

NOTICE OF MEETING
HILLSIDE REVIEW BOARD
CITY OF ST. GEORGE
WASHINGTON COUNTY, UTAH

Public Notice

Notice is hereby given that the Hillside Review Board of the City of St. George, Washington County, Utah, will hold meetings at the referenced site on **Wednesday, April 21, 2021** commencing on-site at approximately **8:30 a.m.**

The estimated site times are in bold.

The agenda for the meetings are as follows:

1. Consider a request for a Hillside Development Permit to allow development of the subject property into townhomes. The applicant is asking for approval of a hillside permit in order to cut into 20-40% slopes. The property is located on the east side of Valley View Drive and just south of Sunset Dr. The property is currently zoned R-1-10 (Residential minimum lots size 10,000 sq ft) & A-P (Administrative Professional). The owner is Steven Park. Case No. 2021-HS-003. (*See 'Meeting Place' exhibit below*). **Meeting time approx. 8:30 am**
2. Consider approval of the meeting minutes from January 27, 2021 and February 17, 2021.

Mike Hadley GISP
Planner III
Development Services

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.

**Meeting Place (East side of Valley View Dr and just South of
Sunset Dr)**



Hillside Permit

HILLSIDE REVIEW BOARD AGENDA REPORT: **04/21/2021**

HILLSIDE DEVELOPMENT PERMIT

Desert Garden Cove

Case No. 2021-HS-003

Request: This is a request for a Hillside Development Permit to allow the applicant to cut into the (20-40%+) hillside for access to a proposed townhome development. There cut would also allow construction of the townhome site. The applicant has provided a slope analysis, proposed drainage report and site layout for consideration.

Exhibits Provided: 1) Exhibit A - Slope Analysis Maps
“Exhibit A” in the packet shows the overall slope analysis for the townhome site under review.

2) Exhibit B – Site plan
“Exhibit B” depicts the proposed layout of the townhome site including open space, roads, building pads, etc.

3) Exhibit C – Preliminary Drainage Control Plan and Report
Dated March 31, 2021 – Drainage report produce by Premier Design & Engineering, Inc.

4) Exhibit D – Narrative
The narrative is a brief description of the proposal and the applicant’s reasoning for asking for the Hillside Review Board’s consideration.

Background: The parcel has a hillside containing slopes greater than 40%. Some of this slope area was created with an old dirt access road to the existing city water towers. The flatter more developable area has had some prior grading activities creating small insignificant areas of slopes 30% or greater of which this application is proposing to develop.

Owner: Mosiah241 LLC

Representative: Raine Christensen

Engineer: Brandee Walker, Civil Science

APN: SG-6-2-24-4435

Location: The property is located on the east side of Valley View Drive just south of Sunset Drive.

Acreage: 6.35 Acres
Zoning: R-1-10 & A-P

Adjacent zones: A-P (Administrative Professional), R-3 (Multi-Family), R-1-6 (Single Family Residential minimum lot size 6,000 sq ft), C-3 (General Commercial)

Powers & Duties: Section 10-13A-8.B.1 of the “Hillside Review Board Powers and Duties” states that the hillside board can make recommendations to “adopt, modify or reject a proposal” to the Planning Commission (PC).

Permit required: Section 10-13A-7 requires that all major development (i.e., cut greater than 4’, etc.) on slopes above 20% requires a ‘hillside development permit’ granted by the City Council upon recommendation from the Hillside Review Board and the Planning Commission.

Analysis: The applicant is proposing to cut into areas that are 20%, 30%, 40% or greater slope (see slope analysis attached). The applicant has provided a narrative stating some of this slope area was created with an old dirt access road to the existing city water towers. The flatter more developable area has had some prior grading activities creating small insignificant areas of slopes 30% or greater of which this application is proposing to develop. The intent of the grading and drainage is to leave as much of the hillside undisturbed as possible and revegetate the 2:1 slope by recommendation of the geotechnical engineer. The size and placement of the buildings will hide some of the proposed cut as well as installing a 6’ to 8’ retaining wall along the proposed development against the hillside.

The Hillside Review Board will need to determine whether or not the areas to be disturbed are “significant” or not. If so, are there conditions that can be placed on the request to mitigate the impacts or is it just not feasible and warrants a denial? Applicable ordinances which may help the board in their review can be found below.

Applicable Ordinance(s):
(Selected portions)

10-13A-1: Density and Disturbance Standards

A. The hillside development overlay zone (HDOZ) limits development densities and provides specific development incentives to transfer underlying zone densities from hillsides (sending areas), to less steep slopes or more safe development areas (receiving areas), within a development.

Percent Natural Slope	Dwelling Units (DU) / Acre
0-19	See underlying zone
20-29	2 DU/acre, provided the units are clustered on 30 percent (30%) or less of the land area within this slope category. 70 percent of this slope category shall remain undisturbed. The 70 percent area is based upon the overall area/development rather than per lot. Also see subsections A1, A2, and A3 of this section.
30-39	1 DU/10 acres, provided no more than 5 percent (5%) of the site is disturbed, and 95 percent of the site remains undisturbed. If the cumulative area is at least 1 acre but less than 10 acres, the cumulative area shall be allowed 1 DU.
40	Development is not permitted (0%), except as provided for in subsection A4 of this section.

Section 10-13A-1: Density and Disturbance Standards

F. The applicant may:

1. Transfer all development density from steeper slope categories (sending areas), to areas within the development with natural slopes of twenty percent (20%) or less (receiving areas); and
2. Develop additional bonus density, calculated from each slope category, as follows:
 - a. Natural slopes twenty percent (20%) or less transferred on a one-to-one (1:1) unit basis; plus
 - b. One (1) additional density unit for each density unit transferred from natural slopes of twenty-one percent (21%) to thirty percent (30%); plus
 - c. Two (2) additional density units for each density unit transferred from natural slopes of thirty-one percent (31%) to forty percent (40%).
3. Unit calculation for the receiving area shall be based on the requirements of the sending area zone.

G. Density transfers to the receiving area may occur without a zone change within the receiving area even though the resulting density or configuration may exceed the density limits of the receiving area zone. Other than density, the receiving area's zoning requirements apply to development in the receiving area. For instance, lot sizes may vary, but single-family zoning districts only allow single-family detached dwellings.

H. If the applicant proposes to develop within the twenty-one percent (21%) to forty percent (40%) slope area, the applicant cannot employ partial density transfers from the sending area and must propose a design, site development plans, and a grading plan that blends and harmonizes all

aspects of the proposed development into the natural topography, and that minimizes road cuts and fills.

I. Non-disturb areas within a residential lot as shown on the slope analysis map shall not be used to calculate minimum lot size.

J. Disturbance standards do not apply to the city for limited city facilities: trails, parks, and utilities.

10-13A-2: Density and Disturbance Standards

A. Slope shall be determined for each significant portion of a development parcel.

B. *Procedure:* The applicant shall map the location of the natural slope by using the following procedure:

1. *Preparation of Contour Maps:* The applicant shall submit an accurate, current contour map, prepared and certified by a licensed professional engineer or surveyor, which shows all land contours at intervals no greater than five feet (5'), drawn at a one inch equals one hundred feet (1" = 100') scale maximum.

2. *Verification through Field Surveys:* The city engineer or designee may require the applicant to submit a field survey to verify the accuracy of the contour map.

C. *Determination of Slope Areas:* Using the contour map, natural slopes shall be calculated using points identified as natural slopes of twenty percent (20%), thirty percent (30%), and forty percent (40%), and shall be located on the contour map and connected by a continuous line. That area bounded by said lines and intersecting property lines shall be used for determining project density. Small washes or outcrops, which have slopes distinctly different from surrounding property, and are not part of the contiguous topography, may be excluded from the slope determination.

HSRB Motion Options: The hillside board can recommend several different options to the Planning Commission and the City Council:

1. Denial
2. Approval as presented
3. Approval with specific conditions and comments added as required.

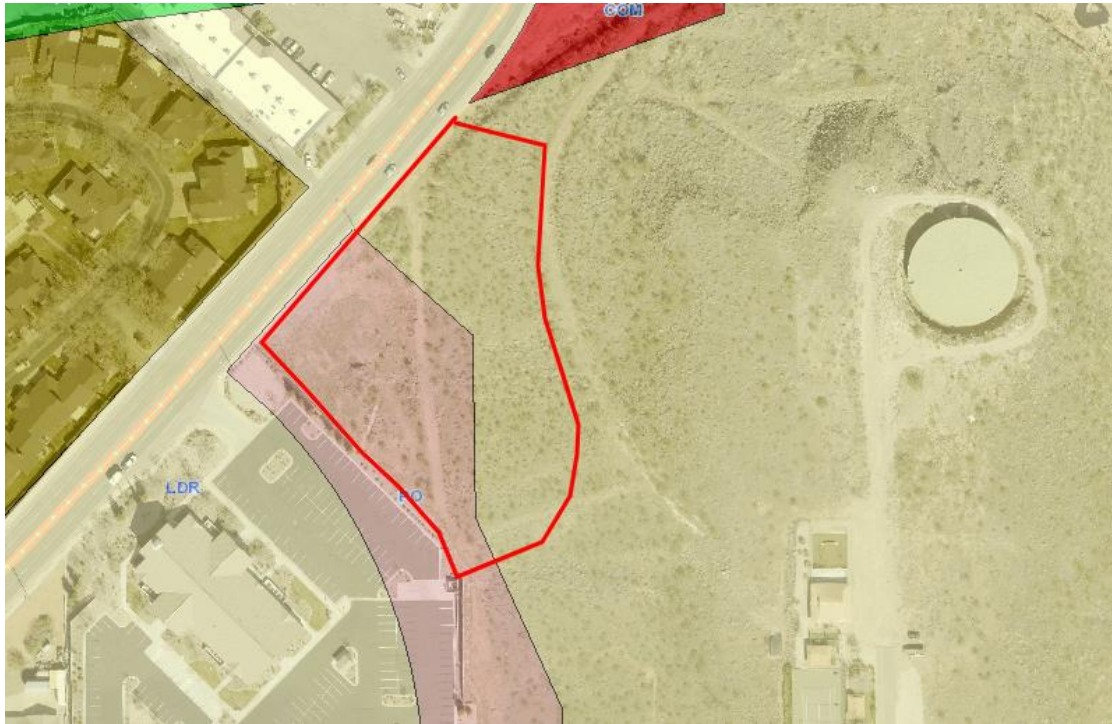
Example Motion: The hillside board recommends _____ of the request for a Hillside Development Permit to allow development of Willow Bend Townhomes as requested and outlined in the staff report including the following comments:

1. _____
2. _____
3. _____

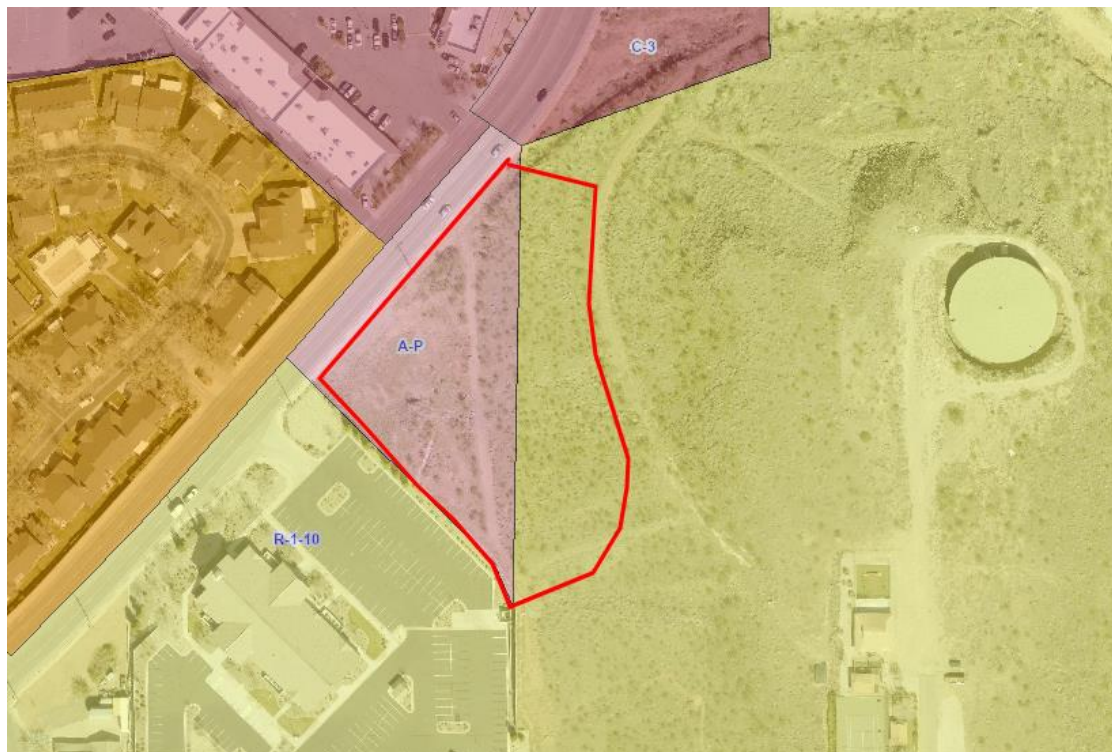
Vicinity Map



General Plan - LDR



Zoning – R-1-10 & A-P





- LEGEND**
- FIRE HYDRANT
 - WATER GATE VALVE
 - EXISTING WATER GATE VALVE
 - EXISTING WATER LINE
 - EXISTING SEWER LINE
 - EXISTING GROUND CONTOUR
 - STORM DRAIN PIPE
 - EXISTING CURB & GUTTER
 - DRAINAGE FLOW DIRECTION
 - SPOT ELEVATION
 - HILLSIDE DISTURBANCE RESTRICTED AREA

SLOPE TABLE					
Color	Minimum Slope	Maximum Slope	Area	Disturbed	%
	0.00%	19.00%	1.36 AC	1.15 AC	84%
	20.00%	29.00%	1.61 AC	0.72 AC	45%
	30.00%	39.00%	1.61 AC	0.16 AC	9.9%
	40.00%	100.00%	1.77 AC	0.07 AC	0.4%
			6.35 AC	2.10 AC	
	40.00% or GREATER (MANMADE OR INSIGNIFICANT)			0.07 AC	

SCALE: 1" = 30'
(SCALE ONLY VALID FOR 24" x 36" PAPER)

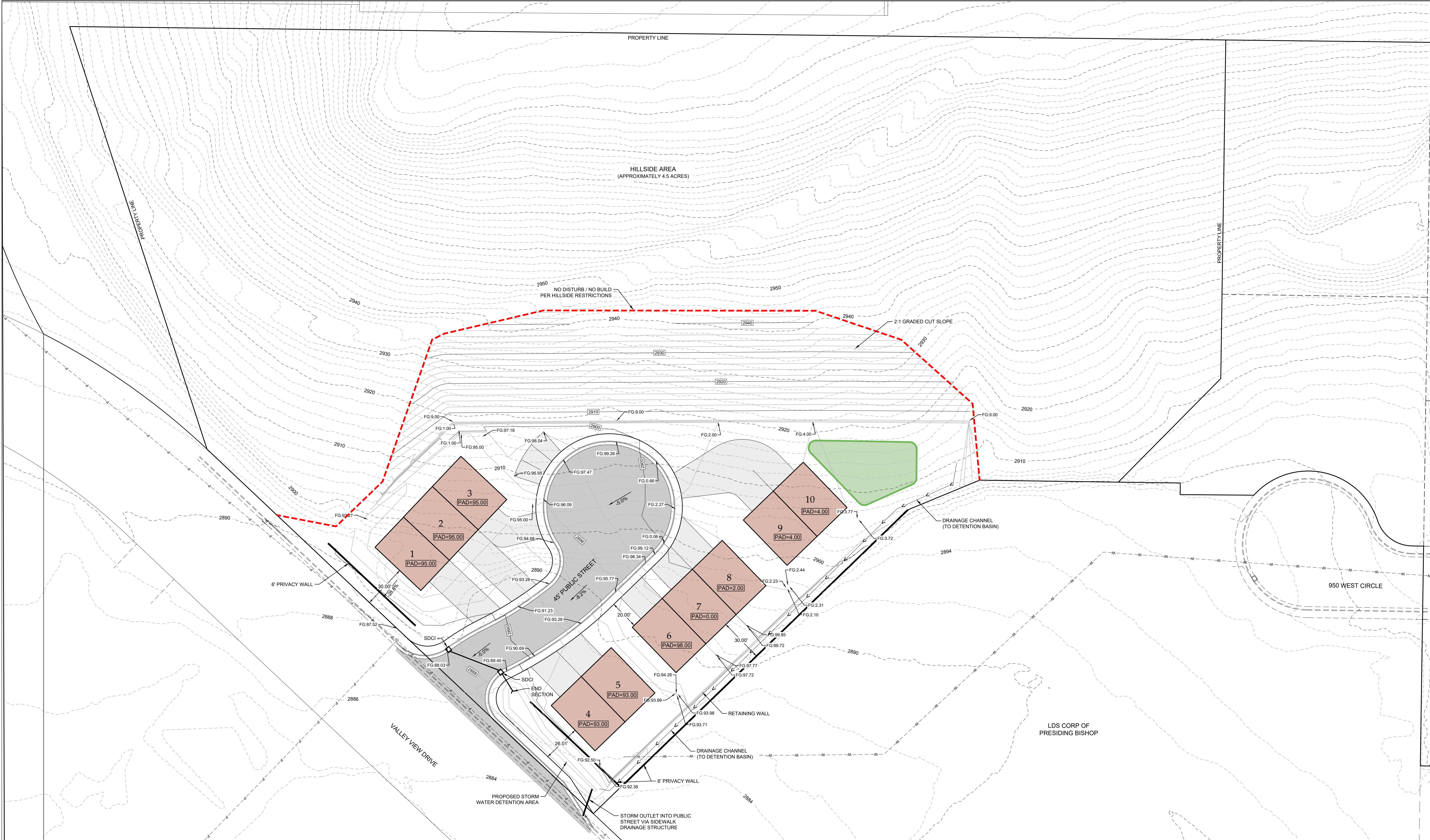
DESERT GARDEN COVE
SLOPE ANALYSIS MAP

DESERT GARDEN COVE
HILLSIDE DEVELOPMENT REVIEW
LOCATED IN ST. GEORGE, UTAH



1453 S. DIXIE DRIVE, SUITE 150
ST. GEORGE, UT 84770
435.986.0100

PROJ. #: FF 21116.00
DRAWN BY: BLW
DATE: 3/31/2021
CHECKED BY: KCS
SCALE OF SHEET
HOR SCALE: 1" = 30'
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CONSTRUCTION TIME TABLE

PROJECT IS ESTIMATED TO BE COMPLETED IN ONE YEAR FROM START DATE AND BE COMPLETED IN A SINGLE PHASE.

DRAINAGE

DRAINAGE RUNOFF WILL BE DIRECTED FROM THE HILLSIDE VIA A DRAINAGE CHANNEL AROUND THE TOWNHOME UNITS TO THE PROPOSED DETENTION BASIN LOCATED ALONG VALLEY VIEW DRIVE. THE DISCHARGE WILL BE THROUGH A SIDEWALK STRUCTURE TO THE FLOW LINE OF EXISTING CURB & GUTTER.

DIRT QUANTITIES

CUT = 10,854 CY
FILL = 3,914 CY
NET = 6,740 CY EXPORT

NOTES:

ALL IMPORTED STRUCTURAL FILL SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO DELIVERY TO THE SITE. ALL IMPORTED STRUCTURAL FILL SHALL BE PLACED IN 8-INCH LOOSE HORIZONTAL LIFTS AND COMPACTED TO A MINIMUM OF 95 PERCENT OF MAXIMUM DRY DENSITY (ASTM D-1557).

ALL EXCAVATION, GRADING AND FILL OPERATIONS WITHIN THE BUILDING AREA SHOULD BE OBSERVED BY THE GEOTECHNICAL ENGINEER TO VERIFY SUB-SOIL CONDITIONS AND DETERMINE ADEQUACY OF SITE PREPARATION, SUITABILITY OF FILL MATERIALS AND COMPLIANCE WITH COMPACTION REQUIREMENTS.

THE CONTRACTOR SHALL PROVIDE SUITABLE EQUIPMENT TO CONTROL DUST AND AIR POLLUTION CAUSED BY CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL ALSO PROVIDE SUITABLE MUD AND DIRT CONTAINMENT TO MAINTAIN THE WORK SITE, ACCESS ROADWAYS AND ADJACENT PROPERTIES IN A CLEAN CONDITION.

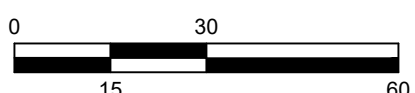
ALL EXCAVATION AND GRADING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ST. GEORGE CITY AND APPENDIX J OF THE INTERNATIONAL BUILDING CODE AND THE SPECIFICATIONS AND REQUIREMENTS INCLUDED IN THE GEOTECHNICAL STUDY.

GEOTECHNICAL ENGINEER TO PROVIDE GRADING COMPLETION REPORT TO CONFIRM WORK HAS BEEN PERFORMED IN CONFORMANCE WITH THEIR RECOMMENDATIONS.

OWNER IS RESPONSIBLE FOR ALL ON-SITE DRAINAGE AND DETENTION.

LEGEND

	EXISTING GROUND CONTOUR		DRAINAGE FLOW DIRECTION
	FINISH GRADE CONTOUR		PAD ELEVATION
	PROJECT BOUNDARY		SPOT ELEVATION
	PROPOSED CURB & GUTTER		TOP BACK OF CURB
	EXISTING CURB & GUTTER		TOP OF ASPHALT
	PROPOSED RETAINING WALL		GRADE BREAK
			FLOW LINE
			TOP OF CONCRETE



SCALE: 1" = 30'
(SCALE ONLY VALID FOR 24" x 36" PAPER)

DESERT GARDEN COVE
HILLSIDE DEVELOPMENT REVIEW
GRADING & DRAINAGE PLAN

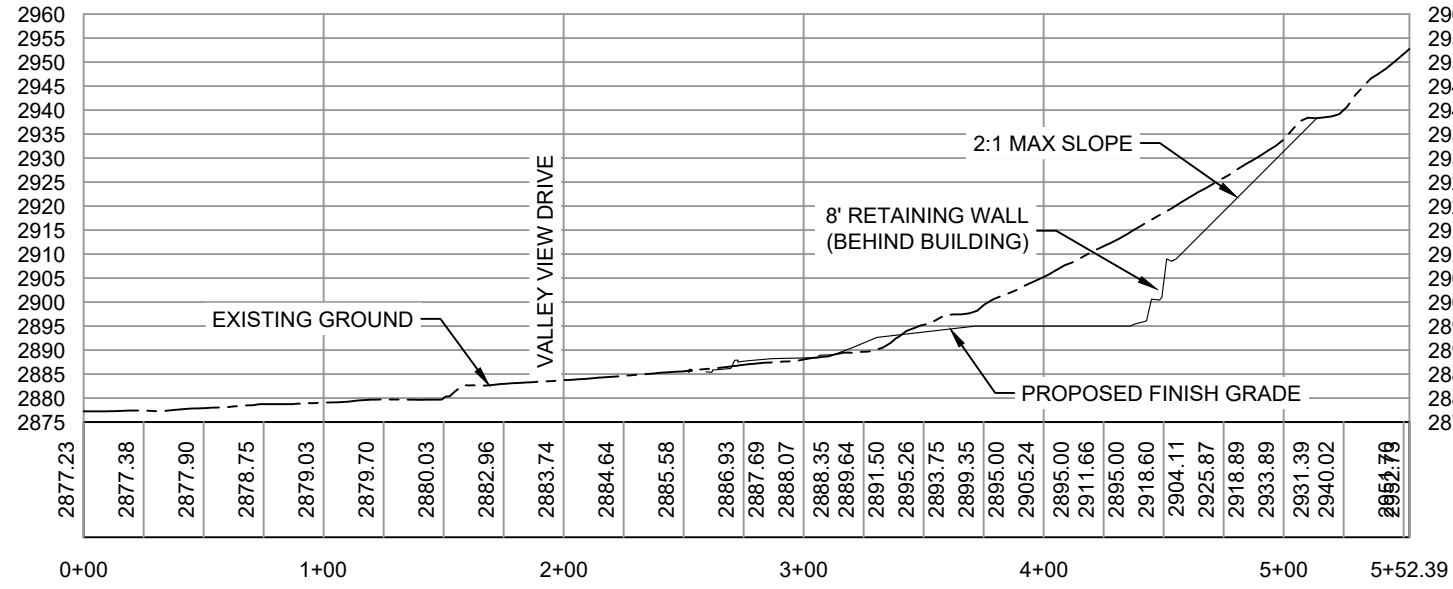
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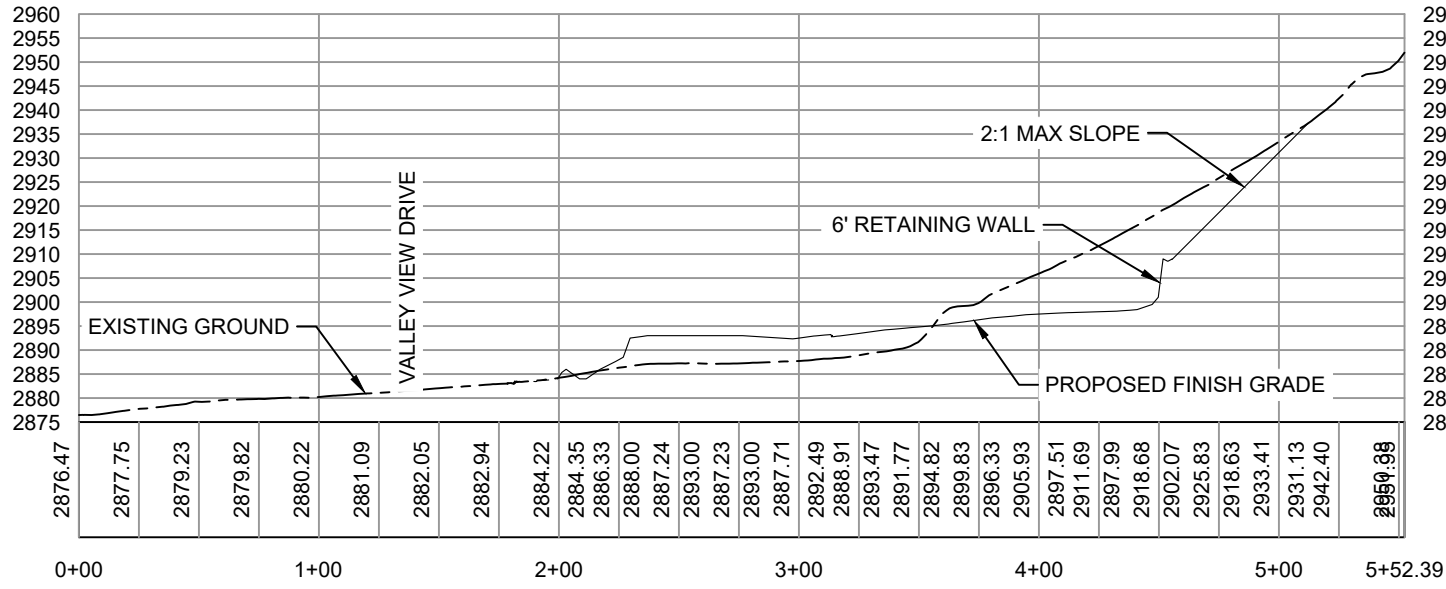
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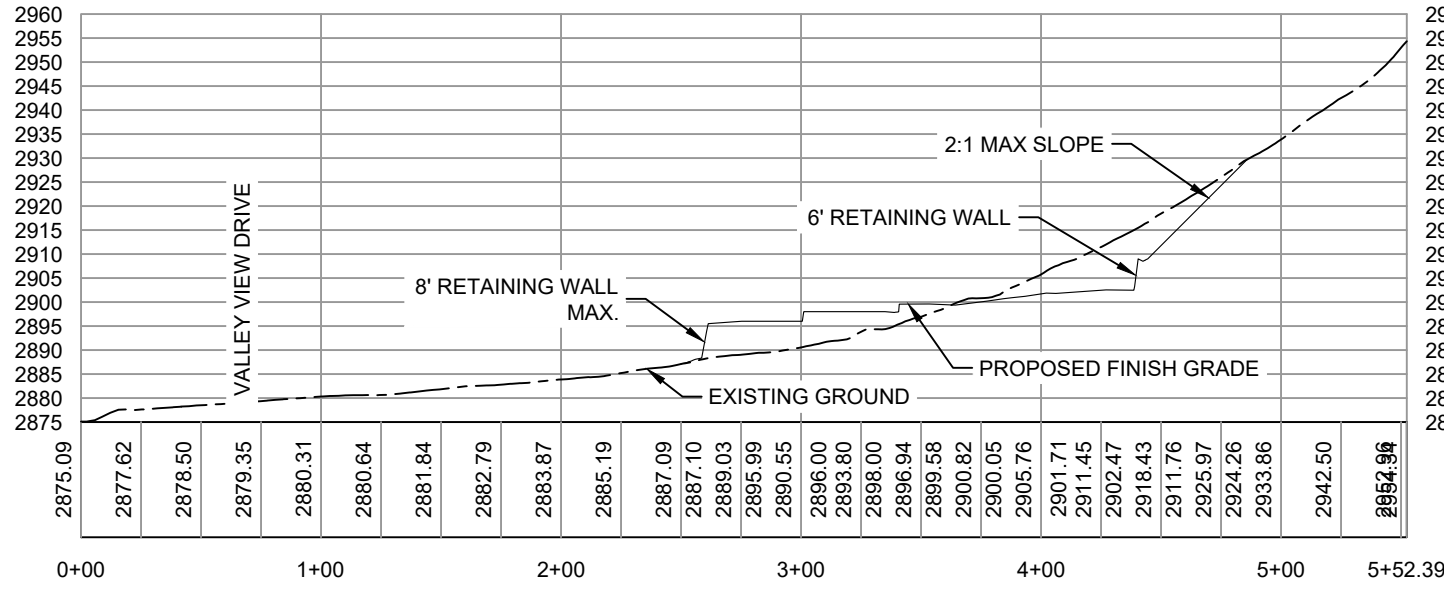
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435.986.0100



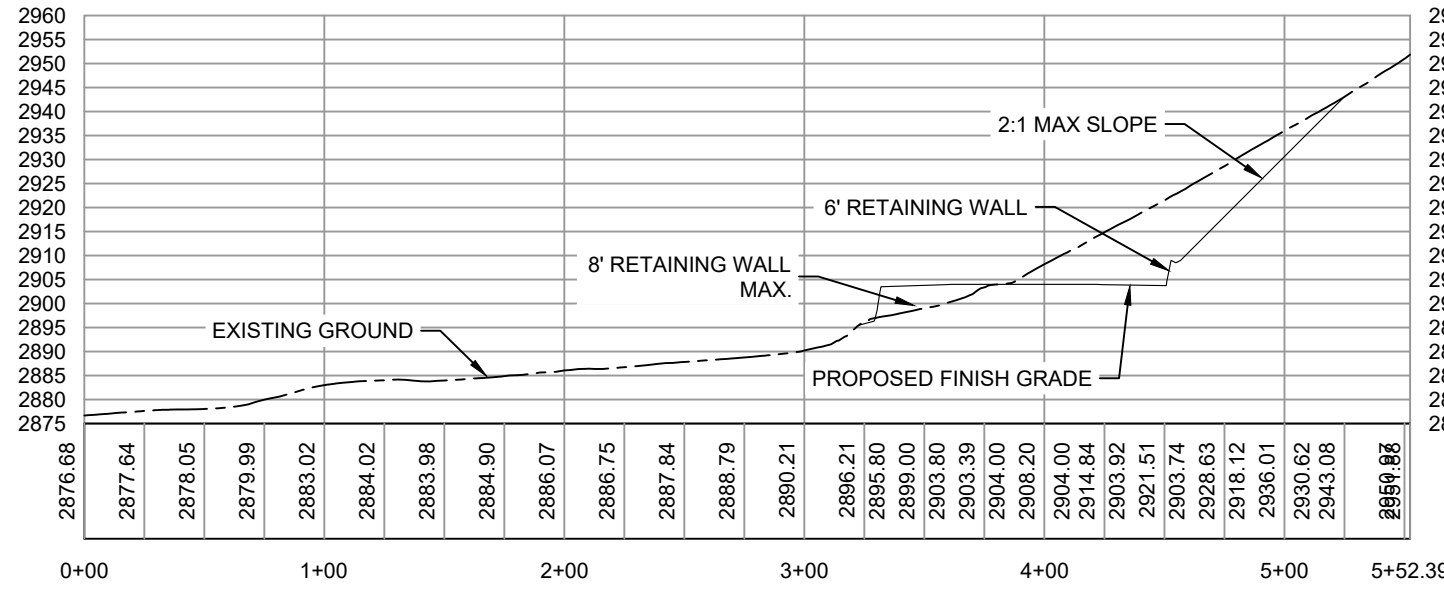
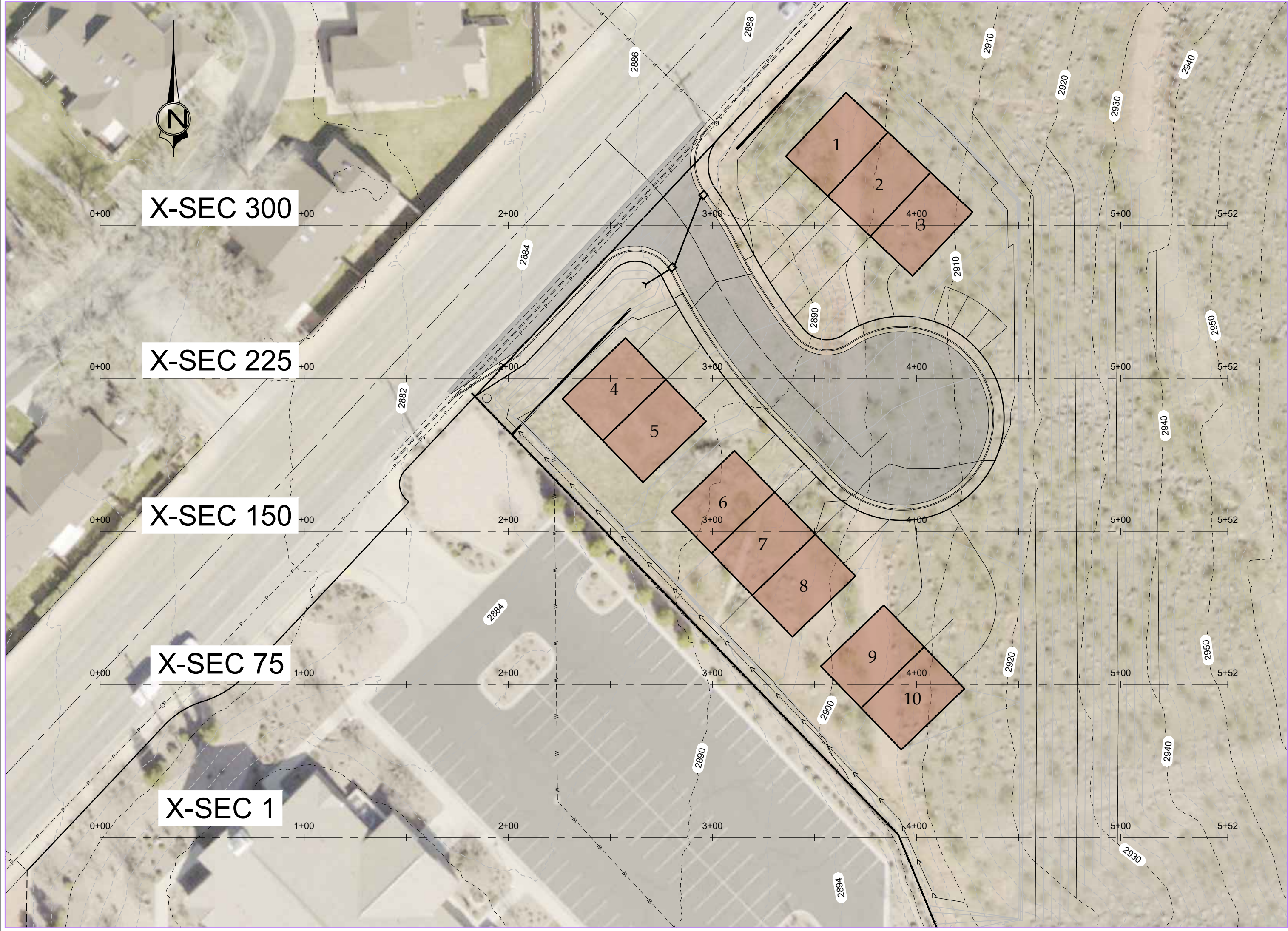
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V: 1"=10'
STA: 0+00 TO STA: 5+52



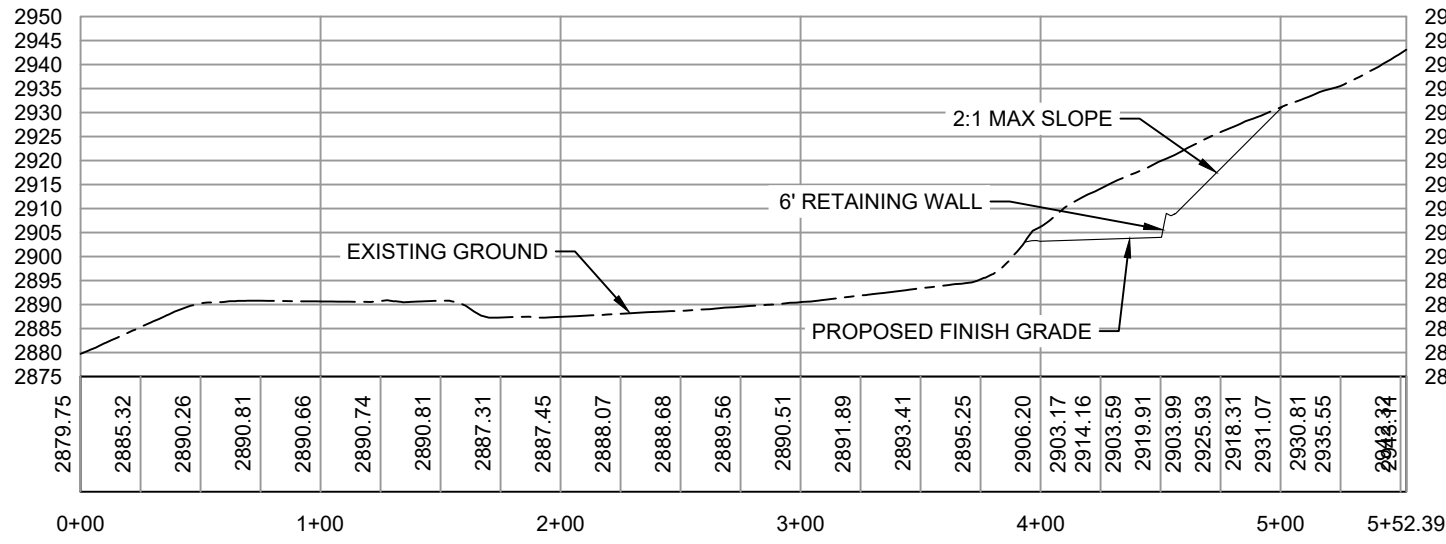
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STA: 0+00 TO STA: 5+52



X-SEC1-Left-150.000
H: 1"=20'
V: 1"=10'
STA: 0+00 TO STA: 5+52



X-SEC1-Left-75.000
H: 1"=20'
V: 1"=10'
STA: 0+00 TO STA: 5+52



X-SEC1
H: 1"=20'
V: 1"=10'
STA: 0+00 TO STA: 5+52

DESERT GARDEN COVE
HILLSIDE DEVELOPMENT REVIEW
CROSS SECTIONS

PROJ. #: FF 21116.00
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DATE: 2-23-21
CHECKED BY: BLW
SCALE OF SHEET
HOR SCALE: 1" = 20'
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LEGEND

- ||||| Shade Awning
- ┌ Aluminum Divider wall
- ★ Vertchii Gardenia
- || Dry Ditch Bed - Drainage
- ⌒ Playground
- ✚ Budders
- Wall on front
- (W) WATER METER FOR LANDSCAPE WITH BACK FLOW PREVENTER
- SLEEVES 2X PIPE DIAMETER
- 3/4" POLY LINE

LEGEND

- ✱ Greenspire Evonymus
- ✳ Double red drift Rose
- ✚ Regal mist grass
- Fan Tex Ash
- Sandstone pavers
- ▭ Planter Boxes



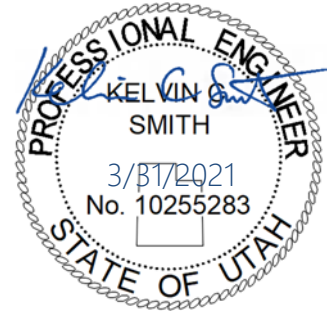
DESERT GARDEN COVE
LANDSCAPE PLAN
LOCATED IN ST. GEORGE, UTAH

To Catherine Hasfurth, P.E.
Engineering Manager | Public Works
City of St. George
175 East 200 North
St. George, UT 84770

From Kelvin C. Smith, P.E.
Project Engineer
Civil Science

Date March 31, 2021
Project Desert Garden Cove
Number CSI# 21116

Subject [Hillside Submittal Drainage Design Memorandum](#)



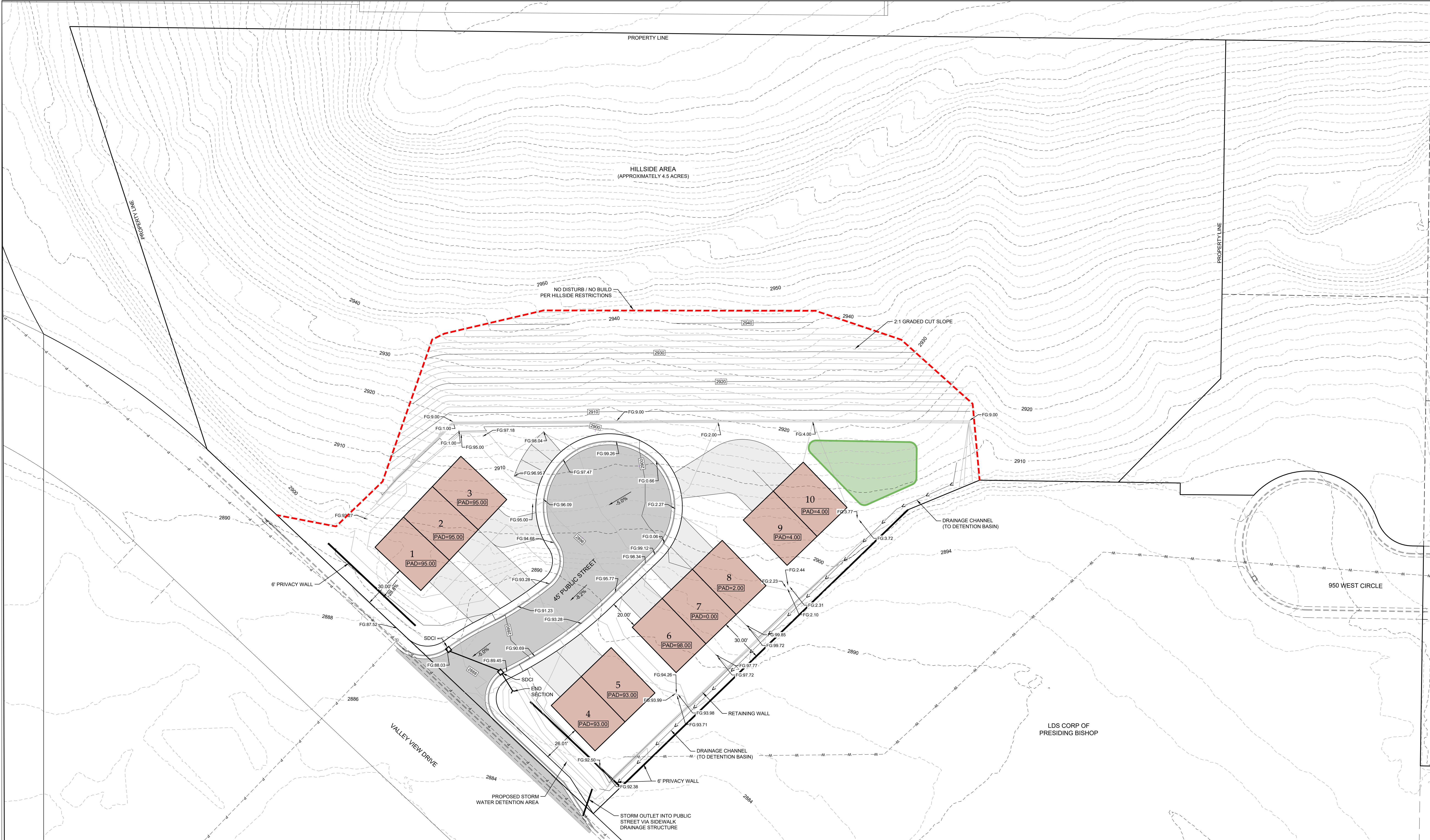
The purpose of this Memorandum is to address the general drainage design of Desert Garden Cove. The property is located at approximately 850 North Valley View Drive. The project site borders a church building property to the south. Storm runoff currently comes off the natural hillside area and through the site to the street. We intend to build a retaining wall on the east side of the project to extend the buildable area of the site and to collect and convey storm water runoff around the project.

Flows to the north side of the retaining wall will be conveyed through a channel at the top of the wall to a natural channel behind the residences, then to a detention basin. Similarly, runoff flows will also be conveyed to the south side of the retaining wall will be conveyed through a channel at the top of the wall to a natural channel with several large check dams to reduce the flow velocity behind the residences, then to a detention basin. The two parts of the detention basin will be connected with a 12" pipe under the access road to act as one detention basin. The outlet structure will be near the southwest corner of the property and will connect to a sidewalk structure to release controlled flows to the gutter. There is no storm drain infrastructure near the project site, which requires the constructure of a sidewalk structure.

The detention basin and outlet structure will be designed to reduce the post-development peak runoff flow to pre-development flow levels for all storms required according to the St. George Drainage Manual.

Attachments

Site Plan



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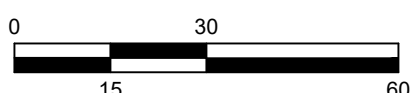
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LEGEND

---	EXISTING GROUND CONTOUR	→	DRAINAGE FLOW DIRECTION
---	FINISH GRADE CONTOUR	PAD=	PAD ELEVATION
---	PROJECT BOUNDARY	LOCATION	SPOT ELEVATION
---	PROPOSED CURB & GUTTER	TBC	TOP BACK OF CURB
---	EXISTING CURB & GUTTER	TOA	TOP OF ASPHALT
---	PROPOSED RETAINING WALL	GB	GRADE BREAK
		FL	FLOW LINE
		TOC	TOP OF CONCRETE



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DESERT GARDEN COVE
HILLSIDE DEVELOPMENT REVIEW
GRADING & DRAINAGE PLAN

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HOR SCALE: 1" = 30'

SHEET
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OF
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1453 S. DIXIE DRIVE, SUITE 150
ST. GEORGE, UT 84770
435.986.0100

Desert Garden Cove
Hillside Review Application
Narrative

The proposed development, Desert Garden Cove, is 6.35 acre parcel with 2.1 acres being the proposed area of disturbance/development. The proposed subdivision consists of 10 townhome units. Each unit is approximately 1,225 square feet with a garage and driveway parking. The Conceptual Site Plan provided contains the site data information in further detail.

The parcel has a hillside containing slopes greater than 40%. Some of this slope area was created with an old dirt access road to the existing city water towers. The flatter more developable area has had some prior grading activities creating small insignificant areas of slopes 30% or greater of which this application is proposing to develop.

The intent of the grading and drainage is to leave as much of the hillside undisturbed as possible and revegetate the 2:1 slope by recommendation of the geotechnical engineer. The size and placement of the buildings will hide some of the proposed cut as well as installing a 6' to 8' retaining wall along the proposed development against the hillside. The buildings are situated above Valley View Drive and the slope will be landscape with native plants and rock materials.

PD ZONE NARRATIVE:

A. Use of Land

The development site consists of 6.35 acres with 10 townhome units proposed. The townhomes are 2-plex and 3-plex buildings with each unit having a garage and driveway. There exists a hillside to the east that will remain open space.

The development will have a small playground recreation area adjacent to the hillside with a community garden. There is not a club house proposed.

B. Height and Elevations

The units will have a maximum height of 25'. Floor plan area is approximately 1,225 square feet, and will include three finished bedrooms and 2.5 baths per unit. The units will also include enclosed garages.

An exterior stone will be used to enhance the appearance as well as stucco and tile roofing. Please refer to the renderings and material board.

C. Density

The overall project density is 1.57 dwelling units per acre. The proposed disturbance area (per Hillside Review application) is 2.10 acres making the disturbed area a total of 4.76 dwelling units per acre.

D. Open Space

The PD Zone requires a minimum of 30% open space (1.9 acres), with this development we are proposing approximately 77% (4.9 acres). The hillside to the east makes up approximately 4.5 acres with the recreation area and other developed landscaping totaling 0.4 acres.

GEOTECHNICAL INVESTIGATION REPORT

for

Valley View and Sunset Development

Parcel No. SG-6-2-24-4435

St. George, Utah

Submitted to:

Mr. Dave Nasal

davenasal@gmail.com

June 15, 2017

Landmark Testing & Engineering

Landmark Project No. 17262

795 East Factory Drive

St. George, Utah 84790

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ST. GEORGE, UTAH

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VALLEY VIEW AND SUNSET DEVELOPMENT
ST. GEORGE, UTAH

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FIGURES 3 through 6:	LOGS OF TEST PITS
FIGURE 7:	UNIFIED SOIL CLASSIFICATION SYSTEM
FIGURES 8 through 9:	SWELL-CONSOLIDATION CURVES
FIGURE 10:	ROCKFALL BERM DETAIL

1.0 INTRODUCTION

This report presents the results of Landmark Testing & Engineering's geotechnical investigation for 7.9 acres of undeveloped land located south of Sunset Boulevard on Valley View Drive in St. George, Utah. The Parcel No. for the site is SG-6-2-24-4435. Figure 1 is a Vicinity Map showing the location of the project relative to surrounding features. Figure 2 is a Site Plan showing the proposed layout of the project. Figure 2 also shows the approximate location of the investigatory test pits completed for this investigation.

This investigation was completed to assist in developing opinions and recommendations concerning site earthwork and foundation design.

2.0 PROPOSED CONSTRUCTION

We understand that proposed construction will consist of 4, three-story apartment building and 2, 11,900 square foot residential building lots. A portion of the apartment building's first stories will be retaining walls. The walls will retain on the order of 12 feet of soil and bedrock. Paved parking, driveway and concrete curb, gutter and sidewalks are also planned. Structural loads have not been provided. However, foundation recommendations are based on footing loads of 1 to 1.5 kips per lineal foot. Any significant changes to the anticipated loads should be reviewed by Landmark to evaluate the continued applicability of the recommendations contained in this report.

3.0 SITE SETTING

3.1 SURFACE CONDITIONS

The proposed development is located on the northern end of the West Black Ridge. The site is bound by the west Black Ridge to the east, Valley View Drive to the northwest, an LDS Church building to the west, and by residential development to the south. The total site is 7.91 acres in plan area, of which approximately 50 percent will not be developed. There is an approximately 0.5-acre portion of the site, between Valley View Drive and the church, which has been cut to a level grade in the past. The majority of the site comprises the western slope of the West Black Ridge. The total elevation change across the site is 120 feet, and up to 40 feet across the cross-section of the proposed development. Cuts and fills on the order of 20 feet will likely be required to bring the site to proposed grades. There is an existing retaining wall which runs along the southwest property lines. The retaining walls retain up to 15 feet. There is an excavated building pad adjacent to the site at the southeast corner of the site. A portion of the spoils from this excavation lie within the site. The ground surface is covered with occasional basalt cobbles and boulders, and vegetation consisted of field grasses and desert brush.

3.2 SEISMICITY AND FAULTING

Seismicity at the site was determined using the United States Geological Survey, Earthquake Hazards Program website. The following values are presented to assist with seismic design:

- ▶ Latitude= 37.1228° N, Longitude= 113.6029° W
- ▶ Site Class = C - Very dense soil and soft rock, based on ASCE 7 (Table 20.3.1) as referenced in 2012 IBC 1613.3.2

Period (sec)	Sa (g)	Site Class
0.2	0.486 S _s	B
1.0	0.149 S ₁	B
0.2	0.388 S _{DS}	C
1.0	0.164 S _{DI}	C

(2010 ASCE-7, USGS, U.S. Seismic Design Maps Calculator, Version 3.1.0)

The St. George basin lies within the transitional zone between the Colorado Plateau to the east and the Basin and Range Province to the west. Southwestern Utah is located on a structural block proximate to the southern segment of the Inter-mountain Seismic belt, which is characterized by high-angle normal faults that tend to step down to the west (Higgins and Willis, 1995)¹. The Hurricane fault with an offset of 6,000 to 8,000 feet forms the eastern edge of the transition zone. The Grand Wash-Reef Reservoir-Gunlock fault system with displacement of about 1,500 to 3,000 feet forms the western edge.

The trace of the Hurricane fault is located approximately 16 miles east of the site. Higgins and Willis (1995) indicate that the Hurricane fault displaces late Quaternary sediments and is considered active. The projected trace of the Washington fault is located approximately 6 miles east of the site. Higgins and Willis (1995) indicate that the Washington fault displaces late Quaternary sediments and is considered active. Strong ground motion associated with movement along the Hurricane or other faults associated with the Inter-mountain Seismic Belt is possible, however, the potential for surface fault rupture is considered low.

Groundwater was not encountered to depths of 13.0 feet. Soils at the site consisted of clayey sand over mudstone bedrock. Liquefaction maps by Lund², 2008, classify the area as having a low liquefaction potential.

¹ Higgins, J.M. and Willis, G.C., 1995, Interim Geologic Map of the St. George Quadrangle, Washington County, Utah; Utah Geological Survey Open-File Report 323.

² Lund, W., Knudsen, T., Vice, G., Shaw, L., Liquefaction Hazard Map for the St. George-Hurricane Metropolitan Area, Utah Geologic Survey Special Study 127, plate 2.

3.3 ROCKFALL

The site is located in an area designated by Lund³ as having a moderate risk of rockfall.

“Moderate rock-fall-hazard areas are present where slopes provide sufficient relief to create an acceleration zone, but where only sparse rock-fall debris is present on slopes or in the runout zone at the base of the slope. Typically rock units in moderate-hazard areas crop out in the slope instead of forming a capping unit, or where a capping unit is present, the resulting rock-fall debris is typically less than 1.5 feet in diameter.”

The slope above the proposed development fits this description. A specific rockfall study for this site is beyond the scope of this report, but may be conducted if required. Design and construction details to mitigate the risk of rockfall are provided in Section 5.3 of this report.

3.4 SUBSURFACE CONDITIONS

Previous geologic mapping by Hayden and Willis⁴, 2011, classifies the soils on-site as talus deposits overlying the Kayenta Formation. The Kayenta Formation comprises the various layers of siltstone and mudstone bedrock encountered in the test pits. The basalt which caps the West Back Ridge, along the eastern edge of the site, is part of the Cedar Bench lava flow, and is 1.5 million years old.

Subsurface soils encountered in the test pits correlated well, and consisted of 4.0 to 4.5 feet of clayey sand (SC) with gravel, cobbles, and boulders, underlain by multiple thin layers of mudstone bedrock to the maximum depth of exploration, 13.0 feet. The cobbles and boulders were confined to the upper foot of the clayey sand, and were basalt. Groundwater was not encountered in our test pits at the time of exploration. For a detailed description of the subsurface conditions encountered in our test pits, please see the Logs of Test Pits, Figures 3 through 6. A key to the descriptions on the test pit logs is presented on Figure 7.

4.0 LABORATORY TESTING

Laboratory tests included mechanical gradation analyses to aid in soil classification, soluble sulfate content, a modified Proctor to aid in construction management, and remolded swell-consolidation tests to evaluate volume change upon wetting. Laboratory results are shown on Logs of Test Pits.

To access the behavior of the mudstone bedrock, two samples were remolded to 95 percent of the modified Proctor dry density. The samples tested collapsed 0.3 percent when saturated under a constant load of 1,000 psf, which is low. Based on these test results, the mudstone will be suitable for use as structural fill. Remolded swell-consolidation test results are shown on Figures 8 and 9.

³ Lund, W., Knudsen, T., Vice, G., Shaw, L., Liquefaction Hazard Map for the St. George-Hurricane Metropolitan Area, Utah Geologic Survey Special Study 127, plate 5.

⁴ Hayden, J. M., Willis, G. C., Geologic Map of the St. George 7.5' Quadrangle, Washington County, Utah, 2011, Map 251DM

The results of the modified Proctor test show a maximum dry density of the mudstone bedrock is 121.3 pcf at an optimum moisture content of 10.9%.

5.0 SITE GRADING AND EARTHWORK

5.1 GRADING

Prior to grading, the upper 6 inches of soil containing the majority of plant roots and other deleterious material should be stripped from the areas to be graded. These soils may be stockpiled for use in landscaped portions of the development, but should not be used as structural fill. Following stripping, the surficial layer of clayey sand should be excavated to a minimum of 3 feet below the existing grade in areas to be filled. Exposed clayey sand subgrade should be scarified a minimum of 8 inches, moisture conditioned to within 2 percent of the optimum for compaction, and compacted to a minimum of 90 percent of the modified Proctor dry density. Areas to be filled should be benched, and fill should be placed in level layers to the proposed grade.

Building and retaining wall foundations should be established on mudstone bedrock or a minimum of 1 foot of structural fill. Footings should not rest partially on bedrock and partially on structural fill. Pavement and exterior flatwork should be supported on a minimum of 1 foot of structural fill. Structural fill should extend a minimum of 2 feet beyond the limits of structures, flatwork, and pavements.

Our test pits were excavated with a CAT 430F, rubber tire backhoe. Refusal was met in Test Pit 2 on a limestone layer, which was 6 inches in thickness when encountered in Test Pit 1. Based on our observations, we anticipate that excavation for the development may be accomplished with typical excavation equipment. Local areas such as corners and utility trenches may require limited use of a “pick” or hammer-hoe.

The spoils pile from the building pad at the southeast corner of the site should be removed from the site. These soils may be suitable for use as structural fill. Following removal of these soils, the ground surface should be “track walked” to create a relatively compacted, roughened surface to reduce erosion of the remaining, bare soils.

5.2 FILL PLACEMENT AND COMPACTION

All fill to be placed for support of footings, slabs-on-grade, pavement, and exterior flatwork should be considered structural fill. The excavated mudstone bed rock is expected to be suitable for use as structural fill. Imported fill 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	80-100
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

Material not meeting the above requirements may be suitable for use as structural fill at the discretion of the geotechnical engineer. Samples of structural fill should be submitted for testing prior to transporting to the site. All structural fill should be evenly spread on a horizontal plane in eight-inch loose lifts.

Each eight-inch lift of structural fill material placed at the site should be tested for compliance with the required relative compaction and moisture content prior to proceeding with additional lifts.

6.0 FOUNDATION AND CONSTRUCTION CONSIDERATIONS

The proposed structures may be supported on conventional spread or continuous footings established on mudstone bedrock or suitable structural fill as shown above. Foundation excavations should be visually observed and tested by qualified personnel prior to placement of reinforcing steel or concrete. Additional foundation recommendations are subsequently presented.

DESCRIPTION	VALUE
Foundation Type	Continuous or spread footings on mudstone bedrock or structural fill
Bearing Material	Mudstone or a minimum one foot of structural fill
Allowable Bearing Capacity	2,000 psf for footings 1.0 foot wide or greater
Minimum embedment depth below finished grade	12 inches (for frost and confinement)

DESCRIPTION	VALUE
Minimum footing width	12 inches (continuous) for single-story, 18-inches for two stories, 24-inches (isolated spread)
Total estimated settlement	1-inch
Total differential settlement	less than 3/4 inch

The allowable bearing capacity is based upon dead load plus long term live load. A one-third increase in allowable bearing capacity may be used for short duration loads, such as wind or seismic loads.

7.0 FLOOR SLABS

It is recommended that concrete floor slabs be constructed on a pad that has been prepared as previously indicated with at least 12 inches of structural fill over 8-inches of compacted sandy soils. A minimum of 4-inches of relatively free-draining material should be used beneath the slab in order to help distribute floor loads, break the rise of capillary water, and aid in the concrete curing process. Alternatively, 6 inches of road base may be used in place of the free draining-material. The thickness of the free-draining material may be included in the 12-inches of structural fill.

Concrete slabs should be designed using rebar reinforcement and frequent crack control joints to help control normal shrinkage and stress cracking. Concrete placement and curing should meet ACI⁵ requirements including following hot or cold weather placement recommendations, when appropriate. If a moisture-sensitive floor covering will be installed, we recommend that a vapor barrier be installed beneath the concrete slab. The moisture sensitivity of floor finishes, anticipated project conditions, and the potential effects of slab curling and cracking should be considered in determining if the barrier should be placed directly beneath the slab or beneath the free-draining gravel (see ACI 302.IR-96 for more information regarding vapor barrier location). If the vapor barrier is installed directly beneath the slab, measures should be taken to minimize excessive slab curl such as reduced joint spacing and use of a low shrinkage (low water-cement ratio) mix.

8.0 LATERAL EARTH PRESSURES

Lateral loads imposed on footings may be resisted by the development of passive earth pressures against the sides of footings and friction between the base of the footing and the supporting soils. Lateral earth pressure values are presented in the table on the following page.

Case Evaluated	Soil Type	Value
Active	Processed Mudstone Fill	40 psf/ft
		50 psf/ft (with seismic)
At-Rest	Processed Mudstone Fill	60 psf/ft
Passive	Processed Mudstone Fill	400 psf/ft
		350 psf/ft (with seismic)
Coefficient of friction $\tan(\phi*0.6)$ where $\phi = 32^\circ$	Processed Mudstone Fill	0.34

The lateral earth pressures presented do not include any safety factors except where the friction angle (ϕ) used to determine the coefficient of friction has been multiplied by 0.6 to account for smooth contact conditions. The pressures also assume horizontal backfill and that the backfill is in a drained condition with no build-up of hydrostatic pressure. The additional effects of sloping backfill, surcharge, structural loads and groundwater conditions should be included in calculating lateral earth pressures.

9.0 BELOW GRADE WALLS

Basement / retaining walls should be designed to resist the lateral earth pressures listed above, and assumes level and drained backfill. Backfill should be placed subsequent to floor slab and floor joist construction. Otherwise, the walls should be braced to prevent lateral movement and cracking. Backfill should be placed in accordance with the requirements of structural fill except that backfill in landscape and areas that will not be subject to structural loadings may be reduced to 90% of the maximum dry density as determined by ASTM D-1557. It is recommended that relatively light, manually propelled compactors be used within 5 feet of the walls and that compactors used beyond 5 feet be limited in weight to 3,000 pounds. We suggest that the below grade portion of the backfill walls be damp-proofed with an impervious damp-proofing agent or membrane.

10.0 CUT AND FILL SLOPES

10.1 TEMPORARY

During the construction of the basement / retaining walls, exposed cuts will be present on the site. These cuts may be on the order of 15 feet in height. Experience in the area has shown that the mudstone in the Kayenta Formation is stable in the short- to mid-term. Nearly vertical cut faces in the mudstone are seen in the area. We anticipate that the greatest hazard from these rock cuts will be in the form of raveling.

We recommend that the upper 4 to 5 feet of soil be sloped back from the top of the temporary cuts at a 2H : 1V slope. The hill above the cut should be checked after the soil is cut to remove any boulders which may roll down the slope. During construction, the mudstone bedrock may be cut at a 1H : 4V slope. Excavation safety is the contractor's responsibility, and all excavations should conform to OSHA standards.

10.2 PERMANENT

Due to the steep grades observed on the site, permanent cuts and fills are expected to be on the order of 15 feet. It is recommended that permanent cut or fill slopes in the clayey sand (SC) or processed mudstone, be maintained at a slope of 2H : 1V or flatter unless structurally retained. Grading of both cut and fill slopes should be such that surface water is directed away from the slopes and not concentrated on slopes or in unprotected channels. Permanent cuts in the mudstone bed rock should slope at a 1H : 2V grade. A separation equal to the height of the exposed rock cut should be maintained between the toe of the cut and any structures. Construction procedures should ensure adequate compaction of slope faces. All excavations should conform to OSHA standards.

A minimum 10 foot wide landing pad should be incorporated behind the buildings to catch debris which is dislodged on the slope above the buildings. A row of minimum 2-foot diameter basalt boulders should be placed on the uphill side of the pad as a berm to minimize the risk of debris reaching the buildings. A detail of the proposed pad and berm is included as Figure 10.

11.0 PAVEMENT DESIGN RECOMMENDATIONS

For automobile parking, a traffic index of 5.5, similar to heavy residential, was used for pavement design. For the access road and apron/approach areas a traffic index of 7.0 (15 loaded three-axle trucks per day) was used.

The following parameters were considered:

- ▶ Pavement Design Life - 20 years
- ▶ Subgrade CBR Value - 3 (maximum)
- ▶ Structural Layer Coefficients - Asphalt = 0.40
- Type II = 0.14

Based on design parameters, the following pavement sections are provided.

	Asphalt Thickness (inches)	Type II Base Course (inches)	Structural Fill (inches)
Auto Parking	2.5	6.0	12.0
Access Road / Driveway	3.0	8.0	12.0

The design recommendations are based on the following assumptions:

1. The underlying 8 inches of on-site soils are scarified, moisture conditioned, and compacted to 90 percent of the maximum dry density (ASTM D 1557).
2. Aggregate base is compacted to at least 95 percent of the maximum dry density (ASTM D 1557).
3. Traffic loads are not greater than the loading anticipated herein.
4. Asphaltic concrete is compacted to at least 96 percent of the laboratory Marshall mix design density (ASTM D 6926 and D 2726).

12.0 MOISTURE CONTROL

This soils report provides recommendations for site preparation and foundation design. Soils tested were slightly moisture sensitive, however, inadequate surface drainage or failure to control moisture may result in excessive differential movement and structural damage. The following moisture control measures are recommended:

1. The ground surface should be graded to drain surface water away from the building addition in all directions. A minimum grade of 5% (IBC 1803.3) in the first 10 feet is recommended. Impervious surfaces such as concrete walkways or asphalt pavement adjacent to the structure are effective in reducing the potential for water migration beneath foundations and slabs and should be considered in design. Impervious surfaces such as asphalt or concrete within 10 feet of the building foundation should be sloped a minimum of 2% away from the building.
2. Roof runoff should be collected and discharged well outside of the backfill limits. Alternatively, roof runoff may discharge on impervious surfaces sloped away from the foundation. Water should not be allowed to pond on the site or adjacent to footings or structurally placed fill.
3. Xeriscape (landscaping that eliminates the need for supplemental irrigation of plants) is recommended within 5 feet of the building foundation.
4. Grass should not be placed within 10 feet of the foundation. Grass, if planted, should have a minimum slope of 5% away from the foundation.
5. Inadequate compaction of foundation backfill and utility trench backfill provides a conduit for water migration. All utility trenches within the building footprint and extending 5 feet beyond the footprint should be backfilled with structural fill similar to that approved for the foundations. Backfill adjacent to structures should be

compacted to at least 90 percent of the maximum dry density as determined by ASTM D-1557 and the minimum slope requirements should be followed. Backfill beneath structures and pavements should be compacted to at least 95% of the maximum dry density.

6. Grading should be such that surface water is directed away from all cut and fill slopes and collected only in channels protected against erosion. Water should not be allowed to pond on-site.
7. Drainage from upgradient sources should be routed around the buildings. Residential Lot 2 has a pile of undocumented fill on the slope above the building area. This area is currently being used as a garden, but saturation of this material due to over-watering or an irrigation pipe break could cause instability in these soils. These soils should be addressed as described in Section 5.1 of this report.

It should be emphasized that final grading and landscaping generally occurs after construction of the structure and observation of these features is outside of normal geotechnical inspection and observation. The developer/owner is responsible to ensure that these surface drainage and moisture control recommendations are followed throughout the life of the structure.

13.0 SOIL CORROSIVITY

Soils high in soluble sulfates and have been shown to be severely corrosive to concrete and metal structures. A sample of the mudstone bedrock from Test Pit 1 showed 1.14 percent soluble sulfate, which is very high. We recommend that concrete mixes in contact with site soils be designed in accordance with ACI 318, Section 4.3 for very severe sulfate exposure. This includes 4,500 psi concrete, the addition of a pozzolan such as flyash, and a low water to cement ratio. Sulfate-resistant CMU block is recommended for any privacy walls at the project. Buried pipes should be plastic (PVC or HDPE) instead of metal, where possible.

14.0 FOUNDATION REVIEW AND TESTING

This report has been prepared to assist in project design and construction. Variations from the conditions portrayed in the exploratory investigations may occur which are sometimes sufficient to require modifications to the design. In order to incorporate recommendations provided into actual field conditions and to confirm that the project specifications are implemented, we recommend that observation and testing be performed during construction to monitor over-excavation, grading, and preparation of soils upon which foundations elements or structural loads may be established.

15.0 LIMITATIONS

The exploratory data presented in this report were collected to provide geotechnical design recommendations for this project and subsurface site descriptions represent conditions observed at the time and at the locations explored. The investigations may not be indicative of subsurface conditions beyond the investigation location and conditions may change with passage of time. If

subsurface conditions are encountered that are significantly different than those reported herein, Landmark should be contacted immediately for the continued applicability of the recommendations. In the event changes to the project are made that differ from those presented in this report, Landmark should be made aware of the changes. Landmark will provide written verification that the recommendations and conclusions remain valid or that modifications are required.

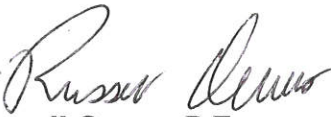
This report has been prepared to assist in project design and construction. We respectfully request the opportunity to review the final design drawings and specifications in order to determine whether the assumptions and recommendations presented herein are applicable to the anticipated designs.

This report is not intended to be used as a bid document. Any information concerning the environmental conditions of the site is beyond the scope of this geotechnical study. This geotechnical report has been prepared to meet the specific needs of our client and may not be appropriate to satisfy the needs of other users.

Respectfully,

LANDMARK TESTING & ENGINEERING

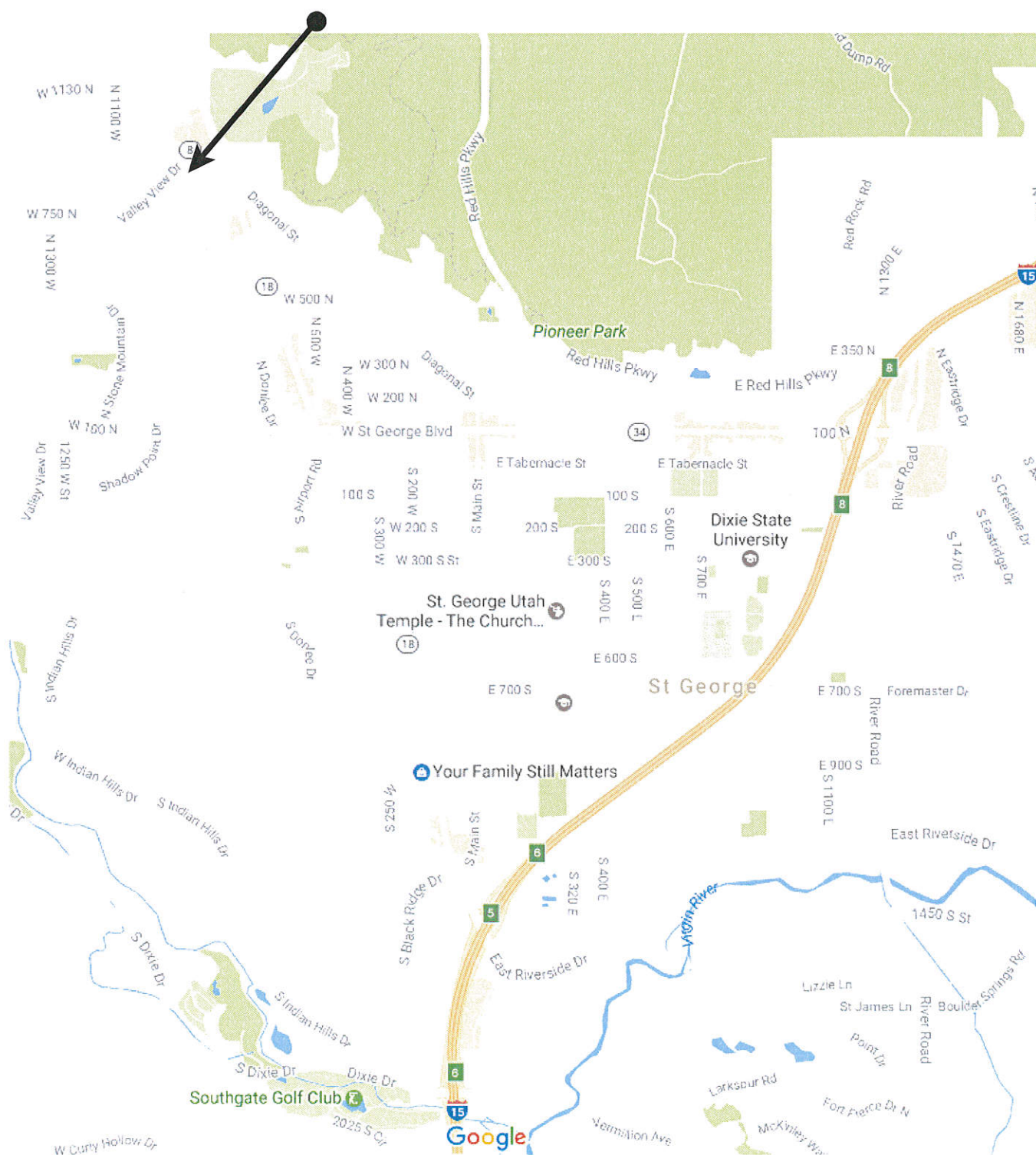
John M. Anderson, P.E.
Project Engineer


Russell Owens, P.E.
Geotechnical Manager



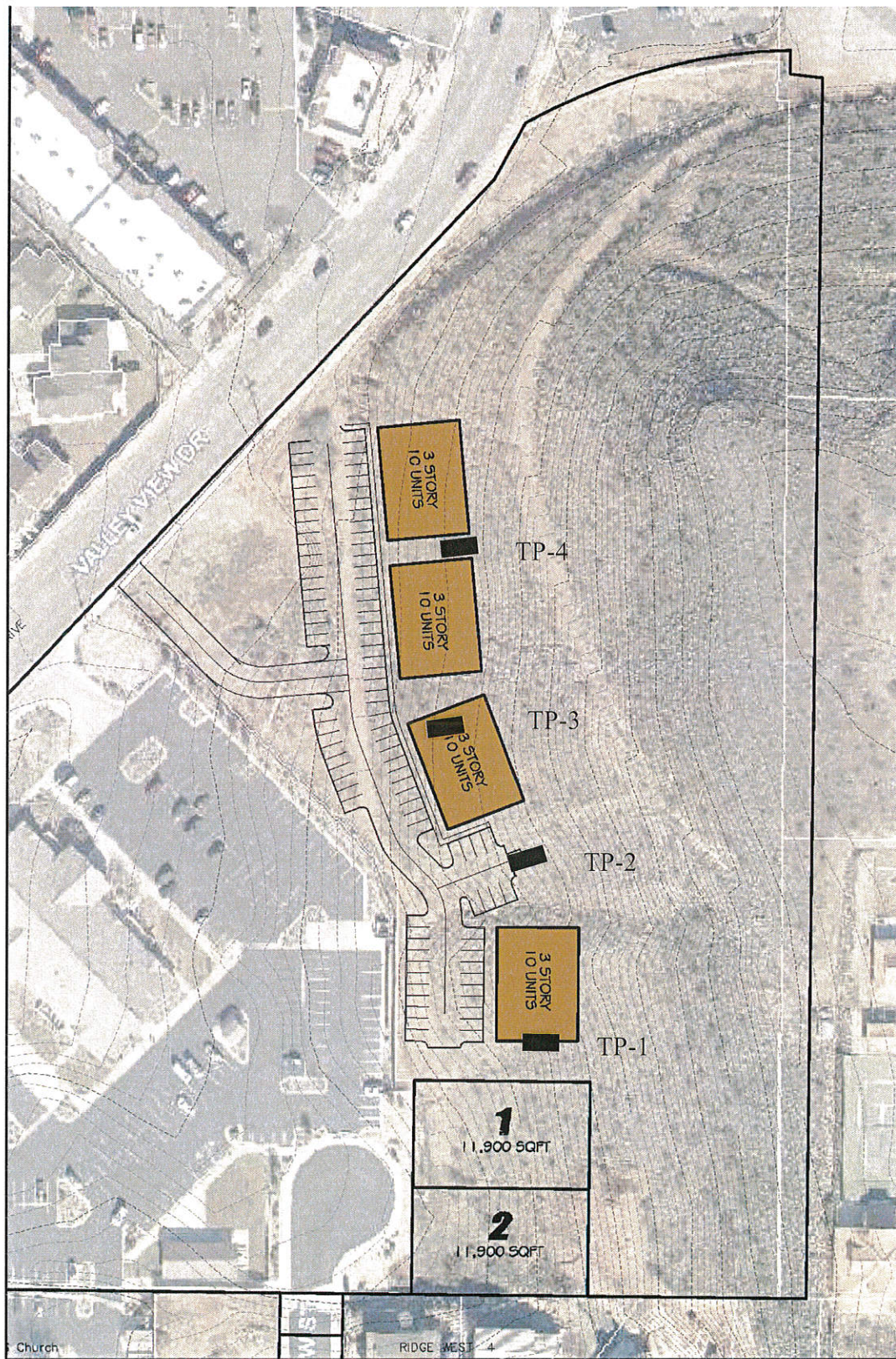


SITE



Vicinity Map
LANDMARK PROJECT 17262

Figure 1



Site Plan

LANDMARK PROJECT 17262

Figure 2

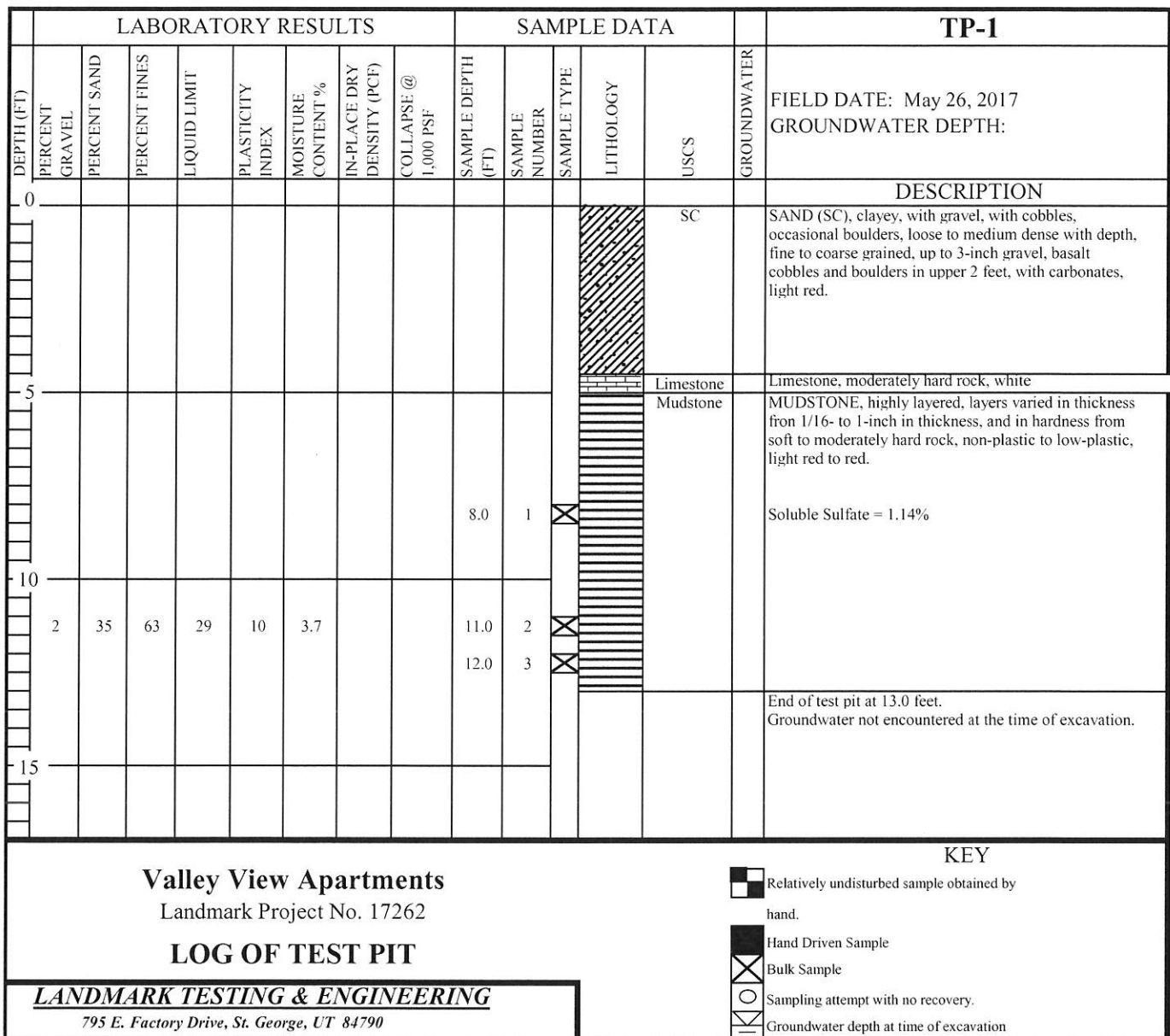


FIGURE 3

LABORATORY RESULTS										SAMPLE DATA				TP-2	
DEPTH (FT)	PERCENT GRAVEL	PERCENT SAND	PERCENT FINES	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	IN-PLACE DRY DENSITY (PCF)	COLLAPSE @ 1,000 PSF	SAMPLE DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	LITHOLOGY	USCS	GROUNDWATER	FIELD DATE: May 26, 2017 GROUNDWATER DEPTH:
0															DESCRIPTION
													SC		SAND (SC), clayey, with gravel, with cobbles, occasional boulders, loose to medium dense with depth, fine to coarse grained, up to 3-inch gravel, basalt cobbles and boulders in upper 2 feet, with carbonates, light red.
5									4.5	1			Limestone		LIMESTONE, moderately hard rock, light grey.
															Refusal at 5.0 feet in limestone. Groundwater not encountered at the time of excavation.
10															
15															

Valley View Apartments
Landmark Project No. 17262

LOG OF TEST PIT

LANDMARK TESTING & ENGINEERING
795 E. Factory Drive, St. George, UT 84790

KEY

-  Relatively undisturbed sample obtained by hand.
-  Hand Driven Sample
-  Bulk Sample
-  Sampling attempt with no recovery.
-  Groundwater depth at time of excavation

FIGURE 4

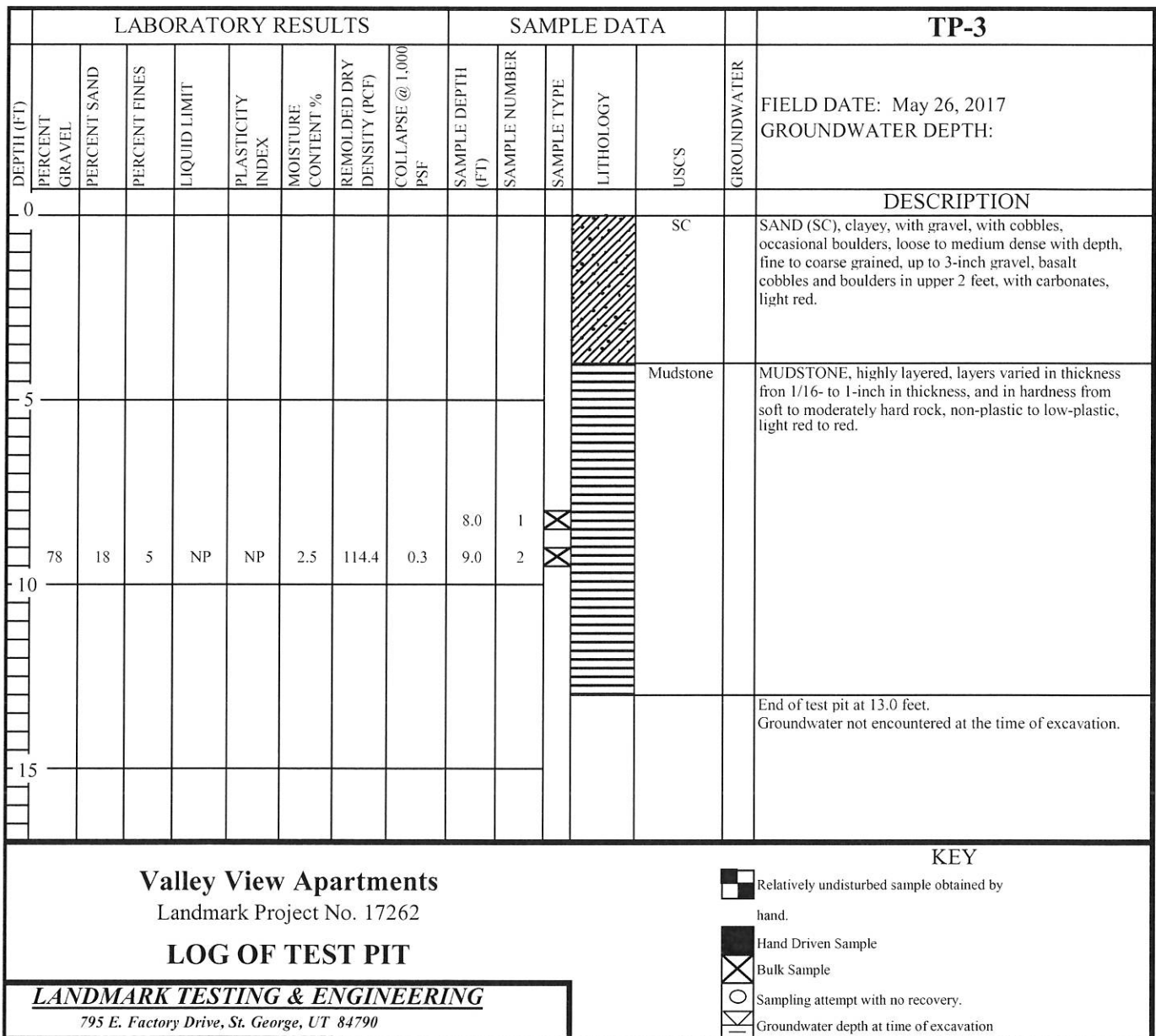


FIGURE 5

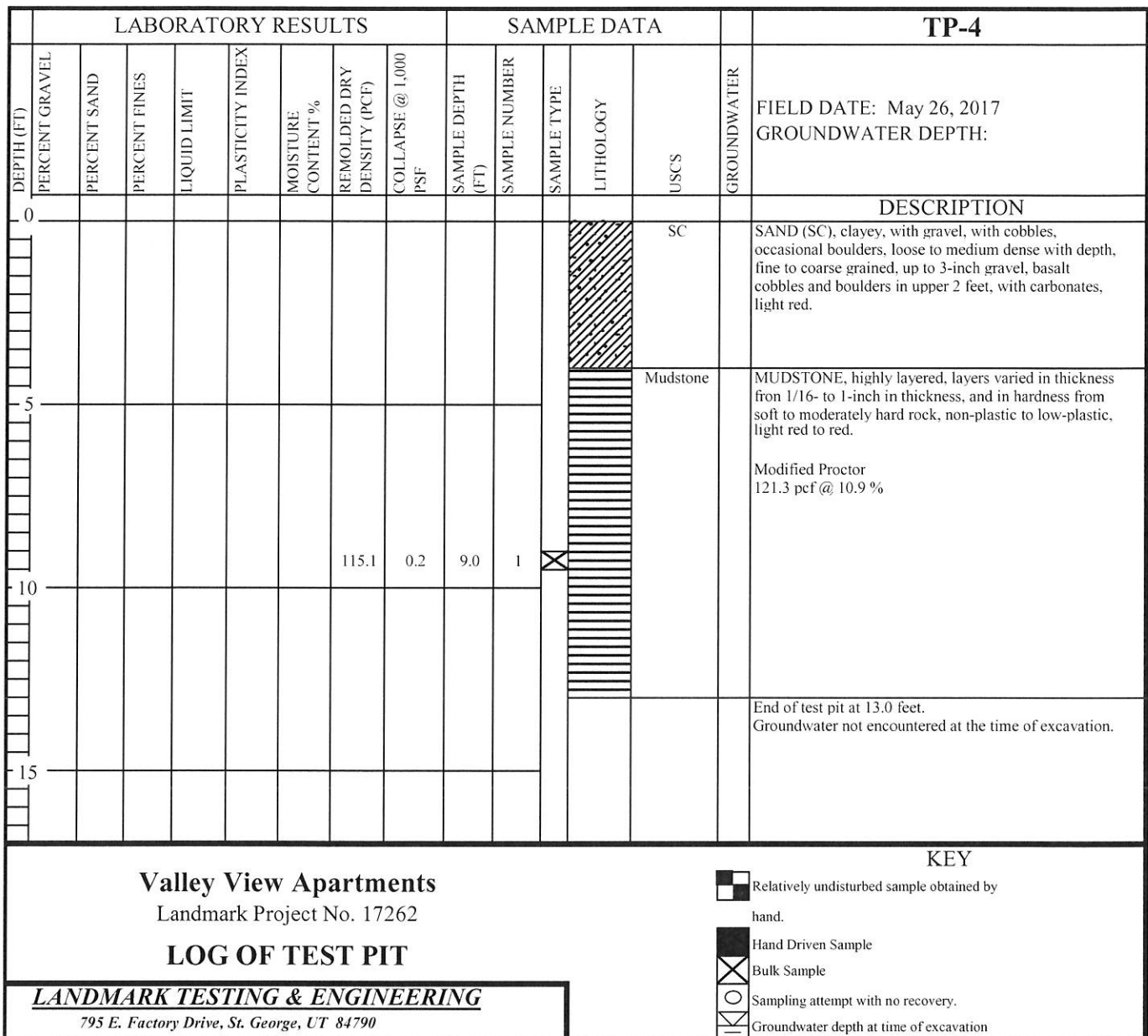


FIGURE 6

UNIFIED SOIL CLASSIFICATION SYSTEM						
MAJOR DIVISIONS		SYMBOL	TYPICAL NAMES			
COARSE-GRAINED SOILS (More than 1/2 of soil > No.200 sieve size)	GRAVELS (More than 1/2 of coarse fraction > No. 4 sieve size)	GW	Well graded gravels or gravel-sand mixtures little or no fines			
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines			
		GM	Silty gravels, gravel-sand-silt mixtures			
		GC	Clayey gravels, gravel-sand-clay mixtures			
	SANDS (More than 1/2 of coarse fraction < No. 4 sieve size)	SW	Well graded sands or gravelly sands, little or no fines			
		SP	Poorly graded sands or gravelly sands, little or no fines			
		SM	Silty sands, sand-silt mixtures			
		SC	Clayey sands, sand-clay mixtures			
FINE-GRAINED SOILS (More than 1/2 of soil < No.200 sieve size)	SILTS & CLAYS Liquid Limit <50	ML	Inorganic silts and very fine sands, rock flour, silty fine sands or clayey silts with slight plasticity			
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandys clays, silty clays, lean clays			
		OL	Organic silts and organic silty clays of low plasticity			
	SILTS & CLAYS Liquid Limit >50	MH	Inorganic silts, micaceous or diatomaceous fine sand or silty soils, elastic silts			
		CH	Inorganic clays of high plasticity, fat clays			
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts			
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils			
GRAIN SIZE CHART			Hardness of Rock			
CLASSIFICATION	RANGE OF GRAIN SIZE		Descriptive Term	Characteristics		
	U.S. Standard Sieve Size	Grain Size in Millimeters				
BOULDERS	Above 12"	Above 305	Moderately Hard	Can be scratched with a knife with light to moderate pressure; breaks with moderate hammer blow.		
COBBLES	12" to 3"	305 to 76.2				
GRAVEL Coarse Fine	3" to No.4 3" to ¾"	76.2 to 4.76 76.2 to 19.1	Hard	Can be scratched with a knife with difficulty; can be broken with heavy hammer blow.		
	¾" to No.4	19.1 to 4.76				
	SAND Coarse Medium Fine	No.4 to No.200 No.4 to No.10 No.10 to No.40 No.40 to No.200			4.76 to 0.074 4.76 to 2.00 2.00 to 0.420 0.420 to 0.074	Very Hard
SILT & CLAY		Below No.200	Below 0.074			
			SOIL CLASSIFICATION			

FIGURE 7

LANDMARK TESTING AND ENGINEERING

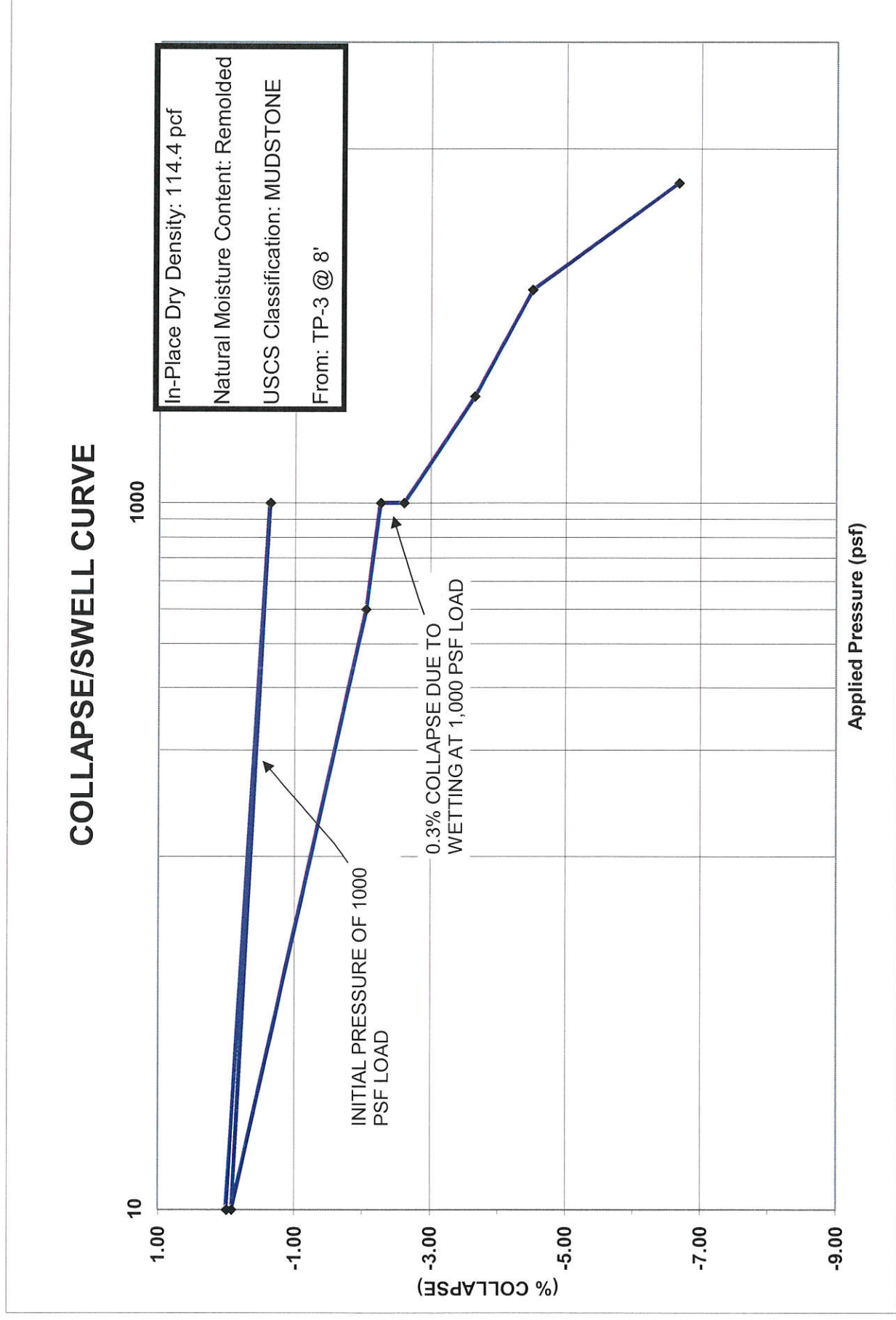


FIGURE 8

COLLAPSE/SWELL CURVE

In-Place Dry Density: 115.1 pcf
 Natural Moisture Content: Remolded
 USCS Classification: MUDSTONE
 From: TP-4 @ 9'

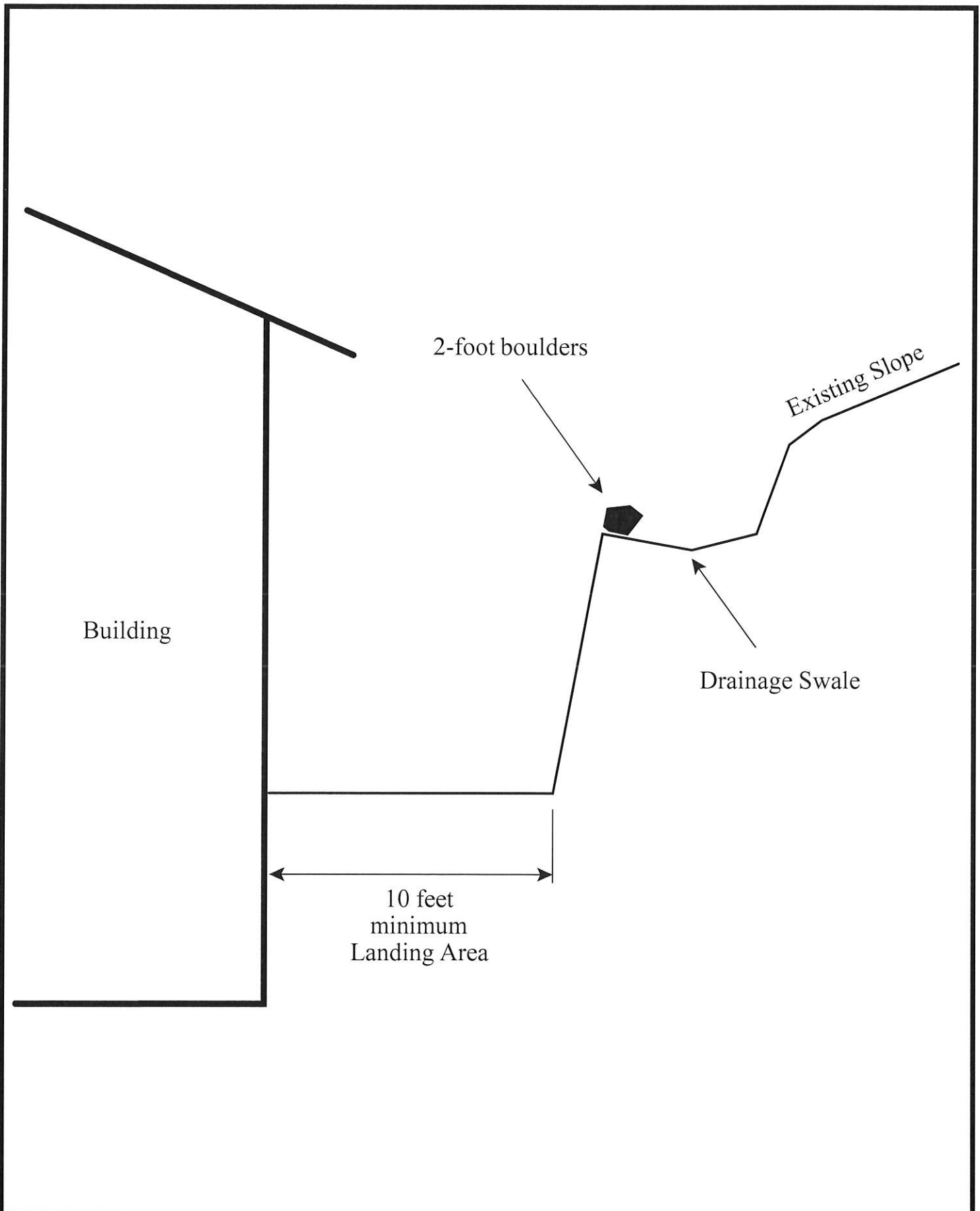
Applied Pressure (psf)	(% COLLAPSE)
10	1.00
100	-1.00
1000	-3.00
1000 (after wetting)	-3.20

INITIAL PRESSURE OF 1000 PSF LOAD

0.2% COLLAPSE DUE TO WETTING AT 1,000 PSF LOAD

Applied Pressure (psf)

FIGURE 9

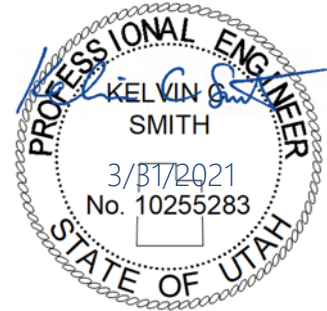


To Catherine Hasfurther, P.E.
Engineering Manager | Public Works
City of St. George
175 East 200 North
St. George, UT 84770

From Kelvin C. Smith, P.E.
Project Engineer
Civil Science

Date March 31, 2021
Project Desert Garden Cove
Number CSI# 21116

Subject [Hillside Submittal Drainage Design Memorandum](#)



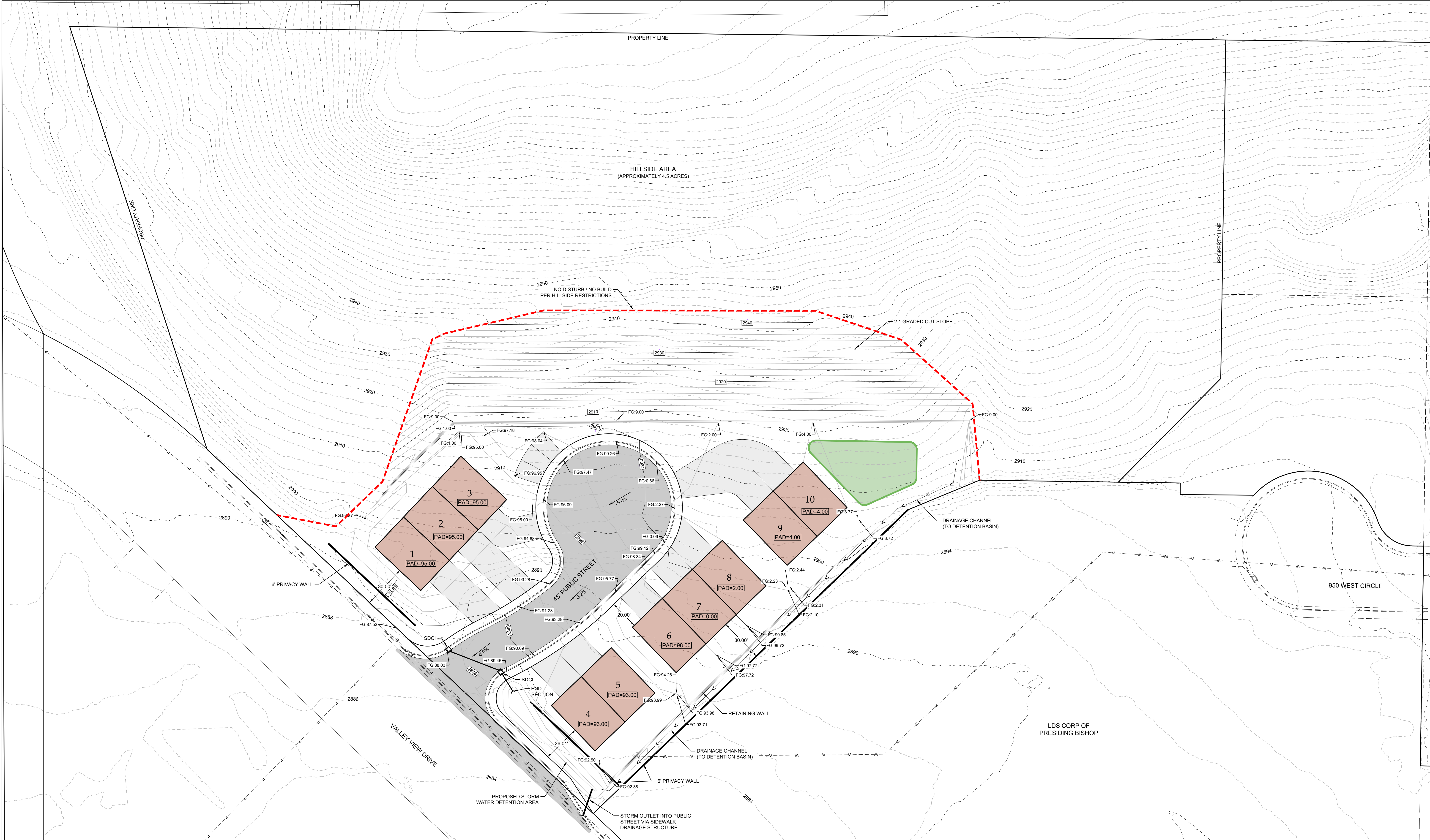
The purpose of this Memorandum is to address the general drainage design of Desert Garden Cove. The property is located at approximately 850 North Valley View Drive. The project site borders a church building property to the south. Storm runoff currently comes off the natural hillside area and through the site to the street. We intend to build a retaining wall on the east side of the project to extend the buildable area of the site and to collect and convey storm water runoff around the project.

Flows to the north side of the retaining wall will be conveyed through a channel at the top of the wall to a natural channel behind the residences, then to a detention basin. Similarly, runoff flows will also be conveyed to the south side of the retaining wall will be conveyed through a channel at the top of the wall to a natural channel with several large check dams to reduce the flow velocity behind the residences, then to a detention basin. The two parts of the detention basin will be connected with a 12" pipe under the access road to act as one detention basin. The outlet structure will be near the southwest corner of the property and will connect to a sidewalk structure to release controlled flows to the gutter. There is no storm drain infrastructure near the project site, which requires the constructure of a sidewalk structure.

The detention basin and outlet structure will be designed to reduce the post-development peak runoff flow to pre-development flow levels for all storms required according to the St. George Drainage Manual.

Attachments

Site Plan



CONSTRUCTION TIME TABLE

PROJECT IS ESTIMATED TO BE COMPLETED IN ONE YEAR FROM START DATE AND BE COMPLETED IN A SINGLE PHASE.

DRAINAGE

DRAINAGE RUNOFF WILL BE DIRECTED FROM THE HILLSIDE VIA A DRAINAGE CHANNEL AROUND THE TOWNHOME UNITS TO THE PROPOSED DETENTION BASIN LOCATED ALONG VALLEY VIEW DRIVE. THE DISCHARGE WILL BE THROUGH A SIDEWALK STRUCTURE TO THE FLOW LINE OF EXISTING CURB & GUTTER.

DIRT QUANTITIES

CUT = 10,854 CY
FILL = 3,914 CY
NET = 6,740 CY EXPORT

NOTES:

ALL IMPORTED STRUCTURAL FILL SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO DELIVERY TO THE SITE. ALL IMPORTED STRUCTURAL FILL SHALL BE PLACED IN 8-INCH LOOSE HORIZONTAL LIFTS AND COMPACTED TO A MINIMUM OF 95 PERCENT OF MAXIMUM DRY DENSITY (ASTM D-1557).

ALL EXCAVATION, GRADING AND FILL OPERATIONS WITHIN THE BUILDING AREA SHOULD BE OBSERVED BY THE GEOTECHNICAL ENGINEER TO VERIFY SUB-SOIL CONDITIONS AND DETERMINE ADEQUACY OF SITE PREPARATION, SUITABILITY OF FILL MATERIALS AND COMPLIANCE WITH COMPACTION REQUIREMENTS.

THE CONTRACTOR SHALL PROVIDE SUITABLE EQUIPMENT TO CONTROL DUST AND AIR POLLUTION CAUSED BY CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL ALSO PROVIDE SUITABLE MUD AND DIRT CONTAINMENT TO MAINTAIN THE WORK SITE, ACCESS ROADWAYS AND ADJACENT PROPERTIES IN A CLEAN CONDITION.

ALL EXCAVATION AND GRADING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ST. GEORGE CITY AND APPENDIX J OF THE INTERNATIONAL BUILDING CODE AND THE SPECIFICATIONS AND REQUIREMENTS INCLUDED IN THE GEOTECHNICAL STUDY.

GEOTECHNICAL ENGINEER TO PROVIDE GRADING COMPLETION REPORT TO CONFIRM WORK HAS BEEN PERFORMED IN CONFORMANCE WITH THEIR RECOMMENDATIONS.

OWNER IS RESPONSIBLE FOR ALL ON-SITE DRAINAGE AND DETENTION.

LEGEND

	EXISTING GROUND CONTOUR		DRAINAGE FLOW DIRECTION
	FINISH GRADE CONTOUR		PAD ELEVATION
	PROJECT BOUNDARY		SPOT ELEVATION
	PROPOSED CURB & GUTTER		TOP BACK OF CURB
	EXISTING CURB & GUTTER		TOP OF ASPHALT
	PROPOSED RETAINING WALL		GRADE BREAK
			FLOW LINE
			TOP OF CONCRETE

DESERT GARDEN COVE
GRADING & DRAINAGE PLAN

DESERT GARDEN COVE
HILLSIDE DEVELOPMENT REVIEW
GRADING & DRAINAGE PLAN

PROJ. #: FF 21116.00
DRAWN BY: BLW
DATE: 3/31/2021
CHECKED BY: KCS
SCALE OF SHEET
HOR SCALE: 1" = 30'

SHEET
2
OF
3

HILLSIDE REVIEW BOARD
CITY OF ST GEORGE
WASHINGTON COUNTY, UTAH
JANUARY 27, 2021

PRESENT:

James Sullivan
James Dotson
David Black
Shawn Patten

CITY STAFF:

Assistant Public Works Director Wes Jenkins
Planner III Dan Boles
Planner II Genna Goodwin

APPLICANT:

Mark Teepen
Reed Scout
Allen Hall, Rosenberg Associates

EXCUSED:

1. Consider a request for a Hillside Development Permit to allow development of PA (Planning Area) 9 of the Divario development. The property was originally considered for hillside approval in 2008 but required additional review to allow cuts and fills of greater than 10 feet. The property is generally located south-east of Varano Vistas and Cecita Crest at Divario subdivisions on Divario Canyon Drive. The property is currently zoned R-1-7 (Residential single family, 7,000 sq ft minimum lot size). The owner is 730 St George, LLC. Case No. 2021-HS-001. (See 'Meeting Place' exhibit below). **Meeting time approx. 8:30 am**

Mark Teepen explained that this area has already been approved by hillside however, here in PA-9, any cuts greater than 10' must return to the hillside review board for review. There are areas that have cuts of about 16' throughout the project.

Took some time to orient everyone to where the meeting was taking place and where the proposals would be.

Discussion on cuts and wall heights.

Mark Teepen explained that there would be varying mitigation measures in place to address the large cuts. The homes tend to block the cuts. They also revegetate the area. Drill cuts are used when possible.

James Sullivan asked how tall a cut would be from a certain pad elevation.
Allen Hall said about 24'. Most of it is solid. We pre-drill all locations to create the best plan.
Mark Teepen added that there would be rock wall tops to the cut slopes.

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WASHINGTON COUNTY, UTAH
JANUARY 27, 2021

David Black noted there was no geotechnical report with this application, however the cuts are solid. Typically, the hillside ordinance is intended to prevent hillsides from scarring as the color beneath the surface varies from the cut color. In this area, that is not the case. The cut is the same color as the surface and noticeable scarring does not occur. The rock walls they are building also blend in. There may be a safety issue with some of the cuts adjacent to the BLM property. A barrier can mitigate that.

Mark Teeppen said that a barrier will be required for the tortoise reserve.

James Dotson said the existing development looks great and if they continue that it should be fine.

Conflict of Interest Statements

James Dotson noted that their firm designed the landscape for the project.

David Black noted that their firm is working on this project, but he is not assigned to this case.

Jaems Suulivan noted that their firm has purchased parcel 14.

MOTION:

James Dotson made a motion to recommend approval of the request for a Hillside Development Permit to allow development of PA-9 as requested and outlined in the staff report.

David Black seconded the motion.

AYES (4)

James Sullivan

James Dotson

David Black

Shawn Patten

NAYS (0)

Motion carries.

2. Consider approval of the meeting minutes from September 23, 2020 and December 16, 2020.

The minutes were not approved at this meeting.

ADJOURN

James Sullivan made a motion to adjourn.

James Dotson seconded the motion.

Meeting adjourned.

HILLSIDE REVIEW BOARD
CITY OF ST GEORGE
WASHINGTON COUNTY, UTAH
FEBRUARY 17, 2021

PRESENT:

James Sullivan
James Dotson
Dave Black
Shawn Patten

CITY STAFF:

Assistant Public Works Director Wes Jenkins
Planner III Dan Boles
Planner III Mike Hadley
Development Services Office Supervisor Brenda Hatch

APPLICANT:

Dave Nasal
Dwain Schallenberger
Eric McFadden, Premier Design
Wayne Rogers, AGECE

EXCUSED:

1. Consider a request for a Hillside Development Permit to allow development of the subject property into townhomes. The applicant is asking for approval of a hillside permit in order to cut into 20-40% slopes. The property is located on the east side of Riverside Drive between Judy Ln. and Foremaster Road. The property is currently zoned R-3 (Multi-Family Residential). The owner is Steven Park. Case No. 2021-HS-002. (*See 'Meeting Place' exhibit below*). **Meeting time approx. 8:30 am**

James Sullivan Called the meeting to order.

Eric McFadden – This site was approved by hillside right before the 2008 fallout and the project never got built. The buyers went bankrupt and the land sat here so the approval is null and void. Dave and Dwain picked this up a few years ago, we started to place some good fills in here to get above the clay. There is a fixed access up where it is staked out which is creating a lot of this cut. It's the proper access by the City between Foremaster and Judy Lane, it also lines up with the approved PD across the street to create functionality. That is what driving this cut is the second access to this property. The City standards are that they like to have 75 feet of throat depth on an entryway, so we have provided that. We thought instead of leaving a bare cut we could put some buildings in front of it, we can hide 85% of the cut, the only cut we can't hide is right on the entryway. We can mitigate that with maybe replanting some things depending on the soils. The balloons are the top edge of the cut. There is a little rock outcropping that we saved, we will have a future park right there. Other than that, the other slopes are man made slopes. We understand that we are getting into a bit of the forbidden slopes, but those slopes were

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CITY OF ST GEORGE
WASHINGTON COUNTY, UTAH
FEBRUARY 17, 2021

made by the cut to bring in the road back in the day. That cut created the 40% slopes we have to disturb.

Wayne Rogers – This hill right here is all sandstone, when you get on the other side of it you get into the clay. We wouldn't even have to over excavate the buildings, almost everything is going to be right on sandstone. We get into the clay a little bit on that entrance road cut.

Eric McFadden – We can walk up there to show you where that cut is, we've got it staked.

Wayne Rogers – We've got it right now shown as 1:1, you could probably steeper with the sandstone at the bench in it like he's got shown. On the clay we will probably flatten it out. We wouldn't take the cut all the way up the hill. There is a little tiny slough up there where they cut the road and that is just because they cut it too steep, the clay dries out, becomes brittle and just slides down. The geology on this area, there is no mapped landslides, there was one in 2008 the study didn't find any landslides in here, in 2011 the geology study came out and showed a landslide, but I think it's the piece that split on the road. And then in 2016 they put an interactive map online, and that map doesn't show the landslide again. So, I called the UGS and they said to go with the latest 2016, use that as your reference. My report does show that it includes that piece that just barely touches, from the road cut. They also have a low to moderate rockfall hazard in this corner, we didn't do a specific runout because it was so far away, and you have this hill protecting where most of the rockfall condition is. We didn't see any pieces that came down in this far into the development.

Eric McFadden – The approved second access location down there with the site distance issues. I know there were some issues down there with the new development around the corner. When we come out here it gives us a good 700 feet of visibility. It has a pretty straight grade from north to south. The back edge of the buildings will tie in some relief so that they don't look flat and boring. All the units have 2 car garages, full driveways, we have all the additional parking.

James Sullivan – Will this be a public street or a private street?

Eric McFadden – Public street.

Shawn Patten – I think my concern would be how you address that big cut right there, what is it 30 feet?

Wayne Rogers – It is 30 feet.

Eric McFadden – There is no other way to get into the road.

Shawn Patten – I understand that but how do you clean that up and make it look attractive?

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CITY OF ST GEORGE
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Eric McFadden – I think if we step it back a little we could soften that like you were saying.

Wayne Rogers – We could put a little rock at the toe, and clean it up at the bottom, the slope itself is just going to be a cut.

Dave Black – I would agree with those comments of Shawn's. In this area here I think the buildings are mitigating the cut, and there is sandstone which is a must softer color that won't jump out at you, so I'm not concerned about the mitigation there. This right here is going to be highly visible and I don't think it would be unrealistic for us to ask for mitigation for it.

Eric McFadden – Can we do 8-foot tiered walls and tie it in that way?

Discussion of what the cut looks like from the road in each direction.

Dave Black – We want to make sure there is a specific stability analysis that addresses the clay and the cut slopes.

Eric McFadden – In the worst spot it's 36 feet. We're under 30 feet there and we could do 3 8-foot tiered walls and that would create more of a grand entrance there than just the cut.

Dave Black – There is a maintenance issue with the plants growing on it. Could you do a planter or something there?

Eric McFadden – There is a drainage ditch in the bottom before you get to the sidewalk so we do have a little space there we could play with to do some planting. Build an 8-foot wall or so.

James Sullivan – You will want to make sure you can get in and clean it out. So, with this being a public street, who is maintaining that?

Eric McFadden – The HOA would be responsible. We could look at stepping that back another 5 or so feet, it's just going to change how far we are up the hill. Which I don't think is a huge issue. The buildings will still cover it. We are going to put a storm drain system in there also that will catch it about every 60 – 80 feet to get the water out of the channel so it's not trying to gravity pull. If you get a heavy storm it will get out of the channel right away, it won't sit in there and try to get out. I know that doesn't help the debris coming off the hill, but it helps mitigate the water. If we widened it we could go back there and maintain all of that.

Group walked up to the entrance point.

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WASHINGTON COUNTY, UTAH
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Eric McFadden – So as you can see we can lay that cut back and we are only getting into basically nothing else. Instead of going 1:1 we could lay it back.

James Sullivan – If you are in sandstone I don't see the point of putting a wall up there. It would almost be worth putting a rock face on it.

Discussion continued on the cut and laying it back.

James Sullivan – I don't know if we leave it to staff or if the motion needs to say that the cut slope will be different, maybe a 2:1?

Dave Black – The geotechnical report investigation needs to specifically address this corner's cut, look at this area for some special enhancement and that they account for maintenance unraveling at the slope so they can accommodate that.

Wes Jenkins – Is it all sandstone behind the units themselves where they are doing that cut?

Wayne Rogers – Back on the east side, yes.

Wes Jenkins – You don't expect any unraveling on that face?

Wayne Rogers -

MOTION: Dave Black made a motion to recommend for approval a Hillside Development Permit for Willow Bend with the following conditions: behind the units that have the sandstone cut they make sure there is enough room to accommodate for maintenance to address any future sloughing, that the geotechnical investigation specifically addresses the stability of the cut in the northeast corner of the property, they look at possible enhancements at the north entrance for the cut slope and account for maintenance and unravelling in their design, the HOA addresses specific maintenance. James Dotson seconded the motion.

AYES (4)

James Sullivan

James Dotson

David Black

Shawn Patten

NAYS (0)

Motion carries.

2. Consider approval of the meeting minutes from September 23, 2020 and December 16, 2020.

MOTION: Dave Black made a motion to approve the meeting minutes from September 23, 2020 and December 16, 2020.

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SECOND: James Dotson

AYES (4)

James Sullivan

James Dotson

David Black

Shawn Patten

NAYS (0)

Motion carries.

ADJOURN

James Dotson made a motion to adjourn.

Dave Black seconded the motion.

Meeting adjourned.