NOTICE OF MEETING
PLANNING COMMISSION
CITY OF ST. GEORGE
WASHINGTON COUNTY, UTAH

Public Notice

Notice is hereby given that the Planning Commission of the City of St. George, Washington County, Utah, will hold a **Planning Commission** meeting in the City Council Chambers, 175 East 200 North, St George, Utah, on **Tuesday, April 25, 2023,** commencing at **5:00 p.m**.

The agenda for the meeting is as follows:
Call to Order
Flag Salute

1. **ZONE CHANGE (ZC) (*Public Hearing)* Legislative**

   Consider a request to change the zoning from C-3 (General Commercial) to PD-C (Planned Development Commercial) on approximately 1.18 acres to establish a use list and to be eligible to obtain a bar license at this location. This property is generally located at 295 and 307 North Bluff Street. The applicant is Jerald Jensen. The project will be known as North St. George Plaza. Case No. 2023-ZC-005. (Staff – Carol Davidson)

2. **PLANNED DEVELOPMENT AMENDMENT (PDA) (*Public Hearing)* Legislative**

   Consider a request for a PD (Planned Development) amendment to Joshua's at Southgate Planned Development Residential (PD-R) zone. The applicant is seeking approval to build 90 townhome units on 10 acres. This property is located approximately at 800 W Tonaquint Drive. The applicant is Eugene Gordon Inc, and the representative is Adam Allan. The project will be known as Tonaquint Townhomes. Case No. 2023-PDA-006. (Staff – Mike Hadley)

   THIS ITEM WILL NOT BE HEARD AT THIS MEETING, IT WILL BE NOTICED AT A LATER DATE.

3. **DEVELOPMENT AGREEMENT (DA) *(Public Hearing)* Legislative**

   Consider a request to an amended development agreement to expand the golf cart right-of-way easement in Sun River to allow access to new commercial areas in Sun River Commons. The applicant is Sun River St. George Community Association, representative Scott McCall. Case No. 2022-2023-DA-001. (Staff – Carol Davidson)

4. **CONDITIONAL USE PERMIT (CUP) Administrative**

   Consider a request to consider a conditional use permit to update the building facades and add a 1500 square foot drive-thru restaurant to the southwest corner of this property. The project is generally located on the northeast corner of St. George Boulevard and Bluff Street. The applicant is Jason Hurst and the representative is Matthew Metcalf. The project will be known as 160 N Bluff. Case No. 2023-CUP-001. (Staff – Carol Davidson)

5. HILLSIDE DEVELOPMENT PERMIT (HS) Administrative

Consider a request for a hillside development permit for a residential retaining wall. The applicant is requesting that the Hillside Review Board consider the structural stability and mitigate the appearance and location of this retaining wall. The property is currently zoned R-1-8 (Single Family Residential, minimum lot size 8,000sf). The site is located at 150 N. Donlee Drive. The applicants are Ryan and Martina Davis. Case No. 2022-HS-018. (Staff – Carol Davidson)

6. PRELIMINARY PLAT (PP) Administrative

A. Consider a request to consider a preliminary plat for (3) parcels. Consider a request for a nine (9) lot preliminary plat known as Desert Canyons business Park. The property is located approximately 4921 S Airport Pkwy. The property is 30.12 acres and is zoned PDR. The applicant is Desert Canyons Development LLC, and the representative is Curt Gordon. Case No. 2023-PP-012 (Staff – Mike Hadley).

B. Consider a request to consider a preliminary plat for (3) parcels. Consider a request for a three (3) lot preliminary plat known as Tonaquint Commercial located north and northwest of the existing Tonaquint Cove subdivision. The property is 132.91 acres and is zoned M&G. The applicant is DSG Engineering, and the representative is Logan Blake, DSG Engineering. Case No. 2023-PP-015 (Staff – Mike Hadley).

7. MINUTES

Consider a request to approve the meeting minutes from the April 11, 2023, meeting.

8. CITY COUNCIL ACTIONS

Report on items heard at the May 20, 2023, City Council meeting.

1. 2023-PDA-002 Atara Resort at Desert Color
2. 2023-PP-008 Atara Resort at Desert Color
3. 2023-PDA-003 Cascade Collision and Tire Store
4. 2023-ZC-001 Rosewood Townhomes
5. 2023-PP-006 Rosewood Townhomes
6. 2023-HS-001 Rosewood Townhomes
7. 2022-GPA-011 GV-5
8. 2023-GPA-001 Tonaquint Heights Ph 4-7
9. 2023-GPA-002 Desert Canyons Business Park
10. 2023-PDA-005 Mall Drive Professional Office
11. 2023-DA-002 St. George Storage Facility
12. 2022-PDA-052 STG Storage Facility
13. 2023-CUP-001 160 N Bluff St

Brenda Hatch – Development Office Supervisor

Reasonable Accommodation: The City of St. George will make efforts to provide reasonable accommodations to disabled members of the public in accessing City programs. Please contact the City Human Resources Office at (435) 627-4674 at least 24 hours in advance if you have special needs.

St.George
Community Development

ITEM 1

Zone Change

PLANNING COMMISSION AGENDA REPORT: 04/25/2023

North St. George Plaza Initial Zone Change (Case No. 2023-ZC-005)		
Request:	Consider a request to change the zoning from C-3 (General Commercial) to PD-C (Planned Development Commercial) to establish a use list and to be eligible to obtain a bar license at this location.	
Applicant:	Jerald Jensen	
Location:	295 and 307 North Bluff Street	
General Plan:	Connected Corridor	
Existing Zoning:	C-3 (General Commercial)	
Surrounding Zoning:	North	C-3 (General Commercial)
	South	C-3 (General Commercial)
	East	C-3 (General Commercial)
	West	OS (Open Space)
Land Area:	Approximately 1.18 acres	

BACKGROUND:

This is a request for a zone change from C-3 (General Commercial) to PD-C (Planned Development Commercial) for a 1.18-acre parcel located at 295 and 307 N. Bluff Street. The applicant is requesting to rezone this parcel for the purpose of establishing a use-list for this existing development and to be eligible to obtain a bar license.

This development was built in 2020, replacing the previous commercial development that was removed for the Bluff Street expansion. One of the businesses within this development is Blues Katz, a bar and grill restaurant, which also offers live music on the weekends. Blues Katz has a liquor license that allows them to sell alcohol with their food. The license they have requires them to have 70% of their total restaurant business from the sale of food and 30% from alcohol. This requirement works for the majority of the time the restaurant is open. However, during the evening or weekend evening entertainment, the owner would like to offer alcohol to their guests without having to purchase food.

At this time, City Code allows for four bar licenses within the City of St. George and requires that they be located in the PD-C zone. There are no existing licenses in the PD-C zone; this is the first request.

To establish the PD-C zone in an existing development, a use list is required. The applicant has provided a use list found in **Exhibit B.** If approved, Blues Katz will only be open to guests 21 years of age or older.

Title 3-3-3-A.3
Bar Establishment: The total number of licenses issued within the city shall not exceed that number determined by dividing the population of the city by twenty thousand (20,000). This license may only be issued in a planned development zone that has been amended by the city council allowing a bar establishment in that zone and the approval was given after September 30, 2018.

RECOMMENDATION:

Staff recommends approval of this zone change for North St. George Plaza.

ALTERNATIVES:

1. Recommend approval as presented.
2. Recommend approval with conditions.
3. Recommend denial.
4. Table or Continue the proposed zone change amendment to a specific date.

POSSIBLE MOTION:
The Planning Commission recommends approval of the zone change for North St. George Plaza.

FINDINGS FOR APPROVAL:
1. The proposed uses are permitted uses found in the PD-C zone.
2. The proposed zone change meets the initial zone-change application requirements found in Section 10-8D-2A.

Exhibit A
Applicant's Narrative

Hello,

We are proposing a zoning change for the property where Blues Katz Grill is located to change our current full service restaurant license and obtain a bar license. Being one of the major live music venues on the weekends makes it very difficult to get people to buy food with the alcohol. Most people moving here from out of state want a glass of wine and kick back and watch the live music. With the music starting after 8 PM many become frustrated and even will leave if I make them buy food. This is becoming more and more of a issue and I would like to change the licensing to continue to provide a quality live music experience. We will still be a full-service restaurant for 21 and over serving a delicious menu from chef Khuyen.

Exhibit B
Proposed Use List

All uses allowed in the C-3 District

10-8B-1: ALLOWED USES:

Any use not specifically permitted, permitted with standards, or conditionally permitted is prohibited. Only the following uses are allowed:

A. Uses indicated by the letter "P" below are permitted in the designated zone.

B. Uses indicated by the letters "PS" are permitted uses with required standards in this zone. Uses must comply with the standards and evaluation criteria established in chapter 17 of this title.

C. Uses indicated by the letter "C" are conditional uses in the designated zone.

Allowed Uses

	C-1	C-2	C-3	C-4
Alcohol establishments, including the following:				
Bar establishment		C	C	C
Off-premise beer retailer		P	P	P
Microbrewery or micro-winery (with restaurant or bar establishment)		P	P	P
Nightclub, dance hall (with alcohol)		C	C	C
Ambulance service		P	P	
Amusement centers (with no water activity)				
Indoor		P	P	
Outdoor		C	C	
Amusement centers (with water activity)		PS	PS	
Animal services, including the following:				
Animal boarding/care for small animals only and boarded for less than 30 days a year; provided, conducted completely within enclosed building		P	P	P
Animal hospital and veterinarian clinic, including overnight care of large animals (no boarding)		PS	PS	
Automobile and vehicle services, limited to the following uses:				
Automobiles and other similar vehicle sales lots		PS	PS	
Automobile parts sales (new parts only); provided, conducted within completely enclosed building		P	P	P
Automobile rental (vehicles up to 26' in length)		P	P	

Allowed Uses

	C-1	C-2	C-3	C-4
Automobile repair, storage, including paint, body and fender, brake, muffler, upholstery or transmission work; provided, conducted within completely enclosed building (GVW 14,000 lbs or less)		P	P	P
Tire sales and service; provided, conducted within completely enclosed building		P	P	P
Financial, medical and professional services	P	P	P	P
Food service establishments, including the following and similar uses:				
Catering establishment		P	P	P
Restaurant	P	P	P	P
Lodging, temporary, limited to the following uses:				
Bed and breakfast		P	P	P
Hotel/motel		P	P	P
RV parks, long and short term		PS		
Timeshare units		P	P	P
Hospitals			P	P
Counseling center, mental health, alcohol, drugs (nonresidential, less than 24 hours)		P	P	P
Mental health treatment center, with overnight stay		C	C	C
Nursing home		P	P	
Office	P	P	P	P
Religious facility	P	P	P	P
Residential, limited to the following use:				
Living quarters for manager or security personnel for business which requires 24-hour assistance or security – Up to 600 sf with occupancy limited to 4 people		PS	PS	PS
Large floor area building or site (20,000 sf or more ground floor aggregate)		C	C	C
Retail shops:				
Antique store		P	P	P
Athletic and sporting goods store		P	P	P

Allowed Uses

	C-1	C-2	C-3	C-4
Department store		P	P	P
Drive-through sales (pharmacy, dairy products, etc.)		P	P	P
Furniture and large appliances sales (used)		P	P	
Furniture sales (new) and repair		P	P	P
Household appliance sales and service		P	P	P
Office supply, office machines sales and service		P	P	P
Paint or wallpaper store		P	P	P
Pawnshop		P	P	
Seed and feed store, retail		P	P	
Supermarket/grocery store		P	P	P
Thrift shop/secondhand store/consignment store (no outside storage and no drop-off of items during the hours the business is closed)		P	P	P
Vegetable stand		P	P	P
Payday lending/title loans		P	P	
Retail sale of goods with some operations outdoors, limited to the following uses:				
Building materials sales			P	
Convenience markets with gas pumps/gas station		P	P	
Convenience markets with gas pumps located in the rear of the building				P
Farm implement sales (outdoor display)		P	P	
Fence, sales and service		P	P	
Garden supplies and plant material sales		P	P	
Greenhouse and nursery; soil and lawn service			P	
Landscape rock sales, ancillary to a permitted use			P	
Service businesses, limited to the following uses:				
Body piercing, ancillary to a permitted use		P	P	P
Carpet and rug cleaning		P	P	P
Child care center	P	P	P	P
Communication transmission facilities, including wireless, primary		PS	PS	PS

Allowed Uses

	C-1	C-2	C-3	C-4
Communication transmission facilities, including wireless, primary, height over 50'	C	C	C	C
Construction trade services, plumbing shop, electrical shop, etc.			P	
Crematorium, independent human		P	P	
Educational institutions, schools, college, learning centers, trade schools (no residential or 24-hour facilities)		P	P	P
Gunsmith		P	P	P
Janitor service and supply		P	P	P
Locksmith		P	P	P
Mortuary		P	P	P
Permanent cosmetics, a secondary use to an establishment employing cosmetologist(s)/barber(s), aesthetician(s), electrologist(s), or nail technician(s) licensed by the state under 58-11a-101 et seq., Utah Code Annotated, 1953, as amended, excluding tattoo establishments and home occupations	P	P	P	P
Personal care service	P	P	P	P
Personal instruction service	P	P	P	P
Pest control and extermination		P	P	P
Pet grooming		P	P	P
Printing, lithographing, publishing or reproduction sales and service			P	P
Psychic, tarot card reader, fortune teller, occult art practitioners, hypnotist		P	P	P
RV storage		PS	PS	
Sign sales		P	P	P
Storage rental units		PS	PS	
Tattoo establishment		P	P	P
Taxidermist		PS	PS	
Transportation, limited to the following uses:				
Bus terminal		P	P	P
Taxi/shuttle		P	P	P

Allowed Uses

	C-1	C-2	C-3	C-4
Government, public services and facilities, limited to the following uses:				
City, all facilities	P	P	P	P
Public utility facilities, primary		PS	PS	PS

(Ord. 2019-10-002, 10-10-2019; amd. Ord. 2020-06-002, 6-4-2020; Ord. 2021-05-002, 5-6-2021; Ord. 2022-07-009, 7-28-2022)

The St. George City Code is current through Ordinance 2022-07-009, passed July 28, 2022.

Disclaimer: The city recorder has the official version of the St. George City Code. Users should contact the city recorder for ordinances passed subsequent to the ordinance cited above.

City Website: www.sgcity.org
City Telephone: (435) 627-4000
Code Publishing Company

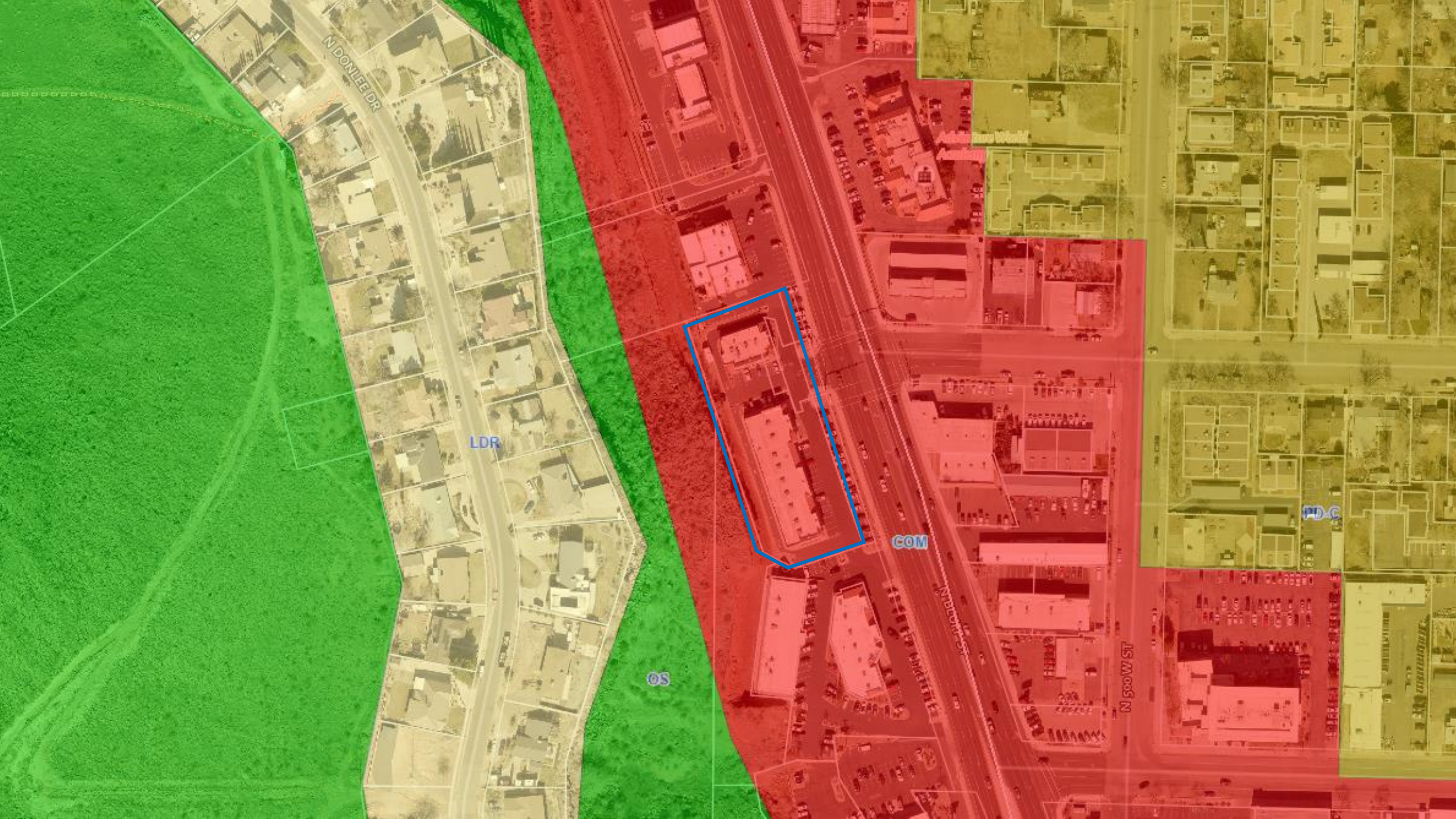
Exhibit C
PowerPoint Presentation

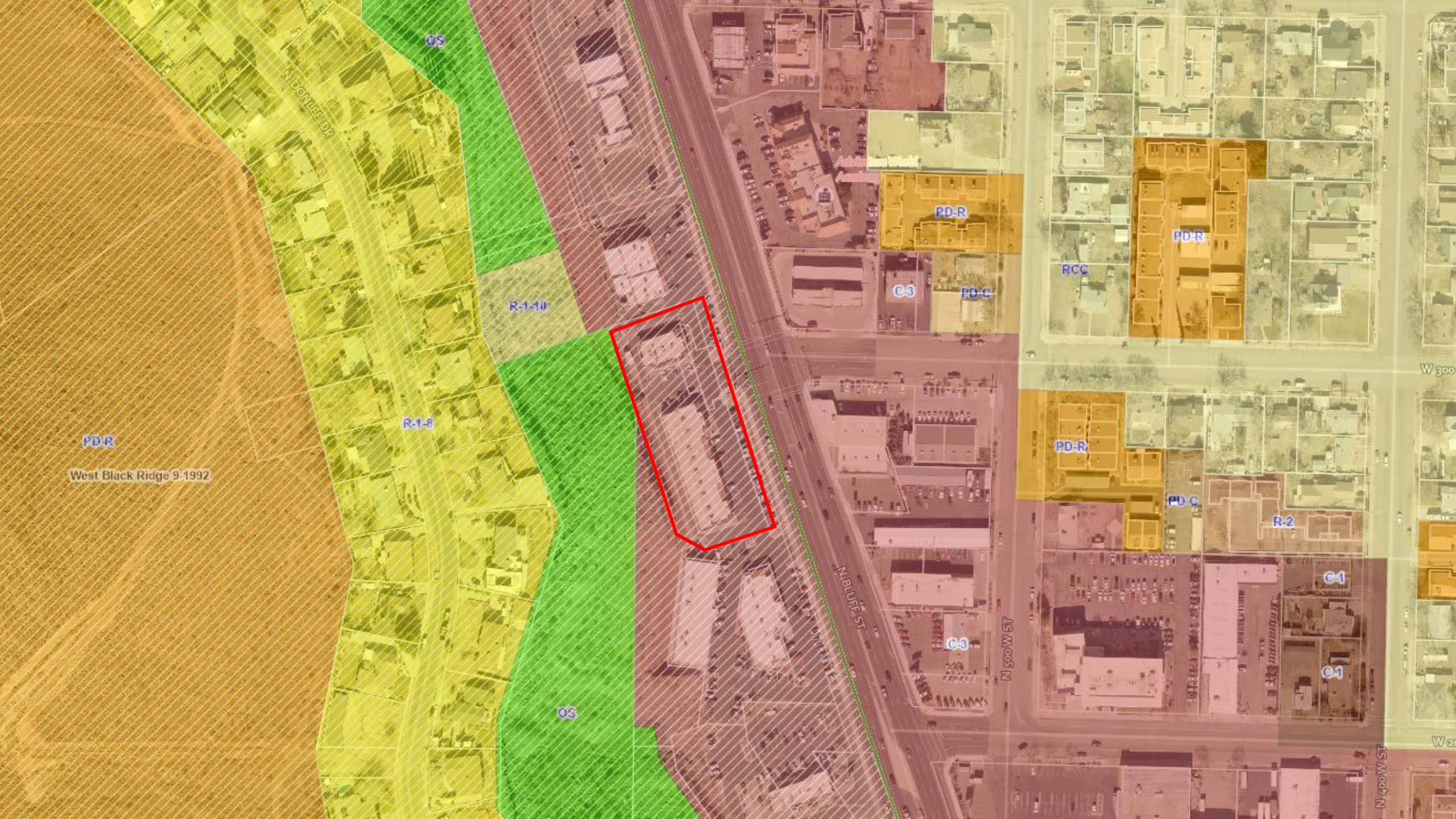
NORTH ST. GEORGE PLAZA

Zone Change

2023-ZC-005


N DONLEE DR
Adventure World Academy
N BLUFF ST
N 500 W ST
W 300 N
W 200 N
N 400 W ST


N DONLEE DR
LDR
OS
COM
PD-C
N 500 W ST


OS
N DONLEE DR
R-1-10
R-1-8
PD-R
West Black Ridge 9-1992
OS
PD-R
C-3
PD-C
RCC
PD-R
W 300
PD-R
PD-C
R-2
C-1
C-3
C-1
N BLUFF ST
N 500 W ST
N 400 W ST


316 N
304 N
290 N
276 N
260 N
244 N
319 N
307 N
269 N
277 N
281 N
283 N
287 N
291 N
295 N
237 N
237 N Unit G
Unit F
N BLUFF
W 300 N ST
580 W
296 N
280 N
256 N
244 N
528 W
305 N
317 N
299 N
SR 34

CONSTRUCTION NOTES

1. UNLESS SHOWN OTHERWISE ON THESE PLANS ALL CONSTRUCTION SHALL CONFORM TO THE "CITY OF ST. GEORGE STANDARD SPECIFICATIONS FOR DESIGN AND CONSTRUCTION," "THE UNIFORM PLUMBING CODE," AND THE "INTERNATIONAL BUILDING CODE," - THE LATEST EDITIONS AS ADMINISTERED BY THE CITY OF ST. GEORGE.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UNDERGROUND UTILITIES DURING CONSTRUCTION.

3. ALL EXCAVATIONS AND GRADING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY OF ST. GEORGE, SPECIFICALLY APPENDIX 33 OF THE "UNIFORM BUILDING CODE," 1994 EDITION FOR FEE SCHEDULES, APPENDIX K OF THE "UTAH UNIFORM BUILDING STANDARD ACT RULES" FOR GRADING, EXCAVATION AND EARTHWORK CONSTRUCTION AND THE SPECIFICATIONS AND REQUIREMENTS INCLUDED IN THE GEOTECHNICAL STUDY PREPARED BY OTHERS AND ON FILE AT THE CITY OF ST. GEORGE.

4. THE CONTRACTOR IS REQUIRED TO CALL THE CITY FOR INSPECTION OF ALL IMPROVEMENTS RELATED TO THIS PROJECT.

5. THE CONTRACTOR IS REQUIRED TO OBTAIN AN ENCROACHMENT PERMIT FOR ANY WORK DONE IN A PUBLIC RIGHT-OF-WAY.

6. FOR PUBLIC STREETS - TRAFFIC CONTROL SIGNS AND PAVEMENT MARKINGS SHALL BE INSTALLED AT LOCATIONS SHOWN IN ACCORDANCE WITH THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES," AND "ST. GEORGE CITY STANDARD SPECIFICATIONS FOR DESIGN AND CONSTRUCTION." STREET NAME SIGNS SHALL BE PLACED AT ALL INTERSECTIONS.

7. ANY NECESSARY MODIFICATIONS SHALL BE APPROVED BY THE DESIGN ENGINEER PRIOR TO CONSTRUCTION.

8. PROJECTS SHALL INSTALL AN INFORMATIONAL SIGN ON SITE BEFORE CONSTRUCTION BEGINS. THIS SIGN WILL HAVE A MINIMUM SIZE, PLACEMENT LOCATION AND CONTENT INFORMATION WITH THE COMPANY NAME, PHONE CONTACT, AND GRADING PERMIT NUMBER.

9. PROJECTS SHALL SUBMIT A DUST CONTROL PLAN WITH DETAILS ON EQUIPMENT, SCHEDULING, AND REPORTING OF DUST CONTROL ACTIVITIES.

10. A MANDATORY PRE-CONSTRUCTION MEETING WILL BE REQUIRED ON ALL PROJECTS PRIOR TO ANY GRUBBING, GRADING, OR CONSTRUCTION ACTIVITIES. THE PERMIT HOLDER WILL BE REQUIRED TO NOTIFY ALL DEVELOPMENT SERVICES INSPECTIONS.

11. FOLLOW APPENDIX 'J' STANDARDS FOUND IN THE IBC.

12. ALL WORK AND MATERIALS MUST MEET CITY OF ST. GEORGE STANDARDS.

SITE DATA

1.) CURRENT ZONING = C3
2.) GENERAL PLAN = COMMERCIAL
3.) ZONING OR GENERAL PLAN CHANGES = NONE
4.) TOTAL AREA SQUARE FOOTAGE = 56,992 SQ.FT. = 100.00%
5.) BUILDING AREA = 15,300 SQ.FT. = 26.8%
6.) IMPERVIOUS AREAS = 36,976 SQ.FT. = 64.9%
7.) LANDSCAPE AREA = 4,716 SQ.FT. = 8.3%
ADDITIONAL LANDSCAPE AREA PROVIDED ALONG BLUFF ST = 2,767 SQ.FT.
8.) BUILDING HEIGHT = UP TO 35' MAXIMUM
9.) PROPOSED USE = RETAIL & FOOD SALES
10.) PARKING REQUIRED = OFFICE / RETAIL SPACE
1 / 250 SQ FT.
13,100 / 250 = 52 SPACES REQUIRED

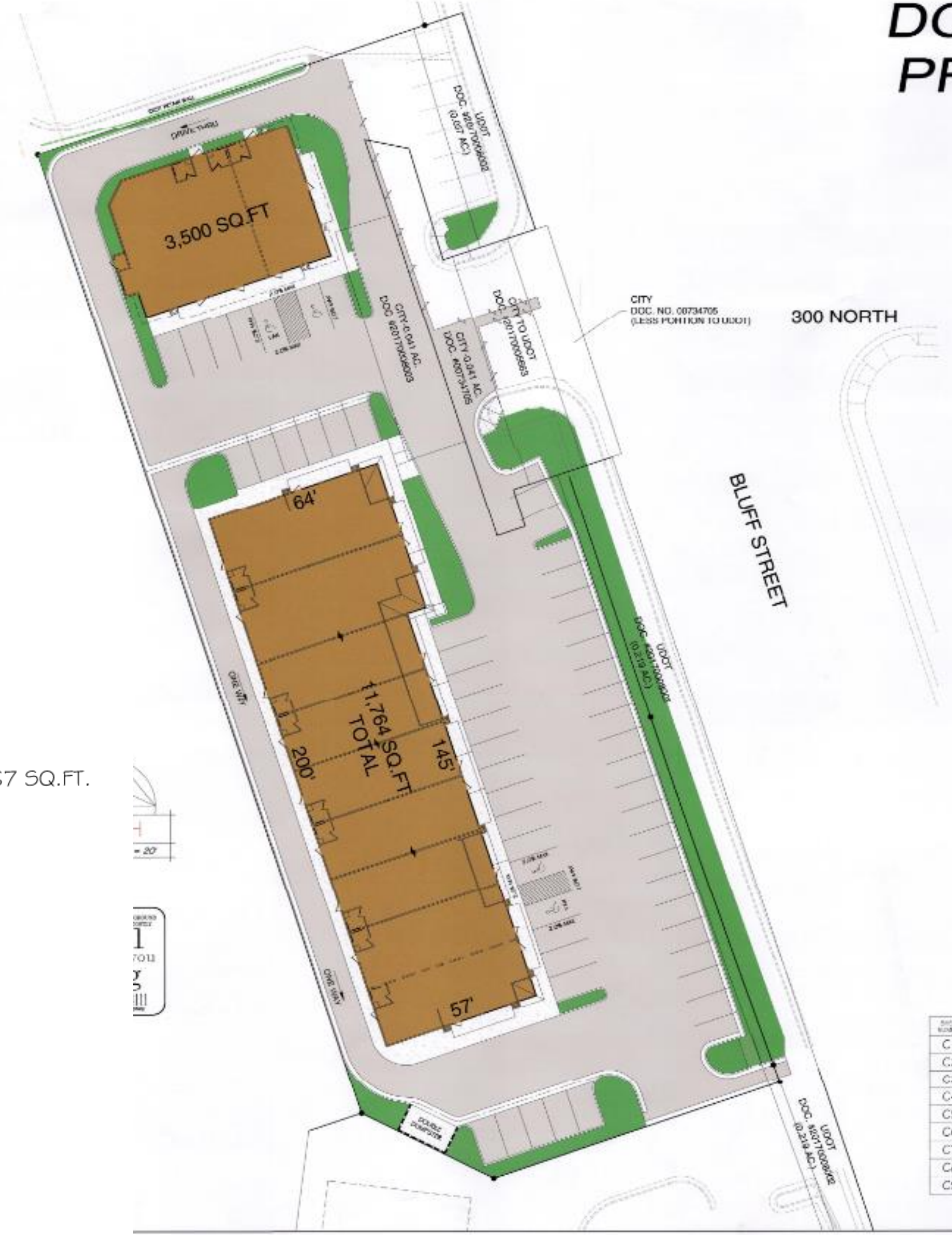
RESTAURANT SPACE
1 / 100 SQ FT.
2,200 / 100 = 22 SPACES REQUIRED

74 TOTAL SPACES REQUIRED

64 SPACES PROVIDED
11 SPACES PER VARIANCE

75 SPACES PROVIDED

DON DARLING PROPERTIES

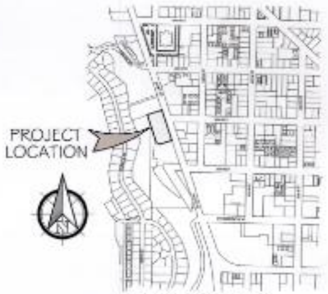


PROPERTY INFO

PROPERTY ADDRESS = SG-534-B & SG-534-C
225 N BLUFF STREET
ST GEORGE, UTAH 84770

OWNER / DEVELOPER:
NORTH BLUFF PLAZA LLC
1618 E. 580 S CIRCLE
ST GEORGE, UT 84790
CONTACT: DONALD C DARLING

Approved for Construction



VICINITY MAP
N.T.S.

	SHEET DESCRIPTION
C1	COVER SHEET
C2	EROSION CONTROL PLAN & DETAILS
C3	UTILITY PLAN
C4	GRADING PLAN
C5	DETAILS
C6	SITE PLAN
C7	LANDSCAPE & IRRIGATION PLAN
C8	IRRIGATION DETAILS
C9	PHOTOMETRIC PLAN


Reliable MAYTAG
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SPILLMAN & CRANE
1ST MONTH FREE! NO PAYMENTS 90 DAYS!
HOME AUTO
BUSINESS LIFE


BLUES KATZ

NORTH ST. GEORGE PLAZA

Recommendation

PLANNING COMMISSION AGENDA REPORT: 04/25/2023

Golf Cart Expansion at Sun River Development Agreement (Case No. 2023-DA-001)	
Request:	Consider approval of an amended development agreement to expand the golf cart right-of-way easement in Sun River to allow access to new commercial areas in Sun River Commons
Applicant:	Sun River St. George Community Association
Representative:	Doug Brown and Scott McCall
Location:	Located in the Sun River Development
Streets Affected:	Arrowhead Canyon Drive, Bluegrass Way, Sand Piper Drive, Nighthawk Drive, and Copeland Drive

BACKGROUND:
In the City of St. George, golf carts are not allowed, by right, on public streets. However, in 2011, a development agreement was approved to allow golf carts on certain streets within the Sun River Development. At this time, golf carts are allowed on portions of Angel Arch Drive, English Ivy Drive, Pearl Vista Drive, Havasu Drive, Country Club Drive, and Bluegrass Way. With the new commercial development planned in the Sun River Commons commercial area, the residents of Sun River have expressed an interest in expanding the allowable areas for golf carts. This development agreement amendment expands the existing golf cart easement within the Sun River Development.

The agreement addresses the following:

1. Definition of a golf cart
   A Golf cart shall mean and refer to any self-propelled device of conveyance of at least four wheels (whether or not authorized for operation on public streets)

2. Where Golf Carts can travel in the public Right-of-way (see **Exhibit B** of the Development Agreement)
   a. Golf cart usage would be expanded to portions of the following streets:
      - Copeland Drive
      - Arrowhead Canyon Drive
      - Bluegrass Way
      - Sand Piper Drive
      - Nighthawk Drive
   b. Golf cart usage is allowed on the above streets in the bicycle lanes that are to be shared with golf carts. The bicycle lanes are anticipated to be 7' wide.
   c. The following streets allow golf cart crossing only:
      - Sun River Parkway
      - Pioneer Road

3. Term of this agreement
   This agreement shall continue for 20 years from approval and shall automatically and consecutively renew every 20 years, until the parties decide to terminate it.

4. Costs
   Sun River is to pay for 87% of the costs and expenses of the new improvements and maintenance to the easement area and Villas agrees to pay the remaining 13% towards new improvements and maintenance. However, if agreed by both parties, the City may complete the improvements and maintenance with Sun River and Villas to reimburse the City.

RECOMMENDATION:
Staff recommends approval of this development agreement as written.

ALTERNATIVES:
1. Recommend approval as presented.
2. Recommend approval with conditions.
3. Recommend denial.
4. Table or Continue the proposed amended development agreement to a specific date.

POSSIBLE MOTION:
The Planning Commission recommends approval of the development agreement for the Golf Cart Expansion at Sun River.

FINDINGS FOR APPROVAL:
1. The development agreement has followed the required approval process, including a recommendation and public hearing from the Planning Commission, according to Utah State Code 10-9a-532.

Exhibit A
Development Agreement

When Recorded Return To:
City of St. George
Attn: Legal Department
175 East 200 North
St. George, Utah 84770

Tax ID #: SG-SUR-all phases, SG-VISR-all phases, SG-SURC- all phases

EXPANDED RIGHT-OF-WAY EASEMENT AGREEMENT
Golf Cart Use at SunRiver St. George

THIS RIGHT-OF-WAY EASEMENT AGREEMENT (hereafter "Agreement") is entered into this ____ day of _____, 2023, by and between the City of St. George, a Utah municipal corporation (hereafter "City"), SunRiver St George Community Association, Inc. (hereafter "SunRiver") and The Villas at SunRiver St. George Owner's Association, Inc. (hereafter "Villas"). City, SunRiver and Villas are at times referred to together herein as the "Parties."

WITNESSETH:

WHEREAS, SunRiver and the City entered into a Right of Way Easement Agreement Golf Cart Use at Sun River St. George, in April of 2011 ("2011 Easement); and

WHEREAS, the Parties wish to enter into this Agreement to expand and/or modify the terms of the 2011 Easement as set forth herein; and

WHEREAS, the real estate development known as Sun River St. George (the "Community") is located within the municipal boundaries of the City; and

WHEREAS, SunRiver and Villas are non-profit corporations whose membership includes all of the homeowners in the Community; and

WHEREAS, transportation within the Community is facilitated by the presence of both private roadways, owned and maintained by SunRiver and Villas, and public roadways dedicated to the public and maintained by the City; and

WHEREAS, SunRiver and Villas desire for its members, their guests and invitees, to have the ability to drive golf carts on the public roadways located within the Community, for the purpose of travelling between locations within the Community; and

WHEREAS, the areas of the public roadways within the Community where SunRiver and Villas desire for its members, their guests and invitees, to have the ability to drive golf cars are identified as "Existing Public Roads with Golf Cart Travel Easement" ("Existing Easement Area") and "Proposed Expansion of Public Roads with Golf Cart Travel Easement" ("Proposed Easement Area") on the map attached hereto as Exhibit "A"; and

WHEREAS, City is willing to permit SunRiver and Villas members, guests and invitees said ability, upon the following terms and conditions.

AGREEMENT

NOW THEREFORE, for and in consideration of the mutual covenants contained herein and in the Agreement, together with good and valuable consideration, receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. ***Easement***. City hereby grants to SunRiver and Villas a nonexclusive easement in the public rights-of-way identified as the Existing Easement Area and the Proposed Easement Area, more particularly described herein below, and as set forth in Exhibit "A" attached hereto and incorporated herein, the scope of use of which shall be strictly limited to the fulfillment of the purposes stated herein, and to the physical scope of use described herein. This Easement shall not be revoked except by mutual agreement of the Parties or by termination as expressly set forth herein.

2. ***Roadways Affected***. The parties agree that the roadways affected by this Agreement shall be limited to the Existing Easement Area and the Proposed Easement Area (referred to collectively herein as "Roadways"), as set forth in Exhibit "B", located within the Community, which Community is contained within the SunRiver St. George Planned Development Zone. In each case, the travel lane to be established for golf carts shall be aligned parallel to the motor vehicle travel lanes and located away from the motor vehicle travel lanes to the extent reasonably possible, with said golf cart lanes still upon the finished surface of the roadway. The exception shall be the roadway known as SunRiver Parkway, upon which golf cart travel shall not be permitted except to cross the road at the intersections designated on Exhibit "B" hereto. These travel lanes established for golf cart travel shall hereafter be known as the "Golf Cart Travel Lanes."

3. ***Purposes.*** SunRiver and Villas desire to use the Golf Cart Travel Lanes for the purpose of travel by golf cart upon said Roadways by SunRiver and Villas members, their guests and invitees.

4. ***Definition of Golf Cart***. For purposes of this agreement, "Golf Cart" shall mean and refer to any self-propelled device of conveyance of at least four wheels (whether or not authorized for operation on public streets), designed for the primary purpose of transporting a person or persons on golf courses. "Golf Cart" shall exclude any vehicle classified pursuant to Utah Code Annotated 41-1a-102 (2010, as amended) or other Utah state law as a "motor vehicle," an "all-terrain type I vehicle," or an "all-terrain type II vehicle," the use of each of which upon the Roadways shall be governed by existing laws and ordinances.

5. ***Non-exclusivity; Priority of Uses***. This Agreement shall in no way be construed to exclude other existing or future uses of the Roadways by City or to interfere with the City's right of access, use and maintenance of the Roadways on behalf of the public, or the City's right to locate or authorize the location of utilities upon or beneath the Roadways. All such approved

uses of the public utility easements, whether established before or after the date of this Agreement, shall be deemed prior and superior to the use approved herein. The use established herein shall not unreasonably interfere with regular motor vehicle traffic upon the Roadways and shall be established as much as is reasonably possible to be compatible with regular motor vehicle traffic.

6. ***Regulation of Use by the Parties***. SunRiver, Villas and those individuals who receive the benefit of this Agreement shall comply with all rules, regulations, and permits required or established by the City to regulate the use authorized by this Agreement. SunRiver and Villas shall also have an independent right to regulate use of the Golf Cart Travel Lanes through licensing, permits, rules, regulations, and fees, provided that said regulation efforts are compatible with any regulation by the City, and not in violation of any applicable laws and ordinances. In no event shall the City have any obligation to enforce any of the regulation efforts of SunRiver hereunder.

7. ***Easement Fee***. The Easement Fee to be paid to City for the initial term hereof shall equal One Hundred Dollars ($100.00) per year, payable in advance for each year of the term of this Agreement. The Easement Fee shall be non-refundable, except in the event of unilateral termination or suspension of this Agreement by the City in accordance with Section 10, in which case the City shall refund to the payer a portion of Easement Fees already paid, pro rata from the date of termination or during the time such suspension is effective. The Easement Fee shall be due and payable to City annually and for the first year shall be due upon the Effective Date of this Agreement, and thereafter on the same date of each following year. The Easement Fee shall be paid by SunRiver. The Villas shall reimburse to SunRiver their portion of the fee at an amount proportionate to a ratio of the number of Lots within each separate community as set forth in Section 12 below. Any refund issued by the City shall be shared pro rata to the amount paid by each community.

8. ***Term.*** The initial term of this Agreement shall run from the date on which all the parties have signed this Agreement, or on which the St. George City Council has approved or adopted this Agreement, whichever is later (the "Effective Date"); and the initial term shall continue for a period of twenty (20) years from said date.

9. ***Renewal.*** Upon the expiration of the initial term hereof, this Agreement shall renew automatically for additional consecutive renewal terms of twenty (20) years each, which renewal terms shall be on the same terms and conditions as set forth herein. The consecutive renewals shall continue until such time as the parties hereto decide mutually to modify the terms of this Agreement, or this Agreement is terminated as set forth herein below.

10. ***Relinquishment of Easement by SunRiver and Villas.*** SunRiver and Villas agree that they shall relinquish this Easement if State and City laws change to allow for travel on public streets by Golf Carts, or if the City, in its sole discretion, determines that it needs the property occupied by this Easement. If the City determines that it needs the property occupied by this Easement, then the City shall notify SunRiver and Villas in writing that this Easement must be relinquished. SunRiver and Villas shall then cooperate with City to prepare and file all documents which are required to relinquish this Easement.

11. ***Width of Golf Cart Travel Lanes***. The parties anticipate that, except where exceptions are noted in this Agreement and Exhibit "B" hereto, the Golf Cart Travel Lanes shall be established on both sides of the motor vehicle travel lanes and running parallel thereto. The width of the Golf Cart Travel Lanes shall be determined generally by the availability of space outside the motor vehicle travel lanes upon each Roadway, but more specifically is anticipated to be seven feet (7') wide for each Golf Cart Travel Lane, for a total width of fourteen feet (14') for both Golf Cart Travel Lanes on a Roadway.

12. ***Cart Lane Improvements***. SunRiver and Villas agree that they shall pay for and make improvements to the Roadways to make them safe for the use and purpose contemplated herein, which improvements shall include: (a) striping to divide the Golf Cart Travel Lane from the motor vehicle travel lane(s) on each of the affected Roadways; (b) identification of the Golf Cart Travel Lane as such, either through identification painted within said lane or with proper signage; (c) signage identifying the terminus of each Golf Cart Travel Lane at the boundaries of the Community, to discourage golf cart travel on the public roadways outside of the Community; and (d) such other safety-related improvements as may be reasonably required from time to time by the City. SunRiver agrees to pay for 100% of the costs and expenses of said improvements related to the Existing Easement Area. SunRiver agrees to pay 87% of the costs and expenses of said improvements to the Proposed Easement Area and Villas agrees to pay the remaining 13% of the costs and expenses of said improvements. SunRiver and Villas shall ensure that any striping, signage, or other improvements complies with all applicable Utah State and City of St. George laws, rules, and regulations, including but not limited to AASHTO and MUTCD standards and regulations, relating to such improvements. Any striping, signage, or other improvements shall also be subject to review and approval by the City of St. George before any striping, signage, or other improvements may be installed by the parties.

With respect to striping to indicate Golf Cart Travel Lanes, the parties agree as follows:

a. Striping. The roadways marked on Exhibit "B" as "Existing Public Roads with Golf Cart Travel Easements," and the roadways marked as "Proposed Expansion of Public Roads with Golf Cart Travel Easements" within the Community, excluding SunRiver Parkway, shall have stripes painted to identify the location of Golf Cart Travel Lanes.

b. No striping – crossing only. The roadway known as SunRiver Parkway shall not have Golf Cart Travel Lanes striped, as golf cart travel will be restricted to crossing the road at the locations designated on Exhibit "B".

c. Striping upon completion. The roadway known as Arrowhead Canyon is currently improved only to half width. The parties agree that golf carts may travel on Arrowhead Canyon only in designated Golf Cart Travel Lanes. When the road is completed to full width, then SunRiver and Villas shall complete striping of the Golf Cart Travel Lane on the newly completed portion of the roadway.

d. Signage. Signage which is compliant with applicable laws, rules, and regulations shall be installed and shall be subject to approval by the City of St. George before the installation of the signage.

All of the foregoing improvements shall be considered part of the Cart Lane Improvements,

13. ***Authorization for Improvements***. Before construction of any of the improvements set forth in the prior section, SunRiver and Villas shall seek the approval of the City with respect to sufficiency of design, placement, materials, and the like. In all cases where such prior approval is sought, City shall make every effort to ensure that the requested approval is not unreasonably withheld or delayed.

14. ***Maintenance***. SunRiver and Villas shall be responsible for maintenance of all improvements which are required as a result of the Easement granted in the Golf Cart Travel Lanes herein, which improvements would not be required but for the use intended herein (the "Cart Lane Improvements"). This shall include maintenance of the improvements listed in Section 12 above. SunRiver agrees to pay for 100% of the costs and expenses of said maintenance related to the Existing Easement Area. SunRiver agrees to pay 87% of the costs and expenses for maintenance related to the Proposed Easement Area and the Villas agrees to pay the remaining 13% of said maintenance. The City shall continue to maintain the road surfaces, motor vehicle striping and signage, curbs and gutters, shoulder improvements, public utilities, and other such public improvements to the Roadways as may be constructed or authorized by the City from time to time, all of which are excluded from the definition of Cart Lane Improvements, and which are not solely necessitated by the use of the Golf Cart Travel Lanes contemplated herein.

15. ***Costs of Improvements and Maintenance***. As set forth in this Agreement, SunRiver and Villas shall bear the cost of all Cart Lane Improvements and Maintenance, as defined in sections 12 and 14 above. However, there may be particular items of maintenance that, by mutual agreement of the parties, can be completed by the City more efficiently, safely, conveniently, and/or at lower cost. In that event, the parties may agree that the City shall complete said maintenance, and SunRiver and Villas shall reimburse the City, pursuant to their respective share, for the City's actual costs, including the cost of labor, materials and equipment required to complete the same. In the event such maintenance is completed by the City as part of a larger maintenance project, then the parties shall also agree on a reasonable means of determining the portion of costs for the larger project which are attributable to maintenance of the Cart Lane Improvements.

16. ***Indemnification of City by SunRiver***. SunRiver and Villas agree that it shall indemnify City and hold City harmless for any and all losses, claims, damages, accidents, injuries, or deaths that result from or are related to the use of golf carts licensed or permitted by SunRiver and Villas upon any of the Roadways identified herein, whether the same are suffered or asserted by members of SunRiver and Villas, or by guests or invitees of said members, or by any third parties, including but not limited to any general or special damages claimed, and attorneys' fees and court costs expended by City to defend against the same; except to the extent that said losses, claims, damages, accidents, injuries, or deaths result from (i) the City's failure to

perform its roadway maintenance obligations as outlined in Section 14 of this Agreement or (ii) intentional acts of the City, its agents, employees, officers, contractors, or designees. SunRiver and Villas shall also be bound to defend City against such losses, claims, damages, accidents, injuries, or deaths, except to the extent the same result from (i) the City's failure to perform its roadway maintenance obligations as outlined in Section 14 of this Agreement or (ii) intentional acts of the City, its agents, employees, officers, contractors, or designees, and may elect at any time to settle any of the same which are brought against the City, provided such settlement does not require the City to admit to any wrongdoing. SunRiver and the Villas agree to split any costs and expenses related to said indemnification or defense with SunRiver paying for 87% of said costs and expenses and Villas paying 13% of said costs and expenses.

17. ***Notices.*** Any notices required by this Agreement shall be in writing and given by letter mailed, or by personal delivery, to the following for each party. Notice shall deem to be received at the earliest five (5) days after being placed for mailing, or on the date actually delivered to a party as evidenced by signature or otherwise.

City:

City Manager
St. George City Hall
175 East 200 North
St. George, Utah 84770

With a copy to:

City Attorney
St. George City Hall
175 East 200 North
St. George, Utah 84770

SunRiver:

SunRiver St George
Community Association, Inc.
c/o PMP
4275 Country Club Drive
St. George, Utah 84790

Villas:

The Villas at SunRiver
St. George Owner's Assoc.
c/o SunWest Management
1404 SunRiver Pkwy #250
St. George, Ut 84790

With a copy to:

Darcy Stewart
1404 W. SunRiver Pkwy
Ste. 200
St. George, Utah 84790

With a copy to:

James Purcell
Bangerter Frazier Group
912 W 1600 S Ste. A200
St. George, UT 84770

18. ***Corporate Authority.*** The parties represent and warrant that they have respective corporate authority by virtue of their respective governing documents or law or a resolution of the respective board of managers or council to enter into this Agreement.

19. ***Governing Law.*** This Agreement shall be construed in accordance with and governed by the laws of the state of Utah.

20. ***Integration.*** This Agreement constitutes the entire agreement between the Parties pertaining to the Roadways and supersedes all prior agreements and understandings. No covenant, representation, or condition not expressed in this Agreement shall affect or be deemed to interpret, change, or restrict the express provisions herein unless otherwise provided herein. The recitals/Witnesseth section of this Agreement is incorporated as part of this Agreement.

IN WITNESS WHEREOF, this Agreement has been executed as of the dates set forth below.

(Remainder of page intentionally left blank)

SUNRIVER ST. GEORGE COMMUNITY ASSOCIATION, INC.:

_____ Dated this 22 day of March, 2023
By: Steve Lindley
Its: President

THE VILLAS AT SUNRIVER ST. GEORGE OWNER'S ASSOCIATION, INC.:

_____ Dated this 27 day of March, 2023
By: Dalan Madsen
Its: President

CITY OF ST. GEORGE:

_____ Dated this _____ day of _____, 2023
Michele Randall, Mayor

Attest: _____ Dated this _____ day of _____, 2023
Christina Fernandez, City Recorder

Approved as to form: _____
St. George Deputy City Attorney

DIANA LUZ JUAREZ
Notary Public, State of Utah
Commission # 726661
My Commission Expires On
September 12, 2026

STATE OF UTAH)
ss.
WASHINGTON COUNTY)

On the 22 day of March 2023, appeared before me Steve Lindley, whose identity is personally known to me or proved to me on the basis of satisfactory evidence and who did say that he/she is the President of the SunRiver St. George Community Association Inc., a Utah corporation, and that said document was signed by he/she in behalf of said company by authority of a resolution of its board of directors, and said Steve Lindley acknowledged to me that said corporation executed the same.

Notary Public

STATE OF UTAH)
ss.
WASHINGTON COUNTY)

On the 27 day of March 2023, appeared before me Dalan Madsen, whose identity is personally known to me or proved to me on the basis of satisfactory evidence and who did say that he/she is the President of the Villas at Sun River St. George Owner's Association, Inc., a Utah corporation, and that said document was signed by he/she in behalf of said company by authority of a resolution of its board of directors, and said Dalan Madsen acknowledged to me that said corporation executed the same.

DIANA LUZ JUAREZ
Notary Public, State of Utah
Commission # 726661
My Commission Expires On
September 12, 2026

Notary Public

STATE OF UTAH)
ss.
WASHINGTON COUNTY)

On the _____ day of _____, _____, appeared before me Michele Randall, Mayor of the City of St. George, who being duly sworn did say that the within and foregoing instrument was signed by her on behalf of said municipal corporation by authority of a resolution of its City Council, and said Michele Randall did duly acknowledge to me that said corporation executed the same.

Notary Public

Exhibit "A"

Note: These legal descriptions describe the boundaries of the Sun River St. George Planned Development Community, The Villas at Sun River St. George, and the adjacent commercial areas to be included in the golf cart easement originally recorded August 11, 2011 as Document No. 20110024470. The residents within these boundaries are members of the Sun River St. Ggeorge Community Association and the Villas at Sun River St. George and are beneficiaries of this RIGHT-OF-WAY EASEMENT AGREEMENT.

South Portion (The Villas at Sun River St. George) :

Beginning at a point which is a westerly line of the Atkinville Interchange (HPP-15-195601), said point being the northerly corner of The Villas at Sun River St. George Phase 5, as found on file with the Washington County Recorder's Office as Entry No. 20180043982, said a point also being North 01°13'39" East 2,469.31 feet along the extension of the section line and East 3,385.02 feet from the Southwest Corner of Section 23, Township 43 South, Range 16 West, Salt Lake Base & Meridian, and running;

Thence southeasterly the following (7) courses along the southerly line of said Atkinville Interchange
thence South 21°35'02" West 40.10 feet;
thence Southeast 103.00 feet along an arc of a 670.00 feet radius curve to the right (center bears South 21°35'02" West, long chord bears South 64°00'43" East 102.90 feet with a central angle of 08°48'29");
thence South 59°36'29" East 383.16 feet;
thence South 59°36'29" East 411.83 feet;
thence South 57°08'20" East 615.49 feet;
thence South 22°41'53" East 57.93 feet;
thence South 15°51'16" West 594.31 feet tot eh northwesterly line of Interstate 15;
thence South 28°34'00" West 1,218.91 feet along said northwesterly line of Interstate 15;
thence North 61°27'16" West 783.02 feet to the southeasterly line of Arrowhead Canyon Road;
thence northerly the following (5) courses along the easterly line of said Arrowhead Drive;
thence North 636.74 feet along an arc of a 661.00 feet radius curve to the left (center bears North 50°05'13" West, long chord bears North 12°19'00" East 612.40 feet with a central angle of 55°11'34");
thence North 15°16'46" West 340.32 feet;
thence North 1,067.49 feet along an arc of a 1,967.00 feet radius curve to the right (center bears North 74°43'14" East, long chord bears North 00°16'03" East 1,054.43 feet with a central angle of 31°05'39");
thence North 15°48'52" East 136.04 feet;
thence Northeast 60.63 feet along an arc of a 40.00 feet radius curve to the right (center bears South 74°11'08" East, long chord bears North 59°14'19" East 54.99 feet with a central angle of 86°50'55") to the Point of Beginning.

Containing 2,282,509 square feet or 52.40 acres.

North Portion (A portion of the Sun River St. George Community Association, adjacent commercial properties, and any future residential communities within this description) :

Beginning at a point which is a westerly line of the Atkinville Interchange (HPP-15-195601), said point being North 01°13'39" East 2,562.77 feet along the extension of the section line and East 3,419.97 feet from the Southwest Corner of Section 23, Township 43 South, Range 16 West, Salt Lake Base & Meridian, and running;

thence West 2.58 feet along an arc of a 114.66 foot radius curve to the right (center bears North 20°55'07" East, long chord bears North 68°26'17" West 2.58 feet with a central angle of 01°17'14")to the easterly corner of Arrowhead Canyon Road;
thence northerly the following (15) courses along the easterly line of Arrowhead Canyon Road
thence Northwest 73.17 feet along an arc of a 50.00 foot radius curve to the right (center bears North 21°58'07" East, long chord bears North 26°06'37" West 66.81 feet with a central angle of 83°50'31");
thence North 15°48'38" East 59.32 feet;
thence North 130.17 feet along an arc of a 967.00 foot radius curve to the right (center bears South 74°11'22" East, long chord bears North 19°40'01" East 130.07 feet with a central angle of 07°42'45");
thence North 23°31'24" East 260.02 feet;
thence East 39.27 feet along an arc of a 25.00 foot radius curve to the right (center bears South 66°28'36" East, long chord bears North 68°31'24" East 35.36 feet with a central angle of 90°00'00");
thence North 23°31'24" East 33.00 feet;
thence North 23°31'24" East 33.00 feet;
thence North 39.27 feet along an arc of a 25.00 foot radius curve to the right (center bears North 23°31'24" East, long chord bears North 21°28'36" West 35.36 feet with a central angle of 90°00'00");
thence North 23°31'24" East 240.44 feet;
thence Northeast 164.54 feet along an arc of a 967.00 foot radius curve to the right (center bears South 66°28'36" East, long chord bears North 28°23'52" East 164.34 feet with a central angle of 09°44'57");
thence North 33°16'21" East 327.79 feet;
thence East 39.27 feet along an arc of a 25.00 foot radius curve to the right (center bears South 56°43'39" East, long chord bears North 78°16'12" East 35.35 feet with a central angle of 89°59'44");
thence North 33°18'00" East 66.00 feet;
thence North 39.27 feet along an arc of a 25.00 foot radius curve to the right (center bears North 33°18'02" East, long chord bears North 11°41'58" West 35.36 feet with a central angle of 90°00'00");
thence North 59°18'21" West 31.76 feet to the easterly line of Sun River St. George Phase 13;
thence northerly the following (5) courses along said the easterly line of Sun River St. George Phase 13;
thence North 11°59'04" East 374.00 feet;
thence North 22°35'41" West 140.40 feet;
thence North 37°26'10" West 476.86 feet;
thence North 24°44'53" West 353.21 feet;
thence North 50°02'55" West 167.10 feet to the section line;

thence South 88°45'06" East 1,886.58 feet along said section line to the northeast corner of said Section 23, Township 43 South, Range 16 West, Salt Lake Base & Meridian;
thence South 88°50'30" East 1,223.24 feet along the section line tot eh westerly lien of Pioneer Road;
thence southerly the following (9) courses along said westerly line of Pioneer Road;
thence South 11°36'06" West 202.89 feet;
thence South 253.93 feet along an arc of a 810.00 foot radius curve to the right (center bears North 78°23'54" West, long chord bears South 20°34'58" West 252.89 feet with a central angle of 17°57'43");
thence South 29°33'49" West 968.36 feet;
thence Southwest 392.53 feet along an arc of a 510.00 foot radius curve to the right (center bears North 60°26'11" West, long chord bears South 51°36'47" West 382.91 feet with a central angle of 44°05'56");
thence South 73°39'45" West 600.07 feet;
thence North 56°41'58" West 15.75 feet;
thence South 73°39'45" West 8.44 feet;
thence Southwest 263.57 feet along an arc of a 602.00 foot radius curve to the left (center bears South 16°20'15" East, long chord bears South 61°07'11" West 261.47 feet with a central angle of 25°05'09");
thence West 44.13 feet along an arc of a 30.00 foot radius curve to the right (center bears North 41°25'23" West, long chord bears North 89°17'01" West 40.26 feet with a central angle of 84°16'45") to the northerly line of Bluegrass Way;
thence the following (3) courses along said northerly line of Bluegrass Way;
thence North 47°08'39" West 22.92 feet;
thence Northwest 138.92 feet along an arc of a 833.00 foot radius curve to the left (center bears South 42°51'21" West, long chord bears North 51°55'18" West 138.76 feet with a central angle of 09°33'19");
thence North 56°41'58" West 52.23 feet;
thence South 33°18'01" West 65.65 feet to the southerly line of said Bluegrass Way;
thence the following (3) courses along said southerly line of Bluegrass Way;
thence South 56°43'39" East 52.23 feet;
thence Southeast 127.91 feet along an arc of a 767.00 foot radius curve to the right (center bears South 33°16'21" West, long chord bears South 51°57'00" East 127.77 feet with a central angle of 09°33'19");
thence South 47°10'20" East 144.22 feet to the easterly line of said Pioneer Road;
thence northeasterly the following (3) courses along said easterly line of said Pioneer Road;
thence Northeast 307.03 feet along an arc of a 510.00 foot radius curve to the right (center bears South 50°46'03" East, long chord bears North 56°28'45" East 302.42 feet with a central angle of 34°29'36");
thence North 73°43'35" East 618.71 feet;
thence Northeast 207.27 feet along an arc of a 590.00 foot radius curve to the left (center bears North 16°16'25" West, long chord bears North 63°39'44" East 206.21 feet with a central angle of 20°07'43");
thence South 68°25'23" East 76.99 feet to the westerly line of Interstate 15;
thence South 28°34'00" West 91.11 feet along said westerly line of Interstate 15;
thence South 39°18'35" West 643.77 feet;
thence South 39°18'35" West 643.77 feet;

thence Southwest 900.55 feet along an arc of a 1,745.00 foot radius curve to the left (center bears South 50°41'25" East, long chord bears South 24°31'31" West 890.59 feet with a central angle of 29°34'08")to the westerly line of line of said Atkinville Interchange (HPP-15-195601);
thence the following (9) courses along said line of the Atkinville Interchange (HPP-15-195601);
thence South 39°51'41" West 440.26 feet;
thence South 77°24'18" West 37.80 feet;
thence North 64°47'15" West 506.95 feet;
thence North 59°36'29" West 96.11 feet;
thence North 65°19'57" West 110.28 feet;
thence North 59°36'29" West 695.17 feet;
thence Northwest 129.13 feet along an arc of a 840.00 foot radius curve to the left (center bears South 30°23'31" West, long chord bears North 64°00'44" West 129.01 feet with a central angle of 08°48'29");
thence South 21°35'02" West 29.42 feet to the Point of Beginning.

Containing 6,275,122 square feet or 144.06 acres.

September 27, 2022

Exhibit "B"

Expanded Golf Cart Travel Lane Map

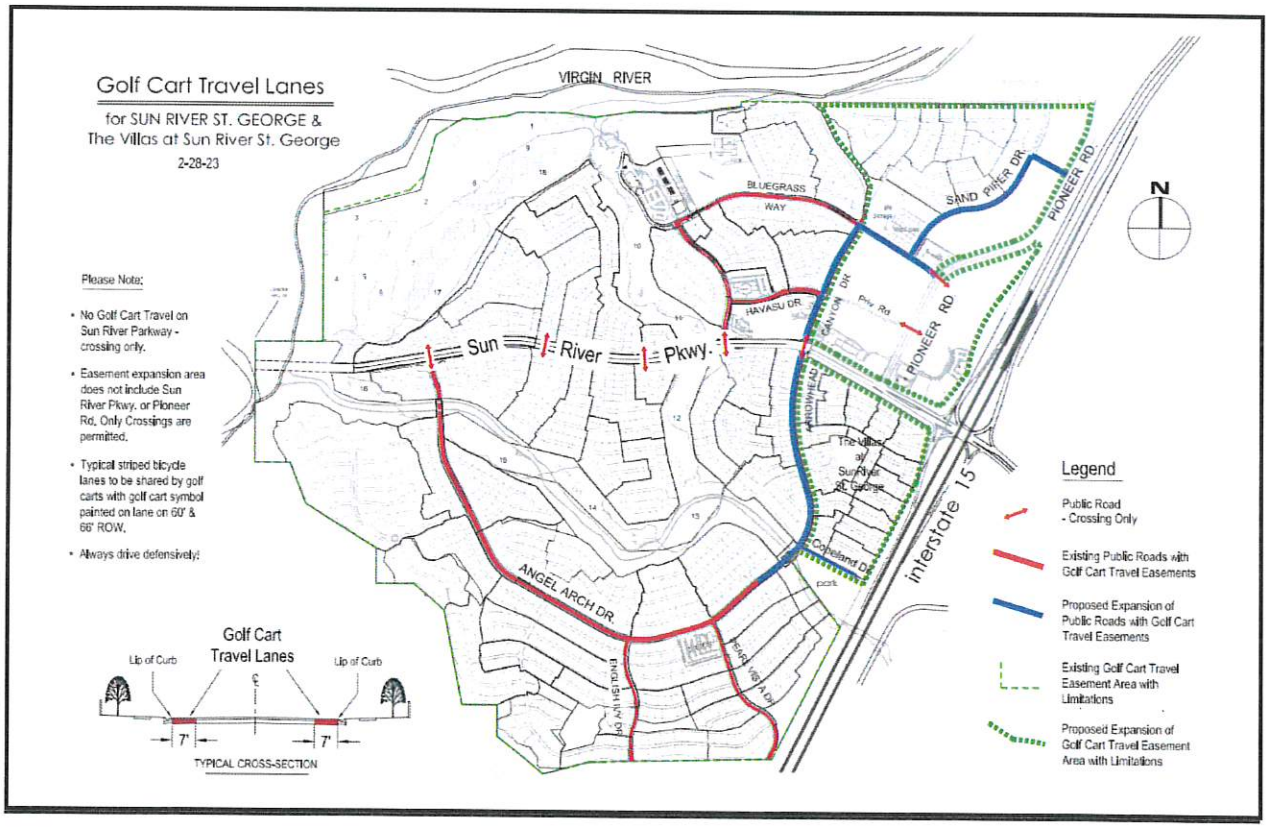


Exhibit B
PowerPoint Presentation

GOLF CART EXPANSION AT SUN RIVER

Amended Development Agreement

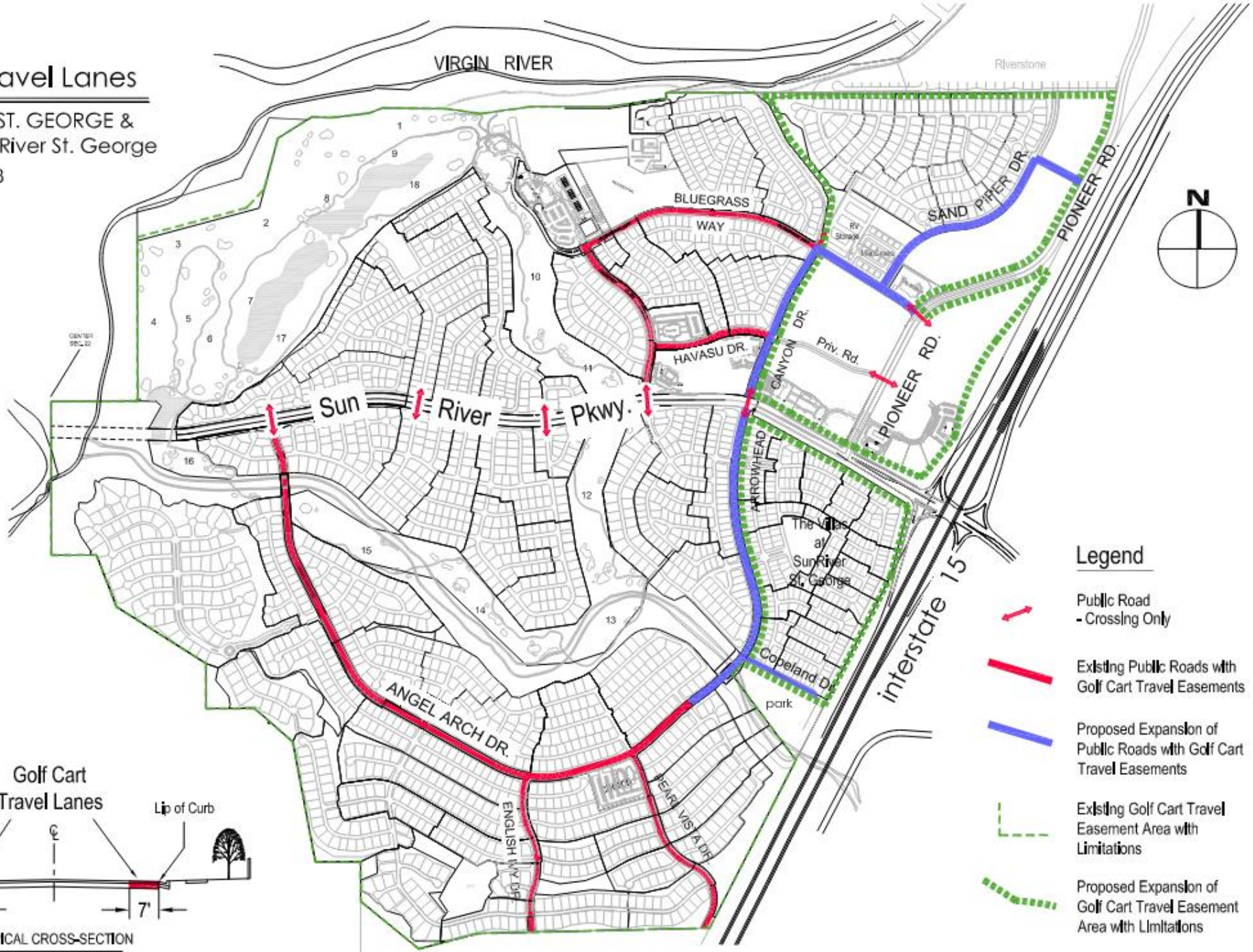
2023-DA-001


Sun River
Development
Sun River Parkway
15

Golf Cart Travel Lanes

for SUN RIVER ST. GEORGE &
The Villas at Sun River St. George

2-28-23



Please Note:

- No Golf Cart Travel on Sun River Parkway - crossing only.
- Easement expansion area does not include Sun River Pkwy. or Pioneer Rd. Only Crossings are permitted.
- Typical striped bicycle lanes to be shared by golf carts with golf cart symbol painted on lane on 60' & 66' ROW.
- Always drive defensively!

TYPICAL CROSS-SECTION

Legend

- Public Road - Crossing Only
- Existing Public Roads with Golf Cart Travel Easements
- Proposed Expansion of Public Roads with Golf Cart Travel Easements
- Existing Golf Cart Travel Easement Area with Limitations
- Proposed Expansion of Golf Cart Travel Easement Area with Limitations

Term of this agreement

This agreement shall continue for 20 years from approval and shall automatically and consecutively renew every 20 years, until the parties decide to terminate it.

Costs

Sun River is to pay for 87% of the costs and expenses of the new improvements and maintenance to the easement area and Villas agrees to pay the remaining 13% towards new improvements and maintenance. However, if agreed by both parties, the City may complete the improvements and maintenance with Sun River and Villas to reimburse the City.

GOLF CART EXPANSION AT SUN RIVER

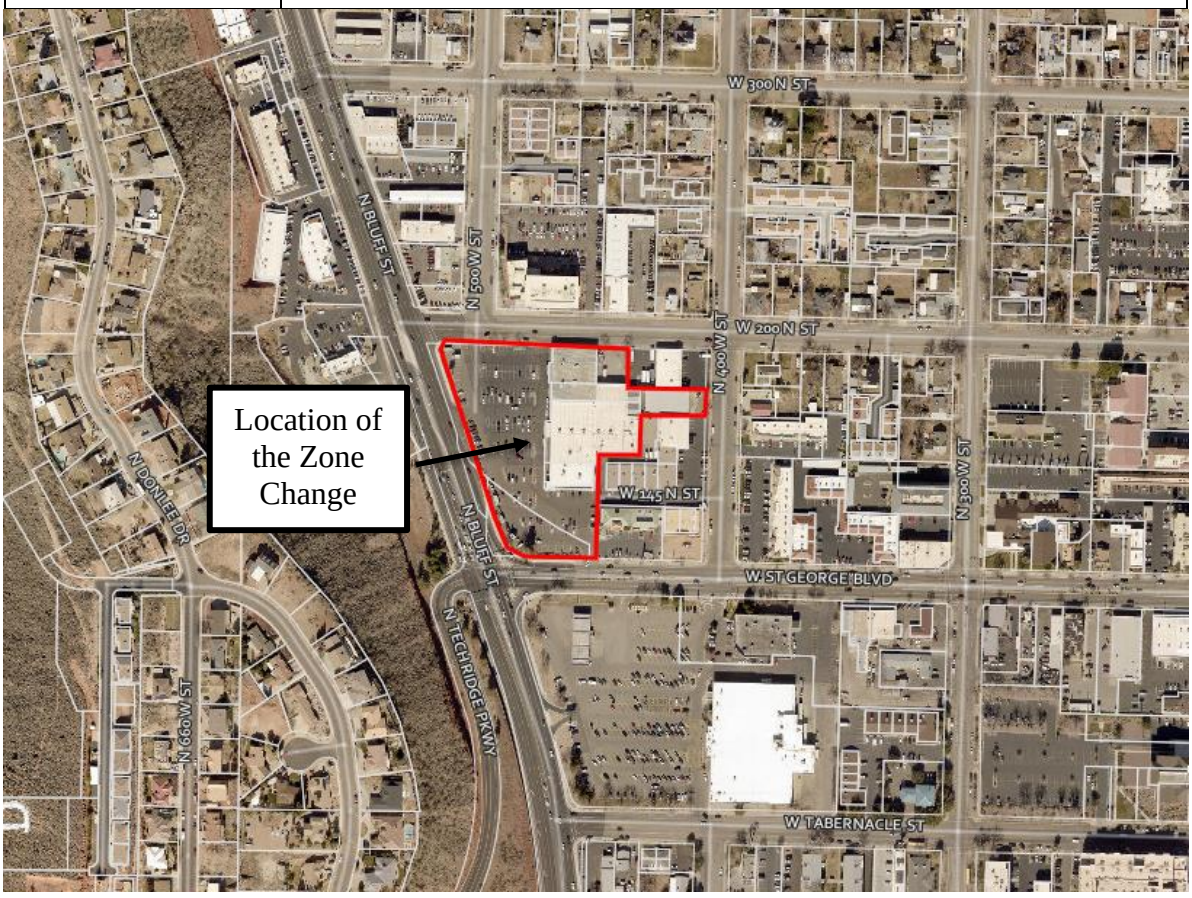
Recommendation

St.George
Community Development

Item 4
Conditional Use Permit

PLANNING COMMISSION AGENDA REPORT: 04/25/2023

160 N. Bluff Conditional Use Permit (Case No. 2023-CUP-001)	
Request:	Consider a conditional use permit to update the building facades and add a 1500 square foot drive-thru restaurant to the southwest corner of the property.
Applicant:	Jason Hurst
Representative:	Matthew Metcalf
Location:	Northeast corner of St. George Boulevard and Bluff Street
General Plan:	COM (Commercial)
Zoning:	C-3 (General Commercial)
Land Area:	Approximately 4.59 acres



BACKGROUND:
The applicants would like to update the building facades and add a 1500 square foot restaurant with drive-thru in the southwest corner of the parking lot of this existing development located on the northeast corner of St. George Blvd and Bluff Street. This development is home to the Hurst General Store / Ace Hardware, Mattress Store, Arturo's, and The Desert Rat. In 2018, an 8,000 square foot building located on the southwest corner of this shopping center was razed as part of the Bluff Street expansion. Prior to the Bluff Street expansion, the total building square footage was 69,550 square feet. Currently, the existing buildings total 61,550 square feet. With the proposed new building the total square footage of this development would be 63,050 square feet.

This proposal will refresh the existing storefronts by creating three distinct storefronts along Bluff Street. The façade on the south side, home to The Desert Rat, will be enhanced as well to make a more prominent entrance. The northernmost retail space will be updated to allow for a restaurant at this location. The new drive-thru structure will allow for 8+ car stacking and will not impede onto the public rights-of-way, and the existing tree along St. George Boulevard will be preserved. Overall, the site will have sufficient parking for the proposed uses and this update will enhance the appearance of this property.

According to Title 10-17B-9, a development site with a building aggregate ground floor area greater than 20,000 square feet requires a Conditional Use Permit with redevelopment.

A conditional Use Permit requires the following standards (10-17B-3 and 10-17B-9) be met:

Review Criteria		
Regulation	**Proposal**	**Staff Comments**
Maximum Intensity and use	There will be an additional building added to the southwest corner of this development.	This intensity and uses are expected to be comparable to what is permitted in this C-3 district
Complies with all Provisions of Code	See attached plans	Staff will ensure the project complies with all codes at the site plan review process
Compared to Permitted Uses, Mitigates Adverse impacts through:		
Size and Location	Just over 63,000 sf in a C-3 district	The proposal is compliant
Traffic Generation	No major traffic impacts as the area is zoned for commercial uses.	The proposal is compliant

Review Criteria		
Regulation	**Proposal**	**Staff Comments**
Utility / Public Infrastructure Demand	Existing utility infrastructure will accommodate the new buildings.	City infrastructure is sufficient to handle this increased demand
Emergency Vehicle Access	Access is available off Main St. and Bluff St.	The proposal is compliant
Off-Street Parking	The parking lot will hold 248 parking spaces.	247 spaces are required. The proposal is compliant.
Vehicle and Pedestrian Circulation	Please see site plan	The vehicle circulation plan is sufficient. Increased pedestrian circulation is needed.
Fencing, Screening, Landscaping	Landscape plans have been submitted	The landscaping will be required to meet the regulations. Staff will confirm during the site plan process. Staff will ask to remove lawn from Bluff Street landscaping.
Usable Open Space	N/A	N/A
Signs and Lighting	Insufficient information has been provided.	The lighting plan will be required to meet regulations and will be reviewed during the site plan review process. The signs will be reviewed during the building permit process.
Compatibility with Surrounding Structures	See the elevations	This proposal will give this shopping area modern elevations and will be compatible with the surrounding structures in design, mass, and color.
Noise, Odors, and Other Factors	No new noise, vibrations, odors, steam or other factors of significance will be introduced with the expansion.	Staff has no concerns.

Review Criteria		
Regulation	**Proposal**	**Staff Comments**
Delivery, loading and unloading operations	Delivery will not change.	There is no change to the existing operations hours.
Trash Generation, Screening, & Recycling	There will be a new solid waste structure along Bluff Street.	The screened solid waste location meets regulations as proposed.
Potential Impacts of Patrons/Employees	With the new redevelopment no new impacts or adverse effects is anticipated.	There is not expected to be any significant negative impact
Impacts of the Use on Public Property Adjoining the Site	N/A	N/A
Hours of Operation and Delivery	Standard operating hours are expected.	Staff has no concerns
Special Hazards Arising from the Use	No anticipated special hazards	Staff has no concerns
Building Mass, Design, & Orientation / Building Façade Articulation	See elevations	Staff has no concerns
Building Colors	See elevations and material board	Staff has no concerns

The City Council may approve the conditional use permit if it meets the following standards found in Chapter 17 of the adopted zoning regulations (10-17B-4):

Upon review and consideration of the criteria identified in Title 10-17B-1 and 10-17B-3, compared to the impacts of allowed uses in the zone, the proposal shall:

A. Be compatible in use, scale, and design with allowed uses in the zone; and

B. Not compromise the health, safety, or welfare of:

a. Persons employed within or using the proposed development.

b. Those residing or working in the vicinity of the proposed use or development.

c. Property or improvements in the vicinity of the proposed use or development; or

d. Not imposed disproportionate burdens on the citizens of the city.

C. The land use authority shall issue a conditional use permit, if the applicant has proposed, or if the land use authority can propose, conditions of approval to substantially mitigate the reasonably anticipated detrimental effects of the proposed use in accordance with the standards and criteria herein. The conditional use permit shall describe the scope of the permit, and the conditions of approval.

D. If the land use authority determines that the applicant has not proposed, and the land use authority cannot impose additional, reasonable conditions of approval to comply with the standards and criteria herein, the land use authority may deny the conditional use permit application.

RECOMMENDATION:

Staff recommends approval of this Conditional Use Permit with the following conditions:

1. The applicant works with staff on improving the pedestrian access points.
2. The applicant combines the three parcels into one.

ALTERNATIVES:

1. Recommend approval as presented.
2. Recommend approval with additional conditions.
3. Recommend denial.
4. Table or continue the proposed conditional use permit to a specific date.

POSSIBLE MOTION:

The Planning Commission recommends approval of the 160 N. Bluff Conditional Use Permit with the condition mentioned in the staff report.

FINDINGS FOR APPROVAL:

1. The proposed conditional use permit is compatible in use, scale, and design with allowed uses in the zone.
2. The proposed conditional use permit does not compromise the health, safety, or welfare of those residing or working in the vicinity of this proposed use.

EXHIBIT A
Applicant's Narrative

Overview:

This project consists of two main parcels and a third smaller parcel:

A. SG-531 located at 160 N Bluff Street St. George, UT 84770, approximately 3.96 acres in size. This parcel is home to Hurst General Store / Ace Hardware, Mattress Store, Arturo's, and The Desert Rat with additional commercial space available at the north end (previously Spirit Halloween)

B. SG-520-E-1 located at 490 W St. George Blvd, St. George, UT 84770, approximately 0.59 acres in size. This is the southwest corner of the property that previously was home to Baskin Robins, Irmita's, Check City (Blockbuster), etc. The ±8,000 sq. ft. building was razed as part of the Bluff St expansion.

C. SG-520-G located adjacent to the previously described parcels and adjacent to Bluff St. Approximately 0.01 acres in size. This property is a small sliver along the deceleration lane from north-bound Bluff St.

- The total site area encompasses approximately 4.59 acres.
- Prior to the Bluff St expansion, total building area was approximately 69,550 sq. ft.
- The current total building area is now approximately 61,550 sq. ft.
- With the proposed drive-thru, total proposed building area is anticipated to be 63,050 sq. ft. (6,500 sq. ft. below the previous area prior to Bluff St expansion).

We are proposing a façade refresh for the north end cap of the Hurst General Store building to break the façade into three distinct storefronts. We are also proposing a new entry façade to the existing Desert Rat retail store at the south end of the Hurst General Store building.
In addition to façade changes, we are also proposing a new 1,500 sq. ft. drive-thru to be located at the southwest end of the property (parcel #: SG-520-E-1).

Narrative:

We are proposing exterior renovation for the north and south ends of the Hurst General Store building. The north end of the building was previously home to Lin's grocery store and the façade currently reads architecturally as a single, large tenant building. We would like to make changes to the façade to break it up into three distinct spaces for current and future tenants. It is anticipated that the Mattress Store will remain in place and the north end will become a restaurant. The center space will be a available for future retail lease.
In addition to these changes, we are proposing a small entry façade to be added to the entrance of the Desert Rat. Currently the south end of the building only has a raised parapet and columns at the southwest corner and there is nothing to denote a distinctive entrance to the Desert Rat.

The proposed designs are intended to be harmonious with the existing building and draw from already established details and materials.

At the southwest corner of the property (parcel #: SG-520-E-1) we would like to add a small drive-thru restaurant approximately 1,500 sq. ft. in size. This is intended to replace, to a small extent, the previous building and tenants lost to the Bluff St expansion by UDOT. Prior to the expansion, the previous food establishments had a symbiotic relationship with Hurst General Store and it is hoped to bring back that patronage and re-establish the corner of Bluff St. and Boulevard as a destination.

Parking has been evaluated and shown to be an improvement over the site prior to the Bluff St expansion. With the Bluff St expansion the ingress/egress and deceleration lane from Bluff St were retained and traffic flow to and from the site has been maintained. The location and design of the Drive-Thru allows high volume stacking of cars which will not impede traffic from public streets or within the development parking area. The Drive-Thru has also been carefully designed to preserve existing shade trees along Boulevard St.

Respectfully submitted,

Architect, Matt Metcalf Architecture, PLLC

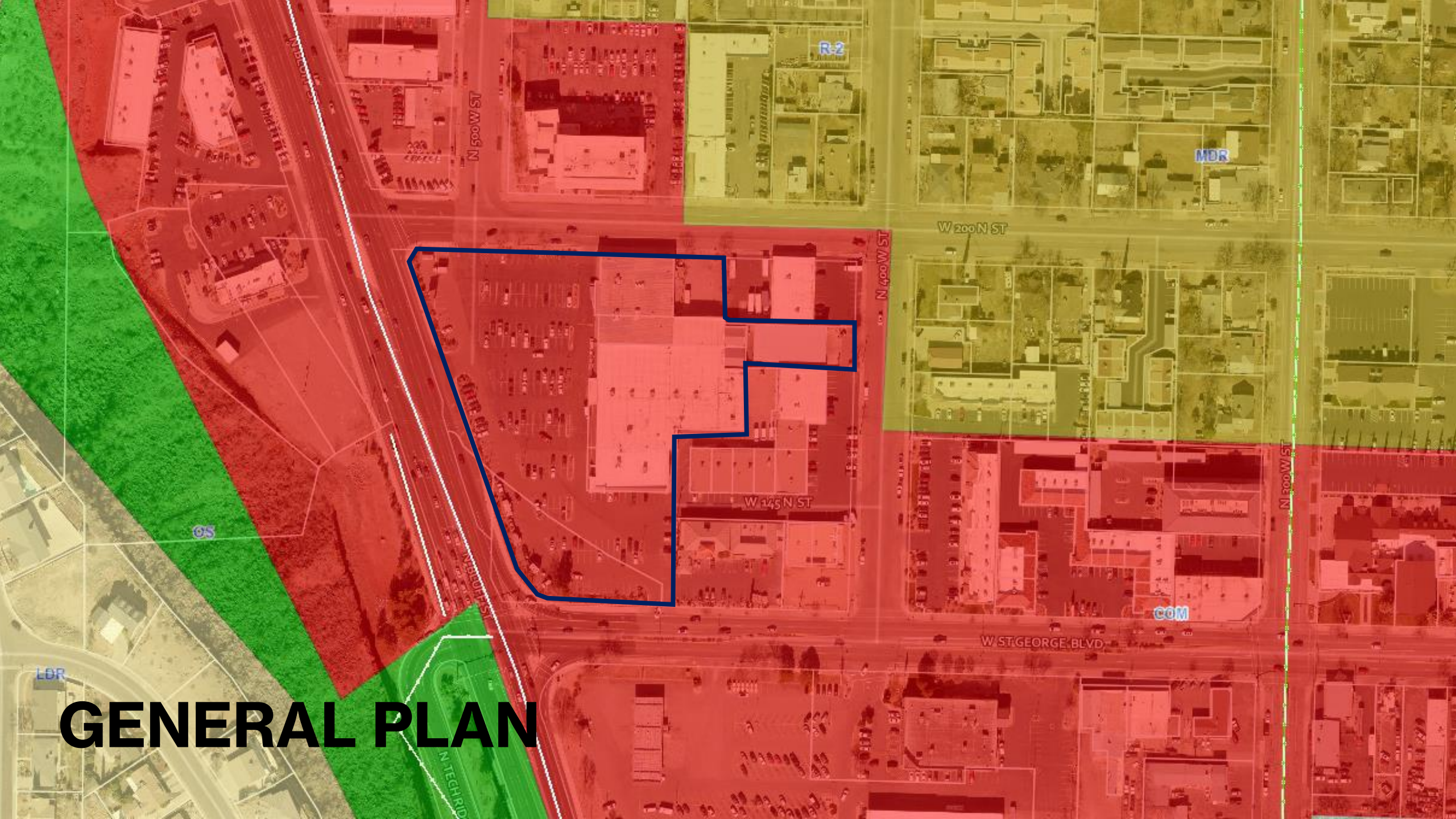
SG-531, SG-520-E-1, & SG-520-G
Jason Hurst

EXHIBIT B
Power Point Presentation

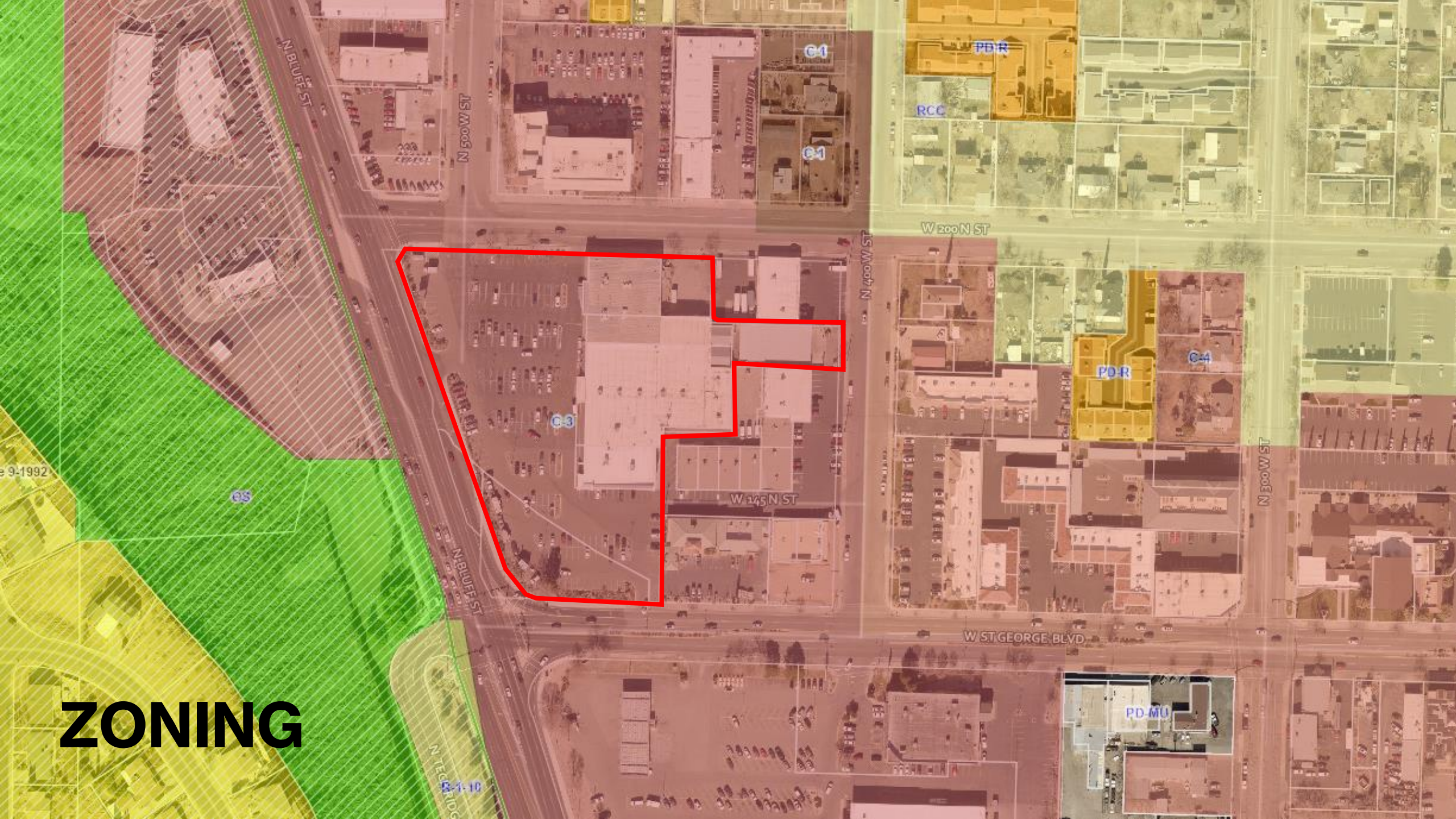
160 N. BLUFF

Conditional Use Permit
2023-CUP-001


N BLUFF ST
S 500 W ST
S 400 W ST
W 200 N ST
W 145 N ST
N DONILEE DR
N BLUFF ST
N TECHRIDGE PKWY
S 300 W ST
W ST GEORGE BLVD
LOCATION



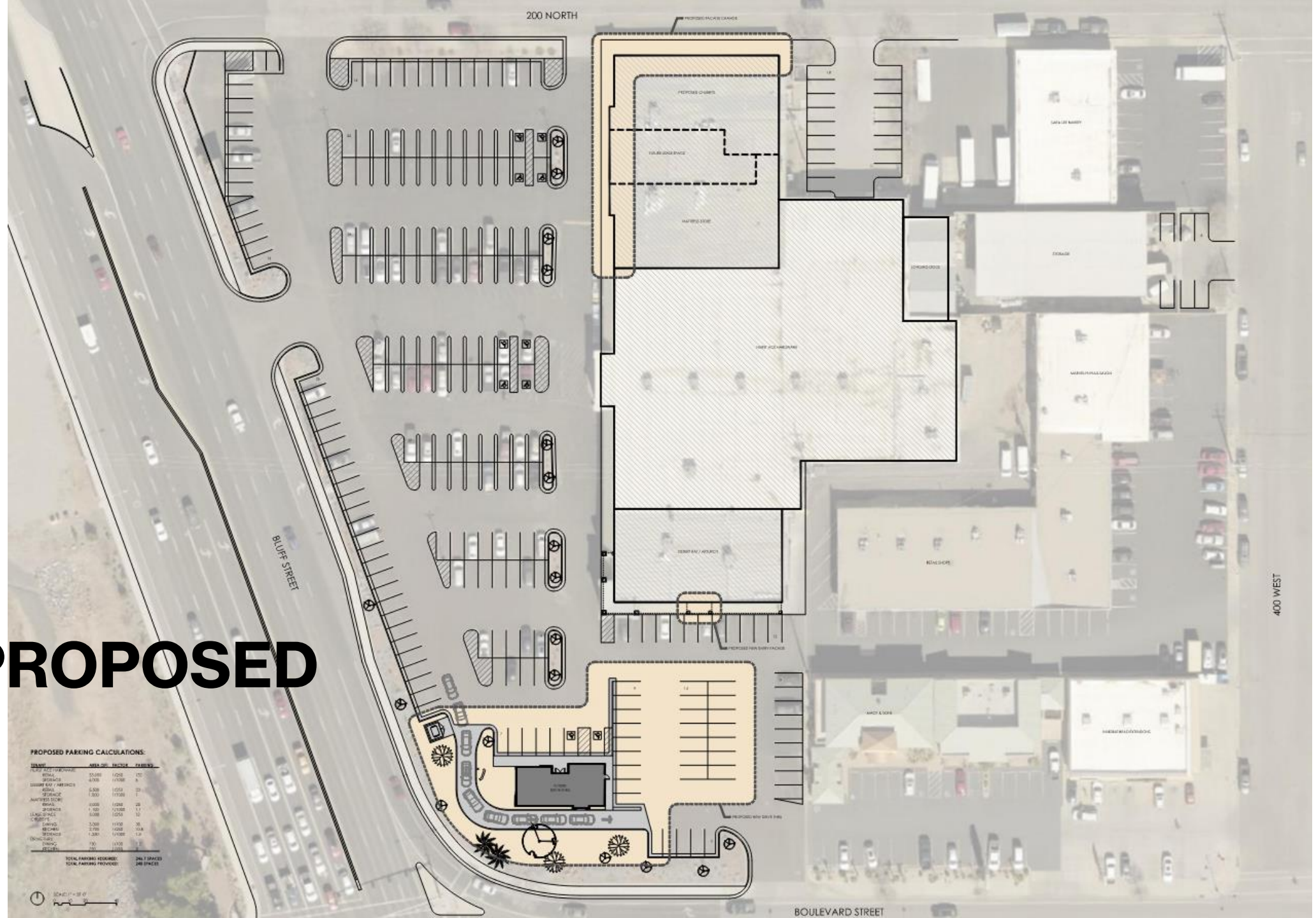
GENERAL PLAN


N BLUFF ST
N 500 W ST
C-1
C-1
PD-R
RCC
W 200 N ST
N 400 W ST
C-3
W 145 N ST
N BLUFF ST
PD-R
C-4
N 300 W ST
W ST GEORGE BLVD
PD-MU
OS
N TECHNOLOGY WAY
R-1-10

ZONING

2018

PROPOSED

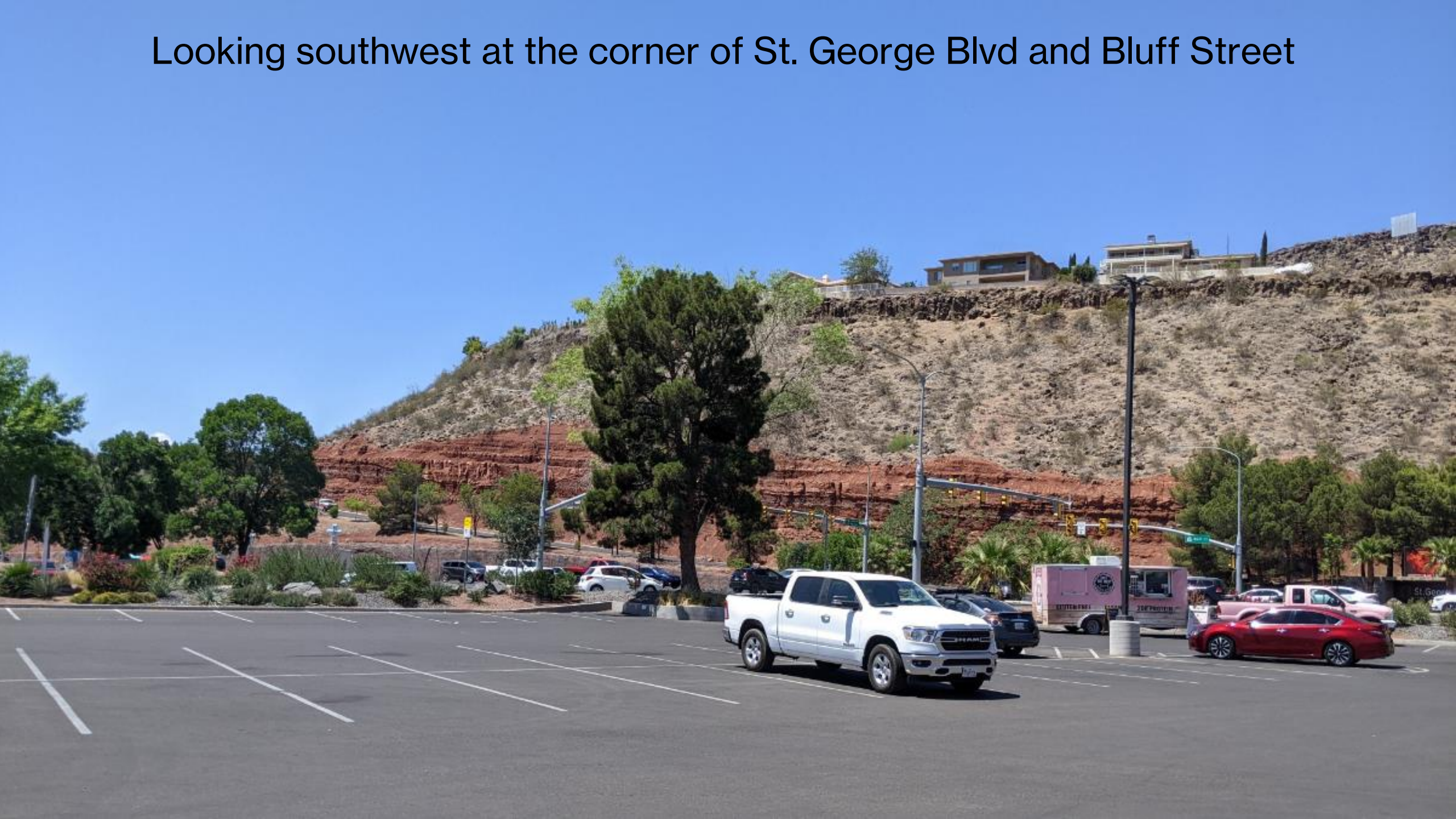

200 NORTH
BLUFF STREET
400 WEST
BOULEVARD STREET
PROPOSED PARKING CALCULATIONS:

Looking northeast from the corner of St. George Blvd and Bluff Street

Looking northeast from the corner of St. George Blvd and Bluff Street

Looking northwest from St. George Blvd

Looking southwest at the corner of St. George Blvd and Bluff Street



Looking southwest at the corner of St. George Blvd and Bluff Street

Looking southeast from Bluff Street

Looking east from Bluff Street

Looking east from Bluff Street

Looking southeast from 200 North Street

Looking southeast from 200 North Street

RECOMMENDATION

160 N. Bluff
2023-CUP-001

Staff recommends approval of this Conditional Use Permit with the following conditions:

1. The applicant works with staff on improving the pedestrian access points.
2. The applicant combines the three parcels into one.

St.George
Community Development

ITEM 5
Hillside Permit

HILLSIDE REVIEW BOARD AGENDA REPORT: 11/30/2022
HILLSIDE REVIEW BOARD AGENDA REPORT: 02/08/2023
PLANNING COMMISSION AGENDA REPORT: 04/25/2023

150 N. Donlee Drive Hillside Development Permit (Case No. 2022-HS-018)		
Request:	A Hillside Development Permit to mitigate the placement of a block wall in the hillside development overlay zone.	
Applicant:	Ryan and Martina Davis	
Representative:	same	
Location:	150 N. Donlee Drive	
General Plan:	Low Density Residential (LDR), Open Space (OS)	
Existing Zoning:	R-1-8 (Single Family Residential, minimum lot size 8,000 sf)	
Surrounding Zoning:	North	R-1-8
	South	R-1-8
	East	OS (Open Space
	West	R-1-8
Land Area:	Approximately 0.26 acres	

BACKGROUND

This is a request to obtain a hillside permit for the property located at 150 N. Donlee Drive, Lot 201, Valley View Heights Phase 2 (see Exhibit A, Final Plat). The applicant has put in a 10.5' tall retaining wall along their rear property line, which is along the ridgeline above Bluff Street, to build up the property to make the yard more usable. The retaining wall was built without a hillside or building permit. This situation has created several concerns that require mitigation. These concerns are:

1. The ridgeline setback
2. The structural stability of the retaining wall
3. The height of the retaining wall

Ridgeline Setback

To mitigate the issue, the applicant began with the Hillside Review Board (HRB). At the first meeting, the HRB discussed and determined that no ridgeline existed at this location and the retaining wall bridged the gap between two existing ridgelines. Since there was no ridgeline at this location, there would be no required ridgeline setback.

Structural Stability of Retaining Wall

The HRB also discussed the structural stability of the retaining wall and requested a report from a structural engineer on the stability of the wall. Once the report was submitted, the HRB met again to discuss. (See **Exhibit B** for the latest engineering report.) The HRB determined that the report was sufficient and that it addressed the structural stability of the wall. However, the HRB wanted to make sure that any future owners of this property would know the situation of this retaining wall; therefore, they requested a deed restriction be recorded against the property along with the updated engineering report. The HRB requested the deed restriction state the following:

1. No compaction tests were taken during the construction of the retaining wall nor any observation of the construction by a geotechnical engineer.
2. Testing on the site did occur after the retaining wall was constructed.

Height of Retaining Wall

Our code allows 8' as the maximum height of a retaining wall. The height of this retaining wall is 10.5'. However, the applicant's plan was to bury the bottom 2.5' of the wall which would lower the exposed height down to 8'. During the HRB meeting, the board members acknowledged that the retaining wall is approximately 10.5' tall, which exceeds the maximum allowed height by 2.5', and that the applicant did have plans to bury 2.5' of the retaining wall, but that the Hillside Review Board would prefer that the applicant does not disturb anymore of the hillside.

APPLICABLE ORDINANCE(S) *(Selected portions)*

10-13A-6: Building Setbacks and Additional Design Standards:

A. *Setbacks:* All setbacks shall conform to the underlying zone criteria except as provided herein. No structure or accessory structure shall be constructed within the setback area as defined below. However, a see-through wrought

iron fence with at least fifty percent (50%) of the fence open, landscaping, and a nonvertical swimming pool are permitted in the setback area.

1. *Ridgelines:* All ridgelines as shown on the ridgeline map shall be subject to the setback provisions contained herein. Setbacks from ridgelines not identified on the ridgeline map shall be a minimum of thirty feet (30'), or greater if recommended in the geotechnical reports.

2. *Plateaus:* On plateaus, the setback from the ridgeline shall be a minimum of fifty feet (50') unless a greater setback is recommended in the geotechnical reports.

C. *Cuesta:* Where a ridgeline occurs on a cuesta, the minimum setback shall be one hundred feet (100') measured normal (perpendicular) to the closest point of the ridge, unless a greater setback is recommended in the geotechnical report.

D. *Additional Design Standards:*

1. Retaining walls shall be colored to blend into the surrounding natural geology.

2. Retaining wall height is limited to the heights set forth in chapter 18 of this title and the standards for rock wall construction.

3. Building exterior colors shall be earth tone and blend with the surrounding natural landscape.

4. In residential zones, “no disturbance” areas shall be held as the “common area” of a project. Common areas shall be owned and maintained by the homeowners’ association or may be deeded to the city when accepted by the city.

5. In nonresidential zones, any “no disturbance” area shall be identified on the final site plan or final plat.

6. Any required no disturbance area shall be identified on the ground with temporary fencing or other approved means to prevent accidental disturbance of the area during construction and such fencing shall be installed prior to issuance of a grading permit.

7. The building site shall be located on the flattest portion of the parcel.

8. No structure shall extend over any natural ridgeline. The structure shall be in contact with the ground at all edges. (Ord. 2019-10-002, 10-10-2019)

HILLSIDE REVIEW BOARD RECOMMENDATION

The Hillside Review Board recommended approval of this hillside permit to allow the retaining wall on this site to remain with the following acknowledgements and conditions:

1. The Hillside Review Board acknowledges that no ridgeline existed at this location and that the owner has created a ridgeline by placing a retaining wall between two existing ridgelines.

2. The Hillside Review Board acknowledges that the retaining wall is approximately 10.5' tall which exceeds the maximum allowed height by 2' and that the applicant did have plans to bury 2' of the retaining wall, but that the Hillside Review Board would prefer that the applicant does not disturb any more of the hillside.

3. A deed restriction shall be recorded against the property so that future owners will know the situation of this retaining wall. The deed restriction shall contain:

    a. A restriction that states this retaining wall was erected prior to obtaining a hillside and building permit and that no compaction tests were taken during construction nor any observation of the construction by a geotechnical engineer.
    b. A restriction that states testing on the site did occur after the wall was constructed.
    c. The updated engineering report shall be included in this deed restriction.

4. The retaining wall shall be colored to blend into the surrounding natural geology.

WALL HEIGHT OPTIONS

After the HRB met and made their recommendation, the applicant had their engineer update the report to give additional options for the wall height concerns. Here are three additional options:

1. Place soil at the bottom of the lower tier to bury it to leave 8' exposed. (This is what the applicant originally wanted to do.)
2. Build a third tier in front of the existing lower tier.
3. Remove the upper tiers of the block wall to reduce the wall height to 8'. There is a second retaining wall above the 10.5' wall. This option would make the backfill between the two walls sloped instead of level.

The first six pages of the attached report, **Exhibit B**, explain these three options in detail.

EXHIBITS PROVIDED

1. Exhibit A – Valley View Heights Phase 2 Final Plat
   "Exhibit A" shows lot 201 of the final plat of Valley View Heights Phase 2

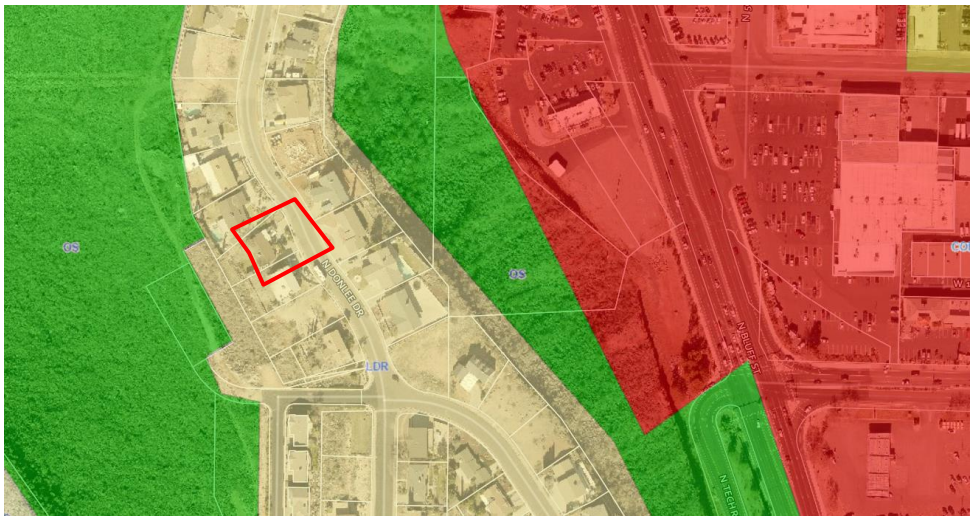
2. Exhibit B – Engineering Report

"Exhibit B" is a report (updated on 04/18/2023) made by Landmark Testing and Engineering of the structural stability of the existing retaining wall and options to reduce the wall height

3. Exhibit C – Photos of the property before and after
   "Exhibit C" are a collection of photos showing the location before and after the building of the retaining wall

4. Exhibit D – PowerPoint Presentation

General Plan - COM



Zoning - R-1-8

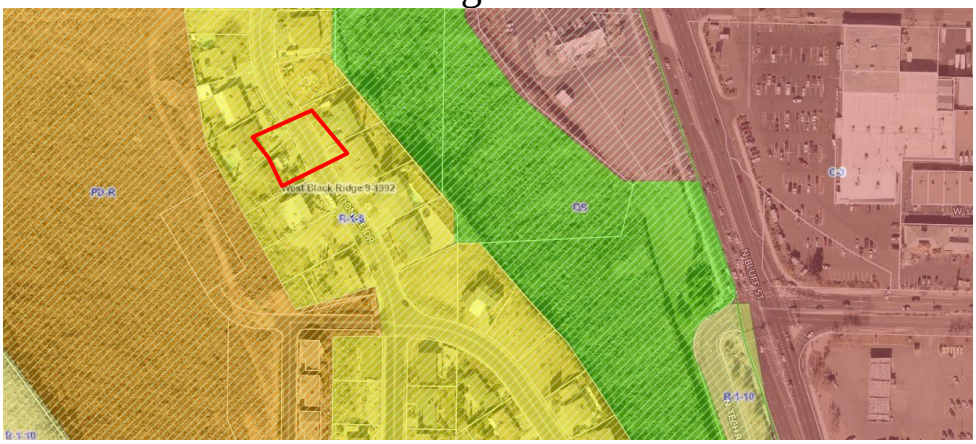


Exhibit A
Valley View Heights Phase 2 Final Plat

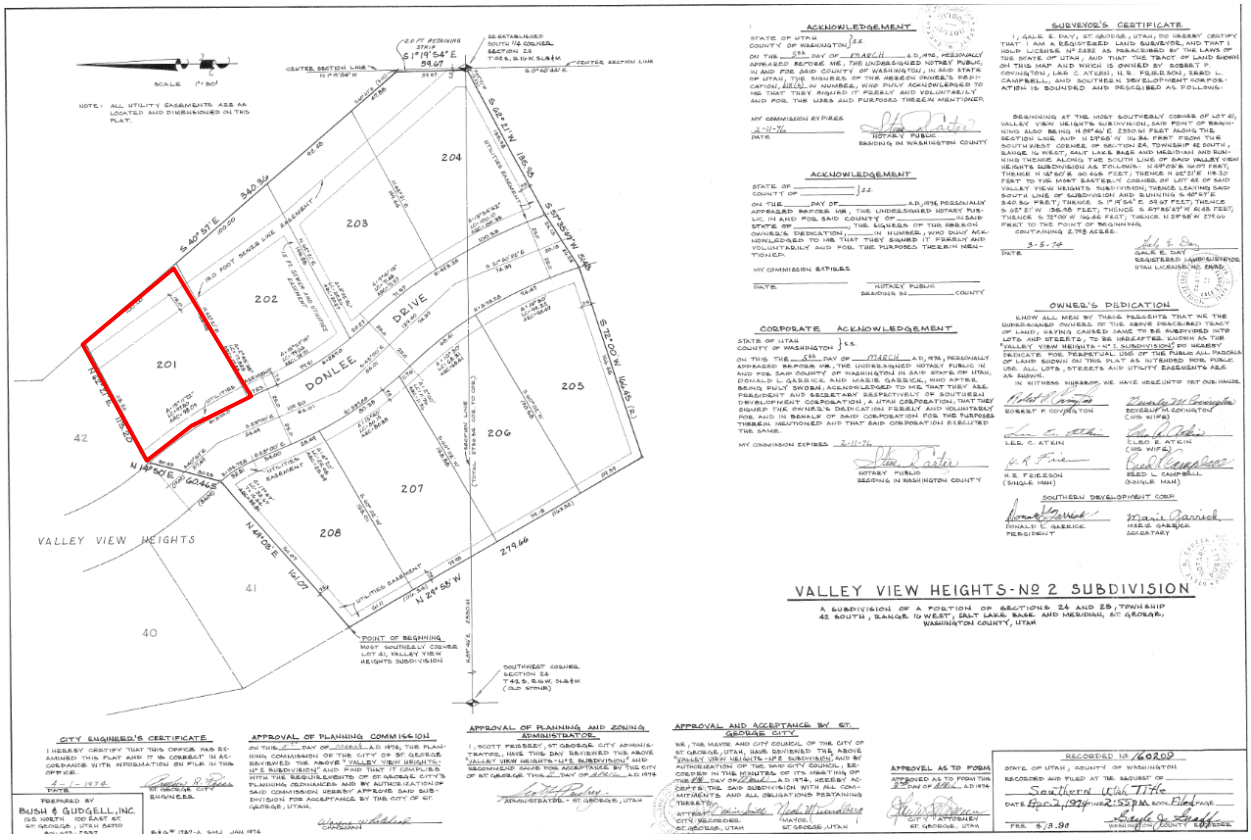


Exhibit B
Retaining Wall Engineering Report

Exhibit C
Before and After Photos of the Project

Rear of House – Before

Rear of House - Before

Rear of House – After

Rear of House – 11/21/2022

April 18, 2023

Ryan Davis
150 North Donlee Drive
St. George, Utah 84770

Subject: Concrete Block Wall Letter
150 North Donlee Drive
St, George, Utah
Landmark Project #220603

Reference: Concrete Block Wall Letter, 150 North Donlee Drive, St. George, Utah, Landmark Project No.: 220603, Dated January 24, 2023

Ryan:

A Redi-Rock concrete block wall has been constructed in the backyard of the residence at 150 North Donlee Drive in St. George, Utah. The wall is located near the top of a 160-foot-tall slope leading down to a parking lot on Bluff Street.

The wall was constructed prior to the completion of a wall design and is taller than the maximum wall height as specified by St. George City. We understand that after multiple meetings with the owner and city officials it was determined that there are three options for decreasing the wall height. This letter will address the pros and cons of each option. Wall designs for each option are attached to this letter.

The three options for decreasing the wall height are outlined below:

Option 1
The first option is to place soils at the bottom of the lower tier. The tier is currently 10.5 feet in height. This will require the placement of 2.5 feet of soil at the bottom of the wall to decrease the wall height to 8 feet.

Pros:
- The placement of soils at the base of the wall will add stability against sliding.
- Placement of soils will be the easiest of the options.

Cons:
- The slope of the soil below the wall is approximately 40 degrees and in order to place 2.5 feet of fill at the base of the wall, the soil will need to extend down the hill and may extend past the property line.

- The soil, given the steep slope, will likely erode with rain. This can be mitigated to some extent if the soil is granular with gravel and cobbles and other erosion control methods such as a geofabric may be used. Gradation recommendations may be provided upon request.

Option 2
The second option is to build a third tier in front of the existing lower tier. The new tier will need to be tall enough to decrease the exposed wall height of the existing lower tier to a maximum height of 8 feet.

Pros:
- This option will provide more stability than the existing wall configuration has

Cons:
- This option will be expensive. Additional blocks will be required and a crane will be required to install them.
- There might not be enough space on the property to install an additional wall.

Option 3
The third option is to remove the upper tiers of the block walls to reduce the wall height to a maximum of 8 feet. This will require the backfill to be sloped between the walls.

Pros:
- This option will not require additional blocks.
- Excess blocks may be returned to the supplier or reused for additional projects.
- This option can be used in conjunction with Option 1

Cons:
- We understand that this option is least desired by the homeowner.

Conclusions
The referenced letter shows that the walls are stable with factors of safety exceeding minimal industry standards. It is the opinion of Landmark that reducing the wall heights will increase the factors of safety and that each option discussed above will provide a more stable wall.

Option 1 appears to be the solution that will be the simplest to employ. However, it also appears to be the option with the least likelihood to be a long-term solution. It is the opinion of Landmark that soils placed at the foot of the wall are likely to erode over time, especially during rain storms. However, if the soil were to include gravel and cobbles and other control methods, it is more likely that the soil will not erode.

Option 2 will provide the most stable walls. However, Landmark does not provide surveying services and it is unknown if there is space on the parcel for the additional wall. If this option is to be chosen, we recommend that a professional surveyor be employed to determine if there is space on the parcel for the new wall.

A wall design was completed for Option 3. The wall was shown to have factors of safety as shown in the following table.

Unit Weight, pcf Friction Angle, deg.	Factors of Safety for Entire Wall (Static/Seismic)					
	Overturning Stability		Slip		Bearing Capacity	
	Static	Seismic	Static	Seismic	Static	Seismic
100/28 (Conservative)	1.74	1.41	4.76	2.99	5.16	3.35
112.6/31 (Actual)	1.94	1.57	5.84	3.85	5.93	4.24
126/32 (Ideal)	2.03	1.63	6.20	4.10	6.11	4.43

The wall with a decreased maximum wall height and increased slope of the backfill behind the wall has factors of safety exceeding minimum industry standards.

Wall analysis shows that walls for each option will meet minimum factors of safety. However, a lack of space on the lot may eliminate one or more of the options from consideration. We recommend that the owner consider the estimated costs, construction time frames, lot line locations, and the ease of construction of each option when deciding which option to pursue.

If you have any questions or would like to discuss this project, please contact the undersigned at (435) 986-0566.

Sincerely,

LANDMARK TESTING & ENGINEERING

Kent Nelson, P.E.
Project Engineer

Reviewed by:

Steven Wells, P.E.
Geotechnical Manager

150 North Donlee Drive
Concrete Block Wall Design - Option 1
Landmark Project Number 220603

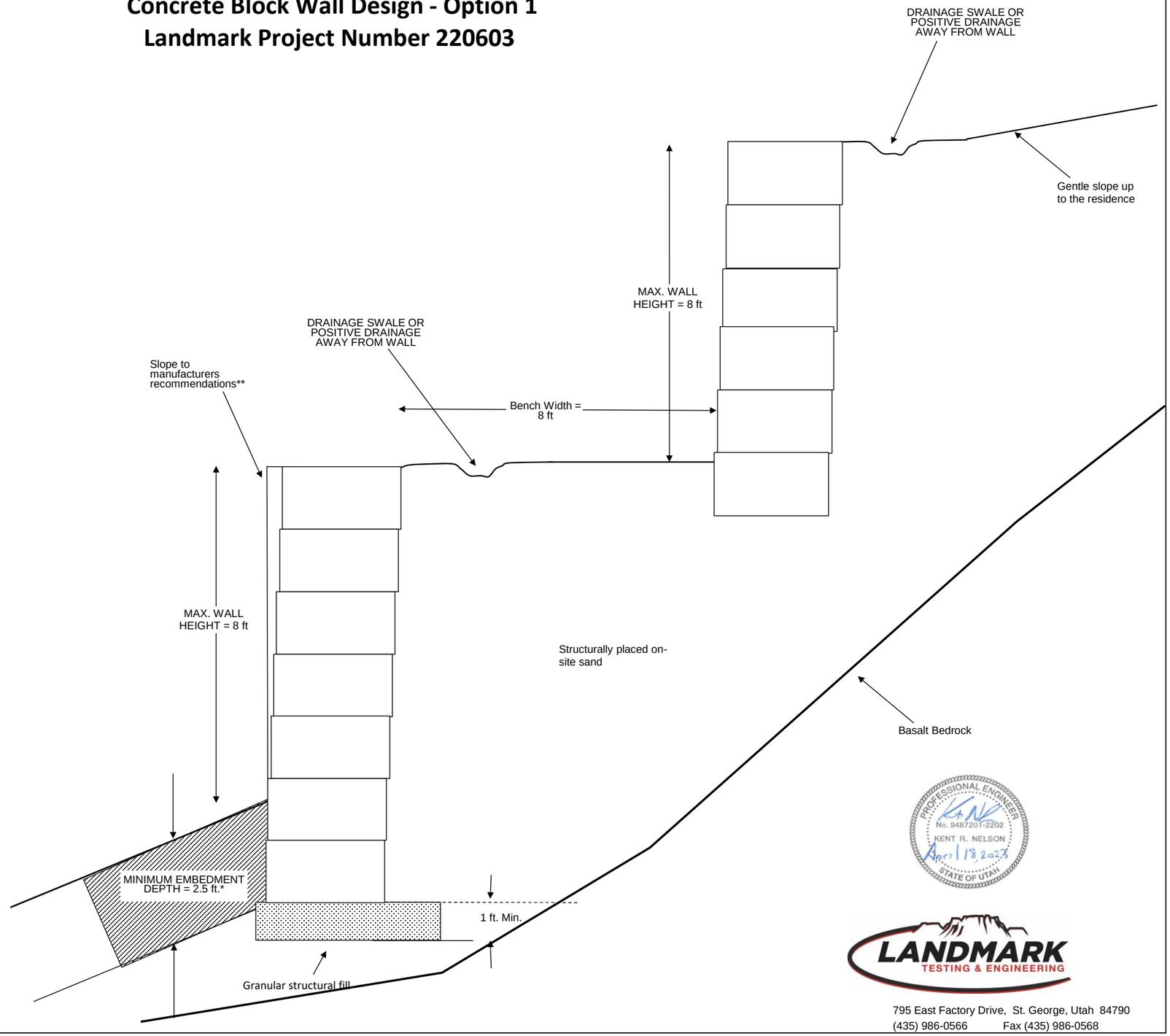
Assumptions: The following are typical recommendations for block walls and assumptions that were made for this wall design

- Prior to the placement of the fill, the existing embankment should be excavated to create benches to allow level lifts to key into the existing embankment. Benching is required for all slopes steeper than 6 horizontal to 1 vertical (6H:1V). Benches should be constructed as an incidental part of the placement and compaction of the fills. The maximum bench height should be limited to 3 feet, or less as dictated by conditions encountered during construction. Benching should include both soils and bedrock.
- The existing soils should be removed from below the base of the blocks and replaced with structural fill. The removal should extend 1 foot below and to the front of the first level of block.
- All fill should be considered structural fill. Imported fill, for wall backfill, if required, should be granular and consist of USCS classifications GC (clayey gravel), GM (silty gravel), or GW (well-graded gravel). Granular fill should be well-graded, non-expansive, and free of organics and all deleterious materials. Soils used for granular, imported, structural fill should meet the following specifications:

Gradation	Percent Passing
6- inch	100
3- inch	70-100
No. 200 Sieve	5-20
Liquid Limit	30 or less
Plasticity Index	10 or less
Maximum Lift Thickness	8-inch (loose)
Minimum Compaction	95% ASTM D-1557
Compacted Moisture Content	within 2% of optimum

- All structural fill should be evenly spread on a horizontal plane in eight-inch loose lifts. Each lift of structural fill material placed at the site should be moisture conditioned to within 2 percent of the optimum moisture content and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D-1557. Each 8-inch lift should be tested prior to proceeding with additional lifts.
- Geogrid reinforcement is not required for this wall
- The onsite sands may be used as structural fill.
- Blocks used for the project are Redi Rock blocks. Blocks should be installed as per manufacturer recommendations.
- Blocks should be stacked to rest upon two blocks from the lower level.
- Top of blocks should be cleared off prior to placement of the next layer.

* The wall should be embedded a minimum of 2.5 feet but may be embedded more than 2.5 feet. The embedment soils should consist of gravelly soils and consideration should be given to wrapping them in a geofabric such as Mirafi 140 N or equivalent.
**Blocks should be placed according to manufacturer recommendations. The upper row of blocks should be placed and snugged against the knobs on the row of blocks below.



PROFESSIONAL ENGINEER
No. 9487201-2202
KENT R. NELSON
Apr 1 18 2023
STATE OF UTAH

LANDMARK TESTING & ENGINEERING
795 East Factory Drive, St. George, Utah 84790
(435) 986-0566 Fax (435) 986-0568

150 North Donlee Drive
Concrete Block Wall Design - Option 2
Landmark Project Number 220603

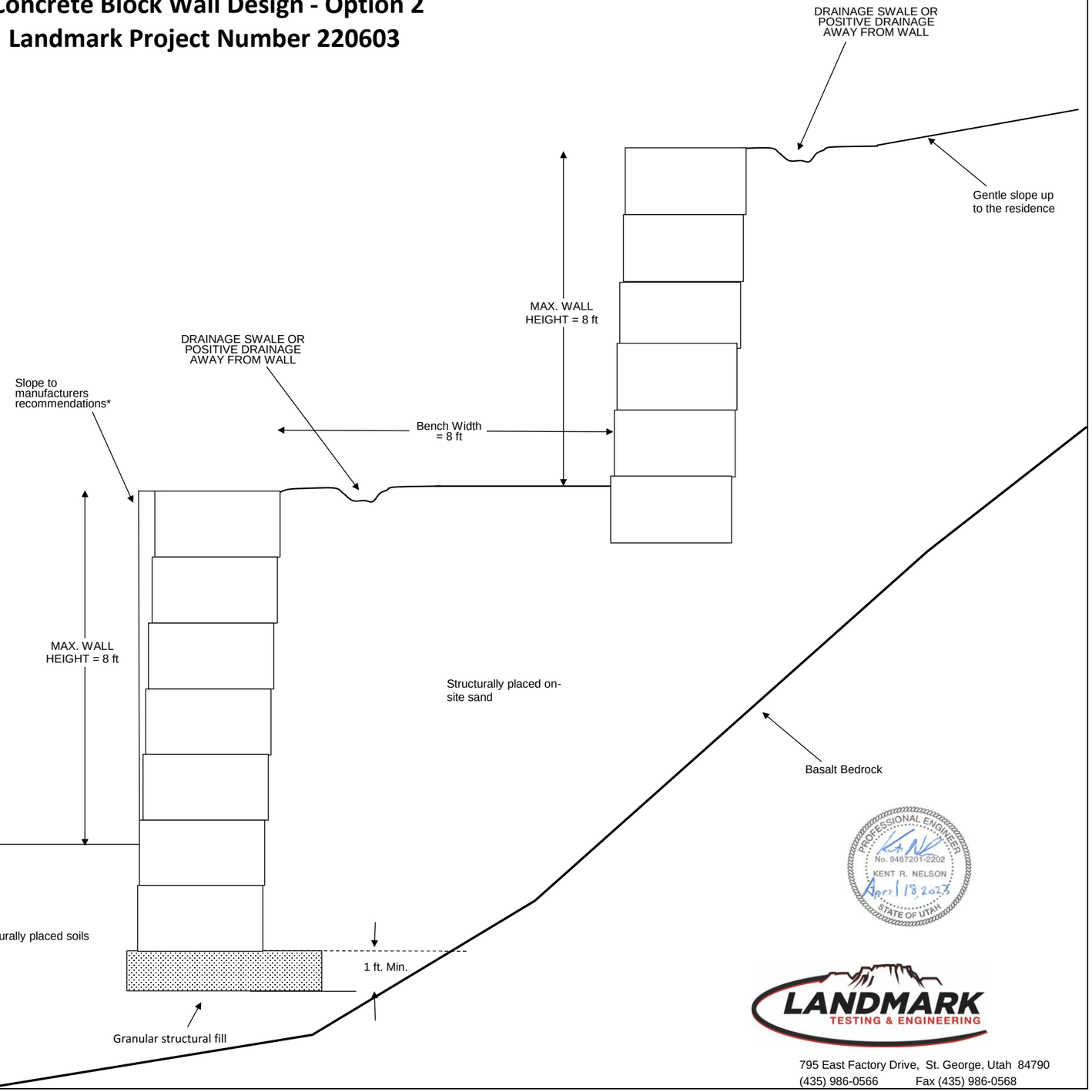
Assumptions: The following are typical recommendations for block walls and assumptions that were made for this wall design

- Prior to the placement of the fill, the existing embankment should be excavated to create benches to allow level lifts to key into the existing embankment. Benching is required for all slopes steeper than 6 horizontal to 1 vertical (6H:1V). Benches should be constructed as an incidental part of the placement and compaction of the fills. The maximum bench height should be limited to 3 feet, or less as dictated by conditions encountered during construction. Benching should include both soils and bedrock.
- The existing soils should be removed from below the base of the blocks and replaced with structural fill. The removal should extend 1 foot below and to the front of the first level of block.
- All fill should be considered structural fill. Imported fill, for wall backfill, if required, should be granular and consist of USCS classifications GC (clayey gravel), GM (silty gravel), or GW (well-graded gravel). Granular fill should be well-graded, non-expansive, and free of organics and all deleterious materials. Soils used for granular, imported, structural fill should meet the following specifications:

Gradation	Percent Passing
6- inch	100
3- inch	70-100
No. 200 Sieve	5-20
Liquid Limit	30 or less
Plasticity Index	10 or less
Maximum Lift Thickness	8-inch (loose)
Minimum Compaction	95% ASTM D-1557
Compacted Moisture Content	within 2% of optimum

- All structural fill should be evenly spread on a horizontal plane in eight-inch loose lifts. Each lift of structural fill material placed at the site should be moisture conditioned to within 2 percent of the optimum moisture content and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D-1557. Each 8-inch lift should be tested prior to proceeding with additional lifts.
- Geogrid reinforcement is not required for this wall
- The onsite sands may be used as structural fill.
- Blocks used for the project are Redi Rock blocks. Blocks should be installed as per manufacturer recommendations.
- Blocks should be stacked to rest upon two blocks from the lower level.

*Blocks should be placed according to manufacturer recommendations. The upper row of blocks should be placed and snugged against the knobs on the row of blocks below.



PROFESSIONAL ENGINEER
No. 9487201-2202
KENT R. NELSON
April 18 2023
STATE OF UTAH

LANDMARK TESTING & ENGINEERING

795 East Factory Drive, St. George, Utah 84790
(435) 986-0566 Fax (435) 986-0568

150 North Donlee Drive
Concrete Block Wall Design - Option 3
Landmark Project Number 220603

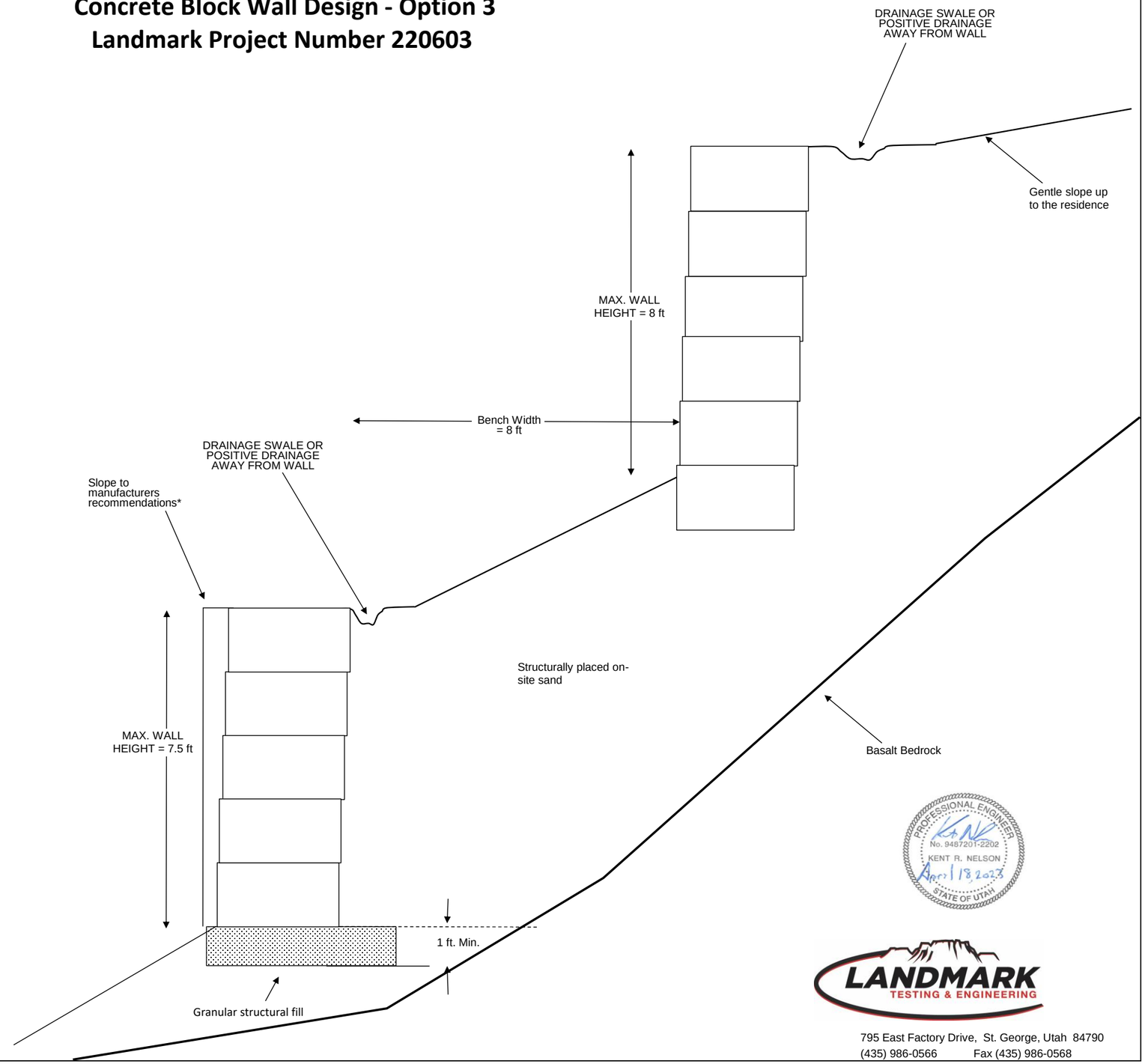
Assumptions: The following are typical recommendations for block walls and assumptions that were made for this wall design

- Prior to the placement of the fill, the existing embankment should be excavated to create benches to allow level lifts to key into the existing embankment. Benching is required for all slopes steeper than 6 horizontal to 1 vertical (6H:1V). Benches should be constructed as an incidental part of the placement and compaction of the fills. The maximum bench height should be limited to 3 feet, or less as dictated by conditions encountered during construction. Benching should include both soils and bedrock.
- The existing soils should be removed from below the base of the blocks and replaced with structural fill. The removal should extend 1 foot below and to the front of the first level of block.
- All fill should be considered structural fill. Imported fill, for wall backfill, if required, should be granular and consist of USCS classifications GC (clayey gravel), GM (silty gravel), or GW (well-graded gravel). Granular fill should be well-graded, non-expansive, and free of organics and all deleterious materials. Soils used for granular, imported, structural fill should meet the following specifications:

Gradation	Percent Passing
6- inch	100
3- inch	70-100
No. 200 Sieve	5-20
Liquid Limit	30 or less
Plasticity Index	10 or less
Maximum Lift Thickness	8-inch (loose)
Minimum Compaction	95% ASTM D-1557
Compacted Moisture Content	within 2% of optimum

- All structural fill should be evenly spread on a horizontal plane in eight-inch loose lifts. Each lift of structural fill material placed at the site should be moisture conditioned to within 2 percent of the optimum moisture content and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D-1557. Each 8-inch lift should be tested prior to proceeding with additional lifts.
- Geogrid reinforcement is not required for this wall
- The onsite sands may be used as structural fill.
- Blocks used for the project are Redi Rock blocks. Blocks should be installed as per manufacturer recommendations.
- Blocks should be stacked to rest upon two blocks from the lower level.

*Blocks should be placed according to manufacturer recommendations. The upper row of blocks should be placed and snugged against the knobs on the row of blocks below.



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Analysis of Redi Rock wall

Input data

Task : 220603 - 150 North Donlee Drive Block Walls
Part : Two 8-foot Block Walls
Customer : Ryan Davis
Author : Kent Nelson
Date : 9/12/2022
Project ID : 150 North Donlee Drive
Project number : 220603

Settings

(input for current task)

Wall analysis

Verification methodology : Safety factors (ASD)
Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Mazindrani (Rankine)
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Allowable eccentricity : 0.333
Internal stability : Standard - straight slip surface
Reduction coeff. of contact first block - base : 1.00

Safety factors			
Permanent design situation			
Safety factor for overturning :	SF_o =	1.00	[–]
Safety factor for sliding resistance :	SF_s =	1.00	[–]
Safety factor for bearing capacity :	SF_b =	2.00	[–]
Safety factor for sliding along geo-reinforcement :	SF_{sr} =	1.50	[–]
Safety factor for geo-reinforcement strength :	SF_{st} =	1.50	[–]
Safety factor for pull out resistance of geo-reinf. :	SF_{po} =	1.50	[–]
Safety factor for connection strength :	SF_{con} =	1.50	[–]

Blocks

No.	Description	Height h [in]	Width w [in]	Unit weight γ [pcf]
1	Block 28	18.00	28.00	120.00
2	Block 41	18.00	40.50	120.00
3	Block 60	18.00	60.00	130.00
4	Top block 24 straight	18.00	24.00	108.00
5	Planter 41	18.00	40.50	120.00
6	Planter 60	18.00	60.00	112.00
7	Top block 28	18.00	28.00	120.00
8	Top block 41	18.00	40.50	120.00
9	Top block 24 straight garden	18.00	24.00	80.00
10	Block R-5236 HC	36.00	52.00	110.00
11	Block R-7236 HC	36.00	72.00	110.00
12	Block R-9636 HC	36.00	96.00	110.00
13	Block R-41 HC	18.00	40.50	110.00

No.	Description	Min. shear strength F_{min} [lbf/ft]	Max. shear strength F_{max} [lbf/ft]	Friction f [°]
1	Block 28	6061.00	11276.00	44.00
2	Block 41	6061.00	11276.00	44.00
3	Block 60	6061.00	11276.00	44.00
4	Top block 24 straight	6061.00	11276.00	44.00
5	Planter 41	6061.00	11276.00	44.00
6	Planter 60	6061.00	11276.00	44.00
7	Top block 28	6061.00	11276.00	44.00
8	Top block 41	6061.00	11276.00	44.00
9	Top block 24 straight garden	6061.00	11276.00	44.00
10	Block R-5236 HC	4550.00	12000.00	44.00
11	Block R-7236 HC	4550.00	12000.00	44.00
12	Block R-9636 HC	4550.00	12000.00	44.00
13	Block R-41 HC	5358.00	12906.00	37.00

Setbacks

No.	Setback s [in]
1	0.010
2	0.375
3	1.625
4	9.375
5	16.625

Geometry

No. group	Description	Count	Setback s [in]
1	Block 41	3	1.62
2	Block 41	1	1.62
3	Top block 28	1	-

Base

Geometry

Upper setback a_1 = 0.00 ft
Lower setback a_2 = 1.00 ft
Height h = 1.00 ft
Width b = 5.00 ft

Material

Soil creating foundation - Basalt

Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [psf]	γ [pcf]	γ_{su} [pcf]	δ [°]
1	Sand		28.00	0.0	100.00	37.50	28.00

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [psf]	γ [pcf]	γ_{su} [pcf]	δ [°]
2	Basalt		35.00	5000.0	140.00	77.50	35.00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters

Sand

Unit weight : γ = 100.0 pcf
Stress-state : effective
Angle of internal friction : φ_{ef} = 28.00 °
Cohesion of soil : c_{ef} = 0.0 psf
Angle of friction struc.-soil : δ = 28.00 °
Saturated unit weight : γ_{sat} = 100.0 pcf

Basalt

Unit weight : γ = 140.0 pcf
Stress-state : effective
Angle of internal friction : φ_{ef} = 35.00 °
Cohesion of soil : c_{ef} = 5000.0 psf
Angle of friction struc.-soil : δ = 35.00 °
Saturated unit weight : γ_{sat} = 140.0 pcf

Backfill

Assigned soil : Sand
Slope = 40.00 °

Geological profile and assigned soils

Position information

GPS : N 37.1111400; W 113.5966200
N 37°6"40.10'; W 113°35"47.83'

Geological profile and assigned soils

No.	Thickness of layer t [ft]	Depth z [ft]	Assigned soil	Pattern
1	-	0.00 .. ∞	Basalt	

Terrain profile

Terrain behind construction has the slope 1: 3.00 (slope angle is 18.43 °).

Water influence

Ground water table is located below the structure.

Input surface surcharges

No.	Surcharge new	Surcharge change	Action	Mag.1 [lbf/ft²]	Mag.2 [lbf/ft²]	Ord.x x [ft]	Length l [ft]	Depth z [ft]
1	Yes		permanent	1000.0				on terrain

Resistance on front face of the structure

Resistance on front face of the structure: at rest
Soil on front face of the structure - Sand
Soil thickness in front of structure h = 1.00 ft
Soil slope in front of structure β = -35.00 °

Applied forces acting on the structure

No.	Force new	Force edit	Name	Action	F_x [lbf/ft]	F_z [lbf/ft]	M [lbfft/ft]	x [ft]	z [ft]
1	Yes		Force No. 1	permanent	0.00	1000.00	0.0	8.00	0.00

Earthquake

Factor of horizontal acceleration K_h = 0.1100
Factor of vertical acceleration K_v = 0.0000

Water below the GWT is restricted.

Settings of the stage of construction

Design situation : permanent
Reduction of soil/soil friction angle : reduce to 2/3 φ (AASHTO)

Verification No. 1

Earthquake effects (active earth pressure) - partial results

Layer No.	Thickness [ft]	φ_d [°]	β [°]	ψ [°]	K_a	K_{ae}	K_{ae}-K_a	Comment
1	0.69	28.00	18.43	6.28	0.714	1.014	0.301	
2	0.42	28.00	18.43	6.28	0.714	1.014	0.301	
3	1.08	28.00	18.43	6.28	0.714	1.014	0.301	
4	4.49	28.00	18.43	6.28	0.403	0.616	0.213	
5	1.51	28.00	18.43	6.28	0.714	1.014	0.301	
6	1.00	35.00	18.43	6.28	0.325	0.467	0.142	

Earthquake effects (active earth pressure)

Layer No.	Start [ft] End [ft]	σ_Z [psf]	σ_D [psf]	Pressure [psf]	Hor. comp. [psf]	Vertical comp. [psf]
1	-0.69	0.0	958.9	288.2	228.0	176.3
	0.00	68.9	890.0	267.5	211.6	163.6
2	0.00	68.9	890.0	267.5	211.6	163.6
	0.42	110.6	848.3	254.9	201.7	155.9
3	0.42	110.6	848.3	254.9	201.7	155.9
	1.50	218.9	740.0	222.4	175.9	136.0
4	1.50	218.9	740.0	157.5	143.8	64.4
	5.99	667.5	291.3	62.0	56.6	25.4
5	5.99	667.5	291.3	87.6	69.3	53.6
	7.50	818.9	140.0	42.1	33.3	25.7
6	7.50	818.9	140.0	19.8	16.2	11.4
	8.50	958.9	0.0	0.0	0.0	0.0

Forces acting on construction

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - wall	0.0	-3.65	3458.1	2.79	1.000
Earthq.- constr.	379.7	-3.71	0.0	2.80	1.000
FF resistance	-15.7	-0.33	0.0	0.00	1.000
Weight - earth wedge	0.0	-1.50	47.3	4.62	1.000
Earthquake - soil wedge	5.2	-1.50	0.0	4.62	1.000

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - earth wedge	0.0	-8.18	256.4	3.56	1.000
Earthquake - soil wedge	28.2	-8.18	0.0	3.56	1.000
Active pressure	1500.9	-3.56	922.8	4.67	1.000
Earthq.- act.pressure	977.2	-6.17	608.8	4.51	1.000
Surch.1 - surface	3738.6	-5.17	2525.1	4.60	1.000
Surch.1 - surface	0.0	-8.84	2067.2	2.99	1.000
Force No. 1	0.0	-8.50	1000.0	9.96	1.000

Verification of complete wall

Check for overturning stability
Resisting moment M_{res} = 45605.6 lbfft/ft
Overturning moment M_{ovr} = 32361.4 lbfft/ft

Safety factor = 1.41 > 1.00
Wall for overturning is SATISFACTORY

Check for slip
Resisting horizontal force H_{res} = 19788.84 lbf/ft
Active horizontal force H_{act} = 6614.02 lbf/ft

Safety factor = 2.99 > 1.00
Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Dimensioning No. 1

Forces acting on construction

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - wall	0.0	-3.45	2758.1	1.87	1.000
Earthq.- constr.	311.7	-3.41	0.0	1.86	1.000
Weight - earth wedge	0.0	-7.18	256.4	2.56	1.000
Earthquake - soil wedge	28.2	-7.18	0.0	2.56	1.000
Active pressure	1278.8	-2.88	616.7	3.54	1.000
Earthq.- act.pressure	719.0	-5.62	442.2	3.48	1.000
Surch.1 - surface	3439.8	-4.47	1942.9	3.49	1.000
Surch.1 - surface	0.0	-7.84	2067.2	1.99	1.000
Force No. 1	0.0	-7.50	1000.0	8.96	1.000

Verification of block No. 1

Check for overturning stability
Resisting moment M_{res} = 29392.0 lbfft/ft
Overturning moment M_{ovr} = 24365.6 lbfft/ft

Safety factor = 1.21 > 1.00
Joint for overturning stability is SATISFACTORY

Check for slip
Resisting horizontal force H_{res} = 11893.85 lbf/ft
Active horizontal force H_{act} = 5777.52 lbf/ft

Safety factor = 2.06 > 1.00
Joint for verification is SATISFACTORY

Bearing capacity of foundation soil

Design load acting at the center of footing bottom

No.	Moment [lbfft/ft]	Norm. force [lbf/ft]	Shear Force [lbf/ft]	Eccentricity [–]	Stress [psf]
1	13970.1	10885.74	6614.02	0.257	4473.6

Service load acting at the center of footing bottom

No.	Moment [lbfft/ft]	Norm. force [lbf/ft]	Shear Force [lbf/ft]
1	13970.1	10885.74	6614.02

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification
Max. eccentricity of normal force e = 0.257
Maximum allowable eccentricity e_{alw} = 0.333

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity
Max. stress at footing bottom σ = 4473.6 psf
Bearing capacity of foundation soil R_d = 15000.0 psf

Safety factor = 3.35 > 2.00
Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

Analysis of Redi Rock wall

Input data

Task : 220603 - 150 North Donlee Drive Block Walls
Part : Two 8-foot Block Walls
Customer : Ryan Davis
Author : Kent Nelson
Date : 9/12/2022
Project ID : 150 North Donlee Drive
Project number : 220603

Settings

(input for current task)

Wall analysis

Verification methodology : Safety factors (ASD)
Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Mazindrani (Rankine)
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Allowable eccentricity : 0.333
Internal stability : Standard - straight slip surface
Reduction coeff. of contact first block - base : 1.00

Safety factors			
Permanent design situation			
Safety factor for overturning :	SF_o =	1.00	[–]
Safety factor for sliding resistance :	SF_s =	1.00	[–]
Safety factor for bearing capacity :	SF_b =	2.00	[–]
Safety factor for sliding along geo-reinforcement :	SF_{sr} =	1.50	[–]
Safety factor for geo-reinforcement strength :	SF_{st} =	1.50	[–]
Safety factor for pull out resistance of geo-reinf. :	SF_{po} =	1.50	[–]
Safety factor for connection strength :	SF_{con} =	1.50	[–]

Blocks

No.	Description	Height h [in]	Width w [in]	Unit weight γ [pcf]
1	Block 28	18.00	28.00	120.00
2	Block 41	18.00	40.50	120.00
3	Block 60	18.00	60.00	130.00
4	Top block 24 straight	18.00	24.00	108.00
5	Planter 41	18.00	40.50	120.00
6	Planter 60	18.00	60.00	112.00
7	Top block 28	18.00	28.00	120.00
8	Top block 41	18.00	40.50	120.00
9	Top block 24 straight garden	18.00	24.00	80.00
10	Block R-5236 HC	36.00	52.00	110.00
11	Block R-7236 HC	36.00	72.00	110.00
12	Block R-9636 HC	36.00	96.00	110.00
13	Block R-41 HC	18.00	40.50	110.00

No.	Description	Min. shear strength F_{min} [lbf/ft]	Max. shear strength F_{max} [lbf/ft]	Friction f [°]
1	Block 28	6061.00	11276.00	44.00
2	Block 41	6061.00	11276.00	44.00
3	Block 60	6061.00	11276.00	44.00
4	Top block 24 straight	6061.00	11276.00	44.00
5	Planter 41	6061.00	11276.00	44.00
6	Planter 60	6061.00	11276.00	44.00
7	Top block 28	6061.00	11276.00	44.00
8	Top block 41	6061.00	11276.00	44.00
9	Top block 24 straight garden	6061.00	11276.00	44.00
10	Block R-5236 HC	4550.00	12000.00	44.00
11	Block R-7236 HC	4550.00	12000.00	44.00
12	Block R-9636 HC	4550.00	12000.00	44.00
13	Block R-41 HC	5358.00	12906.00	37.00

Setbacks

No.	Setback s [in]
1	0.010
2	0.375
3	1.625
4	9.375
5	16.625

Geometry

No. group	Description	Count	Setback s [in]
1	Block 41	3	1.62
2	Block 41	1	1.62
3	Top block 28	1	-

Base

Geometry

Upper setback a_1 = 0.00 ft
Lower setback a_2 = 1.00 ft
Height h = 1.00 ft
Width b = 5.00 ft

Material

Soil creating foundation - Basalt

Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [psf]	γ [pcf]	γ_{su} [pcf]	δ [°]
1	Sand		31.00	0.0	112.60	50.10	29.00

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [psf]	γ [pcf]	γ_{su} [pcf]	δ [°]
2	Basalt		35.00	5000.0	140.00	77.50	35.00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters

Sand

Unit weight : $\gamma = 112.6$ pcf
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 31.00$ °
Cohesion of soil : $c_{ef} = 0.0$ psf
Angle of friction struc.-soil : $\delta = 29.00$ °
Saturated unit weight : $\gamma_{sat} = 112.6$ pcf

Basalt

Unit weight : $\gamma = 140.0$ pcf
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 35.00$ °
Cohesion of soil : $c_{ef} = 5000.0$ psf
Angle of friction struc.-soil : $\delta = 35.00$ °
Saturated unit weight : $\gamma_{sat} = 140.0$ pcf

Backfill

Assigned soil : Sand
Slope = 40.00 °

Geological profile and assigned soils

Position information

GPS : N 37.1111400; W 113.5966200
N 37°6"40.10'; W 113°35"47.83'

Geological profile and assigned soils

No.	Thickness of layer t [ft]	Depth z [ft]	Assigned soil	Pattern
1	-	0.00 .. ∞	Basalt	

Terrain profile

Terrain behind construction has the slope 1: 3.00 (slope angle is 18.43 °).

Water influence

Ground water table is located below the structure.

Input surface surcharges

No.	Surcharge new	Surcharge change	Action	Mag.1 [lbf/ft²]	Mag.2 [lbf/ft²]	Ord.x x [ft]	Length l [ft]	Depth z [ft]
1	Yes		permanent	1000.0				on terrain

Resistance on front face of the structure

Resistance on front face of the structure: at rest
Soil on front face of the structure - Sand
Soil thickness in front of structure $h = 1.00$ ft
Soil slope in front of structure $\beta = -35.00$ °

Applied forces acting on the structure

No.	Force new	Force edit	Name	Action	F_x [lbf/ft]	F_z [lbf/ft]	M [lbfft/ft]	x [ft]	z [ft]
1	Yes		Force No. 1	permanent	0.00	1000.00	0.0	8.00	0.00

Earthquake

Factor of horizontal acceleration K_h = 0.1100
Factor of vertical acceleration K_v = 0.0000

Water below the GWT is restricted.

Settings of the stage of construction

Design situation : permanent
Reduction of soil/soil friction angle : reduce to 2/3 φ (AASHTO)

Verification No. 1

Earthquake effects (active earth pressure) - partial results

Layer No.	Thickness [ft]	φ_d [°]	β [°]	ψ [°]	K_a	K_{ae}	K_{ae}-K_a	Comment
1	0.68	31.00	18.43	6.28	0.658	0.897	0.240	
2	0.42	31.00	18.43	6.28	0.658	0.897	0.240	
3	1.08	31.00	18.43	6.28	0.658	0.897	0.240	
4	4.54	31.00	18.43	6.28	0.344	0.503	0.160	
5	1.46	31.00	18.43	6.28	0.658	0.897	0.240	
6	1.00	35.00	18.43	6.28	0.325	0.467	0.142	

Earthquake effects (active earth pressure)

Layer No.	Start [ft] End [ft]	σ_Z [psf]	σ_D [psf]	Pressure [psf]	Hor. comp. [psf]	Vertical comp. [psf]
1	-0.68	0.0	1061.0	254.3	193.5	165.0
	0.00	76.5	984.5	235.9	179.5	153.1
2	0.00	76.5	984.5	235.9	179.5	153.1
	0.42	123.4	937.6	224.7	171.0	145.8
3	0.42	123.4	937.6	224.7	171.0	145.8
	1.50	245.4	815.6	195.4	148.7	126.8
4	1.50	245.4	815.6	130.3	118.0	55.3
	6.04	756.3	304.7	48.7	44.1	20.7
5	6.04	756.3	304.7	73.0	55.6	47.4
	7.50	921.0	140.0	33.5	25.5	21.8
6	7.50	921.0	140.0	19.8	16.2	11.4
	8.50	1061.0	0.0	0.0	0.0	0.0

Forces acting on construction

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - wall	0.0	-3.65	3458.1	2.79	1.000
Earthq.- constr.	379.7	-3.71	0.0	2.80	1.000
FF resistance	-18.0	-0.33	0.0	0.00	1.000
Weight - earth wedge	0.0	-1.49	51.5	4.62	1.000
Earthquake - soil wedge	5.7	-1.49	0.0	4.62	1.000

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - earth wedge	0.0	-8.18	284.8	3.55	1.000
Earthquake - soil wedge	31.3	-8.18	0.0	3.55	1.000
Active pressure	1454.4	-3.54	968.8	4.67	1.000
Earthq.- act.pressure	807.9	-6.21	546.6	4.50	1.000
Surch.1 - surface	3233.7	-5.18	2390.8	4.59	1.000
Surch.1 - surface	0.0	-8.84	2039.0	2.98	1.000
Force No. 1	0.0	-8.50	1000.0	9.96	1.000

Verification of complete wall

Check for overturning stability

Resisting moment M_{res} = 44900.4 lbfft/ft
Overturning moment M_{ovr} = 28601.1 lbfft/ft

Safety factor = 1.57 > 1.00
Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force H_{res} = 22696.86 lbf/ft
Active horizontal force H_{act} = 5894.64 lbf/ft

Safety factor = 3.85 > 1.00
Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Dimensioning No. 1

Forces acting on construction

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - wall	0.0	-3.45	2758.1	1.87	1.000
Earthq.- constr.	311.7	-3.41	0.0	1.86	1.000
Weight - earth wedge	0.0	-7.18	284.8	2.55	1.000
Earthquake - soil wedge	31.3	-7.18	0.0	2.55	1.000
Active pressure	1221.7	-2.89	624.3	3.54	1.000
Earthq.- act.pressure	610.5	-5.63	408.0	3.46	1.000
Surch.1 - surface	2956.3	-4.51	1805.0	3.48	1.000
Surch.1 - surface	0.0	-7.84	2039.0	1.98	1.000
Force No. 1	0.0	-7.50	1000.0	8.96	1.000

Verification of block No. 1

Check for overturning stability

Resisting moment M_{res} = 28776.2 lbfft/ft
Overturning moment M_{ovr} = 21593.1 lbfft/ft

Safety factor = 1.33 > 1.00
Joint for overturning stability is SATISFACTORY

Check for slip
Resisting horizontal force H_{res} = 14298.82 lbf/ft
Active horizontal force H_{act} = 5131.52 lbf/ft

Safety factor = 2.79 > 1.00
Joint for verification is SATISFACTORY

Bearing capacity of foundation soil

Design load acting at the center of footing bottom

No.	Moment [lbfft/ft]	Norm. force [lbf/ft]	Shear Force [lbf/ft]	Eccentricity [–]	Stress [psf]
1	10549.5	10739.53	5894.64	0.196	3538.1

Service load acting at the center of footing bottom

No.	Moment [lbfft/ft]	Norm. force [lbf/ft]	Shear Force [lbf/ft]
1	10549.5	10739.53	5894.64

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification
Max. eccentricity of normal force e = 0.196
Maximum allowable eccentricity e_{alw} = 0.333

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity
Max. stress at footing bottom σ = 3538.1 psf
Bearing capacity of foundation soil R_d = 15000.0 psf

Safety factor = 4.24 > 2.00
Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

Analysis of Redi Rock wall

Input data

Task : 220603 - 150 North Donlee Drive Block Walls
Part : Two 8-foot Block Walls
Customer : Ryan Davis
Author : Kent Nelson
Date : 9/12/2022
Project ID : 150 North Donlee Drive
Project number : 220603

Settings

(input for current task)

Wall analysis

Verification methodology : Safety factors (ASD)
Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Mazindrani (Rankine)
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Allowable eccentricity : 0.333
Internal stability : Standard - straight slip surface
Reduction coeff. of contact first block - base : 1.00

Safety factors			
Permanent design situation			
Safety factor for overturning :	SF_o =	1.00	[–]
Safety factor for sliding resistance :	SF_s =	1.00	[–]
Safety factor for bearing capacity :	SF_b =	2.00	[–]
Safety factor for sliding along geo-reinforcement :	SF_{sr} =	1.50	[–]
Safety factor for geo-reinforcement strength :	SF_{st} =	1.50	[–]
Safety factor for pull out resistance of geo-reinf. :	SF_{po} =	1.50	[–]
Safety factor for connection strength :	SF_{con} =	1.50	[–]

Blocks

No.	Description	Height h [in]	Width w [in]	Unit weight γ [pcf]
1	Block 28	18.00	28.00	120.00
2	Block 41	18.00	40.50	120.00
3	Block 60	18.00	60.00	130.00
4	Top block 24 straight	18.00	24.00	108.00
5	Planter 41	18.00	40.50	120.00
6	Planter 60	18.00	60.00	112.00
7	Top block 28	18.00	28.00	120.00
8	Top block 41	18.00	40.50	120.00
9	Top block 24 straight garden	18.00	24.00	80.00
10	Block R-5236 HC	36.00	52.00	110.00
11	Block R-7236 HC	36.00	72.00	110.00
12	Block R-9636 HC	36.00	96.00	110.00
13	Block R-41 HC	18.00	40.50	110.00

No.	Description	Min. shear strength F_{min} [lbf/ft]	Max. shear strength F_{max} [lbf/ft]	Friction f [°]
1	Block 28	6061.00	11276.00	44.00
2	Block 41	6061.00	11276.00	44.00
3	Block 60	6061.00	11276.00	44.00
4	Top block 24 straight	6061.00	11276.00	44.00
5	Planter 41	6061.00	11276.00	44.00
6	Planter 60	6061.00	11276.00	44.00
7	Top block 28	6061.00	11276.00	44.00
8	Top block 41	6061.00	11276.00	44.00
9	Top block 24 straight garden	6061.00	11276.00	44.00
10	Block R-5236 HC	4550.00	12000.00	44.00
11	Block R-7236 HC	4550.00	12000.00	44.00
12	Block R-9636 HC	4550.00	12000.00	44.00
13	Block R-41 HC	5358.00	12906.00	37.00

Setbacks

No.	Setback s [in]
1	0.010
2	0.375
3	1.625
4	9.375
5	16.625

Geometry

No. group	Description	Count	Setback s [in]
1	Block 41	3	1.62
2	Block 41	1	1.62
3	Top block 28	1	-

Base

Geometry

Upper setback a_1 = 0.00 ft
Lower setback a_2 = 1.00 ft
Height h = 1.00 ft
Width b = 5.00 ft

Material

Soil creating foundation - Basalt

Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [psf]	γ [pcf]	γ_{su} [pcf]	δ [°]
1	Sand		32.00	0.0	126.00	69.50	32.00

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [psf]	γ [pcf]	γ_{su} [pcf]	δ [°]
2	Basalt		35.00	5000.0	140.00	77.50	35.00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters

Sand

Unit weight : γ = 126.0 pcf
Stress-state : effective
Angle of internal friction : φ_{ef} = 32.00 °
Cohesion of soil : c_{ef} = 0.0 psf
Angle of friction struc.-soil : δ = 32.00 °
Saturated unit weight : γ_{sat} = 132.0 pcf

Basalt

Unit weight : γ = 140.0 pcf
Stress-state : effective
Angle of internal friction : φ_{ef} = 35.00 °
Cohesion of soil : c_{ef} = 5000.0 psf
Angle of friction struc.-soil : δ = 35.00 °
Saturated unit weight : γ_{sat} = 140.0 pcf

Backfill

Assigned soil : Sand
Slope = 40.00 °

Geological profile and assigned soils

Position information

GPS : N 37.1111400; W 113.5966200
N 37°6"40.10'; W 113°35"47.83'

Geological profile and assigned soils

No.	Thickness of layer t [ft]	Depth z [ft]	Assigned soil	Pattern
1	-	0.00 .. ∞	Basalt	

Terrain profile

Terrain behind construction has the slope 1: 3.00 (slope angle is 18.43 °).

Water influence

Ground water table is located below the structure.

Input surface surcharges

No.	Surcharge new	Surcharge change	Action	Mag.1 [lbf/ft²]	Mag.2 [lbf/ft²]	Ord.x x [ft]	Length l [ft]	Depth z [ft]
1	Yes		permanent	1000.0				on terrain

Resistance on front face of the structure

Resistance on front face of the structure: at rest
Soil on front face of the structure - Sand
Soil thickness in front of structure h = 1.00 ft
Soil slope in front of structure β = -35.00 °

Applied forces acting on the structure

No.	Force new	Force edit	Name	Action	F_x [lbf/ft]	F_z [lbf/ft]	M [lbfft/ft]	x [ft]	z [ft]
1	Yes		Force No. 1	permanent	0.00	1000.00	0.0	8.00	0.00

Earthquake

Factor of horizontal acceleration K_h = 0.1100
Factor of vertical acceleration K_v = 0.0000

Water below the GWT is restricted.

Settings of the stage of construction

Design situation : permanent
Reduction of soil/soil friction angle : reduce to 2/3 φ (AASHTO)

Verification No. 1

Earthquake effects (active earth pressure) - partial results

Layer No.	Thickness [ft]	φ_d [°]	β [°]	ψ [°]	K_a	K_{ae}	K_{ae}-K_a	Comment
1	0.68	32.00	18.43	6.28	0.639	0.865	0.226	
2	0.42	32.00	18.43	6.28	0.639	0.865	0.226	
3	1.08	32.00	18.43	6.28	0.639	0.865	0.226	
4	4.55	32.00	18.43	6.28	0.329	0.482	0.153	
5	1.45	32.00	18.43	6.28	0.639	0.865	0.226	
6	1.00	35.00	18.43	6.28	0.325	0.467	0.142	

Earthquake effects (active earth pressure)

Layer No.	Start [ft] End [ft]	σ_Z [psf]	σ_D [psf]	Pressure [psf]	Hor. comp. [psf]	Vertical comp. [psf]
1	-0.68	0.0	1170.4	264.8	199.1	174.6
	0.00	85.4	1085.0	245.5	184.6	161.8
2	0.00	85.4	1085.0	245.5	184.6	161.8
	0.42	137.9	1032.5	233.6	175.7	154.0
3	0.42	137.9	1032.5	233.6	175.7	154.0
	1.50	274.4	896.0	202.7	152.5	133.6
4	1.50	274.4	896.0	137.0	120.9	64.6
	6.05	847.2	323.2	49.4	43.6	23.3
5	6.05	847.2	323.2	73.1	55.0	48.2
	7.50	1030.4	140.0	31.7	23.8	20.9
6	7.50	1030.4	140.0	19.8	16.2	11.4
	8.50	1170.4	0.0	0.0	0.0	0.0

Forces acting on construction

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - wall	0.0	-3.65	3458.1	2.79	1.000
Earthq.- constr.	379.7	-3.71	0.0	2.80	1.000
FF resistance	-20.2	-0.33	0.0	0.00	1.000
Weight - earth wedge	0.0	-1.48	57.3	4.62	1.000
Earthquake - soil wedge	6.3	-1.48	0.0	4.62	1.000

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - earth wedge	0.0	-8.18	317.9	3.55	1.000
Earthquake - soil wedge	35.0	-8.18	0.0	3.55	1.000
Active pressure	1538.5	-3.53	1095.8	4.67	1.000
Earthq.- act.pressure	822.1	-6.23	591.4	4.50	1.000
Surch.1 - surface	3062.7	-5.19	2414.5	4.59	1.000
Surch.1 - surface	0.0	-8.84	2034.3	2.98	1.000
Force No. 1	0.0	-8.50	1000.0	9.96	1.000

Verification of complete wall

Check for overturning stability
Resisting moment M_{res} = 45930.0 lbfft/ft
Overturning moment M_{ovr} = 28156.2 lbfft/ft

Safety factor = 1.63 > 1.00
Wall for overturning is SATISFACTORY

Check for slip
Resisting horizontal force H_{res} = 23883.96 lbf/ft
Active horizontal force H_{act} = 5824.03 lbf/ft

Safety factor = 4.10 > 1.00
Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Dimensioning No. 1

Forces acting on construction

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - wall	0.0	-3.45	2758.1	1.87	1.000
Earthq.- constr.	311.7	-3.41	0.0	1.86	1.000
Weight - earth wedge	0.0	-7.18	317.9	2.55	1.000
Earthquake - soil wedge	35.0	-7.18	0.0	2.55	1.000
Active pressure	1277.8	-2.91	732.1	3.54	1.000
Earthq.- act.pressure	637.0	-5.63	453.7	3.47	1.000
Surch.1 - surface	2785.1	-4.54	1847.0	3.48	1.000
Surch.1 - surface	0.0	-7.84	2034.3	1.98	1.000
Force No. 1	0.0	-7.50	1000.0	8.96	1.000

Verification of block No. 1

Check for overturning stability
Resisting moment M_{res} = 29538.4 lbfft/ft
Overturning moment M_{ovr} = 21250.6 lbfft/ft

Safety factor = 1.39 > 1.00
Joint for overturning stability is SATISFACTORY

Check for slip
Resisting horizontal force H_{res} = 15466.54 lbf/ft
Active horizontal force H_{act} = 5046.60 lbf/ft

Safety factor = 3.06 > 1.00
Joint for verification is SATISFACTORY

Bearing capacity of foundation soil

Design load acting at the center of footing bottom

No.	Moment [lbfft/ft]	Norm. force [lbf/ft]	Shear Force [lbf/ft]	Eccentricity [–]	Stress [psf]
1	9649.7	10969.42	5824.03	0.176	3385.0

Service load acting at the center of footing bottom

No.	Moment [lbfft/ft]	Norm. force [lbf/ft]	Shear Force [lbf/ft]
1	9649.7	10969.42	5824.03

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification
Max. eccentricity of normal force e = 0.176
Maximum allowable eccentricity e_{alw} = 0.333

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity
Max. stress at footing bottom σ = 3385.0 psf
Bearing capacity of foundation soil R_d = 15000.0 psf

Safety factor = 4.43 > 2.00
Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

Analysis of Redi Rock wall

Input data

Task : 220603 - 150 North Donlee Drive Block Walls
Part : Two 8-foot Block Walls
Customer : Ryan Davis
Author : Kent Nelson
Date : 9/12/2022
Project ID : 150 North Donlee Drive
Project number : 220603

Settings

(input for current task)

Wall analysis

Verification methodology : Safety factors (ASD)
Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Mazindrani (Rankine)
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Allowable eccentricity : 0.333
Internal stability : Standard - straight slip surface
Reduction coeff. of contact first block - base : 1.00

Safety factors			
Permanent design situation			
Safety factor for overturning :	SF_o =	1.00	[–]
Safety factor for sliding resistance :	SF_s =	1.00	[–]
Safety factor for bearing capacity :	SF_b =	2.00	[–]
Safety factor for sliding along geo-reinforcement :	SF_{sr} =	1.50	[–]
Safety factor for geo-reinforcement strength :	SF_{st} =	1.50	[–]
Safety factor for pull out resistance of geo-reinf. :	SF_{po} =	1.50	[–]
Safety factor for connection strength :	SF_{con} =	1.50	[–]

Blocks

No.	Description	Height h [in]	Width w [in]	Unit weight γ [pcf]
1	Block 28	18.00	28.00	120.00
2	Block 41	18.00	40.50	120.00
3	Block 60	18.00	60.00	130.00
4	Top block 24 straight	18.00	24.00	108.00
5	Planter 41	18.00	40.50	120.00
6	Planter 60	18.00	60.00	112.00
7	Top block 28	18.00	28.00	120.00
8	Top block 41	18.00	40.50	120.00
9	Top block 24 straight garden	18.00	24.00	80.00
10	Block R-5236 HC	36.00	52.00	110.00
11	Block R-7236 HC	36.00	72.00	110.00
12	Block R-9636 HC	36.00	96.00	110.00
13	Block R-41 HC	18.00	40.50	110.00

No.	Description	Min. shear strength F_{min} [lbf/ft]	Max. shear strength F_{max} [lbf/ft]	Friction f [°]
1	Block 28	6061.00	11276.00	44.00
2	Block 41	6061.00	11276.00	44.00
3	Block 60	6061.00	11276.00	44.00
4	Top block 24 straight	6061.00	11276.00	44.00
5	Planter 41	6061.00	11276.00	44.00
6	Planter 60	6061.00	11276.00	44.00
7	Top block 28	6061.00	11276.00	44.00
8	Top block 41	6061.00	11276.00	44.00
9	Top block 24 straight garden	6061.00	11276.00	44.00
10	Block R-5236 HC	4550.00	12000.00	44.00
11	Block R-7236 HC	4550.00	12000.00	44.00
12	Block R-9636 HC	4550.00	12000.00	44.00
13	Block R-41 HC	5358.00	12906.00	37.00

Setbacks

No.	Setback s [in]
1	0.010
2	0.375
3	1.625
4	9.375
5	16.625

Geometry

No. group	Description	Count	Setback s [in]
1	Block 41	3	1.62
2	Block 41	1	1.62
3	Top block 28	1	-

Base

Geometry

Upper setback a_1 = 0.00 ft
Lower setback a_2 = 1.00 ft
Height h = 1.00 ft
Width b = 5.00 ft

Material

Soil creating foundation - Basalt

Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [psf]	γ [pcf]	γ_{su} [pcf]	δ [°]
1	Sand		28.00	0.0	100.00	37.50	28.00

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [psf]	γ [pcf]	γ_{su} [pcf]	δ [°]
2	Basalt		35.00	5000.0	140.00	77.50	35.00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters

Sand

Unit weight : γ = 100.0 pcf
Stress-state : effective
Angle of internal friction : φ_{ef} = 28.00 °
Cohesion of soil : c_{ef} = 0.0 psf
Angle of friction struc.-soil : δ = 28.00 °
Saturated unit weight : γ_{sat} = 100.0 pcf

Basalt

Unit weight : γ = 140.0 pcf
Stress-state : effective
Angle of internal friction : φ_{ef} = 35.00 °
Cohesion of soil : c_{ef} = 5000.0 psf
Angle of friction struc.-soil : δ = 35.00 °
Saturated unit weight : γ_{sat} = 140.0 pcf

Backfill

Assigned soil : Sand
Slope = 40.00 °

Geological profile and assigned soils

Position information

GPS : N 37.1111400; W 113.5966200
N 37°6"40.10'; W 113°35"47.83'

Geological profile and assigned soils

No.	Thickness of layer t [ft]	Depth z [ft]	Assigned soil	Pattern
1	-	0.00 .. ∞	Basalt	

Terrain profile

Terrain behind construction has the slope 1: 3.00 (slope angle is 18.43 °).

Water influence

Ground water table is located below the structure.

Input surface surcharges

No.	Surcharge new	Surcharge change	Action	Mag.1 [lbf/ft²]	Mag.2 [lbf/ft²]	Ord.x x [ft]	Length l [ft]	Depth z [ft]
1	Yes		permanent	1000.0				on terrain

Resistance on front face of the structure

Resistance on front face of the structure: at rest
Soil on front face of the structure - Sand
Soil thickness in front of structure h = 1.00 ft
Soil slope in front of structure β = -35.00 °

Applied forces acting on the structure

No.	Force new	Force edit	Name	Action	F_x [lbf/ft]	F_z [lbf/ft]	M [lbfft/ft]	x [ft]	z [ft]
1	Yes		Force No. 1	permanent	0.00	1000.00	0.0	8.00	0.00

Earthquake

Factor of horizontal acceleration K_h = 0.0000
Factor of vertical acceleration K_v = 0.0000

Water below the GWT is restricted.

Settings of the stage of construction

Design situation : permanent
Reduction of soil/soil friction angle : reduce to 2/3 φ (AASHTO)

Verification No. 1

Earthquake effects (active earth pressure) - partial results

Layer No.	Thickness [ft]	φ_d [°]	β [°]	ψ [°]	K_a	K_{ae}	K_{ae}-K_a	Comment
1	0.69	28.00	18.43	0.00	0.714	0.714	0.000	
2	0.42	28.00	18.43	0.00	0.714	0.714	0.000	
3	1.08	28.00	18.43	0.00	0.714	0.714	0.000	
4	4.49	28.00	18.43	0.00	0.403	0.403	0.000	
5	1.51	28.00	18.43	0.00	0.714	0.714	0.000	
6	1.00	35.00	18.43	0.00	0.325	0.325	0.000	

Earthquake effects (active earth pressure)

Layer No.	Start [ft] End [ft]	σ_Z [psf]	σ_D [psf]	Pressure [psf]	Hor. comp. [psf]	Vertical comp. [psf]
1	-0.69	0.0	958.9	0.0	0.0	0.0
	0.00	68.9	890.0	0.0	0.0	0.0
2	0.00	68.9	890.0	0.0	0.0	0.0
	0.42	110.6	848.3	0.0	0.0	0.0
3	0.42	110.6	848.3	0.0	0.0	0.0
	1.50	218.9	740.0	0.0	0.0	0.0
4	1.50	218.9	740.0	0.0	0.0	0.0
	5.99	667.5	291.3	0.0	0.0	0.0
5	5.99	667.5	291.3	0.0	0.0	0.0
	7.50	818.9	140.0	0.0	0.0	0.0
6	7.50	818.9	140.0	0.0	0.0	0.0
	8.50	958.9	0.0	0.0	0.0	0.0

Forces acting on construction

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - wall	0.0	-3.65	3458.1	2.79	1.000
Earthq.- constr.	0.0	-3.71	0.0	2.80	1.000
FF resistance	-15.7	-0.33	0.0	0.00	1.000
Weight - earth wedge	0.0	-1.50	47.3	4.62	1.000
Earthquake - soil wedge	0.0	-1.50	0.0	4.62	1.000

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - earth wedge	0.0	-8.18	256.4	3.56	1.000
Earthquake - soil wedge	0.0	-8.18	0.0	3.56	1.000
Active pressure	1500.9	-3.56	922.8	4.67	1.000
Earthq.- act.pressure	0.0	-8.50	0.0	4.03	1.000
Surch.1 - surface	3738.6	-5.17	2525.1	4.60	1.000
Surch.1 - surface	0.0	-8.84	2067.2	2.99	1.000
Force No. 1	0.0	-8.50	1000.0	9.96	1.000

Verification of complete wall

Check for overturning stability
Resisting moment M_{res} = 42858.7 lbfft/ft
Overturning moment M_{ovr} = 24682.8 lbfft/ft

Safety factor = 1.74 > 1.00
Wall for overturning is SATISFACTORY

Check for slip
Resisting horizontal force H_{res} = 24882.14 lbf/ft
Active horizontal force H_{act} = 5223.75 lbf/ft

Safety factor = 4.76 > 1.00
Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Dimensioning No. 1

Forces acting on construction

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - wall	0.0	-3.45	2758.1	1.87	1.000
Earthq.- constr.	0.0	-3.41	0.0	1.86	1.000
Weight - earth wedge	0.0	-7.18	256.4	2.56	1.000
Earthquake - soil wedge	0.0	-7.18	0.0	2.56	1.000
Active pressure	1278.8	-2.88	616.7	3.54	1.000
Earthq.- act.pressure	0.0	-7.50	0.0	3.03	1.000
Surch.1 - surface	3439.8	-4.47	1942.9	3.49	1.000
Surch.1 - surface	0.0	-7.84	2067.2	1.99	1.000
Force No. 1	0.0	-7.50	1000.0	8.96	1.000

Verification of block No. 1

Check for overturning stability
Resisting moment M_{res} = 27854.7 lbfft/ft
Overturning moment M_{ovr} = 19061.1 lbfft/ft

Safety factor = 1.46 > 1.00
Joint for overturning stability is SATISFACTORY

Check for slip
Resisting horizontal force H_{res} = 16226.94 lbf/ft
Active horizontal force H_{act} = 4718.58 lbf/ft

Safety factor = 3.44 > 1.00
Joint for verification is SATISFACTORY

Bearing capacity of foundation soil

Design load acting at the center of footing bottom

No.	Moment [lbfft/ft]	Norm. force [lbf/ft]	Shear Force [lbf/ft]	Eccentricity [–]	Stress [psf]
1	7516.4	10276.94	5223.75	0.146	2905.4

Service load acting at the center of footing bottom

No.	Moment [lbfft/ft]	Norm. force [lbf/ft]	Shear Force [lbf/ft]
1	7516.4	10276.94	5223.75

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification
Max. eccentricity of normal force e = 0.146
Maximum allowable eccentricity e_{alw} = 0.333

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity
Max. stress at footing bottom σ = 2905.4 psf
Bearing capacity of foundation soil R_d = 15000.0 psf

Safety factor = 5.16 > 2.00
Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

Analysis of Redi Rock wall

Input data

Task : 220603 - 150 North Donlee Drive Block Walls
Part : Two 8-foot Block Walls
Customer : Ryan Davis
Author : Kent Nelson
Date : 9/12/2022
Project ID : 150 North Donlee Drive
Project number : 220603

Settings

(input for current task)

Wall analysis

Verification methodology : Safety factors (ASD)
Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Mazindrani (Rankine)
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Allowable eccentricity : 0.333
Internal stability : Standard - straight slip surface
Reduction coeff. of contact first block - base : 1.00

Safety factors			
Permanent design situation			
Safety factor for overturning :	SF_o =	1.00	[–]
Safety factor for sliding resistance :	SF_s =	1.00	[–]
Safety factor for bearing capacity :	SF_b =	2.00	[–]
Safety factor for sliding along geo-reinforcement :	SF_{sr} =	1.50	[–]
Safety factor for geo-reinforcement strength :	SF_{st} =	1.50	[–]
Safety factor for pull out resistance of geo-reinf. :	SF_{po} =	1.50	[–]
Safety factor for connection strength :	SF_{con} =	1.50	[–]

Blocks

No.	Description	Height h [in]	Width w [in]	Unit weight γ [pcf]
1	Block 28	18.00	28.00	120.00
2	Block 41	18.00	40.50	120.00
3	Block 60	18.00	60.00	130.00
4	Top block 24 straight	18.00	24.00	108.00
5	Planter 41	18.00	40.50	120.00
6	Planter 60	18.00	60.00	112.00
7	Top block 28	18.00	28.00	120.00
8	Top block 41	18.00	40.50	120.00
9	Top block 24 straight garden	18.00	24.00	80.00
10	Block R-5236 HC	36.00	52.00	110.00
11	Block R-7236 HC	36.00	72.00	110.00
12	Block R-9636 HC	36.00	96.00	110.00
13	Block R-41 HC	18.00	40.50	110.00

No.	Description	Min. shear strength F_{min} [lbf/ft]	Max. shear strength F_{max} [lbf/ft]	Friction f [°]
1	Block 28	6061.00	11276.00	44.00
2	Block 41	6061.00	11276.00	44.00
3	Block 60	6061.00	11276.00	44.00
4	Top block 24 straight	6061.00	11276.00	44.00
5	Planter 41	6061.00	11276.00	44.00
6	Planter 60	6061.00	11276.00	44.00
7	Top block 28	6061.00	11276.00	44.00
8	Top block 41	6061.00	11276.00	44.00
9	Top block 24 straight garden	6061.00	11276.00	44.00
10	Block R-5236 HC	4550.00	12000.00	44.00
11	Block R-7236 HC	4550.00	12000.00	44.00
12	Block R-9636 HC	4550.00	12000.00	44.00
13	Block R-41 HC	5358.00	12906.00	37.00

Setbacks

No.	Setback s [in]
1	0.010
2	0.375
3	1.625
4	9.375
5	16.625

Geometry

No. group	Description	Count	Setback s [in]
1	Block 41	3	1.62
2	Block 41	1	1.62
3	Top block 28	1	-

Base

Geometry

Upper setback a_1 = 0.00 ft
Lower setback a_2 = 1.00 ft
Height h = 1.00 ft
Width b = 5.00 ft

Material

Soil creating foundation - Basalt

Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [psf]	γ [pcf]	γ_{su} [pcf]	δ [°]
1	Sand		31.00	0.0	112.60	50.10	29.00

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [psf]	γ [pcf]	γ_{su} [pcf]	δ [°]
2	Basalt		35.00	5000.0	140.00	77.50	35.00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters

Sand

Unit weight : $\gamma = 112.6$ pcf
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 31.00$ °
Cohesion of soil : $c_{ef} = 0.0$ psf
Angle of friction struc.-soil : $\delta = 29.00$ °
Saturated unit weight : $\gamma_{sat} = 112.6$ pcf

Basalt

Unit weight : $\gamma = 140.0$ pcf
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 35.00$ °
Cohesion of soil : $c_{ef} = 5000.0$ psf
Angle of friction struc.-soil : $\delta = 35.00$ °
Saturated unit weight : $\gamma_{sat} = 140.0$ pcf

Backfill

Assigned soil : Sand
Slope = 40.00 °

Geological profile and assigned soils

Position information

GPS : N 37.1111400; W 113.5966200
N 37°6"40.10'; W 113°35"47.83'

Geological profile and assigned soils

No.	Thickness of layer t [ft]	Depth z [ft]	Assigned soil	Pattern
1	-	0.00 .. ∞	Basalt	

Terrain profile

Terrain behind construction has the slope 1: 3.00 (slope angle is 18.43 °).

Water influence

Ground water table is located below the structure.

Input surface surcharges

No.	Surcharge new	Surcharge change	Action	Mag.1 [lbf/ft²]	Mag.2 [lbf/ft²]	Ord.x x [ft]	Length l [ft]	Depth z [ft]
1	Yes		permanent	1000.0				on terrain

Resistance on front face of the structure

Resistance on front face of the structure: at rest
Soil on front face of the structure - Sand
Soil thickness in front of structure $h = 1.00$ ft
Soil slope in front of structure $\beta = -35.00$ °

Applied forces acting on the structure

No.	Force new	Force edit	Name	Action	F_x [lbf/ft]	F_z [lbf/ft]	M [lbfft/ft]	x [ft]	z [ft]
1	Yes		Force No. 1	permanent	0.00	1000.00	0.0	8.00	0.00

Earthquake

Factor of horizontal acceleration K_h = 0.0000
Factor of vertical acceleration K_v = 0.0000

Water below the GWT is restricted.

Settings of the stage of construction

Design situation : permanent
Reduction of soil/soil friction angle : reduce to 2/3 φ (AASHTO)

Verification No. 1

Earthquake effects (active earth pressure) - partial results

Layer No.	Thickness [ft]	φ_d [°]	β [°]	ψ [°]	K_a	K_{ae}	K_{ae}-K_a	Comment
1	0.68	31.00	18.43	0.00	0.658	0.658	0.000	
2	0.42	31.00	18.43	0.00	0.658	0.658	0.000	
3	1.08	31.00	18.43	0.00	0.658	0.658	0.000	
4	4.54	31.00	18.43	0.00	0.344	0.344	0.000	
5	1.46	31.00	18.43	0.00	0.658	0.658	0.000	
6	1.00	35.00	18.43	0.00	0.325	0.325	0.000	

Earthquake effects (active earth pressure)

Layer No.	Start [ft] End [ft]	σ_Z [psf]	σ_D [psf]	Pressure [psf]	Hor. comp. [psf]	Vertical comp. [psf]
1	-0.68	0.0	1061.0	0.0	0.0	0.0
	0.00	76.5	984.5	0.0	0.0	0.0
2	0.00	76.5	984.5	0.0	0.0	0.0
	0.42	123.4	937.6	0.0	0.0	0.0
3	0.42	123.4	937.6	0.0	0.0	0.0
	1.50	245.4	815.6	0.0	0.0	0.0
4	1.50	245.4	815.6	0.0	0.0	0.0
	6.04	756.3	304.7	0.0	0.0	0.0
5	6.04	756.3	304.7	0.0	0.0	0.0
	7.50	921.0	140.0	0.0	0.0	0.0
6	7.50	921.0	140.0	0.0	0.0	0.0
	8.50	1061.0	0.0	0.0	0.0	0.0

Forces acting on construction

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - wall	0.0	-3.65	3458.1	2.79	1.000
Earthq.- constr.	0.0	-3.71	0.0	2.80	1.000
FF resistance	-18.0	-0.33	0.0	0.00	1.000
Weight - earth wedge	0.0	-1.49	51.5	4.62	1.000
Earthquake - soil wedge	0.0	-1.49	0.0	4.62	1.000

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - earth wedge	0.0	-8.18	284.8	3.55	1.000
Earthquake - soil wedge	0.0	-8.18	0.0	3.55	1.000
Active pressure	1454.4	-3.54	968.8	4.67	1.000
Earthq.- act.pressure	0.0	-8.50	0.0	4.00	1.000
Surch.1 - surface	3233.7	-5.18	2390.8	4.59	1.000
Surch.1 - surface	0.0	-8.84	2039.0	2.98	1.000
Force No. 1	0.0	-8.50	1000.0	9.96	1.000

Verification of complete wall

Check for overturning stability
Resisting moment M_{res} = 42442.3 lbfft/ft
Overturning moment M_{ovr} = 21914.1 lbfft/ft

Safety factor = 1.94 > 1.00
Wall for overturning is SATISFACTORY

Check for slip
Resisting horizontal force H_{res} = 27276.77 lbf/ft
Active horizontal force H_{act} = 4670.09 lbf/ft

Safety factor = 5.84 > 1.00
Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Dimensioning No. 1

Forces acting on construction

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - wall	0.0	-3.45	2758.1	1.87	1.000
Earthq.- constr.	0.0	-3.41	0.0	1.86	1.000
Weight - earth wedge	0.0	-7.18	284.8	2.55	1.000
Earthquake - soil wedge	0.0	-7.18	0.0	2.55	1.000
Active pressure	1221.7	-2.89	624.3	3.54	1.000
Earthq.- act.pressure	0.0	-7.50	0.0	3.00	1.000
Surch.1 - surface	2956.3	-4.51	1805.0	3.48	1.000
Surch.1 - surface	0.0	-7.84	2039.0	1.98	1.000
Force No. 1	0.0	-7.50	1000.0	8.96	1.000

Verification of block No. 1

Check for overturning stability
Resisting moment M_{res} = 27363.5 lbfft/ft
Overturning moment M_{ovr} = 16865.5 lbfft/ft

Safety factor = 1.62 > 1.00
Joint for overturning stability is SATISFACTORY

Check for slip
Resisting horizontal force H_{res} = 18293.94 lbf/ft
Active horizontal force H_{act} = 4177.99 lbf/ft

Safety factor = 4.38 > 1.00
Joint for verification is SATISFACTORY

Bearing capacity of foundation soil

Design load acting at the center of footing bottom

No.	Moment [lbfft/ft]	Norm. force [lbf/ft]	Shear Force [lbf/ft]	Eccentricity [–]	Stress [psf]
1	4954.2	10192.96	4670.09	0.097	2530.6

Service load acting at the center of footing bottom

No.	Moment [lbfft/ft]	Norm. force [lbf/ft]	Shear Force [lbf/ft]
1	4954.2	10192.96	4670.09

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification
Max. eccentricity of normal force e = 0.097
Maximum allowable eccentricity e_{alw} = 0.333

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity
Max. stress at footing bottom σ = 2530.6 psf
Bearing capacity of foundation soil R_d = 15000.0 psf

Safety factor = 5.93 > 2.00
Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

Analysis of Redi Rock wall

Input data

Task : 220603 - 150 North Donlee Drive Block Walls
Part : Two 8-foot Block Walls
Customer : Ryan Davis
Author : Kent Nelson
Date : 9/12/2022
Project ID : 150 North Donlee Drive
Project number : 220603

Settings

(input for current task)

Wall analysis

Verification methodology : Safety factors (ASD)
Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Mazindrani (Rankine)
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Allowable eccentricity : 0.333
Internal stability : Standard - straight slip surface
Reduction coeff. of contact first block - base : 1.00

Safety factors			
Permanent design situation			
Safety factor for overturning :	SF_o =	1.00	[–]
Safety factor for sliding resistance :	SF_s =	1.00	[–]
Safety factor for bearing capacity :	SF_b =	2.00	[–]
Safety factor for sliding along geo-reinforcement :	SF_{sr} =	1.50	[–]
Safety factor for geo-reinforcement strength :	SF_{st} =	1.50	[–]
Safety factor for pull out resistance of geo-reinf. :	SF_{po} =	1.50	[–]
Safety factor for connection strength :	SF_{con} =	1.50	[–]

Blocks

No.	Description	Height h [in]	Width w [in]	Unit weight γ [pcf]
1	Block 28	18.00	28.00	120.00
2	Block 41	18.00	40.50	120.00
3	Block 60	18.00	60.00	130.00
4	Top block 24 straight	18.00	24.00	108.00
5	Planter 41	18.00	40.50	120.00
6	Planter 60	18.00	60.00	112.00
7	Top block 28	18.00	28.00	120.00
8	Top block 41	18.00	40.50	120.00
9	Top block 24 straight garden	18.00	24.00	80.00
10	Block R-5236 HC	36.00	52.00	110.00
11	Block R-7236 HC	36.00	72.00	110.00
12	Block R-9636 HC	36.00	96.00	110.00
13	Block R-41 HC	18.00	40.50	110.00

No.	Description	Min. shear strength F_{min} [lbf/ft]	Max. shear strength F_{max} [lbf/ft]	Friction f [°]
1	Block 28	6061.00	11276.00	44.00
2	Block 41	6061.00	11276.00	44.00
3	Block 60	6061.00	11276.00	44.00
4	Top block 24 straight	6061.00	11276.00	44.00
5	Planter 41	6061.00	11276.00	44.00
6	Planter 60	6061.00	11276.00	44.00
7	Top block 28	6061.00	11276.00	44.00
8	Top block 41	6061.00	11276.00	44.00
9	Top block 24 straight garden	6061.00	11276.00	44.00
10	Block R-5236 HC	4550.00	12000.00	44.00
11	Block R-7236 HC	4550.00	12000.00	44.00
12	Block R-9636 HC	4550.00	12000.00	44.00
13	Block R-41 HC	5358.00	12906.00	37.00

Setbacks

No.	Setback s [in]
1	0.010
2	0.375
3	1.625
4	9.375
5	16.625

Geometry

No. group	Description	Count	Setback s [in]
1	Block 41	3	1.62
2	Block 41	1	1.62
3	Top block 28	1	-

Base

Geometry

Upper setback a_1 = 0.00 ft
Lower setback a_2 = 1.00 ft
Height h = 1.00 ft
Width b = 5.00 ft

Material

Soil creating foundation - Basalt

Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [psf]	γ [pcf]	γ_{su} [pcf]	δ [°]
1	Sand		32.00	0.0	126.00	69.50	32.00

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [psf]	γ [pcf]	γ_{su} [pcf]	δ [°]
2	Basalt		35.00	5000.0	140.00	77.50	35.00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters

Sand

Unit weight : γ = 126.0 pcf
Stress-state : effective
Angle of internal friction : φ_{ef} = 32.00 °
Cohesion of soil : c_{ef} = 0.0 psf
Angle of friction struc.-soil : δ = 32.00 °
Saturated unit weight : γ_{sat} = 132.0 pcf

Basalt

Unit weight : γ = 140.0 pcf
Stress-state : effective
Angle of internal friction : φ_{ef} = 35.00 °
Cohesion of soil : c_{ef} = 5000.0 psf
Angle of friction struc.-soil : δ = 35.00 °
Saturated unit weight : γ_{sat} = 140.0 pcf

Backfill

Assigned soil : Sand
Slope = 40.00 °

Geological profile and assigned soils

Position information

GPS : N 37.1111400; W 113.5966200
N 37°6"40.10'; W 113°35"47.83'

Geological profile and assigned soils

No.	Thickness of layer t [ft]	Depth z [ft]	Assigned soil	Pattern
1	-	0.00 .. ∞	Basalt	

Terrain profile

Terrain behind construction has the slope 1: 3.00 (slope angle is 18.43 °).

Water influence

Ground water table is located below the structure.

Input surface surcharges

No.	Surcharge new	Surcharge change	Action	Mag.1 [lbf/ft²]	Mag.2 [lbf/ft²]	Ord.x x [ft]	Length l [ft]	Depth z [ft]
1	Yes		permanent	1000.0				on terrain

Resistance on front face of the structure

Resistance on front face of the structure: at rest
Soil on front face of the structure - Sand
Soil thickness in front of structure h = 1.00 ft
Soil slope in front of structure β = -35.00 °

Applied forces acting on the structure

No.	Force new	Force edit	Name	Action	F_x [lbf/ft]	F_z [lbf/ft]	M [lbfft/ft]	x [ft]	z [ft]
1	Yes		Force No. 1	permanent	0.00	1000.00	0.0	8.00	0.00

Earthquake

Factor of horizontal acceleration K_h = 0.0000
Factor of vertical acceleration K_v = 0.0000

Water below the GWT is restricted.

Settings of the stage of construction

Design situation : permanent
Reduction of soil/soil friction angle : reduce to 2/3 φ (AASHTO)

Verification No. 1

Earthquake effects (active earth pressure) - partial results

Layer No.	Thickness [ft]	φ_d [°]	β [°]	ψ [°]	K_a	K_{ae}	K_{ae}-K_a	Comment
1	0.68	32.00	18.43	0.00	0.639	0.639	0.000	
2	0.42	32.00	18.43	0.00	0.639	0.639	0.000	
3	1.08	32.00	18.43	0.00	0.639	0.639	0.000	
4	4.55	32.00	18.43	0.00	0.329	0.329	0.000	
5	1.45	32.00	18.43	0.00	0.639	0.639	0.000	
6	1.00	35.00	18.43	0.00	0.325	0.325	0.000	

Earthquake effects (active earth pressure)

Layer No.	Start [ft] End [ft]	σ_Z [psf]	σ_D [psf]	Pressure [psf]	Hor. comp. [psf]	Vertical comp. [psf]
1	-0.68	0.0	1170.4	0.0	0.0	0.0
	0.00	85.4	1085.0	0.0	0.0	0.0
2	0.00	85.4	1085.0	0.0	0.0	0.0
	0.42	137.9	1032.5	0.0	0.0	0.0
3	0.42	137.9	1032.5	0.0	0.0	0.0
	1.50	274.4	896.0	0.0	0.0	0.0
4	1.50	274.4	896.0	0.0	0.0	0.0
	6.05	847.2	323.2	0.0	0.0	0.0
5	6.05	847.2	323.2	0.0	0.0	0.0
	7.50	1030.4	140.0	0.0	0.0	0.0
6	7.50	1030.4	140.0	0.0	0.0	0.0
	8.50	1170.4	0.0	0.0	0.0	0.0

Forces acting on construction

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - wall	0.0	-3.65	3458.1	2.79	1.000
Earthq.- constr.	0.0	-3.71	0.0	2.80	1.000
FF resistance	-20.2	-0.33	0.0	0.00	1.000
Weight - earth wedge	0.0	-1.48	57.3	4.62	1.000
Earthquake - soil wedge	0.0	-1.48	0.0	4.62	1.000

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - earth wedge	0.0	-8.18	317.9	3.55	1.000
Earthquake - soil wedge	0.0	-8.18	0.0	3.55	1.000
Active pressure	1538.5	-3.53	1095.8	4.67	1.000
Earthq.- act.pressure	0.0	-8.50	0.0	3.99	1.000
Surch.1 - surface	3062.7	-5.19	2414.5	4.59	1.000
Surch.1 - surface	0.0	-8.84	2034.3	2.98	1.000
Force No. 1	0.0	-8.50	1000.0	9.96	1.000

Verification of complete wall

Check for overturning stability
Resisting moment M_{res} = 43269.5 lbfft/ft
Overturning moment M_{ovr} = 21326.8 lbfft/ft

Safety factor = 2.03 > 1.00
Wall for overturning is SATISFACTORY

Check for slip
Resisting horizontal force H_{res} = 28410.08 lbf/ft
Active horizontal force H_{act} = 4581.01 lbf/ft

Safety factor = 6.20 > 1.00
Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Dimensioning No. 1

Forces acting on construction

Name	F_{hor} [lbf/ft]	App.Pt. z [ft]	F_{vert} [lbf/ft]	App.Pt. x [ft]	Design coefficient
Weight - wall	0.0	-3.45	2758.1	1.87	1.000
Earthq.- constr.	0.0	-3.41	0.0	1.86	1.000
Weight - earth wedge	0.0	-7.18	317.9	2.55	1.000
Earthquake - soil wedge	0.0	-7.18	0.0	2.55	1.000
Active pressure	1277.8	-2.91	732.1	3.54	1.000
Earthq.- act.pressure	0.0	-7.50	0.0	2.99	1.000
Surch.1 - surface	2785.1	-4.54	1847.0	3.48	1.000
Surch.1 - surface	0.0	-7.84	2034.3	1.98	1.000
Force No. 1	0.0	-7.50	1000.0	8.96	1.000

Verification of block No. 1

Check for overturning stability
Resisting moment M_{res} = 27965.2 lbfft/ft
Overturning moment M_{ovr} = 16348.0 lbfft/ft

Safety factor = 1.71 > 1.00
Joint for overturning stability is SATISFACTORY

Check for slip
Resisting horizontal force H_{res} = 19453.73 lbf/ft
Active horizontal force H_{act} = 4062.93 lbf/ft

Safety factor = 4.79 > 1.00
Joint for verification is SATISFACTORY

Bearing capacity of foundation soil

Design load acting at the center of footing bottom

No.	Moment [lbfft/ft]	Norm. force [lbf/ft]	Shear Force [lbf/ft]	Eccentricity [–]	Stress [psf]
1	4002.5	10378.06	4581.01	0.077	2454.2

Service load acting at the center of footing bottom

No.	Moment [lbfft/ft]	Norm. force [lbf/ft]	Shear Force [lbf/ft]
1	4002.5	10378.06	4581.01

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification
Max. eccentricity of normal force e = 0.077
Maximum allowable eccentricity e_{alw} = 0.333

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity
Max. stress at footing bottom σ = 2454.2 psf
Bearing capacity of foundation soil R_d = 15000.0 psf

Safety factor = 6.11 > 2.00
Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

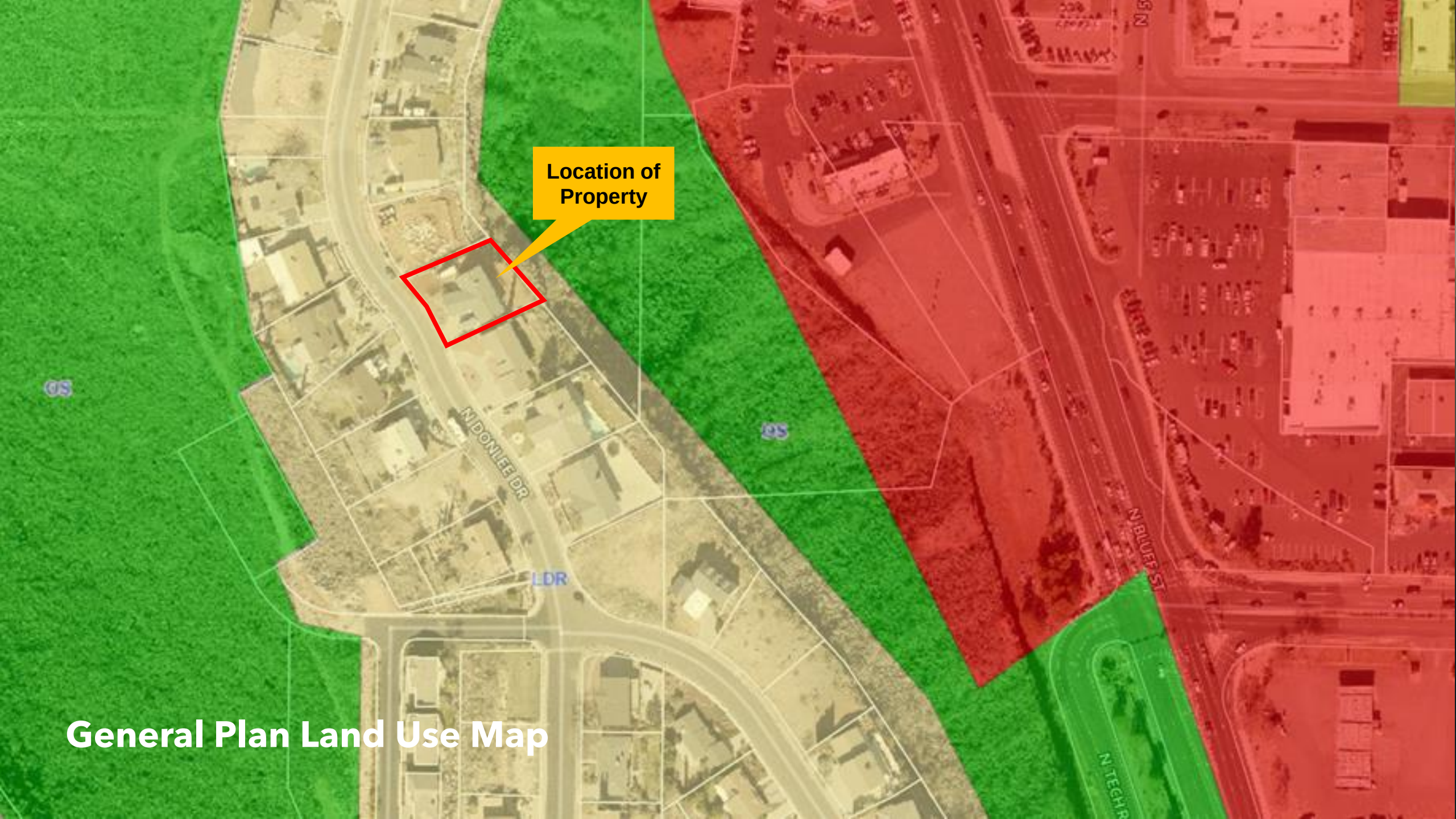
Exhibit D
PowerPoint Presentation

150 N Donlee Drive

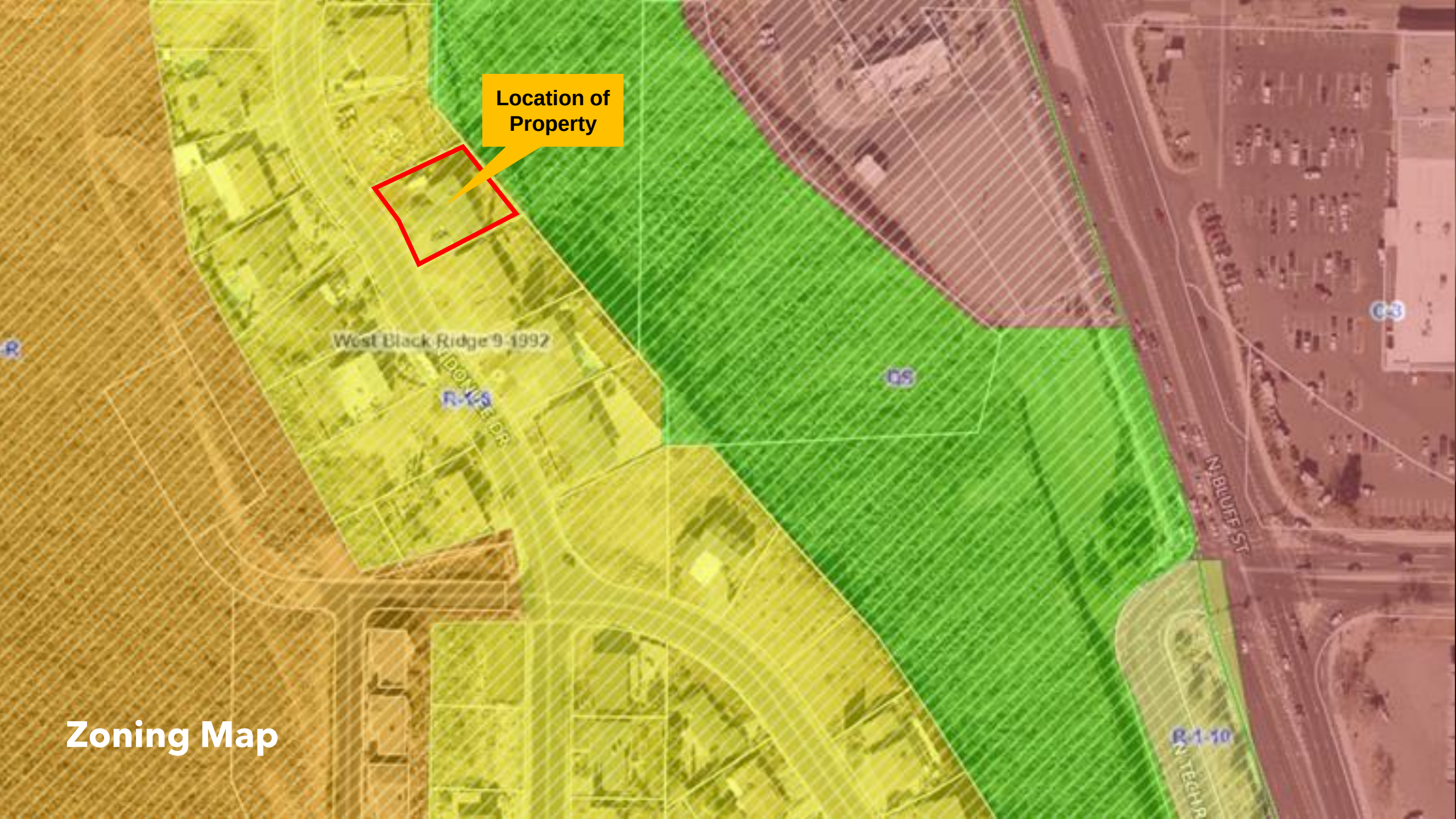
Hillside Development Permit

2022-HS-018


Location of Property
N DONLEE DR
N BLUFF ST



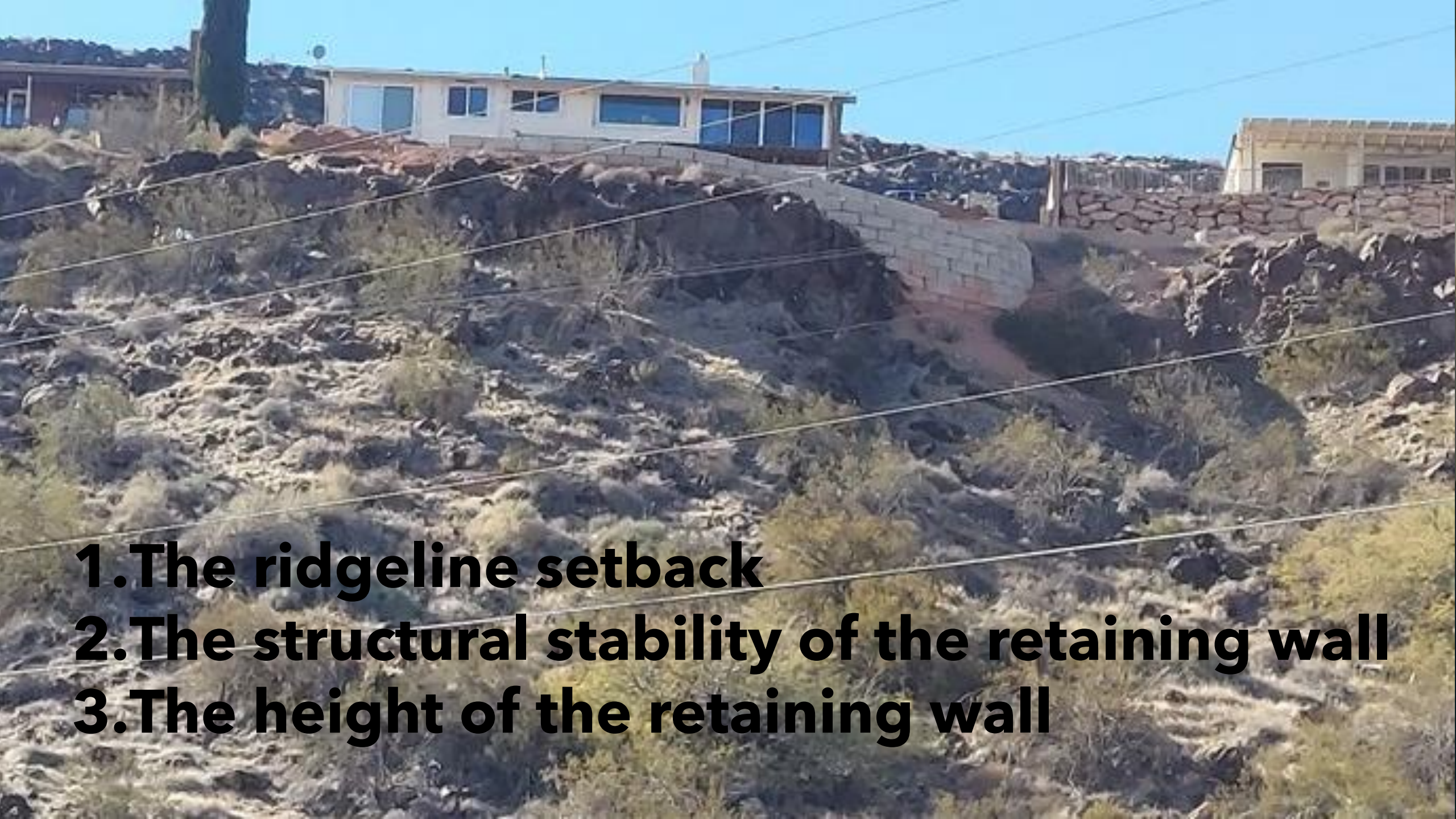
General Plan Land Use Map


Location of Property
West Black Ridge 9 1992
R-1-8
OS
N BLUFF ST
R-1-10

Zoning Map

Rear of House Before

Rear of House After


1.The ridgeline setback
2.The structural stability of the retaining wall
3.The height of the retaining wall

The structural stability of the retaining wall

1. A Notice of Noncompliance letter shall be recorded against the property so that future owners will know the situation of this retaining wall. The letter shall contain:

    a. A notification that states this retaining wall was erected prior to obtaining a hillside and building permit and that no compaction tests were taken during construction nor any observation of the construction by a geotechnical engineer.
    b. A notification that states testing on the site did occur after the wall was constructed.
    c. The updated engineering report shall be included in this noncompliance letter.

The height of the retaining wall

Option 1

The first option is to place soils at the bottom of the lower tier. The tier is currently 10.5 feet in height. This will require the placement of 2.5 feet of soil at the bottom of the wall to decrease the wall height to 8 feet.

Pros:

- The placement of soils at the base of the wall will add stability against sliding.
- Placement of soils will be the easiest of the options.

Cons:

- The slope of the soil below the wall is approximately 40 degrees and in order to place 2.5 feet of fill at the base of the wall, the soil will need to extend down the hill and may extend past the property line.
- The soil, given the steep slope, will likely erode with rain. This can be mitigated to some extent if the soil is granular with gravel and cobbles and other erosion control methods such as a geofabric may be used. Gradation recommendations may be provided upon request.

150 North Donlee Drive
Concrete Block Wall Design - Option 1
Landmark Project Number 220603

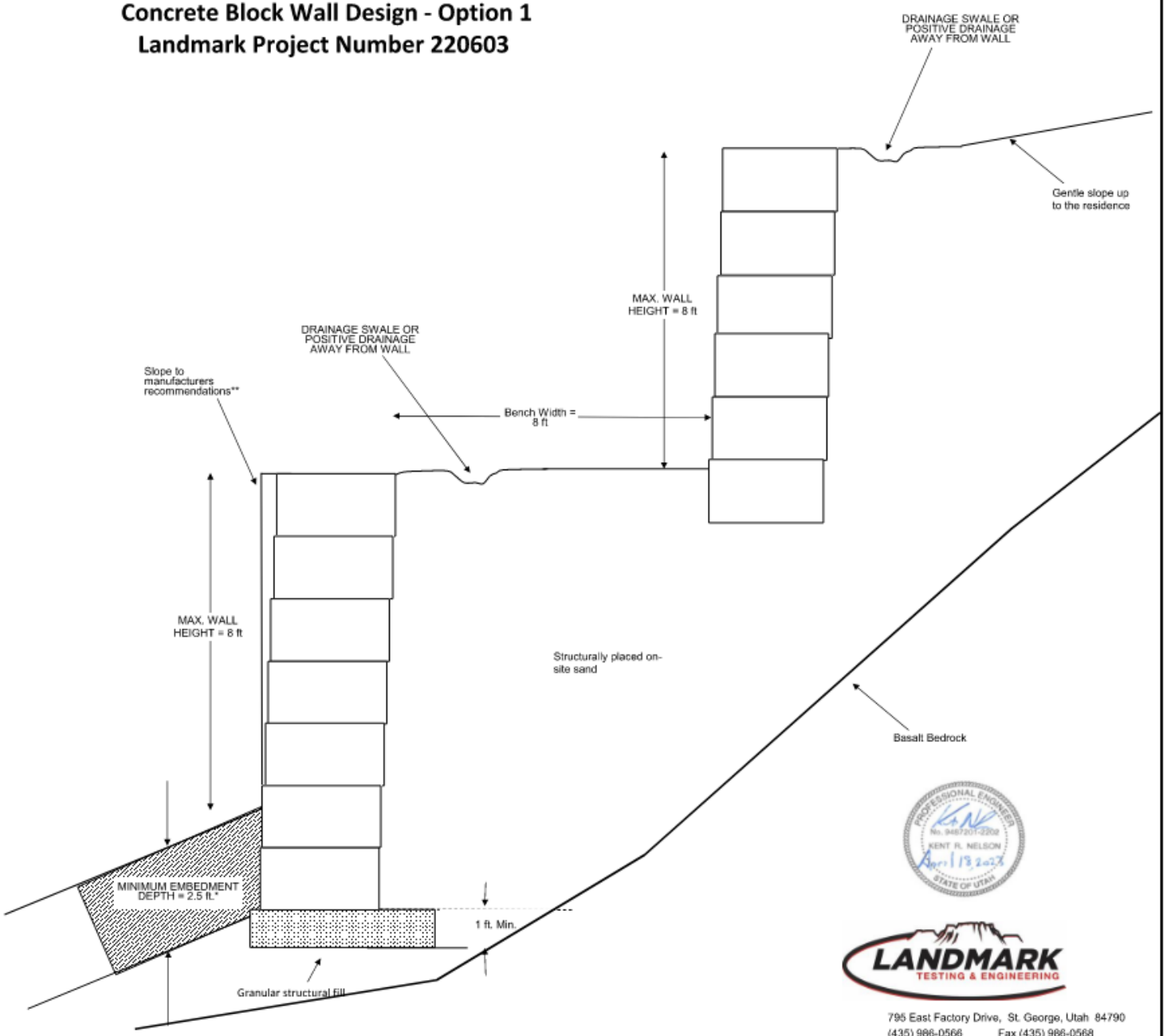
Assumptions: The following are typical recommendations for block walls and assumptions that were made for this wall design

- Prior to the placement of the fill, the existing embankment should be excavated to create benches to allow level lifts to key into the existing embankment. Benching is required for all slopes steeper than 6 horizontal to 1 vertical (6H:1V). Benches should be constructed as an incidental part of the placement and compaction of the fills. The maximum bench height should be limited to 3 feet, or less as dictated by conditions encountered during construction. Benching should include both soils and bedrock.
- The existing soils should be removed from below the base of the blocks and replaced with structural fill. The removal should extend 1 foot below and to the front of the first level of block.
- All fill should be considered structural fill. Imported fill, for wall backfill, if required, should be granular and consist of USCS classifications GC (clayey gravel), GM (silty gravel), or GW (well-graded gravel). Granular fill should be well-graded, non-expansive, and free of organics and all deleterious materials. Soils used for granular, imported, structural fill should meet the following specifications:

Gradation	Percent Passing
6- inch	100
3- inch	70-100
No. 200 Sieve	5-20
Liquid Limit	30 or less
Plasticity Index	10 or less
Maximum Lift Thickness	8-inch (loose)
Minimum Compaction	95% ASTM D-1557
Compacted Moisture Content	within 2% of optimum

- All structural fill should be evenly spread on a horizontal plane in eight-inch loose lifts. Each lift of structural fill material placed at the site should be moisture conditioned to within 2 percent of the optimum moisture content and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D-1557. Each 8-inch lift should be tested prior to proceeding with additional lifts.
- Geogrid reinforcement is not required for this wall
- The onsite sands may be used as structural fill.
- Blocks used for the project are Redi Rock blocks. Blocks should be installed as per manufacturer recommendations.
- Blocks should be stacked to rest upon two blocks from the lower level.
- Top of blocks should be cleared off prior to placement of the next layer.

* The wall should be embedded a minimum of 2.5 feet but may be embedded more than 2.5 feet. The embedment soils should consist of gravelly soils and consideration should be given to wrapping them in a geofabric such as Mirafi 140 N or equivalent.
**Blocks should be placed according to manufacturer recommendations. The upper row of blocks should be placed and snugged against the knobs on the row of blocks below.



PROFESSIONAL ENGINEER
No. 9487201-2202
KENT R. NELSON
April 13, 2023
STATE OF UTAH

LANDMARK TESTING & ENGINEERING

795 East Factory Drive, St. George, Utah 84790
(435) 986-0566 Fax (435) 986-0568

The height of the retaining wall

Option 2

The second option is to build a third tier in front of the existing lower tier. The new tier will need to be tall enough to decrease the exposed wall height of the existing lower tier to a maximum height of 8 feet.

Pros:

- This option will provide more stability than the existing wall configuration has

Cons:

- This option will be expensive. Additional blocks will be required and a crane will be required to install them.
- There might not be enough space on the property to install an additional wall.

150 North Donlee Drive
Concrete Block Wall Design - Option 2
Landmark Project Number 220603

Assumptions: The following are typical recommendations for block walls and assumptions that were made for this wall design

- Prior to the placement of the fill, the existing embankment should be excavated to create benches to allow level lifts to key into the existing embankment. Benching is required for all slopes steeper than 6 horizontal to 1 vertical (6H:1V). Benches should be constructed as an incidental part of the placement and compaction of the fills. The maximum bench height should be limited to 3 feet, or less as dictated by conditions encountered during construction. Benching should include both soils and bedrock.
- The existing soils should be removed from below the base of the blocks and replaced with structural fill. The removal should extend 1 foot below and to the front of the first level of block.
- All fill should be considered structural fill. Imported fill, for wall backfill, if required, should be granular and consist of USCS classifications GC (clayey gravel), GM (silty gravel), or GW (well-graded gravel). Granular fill should be well-graded, non-expansive, and free of organics and all deleterious materials. Soils used for granular, imported, structural fill should meet the following specifications:

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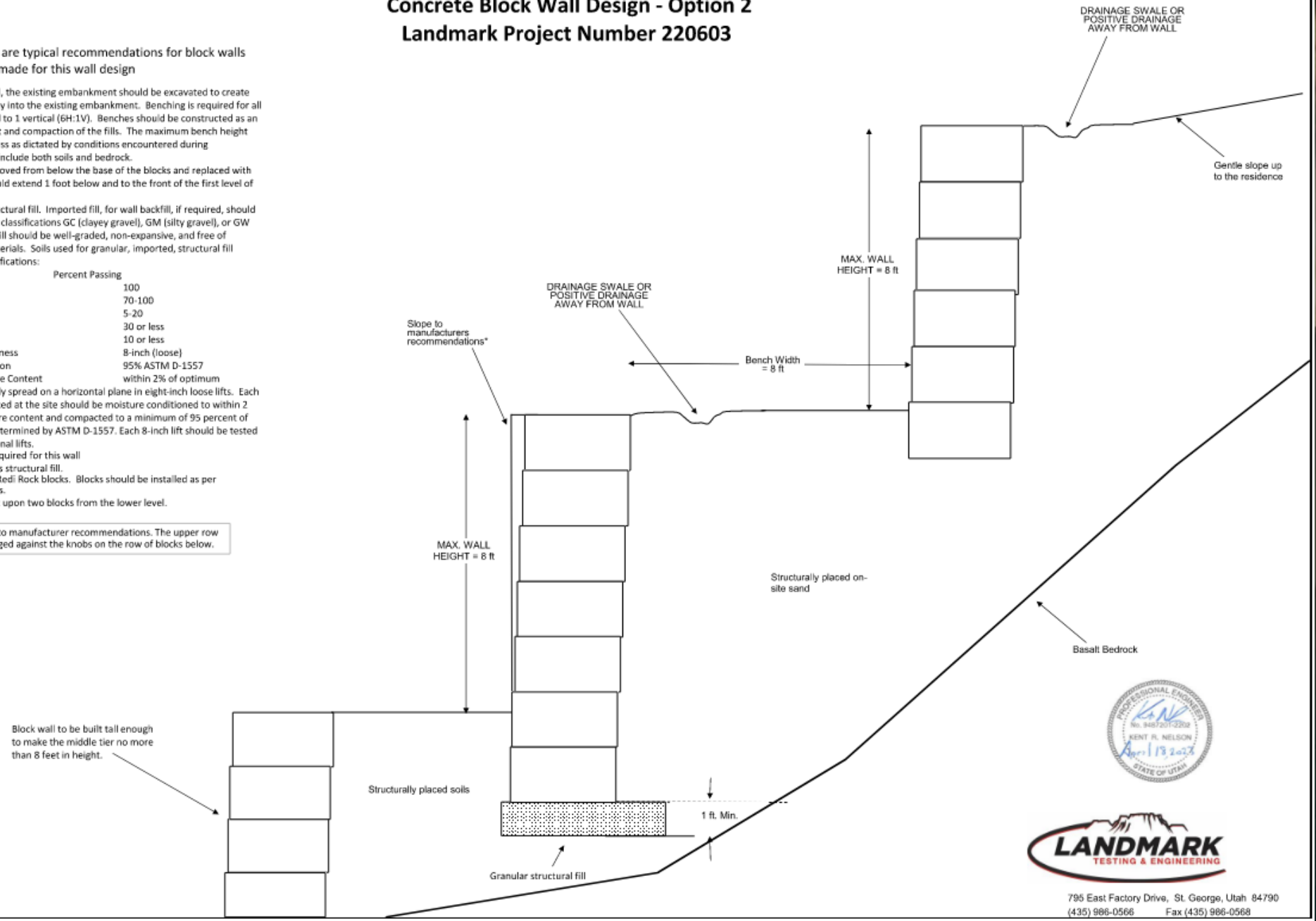
6- inch	100
3- inch	70-100
No. 200 Sieve	5-20
Liquid Limit	30 or less
Plasticity Index	10 or less
Maximum Lift Thickness	8-inch (loose)
Minimum Compaction	95% ASTM D-1557
Compacted Moisture Content	within 2% of optimum

- All structural fill should be evenly spread on a horizontal plane in eight-inch loose lifts. Each lift of structural fill material placed at the site should be moisture conditioned to within 2 percent of the optimum moisture content and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D-1557. Each 8-inch lift should be tested prior to proceeding with additional lifts.
- Geogrid reinforcement is not required for this wall
- The onsite sands may be used as structural fill.
- Blocks used for the project are Redi Rock blocks. Blocks should be installed as per manufacturer recommendations.
- Blocks should be stacked to rest upon two blocks from the lower level.

*Blocks should be placed according to manufacturer recommendations. The upper row of blocks should be placed and snugged against the knobs on the row of blocks below.



PROFESSIONAL ENGINEER
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KENT R. NELSON
April 13 2023
STATE OF UTAH

LANDMARK TESTING & ENGINEERING

795 East Factory Drive, St. George, Utah 84790
(435) 986-0566 Fax (435) 986-0568

The height of the retaining wall

Option 3

The third option is to remove the upper tiers of the block walls to reduce the wall height to a maximum of 8 feet. This will require the backfill to be sloped between the walls.

Pros:

- This option will not require additional blocks.
- Excess blocks may be returned to the supplier or reused for additional projects.
- This option can be used in conjunction with Option 1

Cons:

- We understand that this option is least desired by the homeowner.

150 North Donlee Drive
Concrete Block Wall Design - Option 3
Landmark Project Number 220603

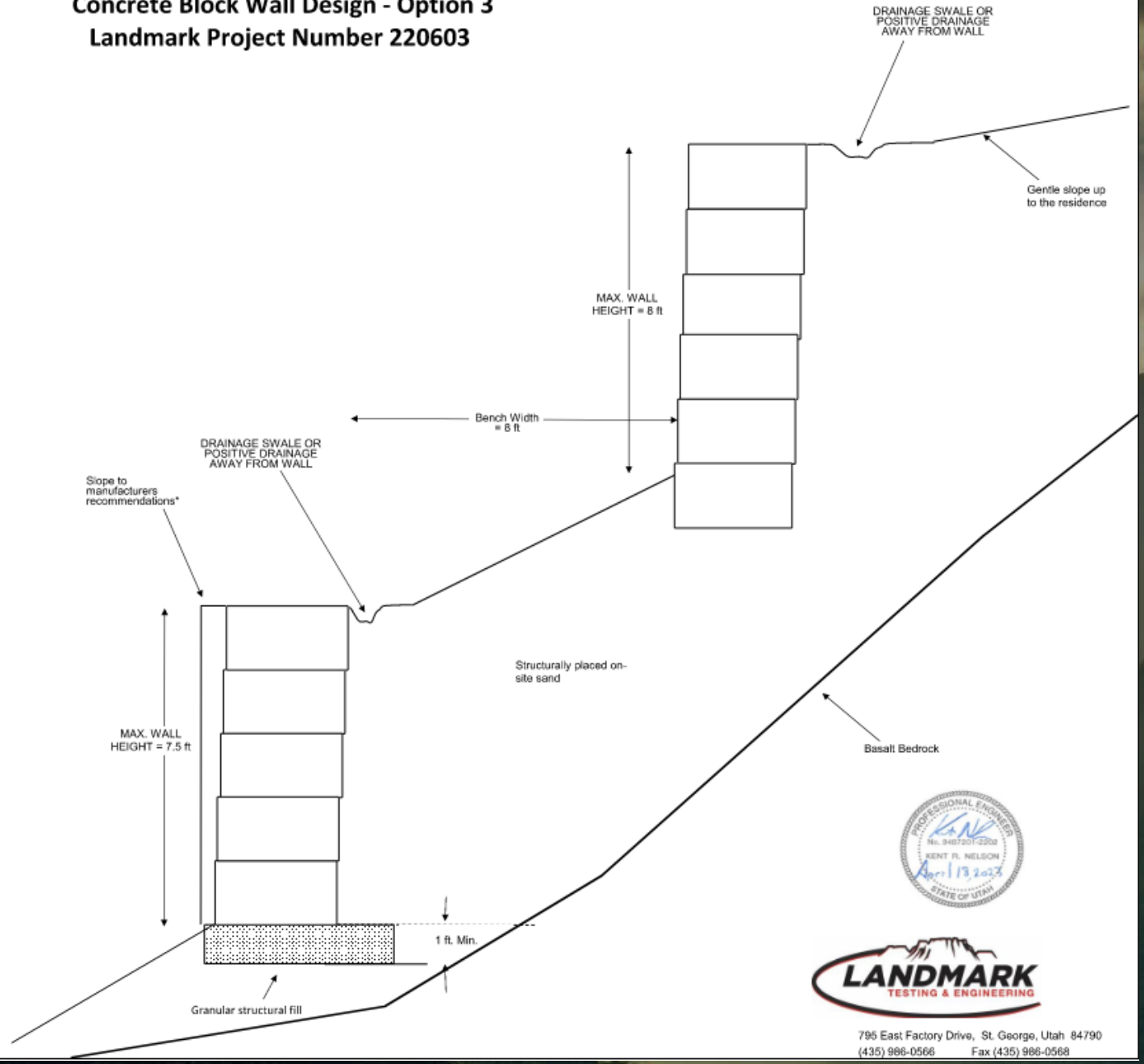
Assumptions: The following are typical recommendations for block walls and assumptions that were made for this wall design

- Prior to the placement of the fill, the existing embankment should be excavated to create benches to allow level lifts to key into the existing embankment. Benching is required for all slopes steeper than 6 horizontal to 1 vertical (6H:1V). Benches should be constructed as an incidental part of the placement and compaction of the fills. The maximum bench height should be limited to 3 feet, or less as dictated by conditions encountered during construction. Benching should include both soils and bedrock.
- The existing soils should be removed from below the base of the blocks and replaced with structural fill. The removal should extend 1 foot below and to the front of the first level of block.
- All fill should be considered structural fill. Imported fill, for wall backfill, if required, should be granular and consist of USCS classifications GC (clayey gravel), GM (silty gravel), or GW (well-graded gravel). Granular fill should be well-graded, non-expansive, and free of organics and all deleterious materials. Soils used for granular, imported, structural fill should meet the following specifications:

Gradation	Percent Passing
6- inch	100
3- inch	70-100
No. 200 Sieve	5-20
Liquid Limit	30 or less
Plasticity Index	10 or less
Maximum Lift Thickness	8-inch (loose)
Minimum Compaction	95% ASTM D-1557
Compacted Moisture Content	within 2% of optimum

- All structural fill should be evenly spread on a horizontal plane in eight-inch loose lifts. Each lift of structural fill material placed at the site should be moisture conditioned to within 2 percent of the optimum moisture content and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D-1557. Each 8-inch lift should be tested prior to proceeding with additional lifts.
- Geogrid reinforcement is not required for this wall
- The onsite sands may be used as structural fill.
- Blocks used for the project are Redi Rock blocks. Blocks should be installed as per manufacturer recommendations.
- Blocks should be stacked to rest upon two blocks from the lower level.

*Blocks should be placed according to manufacturer recommendations. The upper row of blocks should be placed and snugged against the knobs on the row of blocks below.



PROFESSIONAL ENGINEER
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April 13 2023
STATE OF UTAH

LANDMARK TESTING & ENGINEERING

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(435) 986-0566 Fax (435) 986-0568

Recommendation

1. The Hillside Review Board acknowledges that no ridgeline existed at this location and that the owner has created a ridgeline by placing a retaining wall between two existing ridgelines.

2. The Hillside Review Board acknowledges that the retaining wall is approximately 10.5′ tall which exceeds the maximum allowed height by 2′ and that the applicant did have plans to bury 2′ of the retaining wall, but that the Hillside Review Board would prefer that the applicant does not disturb any more of the hillside.

3. A Deed Restriction shall be recorded against the property so that future owners will know the situation of this retaining wall. The letter shall contain:
   a. A restriction that states this retaining wall was erected prior to obtaining a hillside and building permit and that no compaction tests were taken during construction nor any observation of the construction by a geotechnical engineer.
   b. A restriction that states testing on the site did occur after the wall was constructed.
   c. The updated engineering report shall be included in this noncompliance letter.

4. The retaining wall shall be colored to blend into the surrounding natural geology.

St.George
Community Development

Item 6A Preliminary Plat

PLANNING COMMISSION AGENDA REPORT: **4/25/2023**

Desert Canyons Business Park
Case No. 2023-PP-012

Request: Consider a request to consider a preliminary plat for (3) parcels. Consider a request for an nine (9) lot preliminary plat known as Desert Canyons business Park. The property is located approximately 4921 S Airport Pkwy. The property is 30.12 acres and is zoned PDR. The applicant is Desert Canyons Development LLC, and the representative is Curt Gordon. Case No. 2023-PP-012 (Staff – Mike Hadley)

Location: The site is located at approximately 4921 S Airport Pkwy.

Property: 30.12 acres

Number of Lots: 9

Density: 8.93 DU/AC

Zoning: PDR

Adjacent zones: This plat is surrounded by the following zones:
North – Manufacturing (Washington City).
South – Commercial
East – PD-R
West –Commercial & ASBP

General Plan: MDR

Applicant: Desert Canyons Development LLC

Representative: Curt Gordon

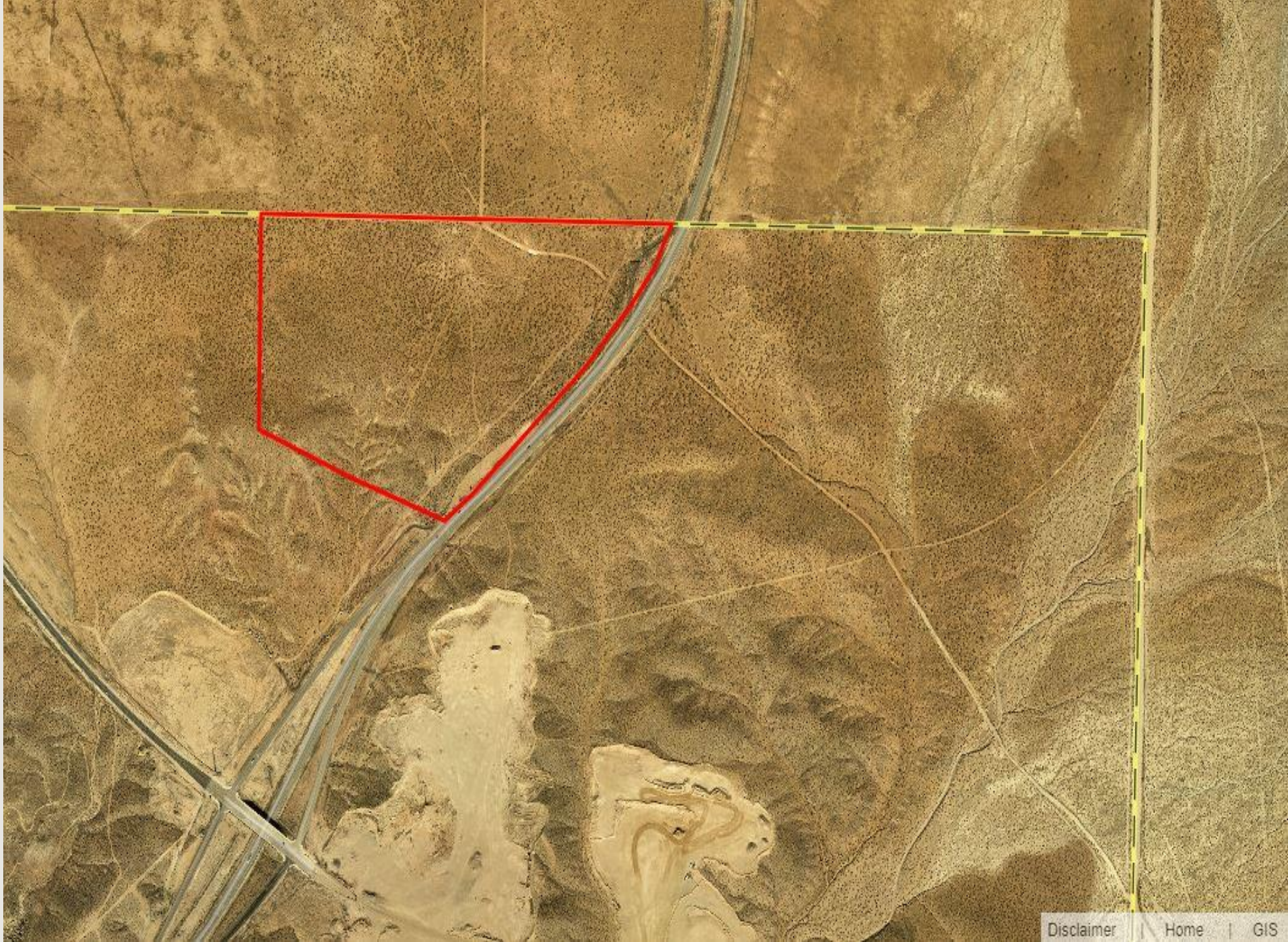
Comments: No Comments from staff departments.

RECOMMENDATION PRELIMINARY PLAT:
Staff recommends approval of the Preliminary Plat for the Desert Canyons Business Park Development with no conditions:

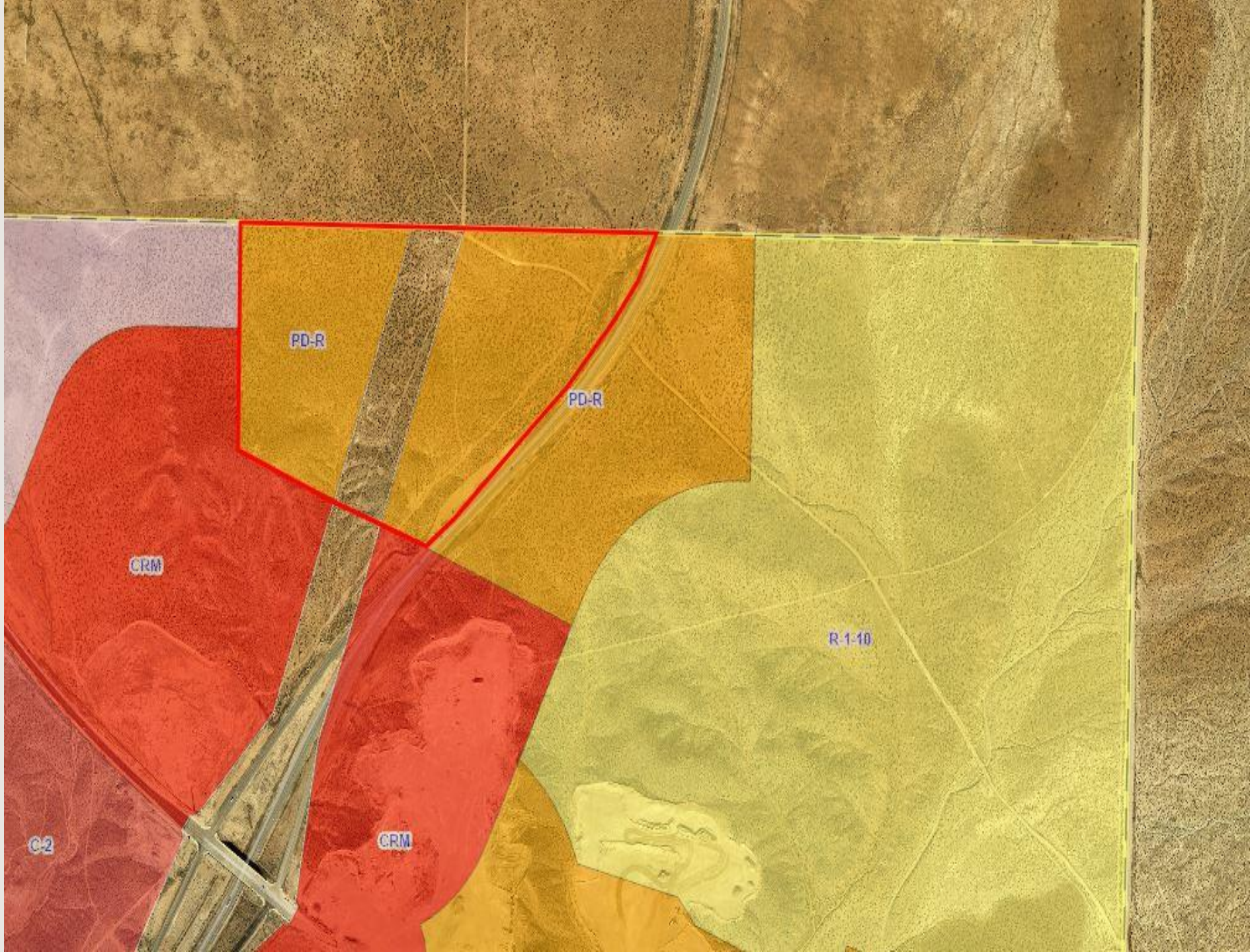
POSSIBLE MOTION:
The Planning Commission recommends approval of the Desert Canyons Business Park preliminary plat with no condition.

Desert Canyons Business Park 2023-PP-012

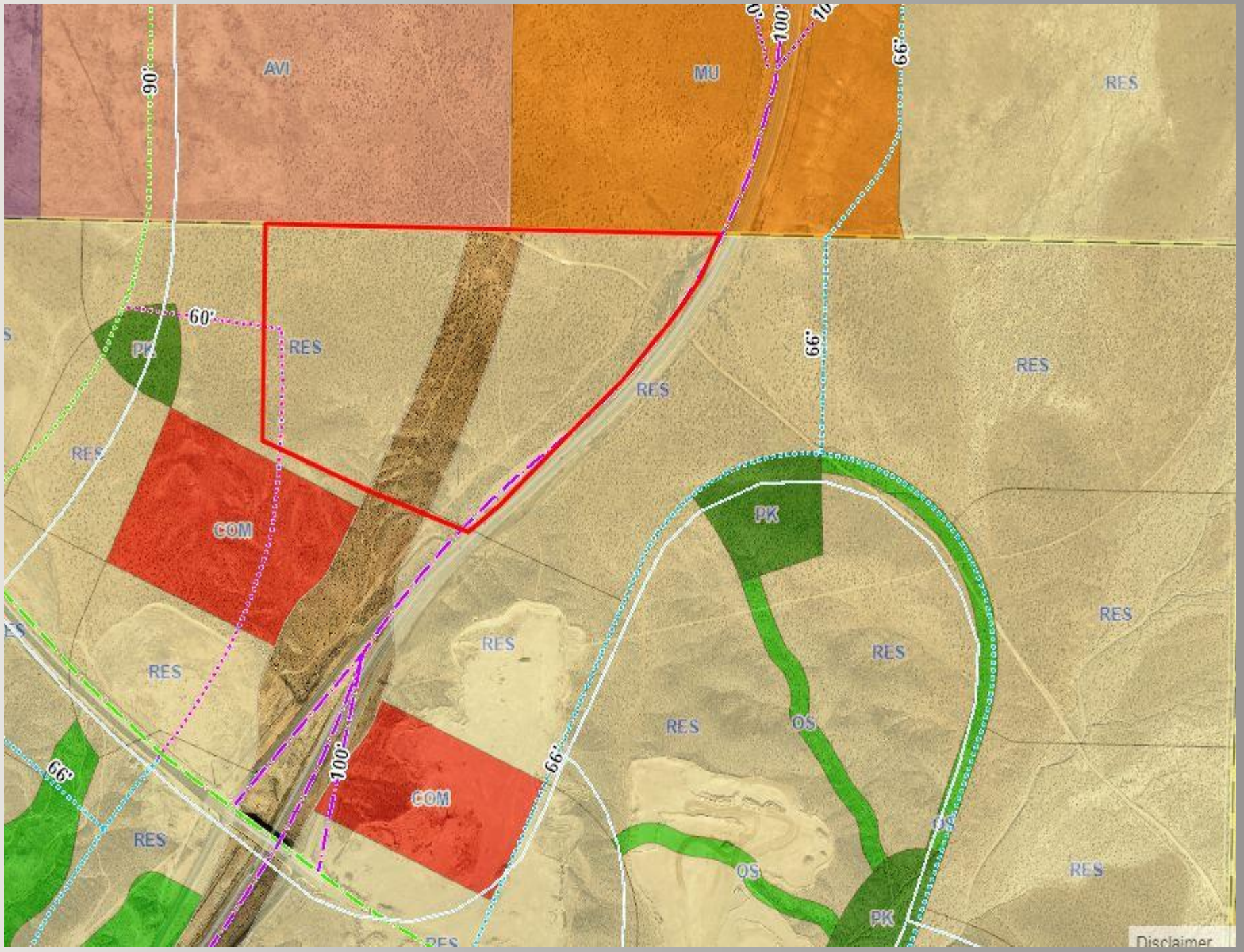
Vicinity Map



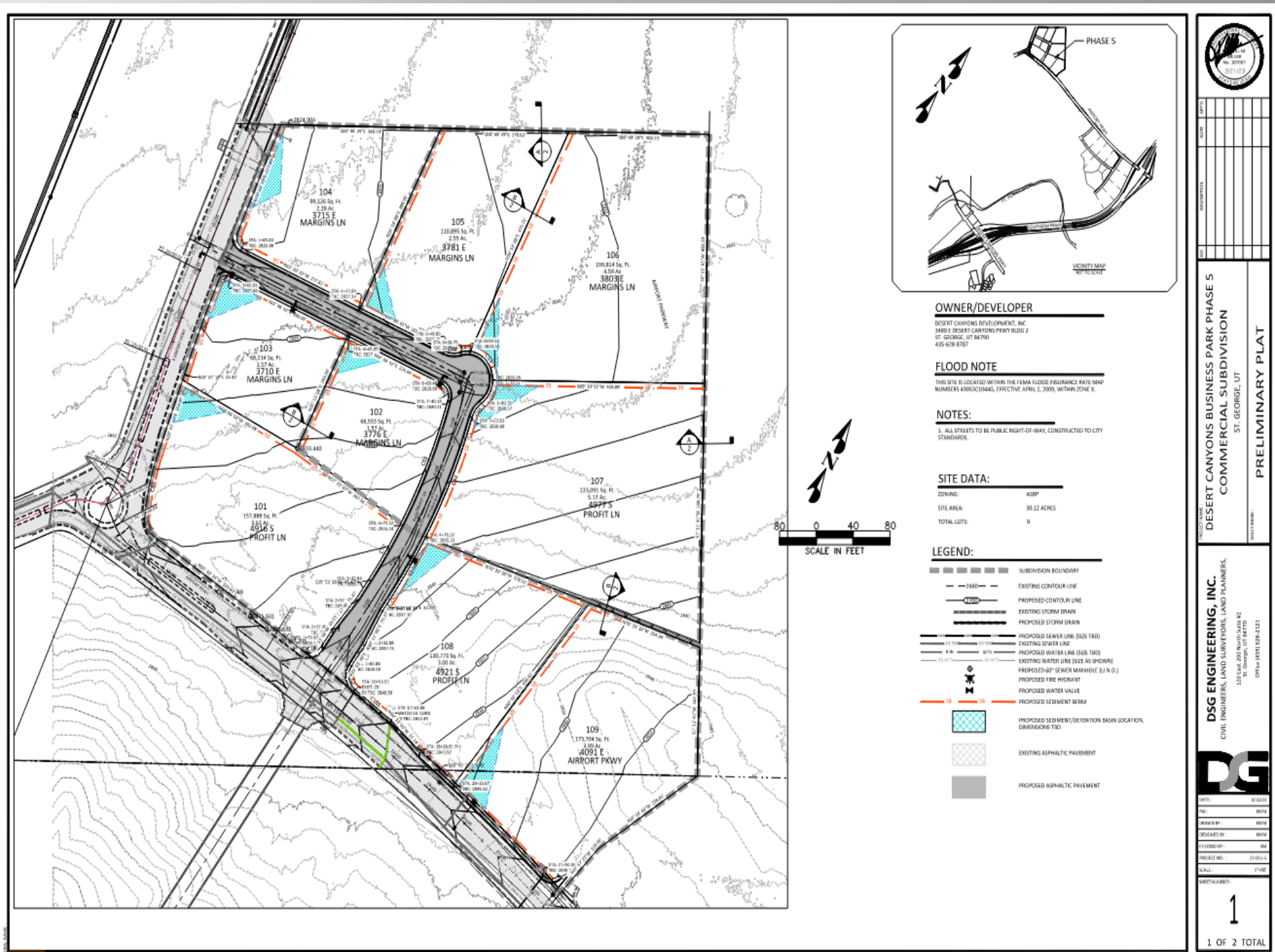
Zoning Map



General Plan Map



Preliminary Plat



St.George
Community Development

Item 6B Preliminary Plat

PLANNING COMMISSION AGENDA REPORT: **4/25/2023**

Tonaquint Commercial
Case No. 2023-PP-015

Request: Consider a request to consider a preliminary plat for (3) parcels. Consider a request for a three (3) lot preliminary plat known as Tonaquint Commercial located north and northwest of the existing Tonaquint Cove subdivision. The property is 132.91 acres and is zoned M&G. The applicant is DSG Engineering, and the representative is Logan Blake, DSG Engineering. Case No. 2023-PP-008 (Staff – Mike Hadley)

Location: The site is located north and northwest of the existing Tonaquint Cove.

Property: 132.91 acres

Number of Lots: 3

Density: N/A

Zoning: M&G (Mining & Grazing)

Adjacent zones: This plat is surrounded by the following zones:
North – M&G
South – M&G
East – R-1-10
West – M&G

General Plan: COM

Applicant: DSG Engineering.

Representative: Logan Blake

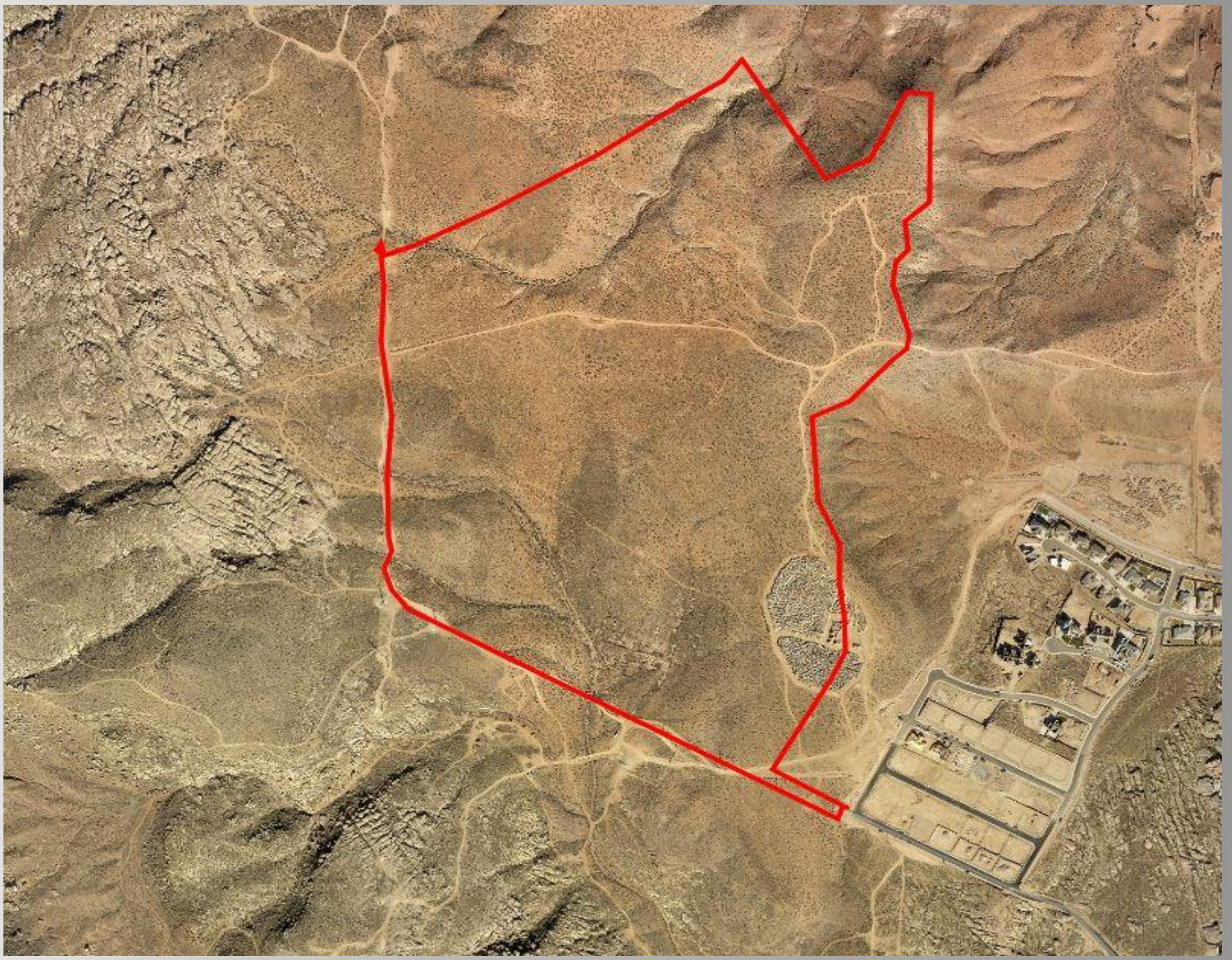
Comments: No Comments from staff departments.

RECOMMENDATION PRELIMINARY PLAT:
Staff recommends approval of the Preliminary Plat for the Tonaquint Commercial with no conditions:

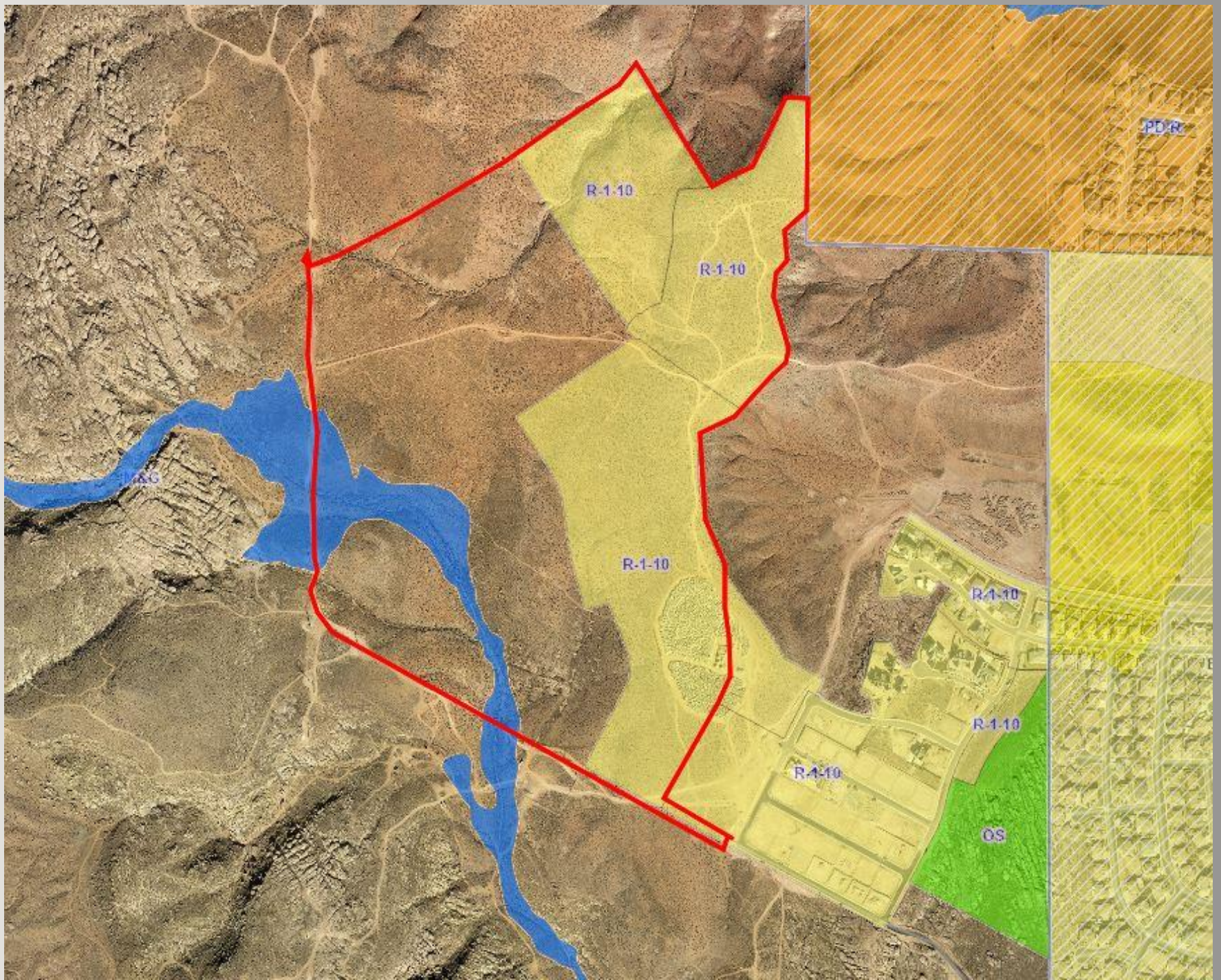
POSSIBLE MOTION:
The Planning Commission recommends approval of the Tonaquint Commercial preliminary plat with no condition.


Tonaquint Commercial
2023-PP-015

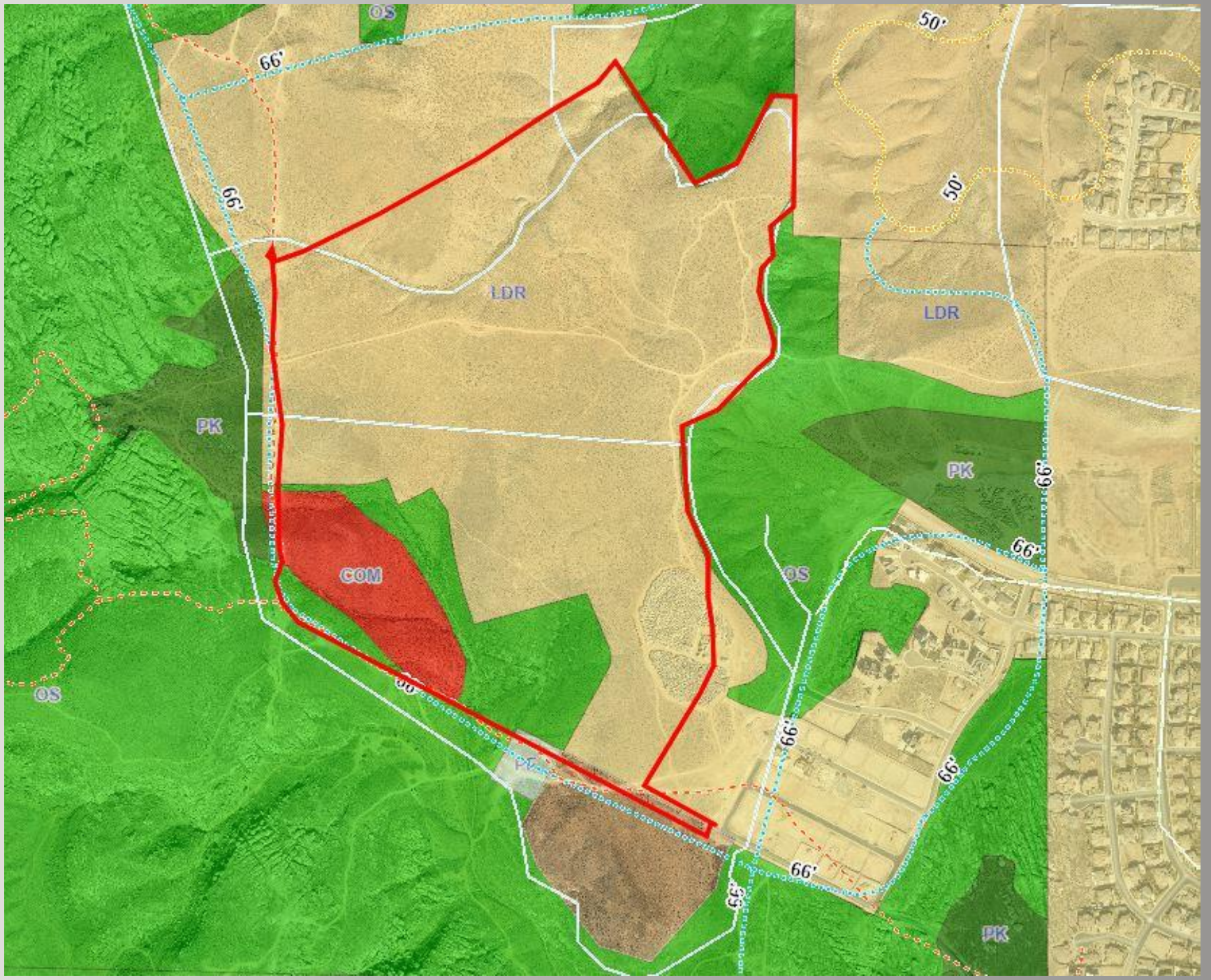
Vicinity Map



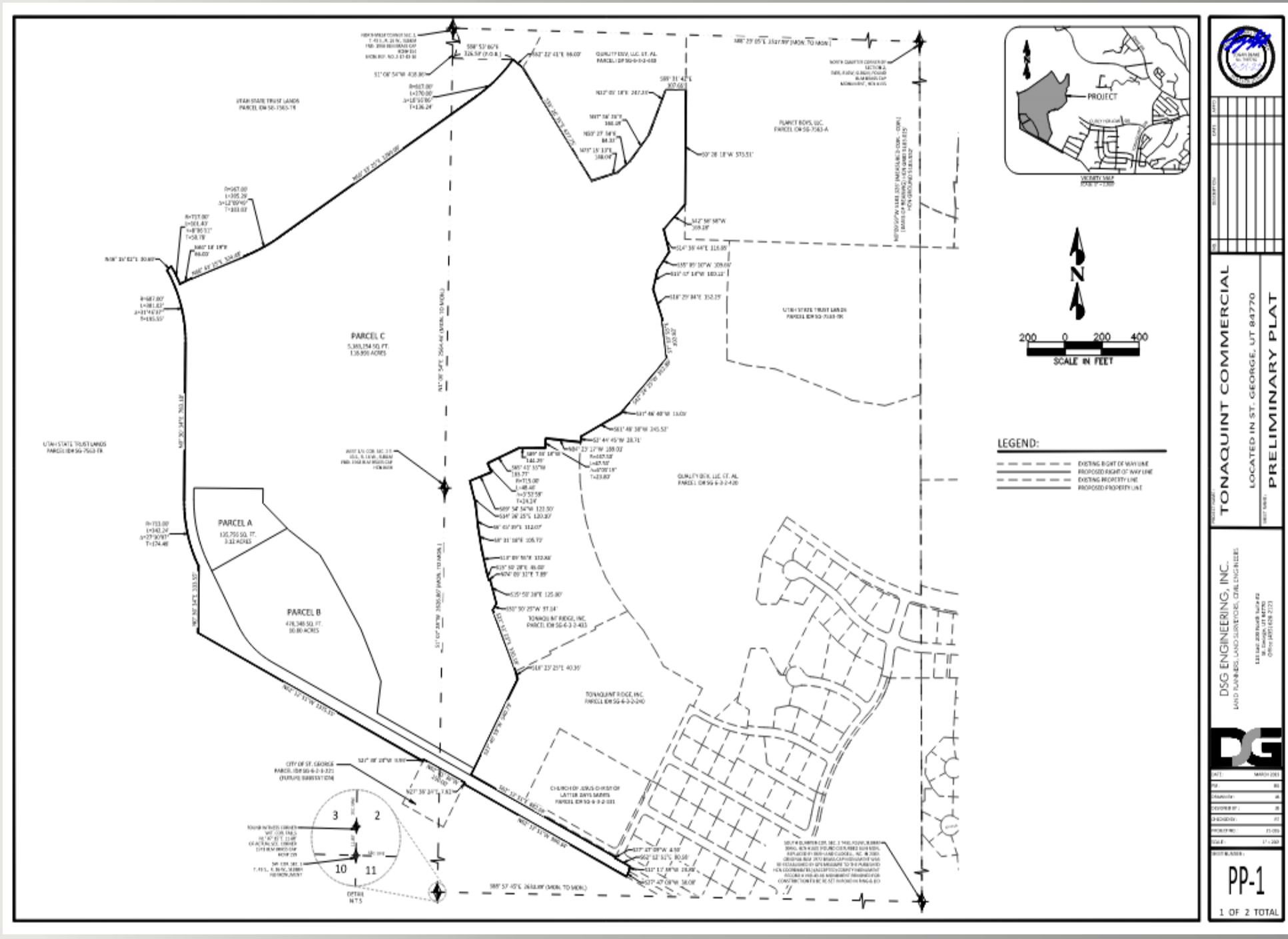
Zoning Map



General Plan Map



Preliminary Plat



NOTICE OF MEETING
PLANNING COMMISSION
CITY OF ST. GEORGE
WASHINGTON COUNTY, UTAH

Public Notice

Notice is hereby given that the Planning Commission of the City of St. George, Washington County, Utah, will hold a **Planning Commission** meeting in the City Council Chambers, 175 East 200 North, St George, Utah, on **Tuesday, April 11, 2023,** commencing at **5:00 p.m**.

PRESENT: Chair Steve Kemp
Commissioner Lori Chapman
Commissioner Emily Andrus
Commissioner Ben Rogers
Commissioner Nathan Fisher

CITY STAFF:
Public Works Assistant Director Wes Jenkins
Deputy City Attorney Jami Bracken
Planner III Carol Davidson
Planner III Mike Hadley
Planner III Dan Boles
Development Office Supervisor Brenda Hatch

EXCUSED: Commissioner Austin Anderson

Chair Kemp called the meeting to order. Commissioner Andrus led us in the Pledge of Allegiance.

1. **CONTINUED ITEMS**

A. Consider a request to amend the Desert Color Planned Development (PD). This PD amendment would adjust the boundary of the TNZ Resort Overlay to the south of the existing boundary line including approximately 1.9 acres. This would place the entire subject parcel into the resort overlay. Additionally, the city has received a request for a PD amendment to allow a hotel resort on an approximately 17.49-acre site. The site is located just south of the Lagoon Parkway and Painted Ridge Parkway intersection on the east side of Pained Ridge Parkway at approximately 5560 South. The applicant is Desert Color and the representative is Craig Coats, Alliance Consulting. The project will be known as Atara Resort at Desert Color. Case No. 2023-PDA-002. (Staff – Dan Boles)

Dan Boles presented the following:

Dan Boles – We spent a lot of time on this last time so I will go through it fairly quickly. Stop me if you have questions. Then we will go over the new material submitted. If you remember they are asking to extend the resort overlay because of how the road went through there. Dan went through the layout with the slides included in the agenda packet. He showed the elevations included in the packet. I think the best thing is to let the applicant run through the height section. We met with the applicant and went through the booklet. There was a conflicting passage in the booklet. It was in the zone plan. The zone plan said 55 ft was the max height in the commercial area, but 50 ft was the max height in the resort area. We are holding them to the 50 ft. Dan showed a slide on how height

is measured in the building code. There will be some mechanical on the roof. That is not counted as part of the measurement according to code.

Mickey Mazerac – As we were doing these studies we dove deeper into the code. I don't know if you have had a chance to read it but the way that we interpreted it and understand it is that this is a flat roof type of building. We are taking the tallest portion which is outlined in the previous slide and establishing the adjacent grade which is measured 6 ft from the edge of the building if a property is more than 6 ft away from a road. Establishing the grade at the two highest elevations, we established a low point at 26.09 and 26.21. The average of those two grades is where we came up with the 26.15 which starts our midway point and then from that point we measure 50 ft to the roofline to the top of the coping. The top of the parapet is the max height of 50 ft.

Commissioner Chapman – Just so I'm clear, looking at these illustrations, it says the height is measured from the adjacent grade, so it's not from the street, it's 6 ft out from the adjacent grade? It's what you said.

Matt Mazerac – Yes.

Commissioner Rogers – Is there something in the development agreement that talks about what is inside the 50 ft? Is there an allowance for mechanical space for a penthouse elevator core to be outside of that 50 ft as described in the zoning ordinance?

Dan Boles – It's not specifically outlined. Not for mechanical equipment, elevator shafts and whatnot. We have never counted those as part of the overall height. It has always been to the coping of the flat parapet wall.

Commissioner Fisher – And when you say we've never counted it, do you mean just in Desert Color or city wide?

Dan Boles – City wide.

Discussion continued on whether the mechanical equipment is included in the measurements.

Commissioner Rogers – Is the adjacent grade existing or proposed?

Dan Boles – It doesn't say, but in all the communities I have worked in we used the proposed grade.

Commissioner Chapman – How tall is the elevator shaft?

Mikey Mazerac – 8 ft 6 inches. Any equipment we would have would be located in the center of the building.

Chair Kemp – Do you plan on screening those at all?

Mickey Mazerac – The top priority is to not see any of the mechanical.

Commissioner Rogers – Again, does that screening come into play with the height of the building? Is that included?

Chair Kemp – The coping is only 8 inches higher than the roof; they are not going to fit mechanical inside 8 inches.

Commissioner Rogers – There is a lot of room for maneuvering around the code and the way that the code is read. And that is my point.

Commissioner Fisher – And I think that Commissioner Rogers and his experience recognizes things we have never seen before and this is where it could be abused and it could be where we want to go back and look at the problem and see if there are some things, maybe it hasn't been abused yet, so it hasn't been brought to staff's attention, but clearly it can be.

Commissioner Chapman – By adding the screening for the mechanical and then the screening is basically aesthetic.

Dan Boles – You are within your rights to place conditions on this applications that it remains under 50 ft. with the mechanical or that it is all screened.

Commissioner Chapman – So this only shows one building.

Dan Boles – That is just the tallest portion. The others are around 44 ft.

Discussion of what buildings are in the project and the height of the buildings.

Dan Boles – Just a reminder, whatever motion you make tonight there are 3 separate approvals, extend the resort overlay, approve the PD amendment and the preliminary plat.

Jami Brackin – The overlay approval will go first then the hotel approval and then you will do 1B.

Chair Kemp – It looks like there will be between a 5 and a 6 ft wall along that road, is that right?

Craig Coats – Yes, that's on the backside of the road in the wash and that has to do with the grades between the wash and the site.

Chair Kemp – And how wide is that road?

Craig Coats – It's a 26 ft wide asphalt road to meet the fire code.

Chair Kemp – That building closest to the southwest corner of the road would be another what 5 ft off the road?

Craig Coats – Yes, give or take.

Discussion on what the height of the buildings are compared to the road.

Commissioner Rogers – My concerns are not with the project but with consistency in the zoning. I would like to see us provide further clarification on what is included in our 50 ft or 55 ft height limit. It is not consistent with what this commission has approved of with buildings.

Commissioner Fisher – To me it makes sense to include the parking area in this project, that is the best use. As far as the height goes, if we deviate from what it has been then we risk a challenge from the developer. I do agree that we define what it is in the future, so there should be clarification on what is done with ancillary items on the rooftops. I don't think the 8 ft here does anything to this project, adding the 8 ft of mechanical. It won't solve the neighbor's issues. The reality is that they could have taller buildings around the perimeter. I think it's a nice project. I think the problem is that the neighbors didn't know what the possibilities were for this area, not the project. This is not the arena to address that. This is a good project overall. I think what the developer has presented to us is a good-looking project.

Chair Kemp – I know that in our downtown plan, what we recently approved we talked about how stepping in and then go up I like that so that it doesn't look like a skyscraper. I don't know if it was intentional or not. I went out and looked at this project. It is a nice project. I do have the same concerns as commissioner Rogers, we need to be consistent with our code.

Commissioner Rogers – As we have seen the project presented, there is some adjustment I can make in my mind. I would like to see some adjustments in our code.

MOTION: Commissioner Fisher made a motion to recommend approval of an extension of the resort overlay zone to 1.9 acres to the south the current resort overlay zone.
SECOND: Commissioner Andrus
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
Commissioner Andrus
NAYS (0)
Motion Carries unanimous vote

MOTION: Commissioner Fisher made a motion to recommend approval Item 1A the PD amendment including the hotel and the other 17.49 acre as it is designed in the renderings we received.
SECOND: Commissioner Andrus
Chair Kemp – Would you amend the motion that all the equipment must be screened?
Commissioner Fisher – Yes.
Chair Kemp – Still Second?
Commissioner Andrus – Yes.
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
Commissioner Andrus
NAYS (0)

Motion Carries unanimous vote

B. Consider a request for a preliminary plat to create seven pads for a hotel resort to be known as Atara Resort At Desert Color located south of the Lagoon Pkwy and Painted Ridge Pkwy intersection on the east side of Painted Ridge Pkwy at approximately 5560 South. The property is 76.04 acres and is zoned PD-R TNZ Resort. The applicant is Desert Color St. George, LLC, and the representative is Craig Coats. Case No. 2023-PP-008 (Staff – Dan Boles)

Dan Boles presented the following:

Dan Boles – This creates the pads and the common area.

MOTION: Commissioner Andrus made a motion to recommend approval of Item 1B a preliminary plat for Atara at Desert Color. SECOND: Commissioner Fisher ROLL CALL VOTE: AYES (5) Chair Kemp Commissioner Chapman Commissioner Rogers Commissioner Nathan Fisher Commissioner Andrus NAYS (0) Motion Carries unanimous vote

C. Consider a request to change the zone from R-1-8 (Single Family Residential minimum 8,000 sq ft lot size), R-1-10 (Single Family Residential minimum 10,000 sq ft lot size) to PD-R (Planned Development Residential). The applicant is seeking approval to change the zone on 14.99 acres to build a townhome development consisting of 134 units. The property is generally located at 1100 W Curley Hollow Dr. The applicant is Tonaquint Inc, and the representative is Tim Stewart. The project will be known as Rosewood Townhomes. Case No. 2023-ZC-001. (Staff – Mike Hadley)

Mike Hadley presented the following:

Commissioner Rogers – Chairman I will recuse myself for this item.

Mike Hadley – The applicant worked with a landscape architect and submitted a new landscape plan. The General Plan designation is MDR. This updated landscape plan shows landscaping between the buildings.

Commissioner Chapman – The concern we had last time is that we had is that this is on clay. With this density it is tough to meet the green space. Does staff feel like this meets the green space?

Tim Stewart – The last time we were here Austin brought up the challenges with clay and landscaping. We met with Wayne Rogers and the advice he had for those challenges. We will be

doing a 17 ft. over excavation. He has approved some types of plants that can be close to buildings with a minimal drip system.

Jared Bates – We had written approval from Wayne saying the landscape plan shown meets the requirements for his report.

Chair Kemp – I remember reading about the membrane.

Tim explained what they replace the 17 ft over excavation with.

Discussion continued regarding excavation.

Tim Stewart – This is MDR, we started out with 8 units per acre MDR allows 9 per acre. They have never brought up that this was too dense. This is not very dense. To provide more affordable housing we have to be more dense. This is the least dense townhome project I have done.

MOTION: Commissioner Chapman made a motion to approve Item 1C.
SECOND: Commissioner Fisher
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Chapman
Commissioner Nathan Fisher
Commissioner Andrus
NAYS (0)
Motion Carries unanimous vote

D. Consider a request for a hillside development permit to build a new townhome development on the property that is generally located at 1100 W Curly Hollow Dr. The applicant is Tim Stewart, and the representative is Jared Bates. Case No. 2023-HS-001 (Staff – Mike Hadley)

Mike Hadley presented the following:

Mike Hadley – This is the related hillside permit for the townhomes above. You can see there are a few areas to the north that they are staying out of.

MOTION: Commissioner Andrus made a motion to recommend approval of Item 1D a hillside permit for 1100 W Curley Hollow Dr.
SECOND: Commissioner Fisher
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Chapman
Commissioner Nathan Fisher
Commissioner Andrus
NAYS (0)
Motion Carries unanimous vote

E. Consider a request for a one hundred thirty-four (134) lot residential subdivision known as Rosewood Townhomes located at approximately 1100 Curly Hollow Dr. The property is 14.99 acres and is zoned R-1-8 and R-1-10. The applicant is Tim Stewart, and the representative is Jared Bates. Case No. 2023-PP-006 (Staff – Mike Hadley)

Mike Hadley presented the following:

Mike Hadley – This is the layout of the townhomes discussed in the two previous items.

MOTION: Commissioner Fisher made a motion to recommend approval of item 1E a 134-lot residential subdivision known as Rosewood Townhomes. SECOND: Commissioner Andrus ROLL CALL VOTE: AYES (5) Chair Kemp Commissioner Chapman Commissioner Nathan Fisher Commissioner Andrus NAYS (0) Motion Carries unanimous vote

Commissioner Chapman - 1:03:20

2. GENERAL PLAN AMENDMENT (GPA) (*Public Hearing*) Legislative

A. Consider a request for a general plan amendment to change the land-use map from LDR (Low Density Residential) to MDR (Medium Density Residential) on approximately 4.51 acres generally located on West Canyon View Drive, west of Dixie Drive. The applicants are Robert and Roseann Campbell. The project will be known as GV-5 GPA Case No. 2022-GPA-011. (Staff – Carol Davidson)

Carol Davidson presented the following:
Carol Davidson – The zoning map shows this as R-1-10. It does have MDR near it. We have 10 lots on Canyon View Drive. 6 of the lots have homes, 4 are vacant. The applicants are just trying to get this to match the area to the west and south. Staff does recommend approval. We did receive comments yesterday that were emailed to you.

Commissioner Fisher – Did we do a zone change for those twin homes on the other side?

Carol Davidson – I don't remember.

Commissioner Fisher – I remember something with the buildings, but I didn't remember if it was low density before.

Commissioner Chapman – There are more lots there that are built on that are single family so rezoning that is a problem. Yes, the lots that are above that is higher density but the other homes in that project are single family.

Carol Davidson – This is just a general plan amendment; you can still have single family in MDR.

Discussion on the zoning surrounding the properties in question.

Chair Kemp – Did every property owner sign off on this application?

Carol Davidson – Yes.

Commissioner Chapman – Is this part of a project?

Carol Davidson – Yes, it's part of Green Valley Phase 5.

Roseanne Campbell – At this point and time we felt like our section of the Green Valley subdivision is really isolated. There is thick landscaping and 30 ft trees. We can't interact with the houses behind us. We have people going to Las Palmas, Trend West, and Sports Village. They are putting a convenience store on the corner. If we were to try and sell our home as a single-family home we would not get a single buyer. We built it 15 years ago. We have a lot on that street we have marketed several times. We will not build a single-family home on that lot the street is too busy. We cannot keep pace with the Green Valley subdivision. If we build on the lots we will make sure that it is lovely and nicely done.

Commissioner Fisher – You made a comment that you should not be part of that subdivision. Please make sure that you are aware that no matter what happens with the City you will still be a part of the subdivision.

Anja Perkins – I am an applicant. I concur with everything Roseanne has just mentioned. The back of our yard, we have 20 units from Las Palmas staring in our backyard. There is also a walkway back there where people are staring into our backyard. I feel like we should be annexed into that.

Chair Kemp opened the public hearing.

Tyler Lake – There are 4 lots that are vacant. The rest of the area has homes on it. There is a reason there are not homes there. That is evidence these are not compatible.

Kirk Ehlers – I live on Ostler Way. Ostler way is where everyone goes from those other projects, I can't get out of my driveway. How does increasing that density in any way make this a better neighborhood?

Chair Kemp closed the public hearing.

Commissioner Chapman – That area is not in the resort overlay area; it is single family. The general plan that they are asking for would allow for duplex. That medium density is just what Tim Stewart got. I have extreme concern with putting this to medium because of what that could allow.

Chair Kemp – With the ADU any of these applicants could rent their basement?

Jami Brackin – Yes, as long as it is owner occupied.

Commissioner Fisher – This is a general plan amendment. So, what we need to consider is does it make sense in this area to have MDR in this area. If they come in for a zone change and you don't like the zone then that is something different.

Chair Kemp – Comments were made by the applicants about a lot of traffic in front of the homes but I don't understand how having duplexes here will make that better.

Commissioner Andrus – I have a comment on the traffic, this is a drop in the bucket. I think from a general plan standpoint, Canyon View Drive is conveying traffic, it makes sense that these don't remain single family homes with what is around them.

Discussion on soils in the area.

Commissioner Fisher – This area does seem mismatched in the zoning. If you look at it both sides of that street are surrounded by higher densities. The contours of the property create a natural buffer. There is already more density around them. They really are isolated. To me it only makes sense to mirror what's adjacent to it and not to what is north of it.

Commissioner Andrus – I agree.

Commissioner Rogers – For me it is making a precedent. Aesthetically that is bad taste to me. In hindsight it would've been great if these were MDR. I also don't think the extra traffic will make a difference, but again my concern is precedence.

Commissioner Fisher – If you look just down the street there are triplexes. R-3 is going to allow something similar. That is why to me it makes sense. The natural line to me is here. To me it makes sense.

MOTION: Commissioner Fisher made a motion to recommend approval of the general plan amendment of MDR 4.51 acres on these 10 lots.
SECOND: Commissioner Andrus
ROLL CALL VOTE:
AYES (3)
Commissioner Rogers
Commissioner Nathan Fisher
Commissioner Andrus
NAYS (2)
Chair Kemp
Commissioner Chapman
Motion Failed

B. Consider a request to change the General Plan from OS (Open Space) to Low Density Residential (LDR) on approximately 74.098 acres generally located south of Tonaquint Terrace and west of

Tonaquint Heights subdivisions. The proposal is for Low Density Single Family Residential lots. The applicant is Utah State Trust Lands Quality development LLC and representative is Logan Blake. The project will be known as Tonaquint Heights General Plan Amendment. Case No. 2023-GPA-001. (Staff – Mike Hadley)

Mike Hadley presented the following:

Mike Hadley – This is near Tonaquint Terrace and Tonaquint Heights. The current zoning is R-1-40. The General Plan is OS. When Tonaquint Heights' first 3 phases came in they should've come in with a General Plan amendment. I'm not sure what happened at that time. We are having them go through this now.

Commissioner Chapman – On Chandler Drive is that just dirt, will it come through?

Logan Blake – This property has a long history. The original application goes back about 20 years. The zoning that is zoned R-1-40 has a hillside permit from 2006. The first 3 phases are in the Open Space, I'm not sure why it was never changed.

Commissioner Chapman – Do hillside permits never expire?

Mike Hadley – It doesn't expire, it only allows them to change the slopes that are within the projects.

Logan Blake – Our intent is to keep the same density, 1 unit per acre with clustering. The ordinance just doesn't allow that anymore with R-1-40, that is why we were asking for a zone change to R-1-20 and then we noticed that it was general planned open space.

Chair Kemp opened the public hearing.

Steve Darke – I am a resident in Tonaquint. I adamantly oppose changing this from open space to low density residential. The open space is used by many people up there. I am adamantly against changing this. There are petroglyphs up there. There are trails that people can use. I would like it to stay that way.

Chad Anderson – We have been here about 10 years now. If you haven't been up there to look at the property, the property is unique. If it stays R-1-40, that is one thing, but if it changes to 1-4 acres a lot that will change things.

Gary Green – I am totally against this. I worry about the safety when they start digging in this. What about the mountain coming down on our house?

Brett Wayne – I am conflicted, I can appreciate the need to want to continue to build homes. I will make a comment about the stubbed-out road here. None of these homes existed. All of these trails are trails we use every day. I think something that is a little bit missing in the context here is that this land was BLM land then it was swapped to SITLA, then it was swapped to Turtle land. Then open space but it's zoned R-1-40. When you take a look at Chandler Drive now, they have left unfinished construction, stubbed out utilities, pipes sticking out. Did they do that before they had permission to change the zoning? When we bought the home representatives from Quality Construction said everything south of the power lines was going to be open space. Our home has

been completely enveloped by the homes behind us. There is a concrete wall that goes up 12 ft behind the berm that is behind our house.

Lauren Bishop – I live against the mesa in Bloomington. There are petroglyphs up there. Why are we eliminating some of these places that are indigenous in culture to the area? I don't think that I would be opposed to a partial to finish off their subdivision. I adamantly oppose to develop all that acreage.

Noelle Willhelmsen – We paid a premium for our lot to get unobstructed views. This is zoned for a park we were told. We didn't want to be hedged in. The rocks here are beautiful. This is such a beautiful part of our community. Any open land is great but when we are destroying natural artifacts and natural recreation areas for money. We understand people need to make money to live.

Wyn Beebe – We were told the open space between us would always be there. This idea that we would always have it, that's why I'm here.

Kevin Lyngle – I live on Escalante. I have giant rocks in the front yard. Is the red line above me the ridge? That ridge is fractured, it is hanging by a thread. I heard that there is a 100 ft setback from the ridge. Any construction will bring that down in various places. There is tons of earthwork, and it is a very delicate area. I am opposed to anything in that area at least that close to the ridge. My concern is it is too close to the ridge. I spend a lot of time up there, it's fabulous.

Randy Harper – Moved here 6 years ago. Came here because of the natural beauty. I wanted to talk about the park. We have been hearing about a park we are supposed to get by Blackhawk.

Curt Gordon – I was the area manager for SITLA for 5 years and worked on the zoning for this property, I am not sure why the general plan was never changed. It became SITLA ground a long time ago probably in the 30's or 40's.

Chair Kemp – What does SITLA do?

Curt Gordon – SITLA was tasked with making money from land given to them for school children. This land was not in the City of St. George. When it was annexed, it came into the City as an Open Space as a holding zone. That is why it was zoned open space. I'm not sure why it has never changed.

Michael Alexander – Has this already been approved to proceed forward?

Commissioner Fisher – The zoning has already been approved. In this case the General Plan wasn't changed. Right now, we are just trying to clean up the general plan to match the zoning.

Michael Alexander – Do we know where the road intends to come out?

Steve Darke – Has this already been approved?

Chair Kemp – This property already has zoning on it.

Noelle Willhelmsen – Who owns this land right now?

Chair Kemp closed the public hearing.

Mike Hadley – It is zoned for residential property. This application is just a cleanup item to make the general plan match the zone.

Chair Kemp clarified questions that were asked during the public hearing.

Commissioner Andrus – Does the zone map include the Hillside overlay?

Mike Hadley – Yes, it is a hatched layer on that map.

Commissioner Chapman – You see where the line goes up, I assume that is a boundary of where the mesa would go up?

Logan Blake – This is the boundary with SITLA. The zoning was a lot larger because it was encompassing open space.

Commissioner Chapman – Is there a section of that where the petroglyphs are and where the trails go to that can be not developed, that can be left natural?

Logan Blake – My understanding is that with the Hillside permit they did a lot of those field investigations walking and they designated a lot of those areas to stay open space inside of the development. Similar to what we have over here in this area behind these lots. There is open space that exists here that is zoned R-1-40 and zoned R-1-30, that's how the process has gone thus far. The 100 ft ridge setback is open space, and the City owns this property.

Chair Kemp – Is the intention to deed the open space to the City?

Logan Blake – Yes. And our plan is to develop one unit per acre.

Discussion on where the lots will be located.

Commissioner Andrus – Are we including in the motion that we move that eastern boundary all the way to Tonaquint?

Chair Kemp – We can make that recommendation, yes.

Commissioner Andrus – Where the homes are.

MOTION: Commissioner Fisher made a motion to recommend approval of this application with the change that the expanded include general plan to include the property to the east of this property in what is now a subdivision Tonaquint Heights.
SECOND: Commissioner Andrus
Commissioner Rogers – They will have to come back for a zone change and a plat, can we control the density at that point?
Commissioner Kemp – Yes.
Commissioner Fisher – Understand that they can do R-1-40 right now.

Discussion on what might happen if/when they come back with a zone change and plat.
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
Commissioner Andrus
NAYS (0)
Motion Carries unanimous vote

Chair Kemp called a 10-minute recess.

C. Consider a request to change the General Plan from RES (Residential), COM (Commercial), & PK (Park) to M-1 (Manufacturing) on approximately 51.97 acres generally located north of exit 7 off Southern Parkway. The applicant is Desert Canyons Development LC and representative is Curt Gordon. The project will be known as Desert Canyons Business Park General Plan Amendment. Case No. 2023-GPA-002. (Staff – Mike Hadley)

Mike Hadley presented the following:

Mike Hadley – We are working out some issues with our GIS departments, so our maps aren't showing this correctly.

Commissioner Chapman – What is developed out there?

Chair Kemp – Nothing. That's out by the airport. Eventually it will be accessed by the Airport Parkway.

Commissioner Chapman – Is this in the Airport overlay?

Mike Hadley – No it isn't.

Chair Kemp – I know there is a proposal in Washington City to take those 20 parcels for an industrial project.

Chair Kemp opened the public hearing.

Chair Kemp closed the public hearing.

MOTION: Commissioner Rogers made a motion to recommend approval of Item 2C as presented.
SECOND: Commissioner Chapman
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher

Commissioner Andrus
NAYS (0)
Motion Carries unanimous vote

3. DEVELOPMENT AGREEMENT (DA) *(Public Hearing)* Legislative

Consider a request to adopt a development agreement for the purpose of redesigning the layout and elevations of an approved but not yet developed storage rental unit facility which is generally located at approximately 3425 S. River Road. The applicant is Devin Sullivan – Pioneer Boys LLC, and the representative is Adam Allen. The project name will be known as STG Storage Facility. Case No. 2022-2023-DA-002. (Staff – Carol Davidson)

Carol Davidson presented the following:

Carol Davidson – Carol went through the sections that were addressed in the development agreement specific to this project that are shown in the presentation in the agenda packet.

Chair Kemp – Has the road dedication been approved by the property to the south?

Matt Loo – Yes, we have talked to Sunroc, and they have approved the road dedication.

Chair Kemp opened the public hearing.

Chair Kemp closed the public hearing.

MOTION: Commissioner Rogers made a motion to recommend approval of Item 3 as presented.
SECOND: Commissioner Fisher
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
Commissioner Andrus
NAYS (0)
Motion Carries unanimous vote

4. PLANNED DEVELOPMENT AMENDMENT (PD-A) *(Public Hearing)* Legislative

A. Consider a request to amend the PD-C (Planned Development Commercial) zone for the purpose of redesigning the layout and elevations of an approved but not yet developed storage rental unit facility which is generally located at approximately 3425 S. River Road. The applicant is Devin Sullivan – Pioneer Boys LLC, and the representative is Adam Allen. The project name will be known as STG Storage Facility. Case No. 2022-PDA-052 (Staff – Carol Davidson)

Carol Davidson presented the following.

Carol Davidson – It was one of your recommendations that a development agreement would accompany this item. We talked about the buffers, the buildings and all the same things.

Commissioner Chapman – So nothing is changing that we approved? Why do we need to have a development agreement?

Jami Brackin – If a project comes in and wants to do something that doesn't meet code then you have to adopt a land use ordinance so that the project can move forward. Because this project doesn't have the building out front it will need the development agreement to move forward.

Chair Kemp opened the public hearing.

Chair Kemp closed the public hearing.

MOTION: Commissioner Fisher made a motion to recommend approval of Item 4A on the agenda with the conditions that were set forth in numbers 3, 5 and 6 on the recommendations that were set forth by staff.
SECOND: Commissioner Chapman
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
Commissioner Andrus
NAYS (0)
Motion Carries unanimous vote

B. Consider a request to amend the Fields at Mall Drive Phase 2 Planned Development Commercial (PD-C) zone. The applicant is seeking approval in order to build a new office building on approximately 1.17 acres. This property is located at 2939 E Mall Drive. The applicant/representative is Tucker Nipko. The project will be known as Mall Drive Professional Office. Case No. 2023-PDA-005. (Staff – Dan Boles)

Dan Boles presented the following:

Dan Boles – This is near the new temple and Lins. This PD-C was approved in 2017. The uses are already approved in the zoning. They are providing 68 stalls; they are required to have 65 stalls. They are over parked by 3. They will share access with the bank to the east. They will also be connected to Revere. The building is 32 ft high to the top parapet. Staff recommends approval.

Commissioner Chapman – It is professional space, not retail, correct?

Dan Boles – Yes.

Chair Kemp opened the public hearing.

Chair Kemp closed the public hearing.

MOTION: Commissioner Chapman made a motion to recommend approval of item 4B as presented.
SECOND: Commissioner Rogers
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
Commissioner Andrus
NAYS (0)
Motion Carries unanimous vote

5. MINUTES

Consider a request to approve the meeting minutes from the March 28, 2023, meeting.

MOTION: Commissioner Chapman made a motion to approve the minutes.
SECOND: Commissioner Rogers
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
Commissioner Andrus
NAYS (0)
Motion Carries unanimous vote

6. CITY COUNCIL ACTIONS

Report on items heard at the April 6, 2023, City Council meeting.

1. 2023-PP-005 Old Farm
2. 2023-HS-004 Flowers Way
3. 2023-PP-009 Smith's Marketplace Sun River
4. 2023-PP-010 Leslie Dunbar Trust
5. 2023-PP-007 White Trails Ph 4-6

7. ADJOURN

MOTION: Commissioner Fisher
SECOND: Chair Kemp
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
Commissioner Andrus
NAYS (0)
Motion Carries unanimous vote