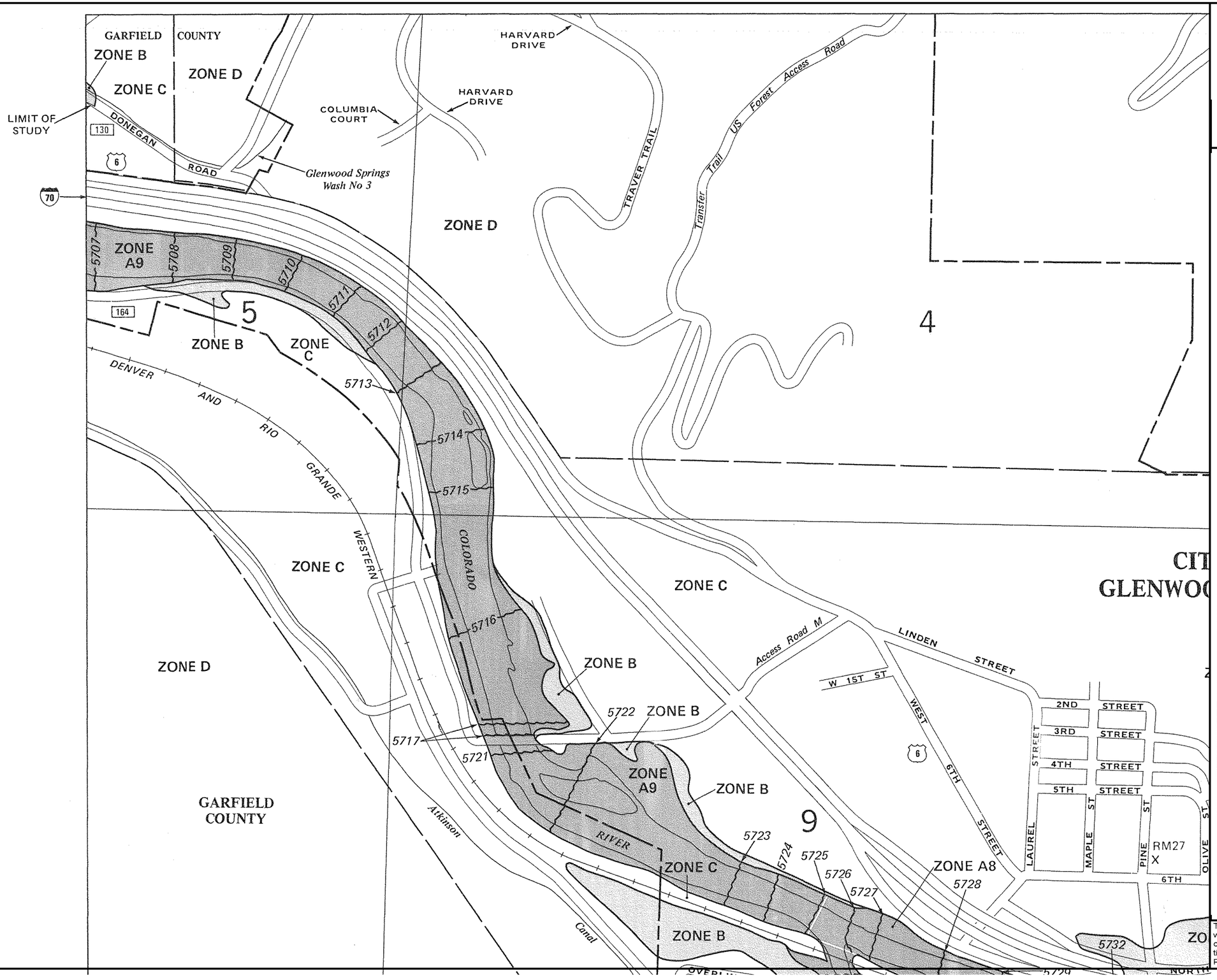
PANEL 1431 OF 1900
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
080205 1431 B

MAP REVISED:
JANUARY 3, 1986

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



APPROXIMATE SCALE IN FEET

500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

GARFIELD COUNTY, COLORADO
(UNINCORPORATED AREAS)

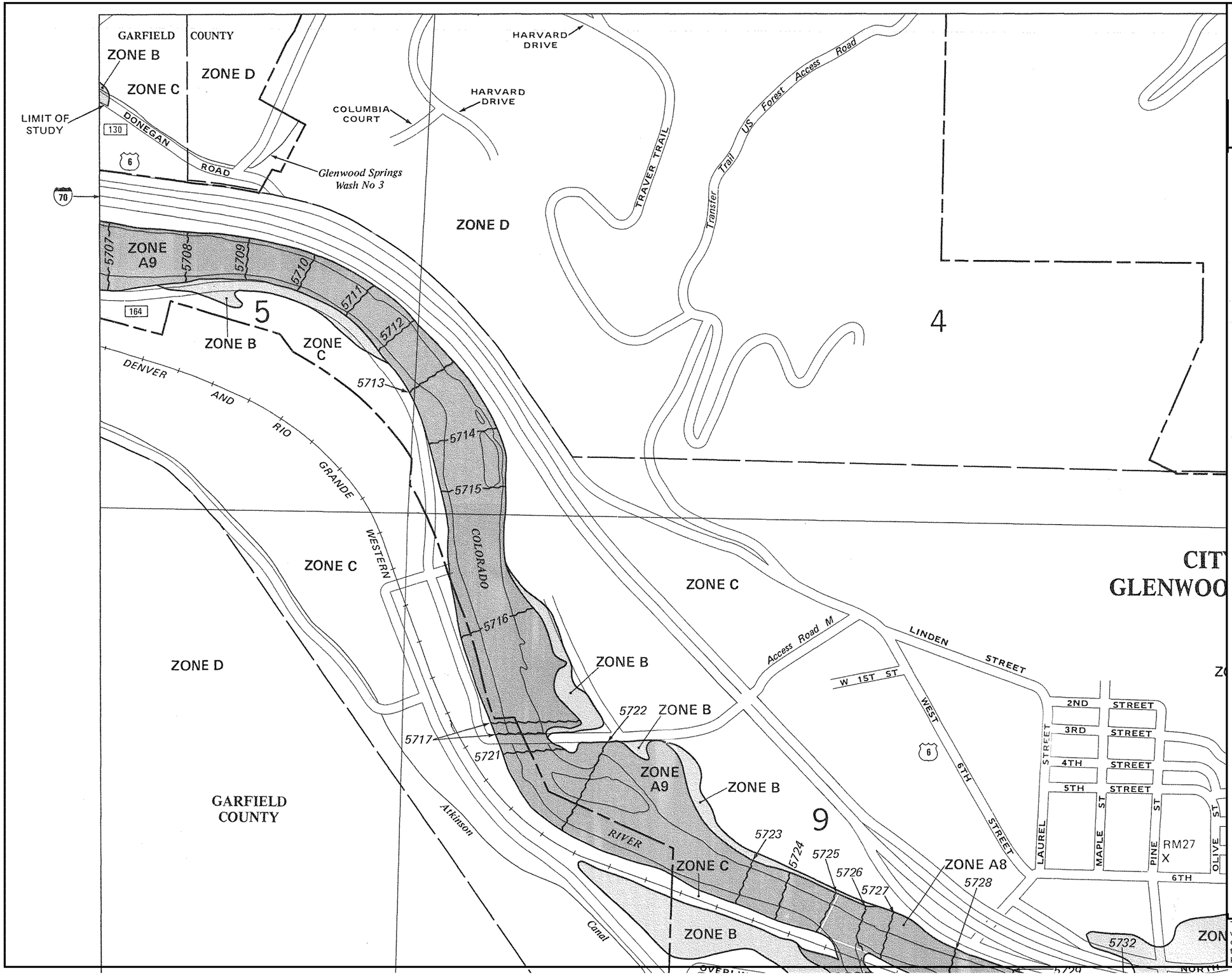
PANEL 1432 OF 1900
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
080205 1432 B

MAP REVISED:
JANUARY 3, 1986

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



APPROXIMATE SCALE IN FEET

500 0 500

KEY TO MAP

500-Year Flood Boundary	
100-Year Flood Boundary	ZONE B
Zone Designations	ZONE A1 / ZONE A5
100-Year Flood Boundary	ZONE B
500-Year Flood Boundary	
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7X
Zone D Boundary	
River Mile	•M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; depths are shown, or areas of 100-year alluvial fan flooding, depths and velocities shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

APPENDIX A

NOAA ATLAS 14 – RAINFALL DATA

NOAA Atlas 14, Volume 8, Version 2
Location name: Glenwood Springs, Colorado, USA*
Latitude: 39.5531°, Longitude: -107.3464°
Elevation: 5922.12 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.123** (0.097-0.159)	**0.177** (0.140-0.229)	**0.263** (0.206-0.341)	**0.331** (0.258-0.431)	**0.420** (0.313-0.563)	**0.485** (0.354-0.663)	**0.548** (0.385-0.770)	**0.608** (0.409-0.882)	**0.683** (0.442-1.02)	**0.736** (0.466-1.13)
10-min	**0.180** (0.142-0.233)	**0.260** (0.205-0.336)	**0.385** (0.302-0.499)	**0.484** (0.378-0.632)	**0.615** (0.458-0.825)	**0.711** (0.518-0.971)	**0.802** (0.564-1.13)	**0.890** (0.599-1.29)	**1.00** (0.647-1.50)	**1.08** (0.682-1.66)
15-min	**0.220** (0.174-0.284)	**0.317** (0.250-0.410)	**0.469** (0.369-0.609)	**0.591** (0.461-0.771)	**0.750** (0.558-1.01)	**0.867** (0.632-1.18)	**0.978** (0.688-1.38)	**1.09** (0.731-1.58)	**1.22** (0.789-1.83)	**1.32** (0.832-2.02)
30-min	**0.294** (0.232-0.379)	**0.414** (0.326-0.535)	**0.601** (0.472-0.780)	**0.748** (0.584-0.976)	**0.939** (0.698-1.26)	**1.08** (0.784-1.47)	**1.21** (0.847-1.69)	**1.33** (0.893-1.92)	**1.48** (0.954-2.21)	**1.58** (1.00-2.43)
60-min	**0.389** (0.307-0.503)	**0.513** (0.405-0.664)	**0.708** (0.556-0.919)	**0.862** (0.673-1.12)	**1.06** (0.790-1.42)	**1.21** (0.879-1.64)	**1.34** (0.944-1.88)	**1.47** (0.991-2.13)	**1.63** (1.05-2.44)	**1.74** (1.10-2.68)
2-hr	**0.485** (0.387-0.618)	**0.613** (0.489-0.782)	**0.815** (0.648-1.04)	**0.975** (0.770-1.25)	**1.18** (0.892-1.56)	**1.34** (0.985-1.80)	**1.48** (1.05-2.05)	**1.62** (1.10-2.31)	**1.79** (1.17-2.63)	**1.90** (1.22-2.88)
3-hr	**0.567** (0.456-0.717)	**0.685** (0.550-0.867)	**0.873** (0.698-1.11)	**1.02** (0.813-1.31)	**1.22** (0.930-1.60)	**1.37** (1.02-1.83)	**1.51** (1.08-2.07)	**1.65** (1.13-2.34)	**1.82** (1.20-2.67)	**1.94** (1.25-2.92)
6-hr	**0.740** (0.602-0.923)	**0.843** (0.685-1.05)	**1.01** (0.820-1.27)	**1.16** (0.930-1.45)	**1.36** (1.05-1.77)	**1.51** (1.15-2.01)	**1.67** (1.22-2.28)	**1.84** (1.28-2.59)	**2.06** (1.38-2.99)	**2.23** (1.45-3.30)
12-hr	**0.921** (0.758-1.13)	**1.05** (0.864-1.29)	**1.27** (1.04-1.56)	**1.45** (1.18-1.80)	**1.72** (1.35-2.21)	**1.93** (1.48-2.52)	**2.14** (1.58-2.88)	**2.37** (1.67-3.29)	**2.67** (1.81-3.83)	**2.91** (1.91-4.24)
24-hr	**1.12** (0.934-1.36)	**1.29** (1.07-1.56)	**1.57** (1.30-1.91)	**1.81** (1.49-2.21)	**2.15** (1.72-2.74)	**2.43** (1.89-3.14)	**2.72** (2.03-3.61)	**3.02** (2.16-4.14)	**3.43** (2.35-4.85)	**3.76** (2.49-5.39)
2-day	**1.35** (1.14-1.62)	**1.54** (1.30-1.84)	**1.87** (1.57-2.24)	**2.15** (1.80-2.59)	**2.57** (2.07-3.22)	**2.90** (2.28-3.70)	**3.25** (2.46-4.26)	**3.62** (2.62-4.89)	**4.14** (2.86-5.76)	**4.54** (3.05-6.41)
3-day	**1.52** (1.29-1.79)	**1.74** (1.47-2.05)	**2.11** (1.78-2.50)	**2.43** (2.04-2.90)	**2.89** (2.34-3.58)	**3.25** (2.57-4.10)	**3.64** (2.77-4.71)	**4.04** (2.93-5.39)	**4.59** (3.19-6.32)	**5.02** (3.39-7.02)
4-day	**1.65** (1.41-1.94)	**1.89** (1.62-2.23)	**2.29** (1.95-2.71)	**2.64** (2.23-3.13)	**3.12** (2.55-3.85)	**3.51** (2.79-4.39)	**3.91** (2.99-5.02)	**4.32** (3.15-5.73)	**4.89** (3.42-6.68)	**5.33** (3.61-7.40)

7-day	**2.01** (1.73-2.33)	**2.26** (1.95-2.63)	**2.69** (2.31-3.14)	**3.06** (2.61-3.58)	**3.57** (2.94-4.34)	**3.98** (3.19-4.91)	**4.39** (3.39-5.57)	**4.83** (3.55-6.31)	**5.41** (3.82-7.30)	**5.86** (4.01-8.04)
10-day	**2.31** (2.01-2.67)	**2.58** (2.24-2.98)	**3.03** (2.62-3.50)	**3.41** (2.93-3.96)	**3.95** (3.27-4.75)	**4.37** (3.53-5.34)	**4.80** (3.73-6.04)	**5.25** (3.89-6.80)	**5.86** (4.16-7.83)	**6.33** (4.35-8.60)
20-day	**3.17** (2.80-3.60)	**3.51** (3.09-3.98)	**4.06** (3.56-4.63)	**4.53** (3.94-5.18)	**5.17** (4.34-6.11)	**5.68** (4.64-6.82)	**6.19** (4.86-7.64)	**6.71** (5.02-8.54)	**7.40** (5.31-9.72)	**7.93** (5.52-10.6)
30-day	**3.89** (3.46-4.38)	**4.31** (3.82-4.85)	**4.99** (4.41-5.63)	**5.55** (4.87-6.30)	**6.32** (5.33-7.38)	**6.90** (5.68-8.20)	**7.48** (5.91-9.13)	**8.06** (6.08-10.1)	**8.82** (6.36-11.5)	**9.40** (6.58-12.4)
45-day	**4.82** (4.31-5.37)	**5.36** (4.79-5.98)	**6.23** (5.55-6.97)	**6.93** (6.13-7.79)	**7.86** (6.67-9.07)	**8.55** (7.07-10.0)	**9.22** (7.33-11.1)	**9.87** (7.48-12.3)	**10.7** (7.76-13.7)	**11.3** (7.97-14.8)
60-day	**5.62** (5.06-6.22)	**6.29** (5.65-6.96)	**7.33** (6.56-8.14)	**8.16** (7.26-9.10)	**9.24** (7.86-10.6)	**10.0** (8.32-11.7)	**10.8** (8.59-12.9)	**11.5** (8.72-14.1)	**12.3** (8.97-15.7)	**12.9** (9.16-16.8)

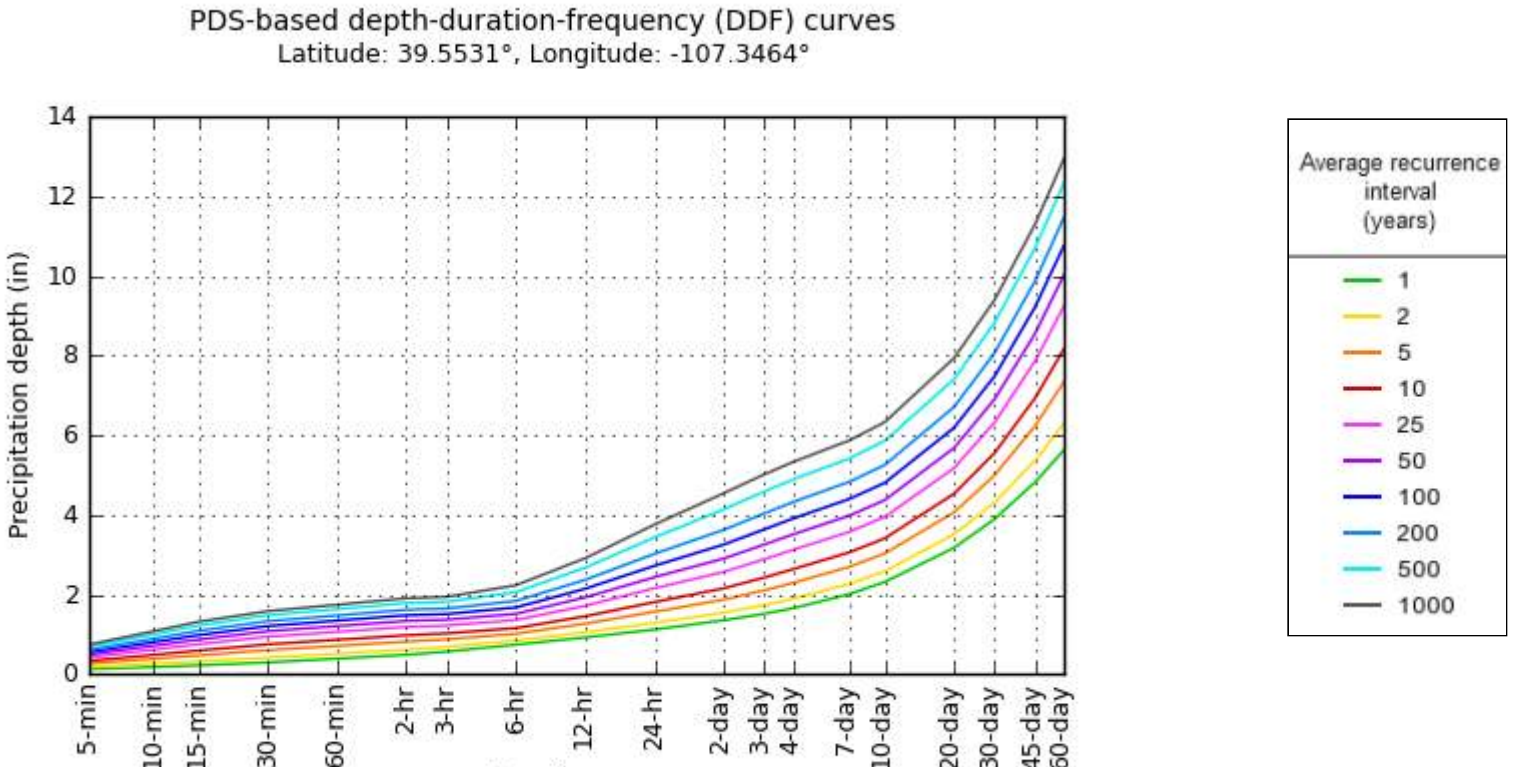
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

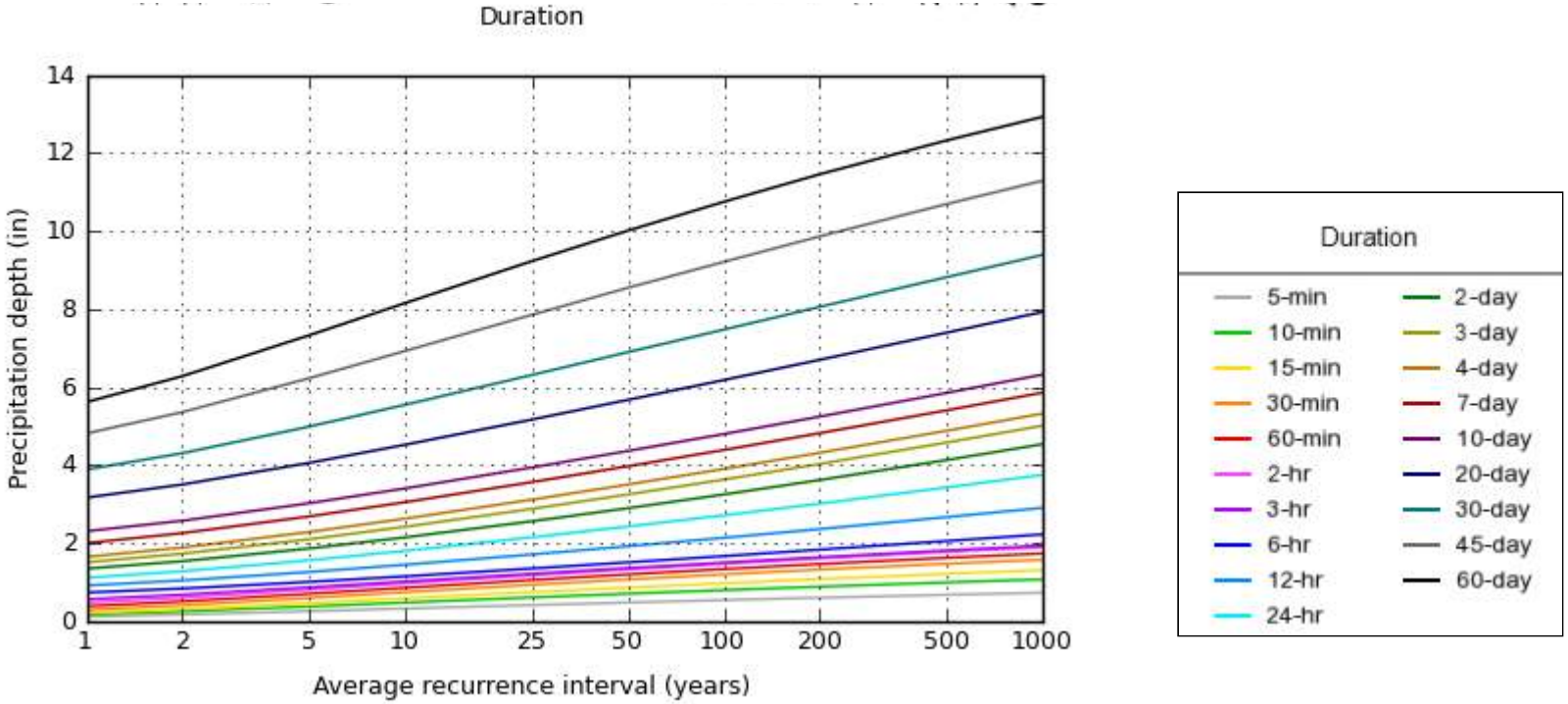
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical





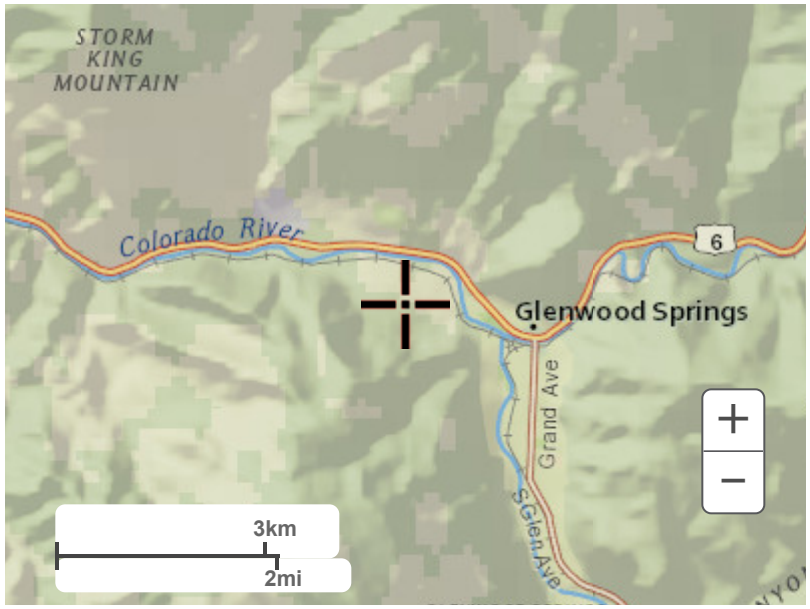
NOAA Atlas 14, Volume 8, Version 2

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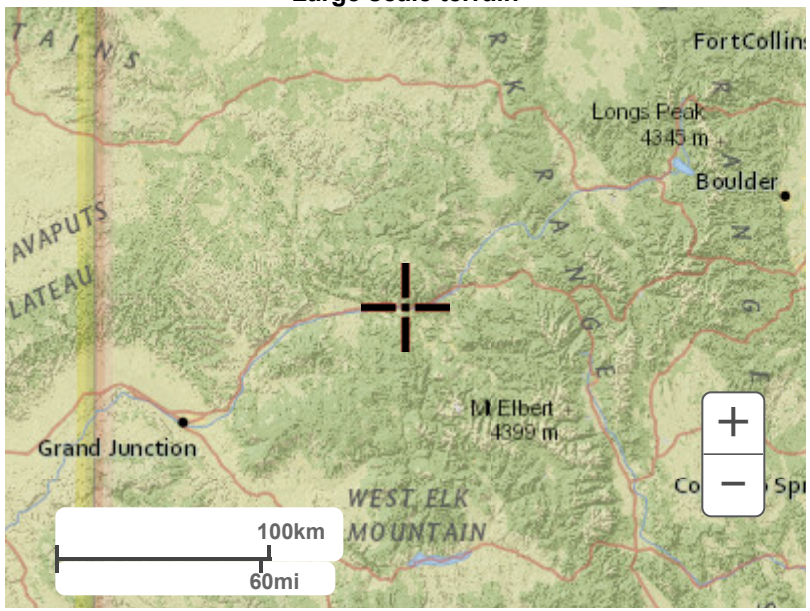
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Maps & aerials

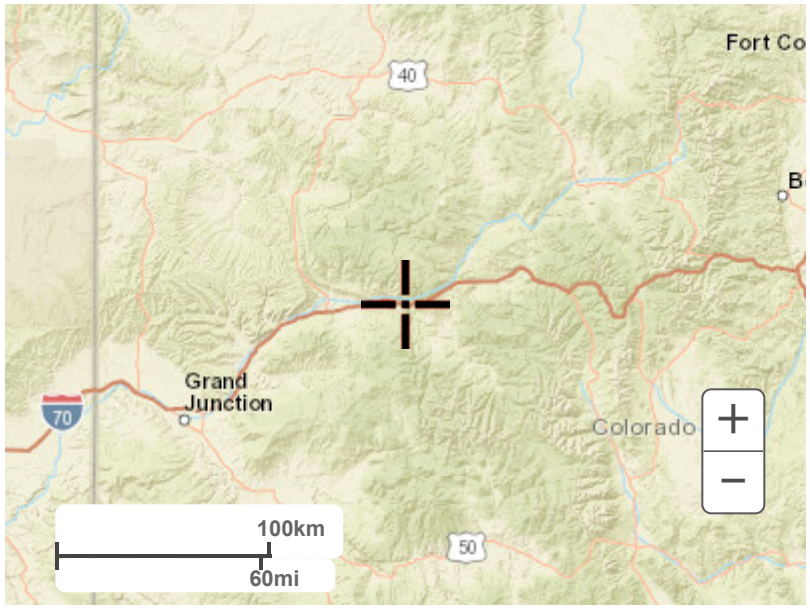
Small scale terrain



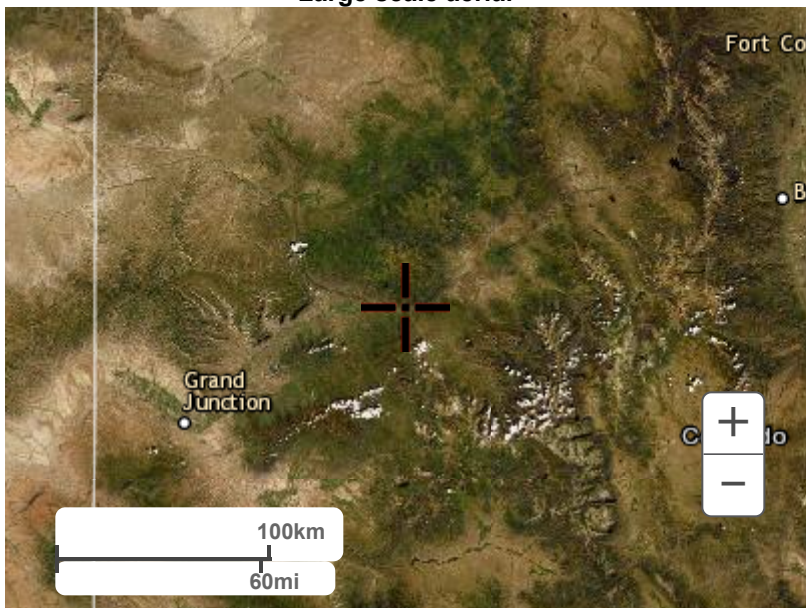
Large scale terrain



Large scale map



Large scale aerial



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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

APPENDIX B

PROPOSED CONDITIONS DRAINAGE MAP – GLENWOOD MEADOWS MASTER DRAINAGE STUDY

CIVIL ENGINEERING

LAND SURVEYING

An Employee-Owned Company

MASTER DRAINAGE REPORT

FOR

GLENWOOD MEADOWS

GLENWOOD SPRINGS, COLORADO

MASTER DRAINAGE PLAN SUBMITTAL

HCE JOB NO. 2000031.00 x 0316
FILE: K:\WP\2000\031\master drainage report.doc

REVISED: MAY 24, 2002
October 3, 2003
March 4, 2004
May 6, 2004

Prepared by:

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PROPOSED OFFSITE NON-CONTRIBUTING BASINS	5
PROPOSED ONSITE DRAINAGE BASINS	6
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CULVERT SUMMARY	9
CONCLUSION	11

DRAWINGS: Vicinity Map
Soil Survey Map
FEMA Floodplain Map
Pondpack Routing Map – Historic and Proposed
Historic Drainage Conditions
Proposed Grading and Drainage Plans

APPENDIX: Historic Flow Calculations - PONDPACK
Proposed Flow Calculations - PONDPACK
Culvert Calculations
Area Calculations

roximately 345 acres located
icinity Map, **Figure 1**. The
development, 33.3 acres of

l development. This project
are multiple off-site basins
ated, and potentially subject

n the Appendix. A 25-year,
year, 24-hour event was used
s Regulations. The design
24-hour storm flows under
nd 2) pass the 100-year, 24-
sting drainage structures and
s of basins and channels to
opments. This analysis does
rge rates but instead limits
ures.

y 5750 feet along Midland
t an elevation of 7500 feet is
ood events (below 7500 feet)
drainage basins should be
ysis was performed using the
historically designated flood

basin was delineated from
umbers range from 70-77,
as shown in Table 1. These
unt the vegetation that was
of 2002. Pre-fire conditions
present when the existing

INTRODUCTION

The proposed Glenwood Meadows is a planned unit development of app
along Midland Avenue in West Glenwood Springs. See the enclosed V
development will consist of approximately 36.8 acres of commercial
mixed use, 10.7 acres of hospitality, and 54.2 acres of residential.

The Colorado River is located to the north and northeast of the propose
is not affected by the 100 year floodplain of the Colorado River. There
that drain to the site from the south. These basins are steep, non-veget
to mitigatable debris flow events.

DESIGN CRITERIA

The stormwater flow calculations for the off-site basins are provided i
24-hour storm event has been adopted for the minor storm and the 100-
for the major event in accordance with the City of Glenwood Spring
criteria used for this study will be as follows: 1) pass the 25-year,
Midland Avenue through existing and proposed drainage structures, a
hour storm flows under the Railroad and Devereux Road through the ex
3) control the release rate from potential debris flow events in a serie
provide protection to the downstream residential and commercial devel
not limit the development to release stormwater at historical discha
discharge rates from the site to the capacities of the downstream struc

EXISTING CONDITIONS

The existing site varies in elevation from 7900 feet to approximatel
Avenue. Stream gage record analysis in western Colorado indicates tha
approximately the dividing elevation between rainfall derived critical fl
and snowmelt derived events (above 7500 feet). Based on this, the
considered as governed by rainfall runoff. Therefore the hydrology anal
SCS method. There is no future development on the site that lies in a
prone area according to FEMA floodplain maps (**Figure 3**).

Sixteen historic drainage basins were analyzed in this report. Each
existing culverts along Midland Avenue (**Figure 4**). The curve
representing woods, juniper and brush and moderately steep slopes,
curve numbers represent pre-fire conditions and do not take into acc
destroyed on the steep portions of the drainage basins in Coal Seam Fir
were analyzed in order to represent the historic conditions that wer

Table 1. Historic Basin Characteristics

Basin	Area	Curve Number
D1	7.79	77
D2	18.45	77
DE3	21.69	77
E4	85.30	77
E5	84.41	75
F6	36.15	77
F7	6.39	74
F8	9.19	74
P-A	11.19	74
F9	8.33	73
F10	10.20	71
F11	6.43	71
F12	18.53	70
F13	70.17	71
G	121.69	73
H	16.81	77

Historically, as shown in Table 2, the existing conditions have a total flowrate to Midland Avenue of 454.75 during the 100-year storm and the combined culverts that drain the site have a total full flow capacity of 830.12 cfs. (Note: Culvert 16 is for the Atkinson Canal, not storm drainage.)

Table 2. Historic Runoff

Design Point	Basin #	Culvert	Size (in)	Capacity (cfs)	Historic Flow (cfs)	
					25 Year	100 Year
1	D1	1	18	11.4	4.75	7.55
2	D2	2	18	12.47	11.06	17.35
3	DE3	3	48	109.0	12.54	19.75
4	E-4	4	48	96.0	49.35	77.69
5	E-5	5	48	121.5	38.24	63.50
6	F-6	6	48	134.0	21.13	33.34
7	F-7	7	18	13.90	2.92	4.82
8	F-8	8	18	13.4	4.07	6.83
9	P-A	9	18	13.75	4.70	8.02
4	F-9	10	18	13.95	2.97	5.26
12	F-10	11	18	11.83	5.23	9.62
	F-11	12	18	9.83		
	F-12	13	18	11.71		
10	F-13, ex-G	14	30	46.78	66.76	119.67
15	G	15	(2) 29x42	126.8	47.06	82.03
16	H	16	48	0	0	0
Total				**746.32**	**270.25**	**454.75**

PROPOSED CONDITIONS

Stormwater runoff and debris flows from offsite contributing drainage basins south of the proposed development will be captured in one of four debris flow ponds and released at a controlled rate utilizing proposed outfall structures. Discharge from the ponds shall be conveyed to the development through open channels to a series of proposed storm drains under Wolfsohn Road. Off-site flows will be combined with on-site flows and conveyed through the development in a series of proposed storm sewers that shall discharge to Midland Avenue. There are 15 existing culverts conveying stormwater runoff under Midland Avenue (excluding culvert #16). The existing culverts have adequate capacity to convey the 25-year storm event under Midland Avenue except for a pair of 18-inch pipes that should be replaced with a 48-inch culvert and the existing 30" replaced with a 48" culvert. The runoff shall then be conveyed to one of five culverts under the Railroad to Devereux Road. The runoff will pass under Devereux Road and discharge to the Colorado River. The historic drainage pattern will be maintained with the developed drainage flow.

Each parcel inside the property will be required to evaluate their site-specific design to ensure they meet or exceed the requirements of this study and the City of Glenwood Springs Development Code. All inlets shall be per CDOT standards. All piping material for storm drains shall be either RCP or ADS-N12 (or approved equal).

In addition to this study, each parcel will be required to implement best management practices and erosion control measures to reduce stormwater sediment and pollutant transport to downstream sources. Water quality measures are the responsibility of individual lot owners and may include detaining the 2 year storm (the water quality capture volume) and/or providing baffled oil skimmers or vortechnics systems to reduce potential pollutants. Erosion control measure should include the following: geo-textile mats or riprap for open channels with high flow velocities (greater than 5 feet per second) or slopes at or greater than 2:1, straw bales for channels and swales, and silt fencing for grading. See the City of Glenwood Springs Development Code for additional Best Management Practices.

PROPOSED OFFSITE CONTRIBUTING DRAINAGE BASINS

There are fourteen offsite drainage basins to the south of the proposed development as shown on the proposed Grading and Drainage Plan (**Figure 5**). They consist of SCS hydrologic Type C & D soils (**Figure 2**). Due to the Coal Seam Fire of 2002, the majority of the vegetation on the site has been destroyed. This has increased the potential for a debris flow, and increased the runoff rate on the site. A curve number of 91 was utilized for those drainage basins that were considered to be potential major debris generators due to their steepness and their lack of vegetation (0-5% vegetation) resulting from the Fire. Curve numbers for the remaining off-site basins were determined based upon the apparent re-growth of vegetation since the Fire.

PROPOSED OFFSITE NON-CONTRIBUTING BASINS

There are seven offsite drainage basins to the north of the proposed development as shown on the proposed Grading and Drainage Plan (**Figure 5**). These basins are located between Midland Avenue and the Railroad tracks and between the Railroad tracks and Devereux Road. The runoff from these basins has been combined with the runoff from the development to ensure that the drainage

structures located under the Railroad tracks and Devereux Road are adequate to handle the additional discharge from these drainage basins.

PROPOSED ONSITE DRAINAGE BASINS

There are twenty on-site drainage basins as shown on the proposed Grading and Drainage Plan **(Figure 5)**. They consist of SCS hydrologic Type C & D soils (**Figure 2**). The development will consist of approximately 36.8 acres of commercial development, 33.3 acres of mixed use, 10.7 acres of hospitality, and 54.2 acres of residential. The developed drainage basins have corresponding developed curve numbers as shown in **Table 3**.

Table 3. Proposed Basin Characteristics

Basin	Area	Curve Number	Basin	Area	Curve Number
*OS-1	39.27	91	PR-C	1.63	92
*OS-2	52.11	91	PR-DD	3.37	84
*OS-4	49.58	91	PR-E	25.80	92
*OS-5	14.93	88	PR-J	20.96	86
*OS-6	56.73	91	PR-L	23.26	92
*OS-7	11.3	88	PR-R	20.87	88
*OS-8	10.45	88	PR-M	16.07	92
*OS-9	7.13	88	PR-Q	11.30	92
*OS-11	22.31	91	PR-P	6.55	88
*OS-12	7.60	91	PR-S	5.01	78
PR-24	65.39	84	PR-T	6.79	88
PR-28	16.55	84	PR-U	8.54	91
PR-AA	7.73	92	COMM	63.43	70
PR-A	15.23	92			
PR-A	21.42	92			
PR-BB	10.67	85			
PR-B	18.49	85			
PR-D	3.52	84			

*Basins that are considered debris flow generators in the calculations due to grade and vegetation.

DEBRIS FLOW PONDS

Debris flow ponds have been placed just south of the proposed development in order to contain the debris flow before it enters the developed portions of the site. These ponds will serve a dual purpose as they will also act to attenuate storm water discharge during non-debris flow events. The total required volume for each debris flow pond can be seen in **Table 4**. The required pond volume is determined by applying a bulking factor to the runoff for the 100-year storm event for those drainage basins that are considered to be debris flow generators then adding the runoff for the 100-yr storm event from those drainage basins that do not generate debris flows. The bulking factor for debris flows is used to account for the additional material that could be accumulated during a debris flow event.

In this analysis a bulking factor of 2.4 was utilized with a solids concentration of 50%. Greater

solids concentrations are considered to be landslides and do not behave as a flowing liquid. Approximately 50% of the solids in the debris flow are greater than 6 inches in diameter. These large particles present the most concern to the proposed residential and commercial structures downstream of the debris flow ponds. Therefore the debris flow ponds are sized to capture the solids in excess of 6-inches in diameter plus an equivalent amount of stormwater runoff produced during the 100-year storm event.

$$\text{Volume}_{\text{stormwater}} * 2.4 = \text{Volume}_{\text{stormwater+debris}}$$

$$\text{Required Detention Volume} = (\text{Volume}_{\text{stormwater+debris}}) * 50\%$$

All grading on the site, including the debris flow ponds, shall have maximum slopes of 2:1 (H:V), with slopes of 2:1 being armored. Due to high velocities through the proposed channels, erosion control measures must be taken. The ponds shall have a maximum depth of 10-feet. The bottom of the ponds up to the 10 year water surface elevations shall be lined with bentonite per the Geotechnical Engineer's recommendations. The outlets will be 12" ADS-N12 with 8" diameter orifice plates installed on the ends. The ponds will also have a standpipe located within the berm in the event of clogging.

Table 4. Required Debris Flow Pond Volumes

Debris Flow Pond	Required Volume (ac-ft)
MOC	6.28
Pond 1	31.37
Pond 2	2.20
Pond 3	9.71

Debris Flow Pond MOC

A portion of the offsite and open space area drains to the existing MOC debris flow pond indicated by the MOC Design Point in the calculations. This runoff was accounted for previously by the MOC drainage report. This pond will capture the debris flow from basins OS-11 and OS-12 and the runoff from basin PR-28. A portion of the runoff that historically went to the MOC debris flow basin will instead be captured by Pond 1, reducing the required size of the MOC debris flow basin from 8.02 ac-ft to 6.28 ac-ft. The existing MOC pond currently encroaches onto the residential neighborhood. The MOC pond could be reduced in size in order to contain it within the city property because the required volume for the MOC pond will be reduced to less than the existing ponds volume. The MOC pond has two outlet structures, one at the east end and one at the west end of the existing structure. If a portion of the pond is removed, the pond would need to be regraded such that all of the drainage would go to the west end of the pond requiring some redesign of that outlet structure.

Debris Flow Pond #1

Debris Flow Pond 1 requires a volume of 31.37 ac-ft for debris flow and runoff detention of which 19.491 ac-ft will be used for stormwater only during the 100-year event. This pond will capture the debris flow from basins OS-1, OS-2, OS-4, OS-5, OS-8, OS-9 and the runoff from basin PR-24. This pond has 3 outlet structures designed to convey a portion of the runoff to Design Points 5, 6,

and 12. The proposed debris flow pond has a combined discharge rate for the three outlet structures of 7.1 cfs for the 25-year storm event and 8.86 cfs for the 100-year storm event.

Debris Flow Pond #2
Debris Flow Pond 2 requires a volume of 2.20 ac-ft for debris flow and runoff detention of which 0.948 ac-ft will be used for stormwater only during the 100-year event. This pond will capture the debris flow from basins OS-7 and the runoff from PR-T. This pond will replace the berm along the southwest side of the Community Center. The proposed debris flow pond has a discharge rate of 1.41 cfs for the 25-year storm event and 1.69 cfs for the 100-year storm event.

Debris Flow Pond #3
Debris Flow Pond 3 requires a volume of 9.71 ac-ft for debris flow and runoff detention of which 6.488 ac-ft will be used for stormwater only during the 100-year event. This pond will capture the debris flow from basin OS-6 and the runoff from PR-U. The proposed debris flow pond has a discharge rate of 2.34 cfs for the 25-year storm event and 2.79 cfs for the 100-year storm event.

DESIGN POINTS

DP 3
Design Point 3 is an existing 48" culvert with a capacity of 71 cfs. It has the capacity to convey the 100-year flow of 36.17 cfs contributed from basins PR-AA and PR-BB under Midland Avenue.

DP 4
Design Point 4 is an existing 48" CMP culvert with a capacity of 96 cfs that passes under Midland Avenue (Midland Culvert No. 4). It has the capacity to convey the 100-year flow released from Detention Pond 4. Basin PR-D and PR-DD flow along the path of the historic basin E-5; this basin historically outfalls into an existing pond constructed by CDOT. This pond has no outlet structures and High Country was unable to obtain any design information on this pond, therefore we do not recommend the use of this pond. The proposed basin PR-D bypasses this pond and discharges to Pond 4 which outfalls to Design Point 4.

Detention Pond 4 is a proposed 0.763 ac-ft volume pond required for runoff detention. This pond will capture a portion of the discharge from Debris Flow Pond 1 (outlet 1A), OS-1, and basins PR-A, PR-B, PR-D, PR-24a and PR-DD. This pond is required in order to convey the 100-year flow under the railroad and Devereux Road and has a discharge rate of 45.44 cfs for the 25-year storm event and 62.37 cfs for the 100-year storm event.

DP 5
Design Point 5 is an existing 48" culvert with a capacity of 122 cfs. It has the capacity to convey the 100-year flow of 4.07 cfs contributed from basin PR-C under Midland Avenue.

DP 6
Design Point 6 is an existing 48" culvert with a capacity of 134 cfs. It has the capacity to convey the 100-year flow of 86.59 cfs contributed from a portion of the discharge from Pond 1 (outlet 1B) and basins PR-E, PR-J, PR-24b and OS-2 under Midland Avenue.

DP 10
Design Point 10 includes an existing 18" CMP culvert and an existing 30" CMP culvert with a total

capacity of 58.49 cfs that pass under Midland Avenue. These culverts will convey the 25-year flow of 55.52 cfs from Ponds 2 and 3 and basins PR-U, PR-S, OS-6, OS-7, PR-Q, PR-P, PR-M, PR-T, and the Community Center. The 100-year flow of 84.03 cfs will overtop Midland Avenue at this point. Thus, we recommend replacing the 30" CMP with a 48" culvert that has the capacity 106 cfs.

DP 12

Design Point 12 includes two existing 18" culverts with a total capacity of 21.5 cfs that pass under Midland Avenue. These culverts are unable to convey the 25-year flow under Midland Avenue. These culverts should be replaced with one 48" culvert under Midland Avenue capable of carrying the flow from a portion of the discharge from Pond 1 (outlet 1C) and basins Pr-L, Pr-R, OS-4, PR-24C, OS-5, OS-8, and OS-9. It will have the capacity to convey the 100-year flow of 88.82 cfs contributed by these basins. The proposed culvert under Midland will be able to convey the 100-year flow released at this point to Railroad Culvert RR3.

DP's RR1 and DR1

Design Points RR1 and DR1 are existing 48" culverts that pass under the railroad and Devereux Road with capacities of 100 and 170 cfs respectively. The Design Point RR1 collects flow from Design Points 5 & 4 and conveys the flow under the railroad and to Design Point DR1 culvert which conveys the flow under Devereux Road. Both Design Point RR1 and DR1 culverts have the capacity to convey the 100-year flows of 67 and 97 cfs.

DP's RR2 and DR2

Design Points RR2 and DR2 are existing 48" culverts that pass under the railroad and Devereux Road with capacities of 95 and 110 cfs respectively. The Design Point RR2 collects flow from Design Point 6 and conveys the flow under the railroad and to Design Point DR2 culvert which conveys the flow under Devereux Road. Both Design Points RR2 and DR2 culverts have the capacity to convey the 100-year developed flows of 88 and 88 cfs respectively.

DP's RR3 and DR3

Design Points RR3 and DR3 are existing 48" culverts that pass under the railroad and Devereux Road with capacities of 124 and 132 cfs respectively. The Design Point RR3 collects flow from Design Point 12 and conveys the flow under the railroad and to Design Point DR3 culvert which conveys the flow under Devereux Road. Both Design Points RR3 and DR3 culverts have the capacity to convey the 100-year flow of 91 and 104 cfs respectively.

DP RR4

Design Point RR4 is an existing 48" culvert that passes under the railroad and discharges into the Colorado River. The culvert has a capacity of 124 cfs. The Design Point RR4 collects flow from Design Point 10 and conveys the flow under the railroad. Design Point RR4 culvert has the capacity to convey the 100-year flow of 85 cfs.

DP RR5

Design Point RR5 is an existing 42" culvert that passes under the railroad and Devereux Road and discharges into the Colorado River. The culvert has a capacity of 71 cfs. The Design Point RR4 collects flow from Design Point 3 and conveys the flow under the railroad. Design Point RR5 culvert has the capacity to convey the 100-year flow of 36 cfs.

TABLE 5 CULVERT SUMMARY

Design Point	Culvert No.	Pipe Size	Inv. In	Inv. Out	Length of Pipe	Pipe Slope (ft/ft)	Culvert Capacity (cfs)	25 year Historic Flow	100 year Historic Flow	25 Year Proposed Flow	100 Year Proposed Flow	Additional Culvert (cfs)	100YR Stormwater Detention Required (ac ft)
Midland Avenue Culverts													
	1	18	5755.24	5751.10	73.05	0.057	11.40	4.75	7.55				
	2	18	5751.52	5747.30	66.65	0.063	12.47	11.06	17.35				
3	3	42	5761.06	5749.47	63.15	0.184	109.00	12.54	19.75	26.98	36.17		
4	4	48	5759.25	5744.81	121.79	0.119	96.00	49.35	77.69	45.44	62.37		
													Pond 1a + 4=
5	5	48	5764.13	5746.84	125.46	0.138	121.50	38.24	63.50	3.17	4.07		4.937 + 0.763
6	6	48	5746.11	5744.48	101.66	0.016	134.00	21.13	33.34	65.74	86.59		
	7	18	5744.34	5742.27	67.44	0.031	13.90	2.92	4.82				Pond 1b =
	8	18	5746.18	5743.28	75.15	0.039	13.40	4.07	6.83				6.19
12	9	18	5743.19	5741.00	70.02	0.031	13.75	4.70	8.02	67.98	88.82		
	10	18	5739.96	5737.86	74.59	0.028	13.95	2.97	5.26				
	11	18	5736.51	5735.58	66.01	0.014	11.83	5.23	9.62			25 yr overtops	Pond 1c=
	12	18	5737.54	5736.71	78.86	0.011	9.83					48"	8.364
10	13	18	5738.94	5738.60	82.92	0.004	11.71	4.52	8.99	62.40	84.03	100-yr overtops -48"	Pond 2 + Pond 3
	14	30	5741.80	5740.62	80.48	0.015	46.78	66.76	119.67				0.948+6.488
	15	(2) 29x42	5760.31	5756.08	68.16	0.062	126.80	47.06	82.03				
	16	48	5763.63	5763.68	144.67		83.80	11.02	17.02				Atkinson Canal
Railroad Culverts													
RR1	RR1	48	5725.94	5719.83	118.25	0.052	100.00	87.59	141.19	48.77	67.32		
RR2	RR2	48	5726.8	5718.17	168.28	0.052	95.00	24.05	38.16	66.46	87.89		
RR3	RR3	48	5727.12	5722.89	329.23	0.013	122.00	14.00	24.47	68.83	90.53		
RR4	RR4	54	5728.31	5723.33	257.02	0.091	124.00	21.00	41.49	62.73	84.72		
RR5	RR5	42	5728.2	5723.89	118	0.037	71.00			27.73	37.76		
RR6	RR6	42	5728.3	5727.81	63	0.008	87.00						
Devereaux Road Culverts													
DR1	DR1	48	5694	5691.87	40	0.053	169.59	44.83	141.75	50.12	70.08		
DR2	DR2	48	5707.44	5705	70	0.035	110.00	26.62	41.77	69.16	93.31		
DR3	DR3	48	5715.42	5713.46	40	0.049	132.09	12.34	22.56	72.56	98.13		

* Culvert numbers 1-16 are located on Midland Avenue.
* Culvert numbers RR1-RR6 are located underneath the railroad.
* Culvert number DR1-DR3 are located underneath Devereaux Road.
* Design Point 4 and 5 continue to Design Point RR1 and DR1
* Design Point 6 continues to Design Point RR2 and DR2.
* Design Point 12 continues to Design Point RR3 and DR3.
* Design Point 10 continues to Design Point RR4.
* Design Point 3 continues to Design Point RR5.

CONCLUSION

The master drainage plan for Glenwood Meadows recommends many types of drainage improvements and structures, all of which will act together to convey expected surface runoff across the site while mitigating impacts to expected building types or the environment. The historic debris flow potential will be reduced significantly with the proposed debris flow ponds and the potential for downstream affects due to the debris flow will be greatly reduced. The proposed stormwater discharge for the 25-year storm event can be conveyed under Midland Avenue. The 100-year storm event can be conveyed under the Railroad and Devereux Road utilizing on-site detention.

REFERENCES

1. United States Geological Survey Magnitude and Frequency of Flood in the Western United States, Part 9, Colorado River Basin, 1966.

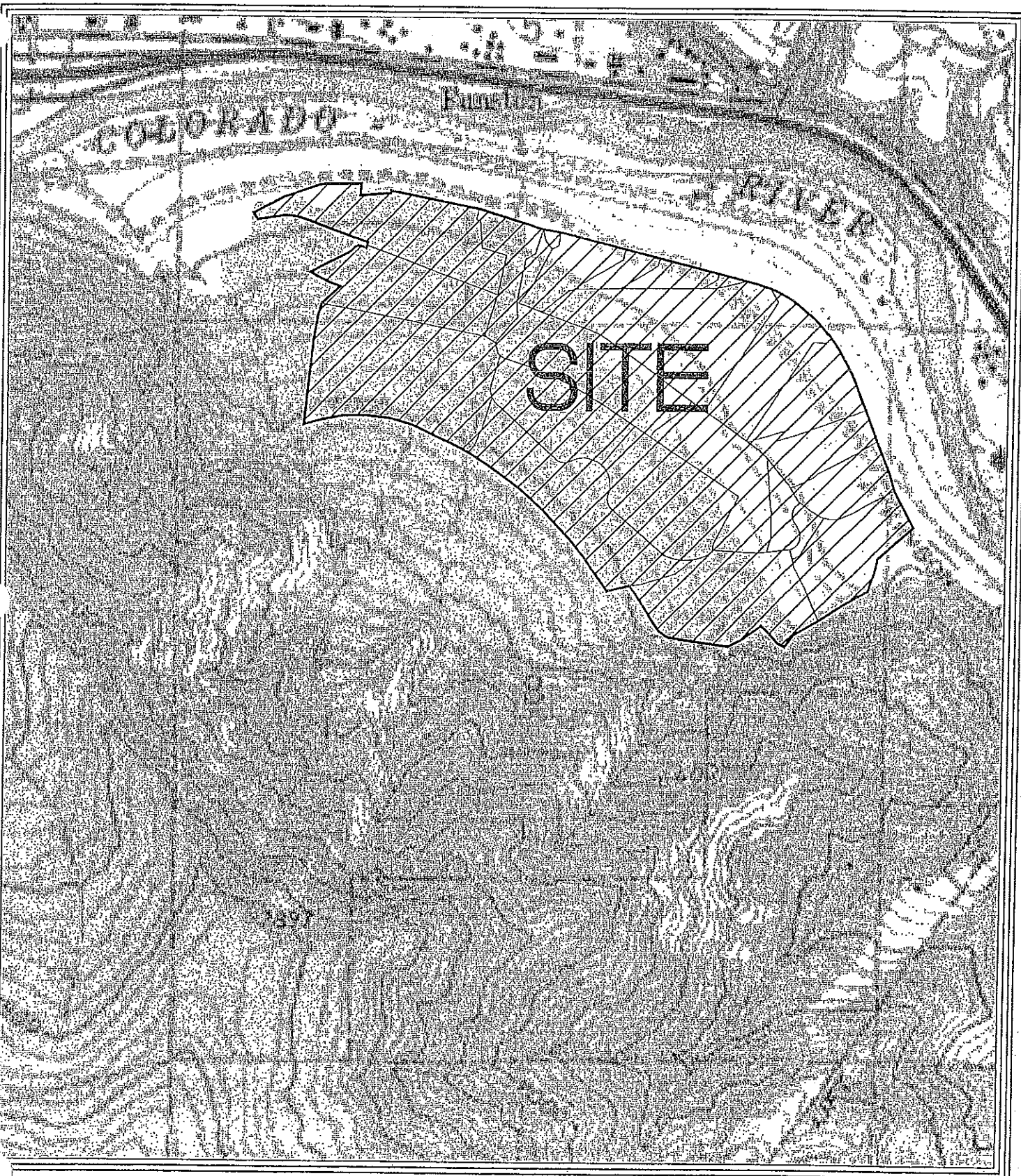
2. National Oceanic and Atmospheric Administration: Precipitation-Frequency Atlas of the Western United States, Volume III-Colorado. Silver Springs, MD 1973.

3. United States Department of Agriculture, Soil Conservation Service: Soil Survey of Aspen-Gypsum Area, Colorado, Parts of Eagle, Garfield, and Pitkin Counties, May 1992.

4. Hydrologic Analysis and Design, Richard H. McCuen: Prentice-Hall, Inc., 1989.

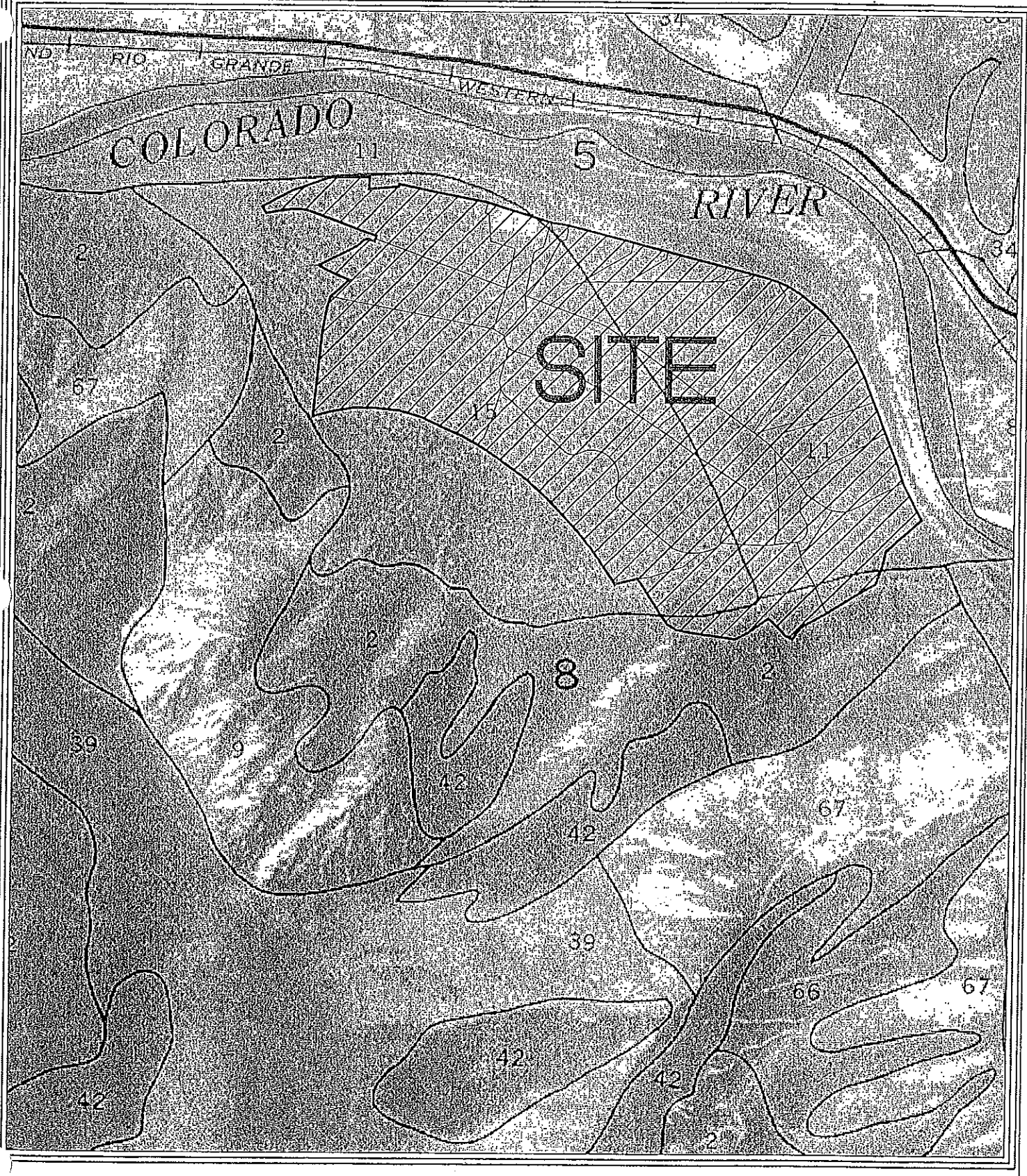
REFERENCE MATERIAL

VICINITY MAP



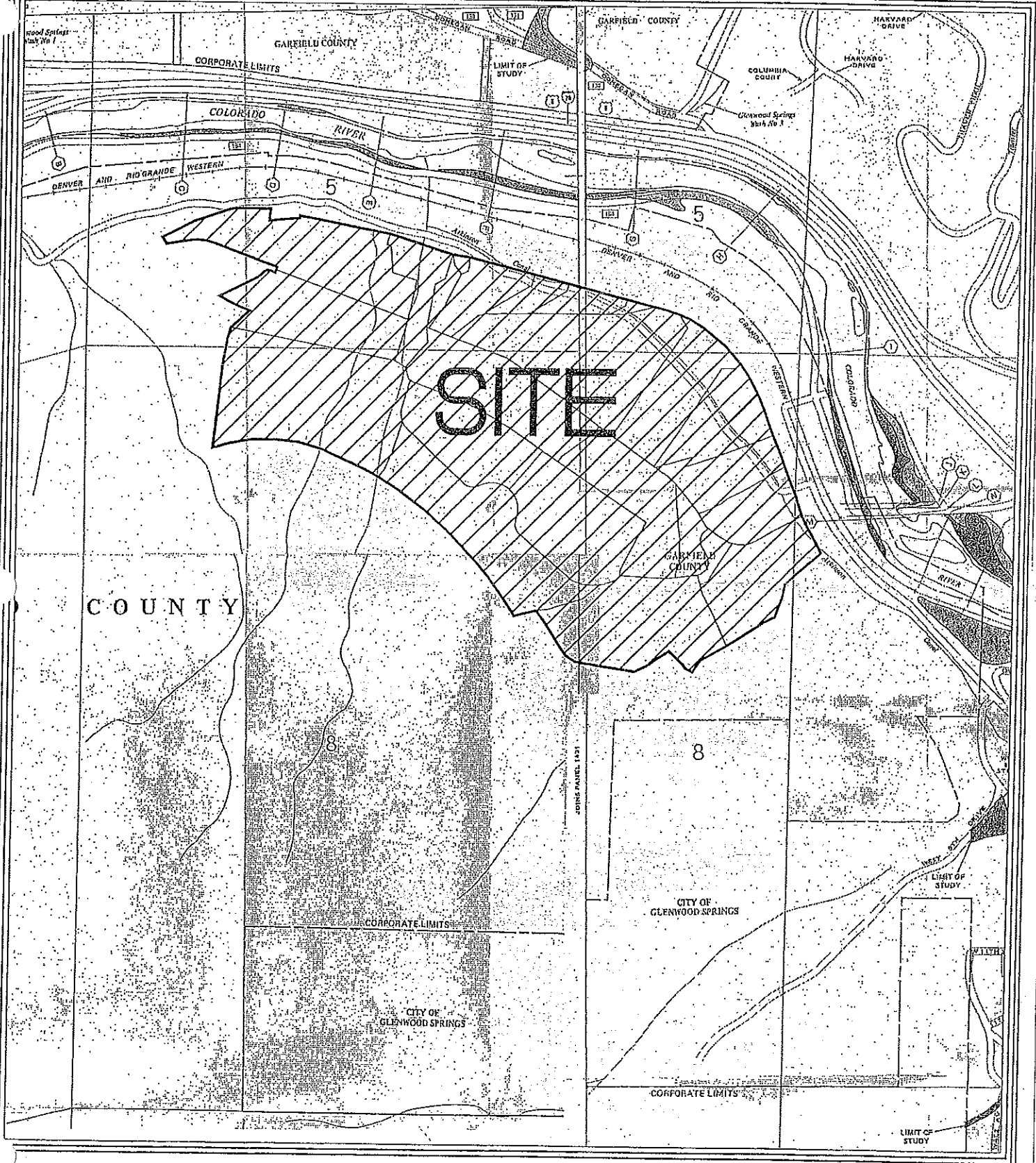
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		DR. JMW	DATE 5/9/02	2000031.01	OF 1

SCS SOILS MAP

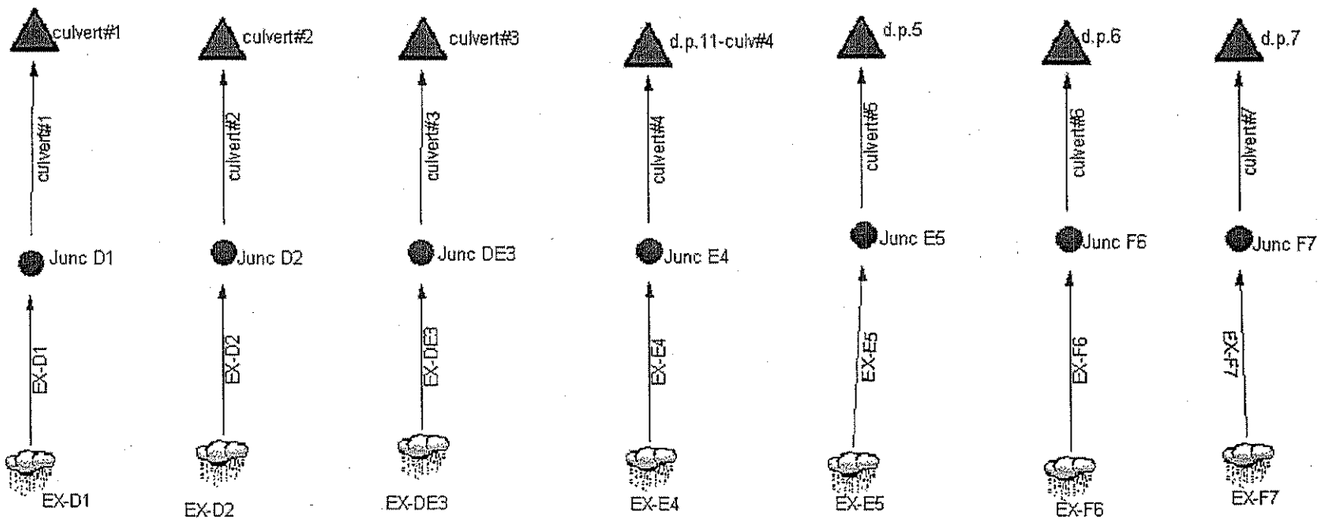


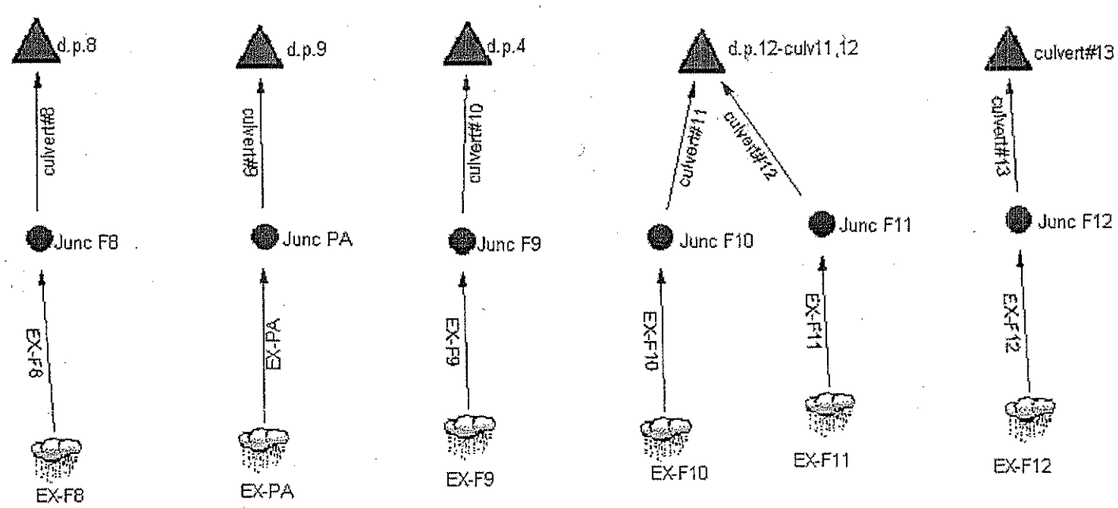
HIGH COUNTRY ENGINEERING, INC. 923 COOPER AVENUE GLENWOOD SPRINGS, CO 81601 (970) 945-8676 SCS-02.DWG	GLENWOOD MEADOWS, LLC GLENWOOD SPRINGS, CO GLENWOOD MEADOWS SCS SOILS MAP FIGURE 7	1" = 2000'			
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		DR. JMW	DATE 5/9/02	2000031.01	OF 1

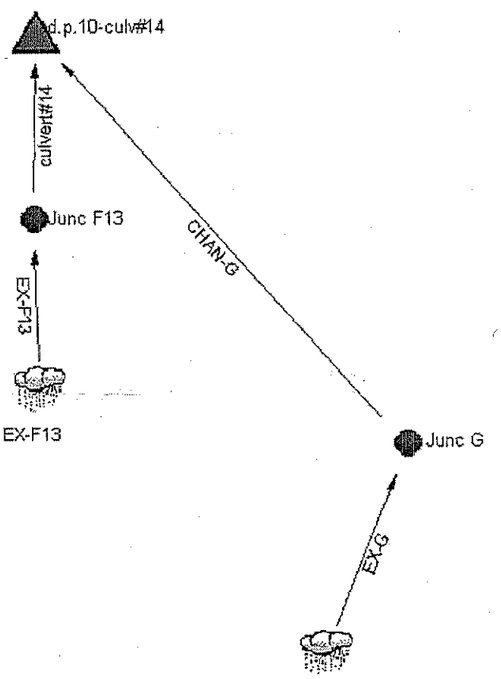
FEMA FLOODPLAIN MAP



HIGH COUNTRY ENGINEERING, INC. 923 COOPER AVENUE GLENWOOD SPRINGS, CO 81601 (970) 945-8676 fema-02	GLENWOOD MEADOWS, LLC GLENWOOD SPRINGS, CO GLENWOOD MEADOWS FEMA FLOODPLAIN MAP FIGURE 3	1" = 2000'		
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		DR. JMW	DATE 5/9/02	SHEET 1 OF 1





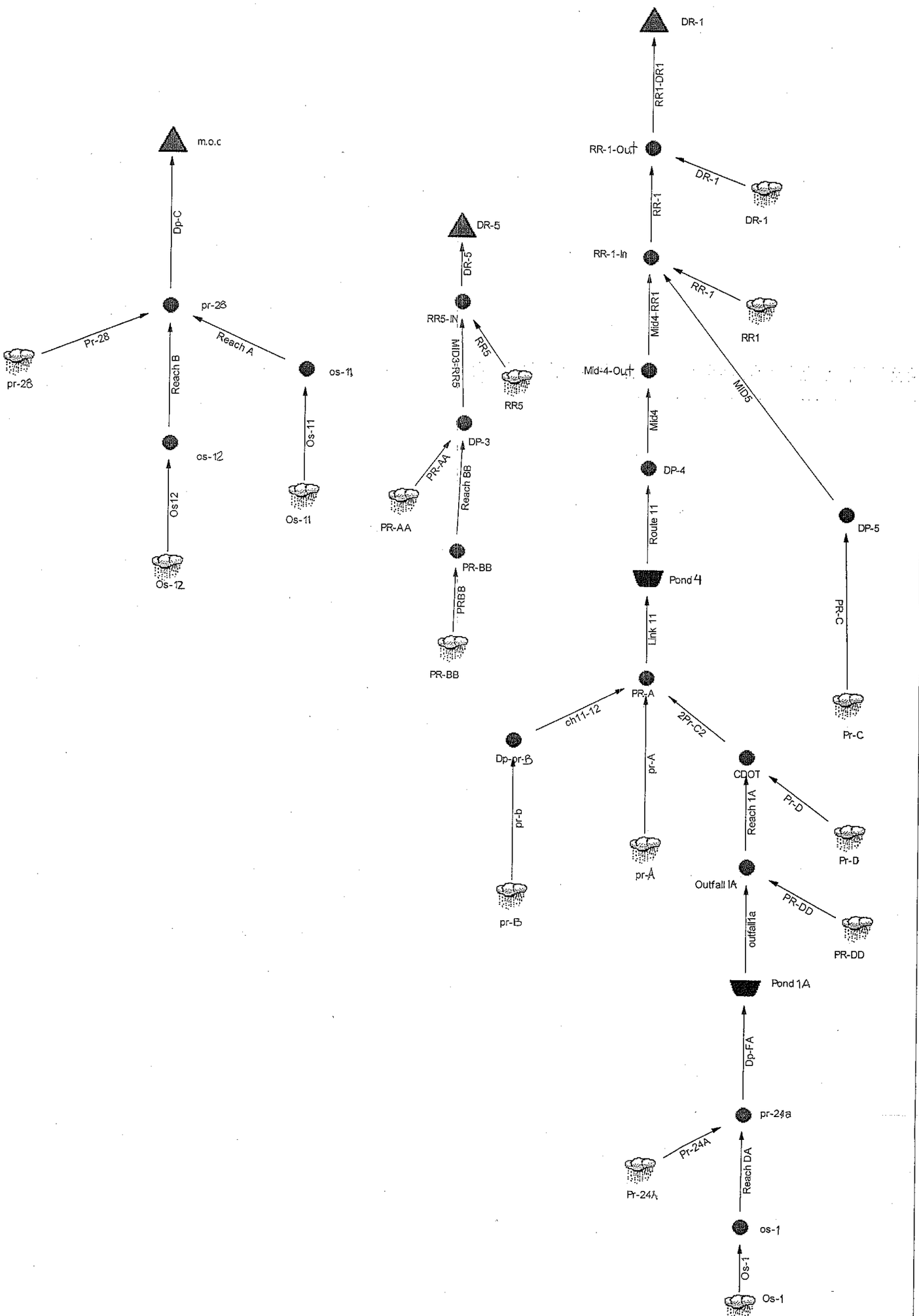


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GLENWOOD MEADOWS
POND PACK ROUTING
EXISTING CONDITIONS

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DES. JRR	CK: LAH	FILE NO.	SHEET
DR. JRR	DATE: 1/25/04	2031027.00	1



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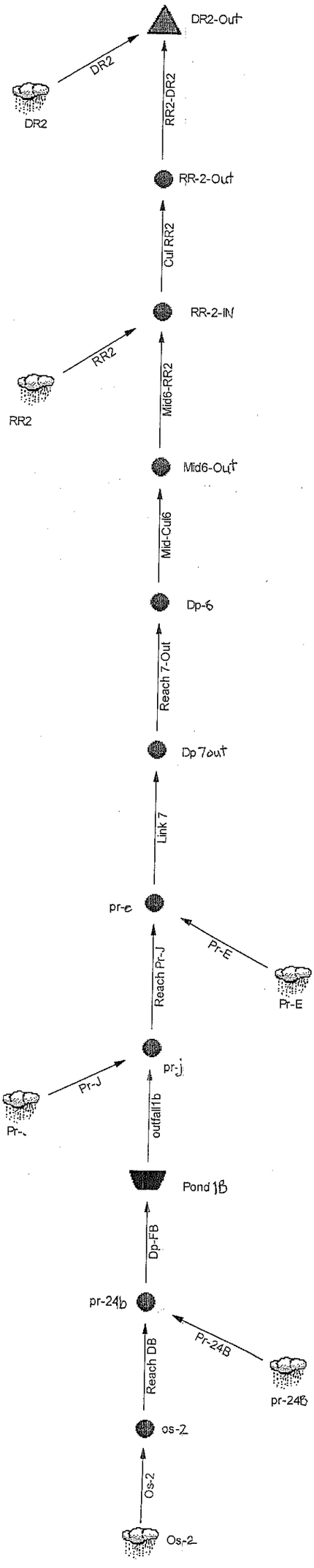
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DR. LAH	DATE: 5/5/04	2000031.00	1

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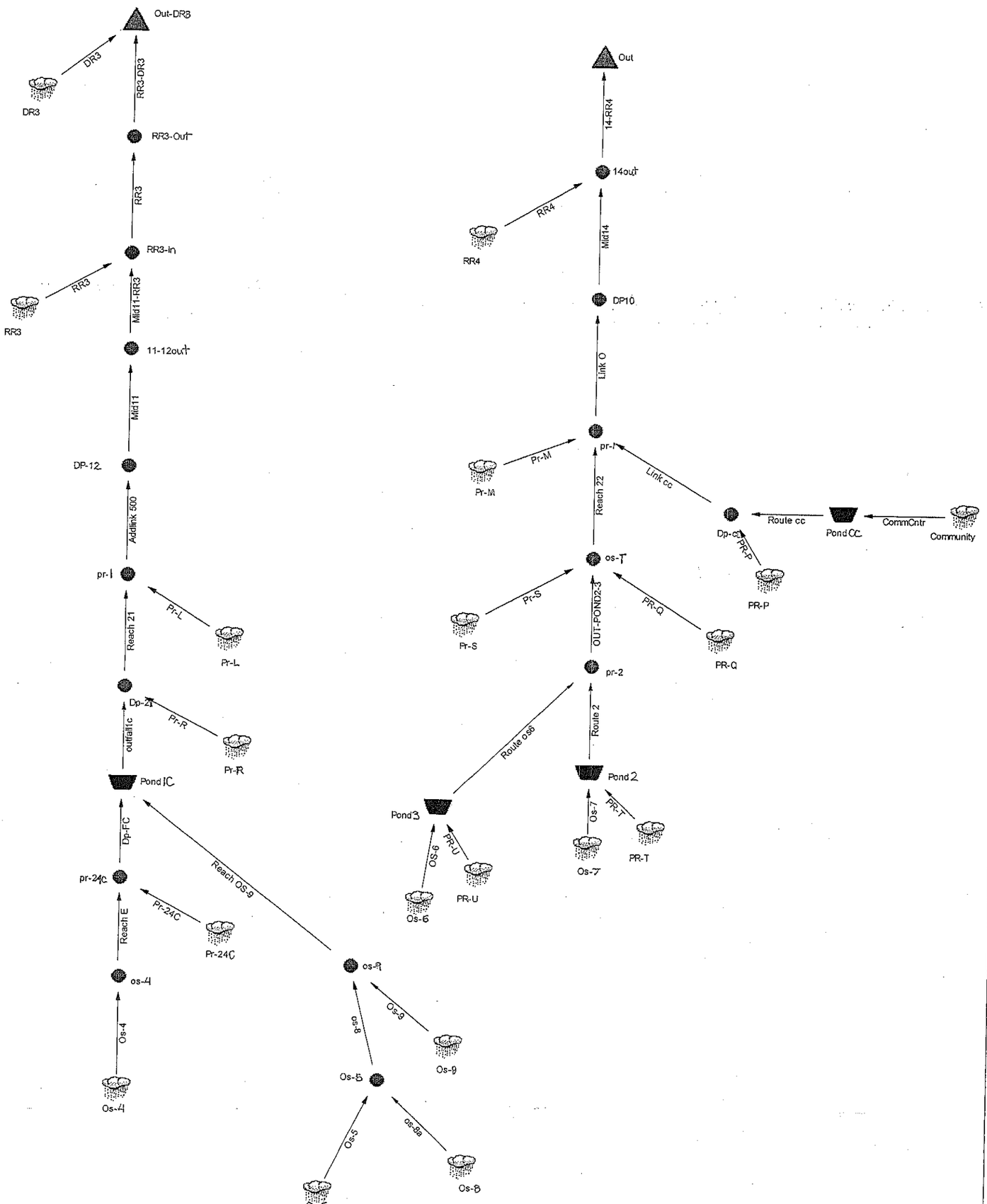
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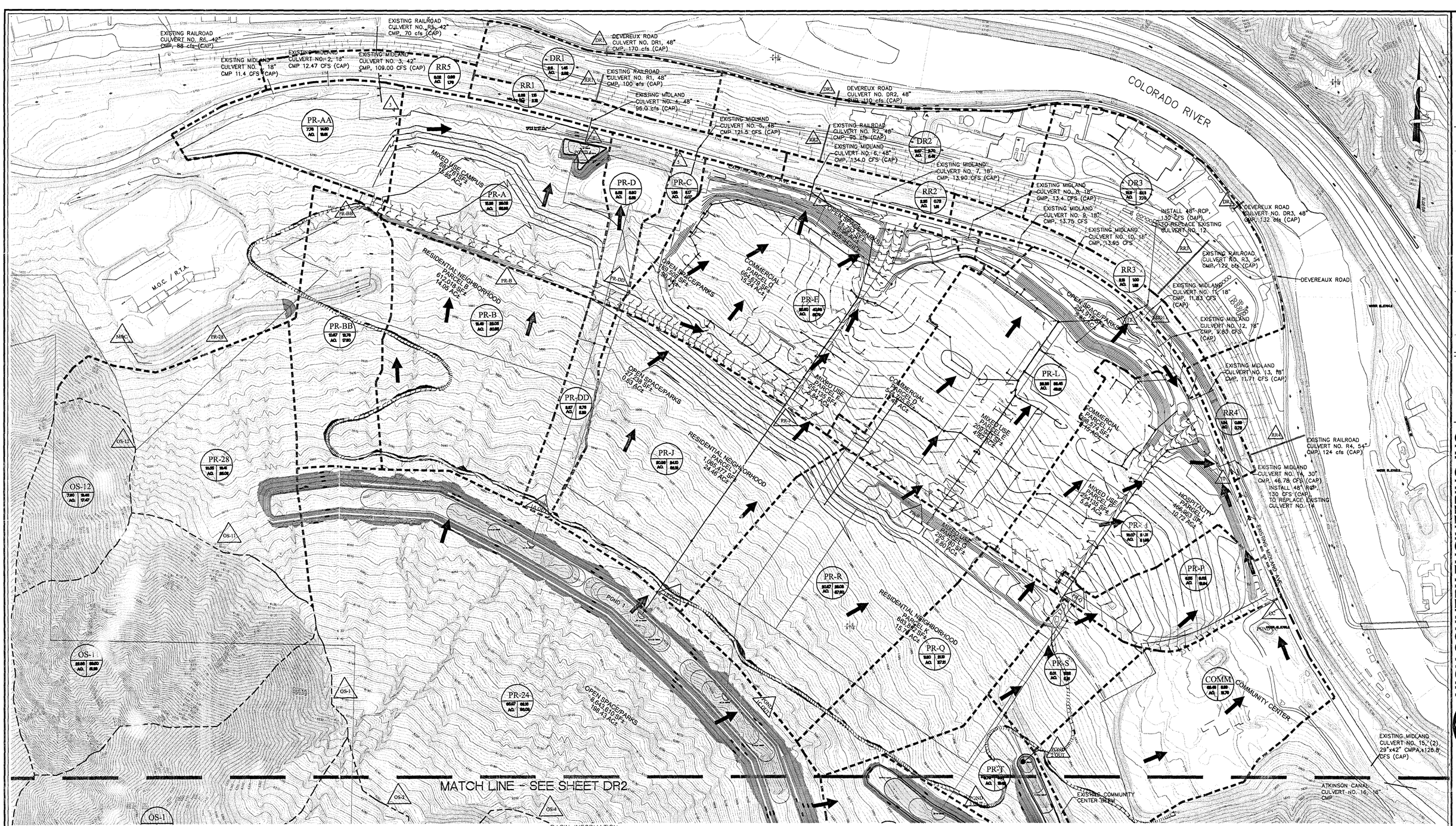
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*BASINS THAT ARE CONSIDERED DEBRIS FLOW GENERATORS IN THE CALCULATIONS DUE TO GRADE AND VEGETATION.

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)

1 inch = 200 ft.

LEGEND

- PROPOSED CULVERTS
- PROPOSED DESIGN POINT
- PROPOSED ROADWAY GRADES
- PROPOSED CURB INLET
- PROPOSED STORM PIPES
- OFFSITE DRAINAGE BASINS: OFFSITE BASIN BOUNDARY; ONSITE BASIN BOUNDARY; CONTOUR 2'; CONTOUR 10'
- PROPOSED DRAINAGE BASINS: PROPOSED CONTOUR 2'; PROPSED CONTOUR 10'
- FLOW DIRECTION

OS-0 (0.00 AC, 0.00 AC) — AREA IN ACRES; FLOW RATE (25 YR, 100 YR)

P-0 (0.00 AC, 0.00 AC) — AREA IN ACRES; FLOW RATE (25 YR, 100 YR)

BASIN INFORMATION

Basin	Area (ac)	C	Q_{25}	Q_{100}	Basin	Area (ac)	C	Q_{25}	Q_{100}
*OS-1	39.27	91	69.53	90.29	PR-BB	10.67	85	12.73	17.80
*OS-2	52.11	91	97.03	112.96	PR-B	18.49	85	22.05	30.85
*OS-4	49.58	91	82.17	106.63	PR-D	3.52	84	3.90	5.53
*OS-5	14.93	88	21.93	29.50	PR-C	1.63	92	3.17	4.07
*OS-6	60.87	91	100.99	131.25	PR-DD	3.37	84	3.73	5.29
*OS-7	9.36	88	13.75	18.50	PR-E	25.60	92	40.36	51.79
*OS-8	9.51	88	13.97	18.79	PR-J	20.96	86	24.10	33.19
*OS-9	4.78	88	7.02	9.45	PR-L	23.26	92	38.45	49.31
*OS-11	22.36	91	39.50	51.29	PR-R	20.87	88	28.03	37.60
*OS-12	7.60	91	13.46	17.47	PR-M	16.07	92	27.21	34.98
					PR-Q	11.30	92	21.19	27.21
PR-24	65.97	84	68.16	96.09	PR-P	6.55	88	9.62	12.94
PR-28	16.55	84	16.41	23.08	PR-S	5.01	78	3.32	5.21
					PR-T	6.76	88	9.97	13.42
PR-AA	7.73	92	14.50	18.61	PR-U	8.54	91	15.12	19.63
PR-A	15.23	92	28.02	35.99	COMM	63.43	70	8.89	18.79

DEVELOPED

Basin	Area (ac)	C	Q_{25}	Q_{100}
RR1	3.62	71	1.15	2.12
RR2	2.26	71	0.72	1.31
RR3	3.13	71	1.00	1.82
RR4	1.24	71	0.39	0.72
RR5	3.02	71	0.96	1.76
DR1	6.11	69	1.45	2.92
DR2	11.37	69	2.70	5.43
DR3	16.11	69	3.83	7.70

DESIGN POINT INFORMATION

DESIGN POINT	CONTRIBUTING BASINS	Q25	Q100
COMM	COMMUNITY CENTER	8.89	18.79
RR5	PR-AA, PR-BB, RR5	27.73	37.76

DESIGN POINT INFORMATION

DESIGN POINT	CONTRIBUTING BASINS	Q25	Q100
3	PR-AA, PR-BB	26.98	36.17
4	OS-1, PR-24A, PR-D, PR-DD, PR-A, PR-B	45.44	62.37
5	PR-C	3.17	4.07
6	OS-2, PR-24B, PR-J, PR-E	65.74	86.59
12	OS-4, PR-24C, PR-R, PR-L, OS-5, OS-8, OS-9	67.98	88.82
10	PR-U, OS-6, OS-7, PR-T, PR-S, PR-Q COMM., PR-P, PR-M	62.40	84.03
PR-BB	PR-BB	12.73	17.80

DESIGN POINT INFORMATION

DESIGN POINT	CONTRIBUTING BASINS	Q25	Q100
PR-B	PR-B	22.05	30.85
PR-DD	OS-1, PR-24A, PR-DD	4.68	6.60
PR-28	OS-11, OS-12 PR-28	66.94	88.95
PR-J	OS-2, PR-24C, PR-J	25.52	34.93
PR-R	OS-4, PR-24C, PR-R OS-5, OS-8, OS-9	28.03	37.60
PR-Q	PR-U, OS-6, OS-7, PR-T, PR-S, PR-Q	26.30	34.87
RR1	OS-1, PR-24A, PR-D, PR-DD, PR-A, PR-B, RR1	48.77	67.32

DESIGN POINT INFORMATION

DESIGN POINT	CONTRIBUTING BASINS	Q25	Q100
RR2	OS-2, PR-24B, PR-J, PR-E, RR2	66.46	87.89
RR3	OS-4, PR-24C, PR-R, PR-L, OS-9 OS-5, OS-8, RR3	68.83	90.53
RR4	PR-U, OS-6, OS-7, PR-T, PR-S, PR-Q COMM., PR-P, PR-M RR4	62.73	84.72
DR1	OS-1, PR-24, PR-D, PR-C, PR-A, PR-B, RR1	50.12	70.08
DR2	OS-2, PR-24, PR-J PR-K, PR-E, RR2	69.16	93.31
DR3	OS-4, PR-24, PR-Q, PR-R, PR-L, OS-1, OS-5, OS-8, OS-9	72.56	98.13

NO.	DATE	REVISION	BY
1	12/24/03	REVISIONS PER CITY COMMENTS	
2	2/27/04	REVISIONS TO DRAINAGE BASINS	

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

DRAWN BY: LAH
CHECKED BY: LAH
DATE: 5/6/04
FILE: DR-01-05-03-04

HIGH COUNTRY ENGINEERING, INC.
14 INVERNESS DRIVE EAST, STE F-120, ENGLEWOOD, CO 80112
PHONE (303) 925-0544 FAX (303) 925-0547
1517 BLAKE AVENUE, STE 101, GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 FAX (970) 945-2555
WWW.HCENG.COM

GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS
MASTER DRAINAGE PLAN
PROPOSED CONDITIONS

PROJECT NO. 2000031.0316

DR1



*BASINS THAT ARE CONSIDERED DEBRIS FLOW GENERATORS IN THE CALCULATIONS DUE TO GRADE AND VEGETATION.

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)

1 inch = 200 ft.

LEGEND

- PROPOSED CULVERTS
- PROPOSED DESIGN POINT
- PROPOSED ROADWAY GRADES
- PROPOSED CURB INLET
- OFFSITE DRAINAGE BASINS (OS-0; Q25 AC. / Q100 AC.; AREA IN ACRES; FLOW RATE CFS 1YR, 100 YRS)
- PROPOSED STORM PIPES
- OFFSITE BASIN BOUNDARY
- ONSITE BASIN BOUNDARY
- CONTOUR 2'
- CONTOUR 10'
- PROPOSED DRAINAGE BASINS (P-0; Q25 AC. / Q100 AC.; AREA IN ACRES; FLOW RATE CFS 1YR, 100 YRS)
- PROPOSED CONTOUR 2'
- PROPOSED CONTOUR 10'
- FLOW DIRECTION

BASIN INFORMATION

BASIN	AREA	CURVE NUMBER	BASIN	AREA	CURVE NUMBER	BASIN	AREA	CURVE NUMBER
*OS-1	39.27	91	PR-A	21.42	92	PR-S	5.40	78
*OS-2	52.11	91	PR-B	26.19	85	OS-T	2.50	92
*OS-4	49.58	91	PR-C	1.69	92	OS-U	1.10	92
*OS-5	14.93	88	PR-D	6.55	92	COMM	63.43	70
*OS-6	56.73	91	PR-E	22.09	92	RR1	3.63	71
*OS-7	11.30	88	PR-J	10.41	86	RR2	2.25	71
*OS-8	10.45	88	PR-K	11.16	85	RR3	3.13	71
*OS-9	7.13	88	PR-L	20.63	92	RR4	1.24	71
*OS-11	22.31	91	PR-M	5.23	92	DR1	6.11	69
*OS-12	7.60	91	PR-N	3.21	92	DR2	11.37	69
PR-20	13.03	84	PR-O	5.10	92	DR3	16.11	69
PR-23	13.19	82	PR-P	6.14	92			
PR-24	65.39	84	PR-Q	10.77	85			
PR-28	16.55	84	PR-R	9.19	88			

DESIGN POINT INFORMATION

DESIGN POINT	Q25	Q100
POND 1A OUTLET	1.99	2.43
POND 1B OUTLET	2.31	2.79
POND 1C OUTLET	2.80	3.64
POND 2 OUTLET	1.41	1.69
POND 3 OUTLET	2.34	2.79
POND 4 OUTLET	45.44	62.37

DESIGN POINT INFORMATION

DESIGN POINT	CONTRIBUTING BASINS	Q25	Q100
OS-1	OS-1	69.53	90.29
OS-2	OS-2	87.03	112.96
OS-4	OS-4	82.17	106.63
OS-5	OS-5	21.93	29.50
OS-8	OS-8	13.97	18.79
OS-9	OS-9	7.02	9.45
OS-6	OS-6	100.99	131.25
OS-7	OS-7	13.75	18.50

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
1	12/24/03	REVISIONS PER CITY COMMENTS	
2	2/27/04	REVISIONS TO DRAINAGE BASINS	

DRAWN BY: LAH
CHECKED BY: LAH
DATE: 5/6/04
FILE: DR01-05-03-04

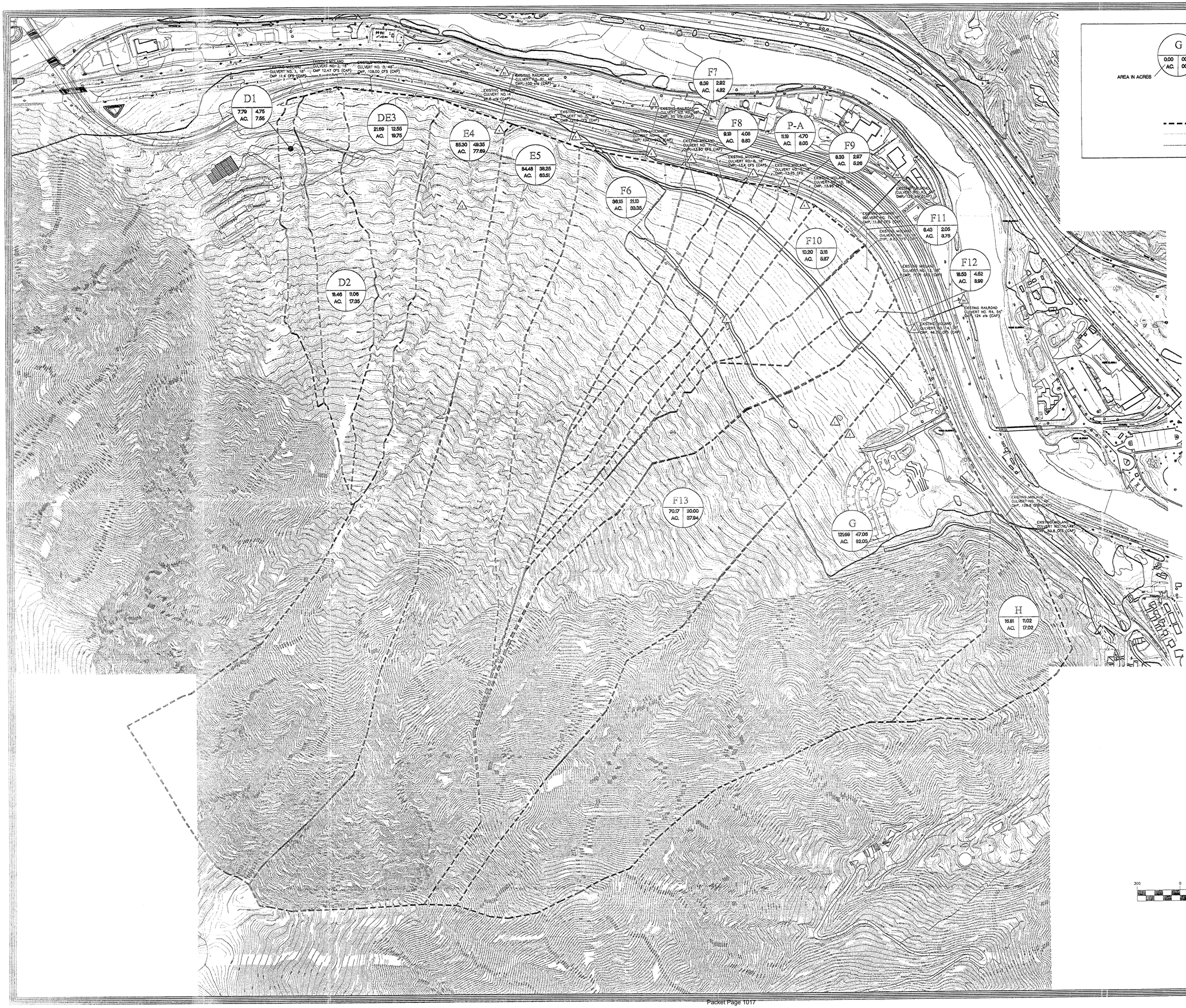
HIGH COUNTRY ENGINEERING, INC.
14 INVERNESS DRIVE EAST, STE F-120, ENGLEWOOD, CO 80112
PHONE (303) 925-0544 FAX (303) 9250547
1517 BLAKE AVENUE, STE 101, GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8576 FAX (970) 945-2555
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GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MASTER DRAINAGE PLAN PROPOSED CONDITIONS

PROJECT NO. 2000031.0316

DR2



LEGEND

- G — 0.00 AC. | 00.00 AC. — AREA IN ACRES / FLOW RATE (25 YR, 100 YR) — EXISTING DRAINAGE BASINS
- EXISTING DESIGN POINT
- EXISTING STORM PIPES
- EXISTING BASIN BOUNDARY
- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR

BASIN	AREA	CURVE NUMBER
D1	7.79	77
D2	18.45	77
DE3	21.69	77
E4	85.30	77
E5	84.41	75
F6	36.15	77
F7	6.39	74
F8	9.19	74
P-A	11.19	74
F9	8.33	73
F10	10.20	71
F11	6.43	71
F12	18.53	70
F13	70.17	71
G	121.69	73
H	16.81	77

NORTH

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

NO	DATE	REVISION	BY
2	2/27/04	REVISIONS TO DRAINAGE BASINS	JRR

DES JRR
DR JRR
CK LAH
DATE 09/19/03
FILE HIST_01

HIGH COUNTRY ENGINEERING, INC.
557 BLACK AVENUE, STE 101
GLENWOOD SPRINGS, CO 81601
PH:(970) 945-3976
FX:(970) 945-3585
14 INVERNESS DRIVE EAST, STE D-136
ENGLEWOOD, CO 80112
PH:(303) 925-0554
FX:(303) 925-0547

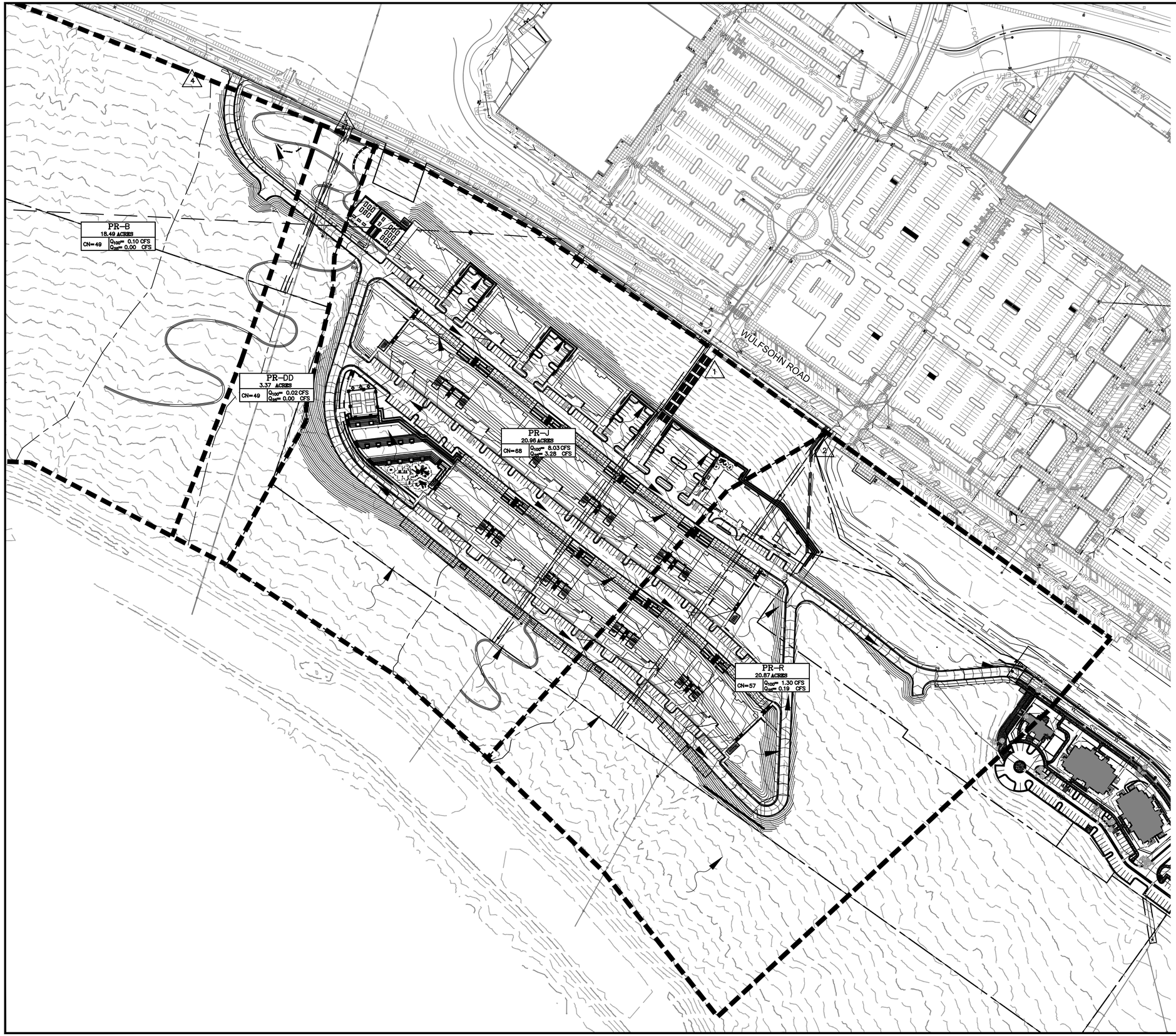
GLENWOOD SPRINGS
GLENWOOD MEADOWS
HISTORIC FLOW CONDITIONS

PROJECT NO
200031.01

SHEET H1

APPENDIX C

PROPOSED CONDITIONS DRAINAGE MAP – GLENWOOD MEADOWS MULTI-FAMILY



GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

PRELIMINARY NOT FOR CONSTRUCTION

LEGEND

- EXISTING PROPERTY BOUNDARY
- 8010 EXISTING MAJOR CONTOUR
- 8008 EXISTING MINOR CONTOUR
- 8160 PROPOSED MAJOR CONTOUR
- 8158 PROPOSED MINOR CONTOUR
- OFFSITE DRAINAGE BASIN BOUNDARY
- EXISTING DRAINAGE BASIN BOUNDARY
- PROPOSED DRAINAGE BASIN BOUNDARY

EX-1	PR-1
## ACRES	### ACRES
CN=##	Q_{100}=#.## CFS
	Q_{25}=#.## CFS

DRAINAGE BASIN ID
DRAINAGE BASIN SIZE (ACRES)
CN= RUNOFF CURVE NUMBER
Q_{100}=100 YEAR RUNOFF FLOW (CFS)
Q_{25}=25 YEAR RUNOFF FLOW (CFS)

DRAINAGE FLOW PATTERN

DESIGN POINT

DESIGN POINTS

1 **DESIGN POINT 1: RECEIVES CHANNEL FLOW (PIPE) FROM BASIN PR-J.**

2 **DESIGN POINT 2: RECEIVES CHANNEL FLOW (PIPE) FLOW FROM BASIN PR-R.**

NOTES:

1. A SITE SPECIFIC GEOTECHNICAL REPORT WAS COMPLETED FOR GLENWOOD MEADOWS NO. 6 HOUSING, CITY OF GLENWOOD SPRINGS, COLORADO BY AMERICAN GEOSERVICES, DATED JULY 22, 2002, JOB NUMBER 0280-WS2020.
2. THE ENTIRE SITE IS LOCATED WITHIN ZONE D ON THE FIRM MAPS 0802051431B AND 0802051432B.
3. EXISTING SURVEY INFORMATION COMPLETED BY TUTTLE SURVEYING SERVICES.
4. PROPOSED BASIN DELINEATION FROM GLENWOOD MEADOWS MASTER DRAINAGE REPORT COMPLETED BY HIGH COUNTRY ENGINEERING, INC. (PROJECT NO. 2000031) DATED MAY 6, 2004.

COLORADO 811
CALL BEFORE YOU DIG
Utility Notification Center of Colorado

NO.	DATE	REVISION	BY
1	12/11/20	MAJOR SITE / ARCH. REVIEW	MGG
2	1/22/21	MAJOR SITE / ARCH. REVIEW #2	MGG
3	6/25/21	MAJOR SITE / ARCH. REVIEW #3 DRAFT	

DRAWN BY: MGG
CHECKED BY: MGG
DATE:
FILE:
SCALE 1" = 100'

HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101,
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 · FAX (970) 945-2555
WWW.HCENG.COM

BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

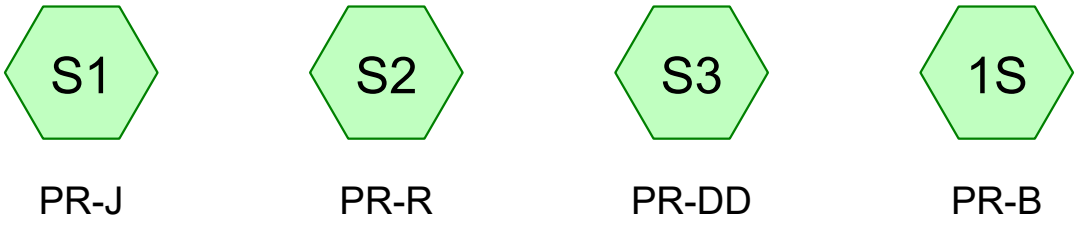
PROPOSED DRAINAGE BASIN MAP

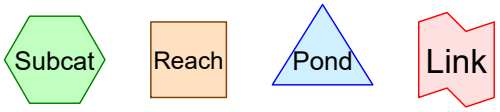
PROJECT NO.
2201044.00

PRDR

APPENDIX D

PROPOSED HYDROLOGIC CALCULATIONS





Routing Diagram for 220100-Proposed

Prepared by HydroCAD SAMPLER 1-800-927-7246 www.hydrocad.net, Printed 6/25/2021

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
12.458	98	Impervious (1S, S1, S2, S3)
46.792	48	Oak-aspen, fair, HSG B (1S, S1, S2, S3)
4.441	49	Open space, fair, HSG A (S1, S2)
63.691	**58**	**TOTAL AREA**

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
4.441	HSG A	S1, S2
46.792	HSG B	1S, S1, S2, S3
0.000	HSG C	
0.000	HSG D	
12.458	Other	1S, S1, S2, S3
63.691		**TOTAL AREA**

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: PR-B Runoff Area=18.490 ac 1.24% Impervious Runoff Depth=0.00"
Flow Length=976' Slope=0.1609 '/' Tc=16.1 min CN=49 Runoff=0.00 cfs 0.000 af

Subcatchment S1: PR-J Runoff Area=20.961 ac 40.75% Impervious Runoff Depth>0.22"
Flow Length=2,082' Tc=16.8 min CN=68 Runoff=3.28 cfs 0.384 af

Subcatchment S2: PR-R Runoff Area=20.871 ac 17.23% Impervious Runoff Depth>0.04"
Flow Length=1,765' Tc=16.3 min CN=57 Runoff=0.19 cfs 0.069 af

Subcatchment S3: PR-DD Runoff Area=3.369 ac 2.67% Impervious Runoff Depth=0.00"
Flow Length=1,000' Tc=16.6 min CN=49 Runoff=0.00 cfs 0.000 af

Total Runoff Area = 63.691 ac Runoff Volume = 0.452 af Average Runoff Depth = 0.09"
80.44% Pervious = 51.233 ac 19.56% Impervious = 12.458 ac

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Summary for Subcatchment 1S: PR-B

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

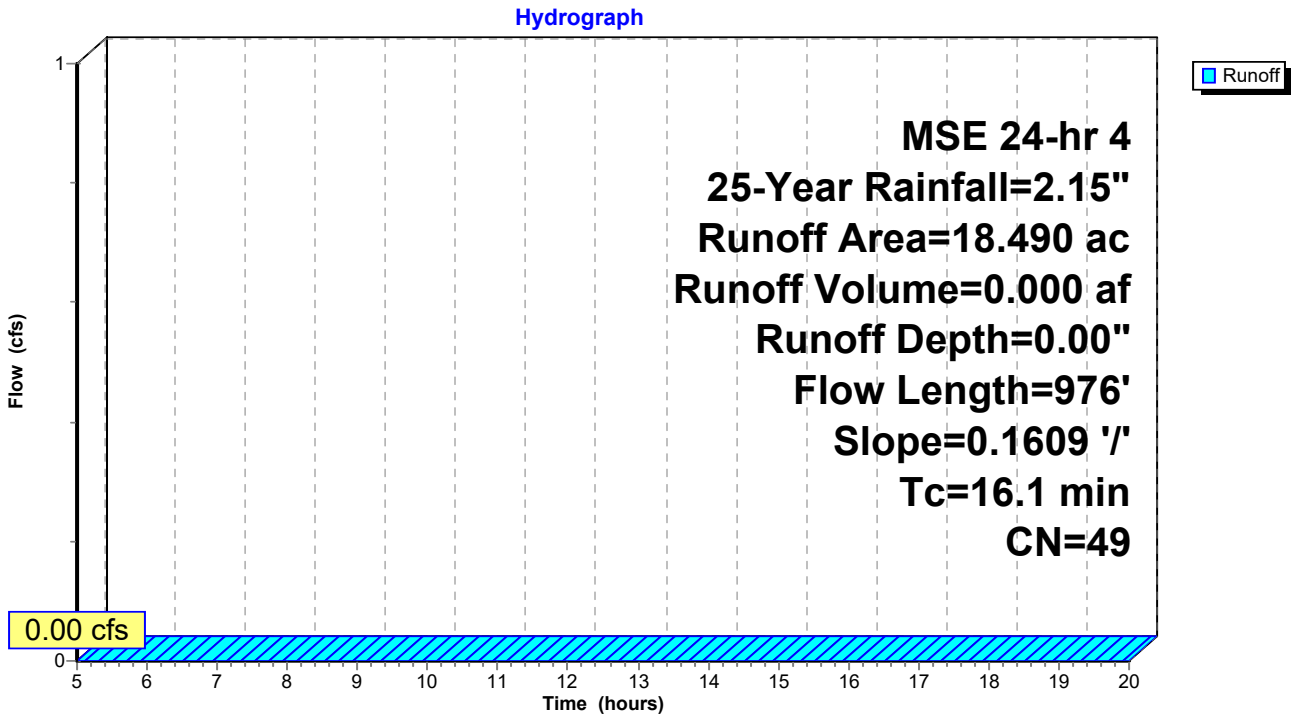
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 25-Year Rainfall=2.15"

	Area (ac)	CN	Description
*	18.260	48	Oak-aspen, fair, HSG B
*	0.230	98	Impervious
	18.490	49	Weighted Average
	18.260		98.76% Pervious Area
	0.230		1.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	300	0.1609	0.35		**Sheet Flow,** Range n= 0.130 P2= 1.29"
1.7	676	0.1609	6.46		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
16.1	976	Total			

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Subcatchment 1S: PR-B



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Summary for Subcatchment S1: PR-J

Runoff = 3.28 cfs @ 12.34 hrs, Volume= 0.384 af, Depth> 0.22"

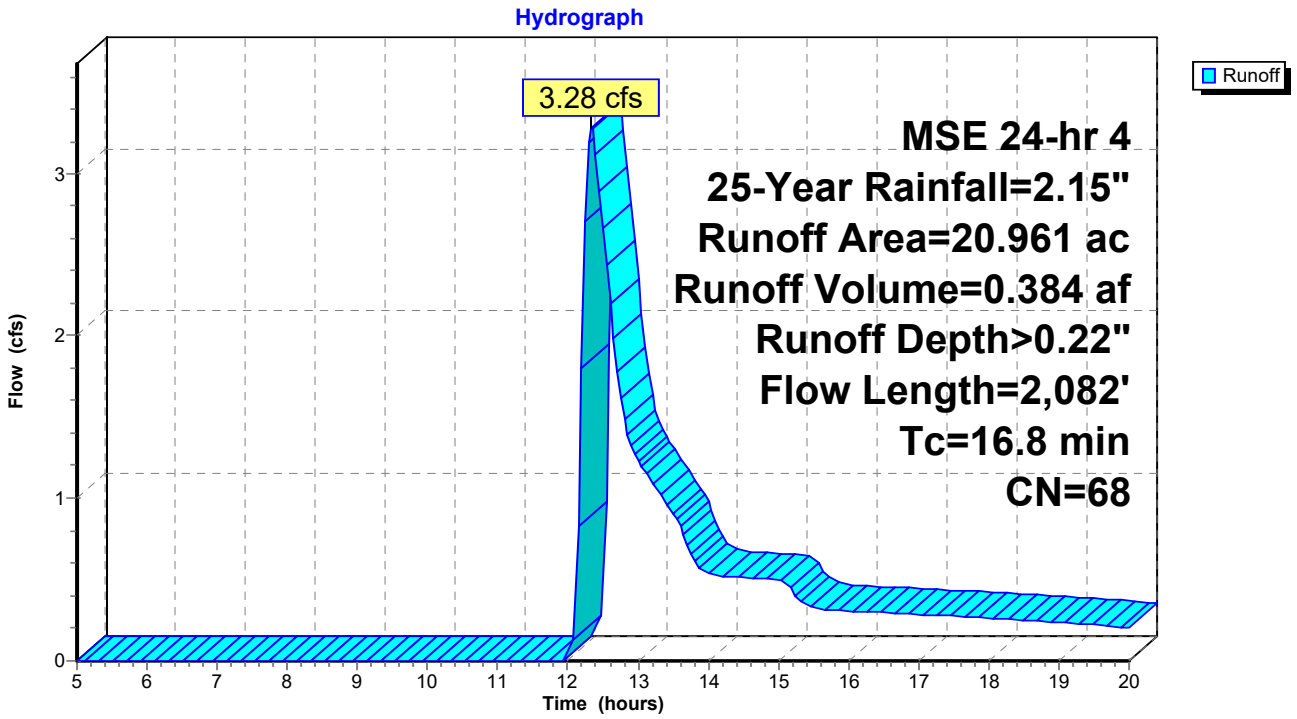
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 25-Year Rainfall=2.15"

	Area (ac)	CN	Description
*	10.013	48	Oak-aspen, fair, HSG B
*	2.407	49	Open space, fair, HSG A
*	8.541	98	Impervious
	20.961	68	Weighted Average
	12.420		59.25% Pervious Area
	8.541		40.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	300	0.1682	0.35		**Sheet Flow,** Range n= 0.130 P2= 1.29"
1.0	326	0.0680	5.29		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	1,456	0.0840	14.24	11.19	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
16.8	2,082	Total			

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Subcatchment S1: PR-J



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Summary for Subcatchment S2: PR-R

Runoff = 0.19 cfs @ 13.39 hrs, Volume= 0.069 af, Depth> 0.04"

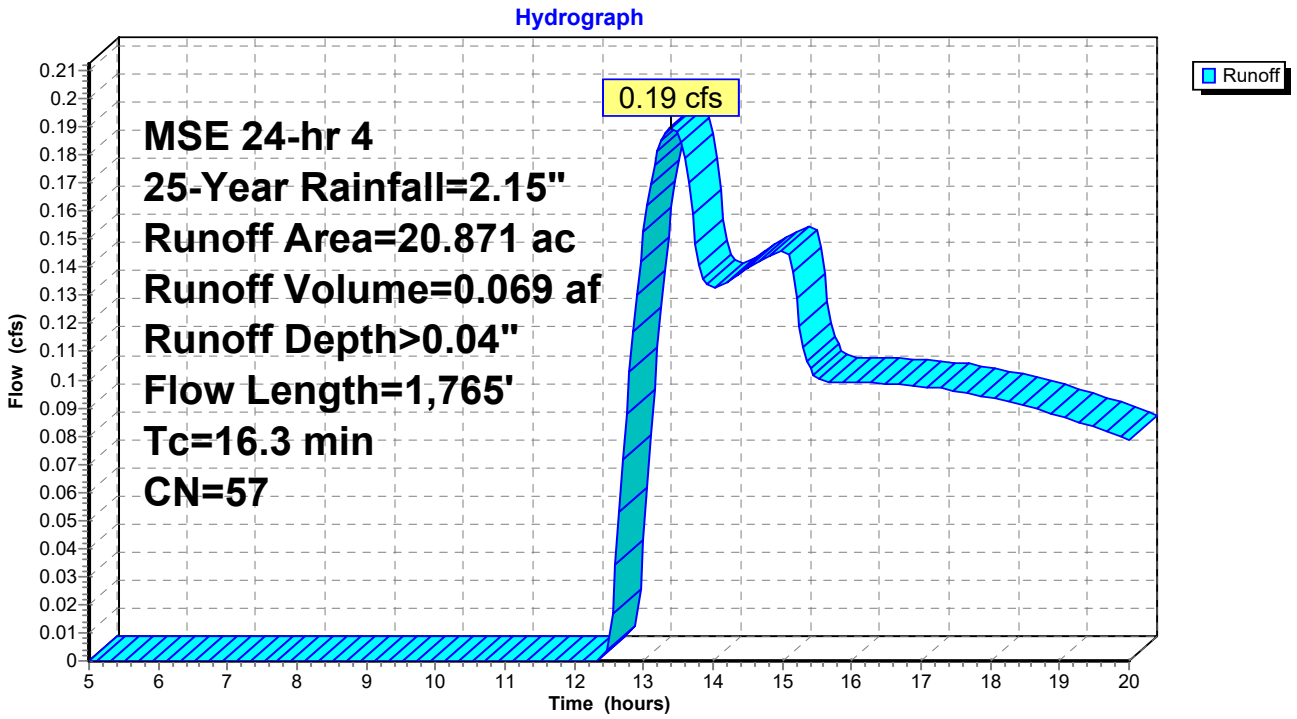
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 25-Year Rainfall=2.15"

	Area (ac)	CN	Description
*	15.240	48	Oak-aspen, fair, HSG B
*	2.034	49	Open space, fair, HSG A
*	3.597	98	Impervious
	20.871	57	Weighted Average
	17.274		82.77% Pervious Area
	3.597		17.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	300	0.1570	0.34		**Sheet Flow,** Range n= 0.130 P2= 1.29"
0.3	106	0.0650	5.18		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	1,359	0.0980	15.38	12.08	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
16.3	1,765	Total			

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Subcatchment S2: PR-R



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Summary for Subcatchment S3: PR-DD

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

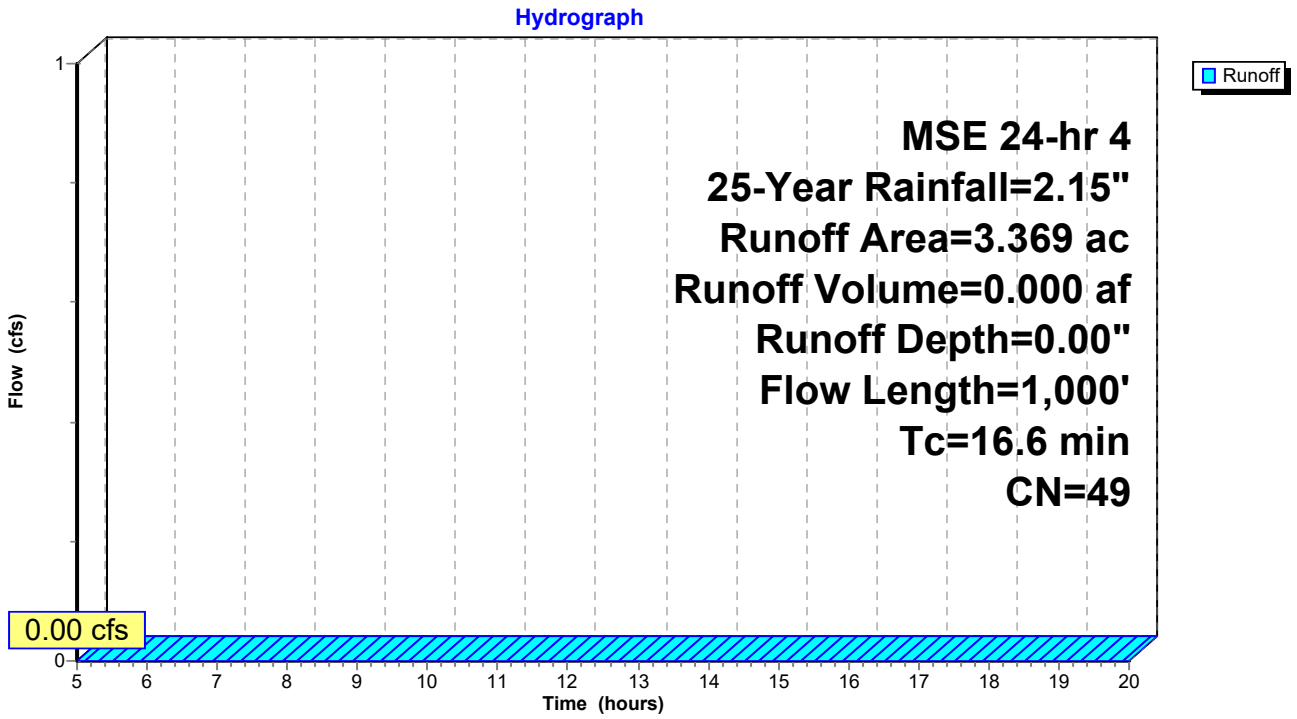
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 25-Year Rainfall=2.15"

	Area (ac)	CN	Description
*	3.279	48	Oak-aspen, fair, HSG B
*	0.090	98	Impervious
	3.369	49	Weighted Average
	3.279		97.33% Pervious Area
	0.090		2.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	300	0.1518	0.34		**Sheet Flow,** Range n= 0.130 P2= 1.29"
1.9	700	0.1506	6.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
16.6	1,000	Total			

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Subcatchment S3: PR-DD



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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: PR-B Runoff Area=18.490 ac 1.24% Impervious Runoff Depth>0.03"
Flow Length=976' Slope=0.1609 '/' Tc=16.1 min CN=49 Runoff=0.10 cfs 0.043 af

Subcatchment S1: PR-J Runoff Area=20.961 ac 40.75% Impervious Runoff Depth>0.45"
Flow Length=2,082' Tc=16.8 min CN=68 Runoff=8.83 cfs 0.782 af

Subcatchment S2: PR-R Runoff Area=20.871 ac 17.23% Impervious Runoff Depth>0.15"
Flow Length=1,765' Tc=16.3 min CN=57 Runoff=1.30 cfs 0.254 af

Subcatchment S3: PR-DD Runoff Area=3.369 ac 2.67% Impervious Runoff Depth>0.03"
Flow Length=1,000' Tc=16.6 min CN=49 Runoff=0.02 cfs 0.008 af

Total Runoff Area = 63.691 ac Runoff Volume = 1.086 af Average Runoff Depth = 0.20"
80.44% Pervious = 51.233 ac 19.56% Impervious = 12.458 ac

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Summary for Subcatchment 1S: PR-B

Runoff = 0.10 cfs @ 15.05 hrs, Volume= 0.043 af, Depth> 0.03"

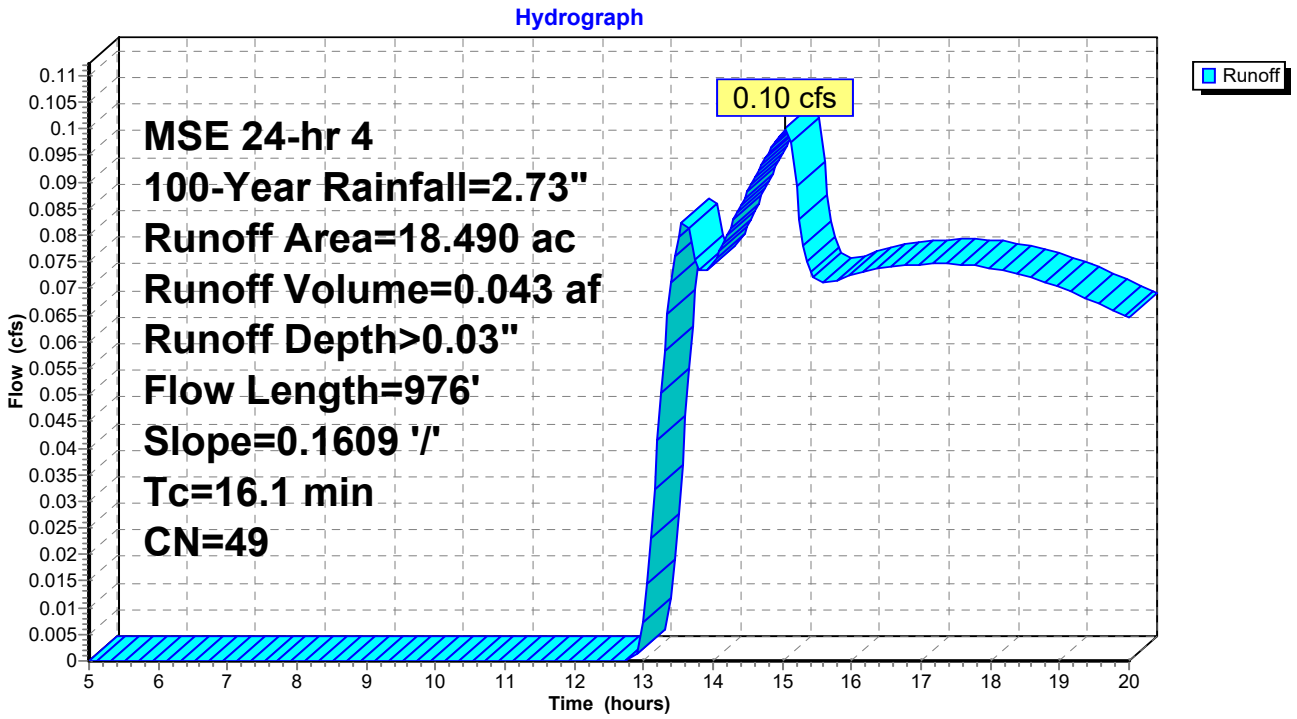
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 100-Year Rainfall=2.73"

	Area (ac)	CN	Description
*	18.260	48	Oak-aspen, fair, HSG B
*	0.230	98	Impervious
	18.490	49	Weighted Average
	18.260		98.76% Pervious Area
	0.230		1.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	300	0.1609	0.35		**Sheet Flow,** Range n= 0.130 P2= 1.29"
1.7	676	0.1609	6.46		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
16.1	976	Total			

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Subcatchment 1S: PR-B



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Summary for Subcatchment S1: PR-J

Runoff = 8.83 cfs @ 12.30 hrs, Volume= 0.782 af, Depth> 0.45"

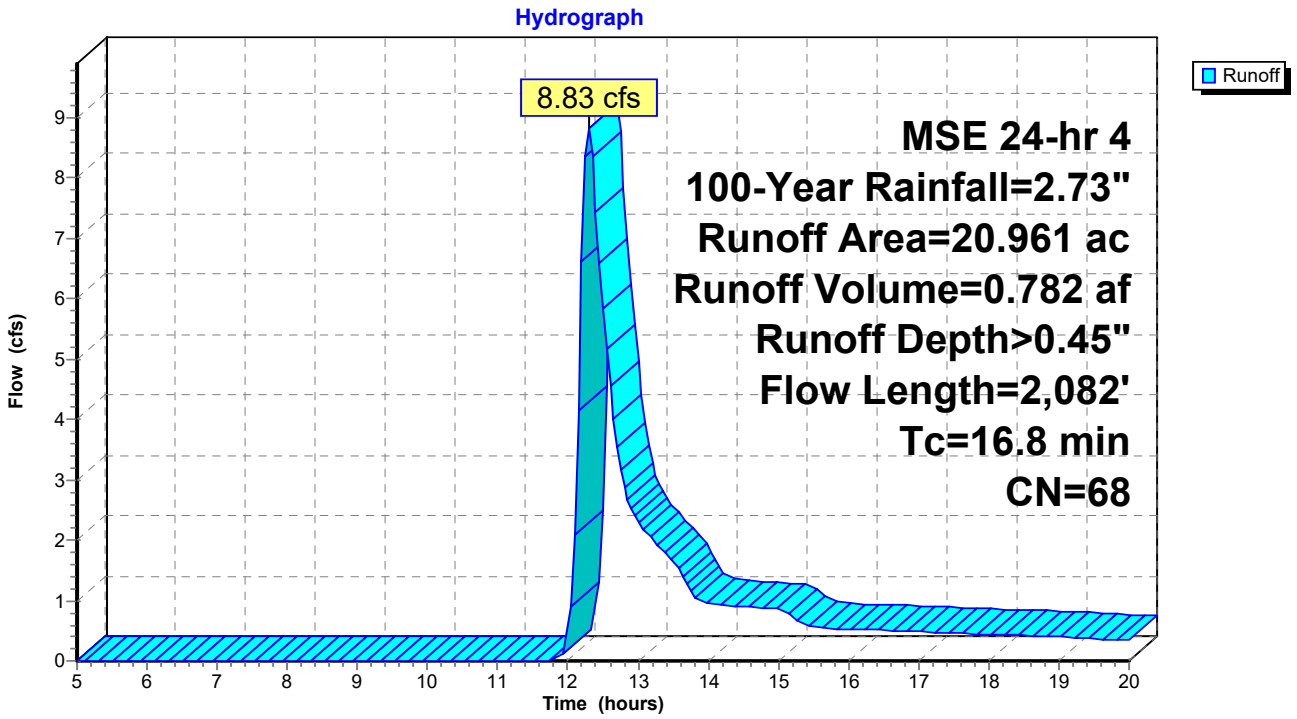
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 100-Year Rainfall=2.73"

	Area (ac)	CN	Description
*	10.013	48	Oak-aspen, fair, HSG B
*	2.407	49	Open space, fair, HSG A
*	8.541	98	Impervious
	20.961	68	Weighted Average
	12.420		59.25% Pervious Area
	8.541		40.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	300	0.1682	0.35		**Sheet Flow,** Range n= 0.130 P2= 1.29"
1.0	326	0.0680	5.29		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	1,456	0.0840	14.24	11.19	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
16.8	2,082	Total			

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Subcatchment S1: PR-J



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Summary for Subcatchment S2: PR-R

Runoff = 1.30 cfs @ 12.50 hrs, Volume= 0.254 af, Depth> 0.15"

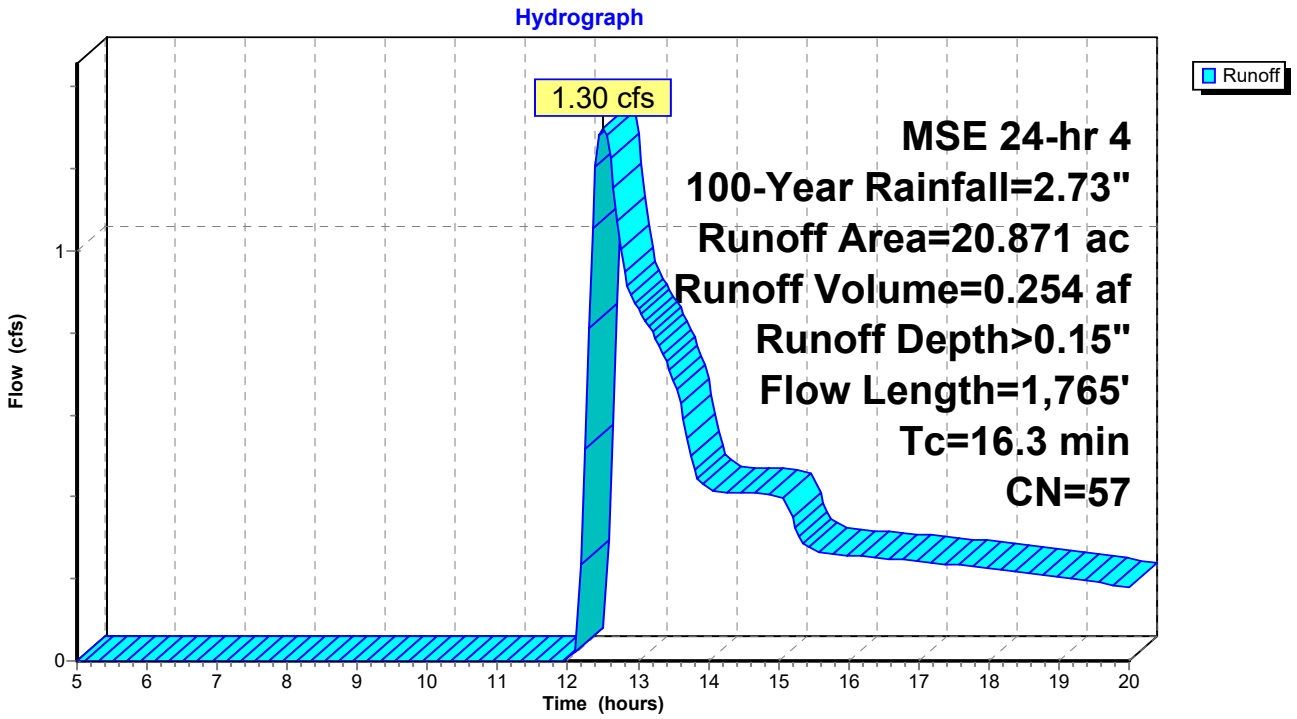
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 100-Year Rainfall=2.73"

	Area (ac)	CN	Description
*	15.240	48	Oak-aspen, fair, HSG B
*	2.034	49	Open space, fair, HSG A
*	3.597	98	Impervious
	20.871	57	Weighted Average
	17.274		82.77% Pervious Area
	3.597		17.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	300	0.1570	0.34		**Sheet Flow,** Range n= 0.130 P2= 1.29"
0.3	106	0.0650	5.18		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	1,359	0.0980	15.38	12.08	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
16.3	1,765	Total			

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Subcatchment S2: PR-R



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Summary for Subcatchment S3: PR-DD

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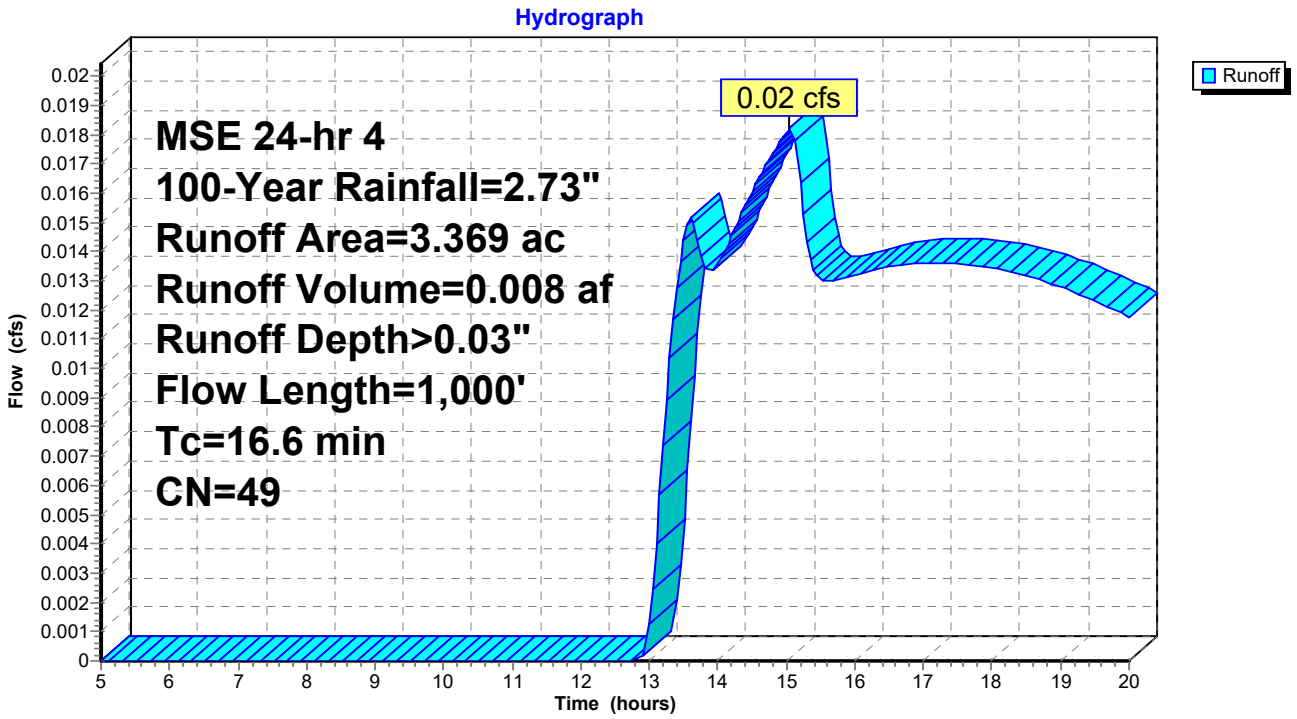
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 100-Year Rainfall=2.73"

	Area (ac)	CN	Description
*	3.279	48	Oak-aspen, fair, HSG B
*	0.090	98	Impervious
	3.369	49	Weighted Average
	3.279		97.33% Pervious Area
	0.090		2.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	300	0.1518	0.34		**Sheet Flow,** Range n= 0.130 P2= 1.29"
1.9	700	0.1506	6.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
16.6	1,000	Total			

This report was prepared with the free HydroCAD SAMPLER, which is licensed for evaluation and educational use ONLY. For actual design or modeling applications you MUST use a full version of HydroCAD which may be purchased at www.hydrocad.net. Full programs also include complete technical support,training materials, and additional features which are essential for actual design work.

Subcatchment S3: PR-DD



Chad J. Lee, Esq.
Telephone (970) 945-6546
clee@balcombgreen.com

December 28, 2020

Via Electronic Submission:
Trent Hyatt, Planning Director
City of Glenwood Springs
Community Development Department
101 West 8th Street
Glenwood Springs, CO 81601
trent.hyatt@cogs.us

Re: ***Glenwood Meadows – Phase 1***
Applications for a Major Site Architectural Review and Minor Subdivision

Dear Trent:

BLD Group, LLC ("Applicant") is proud to present the enclosed Major Site/Architectural Review application for a 14 building apartment complex ("Application") within the Residential-High Zone District of Glenwood Meadows. This Application is for 300 units, ranging from studio to three bedroom apartments focused on 27 acres and designed specifically to conform Design Guidelines within Glenwood Meadows. The original Glenwood Meadows approvals authorize and anticipate 475 housing units in this zone district given its proximity to retail, recreation, and public transit, not to mention Glenwood's persistent shortage of attainable housing to meet the needs of local employers. This Application conforms with the permitted 300 commercial apartment units within Glenwood Meadows residential zone district. Indeed, our Comprehensive Plan "strongly encourage[s] the development of the planned residential component for Glenwood Meadows, including live-work housing, apartments, etc." (Pg. 77, emphasis added). This Application represents the majority of the planned residential component of Meadows. We look forward to working with your team throughout the Site/Architectural Review process.

I. Existing Approvals and Conditions

This Application is for a 300 unit apartment complex located on approximately 27.5 acres of Lot 11C-B (Parcel No. 218508141003) and Lot 11C-C (Parcel No. 218508141002), GM Subdivision No. 6 (the "Property"). The Property consists of portions of the 49.414 acre Residential-High Zone District land owned by Glenwood Meadows, LLC. Applicant is under contract to purchase the Property. We are also preparing an application for Minor Subdivision to create one additional lot, the general configuration of which is shown on the Site Plan in this Application. We anticipate filing the subdivision application within the next month. This Application is for major site/architectural review of the apartment complex envisioned by the Meadows approvals.

As you know, the Glenwood Meadows development is on 345 acres of land west of downtown. The Glenwood Meadows property was annexed into the City of Glenwood Springs in 2002 following a three year application process. Two hundred and ten acres of land was dedicated by the developer of Glenwood Meadows to the City as public open space. The vast majority of this dedicated public open space is located just behind and adjacent to this project.

Throughout the three year approval and annexation process, impacts of housing and other approved uses and densities within Glenwood Meadows were considered and mitigated, including traffic, water and sewer facilities, debris flow mitigation, and on and off-site pedestrian flow and connections. The Applicant is fully committed to paying the City's current impact fees, which were specifically quantified by the City to offset the impacts of development on the City's infrastructure.

During the Meadows annexation and zoning process, City Staff and City Council also implemented an exhaustive process to establish guidelines and enhanced zoning to ensure that the development of Glenwood Meadows achieves the highest quality of development standards. The Glenwood Meadows Annexation and Development Agreement codifies those standards, including in a Zoning and Development plan which governs development of the Property. (See, Annexation and Development Agreement Glenwood Meadows, LLC Annexation, recorded December 6, 2002 as Reception No. 816083 ("ADA")). Pursuant to the ADA, the Property was zoned R-3, the most flexible and intense residential zone district. In 2018, the City's R-3 District was re-zoned to RH (Residential High). Multi-family use is a permitted use in the RH District.

The ADA, together with subsequent amendments, set forth specific entitlements regarding density of the various zone districts and parcels within Glenwood Meadows. The ADA contemplated full residential build out of the planned residential component of the Meadows and specifically entitles this parcel for up to 475 residential units, no more than 300 of which were permitted as commercial apartments. (See ADA § 9(c); Fourth Amendment to ADA[1] § I(A)(iii)). This application is for the remaining 300 commercial apartments envisioned within the RH District of Glenwood Meadows.

II. Need for Housing / Consistency with Comprehensive Plan

The multi-family represented by this Application is a key component to the overall Glenwood Meadows development as contemplated by City Council in the 2002 ADA. It allows for the overall balance of the approved mixed-use, master planned community and specifically reacts to one of the most important issues facing our community – the need for a diverse stock of housing. Over the past 15 years, various strategic documents prepared by professional City planners after substantial public participation have expressed the importance of creating more and diverse housing for Glenwood's workforce. But for the vast majority of this period, policy and land use approvals did not keep up with demand. As a result, until a couple years ago, Glenwood was one of the slowest growing municipalities in eastern Garfield County despite a huge pent-up demand for housing.

As a result, despite a recent uptick of approved residential projects, Glenwood still needs housing, specifically the rental housing proposed in this Application. In 2005, Glenwood commissioned a Housing Study, which found that over the next 10 years, 2,885 units would need to be added to Glenwood's Housing inventory, including 1,295 rental units. Less than 10% of this goal was achieved by 2015. In 2010, Glenwood's Strategic Housing Plan again affirmed the desperate need for local housing, including both "catch up" and "keep up" needs. "Catch-up", of course, being housing needed to catch up to the current deficient housing conditions, and "keep up" generally defined as housing needed to keep up with future demand in relation to job and population growth. The current pandemic has only amplified the need for rental housing to house our growing workforce and maintain a healthy community.

[1] Fourth Amendment to Annexation and Development Agreement Glenwood Meadows LLC Annexation, recorded April 10, 2015 as Reception No. 861345.

Our Comprehensive Plan recognizes that "to create a more sustainable community, it is necessary to increase the supply of housing relative to employment. Doing so would increase affordable housing options for employees of Glenwood Springs businesses." (Page 71). Additionally, "[D]ue to the physical limitations to growth and the approaching built-out nature of the community, there are few large tracts of land left to develop, and some may not be suitable for housing. Therefore, it will be important to take advantage of every opportunity to increase the supply of housing in general…." (Page 76, emphasis added).

Indeed, the Comprehensive Plan speaks specifically to this Application when one of the stated goals of our community is to:

> ***"Strongly encourage the development of the planned residential component for Glenwood Meadows, including live-work housing, apartments, etc."*** (Page 77, emphasis added).

This Application is the majority of the planned residential component of Glenwood Meadows. This Application represents one of the final and perhaps most important pieces of the planned residential components of Glenwood Meadows. As a result, the Comprehensive Plan "strongly encourages" this Application.

III. Summary of Proposed Development

This project was designed to fit neatly within all requirements of the ADA and City Code, including all design guidelines set forth in the ADA. One of the main reasons this Property was planned for residential development is its location within Glenwood Meadows in proximity to public transit, retail, and recreation and open space amenities, all of which make this a desirable location to increase the City's attainable housing stock and diversify the housing options within the City limits.

Primary access to the site will be on the east side of the property, continuing up from East Meadows Drive past the existing Glenwood Greens development. A secondary access point is provided on the west side of the property, closer to the West Glenwood Park and Ride. A pedestrian access point will be located across from the intersection of Wulfsohn Road and West Meadows Drive.

One main consideration for the layout was to limit the amount of earthmoving on the site and to the extent possible, work with the existing site grading conditions as prioritized by the ADA. This is a priority in the ADA itself. The hillside on the north of the site, sloping up from Wulfsohn Road, is shown as un-disturbed from its current condition. The lowest tier of buildings will be situated at the top of this existing slope. The site will be terraced above this point where the existing slope is more moderate. There are three tiers of buildings. The lower tier incudes the clubhouse and three multi-family buildings. The middle and upper tiers have five multifamily buildings each. The tiers will connected by a well-designed internal network of sidewalks, paths and open space.

The architecture has been specifically designed to meet the design guidelines of the ADA. A total of 14 buildings are being proposed for the site, including a neighborhood clubhouse building and 13 residential apartment buildings that make up the 300 housing units. There are three types of buildings in order to provide diversity in the style and form of the architecture as required in the ADA. The total number of units per building type are 168 units, 60 units and 72 units respectively. The maximum length of the buildings will be 125 feet per the design standards in the ADA. The minimum spacing between the

buildings ranges from 40-60 feet with common open space surrounding the buildings. The buildings have been designed to work with the existing slope conditions, with approximately 10' of grade taken up within the footprint of the 3 story buildings. The maximum building height is approximately 35' and will not exceed the Maximum building height of 40'.

The Application also includes all required parks, amenities, and open space required by the ADA. These parks, amenities, and open space within the subject property are intended to be enjoyed by residents of the apartment complex. There are two one-acre parks as required in the ADA, generally located on the west side of the development. The first one acre park is adjacent to the secondary access road and lower tier of housing. The amenities in this park are designed for passive recreation and include a soft surface trail that leads from the sidewalk along Wulfsohn Road through the park leading to a proposed new connecting trail from the south side of the park to the Wulfsohn Mountain Trail Network. In addition to the trail, the park includes park benches, picnic tables and a community garden with raised planter boxes.

The second park is located between the middle and upper tiers of housing. The park has been terraced to create three level areas for more active recreation. Park amenities include two pickle ball courts, a flexible open space, a playground with play equipment, park benches, picnic tables, seating areas and shade trees. A second proposed trail connection to the Wulfsohn Mountain Trail Network is located on the upper street in the center of the development.

Additional community and open space amenities will be located throughout the neighborhood. The covered parking area on the lower and middle tiers will include roof deck patios with common gathering areas and amenities such as grills, fire tables, seating areas, umbrellas or shade structures and outdoor furniture. A neighborhood club house is another amenity space that will include a fitness center, gathering space, an outdoor pool and a day care center and associated outdoor play area. Consistent with the ADA's preferred community amenities, this Application includes an outdoor swimming pool, for Glenwood's seemingly increasingly hot summers, and to provide residents an alternative to Glenwood's busy indoor community center pool (See ADA, Page 71, recommending swimming pools as outdoor amenities). The pool will be engineered to ensure solid foundation, as well as monitored for leakage. Additional common open space is located throughout the neighborhood including in between the building units and at the ends of the middle and upper tiers of housing.

IV. Approval Criteria (070.060.050(a)(6))

The review criteria for a major site/architectural plan review is contained in in Subsection 070.060.050(a)(6), and set forth below.

a. The site/architectural plan is consistent with the general purpose and intent of this Code;

This Application is consistent with the general purpose and intent of the Code, including RH District, the intent of which is to accommodate various housing types ranging from single family detached on small lots to multifamily dwellings. This Application is for multifamily dwellings in the RH District on a parcel specifically contemplated for up to 300 multifamily units within Glenwood Meadows.

b. The site/architectural plan is consistent with the dimensional, design, development, and all other standards of this Code;

This Application is consistent with the Design Guidelines of the Glenwood Meadows ADA.

c. The site/architectural plan is consistent with any previously approved plat, PUD, or any other precedent land use approval; and

The Glenwood Meadows ADA entitled this property for up to 475 residential units, including up to 300 commercial apartments. This application is for 300 commercial apartments, and is otherwise consistent with prior land use approvals, including the Glenwood Meadows ADA.

d. The site/architectural plan is consistent with the Comprehensive Plan and other adopted City policies and plans.

One of the stated goals in our Comprehensive Plan is to "[S]trongly encourage the development of the planned residential component for Glenwood Meadows, including live-work housing, apartments, etc." (Page 77, emphasis added). This Application is the vast majority of the remaining planned residential component of Glenwood Meadows. This application is not only consistent with our Comprehensive Plan, our Comprehensive Plan explicitly and "strongly" encourages development of this apartment complex.

V. Conclusion

This Application represents a critical housing element envisioned in 2002 in the Glenwood Meadows ADA, and re-affirmed in our 2010 Comprehensive Plan. The Application is designed specifically to all standards within the ADA and the City Code. The project will include studio to three bedroom units, within walking distance of Glenwood Springs Community Center, public transit systems, and the shops and restaurants within Glenwood Meadows. Together with the Lofts and Glenwood Green, this project will create the level of vibrancy, community, and character originally envisioned within Glenwood Meadows. Residents of these units will enjoy an attainable, livable, small-town friendly living experience with easy access to employment and recreation within Glenwood Springs, and throughout the Roaring Fork Valley.

Sincerely,

BALCOMB & GREEN, P.C.

By:_____
Chad J. Lee, Esq.

Encl: Appendix A: Development Team
Appendix B: Submittal Materials

Appendix A: Development Team

Applicant:	BLD Group, LLC c/o Greg Baumann 1500 Cordova Road, Suite 300 Ft. Lauderdale, FL 33316 gbaumann@bldgroup.com	Engineer:	Michael Grzesiak, P.E. High Country Engineering 1517 Blake Avenue, Suite 100 Glenwood Springs
Landscape Architect:	Jennifer DiCuollo, P.L.A. DHM Design 311 Main Street, Suite 102 Carbondale, CO 81623 jdicuollo@dhmdesign.com	Legal:	Chad J. Lee, Esq. Balcomb & Green, P.C. 818 Colorado Avenue Glenwood Springs, CO 81601 clee@balcombgreen.com
Architect:	Richard Coba BLD Group, LLC 1500 Cordova Road, Suite 300 Ft. Lauderdale, FL 33316 rcoba@bldgroup.com		

Appendix B: Submittal Materials

Enclosed within this Application are the following materials:

1. Planning Application
2. Warranty Deed
3. Proof of Public Notice / Neighborhood Meeting Materials
4. Project Description / Narrative re: Compliance with Meadows and City Standards
5. Complete Plan Set
   a. Civil Sheet Set
   b. Landscape Sheet Set
   c. Architecture Sheet Set
6. Traffic Impact Statement
7. Geotechnical Report
8. Preliminary Drainage Study
   a. Preliminary Grading Plan
9. Preliminary Utility Report
   a. Preliminary Utility Plan

GLENWOOD MEADOWS MULTI-FAMILY

PRELIMINARY UTILITY REPORT

PREPARED FOR:

BLD GROUP
1500 Cordova Road, Suite 300
Fort Lauderdale, FL 33316

Prepared By:

HIGH COUNTRY ENGINEERING, INC.
1517 Blake Avenue, Suite 101
Glenwood Springs, CO 81601
(970) 945-8676

HCE Project No. 2201044.00

December 10, 2020
Revised: July 2, 2021

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INTRODUCTION

Location

The subject property is located within the Glenwood Meadows development, is platted as Lots 11C-B and 11C-C of the Glenwood Meadows No. 6 Subdivision, in the City of Glenwood Springs, Colorado. The proposed site is located on the south side of Wulfsohn Road across from the existing Target and Lowe's commercial sites.

Existing Land Use

The parcel is approximately 49.54 acres in size. The existing lot consists of undeveloped open space. To the north the site is bordered by Wulfsohn Road and The Lofts residential development. To the west, south and east is undeveloped property owned by the City of Glenwood Springs. Access to the development is proposed by extension of Flat Tops View Drive to the east, and connection to Wulfsohn Road at an existing curb cut to the west.

Proposed Land Use

Proposed development consists of thirteen multi-unit residential apartment buildings and a clubhouse. Additional improvements include asphalt parking areas and roadways, sidewalks, site amenities such as pickleball courts, park areas, dog walks, hiking trails and open space areas.

WASTEWATER SYSTEM

Sanitary Sewer System

An existing sanitary sewer main is located east of the site within Flat Tops View Drive right-of-way and will serve the proposed development. The connection to this main will be an existing sanitary manhole currently located northwest as an extention off the terminus of Flat Tops View Drive. An 8-inch gravity sewer main is proposed to the site up the proposed road connecting to Flat Tops View Drive. Three roads are proposed to serve the apartment buildings within the development; a lower, middle, and upper road. Generally the profile

grade of the roads falls to the southeast. Two runs of sanitary main are proposed to serve the development; one run along the lower road which will serve eight apartment buildings and club house, and one run along the middle road which will serve the remaining five apartment buildings.

The proposed development has and will have minimal system flows and the proposed sanitary system will serve residential uses. A single service is proposed for each building. For calculation purposes, each unit has been considered a single-family residence. In total the system demand has been analyzed for 300 single-family residences. Effluent flows are estimated to be 84,000 gallons per day, with a peak flow of 210,000 gallons per day. These flows will be conveyed by 8" diameter main pipes, and 6" diameter building service pipes. At maximum capacity the pipes are under 80% capacity. Sanitary sewer demand calculations can be referenced in **Appendix A.**

WATER DISTRIBUTION

Water Distribution

The development will be served by connecting to existing water mains located to the northwest within Wulfsohn Road, and east within Flat Tops View Drive. An existing watermain stub is located at the terminus of Flat Tops View Drive. A loop will be completed by running 8-inch Class 52 Ductile Iron Pipe main through the site. This loop will connect to the existing Wulfsohn Road main by installing a new tee, route southeast up the lower road, through the site and connect to the Flat Tops View Drive stub east of the parcel. Additional loops will tee off the lower main, run up and through the middle and upper roads of the development. The propose 8-inch line provides system demand and fire flows to the development. Water demand calculations can be referenced in **Appendix A**, water line sizing calculations can be referenced in **Appendix B**.

System Demand

Glenwood Springs Municipal Code section 080.060.020 classifies multi-family residential units the greater of 0.25 EQR per bedroom or 0.06 EQR per 100 square feet, not to exceed

1.00 EQR. Assuming a demand of 1 EQR being the equivalent of 350 gpd and a 16-hour day for 300 multi-family residential units and other uses, the Average Daily Demand for the phase I development will be 59,850 gallons per day (62 gpm). Peak hour would typically be 4 times the average daily demand or 249.4 gpm. The overall 249 gpm will be used for determination of service sizes and demand on top of fire flows, which is the more conservative approach.

DRY UTILITIES

Electric

The point of contact for electrical service is Doug Hazzard with the City of Glenwood Springs Electric Department (970-384-6353).

A proposed underground electric line is to be installed along the south side of the access road connecting to Flat Tops View Drive. This line will connect to the existing line on the adjacent lot 11C-C. This line will serve as the main electric supply for the Glenwood Meadows Multi-Family development. The developer will contract with the City of Glenwood Springs Electric Department for costs associated with extending the electric utility to the site.

Gas

A proposed gas line is to be installed along the south side of the access road connecting to Flat Tops View Drive. This line will connect to the existing line on the adjacent lot 11C-C. This line will serve as the main electric supply for the Glenwood Meadows Multi-Family development. The contractor will contract with Black Hills Energy for gas service extension.

Cable

A proposed cable line is to be installed along the north side of the access road connecting to Wulfsohn Road. This line will serve as the main feed for the development. The point of

contact for Comcast Cable Television service is (970-945-7292). The contractor will contract with Comcast Cable for cable tv service extension.

Telecommunications

The point of contact for Telecommunications service is Michael Gardner with City of Glenwood Springs broadband.

A proposed telecommunications line is to be installed along the north side of the access road connecting to Wulfsohn Road. This line will serve as the main feed for the development. The contractor will contract with the City of Glenwood Springs broadband for telecommunications service extension.

CONCLUSION

Water and Sewer

This report and the associated plans identify the proposed water, sewer and dry utility layouts for the proposed Glenwood Meadows Multi-Family development. The proposed onsite sanitary sewer will provide adequate capacity to serve the proposed residential development. The existing water main within Flat Tops View Drive will provide adequate water service to meet the domestic water demands and fire flows required when construction is completed. All lots will be required to meet building code requirements when constructing the final water system for each building.

Dry Utilities

Dry utilities to service the site are to be installed along the south side of the connection to Flat Tops View Drive, and the north side of the connection to Wulfsohn Road. This includes gas, electric, telephone and cable to all buildings within the development.

REFERENCES

International Fire Code: International Code Council. International Conference of Building Officials, Whittier, CA, 2009.

Uniform Building Code: International Conference of Building Officials. Whittier, CA, 2009.

APPENDIX A

GLENWOOD MEADOWS MULTI-FAMILY

ESTIMATED WATER/SEWER REQUIREMENTS

Date:	7/2/2021
HCE Project No:	2201044.00
By:	MGG

WATER (OVERALL DEVELOPMENT)			NOTE
Total EQR's	171		1
Average Daily Domestic Demand @ 350 GPD/EQR	59,850	GPD	
Fire Flow Required	1,500	GPM	2
Max. Day (Average Daily x 2.0)	119,700	GPD	
Peak Flow (Average Daily x 2.5)	149,625	GPD	
Max. Day Demand	**1,625**	**GPM**	3,4

SANITARY SEWER (OVERALL DEVELOPMENT)			
Domestic Average Day Use	47,880.0	GPD	5
Peak Flow (Average Daily x 2.5)	119,700.0	GPD	
Peak Flow (CFS)	**0.185**	**CFS**	

Notes

1) EQR calculation based on B&G system improvement fees EQR calculation
2) 2 hour minimum duration.
3) 1 day calculated as 16 hours.
4) Fire flow included for 1 building in max day demand
5) Calculated as 80% of average daily domestic water demand

GLENWOOD MEADOWS - PHASE I				
EQR Calculation				
MULTI-FAMILY RESIDENTIAL UNITS	**QUANTITY**	**AREA (SF)**	**EQR/100-SF**	**TOTAL**
STUDIO	42	593	0.06	14.94
1 BEDROOM (B-2)	42	711	0.06	17.92
1 BEDROOM (B-1)	60	704	0.06	25.34
2 BEDROOM (C-2)	42	1109	0.06	27.95
2 BEDROOM (C-1)	72	1126	0.06	48.64
3 BEDROOM	42	1269	0.06	31.98
NON-RESIDENTIAL	**QUANTITY**		**EQR**	**TOTAL**
SANDWICH/COFFE SHOP W/DISHWASHER	1		0.65	0.65
CLUBHOUSE AND DAYCARE CENTER	1		2.10	2.10
SWIMMING POOL	1 EQR/25,000 GALLONS			1.00
HOT TUB	0.20 EQR/500 GALLONS			0.40
			TOTAL EQR	**170.92**

Notes

1) EQR values per City of Glenwood Springs Municipal Code Section 080.060.020 - Classification

APPENDIX B

Channel Report

8-IN SANITARY

Circular

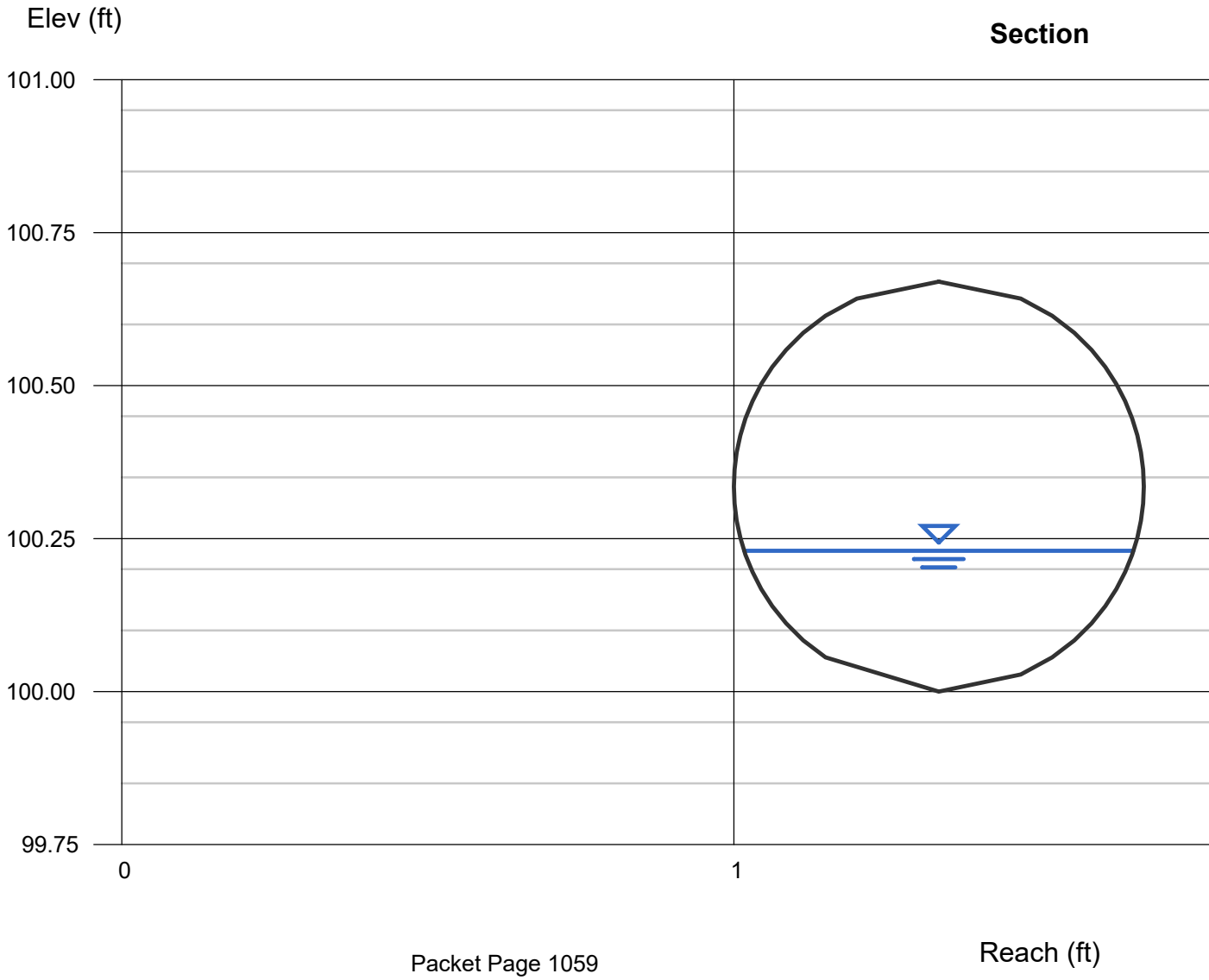
Diameter (ft)	= 0.67
Invert Elev (ft)	= 100.00
Slope (%)	= 0.40
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.19

Highlighted

Depth (ft)	= 0.23
Q (cfs)	= 0.190
Area (sqft)	= 0.11
Velocity (ft/s)	= 1.76
Wetted Perim (ft)	= 0.84
Crit Depth, Yc (ft)	= 0.20
Top Width (ft)	= 0.64
EGL (ft)	= 0.28



Depth	Q	Area	Veloc
(ft)	(cfs)	(sqft)	(ft/s)
0.07	0.016	0.018	0.88
0.13	0.069	0.051	1.35
0.20	0.152	0.089	1.70
0.27	0.261	0.132	1.98
0.34	0.390	0.177	2.20
0.40	0.522	0.221	2.36
0.47	0.650	0.264	2.46
0.54	0.757	0.302	2.50
0.60	0.825	0.334	2.47
0.67	0.774	0.353	2.20

Wp	Yc	TopWidth	Energy
(ft)	(ft)	(ft)	(ft)
0.43	0.06	0.40	0.08
0.62	0.12	0.54	0.16
0.78	0.18	0.61	0.25
0.92	0.24	0.66	0.33
1.06	0.29	0.67	0.41
1.19	0.34	0.66	0.49
1.33	0.38	0.61	0.56
1.48	0.41	0.54	0.63
1.68	0.43	0.40	0.70
2.10	0.42	0.00	0.74

Main - Fire & Domestic		
HAZEN-WILLIAMS EQUATION, CIRCULAR PIPE		
From	Wulfsohn Rd	
To	Highest Bldg Service Tee	
Input Data		
Pressure 1	95.00	psi
Elevation 1	5849.22	ft
Elevation 2	5941.43	ft
Roughness Coefficient	150	
Diameter	8	in
Flow	1749	gpm
Length	1165	feet
Results		
Elevation Head	92.21	ft
Friction Loss	45.97	ft
Velocity	11.16	fps
Total Head Loss	**138.18**	**ft**
Pressure Loss	**59.83**	**psi**
Pressure 2	**35.17**	**psi**

Highest Bldg - Fire & Domestic Service		
HAZEN-WILLIAMS EQUATION, CIRCULAR PIPE		
From	Service Tee	
To	Highest Bldg Service Tee	
Input Data		
Pressure 1	35.17	psi
Elevation 1	5941.43	ft
Elevation 2	5942.43	ft
Roughness Coefficient	150	
Diameter	6	in
Flow	1749	gpm
Length	65	feet
Results		
Elevation Head	1	ft
Friction Loss	10.41	ft
Velocity	19.84	fps
Total Head Loss	**11.41**	**ft**
Pressure Loss	**4.94**	**psi**
Pressure 2	**30.23**	**psi**

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

PRELIMINARY NOT FOR CONSTRUCTION

WULFSOHN RD.

CONNECT TO EXISTING WATERMAIN PER CITY OF GLENWOOD SPRINGS STANDARDS

INSTALL NEW MANHOLE ON EXISTING STORM SEWER

249.15'–12" HDPE @ 0.45%

EXISTING CURB CUT TO BE REMOVED

24.88'–12" HDPE @ 0.40%

12.19'–15" HDPE @ 19.23%

CONNECT TO EXISTING STORM SEWER STRUCTURE

116.60'–15" HDPE @ 17.79%

24.00'–12" HDPE @ 1.00%

141.58'–12" HDPE @ 6.97%

62.32'–12" HDPE @ 3.62%

24.00'–12" HDPE

95.95'–12" HDPE @ 9.05%

118.56'–12" HDPE @ 10.77%

63.43'–12" HDPE @ 2.24%

14.00'–12" HDPE @ 2.00%

229.99'–12" HDPE @ 0.75%

14.00'–12" HDPE @ 2.00%

229.98'–12" HDPE @ 0.75%

14.00'–12" HDPE @ 5.70%

EXISTING 24" STORM PIPE "1B"

INSTALL MANHOLE ON EXISTING STORM SEWER

144.48'

134.80'–12" HDPE @ 4.27%

333.20'–12" HDPE @ 1.09%

400.00'–8" PVC @ 1.10%

333.20'–12" HDPE @ 1.09%

227.44'–8" PVC @ 1.10%

8" D.I.P. WATER MAIN

SAN–MH8

SAN–MH7

57.58'

11.0' TYP. 10. MIN.

6" PVC SANITARY SERVICE, TYP.

6" D.I.P. WATER SERVICE, TYP.

51.17'–12" HDPE @ 4.12%

260.75'–8" PVC @ 1.66%

8" D.I.P. WATER MAIN

SAN–MH4

135.66'–4" HDPE @ 5.00%

56.04'–12" HDPE @ 6.00%

135.99'–12" HDPE @ 5.00%

COMBINED FIRE/DOMESTIC WATER SERVICE CONNECTIONS TO BE NFPA24 COMPLIANT, TYP.

EXISTING STORM SEWER TO BE ABANDONED/REMOVED

8" D.I.P. WATER MAIN

INSTALL MANHOLE ON EXISTING STORM SEWER

LEGEND

EXISTING	PROPOSED
STORM MANHOLE	WATER SHUTOFF VALVE
SANITARY CLEAN–OUT	WATER VALVE
SANITARY MANHOLE	TEE W/THRUST BLOCK
FIRE HYDRANT	BEND W/THRUST BLOCK
WATER VALVE	FIRE HYDRANT
WATER MANHOLE	INLET
GAS METER	CURB INLET
TELEPHONE PEDESTAL	STORM MANHOLE
LIGHT POLE	SANITARY CLEANOUT
UTILITY POLE	CABLE MANHOLE
SIGN	ELECTRIC VAULT
	ELECTRIC TRANSFORMER

BOUNDARY
RIGHT–OF–WAY
EASEMENT
STRUCTURE
ASPHALT
GRAVEL
CONCRETE
RETAINING WALL
CENTERLINE ROAD
CURB AND GUTTER
FLOWLINE
PAVEMENT STRIPING
WATER MAIN
WATER SERVICE
SEWER MAIN
SEWER SERVICE
OVERHEAD ELECTRIC
ELECTRIC
CATV
TELEPHONE
GAS
STORM SEWER

NOTES

1. SURVEY COMPLETED BY TUTTLE SURVEYING SERVICES. REFER TO ALTA/ASCM LAND TITLE SURVEY DATED 10/08/20 FOR EXISTING CONDITIONS INFORMATION. DATE OF SURVEY SEPTEMBER 5–8, 2020.
2. BASIS OF BEARINGS: #5 REBAR WITH ALIMINUM CAP LS #5933 AT THE SOUTHEASTERLY, A FOUND #5 REBAR WITH ALUMINUM CAP L.S. 25954 FOUND AT THE NORTHEASTERLY CORNER OF SUBJECT LOT 1A, USING A BEARING OF N00°21'00"E BETWEEN THE TWO DESCRIBED MONUMENTS.
3. CONTOUR INFORMATION OBTAINED FROM US GEOLOGICAL SURVEY 2017 DATA, STATE PLANE NAD 83 CENTRAL ZONE. FIELD VERIFICATION MAY BE NECESSARY IN AREAS CRITICAL TO DESIGN.
4. ALL COMBINED FIRE/DOMESTIC WATER SERVICES SHALL BE NFPA24 COMPLIANT.
5. PUBLICLY DEDICATED UTILITIES SHALL HAVE UTILITY EASEMENT FOR ACCESS AND MAINTENANCE.
6. ALL FIRE HYDRANTS TO HAVE 15' EASEMENT FOR ACCESS AND MAINTENANCE.

COLORADO 811 CALL BEFORE YOU DIG Utility Notification Center of Colorado

NO.	DATE	REVISION	BY
1	12/11/20	MAJOR SITE / ARCH. REVIEW	MGG
2	1/22/21	MAJOR SITE / ARCH. REVIEW #2	MGG
3	7/2/21	MAJOR SITE / ARCH. REVIEW #3	MGG

DRAWN BY: MGG
CHECKED BY: MGG
DATE: 7/1/2021
FILE:
SCALE 1" = 40'

HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101,
GLENWOOD SPRINGS, CO 81601
PHONE (970) 945-8676 · FAX (970) 945-2555
WWW.HCENG.COM

GLENWOOD MEADOWS MULTI-FAMILY

BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

PRELIMINARY UTILITY PLAN
SHEET 1

PROJECT NO.
2201044.00

UT1

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

PRELIMINARY NOT FOR CONSTRUCTION

CONNECT TO WATERMAIN STUB PER CITY OF GLENWOOD SPRINGS STANDARDS

CONNECT TO IRRIGATION STUB PER CITY OF GLENWOOD SPRINGS STANDARDS

EXISTING SANITARY MANHOLE TO BE REMOVED

EXISTING 24" STORM PIPE "1C"

INSTALL MANHOLE ON EXISTING STORM SEWER

EXISTING STORM STRUCTURES TO BE REMOVED BETWEEN NEW STORM SEWER, TYP.

8.45'–12" HDPE @ 2.00%

157.17'–12" HDPE @ 1.00%

36.42'–12" HDPE @ -1.00%

57.66'–8" PVC @ 13.94%

FLAT TOPS VIEW DR.

SAN–MH1

INSTALL NEW SANITARY MANHOLE PER CITY OF GLENWOOD SPRINGS STANDARDS

SAN–MH3

173.68'–8" PVC @ 7.21%

24.04'–12" HDPE @ –1.00%

144.71'–8" PVC @ 4.74%

194.90'–8" PVC @ 5.62%

5" D.I.P. WATER MAIN

SAN–MH4

SAN–MH2

148.42'–12" HDPE @ –1.00%

60.25'–12" HDPE @ –8.63%

CONNECT TO EXISTING STORM INLET PER CITY OF GLENWOOD SPRINGS STANDARDS

238.98'–12" HDPE @ 1.73%

172.26'–8" PVC @ 0.40%

246.66'–8" PVC @ 0.40%

SAN–MH6

SAN–MH5

62.97'–12" HDPE @ 1.00%

58.94'–8" PVC @ 4.80%

SAN–MH9

27.38'–12" HDPE @ 1.00%

11.0' TYP. 10' MIN.

192.09'–8" PVC @ 7.95%

172.71'–12" HDPE @ 8.85%

24.00'–12" HDPE @ –1.00%

33.20'–8" PVC @ 6.43%

42.16'–12" HDPE @ 8.53%

SAN–MH10

70.74'–12" HDPE @ 0.98%

SAN–MH12

247.80'–8" PVC @ 1.63%

SAN–MH13

216.91'–12" HDPE @ 5.65%

222.33'–8" PVC @ 6.00%

SAN–MH11

8" D.I.P. WATER MAIN

6" PVC SANITARY SERVICE, TYP.

181.46'–12" HDPE @ 9.74%

EXISTING STORM PIPE TO BE ABANDONED/REMOVED, TYP.

16" D.I.P. WATER SERVICE, TYP.

24.00'–12" HDPE @ 1.00%

8" D.I.P. WATER MAIN

234.00'–12" HDPE @ –4.25%

45.18'–12" HDPE @ 1.00%

200.51'–12" HDPE @ 9.10%

48.69'–12" HDPE @ 2.00%

28.24'–12" HDPE @ 2.00%

COMBINED FIRE/DOMESTIC WATER SERVICE CONNECTIONS TO BE NFPA24 COMPLIANT, TYP.

60.33'–12" HDPE @ 12.31%

93.82'–12" HDPE @ 18.37%

INSTALL MANHOLE ON EXISTING STORM SEWER

EXISTING 12" STORM PIPE

EXISTING 12" STORM PIPE "1C"

MATCH LINE SHEET 2

LEGEND

	EXISTING	PROPOSED
	STORM MANHOLE	WATER SHUTOFF VALVE
	SANITARY CLEAN–OUT	WATER VALVE
	SANITARY MANHOLE	TEE W/THRUST BLOCK
	FIRE HYDRANT	BEND W/THRUST BLOCK
	WATER VALVE	FIRE HYDRANT
	WATER MANHOLE	INLET
	GAS METER	CURB INLET
	TELEPHONE PEDESTAL	STORM MANHOLE
	LIGHT POLE	SANITARY MANHOLE
	UTILITY POLE	SANITARY CLEANOUT
	SIGN	CABLE MANHOLE
		ELECTRIC VAULT
		ELECTRIC TRANSFORMER
BOUNDARY		
RIGHT–OF–WAY		
EASEMENT		
STRUCTURE		
ASPHALT		
GRAVEL		
CONCRETE		
RETAINING WALL		
CENTERLINE ROAD		
CURB AND GUTTER		
FLOWLINE		
PAVEMENT STRIPING		
WATER MAIN	W	W
WATER SERVICE		WS
SEWER MAIN	SS	S
SEWER SERVICE	SS SS	SS SS
OVERHEAD ELECTRIC	OE	
ELECTRIC	E	E
CATV	CTV	C
TELEPHONE	T	T
GAS	G	G
STORM SEWER		

NOTES

1. SURVEY COMPLETED BY TUTTLE SURVEYING SERVICES. REFER TO ALTA/ASCM LAND TITLE SURVEY DATED 10/08/20 FOR EXISTING CONDITIONS INFORMATION. DATE OF SURVEY SEPTEMBER 5–8, 2020.
2. BASIS OF BEARINGS: #5 REBAR WITH ALIMINUM CAP LS #5933 AT THE SOUTHEASTERLY, A FOUND #5 REBAR WITH ALUMINUM CAP L.S. 25954 FOUND AT THE NORTHEASTERLY CORNER OF SUBJECT LOT 1A, USING A BEARING OF N00°21'00"E BETWEEN THE TWO DESCRIBED MONUMENTS.
3. CONTOUR INFORMATION OBTAINED FROM US GEOLOGICAL SURVEY 2017 DATA, STATE PLANE NAD 83 CENTRAL ZONE. FIELD VERIFICATION MAY BE NECESSARY IN AREAS CRITICAL TO DESIGN.
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6. ALL FIRE HYDRANTS TO HAVE 15' EASEMENT FOR ACCESS AND MAINTENANCE.

COLORADO 811 CALL BEFORE YOU DIG Utility Notification Center of Colorado

NO.	DATE	REVISION	BY
1	12/11/20	MAJOR SITE / ARCH. REVIEW	MGG
2	1/22/21	MAJOR SITE / ARCH. REVIEW #2	MGG
3	7/2/21	MAJOR SITE / ARCH. REVIEW #3	MGG

DRAWN BY: MGG
CHECKED BY: MGG
DATE:
FILE: SCALE 1" = 40'

HIGH COUNTRY ENGINEERING, INC.
1517 BLAKE AVENUE, STE 101,
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PHONE (970) 945-8676 FAX (970) 945-2555
WWW.HCENG.COM

BLD GROUP, LLC.
GLENWOOD SPRINGS, CO

GLENWOOD MEADOWS MULTI-FAMILY

PRELIMINARY UTILITY PLAN

SHEET 2

PROJECT NO.
2201044.00

UT2

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526

ANNEXATION AND DEVELOPMENT AGREEMENT{PRIVATE}
GLENWOOD MEADOWS, LLC ANNEXATION

THIS ANNEXATION AND DEVELOPMENT AGREEMENT ("Agreement") is made and entered into this 18 day of September, 2002, by and between the CITY OF GLENWOOD SPRINGS, COLORADO, a Colorado municipal corporation (hereinafter "City"), and GLENWOOD MEADOWS, LLC, a Colorado limited liability company, its successors, assigns, and its legal or other representatives (hereinafter collectively "Owner");

W I T N E S S E T H:

WHEREAS, Owner owns approximately three hundred forty-five (345) acres of real property currently located in unincorporated Garfield County, Colorado, and more particularly described on Exhibit A, attached hereto and incorporated herein by this reference (hereinafter "Property"), which Property shall be known as "Glenwood Meadows"; and

WHEREAS, Owner and City entered into that certain Pre-Annexation Agreement concerning the Property dated August 20, 1999 and subsequently amended by instrument dated January 12, 2000 (as amended, the "PAA"); and

WHEREAS, in February, 2000, Owner filed with the City Clerk a petition and request for annexation of the Property into the City; and

WHEREAS, a duly noticed public hearing was held on March 2, 2000, whereat the City adopted a Resolution finding said petition and request to be in substantial compliance with the statutory requirements for annexation of the Property to the City; and

WHEREAS, Owner applied to the City for approval of certain Planned Unit Development zoning for the Property in March, 2000 (Zoning Application #42-99), which zoning application was subsequently withdrawn by Owner at a public hearing before the City Council on November 15, 2000; and

WHEREAS, upon the request of the City, approximately 4.63 acres of the Property was approved for annexation and zoning as C-1 Limited Commercial (the "MOC Entrance Parcel") and is subject a separate Annexation Agreement between the Owner and City; and

WHEREAS, on September 19, 2001 (Zoning Application #59-01) Owner submitted an application to the City for approval of a zoning plan for the Property which included C-1 Limited Commercial, C-2 Core Commercial, C-4 Resort Commercial and R-3 Residential zoning districts for the portions of the Property not intended for public dedication (any portion of the Property intended for public dedication pursuant to this Agreement and the instruments incorporated herein may be zoned under the same application and review process as HP Hillside Preservation) as more fully described upon Exhibit B attached hereto and by this reference incorporated herein (the "Zoning Map"); and

WHEREAS, on March 21, 2002, the Owner did amend its original February, 2000 Annexation Petition to reflect the distinct characteristics of the Property subject to this Agreement and the MOC Entrance Parcel; and

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415
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WHEREAS, on March 21, 2002 a Public Hearing was held pursuant to C.R.S. Section 31-12-109, as amended, at which public hearing it was determined that the annexation petition had satisfied all requirements of C.R.S. Section 31-12-101 et. Seq.; and

WHEREAS, on July 18, 2002 the City Council of the City of Glenwood Springs ("Council") did adopt Ordinance No. , Series of 2002, and Ordinance No. , Series of 2002, which respectively approved the Owner's petition and request for annexation of the Property and approved the Owner's application for municipal zoning of the Property; and

WHEREAS, during the public review of the annexation and zoning processes, the parties hereto have agreed to amend and eliminate the provisions of the prior PAA and to set forth and memorialize all agreements regarding the annexation, zoning and development of the Property in the instant Agreement; and

WHEREAS, the City and Owner desire to enter into this Agreement to set forth their agreements in writing concerning the terms and conditions of annexation of the Property to the City, the zoning of the Property under the City's Municipal Code and the adopted Zoning and Development Plan (Exhibit C attached hereto and by this reference incorporated herein), as well as the other conditions of the development of the Property as hereinafter described; and

WHEREAS, Owner intends to submit its development proposal to the City for subdivision review and approval and to construct the development in phases which correspond to the Zoning Plan parcels, it being understood that nothing herein shall confer upon Owner any other or further rights not expressly contained herein or by instruments incorporated herein.

NOW, THEREFORE, for and in consideration of the mutual promises and covenants contained herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the City and Owner agree as follows:

1. Purpose. The purpose of this Agreement is to set forth the terms and conditions of the annexation of the Property to the City, and the zoning and development of the Property in the City. Except as expressly provided for herein to the contrary, all conditions herein are in addition to any and all requirements concerning annexation and development contained in the Municipal Code of the City of Glenwood Springs, Colorado (hereinafter "Municipal Code"), the Municipal Annexation Act of 1965, as amended at C.R.S. §31-12-101 et seq., and other applicable laws.

Except as expressly provided herein to the contrary, the complete execution, delivery and recording of this Agreement shall render null and void the PAA between these same parties. Furthermore, and except as expressly stated otherwise herein, all terms and conditions of the following agreements, contracts and documents shall remain in full force and effect:

(i) Midland Avenue Right Of Way Extension Agreement, dated September 20, 1994;

(ii) Community Center Acquisition and Exchange Agreement, dated March 16, 1999;

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(iii) Municipal Operations Facility Site Acquisition Agreement, dated December 27, 1999

(iv) MOC Water and Sewer Fee Credits Assignment and Bill of Sale, dated January 17, 2000;

(v) MOC Entrance Parcel Annexation and Development Agreement.

2. Zoning Characteristics/Constraints/Requirements. The Zoning and Development Plan attached hereto as Exhibit C (the "Plan") shall govern the development of the Property. Any and all future site planning, whether in the form of an application for planned unit development, major or minor subdivision, major or minor development permit approval or any other form requiring the review and approval of the City, shall, as an element of its application for approval and review, evidence, to the satisfaction of the applicable City department, commission and/or City Council, compliance with the criteria and conditions of the Plan, as said Plan relates to such development application and the underlying Municipal Code requirements. All zoning and development hereunder is deemed to require the application of the more stringent of either (i) the Municipal Code or (ii) the Plan. An applicant may seek relief from specific elements of the Plan and/or the Municipal Code only through appropriate variance processes outlined in the City of Glenwood Springs Municipal Code.

Owner shall, within ninety (90) days after the mutual execution of this Agreement, submit a surveyed zoning map to the City. Such surveyed zoning map shall include legal descriptions for each of the twelve (12) zoning parcels (Parcels A through L, inclusive) identified by Exhibits B and C attached hereto. The City's Community Development Director and the City Attorney shall review such descriptions and, if generally consistent with the representations and approvals of the annexation and zoning public processes, shall approve the same. The City shall incorporate the surveyed zoning map into the Citywide zone district designation mapping and maintain an accurate and current copy thereof in accordance with State and local laws.

Prior to or contemporaneous with the first subdivision and/or development application for the Property, the Owner shall submit an overall geologic hazards map and mitigation plan of the Property to the City Engineer for his review and approval, which approval shall not be unreasonably withheld. The City shall incorporate the approved overall geologic hazards map and mitigation plan into the Citywide mapping and maintain an accurate and current copy thereof in accordance with applicable laws.

Prior to the first subdivision and/or development application for the Property, the Owner shall submit a Master Grading Plan and Master Drainage Plan for the development areas of the Property to the City Engineer. Said plans shall be consistent with the requirements of the Colorado Geologic Survey's letter dated October 23, 2001 and maintained on file with the City. Upon approval of said plans, Owner may apply for a grading permit to commence the preparation of all or part of the Property scheduled for development under the Plan. Based upon the detailed requirements and master planning of the Property as set forth herein and upon the Zoning and Development Plan attached hereto, such grading permit request may be granted by the City in advance of site specific development plans for an individual Parcel of the Property and may include certain off-site earth work, including, without limitation, (i) the "rough grading" of certain areas, as directed by the City, of Parcel L for said area's future use as active park facilities, and (ii) the

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construction of debris mitigation structures within Parcel L as more fully described in Section 14 hereinbelow. All Master Grading Plans, Master Drainage Plans and grading permit requests shall include revegetation plans acceptable to the City Engineer and City Planning Department. At a minimum said revegetation plans shall incorporate grass, forb and shrub species into any debris flow mitigation structure development in a manner beneficial to wildlife for forage and cover and shall adequately address erosion control.

Prior to the first subdivision and/or development application for the Property, the Owner shall submit a Master Utility Plan for the development areas of the Property to the City Engineer. The City shall incorporate the Master Utility Plan into the Citywide mapping and maintain an accurate and current copy thereof in accordance with State and local laws and with City policy.

3. Non-Specific Assessments/Credits/Fees-in-Lieu of School Land Dedication

a. Non-Specific Assessments/Credit. Any future impact fees, surcharges, special permit fees, special taxes or assessments, development fees or tap fees, and other items not addressed by this Agreement shall be exacted uniformly and non-discriminatorily on the Property and as exacted throughout the City. Notwithstanding the foregoing, nothing herein affects or shall affect the City's ability to exact impact fees for different facilities from certain residents or as to certain geographical areas. Owner shall receive full credit against any such future imposition for the full costs of all improvements, dedications, or payments made with respect to the matters to which such imposition relates. For example, in the event of a City's imposition of a fee for pedestrian trail facilities, Owner would be entitled to credit for the costs of all such trail improvements (as properly evidenced by invoices for design and construction) and dedications of land for trails (the value of which shall be established by the same appraisal mechanism described in Section 13.c. below) Owner had made up to that point in time on or concerning the Property.

Owner's credit for such costs shall include all costs incurred with respect to the applicable on-site or off-site improvements or dedications, including without limitation, all land costs (based upon the value of such land as vacant land, agricultural land or land for commercial or residential development, whichever is applicable, at the time the final plat for such land is approved), construction and construction management costs (excluding Owner's profit), and design, legal, consulting, and financing costs for the land so dedicated or on which the applicable improvements are constructed.

Notwithstanding the foregoing, Owner shall not receive credit as against such costs for the value of water rights dedicated or otherwise transferred to the City or the ownership shares of the attendant Atkinson ditch structure, both as more fully described by Section 11 hereinbelow. Further, in the case of an imposition of general applicability to provide general fund revenues, Owner shall not be entitled to credit against any impact fees or general assessments.

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Except with respect to Parcel I as identified on Exhibits B and C hereof, Glenwood Meadows, its successors and assigns, shall not be required to pay any future Traffic/Transportation Impact Fee established by the City subsequent to the execution and recordation of this Agreement. The City and Glenwood Meadows have established the full and complete obligations of Glenwood Meadows with respect to on-site and off-site traffic/transportation improvements and financial contributions as set forth by Section 12 hereinbelow.

Owner does own, and the City acknowledges and ratifies such ownership herein, certain water and sewer system "Fee Credits" (specifically, 135 sewer system improvement fee credits and 135 water system improvement fee credits) arising from Owner's prior transfer to the City of certain lands for development of the Municipal Operations Center (see instruments dated December 27, 1999 "Municipal Operations Facility Site Acquisition Agreement" and January 17, 2000 "Assignment and Bill of Sale"). Owner and City shall maintain accurate records regarding Owner's use of such Fee Credits as the Property is developed.

b. Fee-in-Lieu of School Land Dedication. Owner shall pay and the City shall accept fees in lieu of land dedication for the benefit of schools in the RE-1 School District (the "District") pursuant to Ordinance No. 34 Series of 1999 and Municipal Code Section 070.030.150. D.; or any amended version thereof in force and effect at the time of the final development permit approval of a given portion of the Property by the City. Such fees shall be applicable to the number of units proposed for all residential phases scheduled for development and shall be payable upon the issuance of a building permit for a residential dwelling unit. Owner shall have the right to seek relief from the obligation to pay such school impact fees for any "affordable housing dwelling units" or "employee housing dwelling units" provided by Owner or its assignees within the Property.

c. Credit to Owner for Actual Development of Public Facilities. Owner is specifically entitled to a credit against any City parkland improvement fee or similar fees if eventually implemented and which would be otherwise applicable to development on the Property as follows:

(i) the value of land dedicated to public use and the costs of construction of pedestrian and bicycle trails within the Property as more fully described by Section 13(a) and 13 (b) below;

(ii) the value of land dedicated to public use and the costs of construction or Owner's contributions to the costs of construction of pedestrian and bicycle trails outside the boundaries of the Property as more fully described by Section 13(c) below;

(iii) the value of any "rough grading" performed by Owner, its successors and assigns, as requested by the City pursuant to the provisions of Section 15 below; and

(iv) the value of land, if any, dedicated by the Owner to the City for public use and enjoyment as open space, active parklands and passive parklands in

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Parcel L, which lands represent a dedication in excess of the quantity of such lands otherwise required to be dedicated in support of the development on the Property.

Owner shall not be entitled to any credit against such fees for the development of commonly owned open spaces and recreation facilities within the development of Parcels A through K.

4. Conditions Precedent.

a. The provisions of this Annexation Agreement shall not be effective until the following conditions have been satisfied in full:

(1) Final approval has occurred as follows:

(a) For the purposes of this Agreement, final approval occurs on the thirtieth (30th) day following the effective date of the latest of the motion, ordinance and/or resolution by which the City Council (hereinafter "Council") approves:

(i) This Agreement;

(ii) The formal annexation of the Property to the City;

(iii) The zoning for the Property as C-1 Limited Commercial, C-2 Core Commercial, C-4 Resort Commercial, R-3 Residential and HP Hillside Preservation; and

(2) Owner and City have mutually executed and delivered this Agreement for recordation with the Garfield County Clerk and Recorder.

b. If any legal proceedings, referenda, or elections are commenced regarding any of the items specified in Section 4(a) hereinabove, and in accordance with the City's Municipal Charter, but are not favorably concluded within fifteen (15) months thereafter (subject to each party's obligations pursuant to Section 5 below), this Agreement may be terminated by either party upon written notice to the other.

c. If none of the actions addressed in Section 4(b) above is taken or commenced within such thirty (30) days, or if an election is called pursuant to said Section 4(b) and ratification thereafter made by the voters of the City, then Final Approval shall occur upon conclusion of the election.

5. Cooperation in Defending Legal Challenges. If any legal or equitable action or other proceeding is commenced by a third party: (a) within one (1) year after the Final Approval, challenging the validity of the annexation of the Property into the City or the City's zoning of the Property or the City's execution and delivery of this Agreement, Owner and the City shall defend

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such action or proceeding; or (b) subsequent to such one-year period, challenging the validity of any provision of this Agreement (other than as set forth in clause (a) above), Owner and the City agree to cooperate in defending such action or proceeding, and in connection with any such action or proceeding, the City shall bear its own expenses and Owner shall bear Owner's expenses. Unless the City and Owner otherwise agree, each party shall select its own legal counsel to represent it in connection with any such action or proceeding.

6. Interim Use of Available Raw Water During Site Development. The parties agree that the developer of the Property may utilize the Atkinson Canal and associated water rights being dedicated to the City for dust mitigation and site preparation during the grading and construction activities on the Property. If the developer elects to so utilize the water structures and water rights, all cost, including but not limited to construction, maintenance and legal fees associated with such use shall be borne exclusively by said developer.

7. Deannexation. The provisions of this Agreement, as well as acceptable City zoning of the Property, are material considerations of Owner's agreement to annex the Property to the City. Therefore, in the event (a) the City fails to perform under the terms of this Agreement, or (b) Owner is unable to obtain, either before or after annexation proceedings are complete, C-1 Limited Commercial, C-2 Core Commercial, C-4 Resort Commercial and R-3 Residential zoning and/or subdivision and/or development approval (subject to limitations herein set forth) which it in its sole discretion finds acceptable, Owner and the City stipulate and agree, pursuant to C.R.S. §31-12-501, that it shall be in the best interest of the City that the Property be de-annexed from the City. In such event, the City agrees that it shall initiate de-annexation proceedings, and to take all steps necessary to effect the de-annexation. The City further acknowledges and agrees that de-annexation is not prohibited by the City Charter or Municipal Code and ordinances, and that the City will not amend its ordinances to preclude a de-annexation permitted hereunder. The parties' right to de-annex shall be in addition to those rights set forth in Section 4, above. Upon the de-annexation of the Property from the municipal boundaries and specific jurisdiction of the City, the City agrees that it shall convey, assign, transfer and quitclaim to Owner, its successors and assigns, any and all land and water rights (the public dedication of which is more fully described by Section 11 hereof) previously dedicated by Owner hereunder to the City for the public use and benefit.

8. Owner Representations. All representations of Owner set forth in its annexation petition, annexation plat, public hearings on the application for C-1 Limited Commercial, C-2 Core Commercial, C-4 Resort Commercial and R-3 Residential zone district classification, the Zoning and Development Plan and mapping and related documents shall, if accepted by the City, be considered incorporated into this Agreement as if set forth in full herein. Notwithstanding their incorporation by reference, the City makes no representations about the accuracy of such documents.

9. Site Planning/Density Limits/Plats/Subdivision Improvements Agreements. The City and Owner agree to the following terms and conditions regarding site planning, vested rights, subdivision improvements agreements (hereinafter "SIAs") or development permit agreements (hereinafter, "Development Permits") and plat recordation:

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a. Site Planning. Unless otherwise mutually agreed upon by the parties, Owner shall develop the property in eleven (11) distinct phases; each of which shall correspond, according to the surveyed zoning map described by Section 2 hereinabove, to one of the zoning parcels (A through K) generally set forth by Exhibit B and Exhibit C (hereinafter, a "Parcel" or the "Parcels"). One or more zone parcels may be commenced as a single phase of site specific planning and development, provided the developer thereof complies with all obligations of each parcel's development; to wit, the timing and amount of applicable Off-Site Transportation Improvements (Section 12 hereof), the Geotechnical Mitigation requirements (including debris flow detention facility extensions) (Section 14 hereof) and all other applicable fees and conditions of development associated with each zoning parcel. During any planned unit development ("PUD") review process, subdivision process, development permit process or other development process, Owner shall submit to the City a final plat for each encompassed Parcel, which plat shall correspond to and indicate the proposed plan of development in each Parcel of the Property (the "final plat"), which shall include, at a minimum, the intended locations and densities of such development. The parties agree that the final plat shall be recorded promptly following approval.

The City and Owner agree that, together with the application for the first subdivision and/or development on the Property, except the subdivision and or development of Parcel I, and otherwise regardless of which zoning parcel or phase is involved, an element of the approval of the final plat thereof shall be the public dedication to the City, either by such plat or by separate conveyance instrument, of the HP Hillside Preservation (Parcel L) lands. It is further agreed that such conveyance shall and does provide part of the consideration herein agreed to and accepted by the parties as support for Owner's enforceable vested rights as further described and defined in Section 10 hereinbelow. It is also agreed that the dedication and conveyance of other, future public lands and facilities (such as publicly dedicated streets and utility easements) will occur in conjunction with future subdivision and/or development application approvals.

b. Infrastructure Easements. Regardless of Owner's schedule, Owner agrees to provide infrastructure for roads, water and sewer facilities, electrical and natural gas service, and other facilities and services as mutually agreed upon by Owner and the City Engineer to serve the Property adequately during the period(s) between development of parcels. Such infrastructure shall be provided at Owner's expense, and shall be reviewed and subject to approval by the City. Owner will loop water or sewer lines or provide other stand-alone features of such infrastructure, all as approved by the City engineer, to accomplish this goal. The City shall accept easements for such public facilities pending the actual and final public dedication of the same upon the final platting of the affected Parcel(s).

c. Density Cap. Notwithstanding the zoning designation of the Property as: (i) a C-1 Limited Commercial zoning district (Parcels A, C, D and H on the Plan) or C-2 Core Commercial zoning district (Parcels E, F and G on the Plan), Owner agrees that it shall not plan, develop, construct or sell more than 490,000 total square feet of

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commercial space (exclusive of any development which may occur within that area of the C-4 Resort Commercial zone district identified as "Hospitality" [Parcel I on the Plan], the density maximums of which are separately limited by the City's Municipal Code) within the Property; and (ii) an R-3 Residential zoning district (Parcels B, J and K of the Plan), Owner agrees not to plan, develop, construct or sell more than 475 residential dwelling units (subject to the provisions of Section 9(c)(i) below) within Parcels B, J and K.

(i) *Specific Housing Agreements between Owner and City.* The Owner and its successors-in-interest shall comply with the City's community housing requirements contained in Ordinance #24, Series of 2001, Inclusionary Residential Requirements for Affordable Housing and the applicable Guidelines, as contained in Resolution #2001-16. Glenwood Meadows further agrees that a minimum of twenty (20) dwelling units shall be developed on the Property and shall be located within the mixed-use Parcels E, F and G. Finally, the City and Owner agree that no more than three hundred (300) of the total residential dwelling units permitted hereunder shall be commercial apartment rentals as "apartments" are now or may hereafter be defined in the City's Municipal Code.

(ii) *Limitation.* The foregoing density limits shall not apply to portions of the Property conveyed to or developed as (i) governmental services facilities (including a public school district facility) or (ii) non-governmental, non-profit health and human services facilities. Except as expressly provided herein to the contrary, proposed land uses which exceed the maximum density limits established hereby and reiterated by the incorporated Zoning and Development Plan shall require the written mutual execution of a specific amendment to this Agreement. No such amendment shall be valid unless approved at a duly and properly noticed, public hearing before both the City's Planning & Zoning Commission and the Glenwood Springs City Council on the question.

d. SIAs/Development Permits and Plat Recordation. The City and Owner shall, following Council approval of the final plat of one or more of the Parcels of the Property's development, but before the final plat is recorded, negotiate acceptable terms of a separate subdivision improvements agreement ("SIA") for the Parcel(s) scheduled to proceed to development. The City shall authorize the Mayor to execute the SIA for the Parcel(s) following final plat approval. The City shall further authorize the Mayor to execute the SIAs for subsequent Parcel(s), subject to the foregoing:

i. No SIA for any Parcel shall be recorded until all necessary documents in support of that Parcel, including a financial guarantee acceptable to the City, updated cost estimates for public improvements, and an updated title commitment, all pursuant to the Municipal Code (the "Financial Items") have been provided to the City and approved by City staff. For purposes of this Agreement, both (i) Off-Site Transportation Improvements in

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accordance with the provisions of Section 12 hereinbelow and the Glenwood Meadows' Transportation Improvements Plan and (ii) Geotechnical mitigation requirements applicable to a given phase of development (including debris flow detention structure extensions) in accordance with the provisions of Section 14.a. hereinbelow, shall be deemed included within the definition of "Financial Items" requiring review and approval of the City's Community Development Director prior to recordation of the final plat of a given approved phase of development. Upon the City's receipt of the Financial Items, no public hearing shall be necessary if all City review departments approve the Financial Items without imposing conditions thereon and without recommending or requesting a public hearing. Nevertheless, the SIA for each phase of the Property's development shall be subject to Council review and approval at a regular Council meeting. Promptly following final approval and execution, the City shall record the SIA for the Parcel(s), which will thereafter proceed to be developed.

ii. The parties agree that any filing or other numbers which appear on the final plat for the various phases of development of the Property are for reference and identification purposes only and have no bearing on the sequence in which the Property may be developed.

iii. Owner may only sell lots on the Property located within a Parcel:

A. which includes within its final plat and design an identification of the lot(s) to be sold;

B. for which an SIA designating said lots has been executed and recorded; and

C. for which acceptable financial guarantees have been posted to secure construction of improvements.

In the absence of a specific "subdivision" request, the Financial Items and other obligations required hereunder may be enforced by the City through conditions of Major Development Permitting or other similar and enforceable mechanics.

e. Compliance With Agreement and Subsequent Obligations. Owner's compliance with all requirements of this Agreement, the Plan, the Municipal Code and other governing documents incorporated herein or as part of the zoning approval process, including future SIA/Development Permit instruments, is a condition of subdivision and/or major development permit approval. Notwithstanding the foregoing or Section 10 hereinbelow, nothing herein shall constitute a guarantee, covenant or agreement that the City shall approve such application(s) in the event of non-compliance.

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10. Vested Rights. In order to allow Owner a reasonable opportunity to develop the Property in accordance with this Agreement, the Zoning and Development Plan, the Final Approval and in consideration of the substantial public dedications of land as described herein and upon the attachments hereto, the development rights and uses approved thereby shall, to the extent allowed by law, constitute a "site specific development plan" under C.R.S. §§24-68-101 et seq., as amended. Subject to Owner's satisfactory completion of Parcel phases of development pursuant to this Agreement, the site specific development plan shall be vested in Owner under the following conditions:

a. The site specific development plan shall be vested for a period of ten (10) years, beginning on the date the final plat of the first phase of development on the Property is recorded (the "Vested Period"). The Property as to which rights have been vested shall be immune from changes in the City's land use regulations for the duration of the Vested Period, subject to the below provisions.

b. After the Vested Period expires, this Agreement shall be deemed terminated and of no further force or effect as to such phase; provided, however, that such termination shall not affect (a) annexation to and zone district designations of the Property in the City; (b) any common-law vested rights obtained prior to such termination; (c) any right arising from City permits, approvals or other entitlements for the Property which were granted or approved prior to, concurrently with, or subsequently to the approval of this Agreement; (d) any continuing obligations of Owner regarding providing services or facilities to such phase, performing covenants implied within this Agreement, or other Owner responsibilities under this Agreement, which shall survive termination; or (e) any rights of the City relating in any way to Owner's performance or nonperformance hereunder.

c. Notwithstanding the foregoing, if Owner does not complete the items listed and intended for each phase within the time period allotted for construction of such phase pursuant to an applicable SIA, the Vested Period as to all uncompleted work on the Property in connection with the subject phase(s) shall expire, vested rights as to such uncompleted work shall be extinguished, and this Agreement shall terminate in favor of the provisions of the applicable SIA. "Completion" for the purpose of this paragraph shall mean that all work for such phase shall have been performed, submitted to the City for approval, and finally approved pursuant to applicable City subdivision and platting requirements, and that Owner properly posted financial guarantees acceptable to the City to assure completion of that phase's improvements within the time period allotted by the subject SIA.

d. Except in instances of force majure, the requirements of federal or state law, cases of preemption or other superior jurisdictional mandate, the City shall not initiate any zoning or land use action which would alter, impair, prevent, diminish, impose a moratorium on development, or otherwise unreasonably delay any of Owner's rights set forth in this Agreement or Owner's plans for development or zoning, as approved by the City.

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e. Notwithstanding the foregoing, the establishment of vested property rights under this Agreement shall not prevent the City from enacting and enforcing regulations of general applicability (including, but not limited to, building, fire, plumbing, electrical and mechanical codes, including the preliminary plat and final plat subdivision requirements under the Municipal Code and other City ordinances), except where the approved plans for development of the Property or state or federal regulations provide otherwise, as all of such regulations exist on the date of this Agreement or may be enacted or amended after the date of this Agreement.

11. Water Rights Dedication and Ditch Structure Conveyance. At or before the time the recordation of the final plat for the first phase of subdivision and/or development (whereupon the land zoned as HP Hillside Preservation shall be dedicated to the City for public use and enjoyment as open space, active park lands and passive park lands), but in no event later than six (6) months after the mutual execution of this Agreement, Owner shall convey by special warranty deed to the City, free and clear of all liens and encumbrances (but subject to the provisions of Section 6 hereinabove), water rights acceptable to the City, as determined by mutual agreement to be satisfactory to provide a secure, legal water supply for appropriate useful application within the proposed development contemplated by this Agreement and the Plan; provided, however, Owner's obligations in this regard shall be limited to the historic water rights owned by Owner and used on the Property. Prior to dedication, the Owner and City shall agree to the maximum needs of the contemplated uses. The water rights dedicated shall be those historically associated with the subject Property and more specifically known as priorities 105A, 107A, 228 and 594 as decreed in Case Nos. 1056, 1225, 1338 and 4033 respectively. The Owner may retain water rights which exceed the needs described above, provided that the water rights retained are junior in priority to those dedicated and that any change in the point of diversions downstream of the point of diversion utilized to service the annexed Property. In addition, the Owner hereby agrees not to oppose any application by the City for an alternate point of diversion for the dedicated water rights in order to better serve the Property and the City's needs. Owner shall be entitled to sever and maintain ownership of those water rights not necessary for the City to offset the future use on the Property. Owner shall be solely responsible for the costs associated with any legal proceedings, including those related to approval of an augmentation plan or request for change in use, arising from the retention by Owner of any portion of its present water rights. By this conveyance, Owner shall fully satisfy any and all water rights dedication requirements of the City for annexation and development of the Property as set forth in the Municipal Charter and Municipal Code and as approved by the City Council.

As an element of the consideration hereunder, Owner agrees to assign one hundred percent (100%) of its ownership interest in and to the Atkinson Canal Company to the City contemporaneous with the dedication of water rights described by this Section 11. Such assignment shall include, without limitation, all right, title and interest of the Atkinson Canal Company in any agreements, contracts, easements, rights-of-way and other appurtenant benefits.

Owner, as an element of its Master Drainage Plan and its Master Utility Plan, shall at Owner's sole cost, design a raw water irrigation system, acceptable to the City Engineer, serving the Property and adjacent City-owned lands (i.e. Community Center, MOC Site and the Parcel L property). The City shall be the owner of any such raw water irrigation system and shall pay for the

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costs associated with construction of the same. Upon the City's development of a raw water irrigation system, all development within the Property shall be required to purchase such taps and pay such other fees as are generally applied to the system's use.

12. Off-Site Traffic Improvements Obligations. As an element of the City's approval of (i) Owner's Petition for Annexation, (ii) Owner's Application for Zoning and (iii) acceptance of this Agreement, the Owner has agreed to make certain improvements to the surrounding transportation system and to cooperate financially with the City on specified future transportation system improvements as described herein:

(a) As a specific requirement of any application for a Parcel's subdivision and/or development, the Owner shall calculate the estimated number of daily trips attributable to the site specific development's intended uses and provide the City with a complete copy of said calculations for the City's records.

(b) Owner shall cooperate with the City to obtain a CDOT Access Permit on behalf of, and in the name of the City. The City shall be provided a copy of any Access Permit granted hereunder. Said Access Permit shall describe the nature and impacts of construction and improvements affecting the Interstate 70/Midland Avenue right-of-way areas. Owner shall pay the costs of the Access Permitting process and shall comply with the terms associated therewith.

(c) Owner shall be responsible for the design and, upon approval of the City Engineer, the construction of improvements at the intersection of Midland Avenue and Eighth Street. Said improvements shall accommodate existing and anticipated traffic as described by the Owner's Transportation Improvements Plan through intersection modification, grade modification and/or signalization. Owner and or its assigns shall be responsible for all costs of administration, design and actual construction of the approved improvements; the City shall be responsible for all necessary costs of right-of-way acquisition for the approved improvements. The improvements contemplated hereby shall be completed prior to or contemporaneous with the issuance of a final and permanent certificate of occupancy by the City's Building Department for any structure within the first Parcel of commercial and/or residential development (exclusive of any proposed subdivision and development on Parcel I). Provided, however, Owner may apply for and obtain subdivision and/or development permit approval for development on the Property in advance of the actual construction of the improvements herein described; provided however that (i) the obligation to complete the improvement is included in the Financial Items of the respective SIA(s) (see Section 9(d) above) and thereby, the performance secured, and (ii) no permanent certificate of occupancy for any structure on Parcels A, B, C, D, E, F, G, H, J or K shall be issued until the completion of said improvements; provided, however, in the event circumstances warrant, the Owner may apply for relief from the constraints of this Section 12(c) by application to the City Council. Any such relief shall be within the sole and exclusive discretion of the

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City Council and may be subjected to such other conditions, as determined by the City Council at that time.

(d) Owner shall be responsible for the design and, upon approval of the Colorado Department of Transportation ("CDOT") and the City Engineer, the construction of two (2) roundabouts or other acceptable and approved improvements at the Interstate 70 and Midland Alternate Route highway interchange at Exit 114. Said improvements shall accommodate a potential full interchange at the North and at the South sides of said Exit 114. Owner and or its assigns shall be responsible for all costs of administration, design and actual construction of the approved improvements; the City shall be responsible for all necessary costs of right-of-way acquisition for the approved improvements. The improvements contemplated hereby shall be completed prior to or contemporaneous with the issuance of a final and permanent certificate of occupancy by the City's Building Department for any structure within the first Parcel of commercial and/or residential development (exclusive of any proposed subdivision and development on Parcel I). Provided, however, Owner may apply for and obtain subdivision and/or development permit approval for development on the Property in advance of the actual construction of the improvements herein described; provided however that (i) the obligation to complete the improvement is included in the Financial Items of the respective SIA(s) (see Section 9(d) above) and thereby, the performance secured, and (ii) no permanent certificate of occupancy for any structure on Parcels A, B, C, D, E, F, G, H, J or K shall be issued until the completion of said improvements; provided, however, in the event circumstances warrant, the Owner may apply for relief from the constraints of this Section 12(d) by application to the City Council. Any such relief shall be within the sole and exclusive discretion of the City Council and may be subjected to such other conditions, as determined by the City Council at that time.

The Owner and the City have agreed to jointly pursue the recovery of any funds which may be available from CDOT or other sources to reimburse the parties for the capital costs associated with the improvements contemplated by this Section 12(d). In the event the Owner and City are able to recapture any such funds within ten (10) years of the anniversary of this Agreement, Owner or its successors and assigns shall be entitled to recover therefrom only the amount of the actual costs of design, engineering and construction for the subject off-site transportation improvement project. All other recaptured funds, regardless of their source, shall be paid to the City and applied to other City transportation improvements.

(e) Owner shall, at the earlier of either (i) the completion of seventy-five percent (75%) of the total commercial square footage approved hereunder, or (ii) upon the request of the City Engineer following the commencement of actual construction and development on the Property (such request being evidenced by

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documentation of escalating traffic counts along the Midland Avenue corridor which the City Engineer has then determined warrants the improvement of the width of the Midland Avenue Alternate Route), pay all costs of administration, design and construction for the four-laning of the section of the Midland Avenue Alternate route from the present Community Center access point at Wulfsohn Road westerly to the present MOC access point at Wulfsohn Road, inclusive. Owner's responsibility for the four-laning of said section of the Midland Avenue Alternate Route is contingent upon the City's assumption of the obligation to simultaneously pay all of the costs for the administration and design of four lanes on two (2) other sections of the Midland Avenue corridor, to wit: (i) the section form the Colorado River to Wulfsohn Road at the present MOC access point and (ii) the section from Wulfsohn Road at the present Community Center access point to the Eighth Street and Midland intersection. Owner shall contribute to City twenty-five percent (25%) of the actual construction costs for these improvements. The City shall not attribute any financial responsibility for right-of-way acquisition for the improvements hereunder to the Owner. In the event the City Engineer has not required the four-laning of these sections of the Midland Avenue corridor prior to the Owner's commencement of any part of the final twenty-five (25%) of the total approved commercial square footage on the Property, the Owner may estimate, subject to the reasonable approval of the City Engineer, the costs of all improvements contemplated hereby and pay to the City as full and final discharge of Owner's obligations under this Section 12(e) its proportionate share of the estimated costs (i.e. 100% of the costs of the four-lane construction of Midland Avenue Alternate Route adjacent and contiguous to the Property and 25% of the costs of the four-lane construction of Midland Avenue Alternate Route at the two (2) non-adjacent, non-contiguous sections as described herein).

(f) Owner shall be responsible for one hundred percent (100%) of the costs associated with the design and construction of one new access point from the Property to Midland Avenue. The design of any such access point and roadway intersection shall require the prior approval of the City Engineer. Owner shall be responsible for one hundred percent (100%) of the costs associated with the design and construction of a new limited purpose (i.e. an unsignalized right-turn-in/right-turn-out only) access point from the Property to Midland Avenue. The design of any such secondary access point and roadway intersection shall require the prior approval of the City Engineer. Any new access points contemplated by this Section 12 (f) shall, as an element of their design and construction, incorporate a pedestrian grade separation, the design for which shall be subject to the review and approval of the City Engineer. The City may, upon the request of Owner, waive this pedestrian grade-separation obligation if the City has determined that a westward extension of the City-wide or regional trail system is not anticipated.

The City and Owner hereby agree that in the event a city-wide off-site transportation improvement fee program of general applicability within the City's municipal limits shall be hereafter duly

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adopted by the City, said program of general applicability shall apply only to the development of Parcel I on the Plan.

Owner's contribution to the construction and land dedication for on-site pedestrian and bicycle trail connections, including the costs incurred in developing grade-separated crossings, shall be credited to Owner, its successors and assigns, against any other applicable fee(s) now in the Municipal Code or hereafter adopted by the City for the express purpose of improving trails and similar parkland facilities. The Owner shall be responsible for providing to the City copies of all applicable cost records for such expenditures.

13. On-Site Pedestrian/Off-Site Pedestrian Commitments, Transportation Demand Management Commitment; and Transit Commitments. The following commitments regarding pedestrian and bicycle trails development are intended to be exclusive of obligations by the Owner or a future developer with respect to sidewalks and other connections which are distinctly required by the Zoning Plan, the City Code or other applicable requirements.

a. On-Site Hard Trail. The City and Owner have agreed that the City Rivertrail system shall be continued across the Property. Owner has agreed to design and build such a Rivertrail extension as set forth hereby in phases which correspond to the sections of such trail affected by the site specific development of the Parcels of the Property. Upon completion of any phase or section of the Rivertrail, the Owner or its successor-in interest shall dedicate a permanent easement for the Rivertrail's public use, benefit and maintenance using specific, as-built legal descriptions for such transfer of interest. Therefore, within any Parcel of the Property burdened by the existing thirty foot (30') wide underground Public Utility Easement granted by Owner to the City by that certain instrument dated August 8, 2000 (being, specifically, Parcels A, C, D, E, H and I), which Parcel is the subject of application for site specific development, the design and construction of the Rivertrail extension shall be included within such application and planning in a manner substantially in compliance with the City adopted Rivertrail Standards and at a minimum shall be designed in a quality similar to comparable existing Rivertrail improvements in the City. The estimated costs therefor shall be included in the Financial Items accompanying any approval of the Parcel's development. In the event the City desires to proceed with the design and construction of the Rivertrail extension on Parcels of the Property in advance of Owner's application for development on such Parcel(s), then at the time Owner or its successors do develop such Parcel(s), it shall be required, as a Financial Item of approval, to reimburse the City for its actual design and construction costs associated with said Rivertrail extension as determined on a per linear foot basis.

b. On-Site Soft Trail. The City and Owner have agreed that, in conjunction with Owner's development of any section of the debris flow mitigation structures as described in Section 14 hereinbelow, and whether the actual approved location of said debris flow mitigation structure is within the Parcel L lands or within portions of the Parcels B, J or K lands, that Owner or its successors-in-interest shall design

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and construct a "Soft Trail" (i.e. no asphalt or concrete) within, on or near the subject debris flow mitigation structure. The design characteristics of the Soft Trail shall, at a minimum, conform to the design characteristics of other City-owned soft trail systems within the City. In the event the City, at the time of the application for development requiring the construction of a section of the debris flow mitigation structures, determines that such a Soft Trail is, at that time, inconsistent with the City's goals, policies and plans for the public use and benefit of the Parcel L lands, then it may direct the Owner to eliminate the Soft Trail development from said application for development.

c. Off-Site Rivertrail Contribution. The City and Owner have agreed that Owner shall be responsible for contributing fifty percent (50%) of the actual costs of constructing the section of the City Rivertrail system, or other City-adopted pedestrian connection, from the existing Community Center access point at Wulfsohn Road (commencing at Owner's eastern boundary of Parcel I) to the intersection of Eighth Street and Midland Avenue. In no event shall Owner's obligation hereunder exceed the lesser amount of either (i) fifty percent (50%) of the actual construction costs of such off-site trail project as are presently set forth by that certain Pedestrian Feasibility Study dated March 6, 2002 and conducted by OTAK on behalf of the City (the "Study"), which Study estimates a total cost for the City-adopted Alternate B solution at $1,055,000.00 or (ii) fifty percent (50%) of the actual construction costs of such off-site trail project as determined upon completion of said project, regardless of the estimates set forth in the Study (each of the two foregoing limitations upon Owner's financial obligations are further subject to any credits for land dedication as set forth hereafter). Owner owns a 100% undivided interest in certain, presently unincorporated land situate on the northeastern boundary of the Midland Avenue Right-of-Way (commonly known and referred to as the "Wulfsohn East" parcel). Owner has agreed to grant the City an above ground permanent easement for the use of a part of the Wulfsohn East parcel for purposes of providing a safe and beneficial connection from the area of the Community Center to existing City pedestrian corridors. The value of the land dedicated to the City on the Wulfsohn East parcel, by easement or otherwise as hereafter agreed by the parties, shall be deducted from Owner's financial contribution obligations pursuant to this Section 13(c). The "value" shall include any diminution of the value of Owner's other land within the Wulfsohn East parcel, if any. In the event the parties are unable to agree as to the value of Owner's land contribution hereunder, each party shall engage a qualified, licensed appraiser to research and analyze such value. The value shall then be permanently established by the average of the two (2) appraisals. The City agrees that it shall be solely and exclusively responsible for the design and construction of the pedestrian improvements contemplated hereby and shall use all reasonable means to construct the same prior to the commencement of development on the Property; provided, however, that the City further agrees that it shall not unreasonably withhold any subsequent Permits or other development approvals based upon the City's inability to timely complete such trail/pedestrian path construction.

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d. West Property Park and Ride Land Reservation. Owner has agreed to reserve from development, for a period not to exceed five (5) years after the mutual execution of this Agreement, a section of land, not to exceed two and one-half (2.5) acres in size at the west end of Parcel A on the Property (hereafter, the West Park and Ride Site"), for the possible acquisition by the City or other appropriate governmental entity through purchase, exchange or other mutually agreeable mechanism of transfer, for the express use of such West Park and Ride Site as a public park-and-ride/transit facility. In the event the City, or other appropriate governmental authority as assignee of the City's rights hereunder, does not notify Owner or its successors and assigns in writing, on or before the established deadline described immediately above, of its intention to exercise the acquisition of the West Park and Ride Site, Owner shall be relieved from any obligation hereunder to further reserve the Site. In determining the price of the West Park and Ride Site, the parties shall either (i) agree to a price, or (ii) each party shall retain the services of a qualified, licensed Colorado real estate appraiser to appraise the value of the land as such land was zoned immediately prior to the annexation of the Property (Garfield County zone district A/R/R/D), with such value escalated for the passage of time during the reservation period at a rate equal to the published Denver/Boulder Consumer Price Index established as of the date of final annexation and adjusted annually on each anniversary thereof; the average of the appraised value by each appraiser shall be deemed the purchase price for the governmental acquisition of the West Park and Ride Site.

e. East Property Transit Center. This Agreement shall obligate the Owner and/or eventual developer of the land within Parcel I of the Property to negotiate in good faith, at the time of site specific development application, for the dedication to the City of an adequate land area, not to exceed one (1) acre, and location therefor for the City or its agent's development of a transit center facility and attendant parking area. In the event the City and Owner are unable to reach agreement as to the location, size and dedication of such a transit facility and parking area within the proposed development of Parcel I, then, upon the approval of a site specific development proposal for Parcel I, the Owner or is successors and assigns shall make a mandatory contribution to the City in an amount equal to the value of one (1) acre of land within said Parcel I as determined by mutual agreement or as determined by the average of two appraisals; one such appraisal shall be commissioned by the City and one such appraisal shall be commissioned by the Owner, its successors and assigns. In the event the parties do agree on a mutually acceptable size and location for the transit center and parking area, the City shall accept transfer of the site following the issuance of appropriate development approvals and the City shall accept sole and exclusive responsibility for the costs of designing and constructing the facility. The City agrees that any such development of a public transit center and parking area shall comply with all applicable underlying design criteria established by this Agreements and the exhibits hereto in addition to any applicable Municipal Code requirements.

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14. Public Improvements/Geotechnical Mitigation Improvements and Maintenance Obligations. All public improvements required by the Plan, including the development of internal public streets and public utility line extensions, shall be included and subject to performance and financial guarantee requirements referenced in the respective SIA(s)/Development Permit(s). Additionally, at the time a final plat is recorded, Owner shall commit to the dedication, conveyance and assignment to the City all public improvements within the subject phase, together with any land, by deed or easement instrument acceptable to the City, necessary to accommodate such public improvements, and shall, upon completion and acceptance by the City of said public improvements, so dedicate, convey and assign the same in perpetuity. Finally, Owner shall dedicate or convey such public improvements by bill of sale or special warranty deed, free and clear of any liens or encumbrances which would prevent the City from using said public improvements or associated land for their intended purposes.

a. Specific Geotechnical Mitigation Improvements Obligations. All land use and development undertaken on the Property shall comply with the recommendations and requirements of both the Geotechnical Analysis Summary prepared by High Country Engineering, dated September 17, 2001, as amended, and the Drainage Summary prepared by High Country Engineering, dated September 17, 2001, as amended; both of which were reviewed by the office of the Colorado Geological Survey and were incorporated into the City's approval of the Plan. Copies of each report are maintained in the records of the City. More specifically, any application for development of any phase of development on the Property shall, at a minimum, comply with the following conditions and recite the same as a plat note on the recorded plat instrument:

"Foundation/Grading Requirements. Preliminary soils investigations encountered low density and compressible silty sand and gravel debris fan deposits. These soils are hydro-compressive and tend to settle under load when wetted. Subsurface wetting is likely to occur as the result of surface runoff, irrigation and leaky utilities, therefore measures to mitigate settlement shall be required as a part of the site development. Foundation and grading requirements are as follows:

a. Foundations for the site may include driven or drilled pile, reinforced mat, spread footings placed on either pre-wetted soils or structural backfill.
b. Site Grading shall be performed prior to building pad and foundation construction. Site grading and building pad construction should be performed as early as possible to allow for settlement.
c. The ground surface should be sloped at a minimum of 5% for the first ten feet away from foundations in all directions in unpaved areas and 2.5% in paved areas.
d. The Owner shall be responsible for submitting an engineer certified soils report that includes a section on paving requirements. The soils report should include moisture and compaction requirements, excavation and backfill requirements, evaluation of swell and consolidation potential, slope stability and foundation recommendations for structures. The pavement section of the report should include traffic loadings, sub-grade preparation and pavement recommendations. This report must be submitted

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and approved prior to beginning either foundation construction or roadway/parking lot construction.

Surface/Subsurface Drainage Requirements.

Downspouts and drains should discharge outside the limits of the backfill.
Landscape requiring irrigation should be placed a minimum of ten feet from foundation walls.
An under-drain system will be required for all below-grade construction.

Utility Construction

a. Wet utilities will be required to utilize restrained joints throughout the project limits.

Debris Flow Mitigation

a. It is anticipated that the project area will be developed in phases. Each individual phase will be required to construct debris flow mitigation measures in accordance with the Debris Flow Mitigation Plan prepared for the entire development and as approved by the City Engineer. In the event the City desires to proceed with the design and construction of a portion or all of the structures required by the Debris Flow Mitigation Plan, as may be amended from time to time with the approval of the City, upon the lands identified as Parcel L of the Property in advance of Owner's application for development, then at the time Owner or its successors do develop such any Parcel(s) which would have required, as an element of development the construction of such debris flow mitigation structures, such Owner or its successor shall be required, as a Financial Item of approval, to reimburse the City for its actual construction costs associated with said debris flow mitigation structure(s), together with interest on such costs, from the time expended by the City to the time of such reimbursement, at a rate equal to the local construction price index.

b. Debris flow mitigation measures for the project include diversion ditches, berms and debris detention basins located along the southwest perimeter of the property.

c. The Owner's Association or a special district will be responsible for maintenance of the debris flow mitigation measures. Maintenance should include removal of debris following an event and routine mowing.

d. The Owner's Association or a special district will be responsible for irrigation of the slopes until permanent vegetation has been established.

Rockfall

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a. Rockfall hazards are limited to those areas identified in the Geologic and Preliminary Geotechnical Investigation Glenwood Meadows Glenwood Springs, Colorado prepared by CTL Thompson dated February 1, 2000. There is not a potential rockfall hazard associated with the development of this Property. The only rockfall hazard identified for the area is to the west of the land zoned for future development near the existing City Municipal Operations Center site."

Additionally, as an element of Owner's obligation to submit a Master Drainage Plan and a Master Debris Flow Mitigation Plan as set forth under Section 2 hereinabove, such plans submitted to the City shall specifically include (i) an analysis of acceptable outfall corridors from the low points in all identified detention basins, (ii) an analysis of the preferred routes for such flows from the basins to be conveyed through the Property to existing or improved drainage facilities along the north boundary of the Property, and (iii) an analysis of the capacity of the aforementioned existing or improved drainage facilities and related conveyance structures which are intended to deliver excess moisture to the Colorado River. All of the foregoing data shall be reviewed and approved by the City Engineer prior to the issuance of any building permit on the Property.

15. Open Space and Park Land Dedication. In full and complete compliance with relevant park land public dedication and open space public dedication requirements referenced in the Municipal Code, Owner will dedicate the area zoned as HP Hillside Preservation, shown on the Plan as Parcel L, to the City at final plat recordation for the first phase of land use on the Property. Neither the Owner nor its successors-in-interest shall be required by the City to develop any portion of the publicly dedicated lands for active recreation purposes, except as may be otherwise hereafter agreed as an element of the development of Parcel K of the Property's development (Owner or its assigns shall "rough grade" the area of Parcel L, adjacent to said Parcel K and the City's Community Center, for no more than two (2) baseball/softball fields, upon the direction of the City if such direction is provided to Owner prior to commencement of Owner's initial grading for the development of Parcel K of the Property). In partial consideration of the dedication of the Parcel L lands, the City has agreed to plan and develop a permanent water source retention structure for the benefit of indigenous wildlife; such structure shall be developed by the City, subject to the necessary appropriation of funding, following the dedication of the Parcel L land by Owner. The City agrees that its acceptance of the dedication of such lands shall be deemed a "governmental use" (as defined by the Glenwood Springs' Municipal Charter) of the same and thereby prohibits the City from conveying any of the publicly dedicated property to a third party without first submitting the matter to an election of the City's voters. Nothing contained herein is intended to limit or prevent the City from developing some or all of the public dedication lands for the use and benefit of the public as the City may deem appropriate and advisable in the future.

The City shall convey to the Owner or its successors-in-interest in providing, at the time of actual dedication of the HP zoned lands, a mutually acceptable, non-specific, easement for the development within the publicly dedicated land of (i) the geotechnical mitigation structures to be constructed and maintained by the Owner, or a special district established by Owner and assigned such responsibility, pursuant to the general description of such structures set forth by the Zoning and

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Development Plan application materials provided by High Country Engineering, and maintained in the records of the City, (ii) any reasonable and necessary street and utility easements (i.e. for the connection of Wulfsohn Road between Parcels A and C as set forth by the Plan) and (iii) any reasonable and necessary street or public utility easements connecting Wulfsohn Road to Parcel K of the Property, which streets and/or utility easements shall require the review and approval of the City Council. The actual location of such geotechnical mitigation structures shall require the prior approval of the City, which approval shall not be unreasonably withheld. After completion of the actual construction of such geotechnical mitigation structures and any features attendant thereto (i.e. a Soft Trail), an amended permanent easement, complete with as-built legal descriptions, shall be excecuted by the parties and recorded in the Garfield County Clerk and Recorder's Office.

All "commonly-owned" parklands and open space within the Parcels A through K, shall be owned and maintained by the Owner and/or the developer thereof, its successors, an association or a special district.

16. Establishment of Special District(s) and Owners' Association/Downtown Development Authority Incorporation Petition.

(a) Owner agrees that it shall undertake the establishment of a drainage and erosion control special district for the purposes of managing and maintaining in perpetuity all Property drainage and debris flow mitigation functions. The City agrees to join such district to the extent of the City's proportional ownership of land and improvements on the Property which benefit from the geotechnical protections of said structures.

(b) Owner agrees to form, or have formed, a property owners' association as soon as practicable and agrees to include the City, upon the City's written request, as a third party beneficiary with respect to the association's enforcement of Covenants, Conditions, Restrictions, Declarations or other regulations governing the property owners or common areas within the Property, including but not limited to the ability to impose assessments or penalties for noncompliance therewith. At a minimum, the formed association shall include within in its adopted Covenants, Conditions and Restrictions, the recommendations of the Colorado Division of Wildlife ("CDOW") as set forth by letter dated October 1, 2001 and maintained on file with the City; provided, however, neither the Owner nor any association hereafter formed, shall be responsible for any land dedications or indemnification as referenced in said CDOW letter. In the absence of the prior formation of a special district responsible for the maintenance of debris flow mitigation structures within the Property, either (i) the Owner or (ii) such a property association shall be formed with the specific responsibility for such maintenance obligations.

(c) Owner agrees that within one (1) year after the effective date of annexation of the Property to the City as described by Section 4 hereof, but in no event later than the filing of the first application for subdivision and/or development, Owner or its successor-in-interest shall petition for inclusion within the boundaries of the Glenwood

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Springs Downtown Development Authority (hereafter, the "DDA"). The DDA shall, at its discretion, forward such petition to the City Council for approval or disapproval, in whole or in part, of the request for inclusion. This provision in no way obligates the City to include any or all of the Property in the boundaries of the DDA. Should the City choose not to include all or any part of the Property in the boundaries of the DDA at the time of initial petition by Owner for inclusion, the City shall not be precluded from consideration of the same matter at some point in the future.

17. Provisions Exclusive. The City and Owner acknowledge and agree that this Agreement contains all basic requirements of Owner concerning the provision of water and sewer service to the property, potential joint development of a raw water irrigation system, public open space dedication, and public park land dedication, utilities, infrastructure, water rights dedications and other matters expressly addressed under this Agreement. Additional reasonable specifications and regulations may be imposed by the City upon Owner during the subdivision or development approval processes with regard to these enumerated items as well as other items, as appropriate.

18. Breach by Owner; City's Remedies. In the event of any default or breach by Owner of any term, condition, covenant or obligation under this Agreement, the Owner shall be notified immediately in writing. The City may take such action as it deems necessary to protect the public health, safety, and welfare; to protect lot buyers and builders, and to protect the citizens of the City from any and all damages and/or injury to persons and/or property. The City's remedies include:

a. The refusal to issue to Owner any building permit or certificate of occupancy; provided, however, that this remedy shall not be available to the City until after the affidavit described in subparagraph b. below has been recorded. This remedy shall not affect sales to bona fide purchasers nor be applied to bona fide purchasers;

b. The recording with the Garfield County Clerk and Recorder of an affidavit, approved in writing by the City Attorney and signed by the City Manager or his designee, stating that the terms and conditions of this Agreement have been breached by Owner. At the next scheduled Council meeting, the Council shall either approve the filing of said affidavit or direct the City Manager to file an affidavit stating that the breach, or default, has been cured. Upon the recording of such an affidavit, no further lots or parcels may be sold within the Property until the default has been cured. The execution and filing of an affidavit by the City Manager or his designee and approved by the Council stating that the default has been cured shall remove this restriction;

c. A demand that the security given for the completion of the public improvements be paid or honored;

d. The refusal to consider further development plans within the Property; and/or

e. Any other remedy available at law or in equity.

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Unless necessary to protect the immediate health, safety, and welfare of the City or City residents, the City shall provide Owner thirty (30) days' written notice of its intent to take any action under this paragraph during which thirty-day period Owner may cure the breach described in said notice and prevent further action by the City. Furthermore, unless an affidavit as described in this paragraph has been recorded with the Garfield County Clerk and Recorder, any person dealing with Owner shall be entitled to assume that no default by Owner has occurred hereunder unless a notice of breach has been served upon Owner as described above, in which event Owner shall be expressly responsible for informing any such third party of the claimed default by the City.

19. Breach By City; Owner's Remedies.

a. A "breach" or "default" by the City under this Agreement shall be defined as:

i. any zoning or land use action by the City which would alter, impair, prevent, diminish, impose a moratorium on development, or unreasonably delay the development or use of the Property as set forth in the Zoning and Development Plan, and specifically excluding any non-discriminatory regulatory actions, inaction, or circumstances beyond the reasonable control of the City; or

ii. the City's failure to fulfill or perform any material obligation of the City contained in this Agreement.

b. If any default by the City under this Agreement is not cured as described herein, Owner shall have the right to pursue the defaulting party's remedies allowable by Colorado law, subject to the limitations herein. Although C.R.S. Sections 24-68-101 et seq. allow for certain monetary damages in the event of City breach or default, Owner's sole remedies hereunder shall be to enforce the City's obligations under this Agreement by an action for any available equitable remedy, including, without limitation, specific performance or mandatory or prohibitory injunction. Each remedy provided for in this Agreement is cumulative and is in addition to every other remedy provided for in this Agreement.

20. Miscellaneous.

a. Expenses. The costs and expenses associated with the recordation of this Agreement shall be paid by Owner.

b. Waiver of Defects. By executing this Agreement, Owner waives all objections it may have concerning defects, if any, in the formalities whereby it is executed, or concerning the power of the City to impose conditions on Owner as set forth herein, and concerning the procedure, substance, and form of the ordinances or resolutions adopting this Agreement.

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c. Final Agreement. This Agreement supersedes and controls all prior written and oral agreements and representations of the parties regarding annexation and zoning of the Property and is the total integrated agreement between the City and Owner as to those limited matters.

d. Modifications. This Agreement shall not be amended, except by subsequent written agreement of the City and Owner.

e. Captions. The captions in this Agreement are inserted only for convenience and in no way define, limit, or prescribe the scope or intent of this Agreement or any part thereof.

f. Binding Effect. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, successors, and assigns. Further, the terms and conditions of this Agreement shall constitute a covenant running with the land.

g. Invalid Provision. If any provisions of this Agreement shall be determined to be void by any court of competent jurisdiction, then such determination shall not affect any other provision hereof, all of which other provisions shall remain in full force and effect. It is the intention of the parties hereto that, if any provision of this Agreement is capable of two constructions, one of which would render the provision void, and the other of which would render the provision valid, then the provision shall have the meaning which renders it valid.

h. Governing Law. The laws of the State of Colorado shall govern the validity, performance, and enforcement of this Agreement. Should either party institute legal suit or action for enforcement of any obligation contained herein, it is agreed that the venue of such suit or action shall be in Garfield County, Colorado.

i. Attorneys' Fees; Survival. Should this Agreement become the subject of litigation between the City and Owner, the prevailing party shall be entitled to attorneys' fees and costs of suit actually incurred, including expert witness fees. All rights concerning remedies and/or attorneys' fees shall survive any termination of this Agreement.

j. Authority. Each person signing this Agreement represents and warrants that he, she or they is/are fully authorized to enter into and execute this Agreement, and to bind the party represented to the terms and conditions hereof.

k. Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, and all of which, when taken together, shall be deemed one and the same instrument.

l. Notice. All notices required under this Agreement shall be in writing and shall be hand-delivered or sent by facsimile transmission or registered or certified mail, return receipt requested, postage prepaid, to the addresses of the parties herein set forth. All notices by hand delivery shall be effective upon receipt. All facsimile transmissions shall be effective upon transmission receipt. All notices by mail shall be considered effective seventy-two (72) hours after deposit in the United States mail with the proper address as set forth below. Either party by notice so given may change the address to which future notices shall be sent.

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Notice to City:

City of Glenwood Springs
Michael Copp, City Manager
806 Cooper Avenue
Glenwood Springs, CO 81601

With copy to:

Teresa Williams, Esq.
City Attorney
806 Cooper Avenue
Glenwood Springs, CO 81601

Notice to Owner:

Glenwood Meadows, L.L.C.
Attn: Robert Macgregor
525 East Cooper
Aspen, CO 81611

With copy to:

Thomas J. Hartert, Esq.
802 Grand Avenue, Suite 303
Glenwood Springs, CO 81601

m. Nothing contained herein, or in any Exhibit hereto, shall affect or impair the City's powers of eminent domain or other similar authority.

n. Gender. Whenever the context shall require, the singular number shall include the plural, the plural the singular, and the use of any gender shall be applicable to all genders.

WHEREFORE, the parties hereto have executed duplicate originals of this Agreement on the day and year first written above.

CITY OF GLENWOOD SPRINGS, COLORADO

By _____
Donald L. Vanderhoof, Mayor

ATTEST:

_____
Robin Clemons, City Clerk

COLORADO

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GLENWOOD MEADOWS, L.L.C., a Colorado limited liability company

By _____
Robert Duncan Macgregor as President of Dunrene Management, Inc., the Manager

STATE OF COLORADO)
) ss.
COUNTY OF GARFIELD)

Acknowledged, subscribed, and sworn to before me this 23rd day of August, 2002, by Donald Vanderhoof, as Mayor, and by Robin S. Clemons, as Clerk, on behalf of the City of Glenwood Springs, Colorado.

WITNESS my hand and official seal.

My Commission expires: MY COMMISSION EXPIRES 11/28/2005

Notary Public
Barbara Gately

NOTARY PUBLIC BARBARA M. CATELY STATE OF COLORADO

STATE OF COLORADO)
) ss.
COUNTY OF GARFIELD)

Acknowledged, subscribed, and sworn to before me this 18th day of September 2002, by Robert Duncan Macgregor as President of Dunrene Management, Inc., the Manager of Glenwood Meadows, L.L.C.

WITNESS my hand and official seal.

My Commission expires: 10/26/2005.

Notary Public
Barbara P. Kozelka

NOTARY PUBLIC BARBARA P. KOZELKA STATE OF COLORADO

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LIST OF EXHIBITS

Exhibit A	Property Description (from Annexation Plat – 345 acres)
Exhibit B	Zoning Map
Exhibit C	Zoning and Development Plan

EXHIBIT "A"

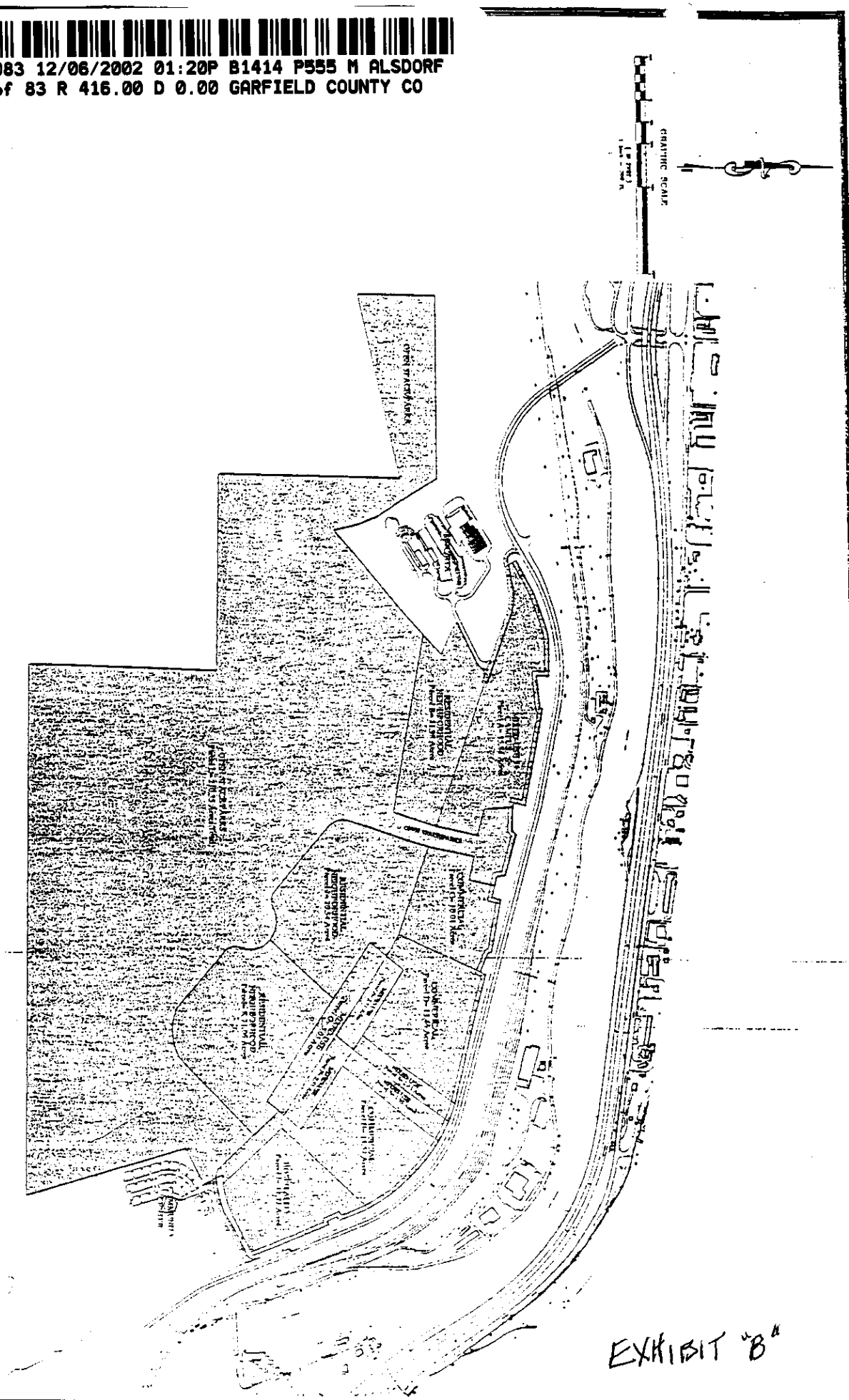
ANNEXATION DESCRIPTION

A PARCEL OF LAND SITUATED IN THE S1/2S1/2 OF SECTION 5, THE SE1/4SE1/4 OF SECTION 6, THE NE1/4NE1/4 OF SECTION 7, THE N1/2 OF SECTION 8 AND THE NW1/4NW1/4 OF SECTION 9, TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE SIXTH PRINCIPAL MERIDIAN; SAID PARCEL BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF SAID SECTION 5, THE POINT OF BEGINNING; THENCE S75°55'37"W A DISTANCE OF 1316.16 FEET; THENCE N01°07'55"E A DISTANCE OF 582.46 FEET; THENCE N90°00'00"E A DISTANCE OF 1265.15 FEET; THENCE S30°38'55"E A DISTANCE OF 522.34 FEET; THENCE S19°31'13"E A DISTANCE OF 160.53 FEET; THENCE S12°53'54"E A DISTANCE OF 181.17 FEET; THENCE N47°17'45"E A DISTANCE OF 1171.28 FEET; THENCE ALONG THE ARC OF A NON-TANGENT CURVE TO THE RIGHT HAVING A RADIUS OF 1260.00 FEET AND A CENTRAL ANGLE OF 10°27'43", A DISTANCE OF 230.07 FEET (CHORD BEARS N65°22'14"W 229.75 FEET); THENCE N63°26'47"E A DISTANCE OF 283.45 FEET; THENCE ALONG THE ARC OF A CURVE TO THE LEFT HAVING A RADIUS OF 137.50 FEET AND A CENTRAL ANGLE OF 24°20'19", A DISTANCE OF 58.41 FEET (CHORD BEARS N51°16'35"E 57.97 FEET); THENCE N63°30'55"E A DISTANCE OF 61.83 FEET; THENCE S70°03'24"E A DISTANCE OF 42.54 FEET; THENCE N19°56'36"E A DISTANCE OF 75.00 FEET; THENCE N70°03'24"W A DISTANCE OF 522.96 FEET; THENCE ALONG THE ARC OF A CURVE TO THE LEFT HAVING A RADIUS OF 337.50 FEET AND A CENTRAL ANGLE OF 28°23'27", A DISTANCE OF 167.24 FEET (CHORD BEARS N84°15'08"W 165.53 FEET); THENCE S81°33'05"W A DISTANCE OF 198.69 FEET; THENCE ALONG THE ARC OF A NON-TANGENT CURVE TO THE RIGHT HAVING A RADIUS OF 1260.00 FEET AND A CENTRAL ANGLE OF 01°42'55", A DISTANCE OF 37.72 FEET (CHORD BEARS N31°49'38"W 37.72 FEET); TO A POINT ON THE SOUTHERLY RIGHT-OF-WAY OF MIDLAND AVENUE; THENCE N62°28'35"E ALONG SAID RIGHT-OF-WAY A DISTANCE OF 262.30 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY N70°48'52"E A DISTANCE OF 233.79 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY ALONG THE ARC OF A CURVE TO THE RIGHT HAVING A RADIUS OF 400.00 FEET AND A CENTRAL ANGLE OF 19°48'21", A DISTANCE OF 138.27 FEET (CHORD BEARS N80°43'04"E 137.58 FEET); THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S89°22'47"E A DISTANCE OF 220.22 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S04°05'51"W A DISTANCE OF 84.94 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S88°21'25"E A DISTANCE OF 29.12 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY N84°12'24"E A DISTANCE OF 200.33 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY N13°23'18"E A DISTANCE OF 18.04 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S79°22'12"E A DISTANCE OF 693.85 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S15°25'14"W A DISTANCE OF 81.35 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S72°50'58"E A DISTANCE OF 30.90 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S87°49'17"E A DISTANCE OF 164.69 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY N47°19'34"E A DISTANCE OF 37.65 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S74°59'10"E A DISTANCE OF 294.83 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S08°06'53"E A DISTANCE OF 62.58 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S77°46'27"E A DISTANCE OF 150.75 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY N14°20'16"E A DISTANCE OF 62.19 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S79°08'31"E A DISTANCE OF 369.05 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S18°40'31"E A DISTANCE OF 29.17 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S66°03'20"E A DISTANCE OF 143.01 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY N25°40'28"E A DISTANCE OF 42.89 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S74°19'33"E A DISTANCE OF 339.00 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S76°23'22"E A DISTANCE OF 559.87 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY ALONG THE ARC OF A CURVE TO THE RIGHT HAVING A RADIUS OF 1190.00 FEET AND A CENTRAL ANGLE OF 53°10'47", A DISTANCE OF 1104.51 FEET (CHORD BEARS S48°18'54"E 1065.29 FEET); THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S21°43'32"E A DISTANCE OF 179.06 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S68°16'28"W A DISTANCE OF 31.36 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S23°26'58"E A DISTANCE OF 78.05 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY N68°16'28"E A DISTANCE OF 29.01 FEET; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY S21°43'32"E A DISTANCE OF 613.97 FEET; THENCE LEAVING SAID RIGHT-OF-WAY S62°49'19"W 292.63 FEET; THENCE ALONG THE ARC OF A CURVE TO THE RIGHT HAVING A RADIUS OF 760.00 FEET AND A CENTRAL ANGLE OF 24°24'13", A DISTANCE OF 323.70 FEET (CHORD BEARS S75°01'26"W 321.26 FEET); THENCE S27°10'41"E 147.90 FEET; THENCE S62°49'19"W A DISTANCE OF 281.27 FEET; THENCE S16°27'24"E A DISTANCE OF 1206.11 FEET; THENCE N89°15'16"W A DISTANCE OF 3719.58 FEET; THENCE N01°13'52"E A DISTANCE OF 1360.08 FEET; THENCE N88°45'05"W A DISTANCE OF 1367.66 FEET; THENCE N01°04'56"E A DISTANCE OF 1369.90 FEET; TO THE POINT OF BEGINNING; SAID PARCEL CONTAINING 344.473 ACRES, MORE OR LESS.

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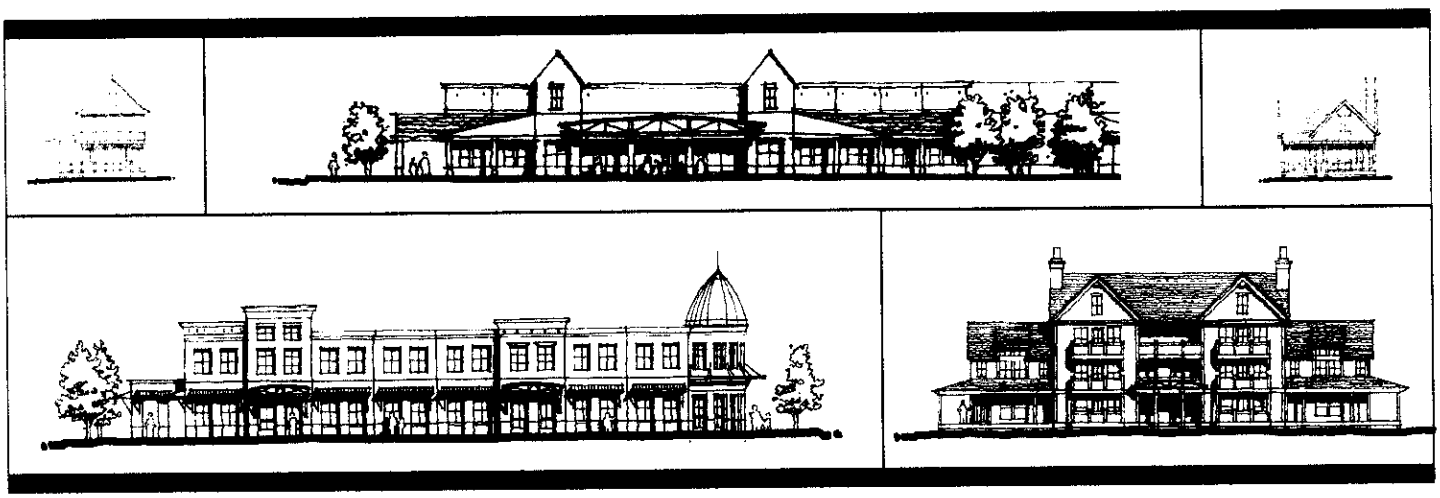
CLEANWOOD MEADOWS
ANNEXATION PARCEL MAP

HIGH COUNTRY ENGINEERING, INC.

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ZONING AND DEVELOPMENT PLAN

GLENWOOD MEADOWS



Glenwood Meadows, LLC

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I. Introduction

A. PROJECT BACKGROUND

Glenwood Meadows is an approximately 345-acre parcel of unincorporated land surrounded on three sides by the municipal limits of Glenwood Springs, Colorado ("City"). The Midland Alternate Route, a 100 foot wide public right-of-way, serves as the northern border to the site and two new City facilities are under construction on the east and west ends; a new community center to the east of Glenwood Meadows and a municipal operations facility to the west of the site. While Red Mountain serves as a backdrop to the site on the south, it is not owned by or a part of the Glenwood Meadows' zoning application and development plan. The subject property, which is owned by Glenwood Meadows, L.L.C. was historically referred to as the "Wulfsohn" property.

Glenwood Meadows is situated west of the core of Downtown Glenwood Springs and directly across the Colorado River from the significant neighborhoods and commercial operations of West Glenwood. Glenwood Meadows and the City's Community Center are highly visible from Interstate 70, the primary entry point to the City from both the east and the west. Despite its juxtaposition with the City, Exit 114 to Interstate 70, the Midland Alternate Route and the two City facilities mentioned, Glenwood Meadows currently resides in the jurisdiction of Garfield County, Colorado. Prior to the completion of the Midland Alternate Route and the City's adoption of its Land Use Plan, annexation of the land was not feasible.

When the oil shale industry collapsed in the early 1980's, the then owner of the site, Union Oil Company, considered various development options. In the mid-1980s, Union Oil Company and the City of Glenwood embarked on negotiations for the joint development of the site as a municipal golf course, residential and commercial venture. The efforts failed, as did two subsequent attempts to pass open space and recreation tax measures aimed at the City's ability to purchase portions of the site.

In 1996, Glenwood Land Company, LLC purchased the property from the Union Oil Company. Approximately two years later Glenwood Meadows, LLC, the current owner of the property, acquired the land. Shortly thereafter, Glenwood Meadows undertook a land exchange with the City of Glenwood Springs, which provided the city with 37.24 acres for use as a Community Center. The city subsequently annexed the Community Center site and has provided a public access point to the property, which is currently under construction. This access point will be shared when the remaining property is developed. In early 2000, the City of Glenwood Springs and Glenwood Meadows undertook another land transaction by which the city acquired an additional 35.57 acres for development of a Municipal Operations Center (MOC). The MOC site was thereafter annexed and the City created a second public access point to Glenwood Meadows, which is also under construction. In addition to the City development of the MOC facility, the site west of Glenwood Meadows is also planned to provide the base operational facility for the newly organized Rural Transportation Authority ("RTA").

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Regardless of how Glenwood Meadows is developed (i.e. for residential, commercial, mixed-use purposes, through the jurisdiction of either Garfield County or the City), Glenwood Meadows is entitled to use both City developed access points as well as two other access points along the Midland Route. Further, Glenwood Meadows has legal rights to utilize the City's municipal sewer and potable water systems.

For the past two years the City and Glenwood Meadows have mutually expressed their desire to annex the land to the City and to subject the property to stringent criteria which would result in the highest quality of future development specifically planned to address the present and future needs of the community as a whole. Through extensive discussions with City staff, it was determined that seeking "enhanced" traditional zoning for the property (traditional zoning with additional development standards and more restrictive uses) would be a more effective tool than the P.U.D. process to achieve the highest quality of future development. This decision was based on the fact that through the traditional zoning process; additional development standards and use restrictions could be applied to traditional zone districts in order to achieve a high level of development quality without the unnecessary analytical and administrative confusion of a cumbersome P.U.D. process. This Zoning Plan, together with the associated Annexation and Development Agreement and the additional information provided represents the culmination of these efforts.

B. STATEMENT OF PURPOSE AND INTENT

This Zoning Plan is intended to serve as a supporting document for the accompanying Annexation Agreement in order to establish appropriate zoning for the 12 individual development parcels within the overall site. In addition, the Zoning Plan establishes standards for the property to ensure that future planning and construction quality remains high, regardless of the phasing of development on different parcels. The following goals serve as the basis for this Zoning Plan and development standards. The goals were identified during an unprecedented and invaluable public hearing process, through community meetings dating back to the original adoption of the City's Comprehensive and Land Use Plans, during work sessions with City staff, citizen committees, the Planning Commission, and City Council members as items to be addressed by this Zoning Plan.

Land Use

- *Promote Glenwood Springs as the governmental hub and the local/tourism service center of the Roaring Fork and Colorado River Valleys.*
- *Establish Glenwood Meadows not as a development, but as a new Glenwood Springs neighborhood with housing opportunities, jobs, shopping, hospitality, and recreation.*
- *Enhance the City's Community Center project through placement of adjacent zoning for uses that include active and passive open areas as well as for tourism and hospitality.*

Development Quality

- *Preserve, maintain, and enhance the visual qualities of the west entrance to Glenwood Springs.*
- *Focus neighborhood retail around pedestrian-oriented streets to break up larger commercial uses.*
- *Provide development standards that supplement from the City's standard development regulations, encouraging creative, quality design.*

Housing

- *Provide a mix of housing types and densities within the Glenwood Meadows neighborhood.*

Open Space and Natural Amenities

- *Balance the quantity of development on the site with the natural characteristics of the site.*
- *Maximize dedicated open space and integrate open space corridors throughout the Glenwood Meadows neighborhood, minimizing impacts to existing site vegetation.*

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Transportation

- *Encourage the allocation of future traffic west of the core Downtown and provide a West Glenwood mass transit option.*
- *Promote directed investment, through any development, aimed at the restoration and enhancement of the City's transportation infrastructure through adoption of an Off-Site Transportation Improvements Fee Program.*

C. RELATIONSHIP TO GLENWOOD SPRINGS COMPREHENSIVE PLAN

Vision

The Glenwood Springs Comprehensive Plan provides the community with a tool for managing its long-term growth and character. Ensuring that the goals and ideals of the Comprehensive Plan were addressed was a critical component of this zoning plan. The following excerpt from the City's Vision Statement outlined in the Comprehensive Plan echoes the overall development vision for Glenwood Meadows.

> *"The City of Glenwood Springs desires to maintain its small town character and preserve its cultural and natural resources...to achieve directed and balanced development, social and economic diversity and address its transportation needs."*

Maintaining Small Town Character

Today, the City consists of a series of individual neighborhoods. While these neighborhoods vary in their size, appearance, and mix of uses, they all function as part of the greater community; each providing different types of housing, shops, employment, and recreational opportunities. This proposed zoning plan focuses on establishing Glenwood Meadows as a new and independent neighborhood that contributes to the small-town character of Glenwood Springs and community need for housing and commercial services. Keeping this appealing character and scale in mind, the plan is focused around a central retail core designed to invoke an intimate, pedestrian-oriented feeling enhanced by plazas, seating areas, and public art. These smaller retail uses will flank the center's two regional commercial anchors along Market Street and Wulfsohn Road, helping to create a more inviting and active space. Other spaces along Wulfsohn will provide offices and additional neighborhood-type retail to serve the adjacent neighborhoods, which will provide a variety of housing types and prices, ranging from apartments to town homes, duplexes, and single-family homes. The plan has been designed so that none of the residences are located farther than ¼ mile away from the retail core, which will give the neighborhood a friendly, walk able scale similar to that found in many of Glenwood's existing neighborhoods. A small employment campus will also contribute to the "small town" feeling of the neighborhood, providing the opportunity for individuals to live near their jobs, reducing commute time and local traffic. Hospitality uses are located across from the new Community Center where both will be easily accessed by adjoining neighborhoods and downtown. Each of the uses identified in the proposed zoning plan has been specified within the Land Use Plan as an appropriate "Regional Use", as designated for the Glenwood Meadows site.

Preserving Natural Resources

Another core community value that has been integrated into the development plan is the careful treatment of the site's natural resources. In fact, approximately 215 acres, or +/- 62 percent of the site will be dedicated as open space and parkland, providing recreational opportunities, such as hiking trails or a public golf venue. The public dedication of this significant parcel of land is specifically designed to provide direct public access to the area through sections of major contiguity with existing publicly owned property at the Community Center and MOC sites. The dedication land

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also specifically provides direct connection to the surrounding BLM land adjacent to it in compliance with the direction of the Glenwood Springs Comprehensive Plan.

The site's topography and dramatic Red Mountain backdrop make it highly visible from major roadways, such as I-70, State Highway 6&24 and the Midland Alternate Route as each enters Glenwood Springs from the east and west. Glenwood Meadows is also visible from other areas of Glenwood Springs where a higher elevation provides a birds-eye vantage of the site. A thick Gambel Oak stand, which blankets the upper 2/3's of the site providing scenic value and wildlife habitat, is another of the site's significant natural features. Each of these factors was given strong consideration in the development of the proposed zoning plan. As a result, the residential neighborhoods at the southern edge of the site have been focused below the 6000-foot Urban Development Boundary contour. Not only does this protect the scenic quality of the site, but also leaves much of the Gambel Oak stand intact.

Addressing Transportation Needs

Transportation is another component of the Land Use Plan that was an important consideration during the development of the zoning plan. The plan strives to provide a mix of uses within a walk able proximity of one another to minimize short automobile trips. However, it is acknowledged that some uses, such as the retail and employment components will draw from a more regional customer base, generating additional trips along the Midland Alternate Route. Perhaps more significant, though, is that the location of the site on the western fringe of Glenwood Springs will be serving a market that currently must travel through downtown along the often congested Grand Avenue to reach similar uses on the south side of town, or even further south in neighboring communities, potentially minimizing the need for many of these cross-town trips. The project will provide funding for several necessary road improvements along the Midland Alternate Route that will result in improved future traffic conditions. The specifics of this are addressed in the Annexation Agreement. With these proposed road improvements, an efficient traffic flow would be maintained. In addition, the compact form of the development plan was conceived with the intention of being able to efficiently incorporate future bus service and future regional rail connections into the community. The plan provides the flexibility, not to exceed 2.5 acres, at the west end of Parcel A for the construction of a park and ride/transit facility. The park and ride would be complemented by the site's retail uses and the potential for limited shared parking where appropriate.

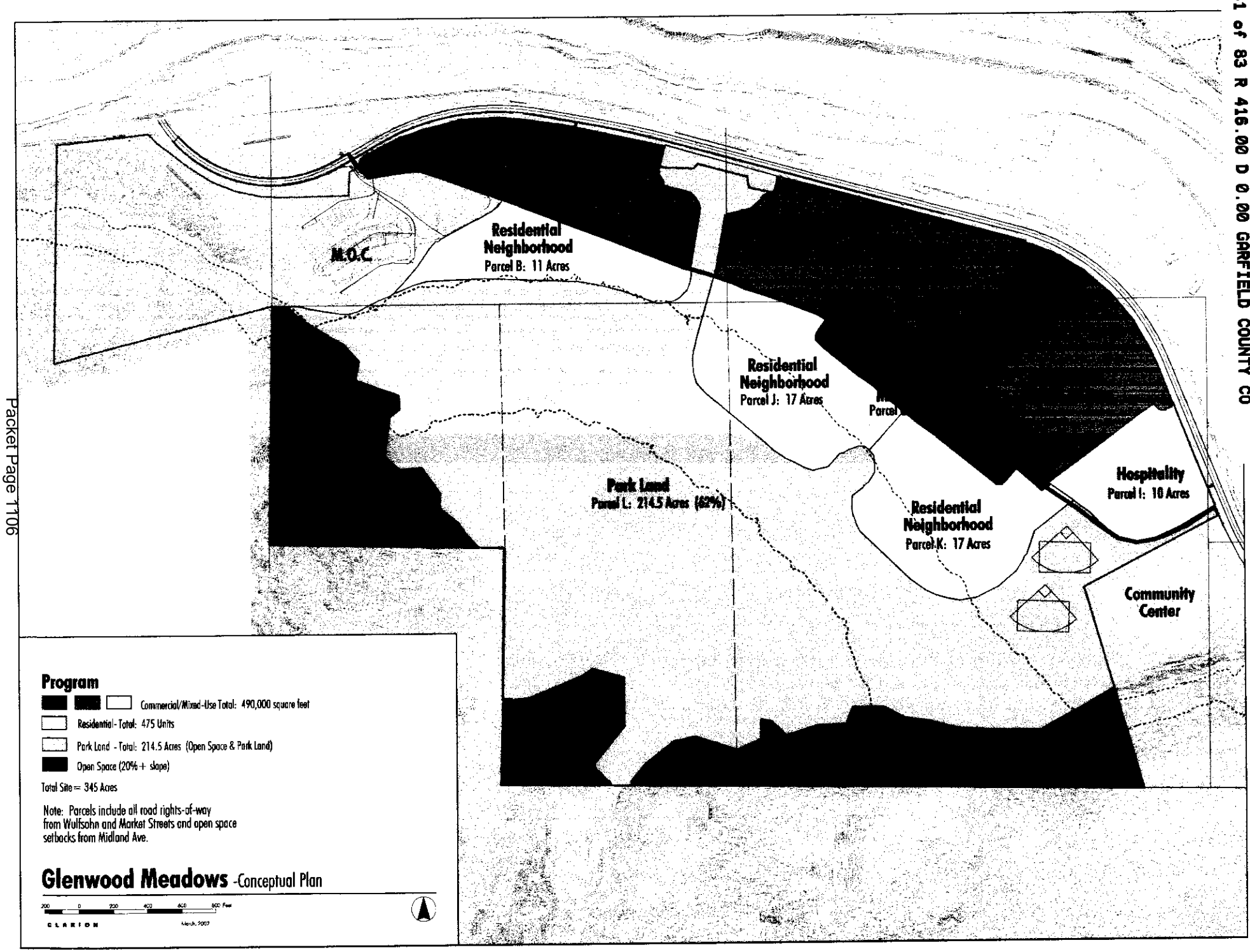
II. Authority

These standards shall apply to all property contained within the approved Glenwood Meadows Annexation Plat and the Annexation Agreement. The regulations and requirements shall become the governing standards for review, approval, and modification of all development activities occurring on the Glenwood Meadows site. Provisions of this guide shall prevail and govern the development of Glenwood Meadows superseding existing zoning ordinances. The proposed zoning regulations and design standards are intended to be more restrictive than the underlying Municipal Code standards. The Glenwood Springs zoning ordinance shall apply where the provisions of this guide do not address a specific subject.

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III. Zoning Map

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IV. Zoning Districts

There are 12 distinct parcels within Glenwood Meadows. Each of these parcels falls within one of 5 zoning categories according to the City of Glenwood's Zoning Ordinance: Multi-family Residential District (R-3), Limited Commercial District (C-1), Core Commercial District (C-2), Resort District (C-4), and Hillside Preservation (HP). The actual boundaries of the parcels may be modified during the preliminary and final design of each area, prior to approval by the City. A table of prohibited uses for each zone district is provided in the Appendix of this document.

The following table provides a brief summary of each zoning category as it applies to individual parcels identified on the zoning map on the following page:

Parcel	Zoning	Acreage	Percentage
A (Mixed-Use Campus)	C-1	20	6%
B (Residential Neighborhood)	R-3	11	3.25%
C (Commercial)	C-1	11	3.25%
D (Commercial)	C-1	12	3%
E (Mixed-Use)	C-2	7.5	2%
F (Mixed-Use)	C-2	7	2%
G (Mixed-Use)	C-2	5	1.5%
H (Commercial)	C-1	13	4%
I (Hospitality)	C-4	10	3%
J (Residential Neighborhood)	R-3	17	5%
K (Residential Neighborhood)	R-3	17	5%
L (Open Space)	HP	214	62%
TOTAL:		345	
Residential Total: 475 units Commercial Total: 490,000 square feet			

*Acreages are subject to change upon completion of final legal descriptions.

*Parcels include all road-rights-of way and open space setbacks from Midland Avenue.

V. General Development Standards

A. GENERAL INTENT

The intent of these General Development Standards is to establish an indigenous style and high level of development quality for Glenwood Meadows that is derived from and builds upon established neighborhoods in Glenwood Springs. These standards set the framework for a new, mixed-use neighborhood that strives to incorporate the most desirable features of Glenwood's most appreciated areas, such as the downtown core and it's attractive, pedestrian-friendly residential neighborhoods. In order to identify these desirable features, existing neighborhoods and developments throughout Glenwood Springs and the Western Slope were evaluated and "dissected" for successful site and building design elements. The result of this evaluation are these standards for character defining features such as appropriate building mass, scale, and materials based on lessons learned, both positive and negative. The standards also establish a cohesive pedestrian and vehicular circulation network within and between neighborhoods, a unified landscape theme for streetscapes and common open space areas, and general standards for parking, and signage. These standards have been developed to provide an additional level of quality to Glenwood Meadows, not required within the City Code, and will be applied *in addition to* those existing standards.





B. APPLICABILITY

These General Development Standards shall apply to *all* development within Glenwood Meadows, including C-1 (Commercial), C-2 (Mixed Use), C-4 (Hospitality), and R-3 (Mixed-Use Campus and Residential Neighborhoods). *These standards shall be applied in addition to standards outlined in the City of Glenwood Springs Municipal Code.*

C. SITE LAYOUT AND DEVELOPMENT PATTERN

1. Intent

The intent of these standards is to ensure that all non-residential and residential development on the site works creatively within the site's natural constraints, such as slope, geologic hazards, and significant vegetation.

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2. General

a) The siting of all buildings shall respond to existing site features to minimize the need for retaining walls, excavation, and other unnecessary site disturbances. Non-residential zones are purposefully located near primary roads on land with lesser degrees of slope.



D. BUILDING DESIGN

1. Intent

These standards are intended to encourage creative, quality commercial and residential building design that utilizes a variety of design techniques to break up larger building masses and emphasizes a pedestrian orientation at the street level.

2. Non-Residential

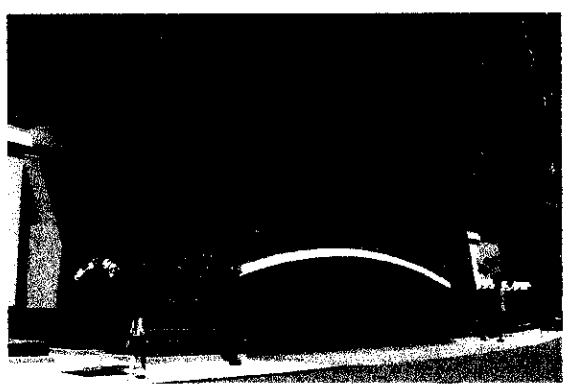
a) No single-user building footprint shall exceed a maximum of 130,000 square feet of enclosed floor area, nor shall the total useable area of any one user exceed 130,000 square feet.

b) Buildings shall have recessed, highly visible customer entrances that feature no less than 2 of the following:



(1) Canopies or porticos;
(2) Overhangs, recesses/projections;
(3) Arcades;
(4) Distinctive roof forms;
(5) Arches;
(6) Outdoor patios;
(7) Display windows;
(8) Planters or wing walls that incorporate landscaped areas and/or places for sitting.

c) For buildings less than 60,000 square feet, two or more of the following design elements shall be incorporated for each 30 horizontal feet of a building façade or wall. For buildings equal to and greater than 60,000 square feet, two or more of the following elements shall be incorporated for each 50 horizontal feet of a building façade or wall:



(1) Changes in color, texture, or materials;
(2) Projections, recesses, and reveals, expressing structural bays, entrances, or other aspects of the architecture with a minimum change of plane of 4-6 inches;
(3) Arcades or pergolas providing pedestrian interest;
(4) Trellises with vines, or
(5) An equivalent element that subdivides the wall into human scale proportions.

d) Building facades or walls that face public

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streets, adjacent developments, or connecting pedestrian frontage shall be subdivided and proportioned along 60% of their horizontal length using features such as:

(1) Windows;
(2) Entrances;
(3) Arcades;
(4) Awnings; or
(5) Other such features.

e) Parapet walls shall be incorporated when a flat roofline is required. The design or height of the parapet shall include a minimum of one change in setback or height along each 60 lineal feet of façade.

f) Sloping roofs shall have a minimum of one of following elements incorporated into their design for each 60 lineal feet of roof:

(1) Projecting gables;
(2) Hips;
(3) Horizontal/vertical breaks; or
(4) Other similar techniques.

g) Sloping roofs shall be integrated into the building architecture and shall be consistent with the characterized architectural style.

h) Sloping roofs shall be used at entries and other prominent features to add prominence. Other features intended to accent entries may be considered.

i) Intense, bright, or fluorescent colors shall not be used on any roof area visible from a public or private right-of-way or open space.

3. Residential



a) A building's special architectural features and treatments shall not be restricted to a single façade. All sides of a multi-family building open to view by the public, whether viewed from public or private property, shall display a similar level of quality and architectural interest.

b) All multi-family buildings shall be designed to provide complex massing configurations with a variety of different wall planes and roof planes. Plain, monolithic structures with long, monotonous, unbroken wall and roof plane surfaces are prohibited. At least every 50 linear feet, wall planes shall contain offsets or setbacks with a differential in horizontal plane of at least 5 feet.

c) The maximum length of a multi-family building shall be 125 feet.

d) All elevations on multi-family buildings shall contain windows.

An eave or overhang of at least 12-inches shall be provided on the perimeter of all residential buildings, except gable roof ends, where an 8-inch overhang shall be required.

For additional specificity, see Section X.

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E. BUILDING MATERIALS

1. Intent

The intent of these standards is to establish a palette of high-quality building materials to be used to add texture, color, and visual interest to the overall development.

2. Non-Residential

a) One or more of the following building materials shall be incorporated into a structure's design:

(1) Stucco;
(2) EIFS (Exterior Insulation and Finish Systems);
(3) Brick;
(4) Stone (cultured and natural);
(5) Tinted, textured and integral color masonry block.

b) Exterior building materials shall not include the following:

(1) Smooth-faced gray concrete block, painted concrete block, tilt-up concrete panels;
(2) Field-painted or pre-finished standard corrugated metal siding; or
(3) Standard single or double tee concrete systems.



c) Ribbed metal siding is prohibited as a primary exterior surface material. It may be used as trim material covering no more than 10% of the façade.

d) Exterior building material shall be continued down to within 9 inches of finished grade on any elevation.

e) High-intensity primary, metallic, or fluorescent colors are prohibited on any roof area visible from any public or private property.

f) All sloping roof areas with a pitch of 3:12 or greater, and visible from any public or private right-of-way, shall be surfaced with attractive and durable materials such as:

(1) Concrete, clay, or slate tiles; or
(2) Seamed architectural metals such as tin or copper; or
(3) Asphalt shingles.

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3. Residential

a) One or more of the following building materials shall be incorporated into a structure's design:

(1) Split shakes;

(2) Rough-sawn wood; or

(3) Board and batten wood.

b) Exterior building materials shall not include the following:

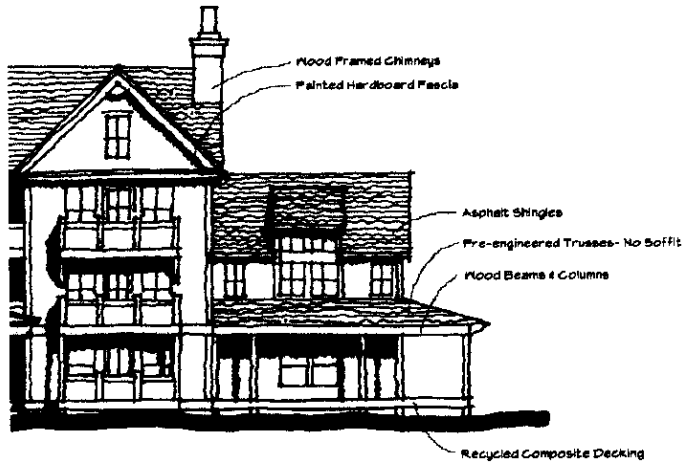
(1) Concrete block (including split face and ground face block), or

c) High-intensity primary, metallic, or fluorescent colors are prohibited on any roof area visible from any public or private property.

d) All sloped roofs visible from the ground or from a surrounding property shall be clad with one of the following:

(1) High profile composition shingles; or

(2) Seamed architectural metals.



F. VEHICULAR AND PEDESTRIAN CIRCULATION AND ACCESS

1. Intent

The intent of these standards is to create a hierarchy of streets within Glenwood Meadows that efficiently facilitate traffic flow, yet are designed to discourage speeds and volumes that impede pedestrian activity.



2. Vehicle Access and Circulation

a) Traffic calming devices, such as bulb-outs or curb extensions, traffic calming circles, and narrower street widths shall be used in residential neighborhoods to discourage through traffic and excessive speeds.

b) To the maximum extent feasible, common or shared service and delivery access shall be provided between adjacent parcels and/or buildings.

c) Internal vehicle circulation patterns shall provide a clear and direct path to the principal entrance of the primary building, to outlying pad sites where applicable, and to each parking area.

d) Internal vehicle circulation patterns shall provide the most direct vehicular route(s) between the development site's main entrance and the primary building's main customer entrance.

e) Main drive aisles shall be continuous and connect to the main entrance to the development site.

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f) Internal intersections shall have adequate sight lines, design geometrics, and/or traffic controls to minimize accident potential.

3. Pedestrian Access and Circulation



a) Continuous sidewalks or trails shall provide connections to and between:

(1) The primary entrance or entrances to each building, including pad site buildings;

(2) All parking lots or parking structures that serve such buildings;

(3) Any sidewalks or walkways on adjacent properties that extend to the boundaries shared with the development;

(4) Any public sidewalk system along the perimeter streets adjacent to the development;

(5) Adjoining land uses;

(6) Any greenway on or adjacent to the property; and

(7) Other community amenities or gathering spaces.

b) Covered shelters shall be provided at transit shuttle sites in locations as determined by the landowner and the City.

G. PARKING

1. Intent

The intent of these standards is to minimize the visual impacts of large blocks of parking, both from within the development and from other areas of Glenwood Springs that, because of their higher elevation, view Glenwood Meadows from above, by breaking it into a series of smaller "rooms". These rooms may be defined by landscaped medians, pedestrian walkways, or tree plantings.

2. General

a) Parking quantities shall be no less than current city requirements, unless specifically noted otherwise.

b) Structured parking is strongly encouraged. Incentives shall be provided to the maximum extent feasible.



c) To the maximum extent feasible, parking shall be distributed between the front, sides, and rear of a building to further break up large parking areas.

d) In addition to the above standard, the visual appearance of parking blocks shall be further mitigated through the establishment of a shady canopy created by orchard plantings or regularly spaced tree diamonds within each parking block.

e) The use of terracing to further break up parking areas is strongly encouraged where grade changes allow. Where terracing is utilized, the standards for retaining walls and

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terracing outlined in Section V.H.6, shall be applied.

f) The above standards shall be applied in addition to the standards outlined in Section V.H. Landscaping and Screening.

H. LANDSCAPING AND SCREENING

1. Intent



The intent of these standards is to provide a high quality appearance for building sites, rights-of-way, parks, and open spaces within Glenwood Meadows. These standards exceed City of Glenwood requirements in some cases in order to enhance the appearance and pedestrian-oriented feeling of all development in Glenwood Meadows. For instance, additional landscape coverage is required for parking areas in order to ensure that the visual impacts of parking on this highly visible site are adequately mitigated by generally improving the appearance of these areas from both within the site and from surrounding neighborhoods with a birds-eye view of Glenwood Meadows. In addition, the spacing of required street tree plantings are significantly smaller that those required in the City Code. This again, is in intended to further enhance the appearance of the overall project and to create an inviting environment for pedestrians.

2. General

a) All landscape areas shall comply with City of Glenwood Springs Municipal Code in addition to these regulations.

b) Landscape architectural design elements shall relate to the physical site and built structures. A combination of evergreen plantings and other landscape elements, as defined in Table 1-Landscape Requirements, shall be used to screen and buffer service areas, mechanical features and break up large lengths of building walls.

c) Unless prohibited by a particular site's geologic mitigation requirements, building foundations shall be planted with ornamental plant material, such as ornamental trees, flowering shrubs and perennials, and ground covers and shall include a variety of plant materials to provide year round interest.

d) Development entryways shall be planted with ornamental plant material, such as ornamental trees, flowering shrubs and perennials, and ground covers.

e) Planting shall be massed and scaled as appropriate for the entryway size and space.

f) Landscaping shall break down in scale and increase in detail, color, and variety to mark entryways into developments.

g) All turf areas within individual sites shall be established by sodding. Un-manicured natural areas may be seeded when adjacent to open space as a transition to turf areas.

h) Due to the site's soil conditions and the arid nature of the Glenwood climate, xeric or low-water plant materials shall be required.

i) The use of the following xeriscape principles shall be required:

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(1) Grouping plants with similar water requirements together;
(2) Utilizing mulch and soil amendment to reduce irrigation requirements;
(3) Utilizing drip irrigation where possible to minimize run-off from sprinklers; and
(4) Restricting the amount of water comsumptive sod.

i) Irrigation systems shall be professionally designed to limit water consumption. The use of moisture sensors to reduce water consumption shall be encouraged.

k) Each owner or owner's association shall be responsible for the maintenance and repair of all site landscaping, including common open space areas.

l) Landscaping and maintenance shall comply with the Glenwood Meadows Geotechnical Mitigation Requirement.

3. Streetscape Improvements

a) Landscaping, decorative paving, and/or other site amenities shall be required to promote and enhance a comfortable pedestrian scale and orientation of the property.



b) The property between curb and the adjacent property line shall be landscaped according to Table 1-Landscape Requirements or paved with decorative paving in heavily used pedestrian areas, such as Market Street and Wulfsohn Road, or be treated with some combination of the two alternatives. Approval of all paving materials shall be subject to review by the Architectural Review Committee.

c) Streetscape shall be developed in a consistent manner and be reviewed as part of the overall development permit, if areas within the pod are developed separately, the design shall be consistent with that previously approved.

d) Trees selected from the plant list in this document shall be required within the back of curb landscaping strip. Such trees shall be planted every 40 feet maximum on center or depending on species at some other distance to ensure their proper spacing so as to develop a continuous canopy when mature.

e) Streetscape plantings shall be provided according to Table 1-Landscape Requirements. Variations in the tree species used from street to street are encouraged to avoid creating monocultures of trees. Landscape in the right-of-way and on individual sites is subject to review by the City of Glenwood Springs and any Design Review Committee of an owner's association.

4. Site Furnishings

a) Site furnishings, including, but not limited to: benches, seating, trash receptacles, bike racks, lighting fixtures and tree grates shall be incorporated with the theme of the building's architecture. All materials shall be considered and approved by any Design Review Committee of an owner's association and be in conformance with the City of Glenwood Springs Standards and these regulations.

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5. Parking Lot Landscaping

a) For lots with less than 20 spaces, a minimum of 10 percent of the total uncovered parking area, including access ways, shall be devoted exclusively to landscaping. For lots with twenty or greater spaces, a minimum of 20 percent of the total uncovered parking area, including access ways, shall be devoted exclusively to landscaping.

b) Required parking area interior landscaping shall be distributed in such a configuration so as to divide groups of parking spaces. No grouping of parking spaces shall exceed 8 in a row.

c) Parking lot edges shall be screened from public streets and sidewalks, public open space, and adjacent properties.

d) Landscaped islands shall be planted with ground cover or sod and a minimum of 2 deciduous trees (minimum caliper of 3 inches) per 200 square feet of landscaped island area.

e) Where a landscaped setback of at least 25 feet is not present, the perimeter of all parking lots shall be screened from adjacent streets, public sidewalks, and adjacent uses, with the exception of the area reserved as a site triangle at intersections, by either of the following methods:

(1) A berm 3 feet high with a maximum slope of 2:1 in combination with coniferous and deciduous trees and shrubs, as specified in table V.H.9.a, or

(2) A low continuous landscaped hedge at least 3 feet high consisting of a double row of shrubs planted 3 feet on center in a triangular pattern; or

(3) A low decorative masonry wall at least 3 feet high in combination with landscaping; or

(4) A combination of any of these methods.

f) Non-living ground cover, such as wood, bark, and rock mulches, decorative stone, brick or concrete paving, shall not exceed 20 percent of the required landscaped area.

6. Retaining Walls

a) Use of designed retaining walls shall be encouraged to reduce the slope and to provide planting pockets or terraces for revegetation and landscaping.

b) Retaining walls may be permitted to support slopes but shall not exceed 10 feet in height in commercial areas or 6 feet in height in residential areas from the finished grade without stepping back a minimum of 3 feet between walls to create a terraced effect.

c) No more than three tiers of retaining walls, as described above, shall be permitted to create terracing on a slope. Terraces created between retaining walls shall be permanently landscaped or revegetated and shall not exceed a 2:1 slope.



d) Retaining walls shall be constructed of or faced with stone or earth-colored materials, or a material compatible with the primary building materials. Railroad ties, timber, and gabion-type retaining walls are prohibited. Retaining walls shall not exceed 50 feet in length without providing an offset at least 12 inches.

e) All exposed retaining walls shall be textured or colored.

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7. Detention/Retention Ponds/Debris Channels

a) Detention/retention ponds and debris channels shall be visually integrated into the surrounding landscape.

b) Embankment slopes shall not exceed a 2:1 ratio.

8. Plant Materials

a) To meet the above standards, Plant Materials shall be chosen from the Plant List provided in the Appendix of this document. Xeric or low-water plant materials shall be utilized to the maximum extent feasible.

9. Landscape Requirements

a) For the purposes of meeting the requirements in the table below, appropriate screening shall mean plant material, a low wall, or combination to provide an opaque barrier between the street and the adjoining use to be screened.

Use	Residential Neighborhood	Mixed-Use	Commercial	Hospitality	Mixed-Use Campus
Required Open Space	40%	15%	15%	30%	30%
Open Space Planting	▪ 1 tree/1200 s.f. ▪ 4-shrubs/1200 s.f.	▪ 1 tree/500 s.f. ▪ 4-shrubs/500 s.f.	▪ 1 tree/1000 s.f. ▪ 4-shrubs/1000 s.f.	▪ 1 tree/1000 s.f. ▪ 4-shrubs/1000 s.f.	▪ 1 tree/1000 s.f. ▪ 4-shrubs/1000 s.f.
Setbacks Buffers Screens	▪ 1 tree/25 l.f. ▪ 1/3 deciduous 2/3 evergreen ▪ 10 shrubs/25 l.f	▪ 1 tree/25 l.f. ▪ 1/3 deciduous 2/3 evergreen ▪ 10 shrubs/25 l.f	▪ 1 tree/25 l.f. ▪ 1/3 deciduous 2/3 evergreen ▪ 10 shrubs/25 l.f	▪ 1 tree/25 l.f. ▪ 1/3 deciduous 2/3 evergreen ▪ 10 shrubs/25 l.f	▪ 1 tree/25 l.f. ▪ 1/3 deciduous 2/3 evergreen ▪ 10 shrubs/25 l.f
Midland Avenue ROW	N/A	▪ 1tree/40 l.f. ▪ Irregular spacing	▪ 1tree/40 l.f. ▪ Irregular spacing	▪ 1tree/40 l.f. ▪ Irregular spacing	▪ 1tree/40 l.f. ▪ Irregular spacing
Wulfson Road ROW	▪ 1tree/35 l.f. ▪ Irregular spacing	▪ 1tree/35 l.f. ▪ Regular spacing	▪ 1tree/35 l.f. ▪ Irregular spacing	▪ 1tree/35 l.f. ▪ Irregular spacing	▪ 1tree/35 l.f. ▪ Irregular spacing
Internal Neighborhood Streets	1 deciduous tree/35 l.f. Evenly spaced	▪ 1 deciduous tree/40 l.f. Evenly spaced	▪ 1 deciduous tree/35 l.f.	▪ 1 deciduous tree/35 l.f.	▪ 1 deciduous tree/35 l.f.

Table 1—Landscape Requirements

I. SERVICE AREA AND MECHANICAL/UTILITY EQUIPMENT SCREENING

1. Intent

The intent of these standards is to minimize the visual and noise impacts created by service areas and mechanical equipment on surrounding uses and neighborhoods from public rights-of-way, surrounding high elevation neighborhoods, and adjacent uses within Glenwood Meadows.

2. Service Areas

a) No areas for outdoor storage, trash collection or compaction, loading, or other such uses shall be located within 20 feet of any public street, public sidewalk, or internal pedestrian

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walkway.

b) Loading docks, truck parking, outdoor storage, trash collection, trash compaction, and other service functions shall be incorporated into the overall design of the building and landscaping so that the visual and acoustic impacts of these functions are fully contained and out of view from adjacent properties and public streets.

c) Screening materials shall be the same as, or of equal quality to, the materials used for the primary building and landscaping.

3. Mechanical/Utility Equipment

a) Mechanical/utility screening shall be an integral part of the building structure and architecture and not give the appearance of being "tacked on" to the exterior surfaces.

b) All mechanical, electrical, and communications equipment, including but not limited to air-conditioning, heating and soft water tanks, television antennas, satellite dishes, security apparatus, transformers, electric and gas meters, shall be integrated into the building design, screened from public view, or when appropriate, enclosed in a suitable structure.

c) Roof-mounted equipment shall be contained within a completely enclosed structure. Such structure shall be an integral part of the building's architectural design and shall use materials compatible with those used on the façade of the building. However, if it can be demonstrated that the roof mounted equipment shall be screened or shall be placed such that the equipment can not be viewed or silhouetted in profile from public vantage points and neighboring properties, this may be considered as an alternative by the City.

d) Roof mounted equipment shall be clustered to the maximum extent feasible.

e) Roof mounted equipment shall utilize neutral colors and/ or materials that are compatible with adjacent natural or constructed colors.

f) A decorative wall constructed of materials compatible with the overall architectural design of the development and softened with landscaping shall screen ground-mounted equipment.

J. OPEN SPACE AND PARKS

1. Intent

The intent of these standards is to provide an interconnected network of open spaces and parks within non-residential and residential areas of Glenwood Meadows as well as to provide a high level of visual interest and a variety of recreational and leisure opportunities within a short walk of each residence in Glenwood Meadows.

2. General

a) Open spaces and parks within Glenwood Meadows shall include traditional, urban gathering spaces such as a village green, plaza, or town square in addition to a network of pathways and informal trails that help integrate the built environment of the neighborhood with adjacent open space and the natural environment. Appropriate locations for the above amenities shall be determined in part by the type of use they are integrated with.

b) Existing trees and vegetation shall be preserved whenever possible to act as buffers between adjoining developments and as site amenities within the neighborhood.

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3. Non-Residential

a) Outdoor Spaces

(1) Pedestrian-oriented outdoor spaces shall be placed near activity generating uses, such as street corners, shops, stores, offices, day care, and dwellings.

(2) To the maximum extent feasible, outdoor spaces shall be linked and visible from streets and sidewalks.

(3) Sculpture, fountains, kiosks, or shelters shall be prominently placed in outdoor spaces.

(4) In developments with multiple buildings, outdoor spaces and landscaped areas shall be integrated into an overall open space system in conjunction with streets and connections and not merely assembled from residual land remaining after buildings and parking lots have been sited.



b) Community Amenities

(1) A minimum of 1,000 s.f. of community amenities, open areas, and public gathering places per 50,000 s.f. of Commercial building area or a percentage thereof. This shall be considered a component of the landscape requirements as referenced in Section H.9.Community amenities may consist of any of the following:

(a) Patio or plaza with seating area;
(b) Mini-parks, squares, or village greens;
(c) Water feature,
(d) Clock tower;
(e) Public art;
(f) Any other, similar deliberately shaped area and/or focal feature that, in the City's judgment, adequately enhances such community and serves as a gathering place.

(2) All community amenities within a commercial development shall be an integral part of the overall design and within easy walking distance of major buildings, major tenants, and any transit stops.

4. Residential

a) Common Open Space

(1) Common open space shall be organized to create integrated systems of open space that connect with the following types of lands located within or adjacent to the development:

(a) Dedicated public park or greenway lands;
(b) Other dedicated open spaces;
(c) Common open space located within or adjacent to the development;
(d) Portions of the trail and open space system;
(e) Neighborhood retail and commercial centers; and
(f) Adjacent employment centers.

Common open space with pedestrian access shall be reasonably accessible to all of the residents of the Glenwood Meadows:

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(2) Where provided, access to common open space shall be a minimum of six feet wide and shall be located where such access is visible to dwelling units and shall not be isolated by walls, screening, landscaping, or any other kind of barrier that would prevent resident surveillance of the open space.

(3) If an applicant constructs recreational facilities in the common open space as a community amenity, such recreational facilities shall be constructed in accordance with applicable city standards regarding, but not limited to, size, siting, use, materials, and similar matters.

(4) Where common open space is bordered by private rear or side yards, opaque fences and walls shall not be erected in such yards bordering the open space. Open style fences, with a maximum 50% opacity (e.g., post and rail), shall be allowed on the perimeter of open space.

b) Parks

(1) One neighborhood park shall be provided within each residentially zoned parcel or "neighborhood". Each park shall be at least 1acre in size.

(2) Each neighborhood park shall be located where the network of local streets provides access and where direct pedestrian and bicycle access are provided from adjacent uses.

(3) Neighborhood parks shall be located in a visible, secure setting that is easily observed from streets. Rear facades of multi-family dwellings that do not contain building entrances shall not abut more than two sides of the park's perimeter.

(4) Each neighborhood park shall contain one or more of the following features:

(a) Multi-use areas;
(b) Community gardens;
(c) Walking paths;
(d) Plazas;
(e) Pavilions;
(f) Picnic tables;
(g) Benches; or
(h) Other similar features for various age groups to enjoy.

K. SIGNAGE

1. Intent

The intent of these standards is to provide consistent, high quality signage for Glenwood Meadows. All signage must be reviewed and approved by the Architectural Review Committee prior to permit application and must conform to all City of Glenwood Springs standards.

2. General

a) Each building group, user, or tenant shall be allowed at least one sign on the primary storefront elevation, providing such signage meets these standards and does not exceed the ordinance and requirements of the City of Glenwood Springs.

b) Signage placed at locations other than site locations and/or storefront elevation (such as rear and side wall locations) shall be considered provided that the total square footage allowance of all signage does not exceed the total aggregate area allowed by requirements of the City of Glenwood Springs Code.

c) All attachment devices, wiring, clips, transformers, lamps, tubes, and other mechanisms for signs shall be concealed.

d) Permanent signage may be illuminated providing it is designed so the source is not visible.

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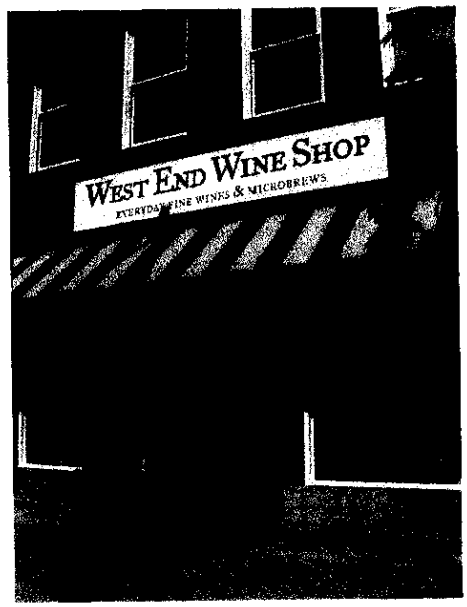
Individual internally lit channel letter signs or accent lighting, which is incorporated to enhance the signage, is acceptable. All signage lighting shall conform to lighting standards provided by the City of Glenwood Springs.

e) Each tenant shall provide signage at its expense and shall apply for and obtain their individual signage permits and approvals from the City of Glenwood Springs.

3. Freestanding Signs

a) No individual sign shall exceed 200 square feet in area nor shall the total sign area of any tenant exceed 600 square feet.

b) The placement of all signs shall be based on visibility and legibility. All freestanding identification signs shall be integrated into the surrounding landscape with good visibility to approaching vehicular traffic.



c) All freestanding signs shall be set back a minimum of 10 feet from the edge of curb and/or property line and six feet from all sidewalks.

d) Freestanding signs shall not be placed within the site triangle of an intersection as defined in the City of Glenwood Springs Code.

e) The information contained on freestanding identification signs shall be limited to company and corporate logos, and may include building names and addresses.

4. Regulatory Signs

a) The basic design and mounting heights of regulatory signs shall follow Federal Highway Administration standards.

5. Building Mounted Signage

a) Building mounted signage shall be allowed only for commercial developments for the specific purpose to provide identification to the tenant.

b) Signage style shall be as approved by the Architectural Review Committee.

6. Colors and Materials

a) The Architectural Review Committee shall consider all colors for approval.

7. Informational/Directional

a) Informational/directional signs shall be designed to conform to the proportions shown in these guidelines and shall not have a sign face which exceeds 20 square feet.

b) The number of informational/directional signs may vary by site, but shall be sufficient to accommodate both vehicular and pedestrian traffic.

c) Informational/directional signs for motorists shall be located between 100 and 200 feet from intersections.

d) Signs for pedestrians shall be placed at decision points in parking lots, in plazas, and where highly traveled walkways intersect.

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L. LIGHTING

1. Intent

The intent of these standards is to ensure that building, site, street, and signage lighting is sensitive to adjoining uses and is compatible with the overall development character in terms of scale and design.

2. General

a) All development shall by in compliance with the City of Glenwood Spring's Lighting Standards or comparable document as provided by the City.

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VI. Development Standards: Parcel "A", Mixed-Use Campus (C-1)



A. GENERAL INTENT

The intent of these standards, when combined with the General Development Standards, is to provide a framework for the development of a quality office and business park for Glenwood Springs. The Campus is envisioned to accommodate a variety of office, research and development activities in addition to complementary secondary uses such as restaurants, convenience shopping, childcare and housing. Additionally, the Campus is intended to function as an integral part of the overall Glenwood Meadows development, providing a range of employment opportunities for nearby residents.

B. APPLICABILITY

These standards shall apply to all development within Parcel "A", Mixed-Use Campus as defined on the accompanying Zoning Map. These standards shall be applied in addition to standards outlined in Section V., General Development Standards and in the City of Glenwood Springs Municipal Code.

C. SITE LAYOUT AND DEVELOPMENT PATTERN

1. Intent

The intent of these standards is to encourage the creation of a park-like campus environment within the mixed-use campus zone and to ensure that non-residential uses within the mixed-use campus environment provide appropriate height and scale transitions to adjacent or adjoining residential uses.

2. General

a) All uses shall be carried out within completely enclosed buildings or structures, except for off-street parking and loading areas.

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3. Landscaping

a) All open space areas shall be landscaped according to Table 1-Landscape Requirements.

D. BUILDING DESIGN

1. Intent

The intent of these standards is to create a cohesive, office park environment through the use of common materials, architectural features, and colors.

2. General

a) See Section V. General Development Standards.

3. Orientation

a) Buildings shall be oriented towards the adjacent street or towards the center of a campus or park-like development block with an internal framework of outdoor spaces or connecting walkway.

4. Transition

a) Buildings abutting a residential area shall provide a gradual transition in height and scale to minimize conflicts between uses.

E. MIX OF USES

1. Intent

The intent of these standards is to provide general standards for appropriate percentages and locations of supporting uses within the mixed-use campus environment. Secondary uses are envisioned to include restaurants, convenience shopping, childcare, housing, or similar uses to complement primary office and research and development activities.

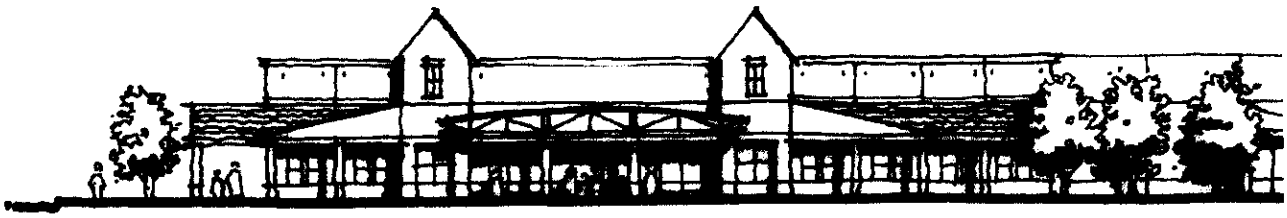
2. General

a) All supporting uses shall be visually and functionally integrated into an overall plan that emphasizes the primary uses of office and employment uses.

b) Retail uses shall not occupy more than 25 percent of the total gross area of the zone district.

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VII. Development Standards: Parcels "C", "D", and "H"-Commercial (C-2)



A. GENERAL INTENT

The intent of these standards is to achieve a high quality, pedestrian-friendly commercial core within Glenwood Meadows. This core will be anchored by large format retail anchors such as a grocery store and/or discount store and will be supplemented with a variety of smaller retail businesses. The purpose of this zone district is to serve both the needs of regional consumers for goods and services and the day-to-day needs of the surrounding residential neighborhoods in a functional and inviting environment that strays from the typical auto-oriented designs found in many commercial centers. The district is intended to function as an integrated center of activity within the overall Glenwood Meadows development through the establishment of clear pedestrian and vehicular circulation patterns and through transitions in the scale and character of development where they abut adjacent uses.

B. APPLICABILITY

These standards shall apply to all development within Parcels "C", "D", and "H", Commercial as defined on the accompanying Zoning Map. *These standards shall be applied in addition to standards outlined in Section V., General Development Standards and in the City of Glenwood Springs Municipal Code.*

C. SITE LAYOUT AND DEVELOPMENT PATTERN

1. Intent

The intent of these standards is to ensure that primary and secondary retail uses utilize careful building placement and orientation to create and enhance an active, attractive, pedestrian environment within the commercial core of Glenwood Meadows. Primary Commercial Buildings will serve as "anchors" for the commercial and mixed-use zones. These larger uses will be flanked by a variety of supporting, pedestrian-oriented retail storefronts and secondary commercial uses located on pad sites. The siting and design of smaller retail stores, or "pads," can create a more inviting appearance along Midland Ave and with in the neighborhood by visibly reducing the project's scale and by expanding the range of activities and businesses found within the neighborhood. The location, orientation of the entry, and architecture of pad site buildings also provide opportunities to frame the entry into the neighborhood and contribute to the development's visual interest by placing storefront spaces closer to the street and creating a street scene. Accordingly, pad site structures shall be compatible with the main buildings on a commercial site. The layout of pad site buildings shall relate coherently to the public streets and surroundings (outward) as well as to the main center (inward), and specific siting decisions shall further the general intent of creating a "sense of place," focal points,

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community amenities, and arrival into the commercial center.

2. General

a) See Section V. General Development Standards.

b) Pad Sites The primary façade of a building located on a pad site, typically the façade containing the primary customer entrance, may be oriented in a variety of ways, including:

(1) Toward the primary access street;
(2) Toward an internal "main street";
(3) Framing a primary entrance to the development or center;
(4) Toward the side (especially when that side faces another pad site building); or
(5) Toward the interior of the center.

c) Regardless of primary orientation, all sides of a pad site building that directly face and have access to a public street shall contain a customer entrance.

d) Pad sites shall be clustered together to define street edges and entry points or to enclose and create community amenities and visual interest between buildings.

e) Wherever practicable, spaces between adjacent pad site buildings shall be improved to provide small pockets (preferably heavily landscaped) of customer parking, pedestrian connections, small-scale project amenities, or focal points. Examples include, without limitation:

(1) A landscaped pedestrian way linking customer entrances between two or more pad site buildings;
(2) A public seating or outdoor eating area;
(3) An area landscaped with living materials emphasizing 4-season colors, textures, and varieties; or
(4) Sculptures or fountains.

D. BUILDING DESIGN

1. Intent

The intent of these standards is to ensure that the design of buildings located in parcels "C", "D", and "H", present a cohesive appearance through the use of common materials, architectural features, and colors.

2. General

a) See Section V. General Development Standards.

b) Pad site buildings and other accessory uses shall incorporate a similar façade and building design as those on the primary commercial building(s) in the zone district, including:



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(1) Exterior building materials;
(2) Roofline or roof materials;
(3) Façade colors;
(4) Pedestrian entry locations and entryway architecture/design;
(5) Amounts of glazing on facades visible from public streets; and
(6) Other distinctive architectural features.

c) Pad site buildings and other accessory uses shall select their exterior building materials from the material palette used on the primary commercial building(s).

3. Large Format Commercial

a) Large format commercial buildings of 60,000 square feet or greater shall have a minimum of one side of the building "wrapped" with independent retail storefronts. Uses adjoining Market Street shall "wrap" the edge closest to the street to help establish a pedestrian-oriented environment and create a transition to the mixed-use zone along Market Street, as discussed in Section VIII.

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VIII. Development Standards: Parcel "E", "F", "G"-Mixed-Use (C-2)

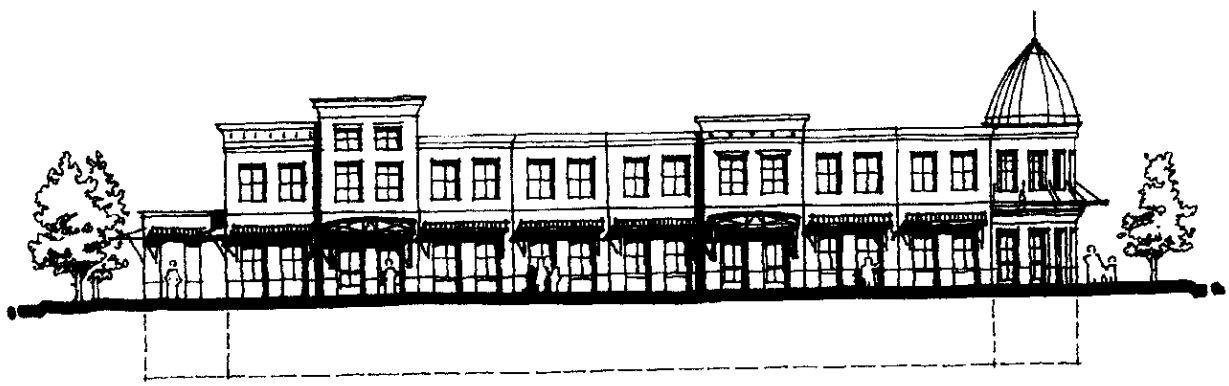
A. GENERAL INTENT

The intent of these standards is to create the framework for a pedestrian-oriented neighborhood retail street that will serve as the focal point for Glenwood Meadows. Oriented along a key connection between Midland Avenue and Wulfsohn Road, Market Street will be defined by a variety of smaller-scale retail shops and restaurants and will be designed with the pedestrian in mind. Storefronts will frame the broad sidewalk, while outdoor seating, landscaping, fountains, and other amenities will combine to create an inviting destination for nearby residents and retail customers alike. Diagonal parking will line either edge of the street, further enhancing the comfortable, pedestrian-oriented feeling by creating a buffer between outdoor activity and through traffic.



Market Street

Along the north side of Wulfsohn Road, bi-level structures will be used to help accommodate a transition in grade between larger commercial uses below and uses at grade with Wulfsohn Road. A variety of retail, offices and flex spaces, and upper-story residential will complement uses along Market Street and on the south side of Wulfsohn Road. Upper stories also help screen views from residential neighborhoods stepping up the hillside over large format uses below. Lower level uses will be oriented towards adjacent commercial and retail while primary uses located on the upper level along Wulfsohn Road will be oriented towards the street and the adjoining neighborhood. Buildings will be pulled up to the sidewalk to create a defined edge along the broad sidewalk. Off-street parking will be focused behind buildings to the extent feasible to enhance the pedestrian nature of the street and diagonal or parallel parking will be provided along Wulfsohn Road. Wulfsohn Road shall be designed to accommodate on-street bicycle circulation.



Wulfsohn Road

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On the south side of Wulfsohn Road, the zone takes on a more neighborhood-oriented character; with small-scale first floor retail uses lining the street and the opportunity for upper-story residences. The addition of residential uses within the zone would provide a transition between commercial uses to the north and residential neighborhoods to the south and provide attainable options within an already varied mix of housing products. This also provides opportunities for live/work units if desired and creates more of an active street environment. The pedestrian nature of the street along Wulfsohn Road provides opportunities for pedestrian-oriented uses such as sidewalk cafes.

B. APPLICABILITY

These standards shall apply to all development within Parcels "E", "F", and "G", Mixed-Use as defined on the accompanying Zoning Map. *These standards shall be applied in addition to standards outlined in Section V., General Development Standards and in the City of Glenwood Springs Municipal Code.*

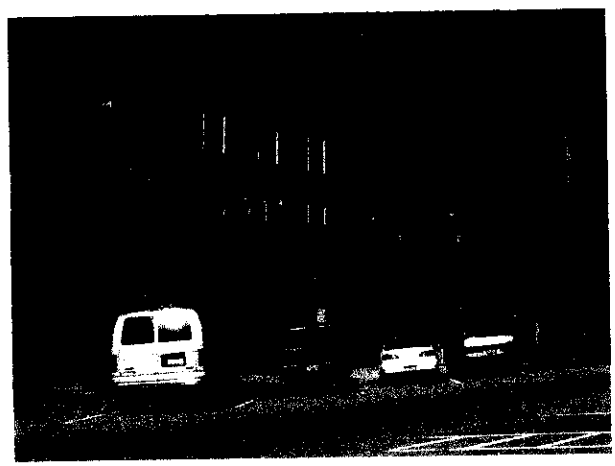
C. SITE LAYOUT AND DEVELOPMENT PATTERN

1. Intent

The intent of these standards is to ensure that building placement, setbacks, and orientation support the creation of a pedestrian scaled neighborhood retail street to serve as the retail core of the larger commercial development and Glenwood Meadows as a whole.

2. General

a) Compatible uses (i.e., office building and a movie theatre) shall explore opportunities for shared-use parking to minimize overall space requirements for parking.

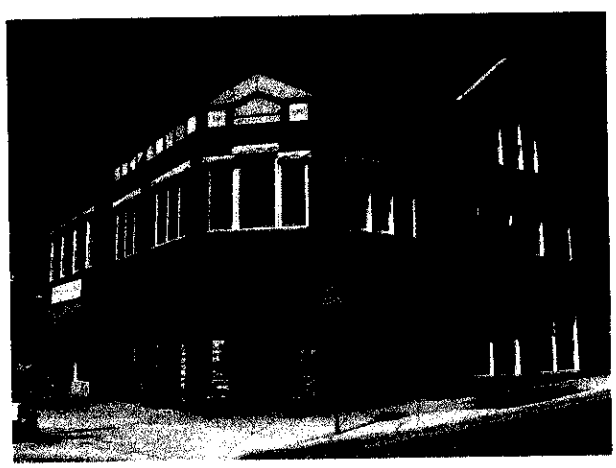


3. Mix of Uses

a) Each pod of development within the zone shall contain at least 2 of the following uses:

(1) Residential;
(2) Retail; or
(3) Office.

b) A minimum of 20 residential units shall be provided within the E, F and G mixed use parcels.

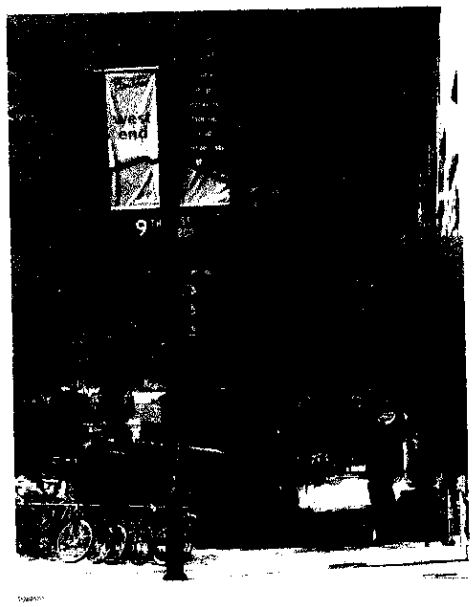


4. Location of Parking along Market Street and Wulfsohn Road

a) Parking shall be angled or parallel on-street parking.

b) Off-street parking shall not be permitted between buildings and either Market or Wulfsohn.

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5. Building Setback from Market Street and Wulfsohn Road

a) There shall be no minimum front, rear, and side yard setbacks required to promote a more urban, pedestrian-oriented environment along the street, provided local building code requirements are met.

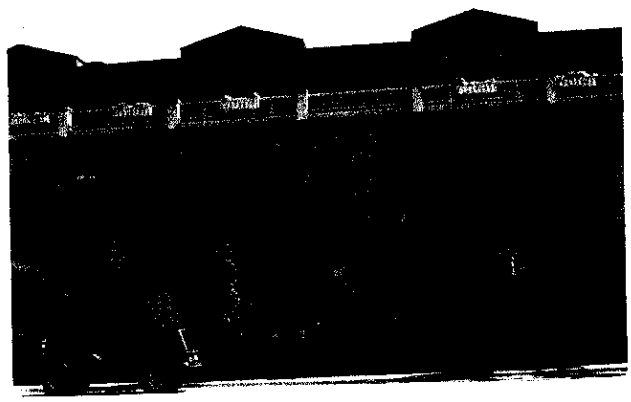
b) Should retail be constructed in phases, the front setback of later structures shall be built to equal the average setback of those structures already in place.

c) Buildings at the corners of Market Street and Wulfsohn Road shall be anchored, or brought up to meet the sidewalk edge and shall utilize a similar scale and massing as other buildings along the street edge.

6. Building Orientation

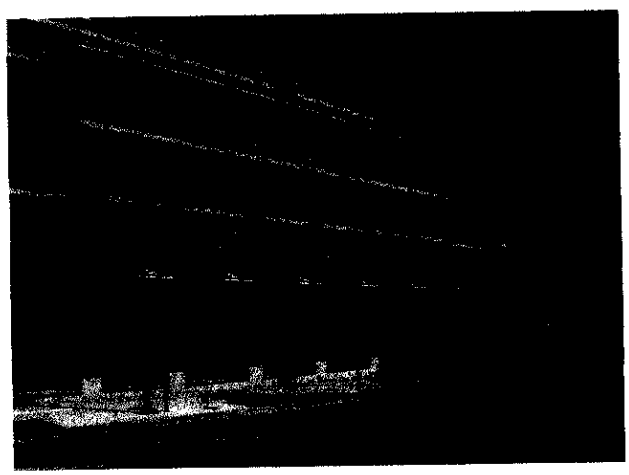
a) All buildings and building entries shall be oriented towards the primary street.

b) New buildings shall be aligned with existing buildings located across the intersecting streets to "complete" the space around the corner and create visual continuity.



7. Sidewalk Width

a) Sidewalk widths shall be a minimum of 10 feet along Market Street and Wulfsohn Road in order to provide ample space for outdoor seating and smooth pedestrian movement.



D. BUILDING DESIGN

1. Intent

The intent of these standards is to create a pedestrian-oriented feeling for the facades of retail establishments along Market Street and along Wulfsohn Road.

2. General

a) See Section V. General Development Standards.

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3. Building Height

a) Buildings shall be a minimum of 2 stories in height along the street edge. However, in order to create an active street environment along Market Street, especially at the intersection of Market St. and Midland Ave., portions of building or key buildings may be less than 2 stories if it can be demonstrated that the establishments add to the vitality of the street environment.

b) Along the north edge of Wulfsohn Road, buildings may need to be 3 stories in height to accommodate changes in grade and meet the above requirement.

4. Façade Articulation

a) One or more of the following design elements shall be incorporated for each 25 horizontal feet of a building façade or wall:

(1) Changes in color, texture, or materials;

(2) Projections, recesses, and reveals, expressing structural bays, entrances, or other aspects of the architecture with a minimum change of plane of 4-6 inches;

(3) Arcades or pergolas providing pedestrian interest.

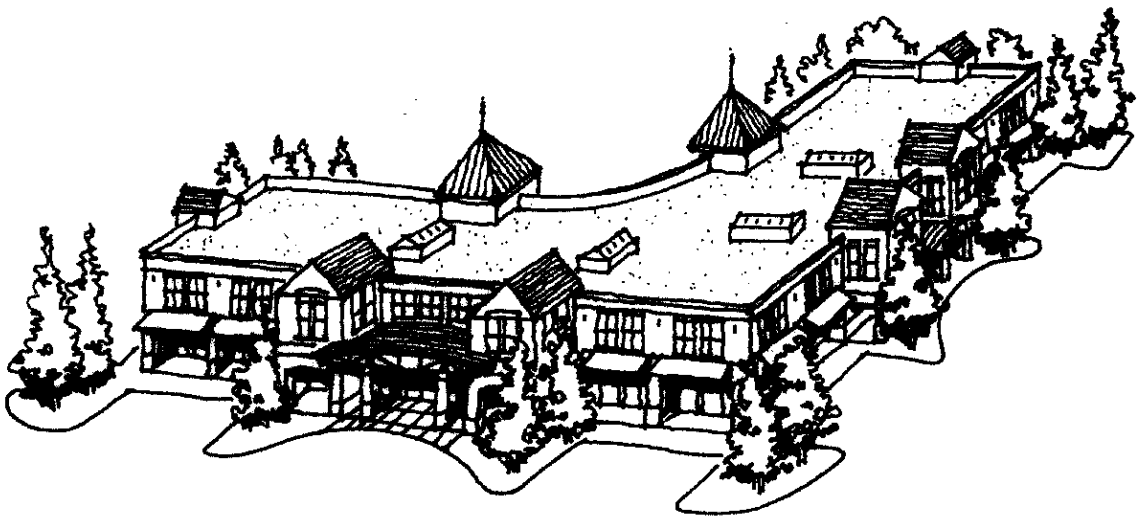
b) Retail storefronts shall consist of predominantly transparent display windows on the first floor sidewalk edge.

c) Darkly tinted glass or other opaque materials shall not be used in display windows.

d) Traditionally, windows in multi-story commercial buildings have a width to height ratio of one to two. Second story or upper story windows should generally be smaller than the storefront windows at ground level and shall be evenly spaced across all facades adjacent to the street.

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IX. Development Standards: Parcel "I", Hospitality (C-4)



A. GENERAL INTENT

The general intent of these standards is to create a full service hospitality site within Glenwood Meadows that accommodates a hotel with conference space or meeting rooms, a multi-screen movie theatre or other entertainment venue, such as a performing arts facility or outdoor amphitheater, visitor center, and/or a limited assortment of supporting retail uses such as restaurants or small stores, outdoor recreational opportunities, and the potential integration of a future park and ride and transit stop. The hospitality site is intended to function as more of a "campus" type environment, with more flexibility regarding the placement and relationship of uses as compared to the site's adjacent commercial areas based on the "campus" concept, meeting rooms or a separate dedicated facility on the site could serve as an extended learning facility or a business education and training facility. In addition to the adjacent commercial uses, all uses found on this site are also intended to complement the adjacent Community Center.

B. APPLICABILITY

These standards shall apply to all development within Parcel "I", Hospitality as defined on the accompanying Zoning Map. These standards shall be applied in addition to standards outlined in Section V., General Development Standards and in the City of Glenwood Springs Municipal Code.

C. SITE LAYOUT AND DEVELOPMENT PATTERN

1. Intent

The intent of these standards are to ensure that the design of hospitality uses are compatible in terms of scale and mass with adjacent residential and commercial development and with the

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Community Center.

2. General

a) Compatible uses (i.e., office building and a movie theatre) shall explore opportunities for shared-use parking to minimize overall space requirements for parking.

3. Setbacks

a) Minimum front yard setbacks shall be as follows:

(1) From Midland Avenue and Wulfsohn Road: 25 ft.

(2) From uses in ajacent commercial parcel: 20 ft.

b) There shall be no minimum side or rear yard setback to promote a more urban, pedestrian-oriented environment within the Hospitality zone district.

c) At the time of the development permit application, a build to line shall be established to create a strong relationship to Wulfsohn Road, the Community Center, and adjacent mixed-use structures. The location of this line may vary depending on the site layout concept.

4. Landscaping

a) All open space areas shall be landscaped according to Table 1-Landscape Requirements.

5. Mix of Uses

a) Retail uses shall be limited to 25% of the total square footage permitted within the zone district. For the purposes of this standard, a theater shall not be defined as a retail use.

6. Relationship to Community Center

a) All uses with frontage along Wulfsohn Road shall provide an entrance along that frontage.

7. Parking

a) Large areas of parking shall be distributed between at least two sides of the primary structure, with not more than 35% of the parking for the entire Hospitality parcel remaining between the principal building and Wulfsohn Road.

D. BUILDING DESIGN

1. Intent

The intent of these standards are to ensure that the design of full service hospitality uses are compatible in terms of scale and mass with adjacent residential and commercial development and with the Community Center.

2. General

a) See Section V. General Development Standards.

b) When public or semi-public spaces such as the hotel/motel lobby, restaurants, meeting rooms, and banquet-facilities are sited at ground level adjacent to a connecting pedestrian walkway, these spaces shall be accented with the use of glass and transparent materials between the height of 3 feet and 8 feet above the walkway or street grade.

3. Building Height

a) The maximum height of buildings shall not exceed 45 feet.

b) A variety of heights within the zone are encouraged. In addition, the use of height to create a focal point or prominent structure within the zone is also encouraged.

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X. Development Standards: Parcels "B", "F", and "G", Residential Neighborhoods (R-3)

A. GENERAL INTENT

The intent of these standards is to establish general criteria for the development of a series of compact residential neighborhoods that provide a range of housing types within a short walk of community amenities, such as parks and open space, retail and commercial services, and employment.

B. APPLICABILITY

These standards shall apply to all development within Parcels "B", "F", and "G", Residential Neighborhoods as defined on the accompanying Zoning Map. *These standards shall be applied in addition to standards outlined in Section V., General Development Standards and in the City of Glenwood Springs Municipal Code.*

C. SITE LAYOUT AND DEVELOPMENT PATTERN

1. Intent

The intent of these standards is to ensure that residential neighborhoods within Glenwood Meadows provide a variety of housing types in a cohesive, pedestrian-oriented environment and provide appropriate transitions to adjacent non-residential uses and open space, and work with the more pronounced topographical features of the site.

2. Mix of Housing Types

a) A range of housing types is strongly encouraged to promote a diverse community of mixed ages, family-types and incomes. Out of the 475 approved residential units, a maximum of 300 apartments shall be provided.

3. Block Layout

a) Residential neighborhoods shall be designed in a pattern of blocks and interconnecting streets and/ or alleys, defined by buildings, streetscape, sidewalks, and trails.

b) The maximum block length for a block shall be 500 feet. Where mid-block pedestrian walkways are provided, blocks may be up to 800 feet.



4. Lot Sizes

a) Lot sizes shall be a minimum of 3000 square feet where permitted by Glenwood Springs Municipal Code.

5. Setbacks

a) Homes shall be setback a minimum of 20 feet from the front property line.

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6. Site Grading

a) The use of extensive grading or unusual site improvements to force a preconceived design onto a particular piece of property is strongly discouraged. Modifying the design of a multifamily development to fit the site generally results in a reduced potential for environmental problems and an improved level of visual interest and variety.

b) To the maximum extent feasible, the layout of residential developments shall follow and respect the natural topography of the site.

c) Berms, channels, swales, and similar man-made changes to the landscape shall be designed and graded to be an integral part of the natural landscape and to provide a smooth transition in changes of slope.

7. Site Layout

a) Each of the three residential parcels within the Glenwood Meadows shall be considered an individual "neighborhood". A mix of housing types is encouraged within each neighborhood.



b) Multifamily buildings shall be separated by common open space, public open space (e.g., a greenway), natural features located on the site (e.g., a stream corridor), or community amenities such as swimming pools or other recreational facilities.



c) To the maximum extent practicable, multi-family buildings shall be oriented or arranged in a manner to enclose common open spaces required above (*Common Open Space*). Such common open spaces should include gardens, courtyards, recreation, or play areas and shall contain at least 3 of the following features:

(1) Seasonal planting areas;
(2) Large, flowering trees;
(3) Seating;
(4) Pedestrian-scaled lighting;
(5) Gazebos or other decorative shelters;
(6) Play structures for children; or
(7) Natural features or areas.

8. Development Transition

a) When any portion of a building or structure within a multifamily development is located adjacent to property used or zoned for lower-density residential, the following standards shall apply to ensure the privacy of nearby residents:

(1) The developer shall site multifamily structures with either fewer units or structures with two-story "end" units adjacent to property zoned or used for single-family residential.

b) Accessory structures, including garages and recreational facilities, shall be set back at least

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5 feet from the adjacent residential property line or zoning district boundary, and the developer shall provide a buffer between the structure and adjacent property. The buffer may be a fence, wall, heavy landscaping, or combination thereof. Fences and walls used for buffer purposes shall be a maximum of 6 feet in height, with finished side facing out.

c) Residential neighborhoods adjacent to open space shall incorporate one or more of the following techniques to create a visual transition between development and surrounding open space:

(1) Staggering building setbacks to create a softer development edge.
(2) Establishing a landscape buffer along the rear or visible edge(s) of the property to create a soft visual edge to the development.
(3) Locating structures near or behind existing stands of significant trees or vegetation so that the cluster of vegetation provides a buffer between the development and the adjoining open space. When siting structures in such a manner, care should be taken to not disturb existing vegetation either during or following construction.
(4) Utilizing a variety of native plant species and planting forms similar to those found on the adjoing open space, to create the appearance of a natural transition in the landscape.

9. Community Amenities

a) All residential projects with more than 10 dwelling units shall reserve and develop internal open space/outdoor leisure space, at a minimum ratio of 200 s.f. per unit. These open spaces/outdoor leisure areas shall be improved with a variety of community amenities, including, but not limited to the following:

(1) Community Garden;
(2) Grove of trees;
(3) Village green;
(4) Pocket park;
(5) Swimming pool;
(6) Resident clubhouse;
(7) Tot lots;
(8) Basketball, volleyball, or other sport court; or
(9) Picnic areas.

b) To the maximum extent feasible, internal open spaces/outdoor leisure spaces as required above shall be consolidated to create larger common spaces for residents.

10. Fencing

a) Perimeter fencing shall be of an open style, such as 2, 3, or 4 rail, split rail, wood post, or other similar style characteristic of the area's rural heritage.

b) Consistent styles of fencing shall be used throughout the neighborhood in order to achieve a cohesive appearance.

11. Storage of Personal Property

a) Dedicated storage for Recreational Vehicles (RV's), snowmobiles, trailers, and other personal property, not including personal automobiles, shall be provided off-street. Such property shall not be stored within the public right-of-way.

b) Storage areas, as outlined above, shall be screened to minimize visibility from adjacent streets and property lines as follows:

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(1) One continuous row of evergreen trees (minimum of 6 feet tall) shall be planted with a minimum spacing of 10 feet on center; or

(2) One continuous row of evergreen shrubs (minimum of 5gallon in size) planted at a minimum spacing of 3 feet on center, and deciduous trees planted at an average of one tree every 15 linear feet.

D. PARKING

1. Intent

The intent of these standards is to ensure that garages and parking areas within Glenwood Meadow's residential neighborhoods are appropriately scaled and sited to minimize their visual impact upon the street.

2. Location and Layout

a) To the maximum extent feasible within slope constraints, garage entries, carports, parking areas, and parking structures shall be internalized in building groupings or oriented away from street frontage.

b) Parking areas and freestanding parking structures (detached garages or carports) shall not occupy more than 50% of each perimeter street frontage.

c) To the maximum extent practicable, freestanding parking structures (detached garages or carports) that are visible from perimeter public streets shall be sited perpendicular to the perimeter street in order to reduce visual impacts on the streetscape.

d) Carports shall be limited to 72 feet in length, with a maximum of 8 parking spaces per carport structure.

e) If a carport backs to the street, a landscape buffer shall be provided according to the requirements contained in Table 1-Landscape Requirements., within Section V.

f) A detached garage structure shall contain parking for no more than 8 cars.

g) No more than 2 detached garage structures or 2 carport structures shall be located adjacent to each other end to end.

h) The minimum separation between adjacent detached parking structures (detached garages or carports) shall be 10 feet, and such separation area shall be landscaped with at least 1 deciduous tree and ground cover or sod. A pedestrian access way may be included within the separation area.

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E. BUILDING DESIGN



1. Intent

These standards are intended to encourage a variety of residential building character within Glenwood Meadow's neighborhoods by encouraging the use of identifiable design features and detailing to emphasize the façade at the street and create visual interest.

2. General

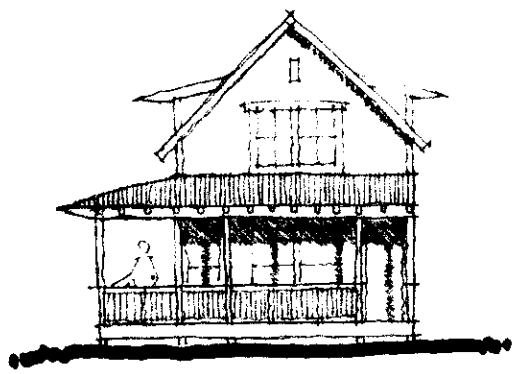
a) See Section V. General Development Standards.

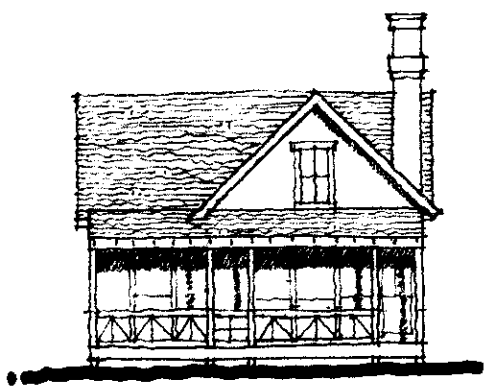
3. Architectural Detail

a) The incorporation of porches, balconies, and patios shall be strongly encouraged for all residential types.

b) Building entries shall be called out as a prominent streetscape feature for all residential types by extending the front of the main façade and emphasizing with materials and detailing.

c) Garages shall not be the prominent streetscape element. They shall be recessed and/or oriented towards the side or rear of the lot.





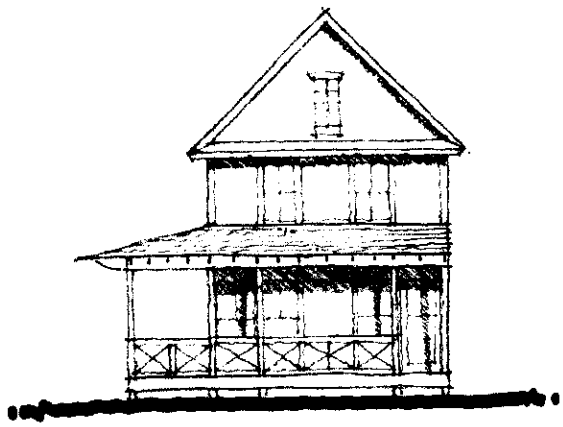
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d) The facades of single-family attached town homes shall be articulated to differentiate individual units.

e) All sides of a multi-family building shall display a similar level of quality and architectural interest. The majority of a building's architectural features and treatments shall not be restricted to a single façade.

f) Fronts of buildings shall be articulated through the use of bays, insets, balconies, porches, or stoops related to entrances and windows.

g) No more than 5 town home dwelling units shall be attached in any single row.



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XI. Parcel L: Open Space and Parks (HP)



A. GENERAL INTENT

The intent of these standards is to provide guidance for the range of appropriate uses that could occur within this portion of the Glenwood Meadow's site. The site is characterized by its dramatic views of Red Mountain, which frames the site on the south side, by its varied and sometimes dramatic topography, and by its lush stand of Gambel oaks. The site encompasses over 62% of the total area of Glenwood Meadows presents an opportunity to establish public open space for the neighborhood and for the larger Glenwood Spring's community that accommodates year-round active and passive recreational uses.

Many of the sites potential uses will vary from season to season, providing a range of activities for the community. For example, the north aspect of Red Mountain's slopes retain snow cover, creating a haven in its shadows for winter sports such as snow shoeing or cross-country skiing, while lower slopes with more solar exposure provide more opportunities for year-round activities such as hiking, biking, and possibly a golf course.

B. APPLICABILITY

These standards shall apply to all development within Parcels "L", Open Space and Parks as defined on the accompanying Zoning Map. *These standards shall be applied in addition to standards outlined in Section V., General Development Standards and in the City of Glenwood Springs Municipal Code.*

C. ACTIVE RECREATION

1. Intent

The intent of these standards is to suggest a range of appropriate active recreational uses for particular areas of the site, based on its varying landscape characteristics, such as slope,

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vegetative cover, and proximity to the residential neighborhoods of Glenwood Meadows. As a general rule, more land intensive, active uses, such as a golf course or a community park shall be located adjacent to or be partially integrated with nearby residential neighborhoods. By locating active uses near developed areas, where slopes are typically between 10 and 20 percent, pedestrian access to the sites would be more easily facilitated and a wider range of uses could be accommodated. Steeper slopes located towards the base of Red Mountain can be utilized to accommodate multi-use trails with little disturbance to existing landforms or views of the site. All development on the site, regardless of its intensity or location, shall work with existing site features to minimize overall disturbance and visual impacts.

2. General

a) Appropriate uses shall include, but not be limited to the following:

(1) Hiking trails;
(2) Golf courses;
(3) Mountain bike trails;
(4) Cross-country skiing trails;
(5) Equestrian trails;
(6) Snow shoeing trails; or
(7) Neighborhood parks.

b) Any of the above uses, as well as any additional non-prohibited uses as identified in the Appendix-Prohibited Uses for Parcel L, shall be required to undergo a special use review prior to approval. Soft surfaced trails and debris flow mitigation structures shall be allowed uses, the design and location of which shall be approved by City staff.

c) The use of motorized recreational vehicles such as snowmobiles, motorcycles, or similar vehicles shall not be permitted.

d) All uses shall use all practical means of preserving natural grade, drainage patterns, soil cover, and vegetation.

e) All uses shall be designed to minimize visual disturbances and scarring to the site, as viewed from within the site, from surrounding developments, and from Interstate-70.

f) All uses shall preserve and integrate outstanding natural physical features such as hill and ridge crests, natural rock outcroppings, major tree belts, watercourses, and other physical features.

g) Public access points shall be provided from residential neighborhoods to adjoining open space. To the maximum extent feasible, access points shall be provided a minimum of every 500 feet.

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XII. Appendix

A. PLANT LIST

1. Large Deciduous Trees

a) Narrow leaf Cottonwood-Populus angustifolia
b) Cottonwood 'Siouxland'-Populus deltoides 'Siouxland'
c) Lanceleaf Cottonwood-Populus x acuminata
d) Norway Maple-Acer plantanoides
e) Red Maple-Acer rubrum
f) Northern Catalpa-Catalpa speciosa
g) Common Hackberry-Celtis occidentalis (spring planting)
h) American Ash-Fraxinus americana 'Autumn Purple'
i) Green Ash-Fraxinus pennsylvanica
j) Thornless Honeylocust 'Shademaster'-Gleditsia triacanthos inermis
k) Bur Oak- Quercus macrocarpa
l) English Oak-Quercus robur
m) American Linden-Tilia americana
n) Littleleaf Linden-Tilia cordata 'Greenspire'
o) Redmond Linden-Tilia x euchlora 'Redmond'
p) American Elm-Ulmus Americana

2. Ornamental Trees

a) Amur Maple-Acer ginnala
b) Thinleaf Alder-Alnus tenuifolia
c) Shadblow Serviceberry-Amelanchier canadensis
d) Rocky Mountain or water birch-Betula occidentalis
e) Cockspur Hawthorn-Crataegus crus-galli
f) Washington Hawthorn-Crataegus phaenophyrum
g) Quaking Aspen-populus tremuloidies
h) Newport Plum-Prunus cerasifera 'Newport'
i) Canadian Red Cherry-Prunus virginiana 'Shubert'
j) Callery Pear-Pyrus calleryana
k) Gambel Oak-Quercus gambelii

3. Evergreen Trees

a) Subalpine or Rocky Mountain Fir-Abies lasiocarpa

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b) Douglas Fir-Pseudotsuga menziesii glauca
c) Rocky Mountain Juniper-Juniperus scopulorum
d) Bristlecone Pine-Pinus aristata
e) Lodgepole Pine-Pinus contorta latifolia
f) Pinyon Pine-pinus edulis
g) Limber Pine-Pinus flexilis
h) Southwestern White Pine-Pinus flexilis reflexa
i) Austrian Pine-Pinus nigra
j) Ponderosa Pine-Pinus ponderosa
k) Scotch Pine-Pinus sylvestris
l) Engelmann Spruce-Picea engelmannii
m) Black Hills Spruce-Picea glauca densta
n) Colorado Spruce-Picea pungens
o) Colorado Blue Spruce-Picea pungens glauca

4. Semi-Evergreen and Broadleaf Evergreen Shrubs

a) Kinnikinnick-Arctostaphylos uva-ursi
b) Euonymus-Euonymus fortunei
c) Manhattan Euonymus-Euonymus kiautschovicus 'Manhattan'
d) Oregon Grape Holly-Mahonia aquifolium
e) Compact Oregon Grape Holly-Mahonia aquifolium 'Compacta'
f) Creeping Oregon Grape Holly-Mahonia repens
g) Soapweed Yucca-Yucca glauca

5. Evergreen Shrubs

a) Armstrong Juniper-Juniper chinensis 'Armstrong'
b) Blue Rug Juniper-Juniperous horizontalis 'Wiltonii'
c) Sea Green Juniper-Juniperous media 'Sea Green'
d) Green Mound Juniper-Juniperous procumbens 'Green Mound'
e) Tammy Juniper-Juniperus sabina 'Tamariscifolia'
f) Table Top Juniper-Juniperus scopulorum 'Table Top'
g) Blue Star Juniper-Junperus squamata 'Blue Star'
h) Wichita Blue Juniper-Juniperus scopulorum 'Wichita Blue'
i) Hillspire Juniper-Juniperus virginiana 'Cupress'
j) Mugo Pine-Pinus mugo

6. Deciduous Shrubs

a) Serviceberry-Amelanchier spp.
b) Barberry-Berberis thunbergii atropurpurea

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c) Butterfly Bush-Buddleia davidii
d) Siberean Peashrub-Caragana arborescens
e) Flowering Quince-Chaenomeles speciosa
f) Blue Mist Spirea-Caryopteris spp.
g) Dogwood-Cornus sericea
h) Smoketree-Cotinus coggygria
i) Peking Cotoneaster-Cotoneaster acutifolia
j) Cranberry Cotoneaster-Cotoneaster apiculatus
k) Burning Bush-Euonymus alatus
l) Forsythia-Ligustrum vugare
m) Honeysuckle- Lonicera spp.
n) Russian Sage-Periovskia atriplicifolia
o) Common Ninebark-Physocarpus opulifolius
p) Potentilla (Shrubby Cinquefoil)-Potentilla fruiticosa
q) Plum-Prunus spp.

7. Perennials

a) Yarrow-Achilles filipendula
b) Columbine-Aquilegia (hybrids)
c) Hollyhock-Althaea rosea
d) Pearly Everlasting-Anaphalis spp.
e) Clustered Bellflower-Campanula glomerata
f) Canterbury Bells-Campanula medium
g) Cup-n-Saucer-Campanula medium calycanterma
h) Shasta Daisy-Chrysanthemum maximum
i) Delphinium-Delphinium elatum
j) Cottage Pink-Dianthus pulmarius
k) Bleeding Heart-Dicentra spectabillis
l) Foxglove-Digitalis purpurea
m) Blanket Flower-Gaillardia aristata
n) Bearded Iris-Iris germanica
o) Perennial Sweet Pea-Lathyrus latifolius
p) Blue Flax-Linum perenne
q) Lupine-Lupinus polyphyllus
r) Daffodil-Narcissus spp.
s) Perennial Phlox-Phlox paniculata
t) Buttercup-Ranunculus asiaticus
u) Johnny Jump-up-Viola kitaibeliana

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B. USE TABLE

In the event a use is permitted in the Glenwood Meadows standards but is not permitted in the underlying zone districts, the stricter obligations of the Code shall prevail.

Prohibited Use

Special Use

Use	A-Mixed-Use Campus (C-1)	C, D, and H-Commercial (C-1)	E, F, and G-Mixed-Use (C-2)	I-Hospitality (C-4)	B, J, and K-Residential Neighborhood (R-3)	L- Parks and Open Space (HP)
Accessory Uses						
Apartments						
Auto Rental						
Auto Repair						
Auto Parking						
Auto Sales						
Auto Service						
Auto Washing and/or Polishing Facility						
Banks with Drive Thru/ Accessory ATM Facilities						
Bed & Breakfast						
Child Care Home						
Commercial Indoor Cinema						
Daycare Facilities						
Sanitariums, Rest Homes, Homes for the Aged, Nursing or Convalescent Homes						
Emergency Services Facilities						
Golf Course						
Gas Sales						
Governmental Facilities and Non-Governmental Health and Human Services Facilities						
Government or Public Utility Service						
Commercial Health and Fitness Centers						
Home Improvement and Garden Supply						
Hospitals and their Related Facilities						
Hotels						

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Use	A-Mixed-Use Campus (C-1)	C, D, and H-Commercial (C-1)	E, F, and G-Mixed-Use (C-2)	I-Hospitality (C-4)	B, J, and K-Residential Neighborhood (R-2)	L- Parks and Open Space (NP)
Indoor Commercial Recreational Facilities						
Light Assembly						
Major Home Occupation						
Membership Warehouse						
Minor Home Occupation						
Mobile Home Manufacturing						
Mobile Home Park						
Mobile Home Sales						
Mortuary						
Multi-family Dwellings						
Museum						
Non-Bank Drive-Through Facilities						
Office Uses						
Office-Showroom						
Outdoor Display						
Outdoor Recreational Facilities						
Outdoor Storage						
Clinical and their Related Facilities						
Pedestrian-oriented Accessory Uses and Outdoor Seating for Restaurants						
Public Park						
Radio Transmission Facilities						
Recreation Vehicle Parking						
Religious Institutions						
Restaurants						
Retail						
Road, Driveway, Bikeway, Parking						
Schools						
Schools: Colleges or Universities						
Self-Storage Facilities						
Service and Repair of Appliances & Building Components						
Personal Service such as Photo Shop, Tailor, Dry Cleaning, Barber						
Single Family Detached Dwellings						
Single-Family Attached Housing e.g. Townhouses and						

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Use	A-Mixed-Use Campus (C-1)	C, D, and H-Commercial (C-1)	E, F, and G-Mixed-Use (C-2)	I-Hospitality (C-4)	B, J, and K-Residential Neighborhood (R-3)	L- Parks and Open Space (NP)
Roughhouses						
Skating Rinks, Public Recreational and Sports Facilities						
Small Animal Hospitals and Clinics						
Transient Housing/Boarding Houses						
Transit Park and Ride/ Bus Station						
Utility Substations						

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XIII. Definitions

Accessory Use—A use incidental and subordinate to the principal use of the lot.
Apartment- A type of multi-family dwelling unit, typically renter-rather than owner-occupied. See definition for multi-family dwellings below.
Auto Parking—Shall mean an off-street parking area or vehicular use area, an off-street parking area within a building or parking structure, or on street parallel or diagonal parking.
Day Care—A child care facility or day nursery, which is maintained for the whole or part of a day for the care of 7 or more children unrelated to the owner on a full time basis and/or requiring a day care nursery or a center license in accordance with the regulations of the State of Colorado Department of Social Services, whether such facility is operated with or without compensation for such care and with or without stated educational purposes.
Indoor Recreation—A commercial recreational land use conducted entirely within a building, including: an arcade, arena, art gallery and studio, art center, assembly hall, athletic and health clubs, auditorium, bowling alley, club or lounge, community center, conference center, exhibit hall, gymnasium, library, movie theater, museum, performance theater, pool or billiard hall, skating rink, swimming pool, or tennis court.
Multi-family dwellings—A building containing 3 or more dwelling units, not including hotels, motels, and similar group accommodations.
Non-banking Drive Thru—An establishment which by design, physical facilities, services, or packaging procedures encourages or permits customers to receive services, obtain goods, or be entertained while remaining in their motor vehicles.
Open Space—That portion of a building lot which is open to the sky, except as provided in the definition of lot coverage.
Outdoor Recreation—A commercial recreational land use conducted outside of a building, characterized by a minimal impact on traffic, the natural environment, or the surrounding neighborhood, including: an arboretum, botanical garden, bridle or hiking trails, country club, golf course, or historic site.
Pedestrian-oriented Development—Development that is designed with a primary emphasis on the street sidewalk and/or connecting walkway access to the site and building rather than on auto access and parking lots. This type of development typically warrants buildings being placed relatively close to the street with the main entrance oriented towards the street sidewalk or a walkway. Parking areas are provided but are not emphasized in the design of the site.
Transit-oriented Development—A development pattern characterized by mixed-use development at transit corridors, a high level of activities and extensive facilities for transit users, pedestrians, and bicyclists to provide easy movement between living and working environments.

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MEMORANDUM OF UNDERSTANDING
REGARDING RESIDENTIAL DEVELOPMENT WITHIN RH DISTRICT OF GLENWOOD MEADOWS

The following Memorandum of Understanding ("MOU" or "Agreement") sets forth the terms and conditions upon which the City of Glenwood Springs, Colorado, a Colorado municipal corporation (the "City") and Glenwood Meadows, LLC, a Colorado limited liability company ("GM") agree to resolve certain infrastructure issues related to future development in Glenwood Meadows as related to future development on lots retained by GM.

RECITALS

WHEREAS, GM originally annexed approximately three hundred and forty-five (345) acres of real property within the City of Glenwood Springs, which Property is commonly known as "Glenwood Meadows" pursuant to that certain Ordinance No. 17, Series of 2002, and Ordinance No. 18, Series of 2002; and

WHEREAS, on September 18, 2002, the City and Owner entered into an Annexation and Development Agreement to set forth their agreements in writing concerning the terms and conditions of annexation of the Property to the City, the zoning of the Property under the City's Municipal Code and the adopted and incorporated Zoning and Development Plan, as well as the other conditions of the development of the Property, which Annexation and Development Agreement was recorded in the records of the Garfield County Clerk and Recorder on December 6, 2002 as Reception No. 616083 (the "Original ADA"); and

WHEREAS, the City and Owner have since entered into: (i) the First Amendment to the Original ADA, which First Amendment was recorded May 6, 2004, as Reception No. 651648, and (ii) the Second Amendment to the Original ADA, which Second Amendment was recorded July 26, 2004 as Reception No. 656670, and (iii) the Third Amendment to the Original ADA, which Third Amendment was recorded December 2, 2010 as Reception No. 795138, and (iv) the Amended and Restated Third Amendment to the Original ADA, which Amended and Restated Third Amendment was recorded August 16, 2011 as Reception No. 806719; (v) the Fourth Amendment to the Original ADA, recorded April 10, 2015 as Reception No. 861345; (the Original ADA, together with all subsequent, recorded amendments thereto is hereafter referenced to as the "ADA"); and

WHEREAS, the City and Owner entered into a Memorandum of Understanding dated July 16, 2013; and

WHEREAS, Glenwood Meadows, LLC is the present owner of certain vacant, undeveloped lots within Glenwood Meadows: (i) Lots 12 and 13 of GM #2 Plat; (ii) Lot 10C of GM #3 Plat; (iii) Lot 11C-B of GM #6 Plat; and (vi) Lot 11C-C of GM #6 Plat (collectively, "GM Retained Lots"); and

WHEREAS, BLD Group, LLC is under contract to purchase portions of Lot 11C-B and 11C-C of GM #6 Plat and has submitted a Major Architectural Review and Minor Subdivision Application with the City of Glenwood Springs on December 29, 2020 and January 26, 2021 respectively (the "Applications"); and

WHEREAS; on March 1, 2021 the City's Assistant City Manager issued a letter to BLD and GM ("Interpretation Letter") that the City is unable to process the Applications because it would exceed the residential unit limits established for the Glenwood Meadows Development based on the City's interpretation of the ADA, as amended; and

WHEREAS, BLD and GM dispute such interpretation, but have agreed to enter into this MOU to resolve the difference of opinion and to expedite the processing of the Applications.

AGREEMENT

1. **Contribution Towards Lift Station Upgrades.** In the event BLD's Applications are approved for at least 300 multi-family units and BLD or its successor is issued a building permit pursuant to such approvals, GM will, in addition to City standard system improvement fees including Sewer System Improvement fees, make a payment of $475,000 to the City at the time of issuance of a building permit which funds shall be used directly for the necessary upgrade of the Midland Sewer lift station to an estimated capacity sufficient to serve all future development within all of Glenwood Meadows. The parties agree that this contribution represents 50% of the estimated costs to upgrade the lift station to such capacity and that the City will fund the balance of the actual costs required and commits to completion of the necessary lift station upgrades and any other necessary sewer system work prior to BLD's request for a certificate of occupancy. In the event the costs required to upgrade the lift station are less than $950,000, the City shall promptly reimburse GM's pro rata for its excess contribution. In the event such costs exceed $950,000, GM shall not be required to contribute any additional funds.

2. **Cost Reimbursement**. GM shall be entitled to cost recovery from any future impact or other fees paid by any future development within Glenwood Meadows, including on the GM Retained Lots, at a rate of $814 per EQR which amount shall increase annually with CPI. The City shall make payment to GM at the time a building permit is issued for such development. This obligation shall expire 20 years after the GM payment.

3. **Traffic Impact Fee.** In the event BLD's application and/or other residential development is approved on GM's Lot 12 of GM #2, Plat Lot 11C-B and/or Lot 11C-C of GM #6 Plat and a building permit is issued for the same, GM will fund an equitable share attributable to 415 additional residential units pursuant to the City's 2021 Glenwood Meadows area traffic study of improving Glenwood Meadows' Midland Avenue intersections, not to exceed $500.00 per fully permitted residential unit. Such funding will occur at the later of issuance of a building permit or at time the City contracts for design of such intersection improvements.

4. **Interpretation of ADA**. The City agrees that, upon the execution of this Agreement, its interpretation of the ADA is that the ADA remains in full force and effect, including but not limited to Section I. A. of the Fourth Amendment to the Original ADA, recorded April 10, 2015 as Reception No. 861345 and therefore 415 additional residential units,

of which 300 may be commercial apartments, are permitted within the RH zoned Lot 12 of GM #2 and Lot 11C-B and Lot 11C-C of GM #6 Plat and these 415 residential units, of which 300 may be commercial apartments, are independent of residential development completed or permitted on other lots and zone districts within Glenwood Meadows, the capacity of which is defined by the zoning of such lots. City agrees that this interpretation shall be binding upon the City for future applications within the GM Retained Lots.

5. **Withdrawal of Interpretation**. Concurrent with execution of this MOU, the City formally withdraws the Interpretation Letter and shall continue to or begin formally processing the Applications, and any other heretofore submitted Glenwood Meadows development applications, pursuant to the City's standard development review process. GM and BLD shall request a continuance of their appeal of the Interpretation Letter and the Planning and Zoning Commission Appeal hearing scheduled for May 10, 2021. Upon ratification of this Agreement by City Council, GM and BLD shall formally withdraw their appeal and cancel the agenda item. The parties understand that the City cannot guarantee approval of the Applications or other pending development applications, but rather such applications shall be subject to the approval of City Council according to the criteria set forth in the Glenwood Springs Land Use Code.

6. **Contingency**. The Paragraph 1 Contribution and Paragraph 2 Cost Reimbursement of this Agreement is contingent upon approval of the Applications for at least 300 multi-family units. In the event the Applications are withdrawn, denied, or approved but the Final Plat is never recorded, or approved but such approvals expire, and no building permit and corresponding payment is made, then Paragraph 1 Contribution and Paragraph 2 Cost Reimbursement provision of this Agreement shall be null and void and terminate automatically. In the event any building permits for any other residential units are issued for all or portions of RH zoned Lot 12 of GM #2 and Lot 11C-B and Lot 11C-C of GM #6 Plat, such residential units shall, in addition to City standard Sewer System Improvement fees, fund Lift Station improvements at a rate $814 per EQR, which amount shall increase annually with CPI.

7. **No Further Exactions.** Consistent with Paragraph 3(a) of the ADA, The City shall not charge any future impact fee, surcharge, special permit fees, special taxes or assessments, development fees or tap fees, or any other item against the GM Retained Lots unless the same is exacted uniformly and non-discriminatorily throughout the City, except as otherwise set forth in this MOU.

8. **Recordation of Final Agreement.** The terms of this Agreement shall be memorialized in a written agreement between GM, or its successor owners, recorded against all of the GM Retained Lots within the RH zone - Lot 12 of GM #2, Lot 11C-B and Lot 11C-C of GM #6 Plat. Such recordation shall occur at the time a Subdivision Improvements or Development Agreement is recorded.

9. **Ratification.** This MOU shall be presented for ratification by the City Council on the next meeting following execution. In the event this MOU is not ratified by the City Council by May 21, 2021, this Agreement shall be null and void.

Executed this 6th day of May 2021.

CITY OF GLENWOOD SPRINGS, COLORADO

By: _____
Debra Figueroa, City Manager

ATTEST:

_____
Ryan Muse, City Clerk

GLENWOOD MEADOWS, LLC,
a Colorado limited liability company
By: Dunrene Management, Inc., Manager

By: _____
Michael Maple, Chief Operating Officer

Karp Neu Hanlon PC
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DATE: December 30, 2021

TO: Glenwood Springs Mayor and Council

FROM: Karp Neu Hanlon, P.C.

RE: Ordinance Regarding Tie Votes by Council

Attached please find Ordinance 1, Series of 2022 amending Section 020.030.100 of the Glenwood Springs Municipal Code to address tie votes by City Council. This ordinance is in response to the stipulation entered in Case No. 2021CV30155, District Court, Garfield County, regarding the recent land-use hearing for BLD Group, LLC and Glenwood Meadows, LLC. Staff is recommending approval of the ordinance.

CITY OF GLENWOOD SPRINGS

ORDINANCE NO. 2022-01

AN ORDINANCE OF THE CITY OF GLENWOOD SPRINGS, COLORADO AMENDING SECTION 020.030.100 OF THE GLENWOOD SPRINGS MUNICIPAL CODE TO PROVIDE FOR A PROCESS ADDRESSING ACTIONS TO BE TAKEN BY COUNCIL ON TIE VOTES.

WHEREAS, the City of Glenwood Springs ("Glenwood Springs" or the "City") is a home-rule municipality organized under Article XX of the Colorado Constitution and with the authority of the Glenwood Springs Home Rule Charter; and

WHEREAS, pursuant to its home rule authority, the City, acting through its City Council (the "Council"), is authorized to adopt ordinances regulating matters concerning campaign finance in municipal elections, including the provision of a complaint process relating thereto; and

WHEREAS, the City wishes to amend Section 020.030.100 of the Glenwood Springs Municipal Code to address tie votes of the Council; and

WHEREAS, the City Council finds and declares that the amendments to Section 020.030.100 set forth in **Exhibit A**, hereto and incorporated herein by this reference, are in the best interest of the City.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF GLENWOOD SPRINGS, COLORADO, AS FOLLOWS:

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

Section 2. Section 020.030.100 of the Glenwood Springs Municipal Code is hereby amended as set forth in **Exhibit A** attached hereto.

Section 3. Any ordinances or resolutions or parts thereof, which are in conflict with this ordinance, are hereby repealed to the extent of such conflict only.

Section 4. With the exception of the provisions of the Municipal Code of the City of Glenwood Springs which are modified as provided herein, all remaining provisions of the Municipal Code of the City of Glenwood Springs shall remain in full force and effect.

INTRODUCED, READ ON FIRST READING, PASSED AND ORDERED PUBLISHED BY TITLE ONLY THIS _____ DAY OF _____, 2022.

CITY OF GLENWOOD SPRINGS, COLORADO

Jonathan Godes, Mayor

ATTEST:

Ryan Muse, City Clerk

INTRODUCED, READ ON SECOND READING, AND ORDERED PUBLISHED BY TITLE ONLY TO BE EFFECTIVE TEN DAYS FOLLOWING THE DATE OF SECOND PUBLICATION THIS _____ DAY OF _____, 2022.

CITY OF GLENWOOD SPRINGS, COLORADO

Jonathan Godes, Mayor

ATTEST:

Ryan Muse, City Clerk

Exhibit A

020.030.100 Voting.

(a) Voting by the Council on all matters except procedural matters shall be as follows, to wit:

(1) The City Clerk shall call the name of each Council Member and the "yes" or "no" of each shall be recorded in the minutes and records of the Council proceedings.

(2) All voting upon ordinances, resolutions and motions shall be in conformity with the Charter.

(3) Except as otherwise provided in the Charter or in this Code, a motion shall be deemed carried if a quorum is present and a majority of those voting vote "yea."

(4) No affirmative action may be taken upon a tie vote~~.~~; ~~and, in~~ In the event the matter being voted upon is a quasi-judicial matter, Council may continue to present motions until a motion passes with a majority, or if Council determines no motion will pass, the matter will be continued to the next regular meeting wherein the full council will be present. If, due to a vacancy or recusal, at the next regular meeting Council determines no motion will pass then the recommendation or decision of the Planning Commission shall be deemed the final decision of Council ~~action of Council, including but not limited to, liquor licenses and items pursuant to Title 070, a tie vote shall be considered to be a denial of the matter~~.

(5) Council Members not entitled to vote on a motion because of a personal or private interest shall be deemed present for purposes of determining whether or not there is a quorum present.

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: Annexation Petition

Action Requested: As written in Section 5.4 of the Glenwood Springs Charter, and Section 31-11-105 of the Colorado Revised Statue, there are two options.

1. If there is an election within 150 days of the time of presentation to Council, the Council may set the Referendum onto said ballot.
2. The Council must debate the Ordinance in question and has the option to repeal said Ordinance.

Department: City Clerk

Presented By: Ryan Muse, City Clerk

Background Info: On December 9th, 2021, the Petition for a Referendum to Repeal Ordinance No. 08, Series of 2021, was submitted to myself, the City Clerk. I sent a letter accepting the referendum via email and mail on December 17, 2021.
315 citizen signatures were checked for authentication. 299 signatures were verified by both myself and my deputy. 16 signatures were found to be insufficient, mainly due to reasons such as the signer not being registered at their written address, in city limits, not being registered to vote, or a signature having very few attributes to that of their voter record. After 299 signatures were verified, the remaining 592 collected signatures were counted to match their corresponding volumes. However, those signatures' validity were not taken into consideration. A total of 907 signatures were collected.

Issues:

Staff Recommendation: Defer to Council.

ORDINANCE NO. 08

Series of 2021

AN ORDINANCE OF THE CITY OF GLENWOOD SPRINGS, COLORADO ANNEXING 480 DONEGAN PROPERTY TO THE CITY.

WHEREAS, the City of Glenwood Springs ("Glenwood Springs" or the "City") is a 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, GLENWOOD PARTNERSHIP LLLP, a Colorado limited liability limited partnership ("Owner") is the owner of certain real property currently located in unincorporated Garfield County, Colorado, more particularly described on **Exhibit A** attached hereto and incorporated herein (the "Property"); and

WHEREAS, COMMERCIAL DEVELOPMENT SERVICES GROUP, LLC, a Delaware limited liability company ("CDSG") is under contract to purchase a portion of the Property and develop that portion as mixed-use, multi-family housing development; and

WHEREAS, C.R.S. §§31-12-101, *et seq*., authorizes the City and Owner to enter into an Annexation Agreement; and

WHEREAS, the portion of the Property to be retained by Owner is currently developed for office and warehouse purposes; and

WHEREAS, Owner desires to annex the Property and connect it to the City of Glenwood Springs and has filed a Petition for Annexation ("Petition") to do the same; and

WHEREAS, the City desires to annex into its boundaries a the Property currently located in unincorporated Garfield County (the "Annexation Parcel", as described on **Exhibit A**); and

WHEREAS, the Annexation Parcel is not solely a public street or right-of-way, and is eligible for annexation in accordance with Article II, Section 30 of the Colorado Constitution, and sections 31-12-104 and 31-12-105, C.R.S.; and

WHEREAS, the Glenwood Springs City Council finds that it is necessary and desirable to annex the Annexation Parcel into the City to permit the development of the area in accordance with the City Code; and

WHEREAS, the City Council therefore desires to annex the Annexation Parcel into the City by the ordinance, in accordance with C.R.S. §§ 31-12-106 and 31-12-501.

NOW, THEREFORE, IT IS ORDAINED BY THE CITY COUNCIL OF THE CITY OF GLENWOOD SPRINGS, COLORADO, THAT:

Section 1. The recitals above are hereby adopted as findings.

Section 2. The City Council find and determines that the Annexation Parcel is eligible for annexation in accordance with Section 30(1)(c) of Article II of the Colorado Constitution and C.R.S. §§ 31-12-104(1)(a), 31-12-105, and 31-12-106(3), in that the proposed annexation:

(a) Would not divide any lands held in identical ownership;
(b) Is less than twenty acres and, as such, does not implicate C.R.S. § 31-12-105(1)(b);
(c) Is for territory for which no annexation proceedings have been commenced for annexation into another municipality;
(d) Would not result in the detachment of area from any school district and the attachment of the same to another school district;
(e) Would not result in the extension of the City's geographic boundary more than three miles in any direction from any point of the current boundary; and
(f) Is property for which not less than one-sixth the perimeter is contiguous with the current City boundary.

Section 3. The City Council does hereby annex the Annexation Parcel to be included in the corporate boundaries of the City of Glenwood Springs.

Section 5. The City Clerk shall promptly complete all filings required of the City to be made by the provisions of Section 31-12-113, C.R.S.

INTRODUCED, READ ON FIRST READING, PASSED, AND ORDERED PUBLISHED BY TITLE ONLY THIS 21st DAY OF OCTOBER 2021.

CITY OF GLENWOOD SPRINGS, COLORADO

Jonathan Godes, Mayor

ATTEST:

Ryan Muse, 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 4th DAY OF NOVEMBER 2021.

CITY OF GLENWOOD SPRINGS, COLORADO

Jonathan Godes, Mayor

ATTEST:

Ryan Muse, City Clerk

ANNEXATION MAP OF:

480 DONEGAN

SITUATED IN A PORTION OF SECTION 6, TOWNSHIP 6 SOUTH,
RANGE 89 WEST OF THE 6TH P.M. COUNTY OF GARFIELD, STATE OF COLORADO

SHEET 1 OF 1

TITLE DESCRIPTION (THIS SURVEY EDITS/ADDITIONS)

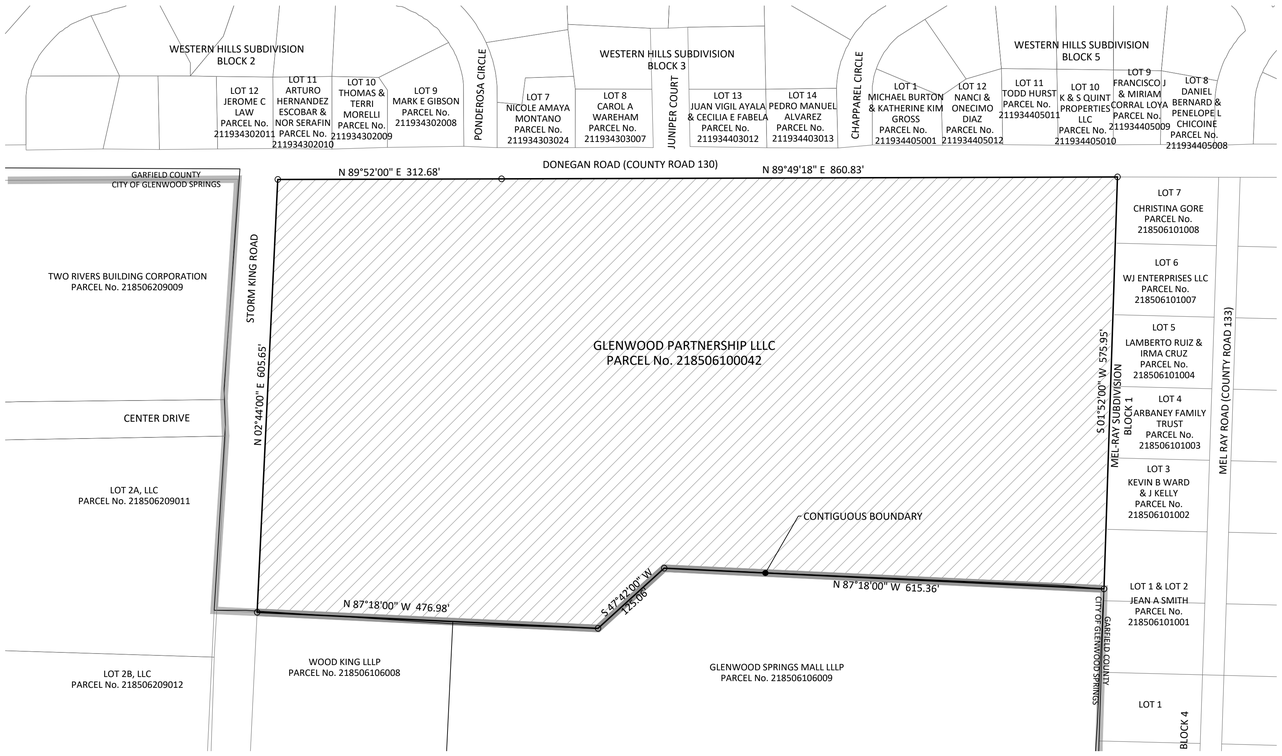
A TRACT OF LAND SITUATED IN SECTION 6, TOWNSHIP 6 SOUTH, RANGE 89 WEST OF THE 6TH P.M. BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE NORTH LINE OF THE GLENWOOD SPRINGS MALL SUBDIVISION WHENCE THE WITNESS CORNER TO THE S1/4 CORNER OF SECTION 34, TOWNSHIP 5 SOUTH, RANGE 89 WEST OF THE 6TH P.M. BEARS N 89° 13' 08" E 866.63 FEET (N 38°40'53" E 853.45 FEET FIELD) SAID POINT OF BEGINNING ALSO BEING THE SOUTHEAST CORNER OF THAT PARCEL DESCRIBED AS PARCEL C IN BOOK 1205 AT PAGE 589 IN THE OFFICE OF THE GARFIELD COUNTY CLERK AND RECORDER;
THENCE ALONG THE EAST LINE OF SAID PARCEL C N 2° 44' 00" E 605.64 FEET TO THE SOUTH RIGHT-OF-WAY LINE OF COUNTY ROAD NO. 130;
THENCE ALONG SAID RIGHT-OF-WAY N 89° 52' 00" E 312.68 FEET;
THENCE (CONTINUING ALONG SAID RIGHT-OF-WAY) N 89° 49' 18" E 860.83 FEET TO THE WEST LINE OF THE MEL-RAY SUBDIVISION;
THENCE ALONG SAID WEST LINE S 1° 52' 00" W 575.96 FEET;
THENCE DEPARTING SAID EAST (WEST) LINE AND ALONG THE NORTH LINE OF SAID GLENWOOD SPRINGS MALL N 87° 18' 00" W 615.36 FEET;
THENCE (CONTINUING ALONG SAID NORTH LINE) S 47° 42' 00" W 125.06 FEET;
THENCE (CONTINUING ALONG SAID NORTH LINE) N 87° 18' 00" W 476.98 FEET TO THE POINT OF BEGINNING.

COUNTY OF GARFIELD
STATE OF COLORADO.

CONTIGUOUS BOUNDARY CALCULATION

TOTAL BOUNDARY	3572.51'
1/6TH CONTIGUITY (3572.51 x 1/6)	595.42'
CONTIGUOUS BOUNDARY	1217.40'

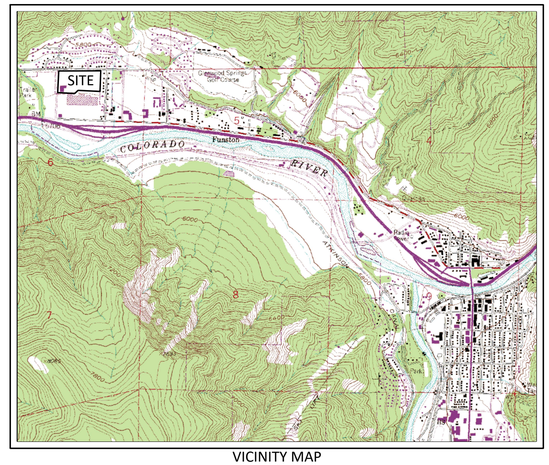


GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

AREA TO BE ANNEXED



VICINITY MAP
SCALE: 1" = 2000'

MAP NOTES

1) DATE OF PREPARATION: October 2020
UPDATED: January 2021

2) BASIS OF BEARING: A bearing of S 01°52'00" W along the westerly boundary line of Mel-Ray Subdivision, according to the map thereof recorded in Book 245 at Page 515 of the Garfield County records.

3) BASIS OF MAP: The Resubdivision of Glenwood Springs Mall Subdivision, the Map of Mel-Ray Subdivision, the Improvement Survey prepared by Sopris Engineering dated January 25, 2021, and the Title Commitment prepared by Land Title Guarantee Company under Order No. ABS63014094-2, effective date January 10, 2020.

4) This survey does not constitute a title search by Sopris Engineering, LLC (SE) to determine ownership or easements of record. For all information regarding easements, rights-of-way and/or title of record SE relied upon the items outlined in Note 3.

5) Adjoiner information was taken from the Garfield County GIS website and is accurate as of this date, January 25, 2021.

6) All references to recorded documents and plats indicated herein refer to the records of the Garfield County Clerk and Recorder.

CITY COUNCIL CERTIFICATE

The annexation depicted on this map was approved by the City Council of Glenwood Springs, Garfield County, Colorado, by Ordinance No. ___, Series of _____, on the _____ day of _____, 2021.

_____
Mayor

Witness my hand and the seal of the City of Glenwood Springs.

ATTEST:

_____
City Clerk

SURVEYOR'S STATEMENT

I, Mark S. Beckler, L.S. No. 28643, a professional land surveyor licensed under the laws of the State of Colorado, do hereby state that the Annexation Map of 480 Donegan, as shown hereon, was prepared under my supervision on the basis of certain plats, deeds and other documents of record which were augmented with a field inspection conducted under my supervision and that such Annexation Map is true and correct to the best of my knowledge and belief.

BY:_____
Mark S. Beckler, L.S. No.28643

_____
Dated

CLERK AND RECORDER'S ACCEPTANCE

This Annexation Map was filed for record in the office of the Clerk and Recorder of Garfield County at _____ o'clock ___.M. on the _____ day of _____, 2021, as Reception No._____.

_____
Clerk and Recorder

By_____
Deputy

SOPRIS ENGINEERING - LLC
CIVIL CONSULTANTS
502 MAIN STREET, SUITE A3
CARBONDALE, COLORADO 81623
(970) 704-0311 SOPRISENG@SOPRISENG.COM

NOTICE: ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER 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 CERTIFICATION SHOWN HEREON.

jb 1/25/2021 - 30017 - G:\2020\30017\SURVEY\Survey DWGs\Survey Plots\30017_ANNEX.dwg

WARNING:
IT IS AGAINST THE LAW:

For anyone to sign this petition with any name other than one's own or to knowingly sign one's name more than once for the same measure or to sign such petition when not a registered elector.

DO NOT SIGN THIS PETITION UNLESS YOU ARE A REGISTERED ELECTOR AND ELIGIBLE TO VOTE ON THIS MEASURE. TO BE A REGISTERED ELECTOR, YOU MUST BE A CITIZEN OF COLORADO AND REGISTERED TO VOTE.

Do not sign this petition unless you have read or have had read to you the proposed measure in its entirety and understand its meaning.

PETITION TO HOLD A REFERENDUM ON AN ORDINANCE ADOPTED BY THE CITY OF GLENWOOD SPRINGS CITY COUNCIL

Pursuant to Section 5.1 of the Charter of the City of Glenwood Springs and C.R.S. §§ 31-11-105, -106, this petition is being circulated to registered electors of the City of Glenwood Springs, Colorado to petition the City Council to hold a referendum to repeal Ordinance No. 08, Series of 2021, AN ORDINANCE OF THE CITY OF GLENWOOD SPRINGS, COLORADO ANNEXING 480 DONEGAN PROPERTY INTO THE CITY.

Pursuant to C.R.S. § 31-11-106(b), the following summary is printed following the warning at the top of each page of a petition section: Ordinance No. 08, Series of 2021.

This ordinance authorizes the City of Glenwood Springs to annex a 15.818-acre parcel of land known as 480 Donegan into city limits.

The full text of the Ordinance is as follows:

WHEREAS, the City of Glenwood Springs ("Glenwood Springs" or the "City") is a 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, GLENWOOD PARTNERSHIP LLLP, a Colorado limited liability limited partnership ("Owner") is the owner of certain real property currently located in unincorporated Garfield County, Colorado, more particularly described on **Exhibit A** attached hereto and incorporated herein (the "Property"); and

WHEREAS, COMMERCIAL DEVELOPMENT SERVICES GROUP, LLC, a Delaware limited liability company ("CDSG") is under contract to purchase a portion of the Property and develop that portion as mixed-use, multi-family housing development; and

WHEREAS, C.R.S. §§31-12-101, *et seq*., authorizes the City and Owner to enter into an Annexation Agreement; and

WHEREAS, the portion of the Property to be retained by Owner is currently developed

for office and warehouse purposes; and

WHEREAS, the portion of the Property to be retained by Owner is currently developed for office and warehouse purposes; and

WHEREAS, Owner desires to annex the Property and connect it to the City of Glenwood Springs and has filed a Petition for Annexation ("Petition") to do the same; and

WHEREAS, the City desires to annex into its boundaries a the Property currently located in unincorporated Garfield County (the "Annexation Parcel", as described on **Exhibit A**); and

WHEREAS, the Annexation Parcel is not solely a public street or right-of-way, and is eligible for annexation in accordance with Article II, Section 30 of the Colorado Constitution, and sections 31-12-104 and 31-12-105, C.R.S.; and

WHEREAS, the Glenwood Springs City Council finds that it is necessary and desirable to annex the Annexation Parcel into the City to permit the development of the area in accordance with the City Code; and

WHEREAS, the City Council therefore desires to annex the Annexation Parcel into the City by the ordinance, in accordance with C.R.S. §§ 31-12-106 and 31-12-501.

NOW, THEREFORE, IT IS ORDAINED BY THE CITY COUNCIL OF THE CITY OF GLENWOOD SPRINGS, COLORADO, THAT

Section 1. **The recitals above are hereby adopted as findings.**

Section 2. The City Council find and determines that the Annexation Parcel is eligible for annexation in accordance with Section 30(1)(c) of Article II of the Colorado Constitution and C.R.S. §§ 31-12-104(1)(a), 31-12-105, and 31-12-106(3), in that the proposed annexation:

(a) Would not divide any lands held in identical ownership;
(b) Is less than twenty acres and, as such, does not implicate C.R.S. § 31-12-105(1)(b);
(c) Is for territory for which no annexation proceedings have been commenced for annexation into another municipality;
(d) Would not result in the detachment of area from any school district and the attachment of the same to another school district;
(e) Would not result in the extension of the City's geographic boundary more than three miles in any direction from any point of the current boundary; and
(f) Is property for which not less than one-sixth the perimeter is contiguous with the current City boundary.

Section 3. The City Council does hereby annex the Annexation Parcel to be included in the corporate boundaries of the City of Glenwood Springs.

Section 5. The City Clerk shall promptly complete all filings required of the City to be made by the provisions of Section 31-12-113, C.R.S.

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This ordinance authorizes the City of Glenwood Springs to annex a 15.818-acre parcel of land known as 480 Donegan into city limits.

The following 3 persons shall represent the proponents in all matters affecting this petition and who shall receive notices or information about the petition.

1. Name: [redacted]
2. Name: [redacted]
3. [redacted]

No	Signature as appears on Voter Reg	Printed Name	Street Address	City/State	Date
1..					
2.					
3.					
4.					

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No	Signature as on voter reg	Printed name	Street Address	City/State	Date
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

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No	Signature as on voter reg	Printed name	Street Address	City/State	Date
13					
14.					
15.					
16.					
17.					
16.					
18.					
19.					

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No	Signature as on voter reg	Printed name	Street Address	City/State	Date
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					

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This ordinance authorizes the City of Glenwood Springs to annex a 15.818-acre parcel of land known as 480 Donegan into city limits.

No	Signature as on voter reg	Printed name	Street Address	City/State	Date
28.					
29.					
30.					
31.					
32.					
33.					
34.					
35.					

AFFIDAVIT OF CIRCULATOR

I do solemnly affirm under penalty of perjury that:

- I have read and understand the laws governing the circulator of petitions.
- I am a citizen of the United States, and at least 18 years old.
- I am the circulator of the petition.
- Each signature on this petition was affixed in my presence.
- Each signature on this petition is the signature of the person whose name it purports to be.
- To the best of my knowledge and belief each of the persons signing this petition was, at the time of signing, a registered elector.
- I have not been paid and will not in the future be paid and that upon information and belief that no other person has been paid, directly or-indirectly, to induce or cause such signor to sign his or her signature to the petition.
- I understand that I can be prosecuted for violating the laws governing the circulation of petitions and truthfully complete this affidavit and that each signature on the petition was affixed in the circulator's presence.
- I understand that I am requited to provide my permanent residence or temporary street address I am staying in Colorado.

Circulator Name (please print)

Last Name_____ First Name _____

Permanent Residence Address (or location if homeless):

Street name and number (no PO Box) _____City/Town_____County_____ State____

Zip Code _____

Temporary Colorado Address (if you are not a Colorado Resident)

Street name and number (no P.O. Boxes)	City/Town	County	State	Zip Code

Sign and Date in the Presence of a Notary

Signature of Circulator	Date of Signing

STATE OF COLORADO, COUNTY OF _____

Subscribed and affirmed before me this _____ (Day) day of _____ (Month), 20_____ (Year)

by _____ (Printed name of Circulator above).

Stamp notary seal within the box below

Type of ID provided by circulator:

_____

(Do not accept out-of-state driver's license; use any ID from Acceptable Forms of ID list on Colorado Secretary of State's website)

Signature (and Title) of Notary / Official Administering Oath:

_____

My Commission Expires: _____

From: Annie Uyehara
To: Ryan M. Muse; Debra Figueroa
Subject: Please put this in the city council packet for the Jan. 6th meeting
Date: Saturday, December 25, 2021 3:39:43 PM

Hello,

Please add this email to packet for the Jan. 6th city council meeting.

Thank you!

Annie Uyehara

> Dear Ms. Wussow, Ms. Stepp and Mr. Hershey—
>
>
> I'm writing to you to ask you to repeal the motion made to approve the annexation of 480 Donegan during your January 6th meeting.
>
> We've produced 1,600+ signatures against the development, and now, we have 3x the amount of signatures needed to have a referendum vote on 480 Donegan.
>
> To save the city money, and to end this whole ordeal for so many people, I am humbly asking you to repeal it.
>
> Hopefully, the developers, or new ones, will come back with a smaller development that has a sizable amount of affordable housing, a childcare facility, and public parkland. The Diemoz pasture is the last lot left in which to have parkland of any decent size in western Glenwood Springs, if I'm not mistaken, and once it's gone, it's gone. We've already witnessed other communities surrounding us on both sides of Glenwood, coming up with solutions for all three of these issues.
>
> You've heard it so many times before: 480 Donegan is too large and too soon and incompatible for the space in which it lies.
>
>
> Thank you very much,
>
>
> Annie Uyehara
> PS: You know I speak for many!
>
>
>

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item:	Repeal Ordinance 2021-08
Action Requested:	Decide whether or not to repeal Ordinance 2021-08; 480 Donegan Annexation
Department:	City Clerk
Presented By:	Ryan Muse, City Clerk
Background Info:	If the Council chooses to repeal the Ordinance, they may do so on a motion. No Ordinance is needed.
Issues:	NA
Staff Recommendation:	NA

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: Resolution 2022-02; Set Referendum for the May 3rd Election Date

Action Requested:

Department: City Clerk

Presented By: Ryan Muse, City Clerk

Background Info: If the Council chooses, they may adopt Resolution 2022-02 and set the Referendum for the May 3rd election.

Issues: NA

Staff Recommendation: Staff defers to Council.

RESOLUTION 2022-02

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF GLENWOOD SPRINGS, COLORADO, FIXING BALLOT TITLE FOR REFERENDUM CONCERNING ORDINANCE NO. 8, SERIES 2021.

WHEREAS, the City of Glenwood Springs ("Glenwood Springs" or the "City") is a home-rule municipality organized under Article XX of the Colorado Constitution and with the authority of the Glenwood Springs Home Rule Charter (the "Charter"); and

WHEREAS, on November 4, 2021 the Glenwood Springs City Council on second reading approved Ordinance No. 8, Series 2021; and

WHEREAS, in accordance with Charter Section 5.2.1 on November 4, 2021 Elizabeth Phillips, Corina Jones, and Tracy Trulove (collectively, the "Circulators") filed a notice of intent to circulate a referendum petition within ten days of final publication of Ordinance No. 8, Series 2021; and

WHEREAS, in accordance with C.R.S. Section 31-11-106, the City Clerk on November 23, 2021 approved the form of petition submitted by the Circulators seeking to hold a referendum on the adoption of Ordinance No. 8, Series 2021; and

WHEREAS, in accordance with Charter Section 5.2.1 on December 9, 2021 the Circulators submitted the referendum petition to the City Clerk within twenty-one days of the submission of the notice of intent to circulate; and

WHEREAS, in accordance with C.R.S. Section 31-11-109, the City Clerk determined that the petition was sufficient and issued a statement of sufficiency for that petition on December 17, 2021; and

WHEREAS, in accordance with C.R.S. Section 31-11-105, and Charter Section 5.3(c) the City Clerk has presented the petition to the City Council, which has reconsidered Ordinance No. 8, Series 2021 and determined to submit to the electors the question as set forth in the petition; and

WHEREAS, by Resolution No. 32, Series 2021 the City Council has called a special election to be held on May 3, 2021, which in accordance with Charter Section 5.2 is within 150 days of the date that the City Clerk presented the petition to City Council

WHEREAS, in accordance with C.R.S. Section 31-11-111(1) after an election has been ordered, Council shall promptly fix a ballot title for the referendum.

NOW, THEREFORE, IT IS RESOLVED BY THE CITY COUNCIL OF THE CITY OF GLENWOOD SPRINGS, COLORADO, THAT:

Section 1. The above recitals are hereby incorporated as findings.

Section 2. The form of the ballot shall be as follows:

SHALL ORDINANCE NUMBER 8, SERIES 2021 OF THE CITY OF GLENWOOD SPRINGS, AN ORDINANCE THAT AUTHORIZES THE CITY OF GLENWOOD SPRINGS TO ANNEX A 15.818-ACRE PARCEL OF LAND KNOWN AS 480 DONEGAN INTO CITY LIMITS, BE REPEALED?

_____ YES

_____ NO

INTRODUCED, READ AND PASSED THIS _____ DAY OF _____ 2022.

CITY OF GLENWOOD SPRINGS, COLORADO

ATTEST: Jonathan Godes, Mayor

Ryan M. Muse, City Clerk

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item:	Ordinance 2022-02; Campaign Finance
Action Requested:	Approval of Ordinance.
Department:	City Administration
Presented By:	Debra Figueroa, City Manager
Background Info:	Ordinance 2022-02; Campaign Finance, adopts procedures for filing and reviewing campaign finance complaints. It also sets an individual campaign contribution limit of $400 per committee. All other rules not set in this ordinance default to the State Fair Campaign Practice Act rules.
Issues:	None
Staff Recommendation:	Staff recommends approval

ORDINANCE NO. 02

Series of 2022

AN ORDINANCE OF THE CITY OF GLENWOOD SPRINGS, COLORADO, AMENDING ARTICLE 010.030 OF THE GLENWOOD SPRINGS MUNICIPAL CODE TO PROVIDE FOR A PROCESS ADDRESSING COMPLAINTS ALLEGING CAMPAIGN FINANCE LAW VIOLATIONS AND ADOPTING VARIOUS ELECTION LAWS BY REFERENCE.

WHEREAS, the City of Glenwood Springs ("Glenwood Springs" or the "City") is a home- rule municipality organized under Article XX of the Colorado Constitution and with the authority of the Glenwood Springs Home Rule Charter; and

WHEREAS, pursuant to its home rule authority, the City, acting through its City Council (the "Council"), is authorized to adopt ordinances regulating matters concerning campaign finance in municipal elections, including the provision of a complaint process relating thereto; and

WHEREAS, in its 2019 Regular Session, the Colorado General Assembly adopted SB19-232, which provides, inter alia, that "any complaint arising out of a municipal campaign finance matter must be exclusively filed with the clerk of the …municipality"; and

WHEREAS, the 2019 legislation necessitates an update to the process by which the City may address complaints alleging violation the campaign finance laws applicable in City elections, which update also presents an opportunity to clarify which laws govern City elections.

WHEREAS, the City Council finds and declares that the amendments to Article 010.030 set forth in **Exhibit A**, hereto and incorporated herein by this reference, are in the best interest of the City.

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

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

Section 2. Article 010.030 of the Glenwood Springs Municipal Code is hereby amended as set forth in **Exhibit A** attached hereto.

Section 3. Any ordinances or resolutions or parts thereof, which are in conflict with this ordinance, are hereby repealed to the extent of such conflict only.

Section 4. With the exception of the provisions of the Municipal Code of the City of Glenwood Springs which are modified as provided herein, all remaining provisions of the Municipal Code of the City of Glenwood Springs shall remain in full force and effect.

INTRODUCED, READ ON FIRST READING, PASSED AND ORDERED PUBLISHED BY TITLE ONLY THIS ____ DAY OF JANUARY 2022.

CITY OF GLENWOOD SPRINGS, COLORADO

_____

Jonathan Godes, Mayor

ATTEST:

_____

Ryan Muse, City Clerk

INTRODUCED, READ ON SECOND READING, AND ORDERED PUBLISHED BY TITLE ONLY TO BE EFFECTIVE TEN DAYS FOLLOWING THE DATE OF SECOND PUBLICATION THIS ____ DAY OF _____ 2022.

CITY OF GLENWOOD SPRINGS, COLORADO

_____

Jonathan Godes, Mayor

ATTEST:

_____

Ryan Muse, City Clerk

010.030.030 – State Election Codes Adopted

Except as otherwise provided by charter or ordinance, including the provisions of this chapter, the following statutes and their implementing rules and regulations, as the same presently exist or as they may be in the future amended, are hereby adopted by the City and shall govern the conduct of all elections held within the City:

(a) C.R.S. 31-10-101 et seq., also known as the "Colorado Municipal Election Code;"

(b) C.R.S. 1-1-102 et seq., also known as the "Uniform Election Code;" and

(c) C.R.S. 1-45-101 et seq., also known as the "Fair Campaign Practices Act;"

(d) C.R.S. 31-11-101 et seq., the law governing municipal initiatives, referenda and referred measures;

(e) C.R.S. 31-4-501, et seq., the law governing municipal recalls; and

(f) C.R.S. 31-2-201, et seq., the law governing the adoption and amendment of the Home Rule Charter.

010.030.040 – Municipal Campaign Contribution Limits.

(a) No person shall make contributions to any single committee that, in the aggregate, exceeds four hundred dollars ($400.00) with respect to any election cycle in which such committee is participating in a municipal election.

(b) For the avoidance of doubt and in accordance with the Fair Campaign Practices Act rules at 8 CCR 1505-6, contributions may only be made to a committee, and not to any individual candidate.

(c) For the purposes of this Section, words shall have the meanings defined in 8 CCR 1505-6 – Rules Concerning Campaign and Political Finance; Rule 1 Definitions, as may be amended.

010.030.050 - Fair campaign practices; enforcement of municipal campaign finance complaints.

(a) Any person who asserts that a violation of Article XXVIII of the Colorado Constitution, the Colorado Fair Campaign Practices Act (C.R.S. §§ 1-45-101 et seq.), or the implementing rules at 8 CCR 1505-6, as amended, has occurred related to a City election may file a written complaint with the City Clerk.

(b) Complaints must be filed no later than thirty (30) calendar days after the complainant knew or should have known by the exercise of reasonable diligence of the alleged violation.

(c) A complaint shall include the following information and any other information that the City Clerk deems necessary to process the complaint:

(1) The name, address, e-mail address, telephone number and signature of the complainant (if the complainant is represented by counsel, include the counsel's name, address, e-mail address, telephone number and signature along with the name, address, e-mail address, telephone number and signature of the complainant);

(2) The name and, if known, the telephone number, email address, and mailing address of the respondent(s) (or each person alleged to have committed a violation);

(3) The particulars of the alleged violation(s), including the specific factual and legal basis for the allegation(s); and

(4) Documentation or other evidence supporting the allegation(s).

(d) A complaint may be submitted by personal delivery, mail, or electronically.

(e) Initial review of complaint.

(1) The City Clerk will review the complaint to determine:

(A) Whether the complaint was timely filed in accordance with this section;

(B) Whether the complainant has specifically identified a violation(s) of Article XXVIII of the Colorado Constitution, the Colorado Fair Campaign Practices Act, or any local campaign finance laws or rules adopted and promulgated by the City concerning a municipal election;

(C) Whether the complainant has alleged sufficient facts and or provided sufficient information to support a legal and factual basis for the complaint; and

(D) Whether it is possible through reasonable efforts, to identify the subject(s) of the complaint. If the subject is identifiable, the City Clerk shall promptly notify the subject of the complaint in writing.

(2) Within fifteen (15) business days of receiving the complaint, the City Clerk must take one or more of the following actions following initial review:

(A) If the City Clerk determines that the complaint fails to satisfy all of the criteria in subsection (e)(1), the City Clerk will dismiss the complaint and notify the complainant and respondent of the reasons for dismissal. The City Clerk's determination and dismissal are a final decision.

(B) If the City Clerk determines that the complaint satisfies all of the criteria in subsection (e)(1), and alleges one (1) or more curable violations as described in subsection (f), the City Clerk will notify the respondent(s) in writing and provide an opportunity to cure as described in subsection (g), holding in abeyance any alleged violations that may not be curable.

(C) If the City Clerk determines that the complaint satisfies all of the criteria in subsection (e)(1), and that none of the alleged violations are curable, the City Clerk will proceed to set the matter for a hearing as described herein.

(f) Curing violations.

(1) Upon the City Clerk's determination that a complaint alleges a failure to file or otherwise disclose required information, or other curable violation, the City Clerk will notify the respondent(s) in writing and advise them of the curable deficiencies alleged in the complaint.

(2) Respondents shall have fifteen (15) business days from the date the notice is issued by the City Clerk to cure the alleged violation(s) and to notify the City Clerk, in writing, of actions taken to cure the alleged violation(s).

(3) The City Clerk will determine, within seven (7) business days of receipt of the respondent's notice of proposed cure, or, if no response, upon expiration of the cure period, whether the respondent(s) cured the violation(s), and if so, whether the respondent(s) "substantially complied" or acted in "good faith" as described herein. The City Clerk may ask the respondent(s) to provide additional information, and may grant an extension of time to cure the violation(s).

(A) If the City Clerk determines that the respondent(s) substantially complied or acted in good faith in curing any alleged violation, the City Clerk will dismiss the complaint as to such violation. The City Clerk's determination and dismissal are a final decision.

(B) If the City Clerk determines that the respondent neither substantially complied nor acted in good faith in curing any alleged violation, the City Clerk shall set the matter for a hearing and notify the complainant and respondent in writing.

(C) The City Clerk will schedule a hearing with respect to any alleged violations held in abeyance after the City Clerk's initial evaluation of the complaint.

(4) In determining whether an entity "substantially complied," the City Clerk must consider:

(A) The extent of the noncompliance;

(B) The purpose of the provision violated and whether that purpose was substantially achieved despite the noncompliance; and

(C) Whether the noncompliance can properly be viewed as an intentional attempt to mislead the electorate or election officials.

(5) In determining whether an entity registered or disclosed in "good faith," the City Clerk may consider whether ten (10) percent or less of either the entity's disclosures or, alternatively, the reported dollar amounts required on the report or appearing on the filed reports at issue in the complaint are out of compliance.

(g) Hearing.

(1) When required, a hearing before the City Clerk shall be scheduled as soon as practicable with due regard for the convenience and necessity of the parties but, unless an extension of time is granted by the City Clerk, the hearing shall be held within fifteen (15) business days after the date of notice to the parties. The City will not be a necessary party to the hearing and will not represent either the complainant, or respondent, but may intervene as a party on its own behalf.

(2) Notice of the hearing shall include any applicable rules of the City Clerk governing the hearing process and the respondent(s) shall also receive a copy of the entire complaint received by the City Clerk.

(3) Upon written motion, the City Clerk may grant either party a continuance of up to thirty (30) calendar days upon a showing of good cause.

(4) Upon the request of either party, the City Clerk may issue administrative subpoenas requiring the attendance of a witness or party in relation to an alleged local campaign finance violation, which shall be served on the party to whom it is directed by the

requesting party pursuant to Rule 4, Colorado Rules Civil Procedure ("C.R.C.P."). It shall be unlawful for a witness or party to fail to comply with such subpoena.

(5) The hearing shall be electronically recorded and held in substantial conformance with such rules as the City Clerk may have promulgated, including rules for holding hearings remotely by electronic means, when necessary, in the opinion of the City Clerk. At the hearing, the complainant and the respondent(s) shall be present, and the complainant shall have the burden of proof to establish the alleged violation(s) by a preponderance of the evidence.

(6) Following the hearing, the City Clerk shall issue a decision in writing within seven (7) business days.

(7) If the City Clerk determines after a hearing that a violation has occurred, the City Clerk's decision shall include any appropriate order, sanction, or relief authorized hereunder and may include, without limitation, sanctions as follows:

(A) A civil penalty, payable to the City, of at least double the amount contributed, received, or spent in violation of any contribution prohibition or in violation of a contribution reporting requirement.

(B) A civil penalty, payable to the City, in the amount of fifty dollars ($50.00) per day for each day that a statement or other information required to be filed pursuant to Article XXVIII of the Colorado Constitution or the Colorado Fair Campaign Practices Act (C.R.S. §§ 1-45-101 et seq.), is not filed by the close of business on the day due.

(C) An order requiring disclosure of the source and amount of any undisclosed contributions or expenditures.

(D) An order requiring the return to the donor of any contribution made which was the subject of a violation.

(8) The City Clerk's decisions are a final decision subject to review under Rule 106(a)(4), C.R.C.P.

(9) Candidates shall be personally liable for penalties imposed upon their candidate committee.

(10) The City may pursue any legal means for the collection of civil penalties imposed under this article. The City administrator may also refer the matter for collection by whatever means are available to the City, including by a private collection agency, and the party responsible to pay the penalty may be assessed the cost of collection.

010.030.060 – Clerk to refer violations.

In the event the City Clerk becomes aware of a potential campaign violation through a means other than a complaint filed pursuant to section 010.030.050, including but not limited to failing to timely file required reports, the Clerk shall refer the facts of such potential violation to the City Attorney for investigation. The City Attorney may file a complaint pursuant to section. 010.030.050.

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: Paid Parking Decision to Move Forward with Pricing

Action Requested: Decision to move forward or not with the pricing of a small program. See options below.

Department: Engineering

Presented By: Terri Partch, City Engineer

Background Info: At the November 10th meeting, staff presented the connection between community concern regarding current and increasing congestion and transportation demand management as a group of measures to reduce the use of single occupancy vehicles.

As stated in the last presentation, paid parking, along with increasing congestion on the roadways, are two of the most effective measures to incentivize people to drive less.

Staff also presented the results of the community input sessions regarding paid/managed parking.

At the Council work session, it seemed that some of the Council wanted to have an option of moving forward slowly with a paid/managed parking program, while some of the Council were opposed to paid parking entirely.

Here are a few suggestions for small programs to move forward with:

Program 1- Not budget neutral

Enforce the regulations we have.

- Add another parking management officer for the downtown area.
- Add license plate recognition vehicles and software for two officers
- Add software for ticket management to allow easier collection and the ability to increase fines for repeat offenders.

The DDA has indicated that they may be willing to help the City with the costs of better managing the regulations we have.

Program 2 - Potentially budget neutral

- Add all of the items from Program 1
- Add paid parking from 9th to 7th, as well as paid parking in the City's parking structure and off street lots.
- Add management of free employee permits at the WW lift station lot.

Issues: None at this time.

Staff Recommendation: Staff recommends that the Council take the next step to price a small paid /managed parking program.

Reduction of Traffic and Congestion

Transportation Demand Management Program and Paid Parking

Resident Top Issues, Priorities & Problems

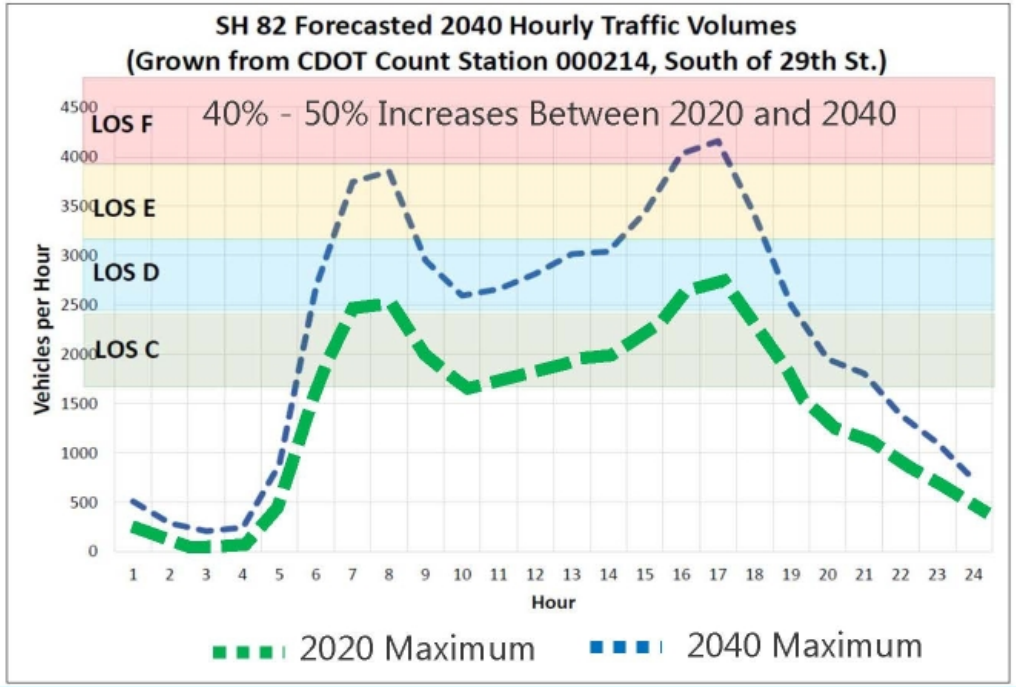
Please describe the top issues, priorities, or problems that you think the City of Glenwood Springs should address in the next three years.



Affordable Housing.	36.59%	311
Street & road repairs	29.41%	250
Traffic & Congestion	23.53%	200
parking	11.65%	99
Homelessness.	9.65%	82
development	8%	68
water	7.76%	66
infrastructure	7.65%	65
building	6.12%	52
growth	5.53%	47



2040 Congestion in Glenwood Springs



Traffic

Average Daily Traffic is projected to grow from 24,000 AADT to 46,000 ADT in 2040.

Transportation Demand Management Definitions

Federal Highway Administration TDM Desk Reference, 2012:

"A set of strategies aimed at maximizing traveler choices"

-As an alternative to building more lane-miles, TDM seeks to get improved efficiency out of existing transportation infrastructure.

CDOT Statewide Transportation Demand Plan, 2019:

"The application of strategies and policies to reduce motor vehicle travel demand, or to redistribute this demand in space or in time.



CITY OF GLENWOOD SPRINGS TRANSPORTATION

TDM Core Strategies

- Transit – Local, Regional, Intercity
- Vanpools
- Carpools
- Walking
- Bicycling
- First /Last Mile Walking & Bicycling – connect to transit
- Variable Work Hours
- Telecommuting



CITY OF GLENWOOD SPRINGS TRANSPORTATION

TDM Support Strategies

- Rideshare Matching
- Guaranteed Ride Home
- Parking Management
- Incentives – financial, time off, transit passes
- Marketing & Education
- Market-Based – toll roads, managed lanes, parking cost
- ITS – incl. Smart Cards for Transit
- App-based – MaaS (Mobility as a Service)
- All-modes infrastructure



CITY OF GLENWOOD SPRINGS TRANSPORTATION

Three Levels or Scales of a TDM Program

Downtown

Glenwood Springs

Regional – Aspen to Parachute

Downtown and Glenwood Traffic Types

- Business owners and employees
- Downtown residents
- Tourists
- Local through-commuters, shopping and eating out
- Big truck deliveries/freight
- Small personal deliveries – meals, parcels (UPS, Fed Ex, etc)
- Driving around searching for parking – 30%
- Through-traffic, regional travel
- Emergency

Create Downtown Transportation Management Association

- COGS initiates and provides start-up funding
- Identify partners
- Analyze business owner/employee survey
- Hire TDM consultant (small contract) to set up ETCs, tech platform, incentive programs
- Fast track needed infrastructure improvements & transit services
- Set up future funding plan and seek grants
- Establish data collection protocol
- Triggered by managed/paid parking initiative

CDOT Grant Available for TDM Program Start Up. Are we interested in pursuing it with some of these ideas?

Why would anyone choose to get out of their cars?

- Current and Projected Worsening of Traffic and Congestion
- Scarcity of Parking at Your Destination
- Having to Pay for Parking at your Destination

Benefits of Managed/Paid Parking Downtown

- Frees up parking for business patrons and tourists
- Eases congestion, auto emissions by reducing parking space hunt and reducing the number of cars overall
- Improves safety & quality of Downtown public spaces
- Generates revenue for expanding transportation options

Paid/Managed Parking Input –Sample of Comments

- Manage our current lots only instead of on street parking
- Should manage the parking to 85% occupancy without charging people.
- Add more garages first and manage the current time limitations
- Don’t charge employees or downtown residents to park
- City and County should provide transit passes for their employees
- Never let developers reduce the required amount of parking
- Paid parking will negatively affect business. Parking should be free.
- Paid parking will force more cars out to the residential areas
- No to paid parking!
- Paid parking is part of the evolution of a resort town.
- Don’t allow housing to be constructed without off street parking
- Paid parking will not stop people from circling the block

Paid/Managed Parking Input –Sample of Comments

- Need residential parking management. Residential cars should be moved every 48 hours.
- City and County lots should be used for public parking also
- Why restrict overnight parking?/ Overnight parking should be prohibited in City lots.
- Provide a lot for RVs
- Snow plowing limits parking spots through icing and snow piles.
- Provide a shuttle service between the hotels and dining.
- Park Mobile app is easy to use
- Allow garages to be used by residents after a certain time. Have them out by 8:00 am
- Paid parking should be one block east and west of grand, not two.
- Build parking structures on the west side of downtown and force long term parking users to these structures

Paid/Managed Parking Input-Sample of Comments

- Provide spaces for residents downtown, perhaps with payment.
- City and County should build multilevel parking lots on their property.
- Need parking to be managed on the weekends
- Agree that there should be no residential parking in the two hour spots
- Provide exceptions for downtown residents between the hours of 6pm and 6 am.
- Need to increase penalties
- Permits for residents will discourage rentals and ADUs/ Make it illegal to operate and ADU downtown
- Adequate public transportation is needed across the valley to accommodate workers
- Free employee permits in certain lots/ USFS would be interested in paying for employee passes.

Ideas in response to the public comments that we'd like to propose:

- Free downtown parking for each license plate for 30 minutes -1 hour for pick up and deliveries
- Free employee passes in the WWTP lot (Propose expanding this and adding new spaces)
- Low cost employee passes in the residential areas near downtown
- Up to three free residential passes for areas around the downtown. Low cost permits for additional cars.
- Free downtown residential permits available for the City garage between the hours of 5:00pm and 8:00 am. Cars must move after 8:00am
- Up to two long term downtown residential car storage permits available for the WWTP lot.
- Improved enforcement through license plate recognition technology, Smart Park or similar technology for parking management by space/block and payment kiosks for those who can't pay through a cell phone.
- Weekend parking management
- Progressive pricing for parking in the downtown area up to four hours.
- Increased fines for repeat offenders for parking tickets
- Work towards a delivery management plan for downtown businesses . It looks like early morning hours for deliveries might work?

Other TDM Ideas in Progress:

- In the 2022 Budget we plan to evaluate increased service to North and South Glenwood
- We are working with RFTA to identify a BRT route to connect West and South Glenwood
- We are working with RFTA on We Cycle implementation in town
- We are improving pedestrian/bike infrastructure in these areas:
  - Underpasses at 27th and SH 82
  - Evaluating improved connectivity between Midland and the underpasses along 27th Street
  - Proposing raised crosswalks on Mount Sopris, and at 12th and 14th on Blake

End of presentation

City of Portland ideas if we have time

The Way to Go Plan: Moving People in Portland

A Transportation Demand Management strategy to advance our mobility, climate, and equity goals





PBOT engages with large employers to increase transit usage to remedy Portland's violation of the **CLEAN AIR ACT.**

TRANSPORTATION OPTIONS DIVISION formed at PBOT.

TRAVELSMART piloted in Multnomah Village.

PBOT launches **SMARTTRIPS** program.

SMARTTRIPS DOWNTOWN launches, coinciding with the construction of the MAX Green line.

SMARTTRIPS BUSINES and **SMARTTRIPS RESIDENTIAL** program launched.

1990s | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009



SAFE ROUTES TO SCHOOL Program begins.

First **SUNDAY PARKWAYS** opens the city's largest public space—its streets—for people to walk, bike, and roll.





Transportation Options Division reorganizes as the **ACTIVE TRANSPORTATION DIVISION.**

SMARTTRIPS NEW MOVERS launches.

PBOT launches Portland's bike-share system, **BIKETOWN.**

PBOT launches the **TRANSPORTATION WALLET** program.

The PBOT Strategic Plan **MOVING TO OUR FUTURE** makes TDM and mobility-related policies, programs, and projects central to the work of the city.

PBOT launches the **PRICING OPTIONS FOR EQUITABLE MOBILITY (POEM)** project.

BIKETOWN transitions to e-assist bikes and expands service area.

2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020



City adopts **VISION ZERO POLICY.**

ACTIVE TRANSPORTATION AND SAFETY DIVISION brings TDM, Safe Routes to School, micromobility management, and Vision Zero into a single team.



PBOT initiates its **SHARED ELECTRIC SCOOTER** pilot.

PRICING OPTIONS FOR EQUITABLE MOBILITY

FINAL REPORT



CITY OF PORTLAND
PORTLAND BUREAU OF TRANSPORTATION
PORTLAND BUREAU OF PLANNING AND SUSTAINABILITY

Bureau of Planning and Sustainability

PBOT



DEVELOPED FOR

PBOT

PERFORMANCE BASED

PARKING

MANAGEMENT MANUAL

APRIL 2018



DEVELOPED BY

Kimley»Horn

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: Franchise Management/Spring Cleanup

Action Requested: Direction on Spring Cleanup

Department: Public Works

Presented By: Matthew Langhorst, Public Works Director

Background Info: Spring Cleanup has been an ongoing discussion since the City of Glenwood Springs stopped providing trash collection services to the residents and businesses of Glenwood Springs in 1983. When curbside collection services run by the city was discontinued, the City implemented a large curbside cleanup effort to help replace a portion of the trash collection services lost to the public. At that time the City had a population half the size that it does now, so the time requirements to complete the collection process was significantly smaller.

The trash collection process that was completed the last year of Spring Cleanup, 2019, was a time consuming one because the trash is not just collected, but sorted out pile by pile by hand so that all possible items that could be recycled or composted, were disposed of in the correct manner at the landfill.

Due to the COVID-19 pandemic and the amount of work time lost to the Streets/SWAT crews each year to complete the cleanup process, staff is still recommending that we once again do not complete the cleanup in 2022 and that we start the process of Curb Side Trash Franchising so that other methods of trash collection can become available to the general public for 2023.

Issues: Public Notifications and Outreach

Staff Recommendation: Staff is recommending that the City move forward with City wide trash collection franchising meeting state statutes and modeled after the franchising process that Carbondale completed in 2019. This model provides a small charge built into the trash collection fee that allows the town to hold a community wide "spring cleanup" process at a specific location that would be run by the hauler and not by the town/city. This would still allow for a city-wide community cleanup effort each spring. Staff will discuss franchising and spring clean up timing with the Council during the meeting.

City Council
STAFF REPORT
City of Glenwood Springs
January 6, 2022

Agenda Item: Code of Conduct

Action Requested: Discussion will be led by Mayor Pro-Tem Willman.

Department: City Administration

Presented By:

Background Info: Attached are drafts for a Code of Conduct and Rules of Procedure. City Council is anticipated to lead this discussion.

Issues: None.

Staff Recommendation: Staff defers to City Council.

City of Glenwood Springs
Charter and Municipal Code Provision Summary
Colorado Open Meetings Summary
Notes - Prepare by Charlie Willman, Third Ward Councilperson - May & June 2020

I. **Charter - Article III - City Council**
- A. 3.1 - powers include "to preserve and enforce good government."
- B. 3.3 - Mayor - presiding officer and "required to vote"
- C. 3.5 Vacancies - created by
  1. Recall
  2. Death
  3. Incapacitation
  4. Resignation
  5. Missing three consecutive regular meeting of City Council
  6. Becomes a non resident of City
  7. Becomes a non resident of Ward for which Councilperson is elected
- D. 3.6 Oath of Office includes "faithfully perform the duties of his or her office."
- E. 3.10 Council-Administration Relations - conducted solely through the City Manager and no member "shall give orders to any of the subordinates of the City Manager
- F. 7.1 - Boards and Commissions - shall operate in accordance with the rules of procedure set forth by Council
- G. 13.12 Violations of Charter and Municipal Code - misdemeanor with fine of up to $1000 and imprisonment of up to one year.

II. **Municipal Code 020**
- A. 020.010 - Council
  1. .010 - powers as noted above - and to establish "policy for all boards and commissions per 020.020.010
- B. 020.020 - Boards and Commissions
  1. .020 (15) - mayor may appoint up to two Council members to act as liaison between Council and a Board or Commission
  2. .040 (d) members shall be subject to removal, at any time, by City Council
- C. 020.030 - Conduct and Procedures for Meetings
  1. .030 (1) work sessions are
     a. to be "devoted exclusively to matters regarding which the interchange of information preliminary to taking action there is deemed to be essential."
     b. No formal votes are taken nor "shall any member enter into a commitment with another respecting a vote to be taken subsequently at a formal meeting."
     c. "To encourage the interchange of ideas at work sessions, it shall be standing policy that individual members not be quoted on ideas that they propose."

2. .030 (2) conference sessions seem to be the same as work sessions in definition

D. 020.050 - Open Meetings - Executive Sessions
   1. Open except Council may conduct executive sessions (note - no provision for Boards and Commissions to hold executive sessions).
   2. Executive Session
      a. only during regular or special meeting of Council
      b. No final policy decision, resolution, rule, regulation, formal action or approving a contract or to pay money can be made.
      c. Limited to:
         (1) Consider the appointment, employment or dismissal of the City Manager, Municipal Judge or City Attorney.
         (2) Hear charges or complaints brought against the City Manager, Municipal Judge or City Attorney.
         (3) Hear testimony and statements concerning persons proposed as members of a board or commission.
         (4) Legal matters which come within the attorney-client privilege.
         (5) Discussions with the Chief of Police, District Attorney or their appointed representatives on matters posing a threat to the security of public buildings, public services or facilities.
         (6) To determine the City's position relative to issues that may be subject to negotiation, to receive reports on negotiation progress and status, to develop strategy and to instruct the City's negotiators.

E. 020.070 - agendas -
   1. Roll call
   2. "An agenda shall also include approval of minutes of previous meetings, **reports from boards and commissions**, old business, new business, communications, citizens appearing before the Council, introduction and adoption of resolutions and ordinances, **departmental reports** and adjournment.
   3. Only matters on agenda may be considered at regular meetings unless a majority of council approves - (**Note** - cannot add items to special meetings.)

F. 020.080 - Presiding officer is Mayor or in absence Mayor Pro Tem - provisions if both are missing

G. 020.090 - Conduct of meetings
   1. 1.b. Every Council Member desiring to speak shall address the chair and, upon recognition by the presiding officer, shall confine himself to the question under debate, avoiding all personalities and indecorous language.
   2. 1.c. A member, once recognized, shall not be interrupted while speaking unless it be to call him/her to order or as may be otherwise provided. If a member, while speaking, is called to order, he/she shall cease speaking

until the question of order is determined; and, if in order, he/she shall be permitted to proceed.

3. 2.c. Members of public limited to **five minutes** unless presiding officer grants an extension (Note - 2.e. - if council asks questions - not part of five minutes
4. 2.d. - comments must be addressed to council as a whole and not to any specific member and questions should be directed to Council through the presiding officer.
5. 2.f. - after public comment is closed - all further debate is Council only
6. 2.g. - prior to comment - presiding officer sees how many persons want to comment on an issue - if more than 5 members of public - can limit time to less than five minutes
7. 3. – "Any person who makes personal, impertinent or slanderous remarks while Council is in session or who shall become boisterous while addressing the Council shall be forthwith barred from further audience before the Council by the presiding officer unless permission to continue is granted by a majority vote of the Council. The Chief of Police, or such member or members of the Police Department as he/she may designate, shall be the sergeant-at-arms of the Council meetings. He/she shall carry out all orders and instructions given by the presiding officer for the purpose of maintaining order and decorum at the Council meeting. Upon the instructions of the presiding officer, it shall be the duty of the sergeant-at-arms to remove any person from the Council meeting who violates the order and decorum of the meeting." (**Note** - does not seem to be limited to public and could be implied to apply to council members.)
8. 4 - Robert's Rule of Order applies

H. 030.100 - Voting

1. (1)The City Clerk calls the name of each Council Member and the "yes" or "no" of each shall be recorded in minutes
2. (5) "Council Members not entitled to vote on a motion because of personal or private interest shall be deemed present for purposes of determining whether or not a quorum is present."
3. (**Note** - does not seem to allow for abstaining)

I. 030.110 - Board and Commissions meeting conducted the same except as it pertains to preparing agenda.

III. Municipal Code 020.040 - Conflict of Interest

IV. Open Meeting Law - Colorado Revised Statutes 24-6-401 et. seq.

A. §402(1)(b) - “Meeting" means any kind of gathering, convened to discuss public business, in person, by telephone, electronically, or by other means of communication.

B. §402(2)(b) - All meetings of a quorum or three or more members of any local public body, whichever is fewer, at which any public business is discussed or at which any formal action may be taken are declared to be public meetings open to the public at all times.

C. §402(2)(c) - Any meetings at which the adoption of any proposed policy, position, resolution, rule, regulation, or formal action occurs or at which a majority or quorum of the body is in attendance, or is expected to be in attendance, shall be held only after full and timely notice to the public. In addition to any other means of full and timely notice, a local public body shall be deemed to have given full and timely notice if the notice of the meeting is posted in a designated public place within the boundaries of the local public body no less than twenty-four hours prior to the holding of the meeting. The public place or places for posting such notice shall be designated annually at the local public body's first regular meeting of each calendar year. The posting shall include specific agenda information where possible.

D. §402(2)(d.5)(II)(C) & (D) -

1. (C) If a court finds, upon application of a person seeking access to the record of the executive session of a local public body in accordance with section 24-72-204 (5.5) and after an in camera review of the record of the executive session, that the local public body engaged in substantial discussion of any matters not enumerated in subsection (4) of this section or that the body adopted a proposed policy, position, resolution, rule, regulation, or formal action in the executive session in contravention of subsection (4) of this section, the portion of the record of the executive session that reflects the substantial discussion of matters not enumerated in subsection (4) of this section or the adoption of a proposed policy, position, resolution, rule, regulation, or formal action shall be open to public inspection pursuant to section 24-72-204 (5.5).
2. (D) No portion of the record of an executive session of a local public body shall be open for public inspection or subject to discovery in any administrative or judicial proceeding, except upon the consent of the local public body or as provided in sub-subparagraph (C) of this subparagraph (II) and section 24-72-204 (5.5).

E. §402(2)(e) - does not apply to any chance meeting or social gathering at which discussion of public business is not the central purpose.

F. §402(4) - The members of a local public body subject to this part 4, upon the announcement by the local public body to the public of the topic for discussion in the executive session, including specific citation to this subsection (4) authorizing the body to meet in an executive session and identification of the particular matter to be discussed in as much detail as possible without compromising the purpose for which the executive session is authorized, and the affirmative vote of

two-thirds of the quorum present, after such announcement, may hold an executive session only at a regular or special meeting and for the sole purpose of considering any of the following matters; except that no adoption of any proposed policy, position, resolution, rule, regulation, or formal action, except the review, approval, and amendment of the minutes of an executive session recorded pursuant to subsection (2)(d.5)(II) of this section, shall occur at any executive session that is not open to the public:

(a) The purchase, acquisition, lease, transfer, or sale of any real, personal, or other property interest; except that no executive session shall be held for the purpose of concealing the fact that a member of the local public body has a personal interest in such purchase, acquisition, lease, transfer, or sale;

(b) Conferences with an attorney for the local public body for the purposes of receiving legal advice on specific legal questions. Mere presence or participation of an attorney at an executive session of the local public body is not sufficient to satisfy the requirements of this subsection (4).

(c) Matters required to be kept confidential by federal or state law or rules and regulations. The local public body shall announce the specific citation of the statutes or rules that are the basis for such confidentiality before holding the executive session.

(d) Specialized details of security arrangements or investigations, including defenses against terrorism, both domestic and foreign, and including where disclosure of the matters discussed might reveal information that could be used for the purpose of committing, or avoiding prosecution for, a violation of the law;

(e) (as applicable to municipalities) Determining positions relative to matters that may be subject to negotiations; developing strategy for negotiations; and instructing negotiators.

(f) (as applicable to municipalities) Personnel matters except if the employee who is the subject of the session has requested an open meeting, or if the personnel matter involves more than one employee, all of the employees have requested an open meeting. The provisions of this paragraph (f) shall not apply to discussions concerning any member of the local public body, any elected official, or the appointment of a person to fill the office of a member of the local public body or an elected official or to discussions of personnel policies that do not require the discussion of matters personal to particular employees.

(g) Consideration of any documents protected by the mandatory nondisclosure provisions of the "Colorado Open Records Act", part 2 of article 72 of this title; except that all consideration of documents or records that are work product as defined in section 24-72-202 (6.5) or that are subject to the governmental or deliberative process privilege shall occur in a public meeting unless an executive session is otherwise allowed pursuant to this subsection (4)

CITY COUNCILCODE OF CONDUCT AND ETHICS
CITY OF GLENWOOD SPRINGS, COLORADO

I. **Purpose**:

City Council Members are always held to the highest standards. Council members are agents of the public purpose and hold office for the benefit of the residents of the City. Debate and presentation of opposing views is part of the democratic process, but it should always be conducted in a professional manner.

Effective governance requires that City Council members to be independent, impartial and responsible to all the residents of the City. Council members should work collaboratively to find common solutions that are in the City's and its' residents' best interest. City Council makes decisions that impact all the residents, businesses and visitors of the City and should direct its discussion to that end. Once a decision is made by Council, the members of Council should support the Council and the City to move forward with effective implementation of the decision.

Council members are expected to exhibit professional behavior when representing the City, whether during Council or outside City Council meetings. All decisions and policies shall be made in accordance with the Colorado Constitution, State Statutes, the Municipal Charter, and the Municipal Code

II. **General Expectations of City Council Members**

A. Responsibility.

1. I understand that the community expects me to serve with dignity and respect and be an agent of the democratic process.
2. I will avoid actions that might cause the public to question my independent judgment.
3. I will not use my office or the resources of the city for personal or political gain.
4. I am a prudent steward of public resources and I actively consider the impact of my decisions on the financial and social stability of the city and its citizens.
5. I will be prepared for and attend all work sessions and regular and special meetings of City Council and all meetings of Boards and Commissions of the City to which I am assigned.
6. I will fully actively listen and participate during all meetings and work sessions of City Council and will not engage in personal business by email, by text or any other means during any meeting or work session except during recesses.

B. Fairness.

1. I will promote consistency, equity, diversity and non-discrimination in public agency decision making.
2. I will make decisions based on the merits of an issue, including research and facts.
3. I will encourage diverse public engagement in decision-making processes and support the right of the public to have access to public information concerning the conduct of the city's business.

C. Respect.

1. I will treat my fellow city officials, staff, commission members and the public with patience, courtesy, civility, and respect, even when we disagree on what is best for the community and its citizens.

D. Integrity.

1. I will be honest with all elected officials, staff, commission members, boards, and the public.
2. I will be prepared to make decisions for the best interest of the public whether those decisions are popular or not.
3. I will take responsibility for my actions even when it is uncomfortable to do so.

III. **Meeting Decorum**.

A. These general rules of decorum should be observed during City Council meetings.

1. All comments should be constructive.
2. No personal attacks shall be made by Council, the Public and or City Staff toward City Council members, the public and/or City Staff nor will a Council Member cause or encourage third parties to engage in such behavior.
3. No belligerent, personal, impertinent, slanderous, threatening, abusive of disparaging comments should be made.
4. No shouting or threatening behavior shall occur.
5. No engaging in violent or distracting action shall be allowed.
6. No willful injury of furnishings or of the interior of the Council chambers or meeting hall shall occur.
7. No one shall refuse to obey any of the rules of conduct provided within this section, including the limitations on occupancy and seating capacity.
8. No one shall refuse to obey an order of the presiding officer.
9. No unreasonably loud or disruptive language, noise, or conduct which obstructs the work or the conducting of the business of the Council shall be allowed.

10. No Council member shall be intoxicated or under the influence of drugs during a Council Meeting or work session
11. Except as to agenda items presented by members of City Staff, Council members shall direct all comments and questions of Staff during City Council meetings to the City Manager or City Attorney.

B. The Presiding Officer may direct the removal of any member of the Public or Staff from a Council Meeting for conduct described above after that person has been given a warning by the Presiding Officer. If a Council member repeatedly violates the Meeting Decorum provided above the Presiding Officer may call a recess, adjourn the meeting or have the Council member removed if the Presiding Officer reasonably believes the behavior presents a threat to Council, the Public or Staff.

IV. **Council Interactions with Staff**.

Pursuant to the Municipal Charter, City Council has direct supervisory authority over the City Manager, City Attorney and Municipal Judge. These positions are appointed and serve at the will of Council and the City Manager is responsible for the supervision, including hiring, disciplining and termination of all other City employees. Section 3.10 of the Municipal Charter provides that*:*

> *Except for the purpose of inquiry, the Council and its members shall deal with the administrative functions of the City solely through the City Manager and neither the Council nor any member thereof shall give orders to any of the subordinates of the City Manager.*

Council Members shall adhere to the Charter requirements.

V. **Boards and Commissions**

A. This Code of Conduct applies to all appointed members of Boards and Commission.
B. Conduct during meetings
   1. Members of the Boards and Commissions should regularly attend all regular and special meetings of Boards and Commissions. Failure to do so may result in a Member being removed by Council or not reappointed pursuant to the Municipal Code.
   2. Members of Boards and Commissions shall comply with this Code of Conduct.

VI. **Executive Sessions and Confidential Communications**

A. Purpose. Executive sessions are for purposes set forth in the Open Meetings law and include confidential attorney/client or other legal privilege.

B. Non-disclosure. Executive sessions and Confidential Communications are confidential and privileged and no disclosure of matters presented or discussed during an executive sessions or in Confidential Communications shall be made by any Council member without permission of the entire Council granted during an open meeting of Council.

C. Waiver of confidentiality. No council member can, for him/herself, waive the privilege which attaches to executive sessions or confidential communications. Only the Council by majority vote in open session may waive the privilege.

D. Scope of executive sessions. All discussion/presentation of materials must pertain to the announced matters at the commencement of session and must be matters for which executive sessions are allowed pursuant to the City Code and/or Open Meetings law

E. Duty to limit scope. If matters occur during an executive session that are outside of scope of announced matters at the commencement of session or which violate City Code and/or the Open Meetings law, each Council member has an affirmative duty to immediately bring this to the attention of the Mayor during the executive session.

VII. Remedies/Sanctions for violation of Code of Conduct

A. Notwithstanding other provisions of law under which violations of the Constitution, Statutes or the Municipal Charter and Code are addressed, Council may upon a written complaint by any member of the Council or Public take such action for continued violations of this Code as permitted by law including but not limited to Public Censure.

B. As provided in the Municipal Charter and Code the Mayor may remove a Council member from any Board or Commission which they were appointed and so notify the Board or Commission that a the removed Council member's participation would be limited to that of a member of the public and not as an appointed member of Council.

City of Glenwood Springs
Modified Rules of Procedure[1]
Draft for Council Comment - September 3, 2020

I. Council Meeting Procedures

A. Open to Public

All meetings and work sessions of the City Council shall be open the public and must complied with Colorado's Open Meetings Law.

B. Addressing matters before Council

1. The Mayor, or Mayor Pro Tem in the Mayor's absence, shall preside at all work sessions of Council and all regular and special meetings of Council as provided in the City's Code and/or Charter.
2. The City's Code of Conduct shall be followed during all meetings of Council
3. A Council Member must be recognized by the Mayor and be given the floor in order to address the Council.
4. A Council Member shall have three minutes to address the matter before Council. Additional time may be requested and reasonable additional time should be granted by the Mayor[2] depending upon the complexity of the matter before Council.
5. A Council Member shall not be granted a second time to address a matter until all other Council Members wishing to address the issue have had his/her opportunity to speak to the matter. Secondary comments shall be restricted to responding to other Council Member comments.
6. No Council Member shall interrupt another Council Member.
7. Interrupting a Council Member or engaging in side discussions while another person has the floor is out of order and the Mayor should direct the member(s) to cease this behavior.
8. The Mayor may independently decide to deviate from or temporarily suspend the Rules of Procedure in order to increase meeting efficiency and to best enable full and informed discussion of a matter before the Council. However, such independent action by the Mayor remains subject to a

[1] It is the intent that these Rules would replace Roberts Rule of Order if adopted by Council. Roberts Rules would be maintained for any matters not directly addressed in these Rules of Procedure.

[2] Any reference to the Mayor in these Rules of Procedure shall apply to the Mayor Pro Tem if presiding at the Council Meeting.

Point of Order and/or a Point of Appeal through which a Council Member can bring the meeting into full compliance with the Rules of Procedure.

9. Any matter upon which public comment is taken shall be open to the public comment as directed by the Mayo. During such time, any member of public may address the Council on the pending matter. Such person shall provide his/her full name and his address. Such comments shall be limited to three minutes, unless the Mayor allows a brief extension of time to comment. A member of public shall address the Council as a whole and shall not direct comments toward an individual Council Member. Any member of the Public who makes belligerent, personal, impertinent, slanderous, threatening, abusive of disparaging comments or who becomes disruptive during a meeting will be direct by the Mayor to cease such conduct and may be removed by the Mayor from the meeting if such conduct continues.

C. **Procedures for Motions**

1. Any matter before Council which requires a formal decision of Council shall be decided by a Motion made by a Council Member.
2. Any Council Member (including the Mayor) may make a Motion.
3. All Motions before discussions shall require a second from another Council Member.
4. A Motion may be withdrawn before a second is made or with the consent of the Council Member seconding the Motion.
5. A Council Member, with the consent of the second, may accept a proposed amendment to the motion.
6. In the alternative, any Council Member may move to Amend the Motion. Only one Motion to Amend may be pending at any time.
7. If the Motion to Amend is seconded by another Council Member, then the vote shall first taken upon the Motion to Amend and then:
   a. If Motion to Amend is approved, a vote on the Amended Motion.
   b. If Motion to Amend is not approved, a vote on the Original Motion.
8. All Council Members are required to vote “yes” or “no” on a Motion unless the Council Member has been excused from the matter and that potion of the Council Meeting due to a Conflict of Interest. No Council Member may abstain from voting on any motion. Unless otherwise provided in these Rules of Procedure, or by the City’s Code of Conduct, the Municipal Code or Municipal Charter, a majority vote is required to approve a pending motion. A tie vote denies approval of the pending motion. If a Council members announces "abstain" or refuses to vote then his/her vote should be counted as an affirmative vote on the matter for which a vote is being taken.

D. **Types of Motions**.

1. **Main Motion**. Presents to Council an item for action. May only be made when no other motion is pending.
2. **Motion to Amend**. Relates to and supplements or builds upon the Main motion.
3. **Motion to Continue**. Continues the pending motion to a future date certain. It may also continue debate on the pending Motion to a later time in the same meeting.
4. **Motion to Continue Indefinitely**. Such motion effectively kills the matter before Council. This may be made before or during debate on a pending motion or matter. This may not be used when the matter before Council relates to Council's decision on quasi-judicial matters.
5. **Motion to Call the Question**. Closes debate on the pending motion. No second is required but if a Council Member objects to the Call for Question, then a vote must be taken on the Motion to Call the Question. There shall be no debate on such motion.
6. **Motion for Recess**. Any Council Member may move for a recess not to exceed 15 minutes. If there is objection, then the motion shall need a second and a vote shall be taken. There shall be no debate on such motion.
7. **Motion to Adjourn**. Any Council Member may move for adjournment of a meeting. If there is objection, then the motion shall need a second and a vote shall be taken. Debate shall be allowed on such motion. If a quasi-judicial matter(s) are still pending during that Council meeting they shall automatically be continued to the next regularly scheduled meeting of Council if the Motion to Adjourn is approved.
8. **Motion to Reconsider**. This requests the Council to reconsider a matter upon which a motion was made and upon which a vote was taken. A Motion to Reconsider must made at the same Council meeting as the vote sought to be reconsidered was made or at the next regular meeting of Council. It may only be made by a Council Member who was on prevailing side in the previous vote. Debate on the Motion to Reconsider only relates to the reason(s) to reconsider the previous vote and not to the underlying matter upon which the original vote was taken. Two-thirds of the Council Members voting on the Motion to reconsider is required to reconsider the prior vote. If the Motion to Reconsider is approved then debate resumes on the Original Motion.
9. **Motion for Executive Sessions**. Such motions must by made and approved as provided by the Municipal Code, Charter and/or State law.

E. **Points of Procedure**.

1. **Point of Order**. Used only when a Council Member asserts that these Rules of Procedure are not being followed or whether a Council Member is violating the Code of Conduct. If made, the Mayor shall decide whether or not the Rules of Procedure or the Code of Conduct are not being followed and take action as provided in these Rules of Procedure or the Code of Conduct. A Point of Order shall not interrupt another Council Member but only asserted after the Council Member has finished speaking.
2. **Point of Information**. This is a request by a Council Member for more information or clarify matters being discussed. It is not a time to present further comment by the Council Member requesting the Point of Information. This shall not interrupt another Council Member but only requested after the Council Member has finished speaking.
3. **Point of Appeal**. A request by a Council Member to challenge a decision of the Mayor concerning the application of these Rules of Procedure. A Point of Appeal shall customarily be in order immediately following the Mayor's decision and may be declared out of order and unavailable where the Council has relied upon the Mayor's decision and continued the proceeding in reliance upon, or in accordance with, the Mayor's decision. The Council Member making the Point of Appeal may briefly state his or her reason for the Point, and the Mayor may briefly explain his or her ruling, but there shall be no further debate on the Point of Appeal. If requested by the Council Member making the Point, a vote shall be taken to uphold or overturn the decision of the Mayor. No second is required to require such a vote.

II. **Application to Boards and Commission**. To the extent reasonable and necessary these Rules of Procedure shall apply to meetings of the City's Boards and Commissions.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Colorado State Office
2850 Youngfield Street
Lakewood, Colorado 80215-7210

In Reply Refer To:
1610 (CO-930)

Dear Cooperator,

The Bureau of Land Management (BLM) is preparing an environmental impact statement (EIS) to analyze and disclose the potential effects of amending management plans for Greater sage-grouse and sagebrush habitats on public lands.[1] The BLM invites you to participate in the process as a cooperating agency in this National Environmental Policy Act (NEPA) and land use planning processes.

Project Background: The BLM amended or revised land use plans in 2014 and 2015 in the States of California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming (2015 Sage-Grouse Plan Amendments) to provide for Greater sage-grouse conservation on public lands. Subsequently, the BLM amended several of those plans in 2019 in the States of California, Colorado, Idaho, Nevada, Oregon, Utah, and Wyoming (2019 Sage-Grouse Plan Amendments). The BLM has determined that 2019 Sage-Grouse Plan Amendments (and for Montana, North Dakota, and South Dakota, the 2015 Sage-Grouse Plan Amendments) are potentially inconsistent with new science and changes affecting the BLM's management of the public lands, including the effects of climate change (e.g., drought, loss of habitat, more frequent wildland fires, less riparian areas).

The BLM is initiating this land use planning process to evaluate alternative management approaches to contribute to the conservation of Greater sage-grouse and sagebrush habitats. The land use planning process will address the management of Greater sage-grouse and sagebrush habitat on BLM-managed public lands in the States of California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming. Additional information regarding these efforts can be found at https://eplanning.blm.gov/eplanning-ui/project/90121/510.

Invitation to Participate as a Cooperating Agency in the NEPA Process: Applicable regulations provide that state agencies, local governments, tribal governments, and other federal agencies may serve as cooperating agencies during the EIS process if they have either jurisdiction by law or special expertise (40 CFR 1508.5). Cooperating agency status provides the opportunity for us to work together collaboratively and to enhance the BLM's planning efforts. More information about being a cooperating agency can be found here: https://www.blm.gov/sites/blm.gov/files/Services_CADRCooperatingAgencyGuide.pdf

Based on our preliminary evaluation, we believe that you meet the cooperating agency criteria described in 40 CFR 1508.5. If you are interested in becoming a cooperating agency, please respond to this letter and we will provide more details about this process (e.g., describing the process to establish a Memorandum of Understanding (MOU) that defines and explains expectations and time commitments). Please be assured, that whether you elect to become a cooperating agency or not, we will afford your agency ample opportunities to participate in the NEPA process.

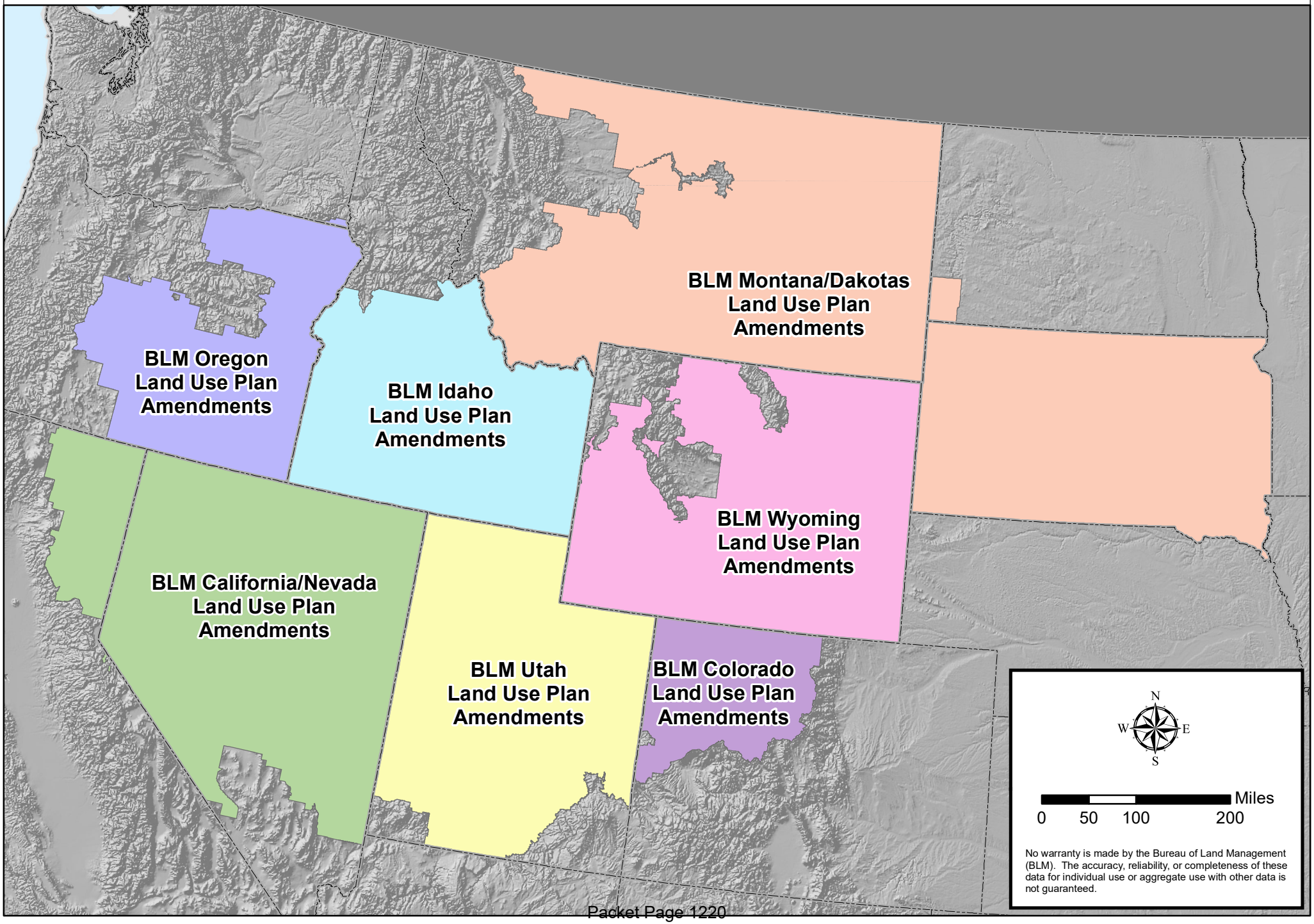
If you have any questions regarding the project, or require any additional information, please contact Leah Waldner, Sage-Grouse Coordinator for the BLM Colorado State Office at lwaldner@blm.gov or (970) 244-3045. The BLM believes that gaining your expertise and perspective is important to the success of the EIS and subsequent management strategies. Thank you for your timely consideration of this invitation to participate in the NEPA process as a cooperating agency. We look forward to your response.

Sincerely,

Jamie E. Connell
BLM Colorado State Director

Attachment: Map of Preliminary Project Boundary

BLM Greater Sage-Grouse Plan Amendments 2021



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.