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M/035/0052
T-23192

Form MR-REV-att (DOGM – Revise/Amend Change Form)
(Revised September 14, 2005)

Application for Mineral Mine Plan Revision or Amendment

Operator: South Valley Rock Products, LLC

Mine Name: Juniper Canyon Pit **File Number:** M/035/0052

Provide a detailed listing of all changes to the mining and reclamation plan that will be required as a result of this change. Individually list all maps and drawings that are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise or amend the existing Mining and Reclamation Plan. **Include page, section and drawing numbers as part of the description.**

DETAILED SCHEDULE OF CHANGES TO THE MINING AND RECLAMATION PLAN

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
X ADD	☐ REPLACE	☐ REMOVE	NOI
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
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I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments and obligations, herein.

Jeff Wright
Print Name

Manager
Sign Name, Position

9/19/24
Date

Return to:

State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801
Phone: (801) 538-5291 Fax: (801) 359-3940

FOR DOGM USE ONLY:
File #: M/ /
Approved:
Bond Adjustment: from ($)
to $

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XI.SIGNATURE REQUIREMENT

I hereby certify that the foregoing is true and correct. (Note: This form must be signed by the owner or officer of the company/corporation who is authorized to bind the company/corporation).

Signature of Permittee / Operator/Applicant:
Name (typed or print): Jeffrey D Wright
Title/Position (if applicable): Manager
Date: 9/19/24

Form MR-REV-att (DOGM – Revise/Amend Change Form)
(Revised September 14, 2005)

Application for Mineral Mine Plan Revision or Amendment

Operator: South Valley Rock Products, Inc.

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I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments and obligations, herein.

Jared Burton
Print Name

Jared Burton, Vice President
Sign Name, Position

9/9/24
Date

Return to:

State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801
Phone: (801) 538-5291 Fax: (801) 359-3940

FOR DOGM USE ONLY:
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to $

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Notice of Intention
To Begin a Large Mining Operation

South Valley Rock Products, Inc
Juniper Canyon Pit
DOGM Number – M/035/0052

Submitted by:

South Valley Rock Products
357 W. 6160 S Unit 4
Murray, UT 84107

To:

Utah Division of Oil, Gas and Mining,
1594 West North Temple, Suite 1210
Salt Lake City, UT 84114-5801

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Rule R647-4-104 Operator, Surface, and Mineral Owners

1.	Mine Name:	Juniper Canyon Mine
2.	Operator:	South Valley Rock Products, Inc. 357 W. 6160 S. #4 Murray, UT 84107 801-302-2200
	Type of Business:	Limited Liability Corporation
	Utah Business Entity No:	10288587-0160
	Local Business License No:	18221
	Issuing City:	Murray, UT
	Registered Utah Agent:	Jeffrey Wright 357 W. 6160 S. #4 Murray, UT 84107 Phone: 801-302-2200 Email: Jeff@JWright.Biz
3.	Permanent Address:	South Valley Rock Products 357 W. 6160 S. Murray, UT 84107 801-302-2200
4.	Contact Person for Permitting, Surety, Notices:	
		Nick Anderson South Valley Rock Products 357 W. 6160 S. #4 Murray, UT 84107 Phone: 801-386-6822 Email: nick@jwright.biz
5.	Location of Operation:	SWSE & SESE Portions of S7, T4S, R1W
6.	Ownership of Land Surface:	Innovative Excavation & Construction 888 Baxter Drive, Suite 100 South Jordan, UT 84095
7.	Owners of Record of Minerals to be Mined:	
		Innovative Excavation & Construction 888 Baxter Drive, Suite 100 South Jordan, UT 84095

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8. BLM Lease or Project File Number:

None

9. Adjacent Landowners:

Adjoining property owners

Utah Department of Transportation 4501 Constitution Blvd, Taylorsville, UT 84129	Herriman City 5355 W Main St, Herriman, UT 84096	Innovative Excavating and Construction, LLC 5403 Wells Park Rd, West Jordan, UT 84081
Paul T Knouse; Viemarie Knouse (Jt) 14920 S. Mountain View Corridor HWY Herriman, UT 84096	Riverside Development, LLC 5157 South 2815 West Bluffdale, UT 84065	Dai Rosecrest, LLC 14034 S 145 E STE 204 Draper, UT 84020
South Bench Investment, LLC 15006 S. Mountain View Corridor HWY Herriman, UT 84096		

Adjoining residential property owners

Tulip I Antar-Mohammed 4268 W Hemsley Ln Herriman, UT 84065	Edgar Drew Larsen 14783 S Garrison Ln Herriman, UT 84065	Perihelion, Llc 14787 S Garrison Ln Herriman, UT 84065
Travis Arthur Wing; Whitney Jo Wing (Jt) 14789 S Garrison Ln Herriman, UT 84065	Travis Arthur Wing; Whitney Jo Wing (Jt) 14789 S Garrison Ln Herriman, UT 84065	Travis Arthur Wing; Whitney Jo Wing (Jt) 14789 S Garrison Ln Herriman, UT 84065
Jack F Johnson; Carolyn M Johnson (Jt) 14791 S Garrison Ln Herriman, UT 84065	Ryan Nielsen 14793 S Garrison Ln Herriman, UT 84065	Carol Sue Smith; Paul Smith (Jt) 14797 S Garrison Ln Herriman, UT 84065
S&T Tracy Properties, Llc 14799 S Garrison Ln Herriman, UT 84065	Heather Layman; Matthew Rocha (Jt) 14801 S Garrison Ln Herriman, UT 84065	Tiffany Sadler 14809 S Garrison Ln Herriman, UT 84065
Van Noy Realty, Llc 14811 S Garrison Ln Herriman, UT 84065	Abhinav Parvataneni 14813 S Garrison Ln Herriman, UT 84065	Troy Hansen; Jennifer Hansen (Jt) 14817 S Garrison Ln Herriman, UT 84065
Ted C Belliston; Kim Belliston (Jt) 14819 S Garrison Ln Herriman, UT 84065	Moala Semisi; Crystal Moala (Jt) 14821 S Garrison Ln Herriman, UT 84065	Todd Parker Earl; Mindy Elizabeth Mounteer (Jt) 14823 S Garrison Ln Herriman, UT 84065
Scott Iverson 14827 S Garrison Ln Herriman, UT 84065	Andrea Christine Lee 14831 S Garrison Ln Herriman, UT 84065	Justin Sanders; Maria P Sanders (Jt) 14833 S Garrison Ln Herriman, UT 84065
Garrison Lane, Llc 14837 S Garrison Ln Herriman, UT 84065	Garrison Lane, Llc 14837 S Garrison Ln Herriman, UT 84065	Jose M Vallejo; Denise J Ramirez Avila (Jt) 14839 S Garrison Ln Herriman, UT 84065
Daniella Oliver; Nathan Oliver (Jt) 14841 S Garrison Ln Herriman, UT 84065	Edith Castillo 14843 S Garrison Ln Herriman, UT 84065	Burnett Real Estate Llc 14847 S Garrison Ln Herriman, UT 84065
Amber Yvette Waters 14849 S Garrison Ln Herriman, UT 84065	Chase Smith; Katie Smith (Jt) 14853 S Garrison Ln Herriman, UT 84065	

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10. Have the land, mineral, and adjacent landowners been notified in writing?
    Yes, they will be notified for public comment.

11. Does the Permittee / Operator have legal right to enter and conduct mining operations on the land covered by this notice.
    Yes.

<u>R647-4-105 - Maps, Drawings & Photographs</u>

105.1 - Topographic base map, boundaries, pre-act disturbance

See Attached map 105.1

105.2 - Surface facilities map

See Attached Map 105.2

105.3 Ephemeral Stream Map

See Attached Map 105.3

105.4 Geologic Map

See Attached Map 105.4

105.5 Photographs

See attached photos

105.6 Underground and Surface Mine Development Maps

SVRP has no underground workings and has no plans to develop an underground mine.

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R647-4-106 - Operation Plan

106.1 - Minerals mined

The Operator will produce crushed and/or screened aggregate for construction projects and building roadways.

106.2 - Type of operations conducted, mining method, processing etc.

Type of Operation

South Valley Rock Products will primarily extract aggregate rock for use as road base, landscape rock, and other construction products.

Mining Methods

SVRP will remove rock from the active mine area by drilling, blasting, and dozing methods. Rock is removed by drilling and blasting to release areas of rock approximately 30-50 feet deep and up to one to two acres in size. Extraction for the loosened materials is done by dozing material downward through exposed rock. After all the upper-level rock has been removed, new areas are then drilled to then loosen the rock below. The lower-level rock is then removed and processed. The loose rock is pushed using a CAT D10 Dozer down to a feed loader that loads material into the crushing jaw for processing. Depending on our current needs of customers different products are then made.

Processing Methods – Crushing

Once the blasted material is brought to the jaw crusher via front end loader. Once it runs through the jaw it drops onto the first set of screens. Depending on the material being process the screens may be different. Any material that does not make it through the first set of screens, goes to the jaw to be re processed into smaller aggregate. The material that does make it through the initial screening is then drops onto a conveyer belt to be sold. After the reject material makes it through the jaw it goes through another set of screens. From there it goes to a stacker belt to be sold.

Blasting Practices:

Blasting typically happens once a quarter. SVRP does not perform blasting in house. Depending on which sub we use they might have slightly different practices. Blasting is done in accordance with all local, state, and federal laws. The operator or subcontractor uses blast monitoring to ensure that blast vibration data is recorded and utilized to manage slope stability. Blasts will be viewed from above if possible. A blast vibration monitoring system utilizing seismographs shall be instituted and actively managed.

Concurrent Reclamation:

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No reclamation of the mine will take place for the first 10 years. The areas mined out will be used to stage materials and equipment to aid in the mining and processing of aggregates. At conclusion of mining operations. Land will be developed with new roads, and commercial and residential housing units built to the specs of the State of Utah and the City of Herriman.

106.3 - Estimated acreages

All parcels involved with the operation totaling 47.27 Acres. (Most of which we will not be mining.) Total Area Currently Disturbed for the Mining Operation 25.15 Acres (This includes stockpile area, scale area, mining area, etc.) Overall Proposed Area to be Mined 27.92 Acres. See attached 105.2 maps.

106.4 - Nature of materials mined, waste and estimated tonnage

Based on demand of the market we will mine 400,000 to 600,000 tons of material per year. There is 6'' of topsoil overburden. The material deposits are 30-100' thick depending on location. No waste material or tailings are generated at this operation. Current stockpiles are around 5,000 tons of road base, gravel, and sand.

106.5 - Existing soil types, location of plant growth material

Soil Description: The mine disturbance area primarily consists of 8019—Stepmount-Tickville complex, 8 to 20 percent slopes. The Stepmount series consists of shallow, well drained soils that formed in alluvium and colluvium over residuum derived from andesite. Stepmount soils are on hillslopes or mountain slopes. Slopes range from 8 to 60 percent. Mean annual precipitation is about 15 inches and the mean annual temperature is about 49 degrees F., The northern portion of the site outside of mining operations contains Clayey terrace escarpments, and KsF2— Knutsen-Preston complex, 10 to 30 percent slopes.

Special Handling of Soil: 35,000 cubic yards of overburden topsoil was removed and placed along Northwest berm of property in May 2017. It was seeded with native seed for protection.

106.6 - Plan for protecting & re-depositing soils

35,000 cubic yards of overburden topsoil was removed and placed along Northwest berm of property in May 2017. It was seeded with native seed for protection. Specific seed mixture is unknown. If topsoil needs to be redeposited, then the operator will place 3-6'' of topsoil across the disturbed area using heavy equipment. It will then be reseeded with a mix consistent with the NRCS Soil Survey. If operator expands into other undisturbed land, they will remove the topsoil using scrapers, or other machinery, to stockpile topsoil along a property boundary. It will then be seeded with a mix consistent with the NRCS Soil Survey.

106.7 - Existing vegetative communities to establish success

The project area ranges from 4,710' to 5,480'. Attached is the Complete NRCS Survey with Ecological Site Descriptions.

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106.8 - Depth to groundwater, extent of overburden, geologic setting

Groundwater

Groundwater depth on the site has never been discovered. No ground water monitoring wells are on location. The USGS Monitoring well number 402952111591801 was at 107.75’ Below Land Surface on 2/18/2021. That site is approximately 1.2 miles from our pit. It has a land surface elevation of 4,672feet above NGVD29. With the mine being at 4,710’ at the low end, ground water is not anticipated onsite.

Overburden / Geologic setting

The Juniper Canyon Mine is located on the Western side of the Jordan River in the foothills of the Traverse Mountain Range. This locality is known for its complex geological areas due to various fault types, formations and past volcanic activity. For reference, please see Utah Geological Survey Map Figure 105.4, the Jordan Narrows Quadrangle located in the maps section of the NOI.

The UGS map identifies the materials to be lacustrine deposits over volcanic rocks of the west Traverse Mountains and is identified as Upper Pleistocene/Oligocene in age. The volcanic rock is planted by wave action and partly concealed by a discontinuous veneer of lacustrine deposits. These lacustrine deposits are sorted in layers down slope from course to fine grained, and where absent, alluvial fan surfaces are covered with angular and sub-angular volcanic boulders. Visually one can see the preserved shorelines left from Lake Bonneville. These deposits are fine to coarse grained sand and silt with minor gravel, typically thick bedded and well sorted. These deposits can be concealed also by loess veneer and volcanic clasts from lava flows. The geology within the mine consists of Sand and some silt and gravel deposited in beaches, typically in two settings that correspond to transgressive and regressive phases of Lake Bonneville: (1) deposited below the Provo shoreline while the lake was at and regressing from (below) this shoreline, possibly as parts of deltas from several canyons, grading downslope into Qlf; and (2) deposited between the Provo and Bonneville shorelines of Lake Bonneville as the lake transgressed to and was at the Bonneville shoreline; estimate up to 200 feet (60 m) thick in Orem quadrangle. Locally includes Holocene eolian deposits that cannot be mapped separately because they grade imperceptibly into sandy lacustrine deposits (Qls) that are reworked by wind, in particular near the former Geneva Steel plant; thickness less than 10 feet (3 m). Volcanic debris flow/lahar breccia and tuff, lesser lava flows and ash-flow tuffs, and minor fluvial volcanicsedimentary rocks; intermediate composition; probable age range of 31 to 33 Ma (Waite and others, 1997); plagioclase age 32.12 + 0.14 Ma in adjacent Tickville Spring quadrangle (Deino and Keith, 1997, TICK28); probably from local vents including the Step Mountain andesite plug, South Mountain area, and other smaller vents; 1000+ feet (300+ m) thick.

106.9 - Location & size of ore, waste, tailings, ponds

There will not be any waste material, tailing, water storage or ponds generated at this mine.

The topsoil overburden will be stockpiled and used from development or sold if not needed. Overburden was stripped using scrapers and dozers. The remaining material will be removed and processed to create aggregate products according to customer specifications.

See 106.9 Stockpile map for stockpile locations.

Also see map in the SWPPP permit on page 32 and 33.

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106.10 – Amounts of Material extracted or moved

Amount of material moved depends on client demands but ranges from 400,000 to 600,000 tons of material per year

R647-4-108 - Hole Plugging Requirements

There are no plans for future for drilling within the permit area for exploration. If drilling does need to happen, other than blast hole drilling, the operator will notify DOGM. At that point correct permits will be applied for and standard operating procedures for designated subcontractor will be followed.

R647-4-109 - Impact Assessment

The Ground was disturbed when we took over the property. See attached Class III Cultural Resources Inventory from Logan Simpson. No archaeological sites, isolated finds, or historic built environment features were observed during the Class III Cultural Resources Inventory for the Project.

109.1 - Impacts to surface & groundwater systems

No ground water is expected to be encountered at this location. Surface water is managed after rain events via SWPPP methods and requirements at a state and city level. Also see map in the SWPPP permit on page 32 and 33.

109.2 – Wildlife habitat and endangered species.

There isn't any threatened or endangered species located within our proposed mining area or within a two-mile radius. Big game has rarely been seen in the area. See attached Utah Natural Heritage Program Online Species Report.

109.3 - Impacts on existing soils resources

Overburden topsoil will be stripped and saved to be used in the development of the land. No wetlands, Threatened or Endangered Species of plant or animals are located within the proposed mining area.

109.4 - Slope stability, erosion control, air quality, safety

No highwalls will be located on the property. Slopes won't exceed 3H:1V slopes. Erosion control measures are in place are handled through BMP's and our SWPPP. SVRP has a permit through the Utah Division of Air quality. Land disturbance permit is in place through Herriman City. All are attached for your reference.

109.5 - Actions to mitigate any impacts

SVRP will minimize and mitigate hazards to public health, safety, and welfare while in operation. This will be done by following all local, state, and federal requirements.

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R647-4-110 - Reclamation Plan

110.1 - Current & post mining land use

Currently the property is just an open area used for grazing and natural area.

The property will be developed for residential and commercial purposes. This has already been approved through the city of Herriman.

Plans for future development are attached.

110.2 - Roads, highwalls, slopes, drainages, pits, etc., reclaimed

As we continue to develop our mine, we are doing it to eventually build out a townhome community. So, everything will be reclaimed according to the engineered plans approved by the City of Herriman. Once they are complete, we can provide a copy to DOGM for their records.

110.3 - Description of facilities to be left (post mining use)

No facilities will be left onsite after mining is complete.

110.4 – Description or treatment and disposition of deleterious or acid forming material

If any deleterious or acid forming material are found onsite. They will be dug out and properly disposed of. There are not any permanent buildings at mine site. At the completion of the mine all equipment will be mobilized offsite. A 1000-gallon diesel fuel tank is onsite with a 1200-gallon lined container that is sits in. Please refer to map 105.2.

110.5 - Revegetation planting program and topsoil redistribution

Revegetation is not planned on this mine. The vast major of the land will be covered in roads and buildings. Then landscaping will be done to City of Herriman requirements around those units. If revegetation is required, we will regrade any slopes back to a safe pitch and spread topsoil out using heavy machinery. We will then use a native seed mix that is consistent with NRCS soil survey and seed the affected area. See bond calculation below.

110.6 – Statement – Operator will all rules, including operations practices and reclamation Practices.

Operator will reclaim project area according to the rules.

R647-4-112 – Variance

No variance requested.

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R647-4-113. Surety.

Bonding Calculations

Direct Costs		
Subtotal Demolition and Removal	$30,426	
Subtotal Backfilling and Grading	$65,867	
Subtotal Revegetation	$28,000	
Subtotal Direct Costs	**$124,293**	
Indirect Costs		
Mob/Demob	$12,429	10.0%
Contingency	$6,215	5.0%
Engineering Redesign	$3,107	2.5%
Main Office Expense	$8,452	6.8%
Project Management Fee	$3,107	2.5%
Subtotal Indirect Costs	**$33,310**	**26.8%**
Total Cost 2024	**$157,603**	
Number of years	5.00	
Escalation factor	0.0485	
Escalation	**$42,110**	
Reclamation Cost Escalated	$199,713	
Bond Amount (rounded to nearest $1,000)	**$200,000**	
Existing Bond	**$203,100**	
Difference	**-$3,100**	
Total Area	28	Acres
Cost Per Acres	$7,142.86	

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XI.SIGNATURE REQUIREMENT

I hereby certify that the foregoing is true and correct. (Note: This form must be signed by the owner or officer of the company/corporation who is authorized to bind the company/corporation).

Signature of Permittee / Operator/Applicant:
Name (typed or print): Jared Burton
Title/Position (if applicable): Vice President
Date: 9/3/2024

Jared Burton

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Equipment Operating and Labor Rates

Hourly Rates	Equipment costs	Equipment Hourly Operating Costs	Labor Hourly Rates	Labor Type	Total Hourly Operating Cost
14M Grader	$ 21,615.00	$ 89.13	$ 96.40	Equip. Oper-Medium	$ 329.54
Water Truck 6000 gal	$ 10,004.76	$ 84.01	$ 91.95	Equip. Oper	$ 246.89
Pickup Truck 4x4	$ 735.00	$ 21.09		Foreman Average Outside	$ 27.79
623K	$ 49,600.00	$ 169.54	$ 96.40	Equip. Oper-Medium	$ 592.89
Laborers			$ 72.55	Common bldg. Laborers	$ 72.55
Cat D8 weekly	$ 8,120.00	$ 109.71	$ 96.40	Equip. Oper-Medium	

*Equipment rental rates from 2024 Equipment Watch
** Labor Hourly Rates include overhead and profit from RSMeans Heavy Construction Cost Data 2024

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General Description	As listed in Surety Spreadsheet	RS Means 2024/Reference	Cost	Unit
Large Truck Rental	Truck mounted, hydraulic, 100 ton capacity	01 54 33 60 2720	$ 2,874.30	DAY
Salt Lake County Landfill	Salt Lake County Landfill	Mixed Trash	$ 34.00	TON
Loading Cost	Front end loader, track mtd.,5 C.Y. cap=160 C.Y./hr.	31 23 16.42 1350	$ 2.40	BCY
Equipment Operator	Equipment Operator (Medium)	RS Means 2024 Standard Crew Rates	$ 96.40	HR
Spreading Seed	Tractor Spreader	32 92 19.14 4500	$354.20	AC
Standard Vegetation Costs	Std Veg	DOGM	$1,000.00	AC

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Structure Description	Length	Width	Height	Diameter	Area	Volume
	FT	FT	FT	FT	SF	CF
Portable Generator and Van Trailer	10.0	12	7		120	840
Feed Belt	62.0	4	1		248	248
Screens	9	45	5		405	2,025
Cone Crusher	9.0	45	7		405	2,835
Cone Feed	10.0	50	5		500	2,500
Stacker	4.5	90	1		405	405
Scale House	35.0	8	8		280	2,240
Crushing Control Van	48.0	9	7		408	2,856
Control house/Tower/Toolshed	24	24	8		576	4,608
Above Ground Water Storage Tank						

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Ref.	Description **Portable Structures**	Materials	Means Reference Number	Unit Cost	Unit	Length FT	Width FT	Height FT	Diameter FT	Area SF	Volume CF	Weight	Density	Time	Number	Unit	Swell/Shrink Factor	Quantity	Unit	Cost
	Portable Generator and Van Trailer	Portable/Steel									840							840	CF	$ -
	Feed Belt	Portable/Steel									248							248	CF	$ -
	Screens	Portable/Steel									2,025							2,025	CF	$ -
	Cone Crusher	Portable/Steel									2,835							2,835	CF	$ -
	Cone Feed	Portable/Steel									2,500							2,500	CF	$ -
	Stacker	Portable/Steel									405							405	CF	$ -
	Scale House	Portable/Steel									2,240							2,240	CF	$ -
	Crushing Control Van	Portable/Steel									2,856							2,856	CF	$ -
	Control house/Tower/Toolshed	Portable/Steel									4,608							4,608	CF	$ -
	Above Ground Water Storage Tank	Portable/Steel	02 65 10 30 1023																	$ 830
	Total Steel Volume																	18,557	CF	
																	0.7	12,990	CF	
	Deduct 30% no interior walls																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight			0.25	TON/CF													549	TON	Only disposing of scale house at Landfill
	Truck's Capacity																			
	Loading Cost																	-	CY	$ -
	Transportation Rental Cost Steel Truck	Truck mounted, hydraulic, 100 ton capacity	01 54 33 60 2720	$ 2,874.30	DAY													3	DAY	$ 8,623
	Equipment Operator (Medium)	Equipment Operator (Medium)	RS Means 2024 Standard Crew Rates	$ 96.40	HR													24	HR	$ 2,314
	Disposal Costs	Salt Lake County Trash	Mixed Trash	$ 34.00	TON/CF													549	TON	$ 18,659
	Recycling Refund - Steel																			
	Subtotal																			$ 30,426
	Total																			**$ 30,426**

Notes:
Assumed structures will be hooked up to a semi truck and disposed of at the landfill. No demolition costs.
Assumed each structure would require 1.5 hours of labor

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Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Portable Structures																			$ 30,426
																				$ 30,426

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	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Rip and Stockpiles															$ 12,224
Surface Shaping and Grading With Scraper															$ 53,643
Total															$ 65,867

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Earthwork Costs
Rip and Stock

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Dozer working to knock down stockpiles to 2.5H: 1V and ripping the site - 1 week ~18,720 cyd to move															
CAT D8	$ 8,120.00	$ 109.71	0.1	$ 96.40	$ 440.38	1	$ 440.00	$/HR					27.78248	HR	$ 12,224
															$ 12,224

Approximately 18,720 cyd of stockpiles will need dozing to 2.5H:1V

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Replace 6" Growth Media Over Phase 1 Quarry Floor Surface Shaping and Grading	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
14M Grader	$ 21,615.00	$ 89.13	0.1	$ 96.40	$ 329.54	1	$ 330.00	$/HR	28	AC	3	AC/HR	22	HR	$ 7,271
623K	$ 49,600.00	$ 169.54	0.1	$ 96.40	$ 592.89	1	$ 593.00	$/HR	22,587		438.4	LCY/HR	52	HR	$ 30,552
Water Truck 6000 gal	$ 10,004.76	$ 84.01	0.1	$ 91.95	$ 246.89	1	$ 247.00	$/HR					40	HR	$ 9,880
Foreman Outside				$ 72.55	$ 72.55	1	$ 75.50	$/HR					40	HR	$ 3,020
Pickup Truck 4x4	$ 735.00	$ 21.09	0.1		$ 72.55	1	$ 73.00	$/HR					40	HR	$ 2,920
															$ 53,643

See Figure 7 93,573 cyd material will be spread over 116 acres requiring grading and shaping. Approximatley 93,573 cyd of material (116 acresx .5 ft)
Solid rock surfaces (41 ac) that will not be reclaimed per As per R647-4-105.3.14.
Existing road to Water Well 30 feet wide (4 acres) per fire code will not be graded or ripped
Finished graded area of 9 acres only requires fine grading DOGM cost $1000/ac
Surface scarification not needed for post mine land use, only grading hours included.

Ref.	Description	Materials	Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Seeding Cost	Standard Vegetation costs	DOGM	$1,000.00	acre					28										$ 28,000.00
Total																				$ 28,000.00

RECEIVED
Sep 13, 2024
DIVISION OF OIL, GAS AND MINING

Project: Juniper
Date: 08/07/24
Prepared by: KMC

WORKSHEET 11A
PRODUCTIVITY OF PUSH-PULL OR SELF-LOADING SCRAPER USE

Earthmoving Activity:

Replace growth media over phase 1 quarry floor, 28 acres

Characterization of Scraper Used (type, capacity, etc.):

623H Scraper

Description of Scraper Use (origin, destination, grade, haul distance, capacity, etc.):

Place growth media over 28 acres quarry floor and benches. This activity involves pushing fairly unconsolidated material at varying feet average (700') to achieve a final configuration and ultimate seed bed preparation.

Productivity Calculations:

Cycle Time = 0.9 min (load time (push-pull is per pair)) + 1.0 min (loaded trip time) + 0.7 min (maneuver and spread time) + 0.5 min (return trip time)

= 3.1 min (push-pull is per pair)

Hourly Production = 18.8 LCY (capacity*) x 60 min/hr ÷ 3.1 min (cycle time**) x 0.83 (efficiency factor)

= 438.4 LCY/hr (push-pull is per pair)

Hours Required = 22586.7 LCY (volume to be handled) ÷ 438.4 LCY/hr (net hourly production) = 51.5 hr

* The average of the struck and heaped capacities; use total for two scrapers for push-pull.

Data Source(s): CAT Handbook ED48

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Sep 13, 2024
DIVISION OF OIL, GAS AND MINING

Project: Juniper
Date: 08/07/24
Prepared by: KMC

WORKSHEET 12
PRODUCTIVITY AND HOURS REQUIRED FOR MOTORGRADER USE

Earthmoving Activity:

Grading/shaping growth media

Characterization of Grader Used (type, size capacity, etc.):

14M Grader

Description of Grader Route (push distance, grade, effective blade width, operating speed, etc.):

Grading/shaping growth media over 28 acres quarry floor. This activity involves finish grading of fairly unconsolidated material at varying distances average 700' to achieve a final configuration and ultimate seed bed preparation. The growth media spread will be approximately 6".

Productivity Calculations:

Grading

Hourly Production = 2.5 mi/hr (average speed) x 12.1 ft (effective blade width) x 5280 ft/mi x 1 ac ÷ 43560 ft^2 x 0.83 (efficiency factor) = 3.0 ac/hr

Hours Required = 28 ac (area to be graded) ÷ 3.0 ac/hr (hourly production) = 9.2 hr

Scarification

Hourly Production = 3 mi/hr (average speed) x 8 ft (scarifier width) x 5280 ft/mi x 1 ac

	÷	43560	ft^2	x	0.75 efficiency factor	=	2.2	ac/hr		
Hours Required =		28 area to be scarified	ac	÷	2.2 hourly production	ac/hr	=	12.8	hr	

Total Hours Required

Total Hours =	9.2 grading hours required	+	12.8 scarification hours required	=	22.0 hr

Data Source(s): CAT Handbook ED48

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Sep 13, 2024
DIVISION OF OIL, GAS AND MINING

Project:	Juniper
Date:	08/07/24
Prepared by:	KMC

WORKSHEET 5
PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE

Earthmoving Activity:

Dozer working to knock down stockpiles to 2.5H:1V and ripping the site Approximately 1 week

Characterization of Dozer Used (type, size, etc.):

CAT D8

Description of Dozer Use (origin, destination, grade, haul distance, material, etc.):

Short push distances 100ft or less to knock down Stockpiles approx. 18,720 cyd

Productivity Calculations:

Operator Adjustment Factor = 0.75 (operator factor) x 1.20 (material factor) x 0.83 (efficiency factor) x 1.00 (grade factor) x 0.87 (weight correction factor)

x 1.20 (production method/blade factor) x 1.00 (visibility factor) x 1.00 (elevation factor) = 0.78

Net Hourly Production = 600 LCY/hr (normal hourly production) x 0.78 (operating adjustment factor) = 468 LCY/hr

Hours Required = 13000 LCY (volume to be moved) ÷ 468 LCY/hr (net hourly production) = 27.8 hr(s)

Data Source(s):

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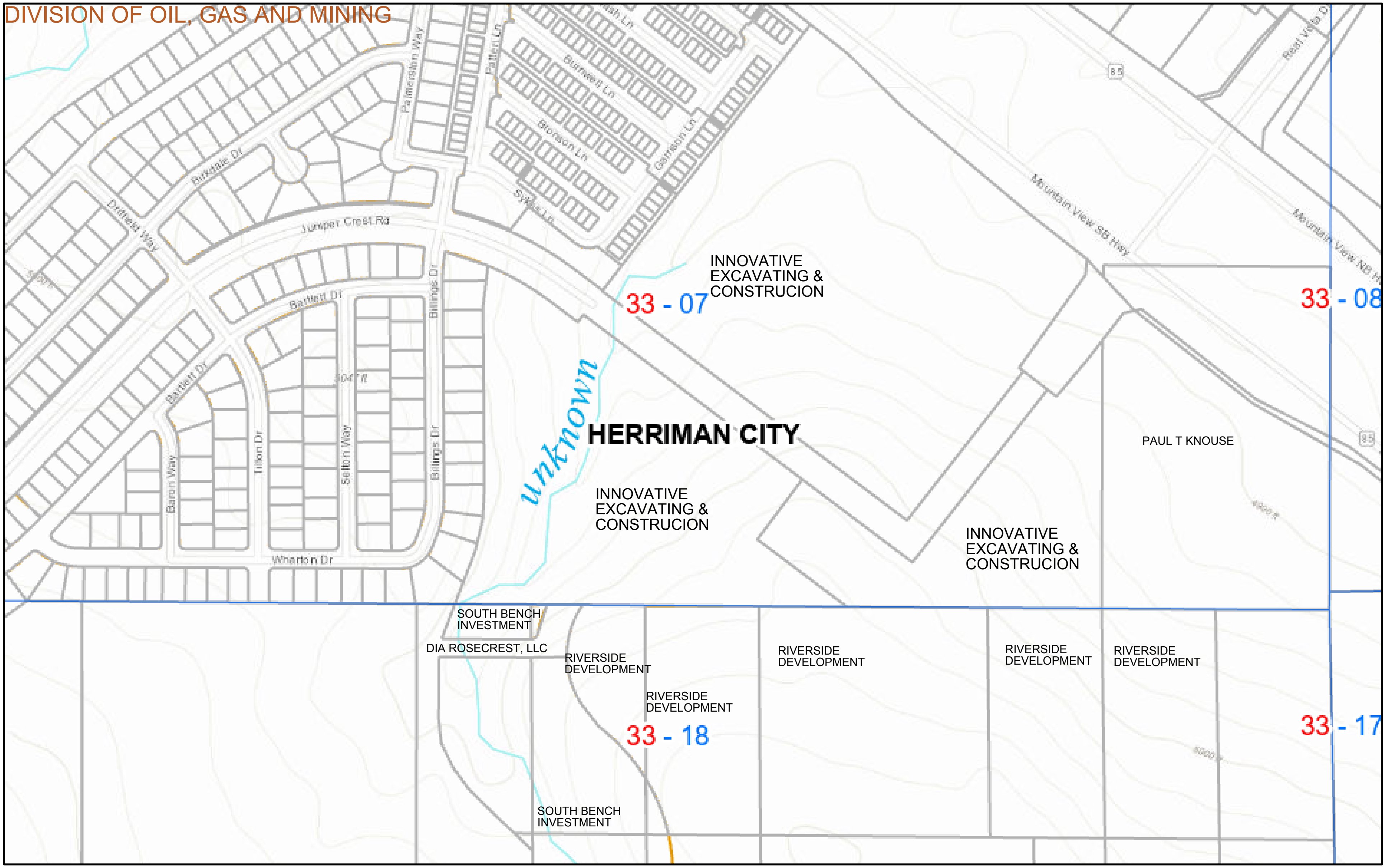

September 3, 2024

1:6,274

0 0.04 0.08 0.16 mi

0 0.05 0.1 0.2 km

County of Salt Lake, County of Utah, Bureau of Land Management, Utah AGRC, Esri, HERE, Garmin, INCREMENT P, USGS, EPA, USDA

This map was created by the office of the Salt Lake County Assessor, in

The information depicted here is to be taken as an approximate fit in regards to the spatial position of the layers presented. This map is not intended to represent an actual field Survey of, nor establish the acutal relation between, any of the layers depicted here.

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105.2 Surface Facilites Map

U.S. Fish and Wildlife Service
National Wetlands Inventory

Ephemeral Stream 105.3

August 31, 2024

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

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Legend:

Qlsb: Lacustrine sand and silt deposits (Upper Pleistocene)

Qlgb/Tvy: Lacustrine deposits over volcanic rocks of the West Traverse Mnts (Upper Pleistocene/Oligocene)

Qaly: Young alluvial deposits (Holocene to Upper Pleistocene)

Source: USGS,NGA,NASA,CGIAR,NLS,OS,NMA,Geodatastyrelsen,GSA,GSI

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Appendix A

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Appendix B

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JUNIPER CREST WEST PHASE 2

HERRIMAN CITY, UTAH

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

JUNE 30, 2017

ROSECREST

LOCATION MAP
N.T.S.

OWNER:
ROSECREST COMMUNITIES, LLC
10421 S. JORDAN GATEWAY, SUITE 200,
SOUTH JORDAN, UTAH 84095
801-316-3215 PHONE

PRELIMINARY

PREPARED BY:
M2 CIVIL
PLANNING & ENGINEERING
10421 SOUTH JORDAN GATEWAY,
SUITE 200,
SOUTH JORDAN, UTAH 84095
801-316-3193 TEL

CALL BEFORE YOU DIG! IT'S THE LAW
BLUE STAKES 1 800 662 4111

INDEX OF SHEETS

GENERAL

SHEET	TITLE	FILE NAME
	COVER SHEET	JCWPh2-C000 CV
C-001	GENERAL NOTES	JCWPh2-C001 GN

OVERALL PLANS (1"=60') OR AS SPECIFIED

SHEET	TITLE	FILE NAME
C-100	OVERALL SITE DEVELOPMENT PLAN WITH AERIAL PHOTOGRAPH (1"=150')	JCWPh2 C100 SA
C-101	OVERALL SITE DEVELOPMENT PLAN WITHOUT AERIAL PHOTOGRAPH (1"=150')	JCWPh2 C101 SD
C-200	SITE PLAN	JCWPh2 C200 SP
C-201	SITE PLAN	JCWPh2 C201 SP
C-300	GRADING AND STORM DRAIN PLAN	JCWPh2 C300 GR
C-301	GRADING AND STORM DRAIN PLAN	JCWPh2 C301 GR
C-400	WATER AND SEWER PLAN	JCWPh2 C400 WS
C-401	WATER AND SEWER PLAN	JCWPh2 C401 WS
C-500	TEMPORARY STRIPING AND SIGNAGE PLAN	JCWPh2 C500 ST
C-501	TEMPORARY STRIPING AND SIGNAGE PLAN	JCWPh2 C501 ST
C-502	FUTURE STRIPING AND SIGNAGE PLAN	JCWPh2 C502 ST
C-503	FUTURE STRIPING AND SIGNAGE PLAN	JCWPh2 C503 ST
C-600	STREET LIGHTING PLAN	JCWPh2 C600 SL
C-601	STREET LIGHTING PLAN	JCWPh2 C601 SL

PLAN & PROFILES (1"=30') OR AS SPECIFIED

SHEET	TITLE	FILE NAME
PP-00	PLAN AND PROFILE MASTER KEY (1"=80')	JCWPh2 PP00
PP-01	PLAN AND PROFILE – JUNIPER CREST ROAD	JCWPh2 PP01
PP-02	PLAN AND PROFILE – JUNIPER CREST ROAD	JCWPh2 PP02
PP-03	PLAN AND PROFILE – REAL VISTA DRIVE	JCWPh2 PP03
PP-04	PLAN AND PROFILE – REAL VISTA DRIVE	JCWPh2 PP04
PP-05	PLAN AND PROFILE – POND STORM DRAIN	JCWPh2 PP05
PP-06	PLAN AND PROFILE – TRAIL	JCWPh2 PP06
PP-07	PLAN AND PROFILE – TRAIL	JCWPh2 PP07

EROSION CONTROL PLANS (1"=60') OR AS SPECIFIED

SHEET	TITLE	FILE NAME
C-700	EROSION CONTROL PLAN	JCWPh2 C700 EC
C-701	EROSION CONTROL PLAN	JCWPh2 C701 EC
C-702	EROSION CONTROL DETAILS	JCWPh2 C702 ED

CONSTRUCTION DETAILS

SHEET	TITLE	FILE NAME
C-800	TYPICAL ROAD SECTIONS	JCWPh2 C800 DT
C-801	TYPICAL DETAILS	JCWPh2 C801 DT

T:\M2Civil\Projects\Rosecrest\Juniper Crest West Ph2\CAD\Improvement Plans\JCW-Ph2 C000 CV.dwg – Jun 30, 2017–10:37am

ROSECREST – JUNIPER CREST WEST PHASE 2 – PRELIMINARY PLANS 6-30-2017

NOT FOR CONSTRUCTION

GENERAL

1. ALL IMPROVEMENTS SHALL BE CONSTRUCTED IN STRICT ACCORDANCE WITH THE FOLLOWING: THE CURRENT HERRIMAN CITY STANDARDS AND SPECIFICATIONS, AND THE CURRENT EDITION OF THE AMERICAN PUBLIC WORKS ASSOCIATION MANUAL OF STANDARD PLANS AND SPECIFICATIONS (APWA), WHERE APPLICABLE. SEE ALSO UNDERGROUND UTILITIES NOTE 6.

2. PRIOR TO ANY WORK BEING PERFORMED, THE CONTRACTOR SHALL CONTACT HERRIMAN CITY FOR A PRE-CONSTRUCTION CONFERENCE AS DIRECTED BY THE OWNER. CONTRACTOR SHALL ALSO NOTIFY THE BELOW LISTED PROJECT CONTACTS (48) HOURS IN ADVANCE OF SAID MEETING:

   A. REGULATORY AGENCY: HERRIMAN CITY
   13011 S 6000 WEST, HERRIMAN, UTAH 84096
   (801) 446-5323
   CONTACT: BRYN MCCARTY, PLANNER
   CONTACT: GORDON HAIGHT, ASSISTANT CITY MANAGER

   B. CITY ENGINEER: HERRIMAN CITY
   13011 S 6000 WEST, HERRIMAN, UTAH 84096
   (801) 446-5323
   CONTACT: BLAKE THOMAS, CITY ENGINEER

   C. OWNER: ROSECREST COMMUNITIES, LLC
   10421 S. JORDAN GATEWAY, #200, SOUTH JORDAN, UTAH 84095
   (801) 316-3215
   (801) 506-6192 FAX
   CONTACT: DAVE BARBEE, PROJECT MANAGER

   D. ENGINEER: M2CIVIL PLANNING AND ENGINEERING
   10421 S. JORDAN GATEWAY, #200, SOUTH JORDAN, UTAH 84095
   (801) 656-5864
   CONTACT: AARON JONES, PROJECT ENGINEER

   E. SEWER DISTRICT: SOUTH VALLEY SEWER DISTRICT
   1253 WEST JORDAN BASIN LANE, BLUFFDALE, UTAH 84065
   (801) 571-1166
   (801) 571-5339 FAX
   CONTACT: MIKE FOERSTER, PE

   F. WATER DISTRICT: HERRIMAN CITY
   13011 S 6000 WEST, HERRIMAN, UTAH 84096
   (801) 446-5323
   CONTACT: JUSTUN EDWARDS, WATER DIRECTOR

   G. POWER COMPANY: ROCKY MOUNTAIN POWER
   12840 SOUTH PONY EXPRESS ROAD, RIVERTON, UTAH 84065
   (801) 576-6227
   CONTACT: LOUIS LOPEZ

   H. GAS COMPANY: QUESTAR
   4002 E. WAGSTAFF WAY, EAGLE MOUNTAIN, UTAH 84005
   (801) 324-3982
   CONTACT: JASON SANDERSON

   I. TELEPHONE COMPANY: CENTURY LINK
   1425 WEST 3100 SOUTH, SALT LAKE CITY, UT 84119
   (801) 974-8143
   CONTACT: BRANDON MICHAELIS

   J. CABLE: COMCAST
   1350 E. MILLER AVE. SALT LAKE CITY, UTAH 84106
   (801) 401-3017
   CONTACT: ELYSIA VALDEZ

3. IT IS INTENDED THAT THESE PLANS AND SPECIFICATIONS REQUIRE ALL LABOR AND MATERIALS NECESSARY AND PROPER FOR THE WORK CONTEMPLATED AND THAT THE WORK BE COMPLETED IN ACCORDANCE WITH THEIR TRUE INTENT AND PURPOSE. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY REGARDING ANY DISCREPANCIES OR AMBIGUITIES WHICH MAY EXIST IN THE PLANS OR SPECIFICATIONS. THE OWNER'S INTERPRETATION THEREOF SHALL BE CONCLUSIVE.

4. WHERE THE PLANS OR SPECIFICATIONS DESCRIBE PORTIONS OF THE WORK IN GENERAL TERMS BUT NOT IN COMPLETE DETAIL, IT IS UNDERSTOOD THAT ONLY THE BEST GENERAL PRACTICE IS TO PREVAIL AND THAT ONLY MATERIALS AND WORKMANSHIP OF THE FIRST QUALITY ARE TO BE USED.

5. THE CONTRACTOR SHALL BE SKILLED AND REGULARLY ENGAGED IN THE GENERAL CLASS AND TYPE OF WORK CALLED FOR IN THE PROJECT PLANS AND SPECIFICATIONS. THEREFORE, AS THE OWNER IS RELYING UPON THE EXPERIENCE AND EXPERTISE OF THE CONTRACTOR, IT SHALL BE EXPECTED THAT PRICES PROVIDED WITHIN THE CONTRACT DOCUMENTS SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY AND PROPER FOR THE WORK CONTEMPLATED AND THAT THE WORK BE COMPLETED IN ACCORDANCE WITH THEIR TRUE INTENT AND PURPOSE.

   THE CONTRACTOR SHALL BE COMPETENT, KNOWLEDGEABLE AND HAVE SPECIAL SKILLS IN THE NATURE, EXTENT AND INHERENT CONDITIONS OF THE WORK TO BE PERFORMED. CONTRACTOR SHALL ALSO ACKNOWLEDGE THAT THERE ARE CERTAIN PECULIAR AND INHERENT CONDITIONS EXISTENT IN THE CONSTRUCTION OF THE PARTICULAR FACILITIES, WHICH MAY CREATE, DURING THE CONSTRUCTION PROGRAM, UNUSUAL OR UNSAFE CONDITIONS HAZARDOUS TO PERSONS, PROPERTY AND THE ENVIRONMENT. CONTRACTOR SHALL BE AWARE OF SUCH PECULIAR RISKS AND HAVE THE SKILL AND EXPERIENCE TO FORESEE AND TO ADOPT PROTECTIVE MEASURES TO ADEQUATELY AND SAFELY PERFORM THE CONSTRUCTION WORK WITH RESPECT TO SUCH HAZARDS.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS AND LICENSES REQUIRED FOR THE CONSTRUCTION AND COMPLETION OF THE PROJECT, AND SHALL PERFORM ALL WORK IN ACCORDANCE WITH THE REQUIREMENTS AND CONDITIONS OF ALL PERMITS AND APPROVALS APPLICABLE TO THIS PROJECT. THE CONTRACTOR SHALL ENSURE THAT THE NECESSARY RIGHT-OF-WAYS, EASEMENTS, AND/OR PERMITS ARE SECURED PRIOR TO CONSTRUCTION.

7. CONTRACTOR SHALL OBTAIN AN ENCROACHMENT PERMIT WHERE APPLICABLE FOR ANY WORK DONE WITHIN RIGHT-OF-WAYS OR EASEMENTS FROM HERRIMAN CITY, SALT LAKE CO., AND/OR UDOT. CONTRACTOR SHALL NOTIFY COUNTY, AND/OR STATE, 24 HOURS IN ADVANCE OF COMMENCING THE WORK, OR AS REQUIRED BY SAID PERMITS.

8. THE CONTRACTOR SHALL, AT THE TIME OF BIDDING, AND, THROUGHOUT THE PERIOD OF THE CONTRACT, BE LICENSED IN THE STATE OF UTAH AND SHALL BE BONDABLE FOR AN AMOUNT EQUAL TO OR GREATER THAN THE AMOUNT BID AND TO DO THE TYPE OF WORK CONTEMPLATED IN THE PLANS AND SPECIFICATIONS.

9. CONTRACTOR SHALL INSPECT THE SITE OF THE WORK PRIOR TO BIDDING TO SATISFY THEMSELVES BY PERSONAL EXAMINATION, OR BY SUCH OTHER MEANS AS THEY MAY PREFER, OF THE LOCATION OF THE PROPOSED WORK, AND OF THE ACTUAL CONDITIONS OF, AND AT, THE SITE OF WORK.

   IF, DURING THE COURSE OF THEIR EXAMINATION, A BIDDER FINDS FACTS OR CONDITIONS WHICH APPEAR TO THEM TO BE IN CONFLICT WITH THE LETTER OR SPIRIT OF THE PROJECT PLANS AND SPECIFICATIONS, THEY SHALL CONTACT THE ENGINEER FOR ADDITIONAL INFORMATION AND EXPLANATION BEFORE SUBMITTING THEIR BID.

   SUBMISSION OF A BID BY THE CONTRACTOR SHALL CONSTITUTE ACKNOWLEDGMENT THAT, IF AWARDED THE CONTRACT, THEY HAVE RELIED AND ARE RELYING ON THEIR OWN EXAMINATION OF (1) THE SITE OF THE WORK, (2) ACCESS TO THE SITE, AND (3) ALL OTHER DATA AND MATTERS REQUISITE TO THE FULFILLMENT OF THE WORK, AND ON THEIR OWN KNOWLEDGE OF EXISTING FACILITIES ON AND IN THE VICINITY OF THE SITE OF THE WORK TO BE CONSTRUCTED UNDER THIS CONTRACT.

   THE INFORMATION PROVIDED BY THE OWNER IS NOT INTENDED TO BE A SUBSTITUTE FOR, OR A SUPPLEMENT TO THE INDEPENDENT VERIFICATION BY THE CONTRACTOR. CONTRACTOR SHALL ACKNOWLEDGE THAT THEY HAVE NOT RELIED SOLELY UPON OWNER OR ENGINEER FURNISHED INFORMATION REGARDING SITE CONDITIONS IN PREPARING AND SUBMITTING THEIR BID.

10. THE CONTRACTOR SHALL PROVIDE ALL LIGHTS, BARRICADES, SIGNS, FLAGMEN OR OTHER DEVICES NECESSARY FOR PUBLIC SAFETY, AS REQUIRED BY HERRIMAN CITY AND UDOT.

11. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ALL WATER, POWER, SANITARY FACILITIES AND TELEPHONE SERVICES AS REQUIRED FOR THE CONTRACTORS USE DURING CONSTRUCTION.

12. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY FIELD CHANGES MADE WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE OWNER, ENGINEER, AND/OR HERRIMAN CITY.

13. THE CONTRACTOR SHALL EXERCISE DUE CAUTION AND SHALL CAREFULLY PRESERVE BENCH MARKS, CONTROL POINTS, REFERENCE POINTS AND ALL SURVEY STAKES, AND SHALL BEAR ALL EXPENSES FOR REPLACEMENT AND/OR ERRORS CAUSED BY THEIR UNNECESSARY LOSS OR DISTURBANCE.

14. THE CONTRACTOR AGREES THAT:

   A. THEY SHALL BE RESPONSIBLE TO CLEAN THE JOB SITE AT THE END OF EACH PHASE OF WORK.

   B. THEY SHALL BE RESPONSIBLE TO REMOVE AND DISPOSE OF ALL TRASH, SCRAP AND UNUSED MATERIAL AT THEIR OWN EXPENSE IN A TIMELY MANNER.

   C. THEY SHALL BE RESPONSIBLE TO MAINTAIN THE SITE IN A NEAT, SAFE, AND ORDERLY MANNER AT ALL TIMES.

   D. THEY SHALL BE RESPONSIBLE TO KEEP MATERIALS, EQUIPMENT, AND TRASH OUT OF THE WAY OF OTHER CONTRACTORS SO AS NOT TO DELAY THE JOB. FAILURE TO DO SO WILL RESULT IN A DEDUCTION, FOR THE COST OF CLEAN UP, FROM THE FINAL PAYMENT.

   E. THEY SHALL BE RESPONSIBLE FOR THEIR OWN SAFETY, TRAFFIC CONTROL, PERMITS, RETESTING AND REINSPECTIONS AT THEIR OWN EXPENSE.

15. THE CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOBSITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

16. DUST CONTROL SHALL BE PROVIDED AT ALL TIMES, AT THE CONTRACTOR'S EXPENSE, TO MINIMIZE ANY DUST NUISANCE AND SHALL BE IN ACCORDANCE WITH SECTION 01570 (APWA) AND THE REQUIREMENTS OF HERRIMAN CITY.

17. FOR ALL WORK WITHIN PUBLIC RIGHT-OF-WAYS OR EASEMENTS, THE CONTRACTOR SHALL PRESERVE THE INTEGRITY AND LOCATION OF ANY AND ALL PUBLIC UTILITIES AND PROVIDE THE NECESSARY CONSTRUCTION TRAFFIC CONTROL. CONTRACTOR SHALL, THROUGH THE ENCROACHMENT PERMIT PROCESS, VERIFY WITH THE NECESSARY REGULATORY AGENCIES, THE NEED FOR ANY TRAFFIC ROUTING PLAN. IF A PLAN IS REQUIRED, THE CONTRACTOR SHALL PROVIDE THE PLAN AND RECEIVE PROPER APPROVALS PRIOR TO BEGINNING CONSTRUCTION.

18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATELY SCHEDULING INSPECTION AND TESTING OF ALL FACILITIES CONSTRUCTED UNDER THIS CONTRACT. ALL TESTING SHALL CONFORM TO THE REGULATORY AGENCY'S STANDARD SPECIFICATIONS. ALL TESTING AND INSPECTION SHALL BE PAID FOR BY THE OWNER. ALL RE-TESTING AND/OR RE-INSPECTION SHALL BE PAID FOR BY THE CONTRACTOR.

19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING THE EXISTING IMPROVEMENTS FROM DAMAGE. WHENEVER EXISTING FACILITIES ARE REMOVED, DAMAGED, BROKEN, OR CUT IN THE INSTALLATION OF THE WORK COVERED BY THESE PLANS OR SPECIFICATIONS, SAID FACILITIES SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE, AFTER PROPER BACKFILLING AND/OR CONSTRUCTION, WITH MATERIALS EQUAL TO OR BETTER THAN THE MATERIALS USED IN THE ORIGINAL EXISTING FACILITIES. THESE COSTS SHALL BE INCLUDED WITHIN THE TOTAL BID PRICE FOR THE PROJECT. THERE WILL BE NO EXTRA COST DUE THE CONTRACTOR FOR REPLACING OR REPAIRING EXISTING IMPROVEMENTS. THE FINISHED PRODUCT SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER, THE ENGINEER, AND THE RESPECTIVE REGULATORY AGENCY.

20. THE CONTRACTOR SHALL MAINTAIN A NEATLY MARKED SET OF FULL-SIZE AS-BUILT RECORD DRAWINGS SHOWING THE FINAL LOCATION AND LAYOUT OF ALL STRUCTURES AND OTHER FACILITIES. AS-BUILT RECORD DRAWINGS SHALL REFLECT CHANGE ORDERS, ACCOMMODATIONS, AND ADJUSTMENTS TO ALL IMPROVEMENTS CONSTRUCTED. WHERE NECESSARY, SUPPLEMENTAL DRAWINGS SHALL BE PREPARED AND SUBMITTED BY THE CONTRACTOR. PRIOR TO ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL DELIVER TO THE OWNER, ONE SET OF NEATLY MARKED AS-BUILT RECORD DRAWINGS SHOWING THE INFORMATION REQUIRED ABOVE. AS-BUILT RECORD DRAWINGS SHALL BE REVIEWED AND THE COMPLETE AS-BUILT RECORD DRAWING SET SHALL BE CURRENT WITH ALL CHANGES AND DEVIATIONS REDLINED AS A PRECONDITION TO THE FINAL PROGRESS PAYMENT APPROVAL AND/OR FINAL ACCEPTANCE.

21. WORK IN EASEMENT AND/OR RIGHT-OF-WAY IS SUBJECT TO THE APPROVAL AND ACCEPTANCE OF THE REGULATORY AGENCY RESPONSIBLE FOR OPERATION AND/OR MAINTENANCE OF SAID EASEMENT AND/OR RIGHT-OF-WAY.

CLEARING AND GRADING

1. BENCHMARK: SALT LAKE COUNTY
   ELEVATION: 5081.44'
   DATUM: SALT LAKE COUNTY
   DESCRIPTION: MONUMENT AT THE SOUTH WEST CORNER OF SECTION 7 T.4S, R.1W, SALT LAKE BASE & MERIDIAN.

2. CONTRACTOR SHALL PERFORM EARTHWORK IN ACCORDANCE WITH HERRIMAN CITY STANDARD SPECIFICATIONS, AND DIVISION 2 OF THE AMERICAN PUBLIC WORKS ASSOCIATION STANDARD SPECIFICATIONS.

3. IF THE PROJECT REQUIRES ANY IMPORT OR EXPORT TO ACHIEVE A BALANCED SITE, A SEPARATE UNIT PRICE PER CUBIC YARD SHALL BE INCLUDED IN THE BID FOR SAID IMPORT OR EXPORT. ANY EXPORT MATERIAL SHALL BE EITHER STOCKPILED AT, OR REMOVED FROM, THE PROJECT SITE, AS DIRECTED BY THE OWNER.

SURFACE IMPROVEMENTS

1. ALL MANHOLE RIMS, LAMPHOLES, VALVES, MONUMENT BOXES, ETC., SHALL BE ADJUSTED TO FINISHED GRADE, AND COLLARED AFTER STREET PAVING, UNLESS OTHERWISE NOTED. COST FOR THIS WORK SHALL BE INCLUDED IN THE UNIT PRICES FOR SAID FACILITIES.

2. PAYMENT FOR PAVEMENT WILL BE MADE ONLY FOR AREAS SHOWN ON PLANS. REPLACEMENT OF PAVEMENT WHICH IS BROKEN OR CUT DURING THE INSTALLATION OF THE WORK COVERED BY THESE SPECIFICATIONS, AND WHICH LIES OUTSIDE OF SAID AREAS, SHALL BE INCLUDED IN THE CONTRACTOR'S UNIT PRICE FOR PAVEMENT, AND NO ADDITIONAL PAYMENT SHALL BE MADE FOR SUCH WORK.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL STRIPING AND/OR PAVEMENT MARKINGS NECESSARY TO TIE EXISTING STRIPING INTO FUTURE STRIPING. METHOD OF REMOVAL SHALL BE BY GRINDING OR SANDBLASTING.

4. STRIPING AND PAVEMENT MARKINGS SHALL BE IN CONFORMANCE WITH APWA SECTIONS 01555 AND 02765, AND THE REQUIREMENTS OF HERRIMAN CITY AND/OR UDOT.

5. BACK OF CURB & GUTTER WILL BE BACKFILLED PRIOR TO ASPHALT PAVING.

ROADWAY MATERIALS

1. ROADWAY MATERIALS SPECIFICATIONS AND CONSTRUCTION REQUIREMENTS SHALL BE AS OUTLINED IN THE GEOTECHNICAL REPORT PREPARED BY: AGEC-DATED DECEMBER 16, 2014 AND AS OUTLINED BY THE APWA STANDARDS AND HERRIMAN CITY REQUIREMENTS.

PRIVATE UTILITIES

1. COORDINATE ALL PRIVATE AND/OR DRY UTILITY INSTALLATION OR RELOCATION DIRECTLY WITH M2CIVIL LAND PLANNING AND ENGINEERING.
2. REFER TO THE ROSECREST UTILITY CROSSING PLAN FOR THIS SPECIFIC PLAT PROVIDED BY M2CIVIL FOR ALL CONDUIT CROSSINGS. COORDINATE CONDUIT CROSSINGS DIRECTLY WITH M2CIVIL.

UNDERGROUND UTILITIES

1. THE INFORMATION SHOWN ON THE PLANS WITH REGARD TO THE EXISTING UTILITIES AND/OR IMPROVEMENTS, WAS DERIVED FROM FIELD INVESTIGATIONS AND/OR RECORD INFORMATION. THE OWNER DOES NOT GUARANTEE THESE LOCATIONS TO BE EITHER TRUE OR EXACT. PRIOR TO CONSTRUCTION, IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO VERIFY ALL EXISTING IMPROVEMENTS AND TO EXPOSE ALL EXISTING UNDERGROUND UTILITIES RELATED TO THE PROJECT, INCLUDING BUT NOT LIMITED TO, SEWER, STORM DRAIN, WATER, IRRIGATION, GAS, AND ELECTRICAL, AND SHALL NOTIFY THE OWNER IN WRITING FORTY-EIGHT (48) HOURS IN ADVANCE OF EXPOSING THE UTILITIES, SO THAT THE EXACT LOCATION AND ELEVATION CAN BE VERIFIED AND DOCUMENTED. THE COST ASSOCIATED TO PERFORM THIS WORK SHALL BE INCLUDED IN EITHER THE LUMP SUM CLEARING COST OR IN THE VARIOUS ITEMS OF WORK. IF LOCATION AND/OR ELEVATION DIFFERS FROM THAT SHOWN ON THE DESIGN PLANS, PROVISIONS TO ACCOMMODATE THE NEW LOCATION/ELEVATION MUST BE MADE PRIOR TO CONSTRUCTION.

2. PRIOR TO COMMENCING ANY WORK, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO HAVE EACH UTILITY COMPANY LOCATE, IN THE FIELD, THEIR MAIN AND SERVICE LINES. THE CONTRACTOR SHALL NOTIFY BLUE STAKES AT 1-800-662-4111 48 HOURS IN ADVANCE OF PERFORMING ANY EXCAVATION WORK. THE CONTRACTOR SHALL RECORD THE BLUE STAKES ORDER NUMBER AND FURNISH THE ORDER NUMBER TO THE OWNER PRIOR TO ANY EXCAVATION. IT WILL BE THE CONTRACTORS SOLE RESPONSIBILITY TO DIRECTLY CONTACT ANY OTHER UTILITY COMPANIES THAT ARE NOT MEMBERS OF BLUE STAKES. IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO PROTECT ALL EXISTING UTILITIES SO THAT NO DAMAGE RESULTS TO THEM DURING THE PERFORMANCE OF THIS CONTRACT. ANY REPAIRS NECESSARY TO DAMAGED UTILITIES SHALL BE PAID FOR BY THE CONTRACTOR. THE CONTRACTOR SHALL BE REQUIRED TO COOPERATE WITH OTHER CONTRACTORS AND UTILITY COMPANIES INSTALLING NEW STRUCTURES, UTILITIES, AND SERVICE TO THE PROJECT.

3. THE CONTRACTOR SHALL PROVIDE ALL SHORING, BRACING, SLOPING OR OTHER PROVISIONS NECESSARY TO PROTECT WORKMEN FOR ALL AREAS TO BE EXCAVATED. FOR EXCAVATIONS 4 FEET OR MORE IN DEPTH, THE CONTRACTOR SHALL COMPLY WITH INDUSTRIAL COMMISSION OF UTAH SAFETY ORDERS SECTION 68 - EXCAVATIONS, AND SECTION 69 - TRENCHES, ALONG WITH ANY LOCAL CODES OR ORDINANCES.

4. PRIOR TO OPENING AN EXCAVATION, EFFORT SHALL BE MADE TO DETERMINE WHETHER UNDERGROUND INSTALLATIONS (I.E. SEWER, WATER, FUEL, ELECTRIC LINES, ETC.) WILL BE ENCOUNTERED, AND IF SO, WHERE SUCH UNDERGROUND INSTALLATIONS ARE LOCATED. WHEN THE EXCAVATION APPROACHES THE APPROXIMATE LOCATION OF SUCH AN INSTALLATION, THE EXACT LOCATION SHALL BE DETERMINED BY CAREFUL PROBING OR HAND DIGGING; AND, WHEN IT IS UNCOVERED, ADEQUATE PROTECTION SHALL BE PROVIDED FOR THE EXISTING INSTALLATION. ALL KNOWN OWNERS OF UNDERGROUND FACILITIES IN THE AREA CONCERNED SHALL BE ADVISED OF PROPOSED WORK AT LEAST 48 HOURS PRIOR TO THE START OF ACTUAL EXCAVATION.

   THE CONTRACTOR WILL VERIFY DEPTHS OF ALL UTILITIES IN THE FIELD BY POTHOLING A MINIMUM OF 300 FEET AHEAD OF PIPELINE CONSTRUCTION TO AVOID CONFLICTS WITH DESIGNED PIPELINE GRADE AND ALIGNMENT. IF A CONFLICT ARISES RESULTING FROM THE CONTRACTOR NEGLECTING TO POTHOLE UTILITIES THE CONTRACTOR WILL BE REQUIRED TO RESOLVE THE CONFLICT WITHOUT ADDITIONAL COST OR CLAIM TO THE OWNER.

5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSTALL PIPE OF ADEQUATE CLASSIFICATION WITH SUFFICIENT BEDDING TO MEET ALL REQUIREMENTS AND RECOMMENDATIONS OF HERRIMAN CITY FOR H-20 LOAD REQUIREMENTS.

6. SANITARY SEWER AND WATER SYSTEM CONSTRUCTION TO BE INSTALLED PER THE REQUIREMENTS OF SOUTH VALLEY SEWER DISTRICT AND APWA.

   A. ALL SEWER SHALL BE CONSTRUCTED ACCORDING TO SVSD CONSTRUCTION SPECIFICATIONS.

   B. ALL WATER SERVICE LINES SHALL BE CONSTRUCTED ACCORDING TO HERRIMAN CITY STANDARD PLANS.

   C. ALL WATERLINE BENDS, ELBOWS, TEES, AND CROSSES SHALL HAVE THRUST BLOCKS PLACED ACCORDING TO APWA PLAN NO. 561.

   D. ALL WATERLINE LOOPS SHALL BE CONSTRUCTED ACCORDING TO APWA PLAN NO. 542.

   E. ALL WATER LINES SMALLER THAN 12 INCHES REQUIRE GATE VALVES. WATER LINES 12" AND LARGER REQUIRE BUTTERFLY VALVES.

   F. ALL SEWERLINES TO HAVE A MINIMUM OF 4' DEPTH OF COVER.

7. THE CONTRACTOR SHALL NOTIFY M2CIVIL ENGINEERING IN WRITING AT LEAST 48 HOURS PRIOR TO BACKFILLING OF ANY PIPE WHICH STUBS TO A FUTURE PHASE OF CONSTRUCTION FOR INVERT VERIFICATION. TOLERANCE SHALL BE IN ACCORDANCE WITH THE REGULATORY AGENCY STANDARD SPECIFICATIONS.

8. ALL UNDERGROUND UTILITIES SHALL BE IN PLACE PRIOR TO INSTALLATION OF CURB, GUTTER, SIDEWALK AND STREET PAVING.

9. THE CONTRACTOR IS RESPONSIBLE FOR ALL STREET LIGHT TRENCHING.

10. ALL CULINARY AND SECONDARY WATERLINES SHALL BE TESTED AND COMMISSIONED PER APWA SECTION 33 08 00.

LEGEND

Symbol	Description
—— — ——	PROPOSED ROW LINE
— — —	PROPOSED ROAD CENTERLINE
···	DITCH FLOWLINE
	DAYLIGHT LINE
SS	PROPOSED SANITARY SEWER LINE AND MH
SS	EXISTING SANITARY SEWER LINE
W	PROPOSED WATER LINE, VALVE AND HYDRANT
W	EXISTING WATER LINE
SD	PROPOSED STORM DRAIN LINE AND CO
SD	EXISTING STORM DRAIN LINE
IRR	PROPOSED IRRIGATION LINE
IRR	EXISTING IRRIGATION LINE
OHE	EXISTING OVERHEAD POWER LINE AND POLE
G	EXISTING GAS LINE
UGT	EXISTING UNDER GROUND TELECOMMUNICATIONS
	PROPOSED STREET LIGHT
	EXISTING MINOR INTERVAL CONTOUR
	EXISTING MAJOR INTERVAL CONTOUR
	PROPOSED MINOR INTERVAL CONTOUR
	PROPOSED MAJOR INTERVAL CONTOUR

•IMPORTANT STANDARDS NOTE•
CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION. ALL WORK IS TO COMPLY WITH HERRIMAN CITY STANDARDS PER "HERRIMAN CITY DEVELOPMENT STANDARDS, ENGINEERING REQUIREMENTS AND SUPPLEMENTAL SPECIFICATIONS FOR PUBLIC WORK PROJECTS - 6TH EDITION 2011 - FEBRUARY 2011" AND "DESIGN STANDARD AND SPECIFICATIONS OF THE SOUTH VALLEY SEWER DISTRICT - AS AMENDED MAY 23, 2012". WHERE A STANDARD NOT SUPPLIED BY HERRIMAN CITY OR SVSD, APWA STANDARDS ARE TO BE APPLIED.

•UNIFIED FIRE AUTHORITY NOTE•
NO COMBUSTIBLE CONSTRUCTION SHALL BE ALLOWED PRIOR TO HYDRANT INSTALLATION AND TESTING BY WATER PURVEYOR. ALL HYDRANTS MUST BE OPERATIONAL PRIOR TO ANY COMBUSTIBLE ELEMENTS BEING RECEIVED OR DELIVERED ON BUILDING SITE.

ABBREVIATIONS

&	AND	L.P.	LOW POINT
@	'AT'/AT THE'	LT.	LIGHT
A.D.	GRADE CHANGE	LT	LEFT
ASPH.	ASPHALT	LVC	LENGTH OF VERTICAL CURVE
BLDG.	BUILDING	MAINT.	MAINTENANCE
BOS	BOTTOM OF STEP	MAX.	MAXIMUM
BOT.	BOTTOM	MFR.	MANUFACTURER
BOW	BACK OF WALK	MH/M.H.	MANHOLE
BV	BUTTERFLY VALVE	MIN.	MINIMUM
BVCE	BEGIN VERTICAL CURVE ELEVATION	MISC.	MISCELLANEOUS
BVCS	BEGIN VERTICAL CURVE STATION	MT.	MOUNTAIN
C	CURVE	N	NORTH
CB	CATCH BASIN	N.I.C.	NOT IN CONTRACT
CF	CURB FACE	NO./#	NUMBER
CIR.	CIRCLE	NOM.	NOMINAL
CL	CENTER LINE	N.T.S.	NOT TO SCALE
CLR.	CLEAR/CLEARANCE	O.C.	ON CENTER
CMP	CORRUGATE METAL PIPE	O.C.E.W.	ON CENTER EACH WAY
CO	CLEANOUT	O.D.	OUTER DIAMETER
COMBO	COMBINATION BOX	OHE	OVERHEAD ELECTRICAL LINE
CONC.	CONCRETE	OPNG.	OPENING
CONN.	CONNECTION	OPP.	OPPOSITE
CONSTR.	CONSTRUCTION	PC	POINT OF CURVE
CONT.	CONTINUE/CONTINUOUS	PED.	PEDESTRIAN
CONTR.	CONTRACTOR	POB	POINT OF BEGINNING
CTR.	CENTER	PRC	POINT OF REVERSE CURVE
CUL.	CULINARY	PRV	PRESSURE RELIEF VALVE
CW	CULINARY WATER	PT	POINT OF TANGENCY
DEPT.	DEPARTMENT	PTD.	PAINTED
DI	DUCTILE IRON	PVC	POLY VINYL CHLORIDE
DIA.	DIAMETER	PVI	POINT OF VERTICAL INTERSECTION
DIM.	DIMENSION	R	RADIUS
DTL.	DETAIL	RCP	REINFORCED CONCRETE PIPE
DWG.	DRAWING	REFL.	REFLECTED/REFLECTIVE
E	EAST	REINF.	REINFORCING
EA.	EACH	REQ.'D	REQUIRED
EG	EXISTING GROUND	REV.	REVERSE
ELEV./EL.	ELEVATION	ROW	RIGHT OF WAY
EOA	EDGE OF ASPHALT	RT	RIGHT
EOG	EDGE OF GRAVEL	S	SOUTH OR SLOPE
EQUIP.	EQUIPMENT	SAN.	SANITARY
EVCE	END VERTICAL CURVE ELEVATION	SCHED.	SCHEDULE
EVCS	END VERTICAL CURVE STATION	SD	STORM DRAIN
EX./EXIST.	EXISTING	SECT.	SECTION
EXP.	EXPANSION	SHT.	SHEET
EXT.	EXTERIOR	SIM.	SIMILAR
F.D.	FLOOR DRAIN	SPEC.	SPECIFICATIONS
FDN.	FOUNDATION	SQ.	SQUARE
FG	FINISH GROUND/ GRADE ELEVATION	SS	SANITARY SEWER
		STA.	STATION
FH	FIRE HYDRANT	STND.	STANDARD
FL	FLOWLINE	STD.	STANDARD
FLR.	FLOOR	STL.	STEEL
FTG.	FOOTING	STOR.	STORAGE
FW	FIRE WATER	STRUCT.	STRUCTURAL/STRUCTURE
GALV.	GALVANIZED	SW	SIDEWALK OR SECONDARY WATER
G.B.	GRADE BREAK		
GND.	GROUND	SYM.	SYMMETRICAL
GR.	GRADE	T	EXTERNAL TANGENT
GV	GATE VALVE	TA	TOP OF ASPHALT
H./HORIZ.	HORIZONTAL	TBC	TOP BACK OF CURB
HC	HANDICAP RAMP	TEL.	TELEPHONE
H.P.	HIGH POINT	TEMP.	TEMPORARY/TEMPERED
HT.	HEIGHT	TG	TOP OF GRATE
HYD	FIRE HYDRANT	TOA	TOP OF ASPHALT
I.D.	INSIDE DIAMETER	TOC	TOP OF CONCRETE
IN.	INCHES	T.O.P.	TOP OF PLATE
INT.	INTERIOR	TOS	TOP OF STEP
INV.	INVERT ELEVATION	TOW	TOP OF WALL
IRR	SECONDARY/IRRIGATION WATER	TYP.	TYPICAL
J-BOX	JUNCTION BOX	UGT	UNDERGROUND TELECOMMUNICATION
JT.	JOINT		
JVWCD	JORDAN VALLEY WATER CONSERVANCY DISTRICT	V./VERT.	VERTICAL
		VAR.	VARIES
K	RATE OF VERTICAL CURVATURE	VC	VERTICAL CURVE
L	LINE OR LENGTH	W	WATER/WEST
LAT	LATERAL	W/	WITH
LD	LAND DRAIN	W/O	WITHOUT
		WV	WATER VALVE

REVISIONS: NO. BY DATE

CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

JUNIPER CREST WEST PH2
GENERAL NOTES

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

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AARON KEVIN JONES
6-30-2017
STATE OF UTAH

SHEET NUMBER
C-001

SCALE
HORIZONTAL: 1"=N/A
VERTICAL: 1"=N/A

JOB NUMBER
47-0159

PROJ. MGR.: DB DESIGNER: AJ
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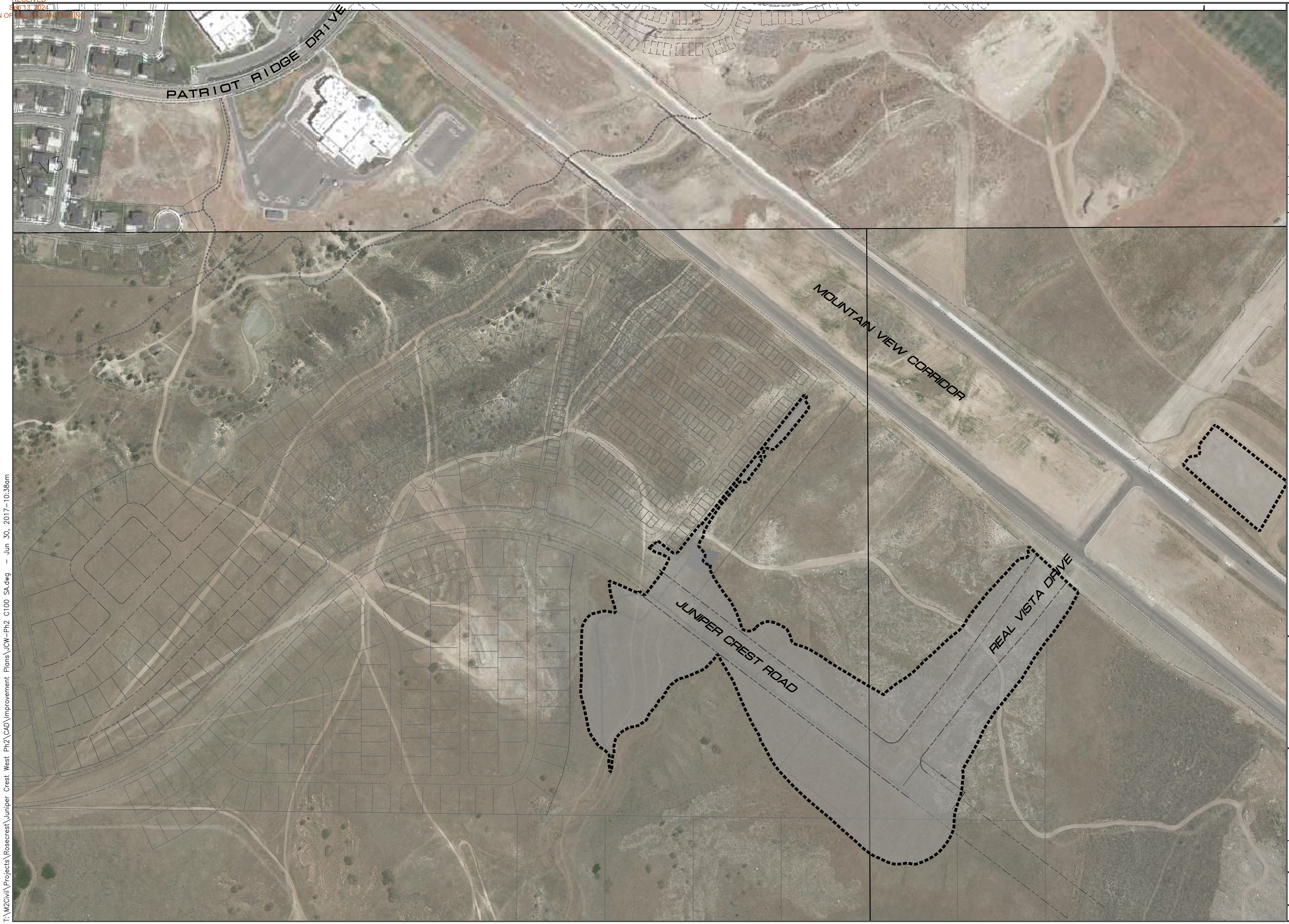

JUNIPER CREST WEST PH2

OVERALL SITE DEVELOPMENT PLAN WITH AERIAL IMAGE

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

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SHEET NUMBER
C-100

SCALE
HORIZONTAL: 1"=150'
VERTICAL: 1"=N/A

JOB NUMBER
47-0159

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JUNIPER CREST WEST PH2

OVERALL SITE DEVELOPMENT PLAN WITHOUT AERIAL IMAGE

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

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C-101

SCALE
HORIZONTAL: 1"=150'
VERTICAL: 1"=N/A

JOB NUMBER
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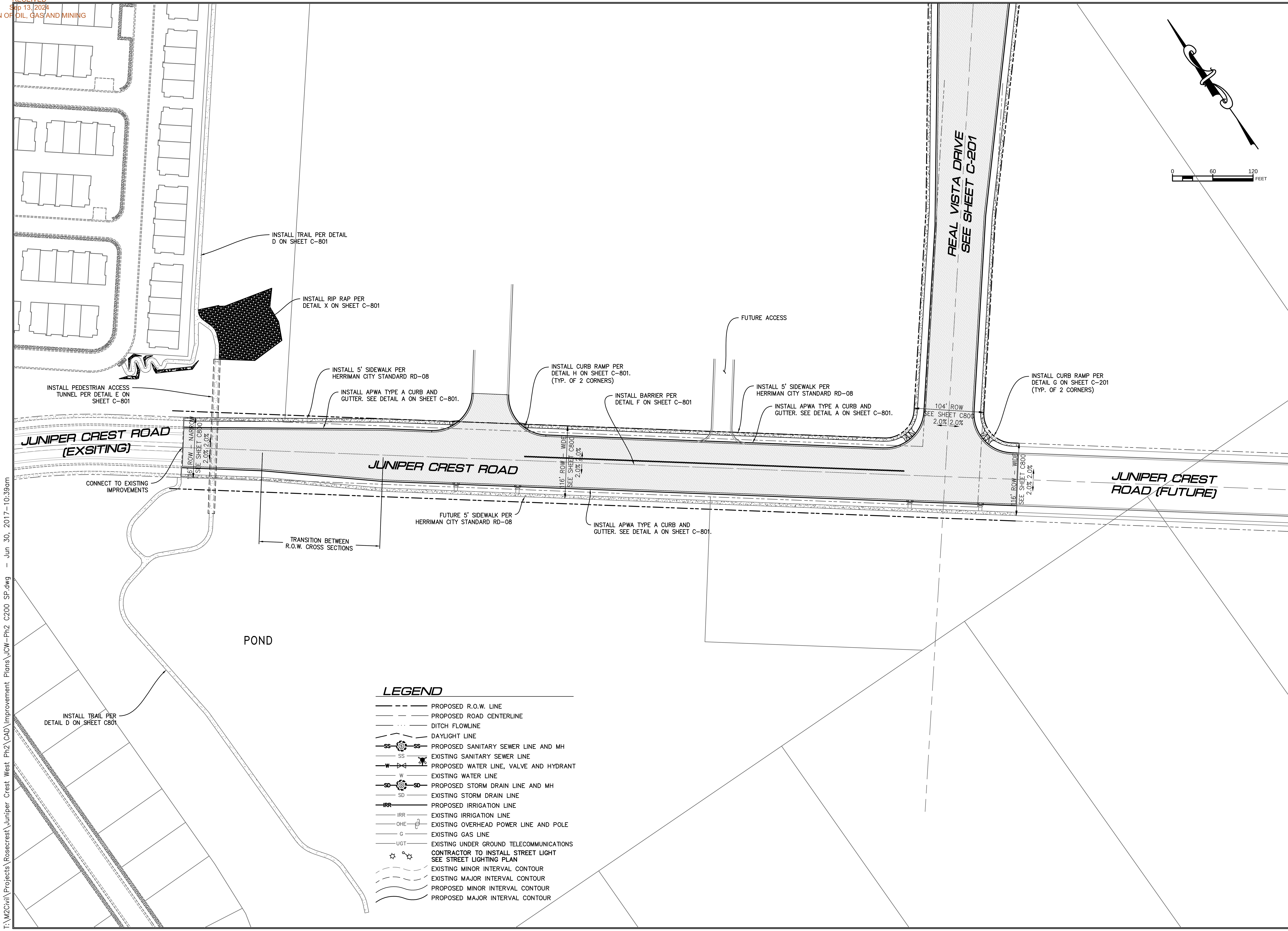

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JUNIPER CREST WEST PH2

SITE PLAN

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

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C-200

SCALE
HORIZONTAL: 1"=60'
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47-0159

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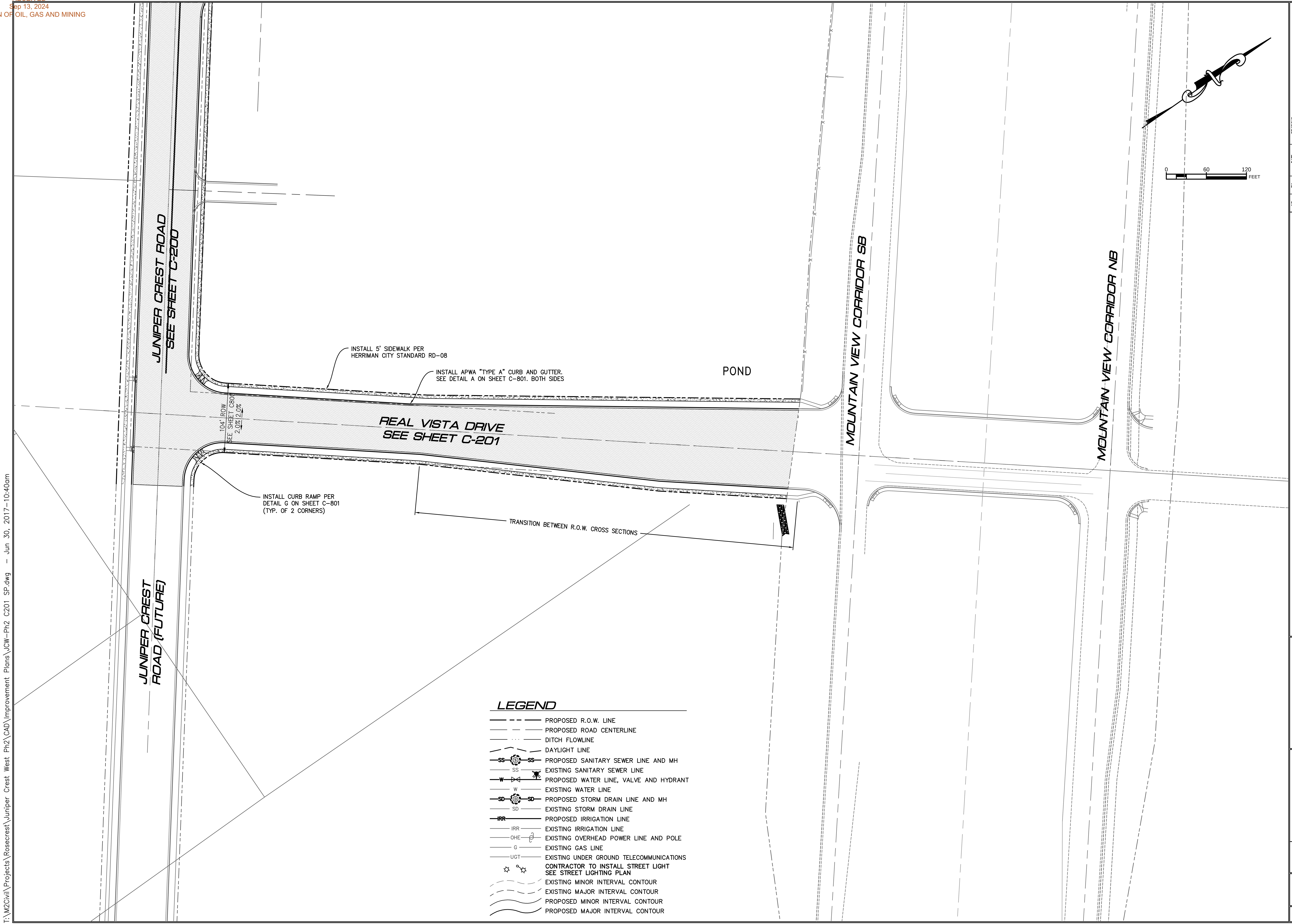

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JUNIPER CREST WEST PH2
SITE PLAN

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

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C-201

SCALE
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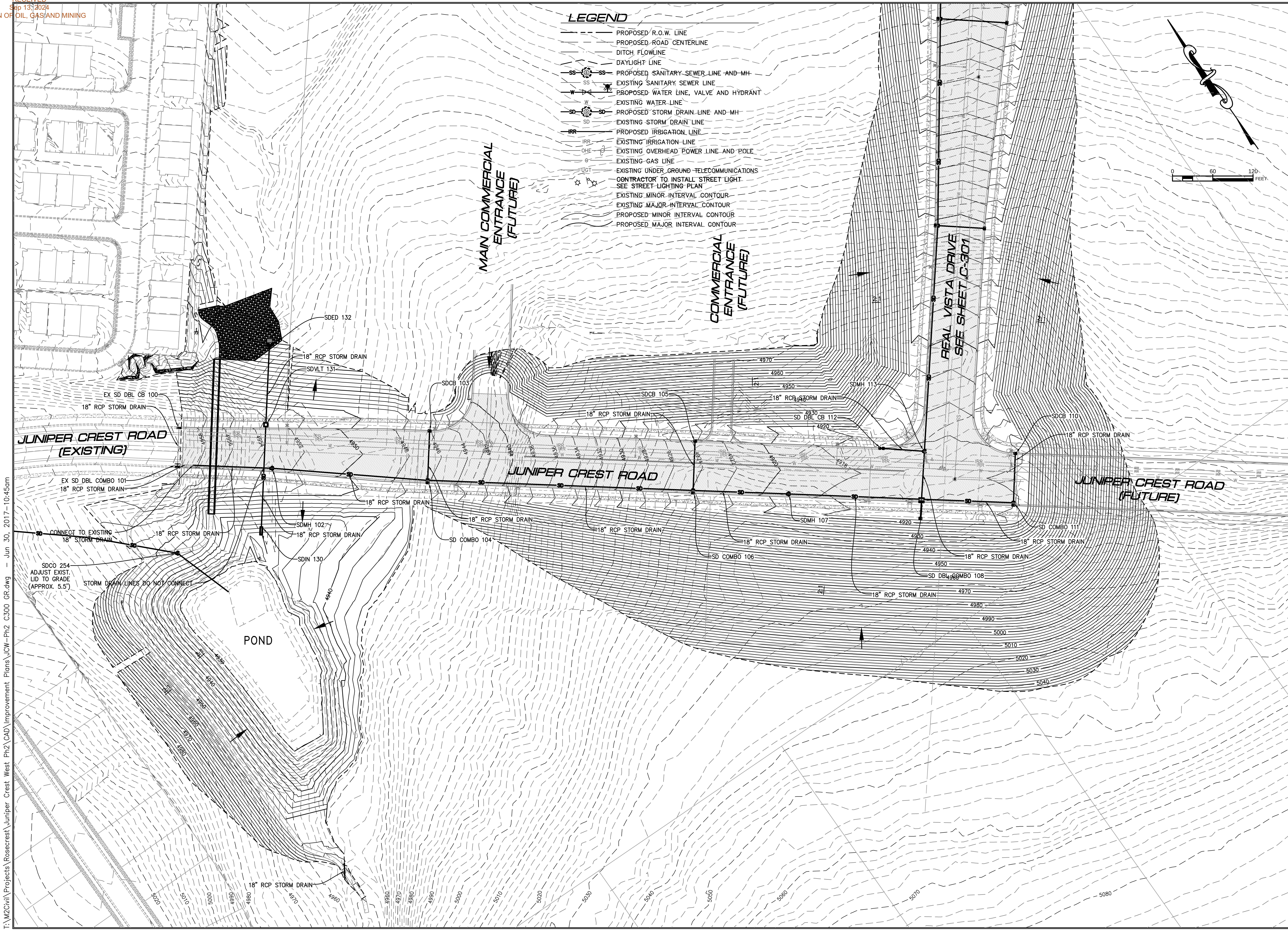

JUNIPER CREST WEST PH2
GRADING AND STORM DRAIN PLAN

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

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SHEET NUMBER
C-300

SCALE
HORIZONTAL: 1"=60'
VERTICAL: 1"=N/A

JOB NUMBER
47-0159

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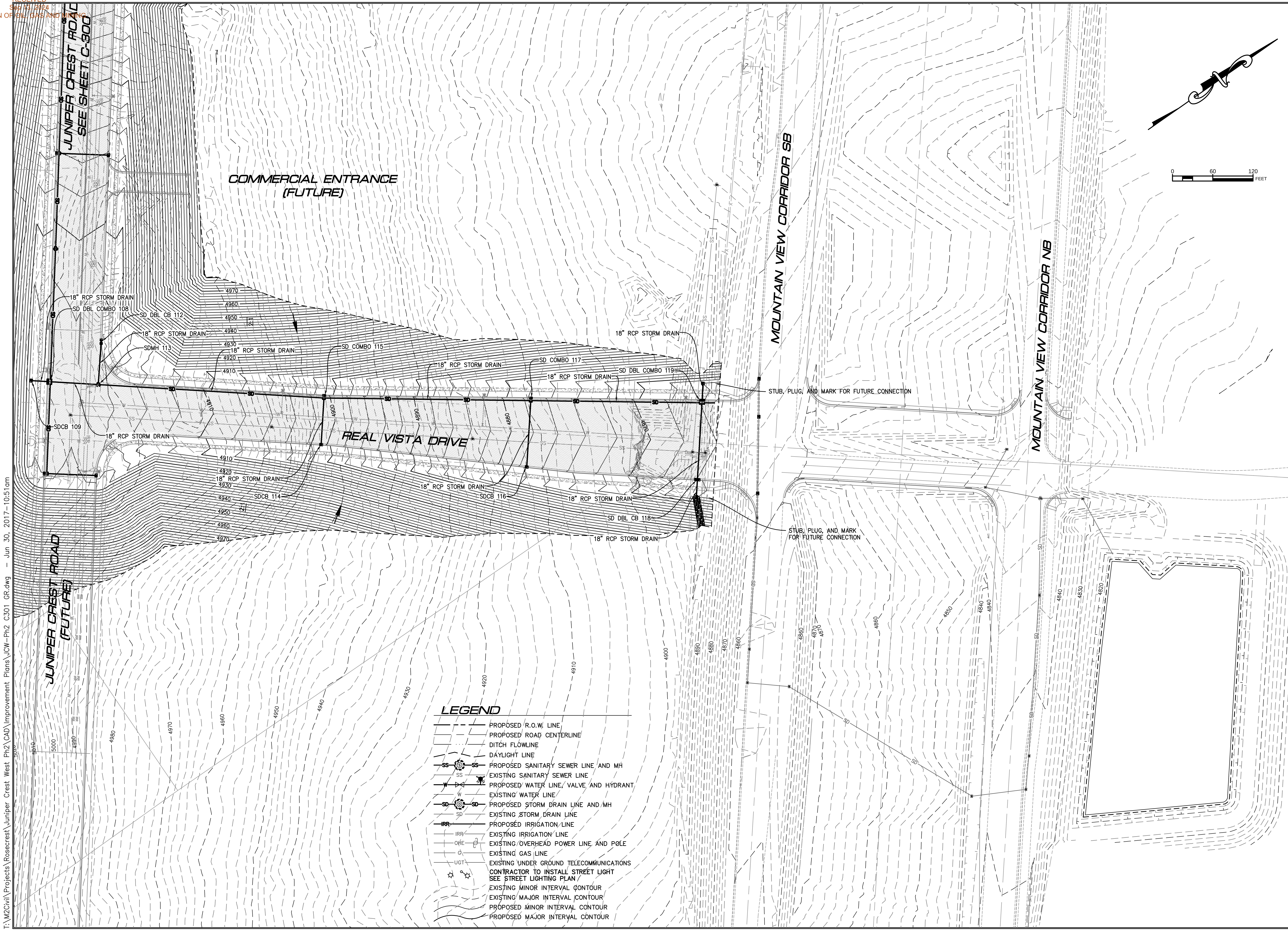

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CAUTION

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JUNIPER CREST WEST PH2
GRADING AND STORM DRAIN PLAN

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

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PRELIMINARY

SHEET NUMBER
C-301

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HORIZONTAL: 1"=60'
VERTICAL: 1"=N/A

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47-0159

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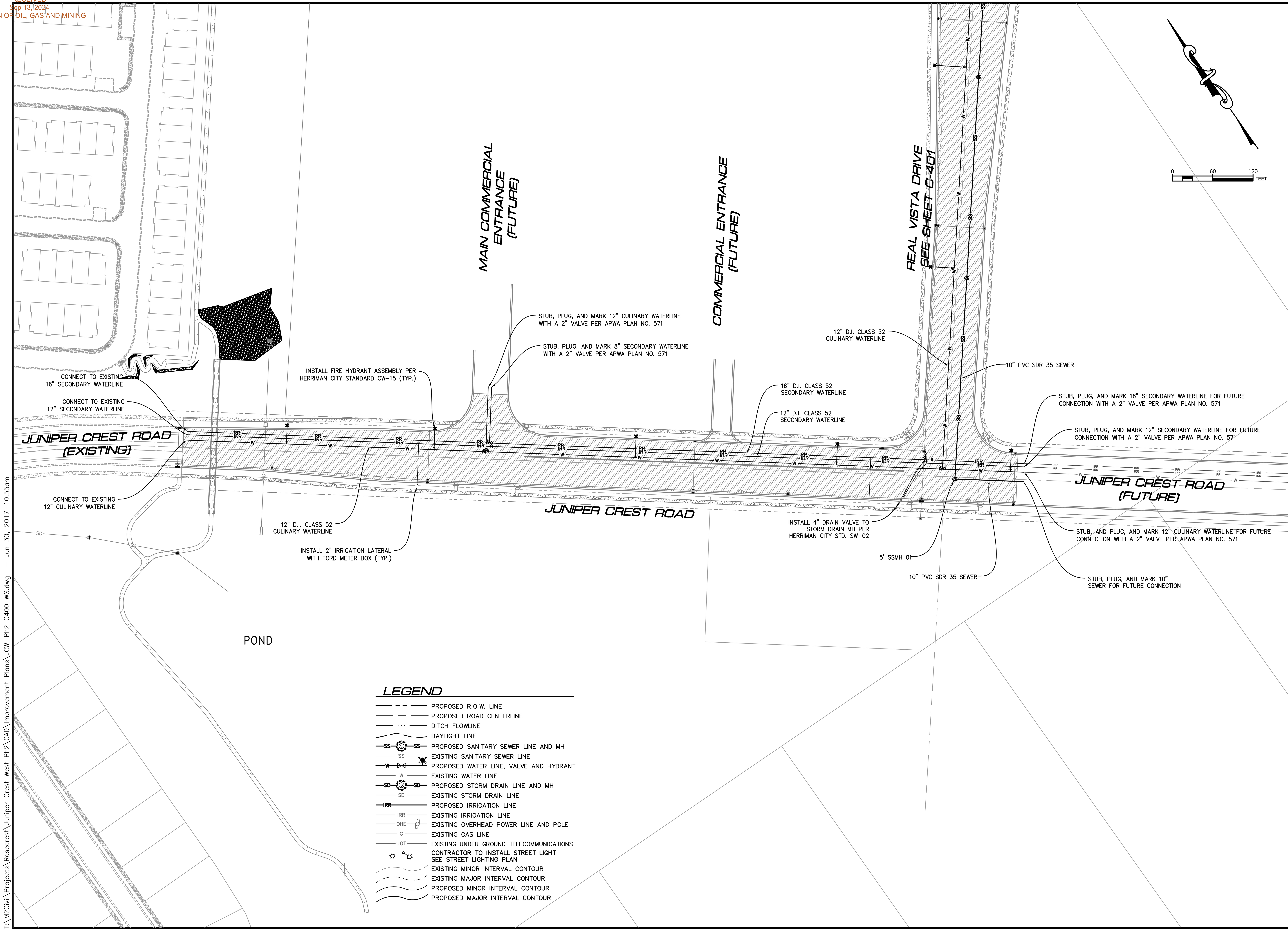

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JUNIPER CREST WEST PH2
WATER AND SEWER PLAN

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

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C-400

SCALE
HORIZONTAL: 1"=60'
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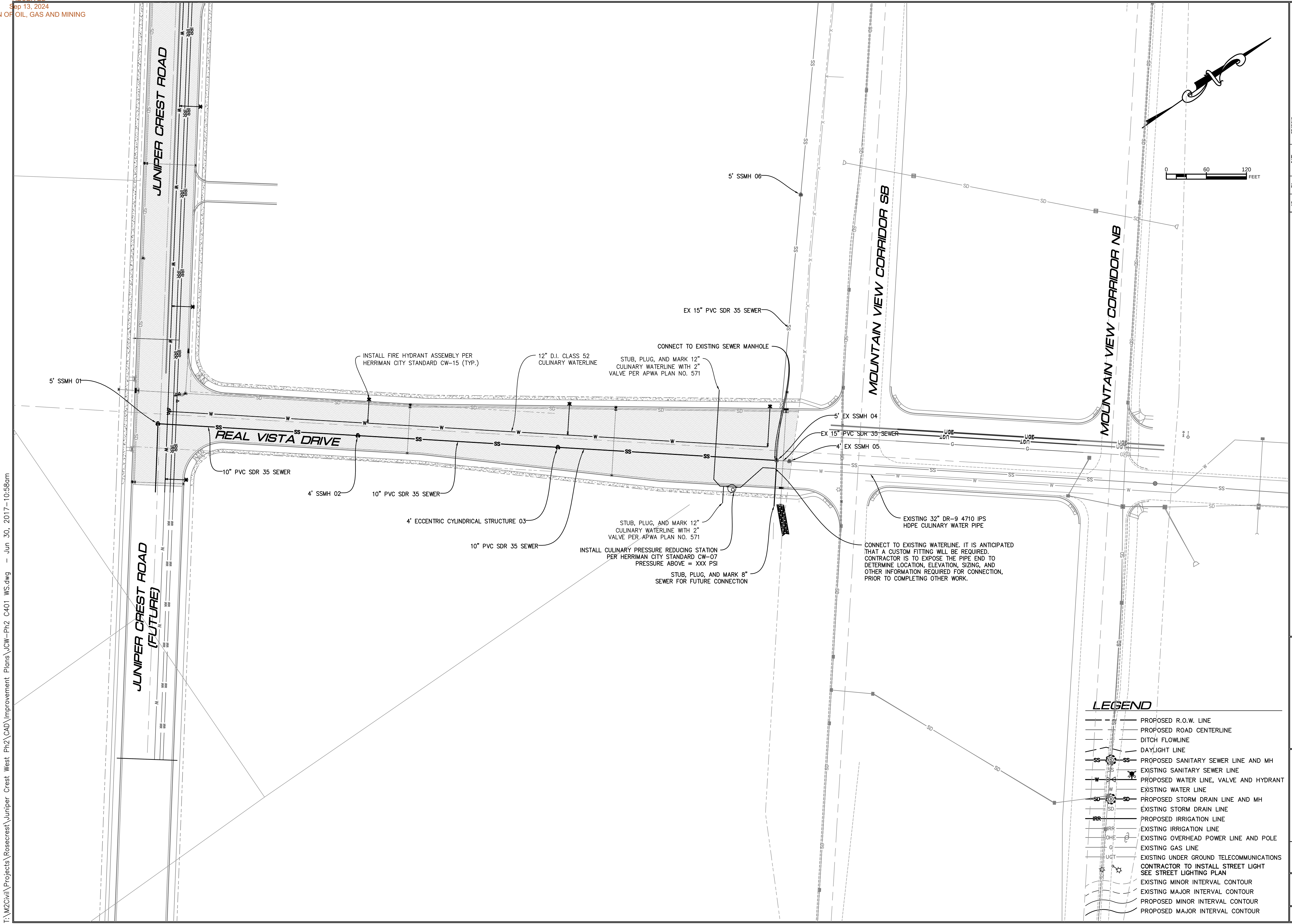

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JUNIPER CREST WEST PH2
WATER AND SEWER PLAN

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

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C-401

SCALE
HORIZONTAL: 1"=60'
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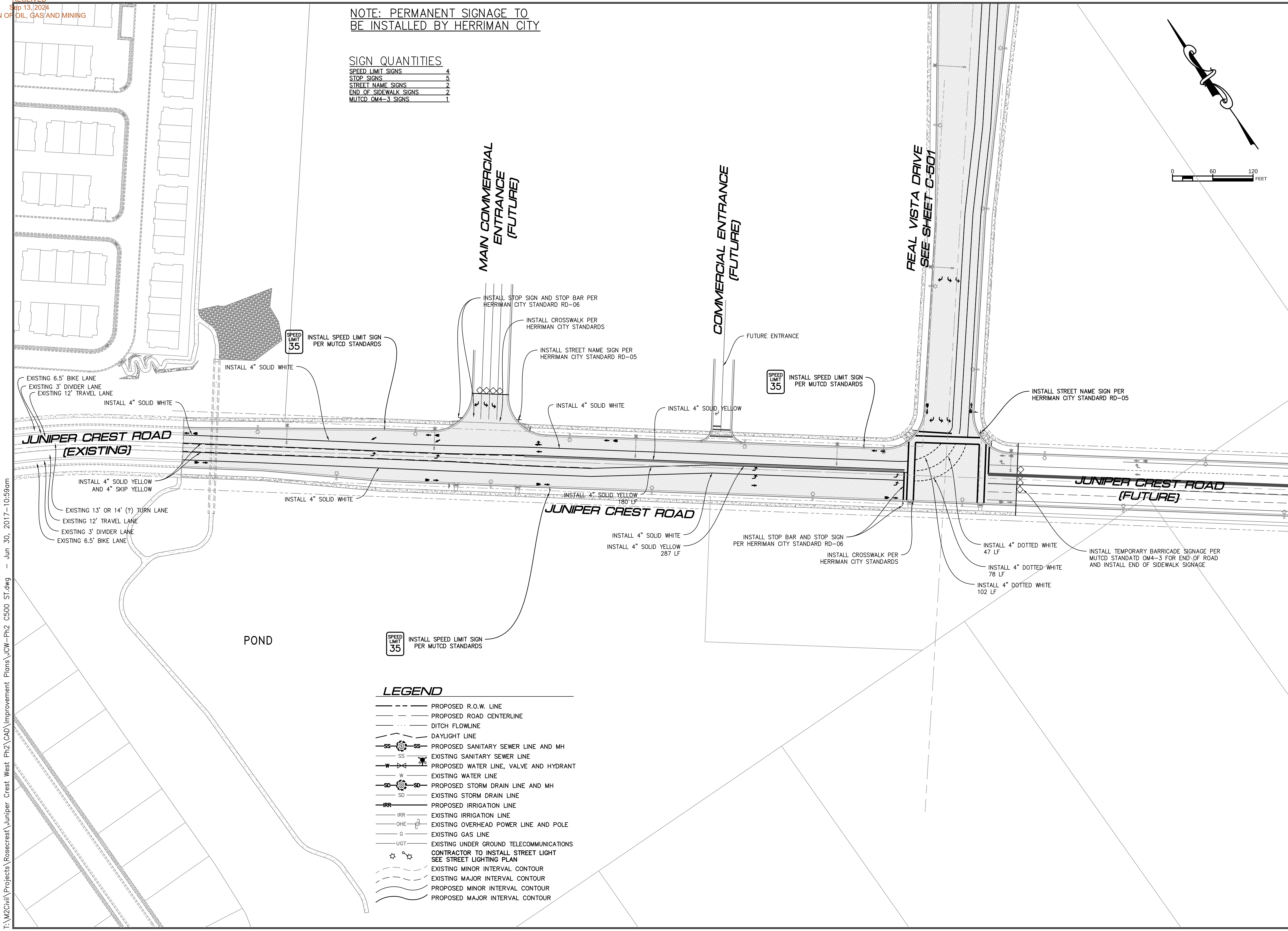
JOB NUMBER
47-0159



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NO. | BY | DATE | REVISIONS

CAUTION
The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

JUNIPER CREST WEST PH2
TEMPORARY STRIPING AND SIGNAGE PLAN

PREPARED FOR: ROSECREST COMMUNITIES
DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

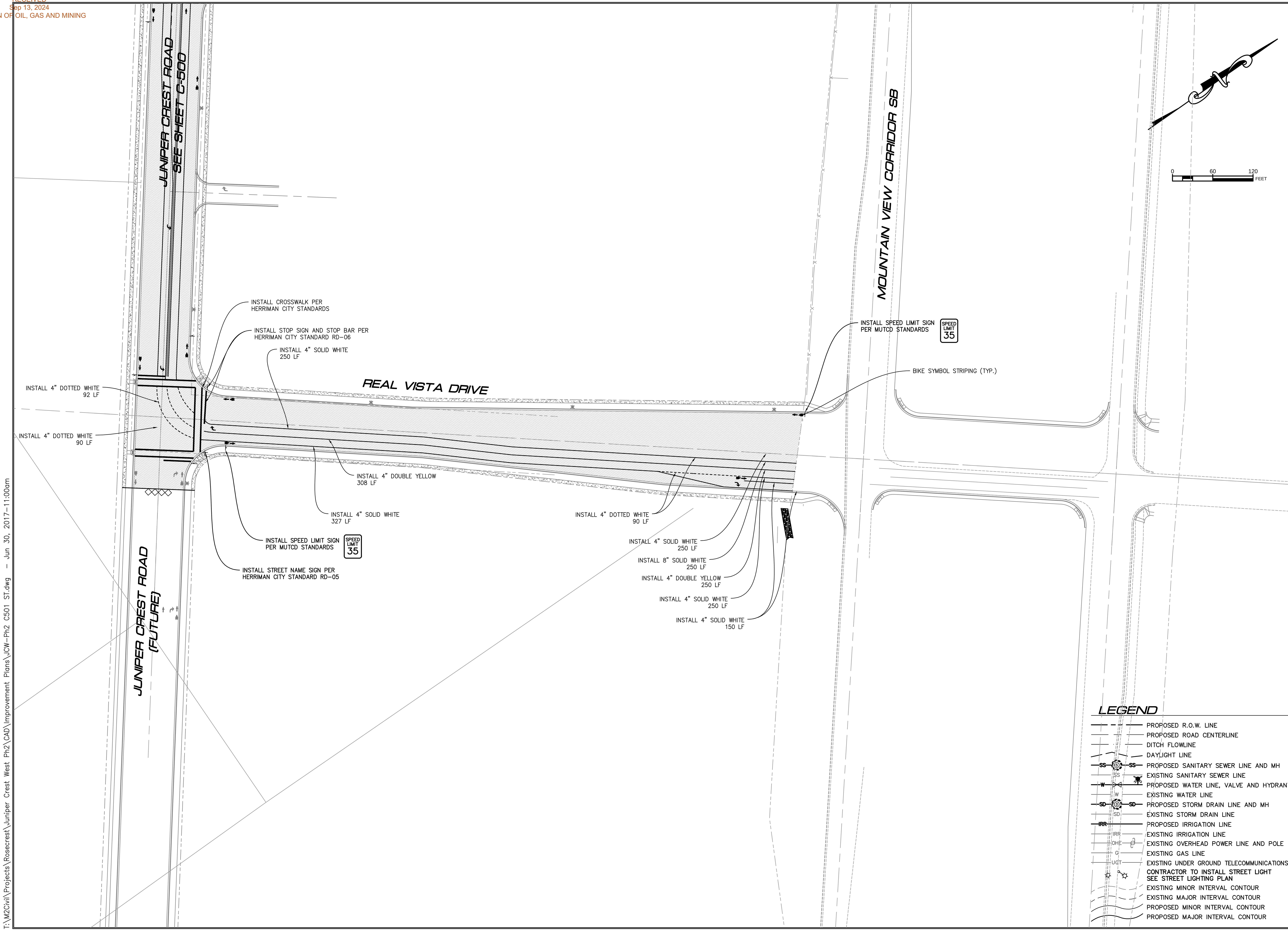
M2 CIVIL
PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY, SUITE 200, SOUTH JORDAN, UTAH 84095
801-316-3193 TEL

REGISTERED PROFESSIONAL ENGINEER
5048462-2202
AARON KEVIN JONES
6-30-2017
STATE OF UTAH
PRELIMINARY

SHEET NUMBER
C-500

SCALE
HORIZONTAL: 1"=60'
VERTICAL: 1"=N/A

JOB NUMBER
47-0159



NO. | BY | DATE | REVISIONS

CAUTION

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JUNIPER CREST WEST PH2
TEMPORARY STRIPING AND SIGNAGE PLAN

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

M2 CIVIL
PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY,
SUITE 200, SOUTH JORDAN,
UTAH 84095
801-316-3193 TEL

PRELIMINARY

SHEET NUMBER
C-501

SCALE
HORIZONTAL: 1"=60'
VERTICAL: 1"=N/A

JOB NUMBER
47-0159

PROJ. MGR.: DB DESIGNER: AJ
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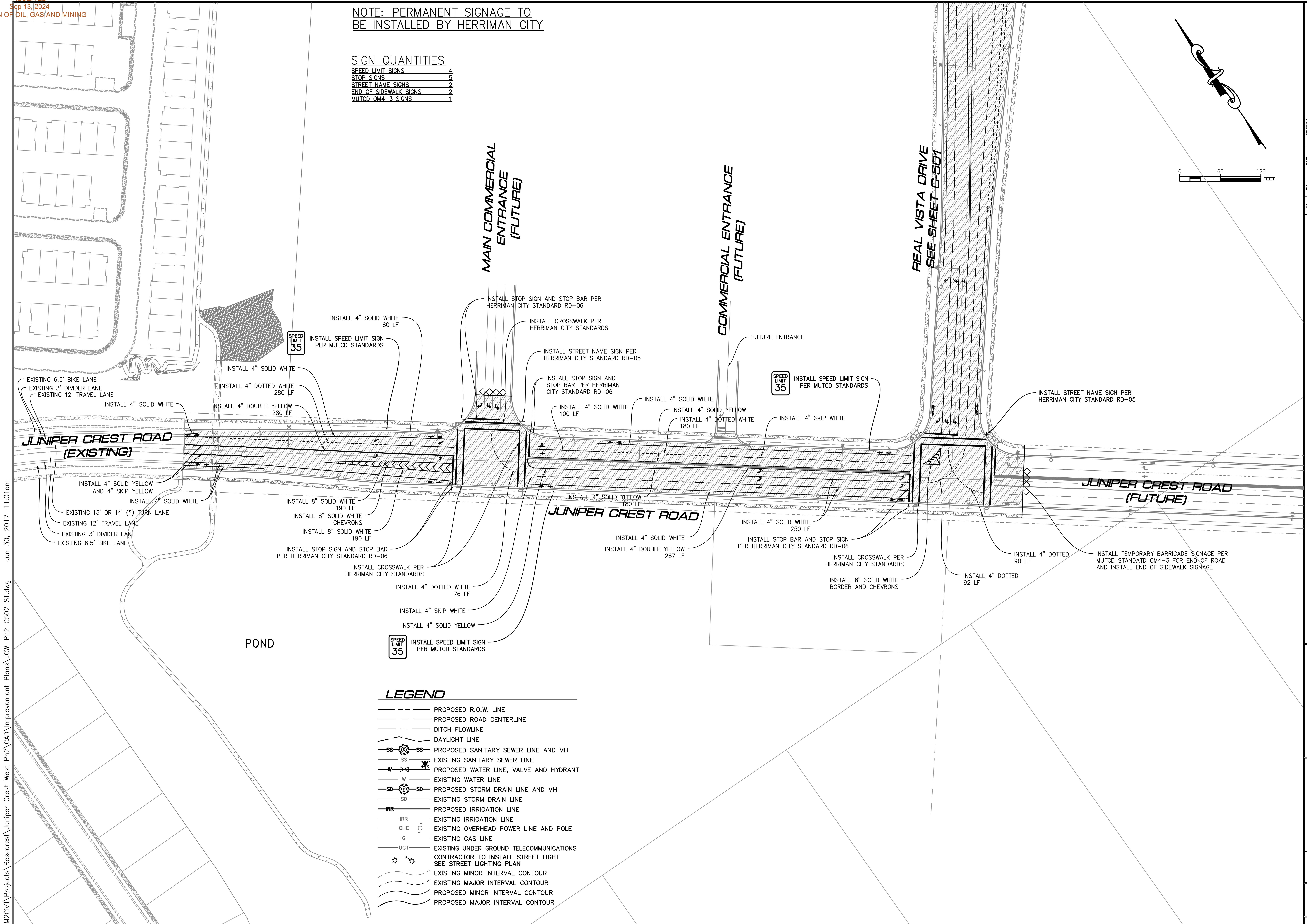
NOTE: PERMANENT SIGNAGE TO BE INSTALLED BY HERRIMAN CITY

SIGN QUANTITIES

SPEED LIMIT SIGNS	4
STOP SIGNS	5
STREET NAME SIGNS	2
END OF SIDEWALK SIGNS	2
MUTCD OM4-3 SIGNS	1



LEGEND

- PROPOSED R.O.W. LINE
- PROPOSED ROAD CENTERLINE
- DITCH FLOWLINE
- DAYLIGHT LINE
- PROPOSED SANITARY SEWER LINE AND MH
- EXISTING SANITARY SEWER LINE
- PROPOSED WATER LINE, VALVE AND HYDRANT
- EXISTING WATER LINE
- PROPOSED STORM DRAIN LINE AND MH
- EXISTING STORM DRAIN LINE
- PROPOSED IRRIGATION LINE
- EXISTING IRRIGATION LINE
- EXISTING OVERHEAD POWER LINE AND POLE
- EXISTING GAS LINE
- EXISTING UNDER GROUND TELECOMMUNICATIONS
- CONTRACTOR TO INSTALL STREET LIGHT SEE STREET LIGHTING PLAN
- EXISTING MINOR INTERVAL CONTOUR
- EXISTING MAJOR INTERVAL CONTOUR
- PROPOSED MINOR INTERVAL CONTOUR
- PROPOSED MAJOR INTERVAL CONTOUR

PROJ. MGR: DB DESIGNER: AJ
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CAUTION
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NO. BY DATE REVISIONS

JUNIPER CREST WEST PH2
FUTURE STRIPING AND SIGNAGE PLAN

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

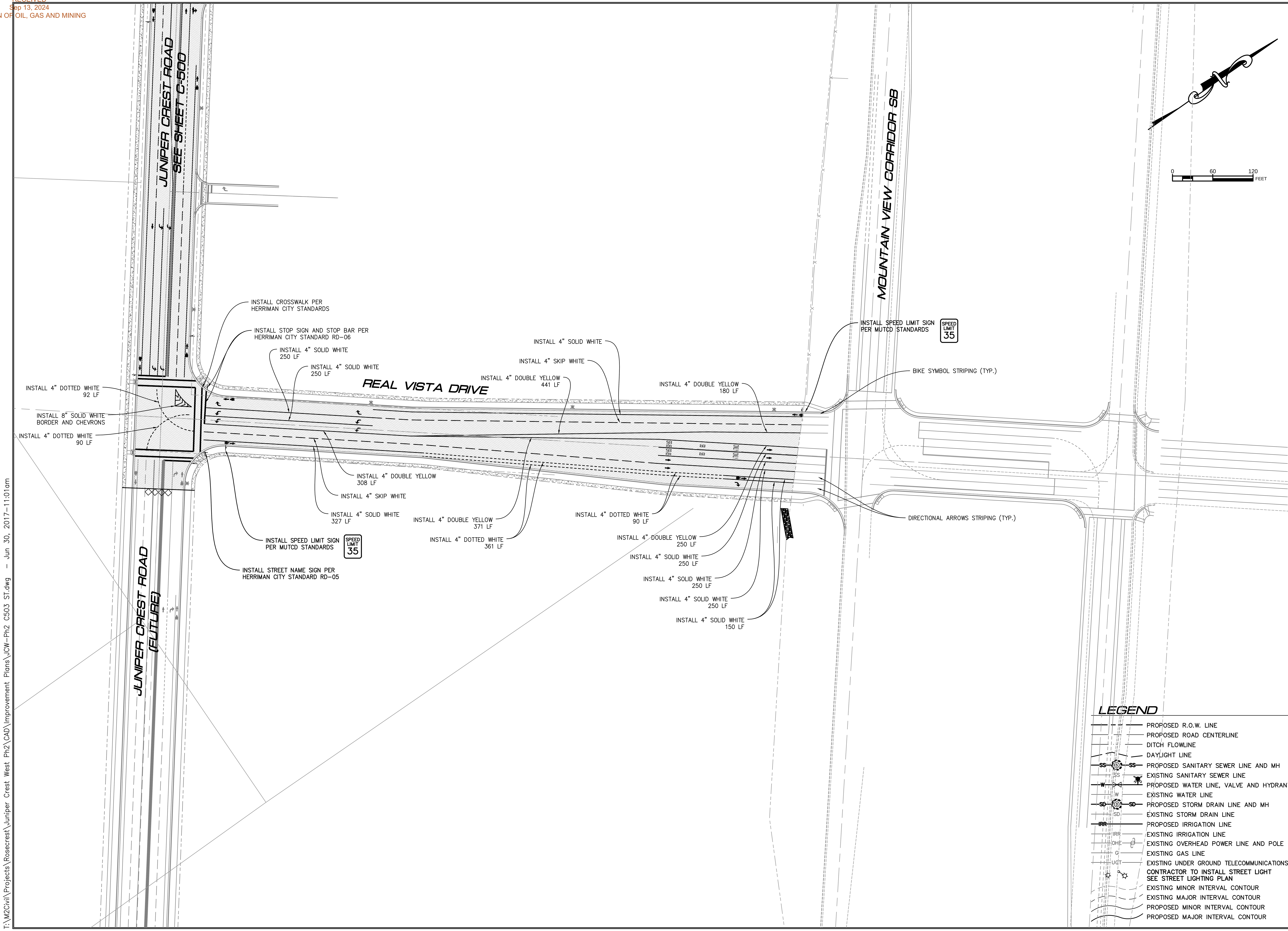
M2 CIVIL
PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY, SUITE 200, SOUTH JORDAN, UTAH 84095
801-316-3193 TEL

REGISTERED PROFESSIONAL ENGINEER 5048468-2202 AARON KEVIN JONES 6-30-2017 STATE OF UTAH
PRELIMINARY

SHEET NUMBER C-502

SCALE HORIZONTAL: 1"=60' VERTICAL: 1"=N/A

JOB NUMBER 47-0159



PROJ. MGR.: DB DESIGNER: AJ

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NO.	BY	DATE	REVISIONS

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JUNIPER CREST WEST PH2
FUTURE STRIPING AND SIGNAGE PLAN

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

M2 CIVIL
PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY, SUITE 200, SOUTH JORDAN, UTAH 84095
801-316-3193 TEL

REGISTERED PROFESSIONAL ENGINEER
5048462-2202
AARON KEVIN JONES
6-30-2017
STATE OF UTAH
PRELIMINARY

SHEET NUMBER
C-503

SCALE
HORIZONTAL: 1"=60'
VERTICAL: 1"=N/A

JOB NUMBER
47-0159

RECEIVED
Sep 13, 2024
DIVISION OF OIL, GAS AND MINING

PROJ. MGR: DB DESIGNER: AJ
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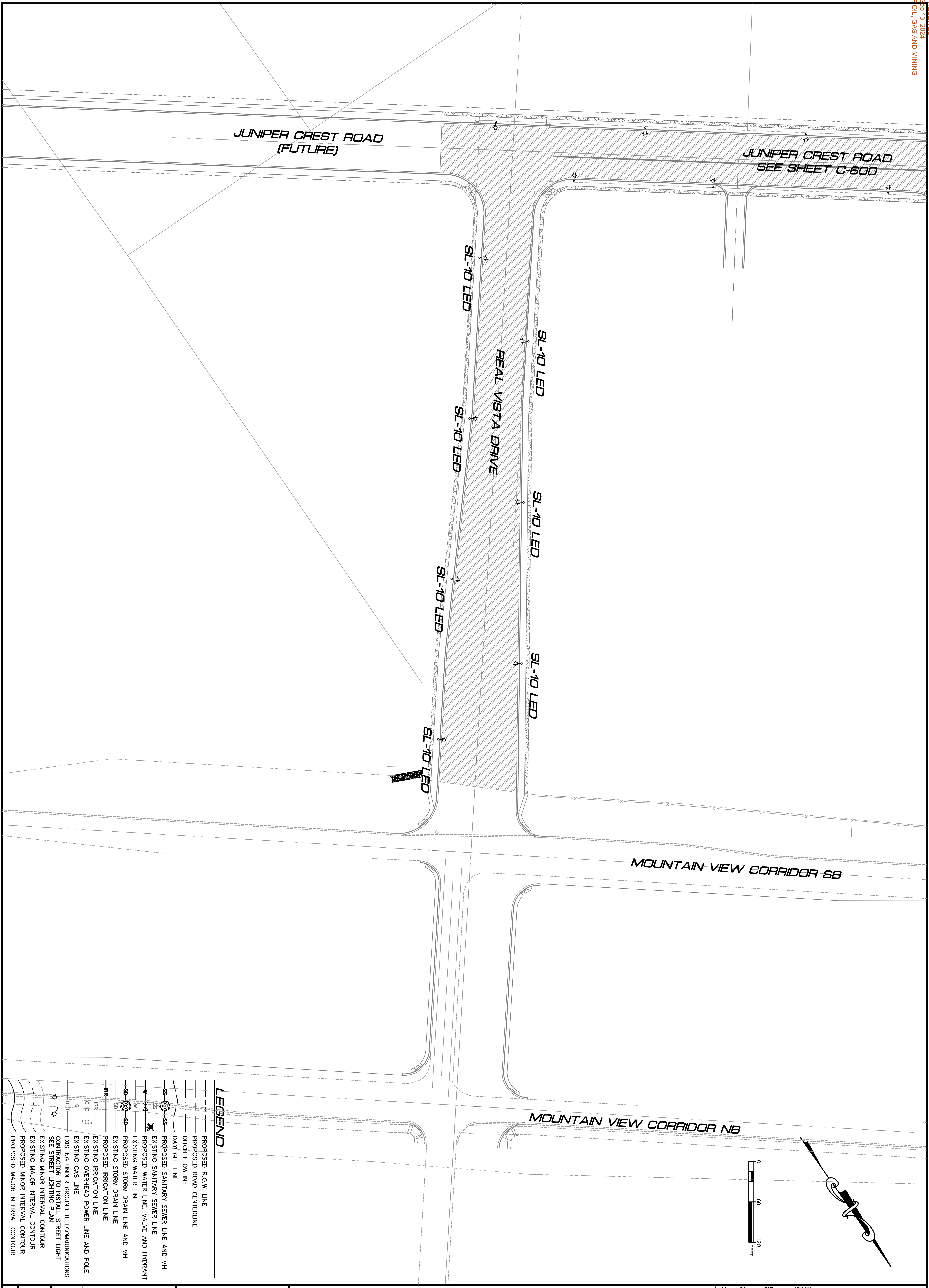

JUNIPER CREST WEST PH2
STREET LIGHTING PLAN

PREPARED FOR: ROSECREST COMMUNITIES
DATE SUBMITTED: 6/30/17

NO.	BY	DATE	REVISIONS:

CAUTION
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M2 CIVIL
PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY, SUITE 200, SOUTH JORDAN, UTAH 84095
801-316-3193 TEL

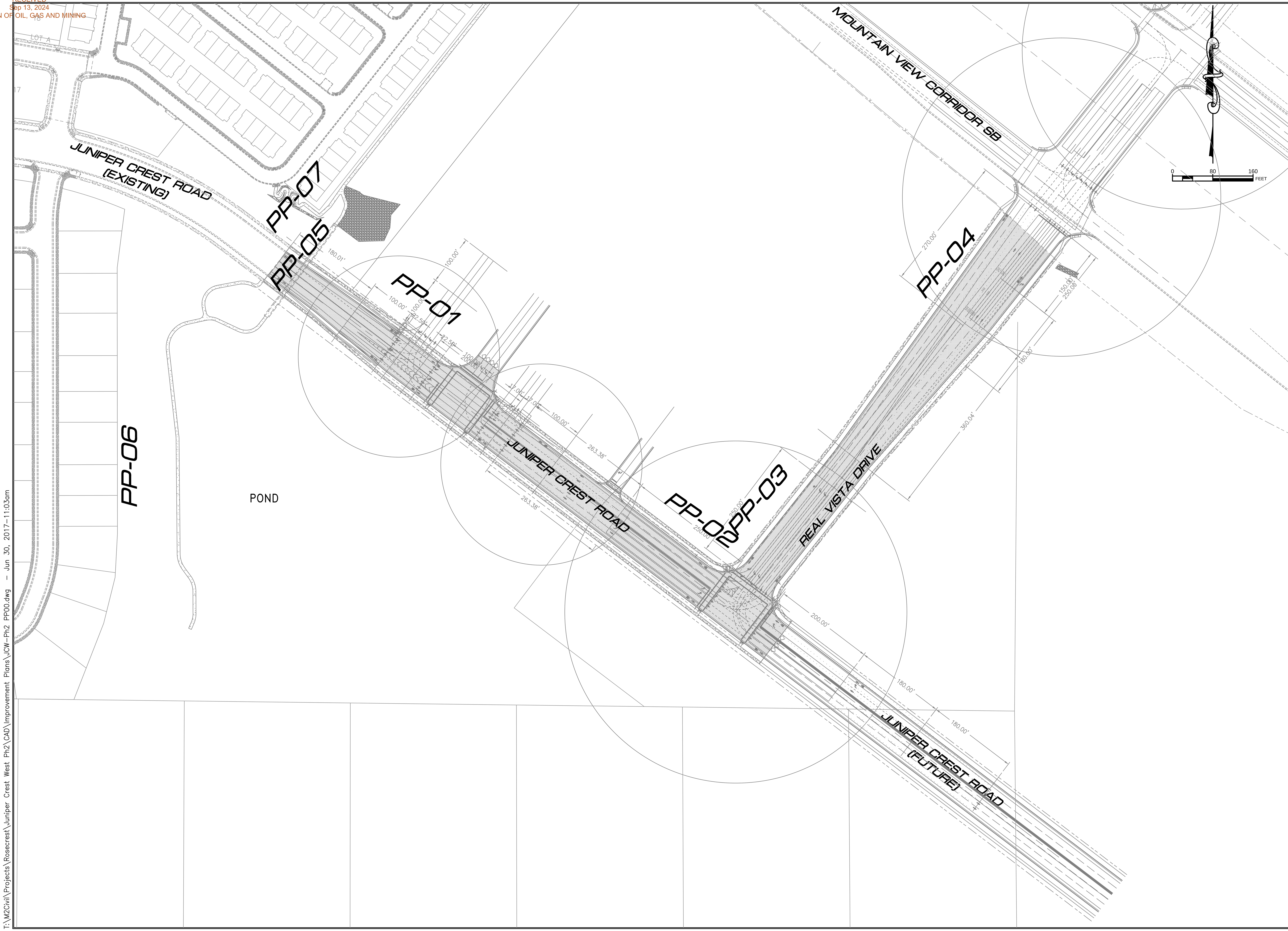
PRELIMINARY

SHEET NUMBER
C-601

SCALE
HORIZONTAL: 1"=60'
VERTICAL: 1"=N/A

JOB NUMBER
47-0159

NOT FOR CONSTRUCTION



PROJ. MGR: DB DESIGNER: AJ
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NO.	BY	DATE	REVISIONS

CAUTION

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JUNIPER CREST WEST PH2
PLAN AND PROFILE MASTER KEY

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

M2 CIVIL
PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY,
SUITE 200, SOUTH JORDAN,
UTAH 84095
801-316-3193 TEL

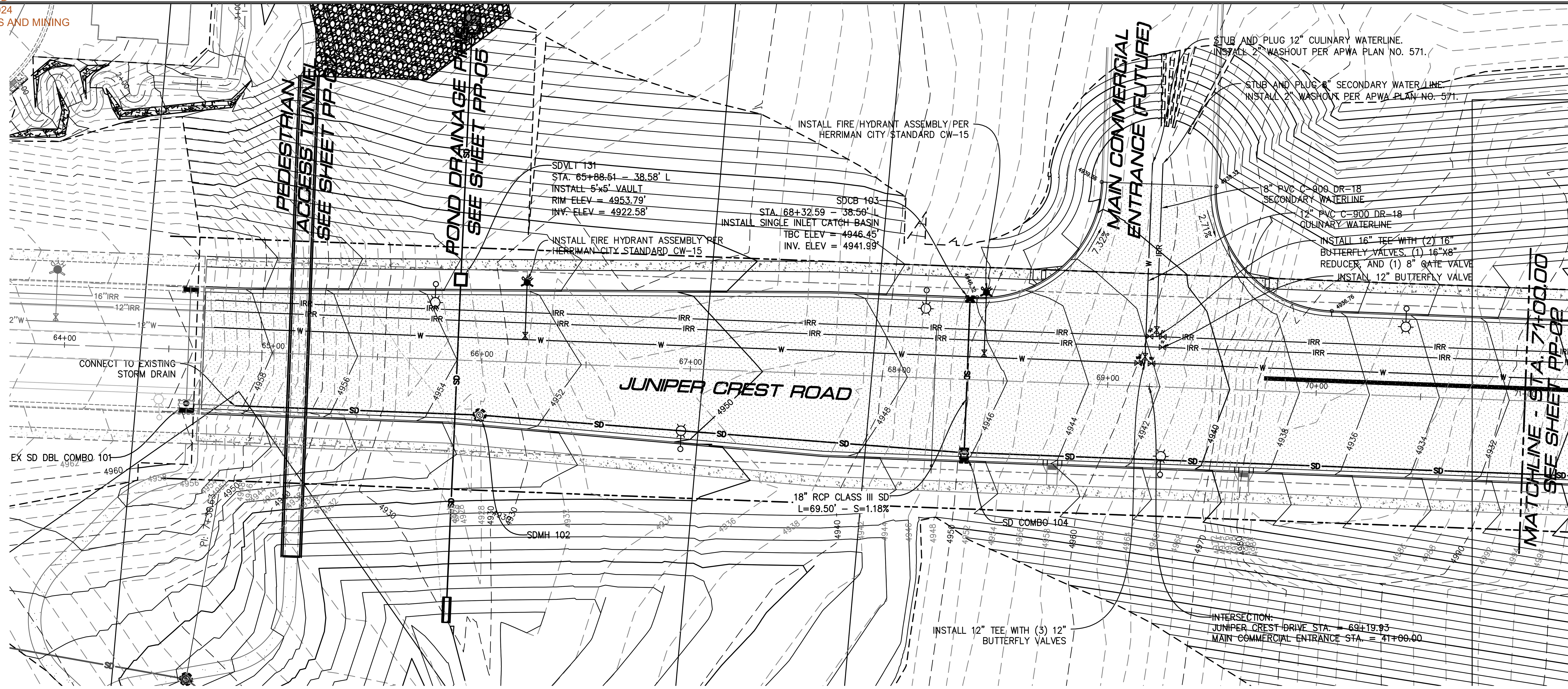
REGISTERED PROFESSIONAL ENGINEER
5048461-2202
AARON KEVIN JONES
6-30-2017
STATE OF UTAH
PRELIMINARY

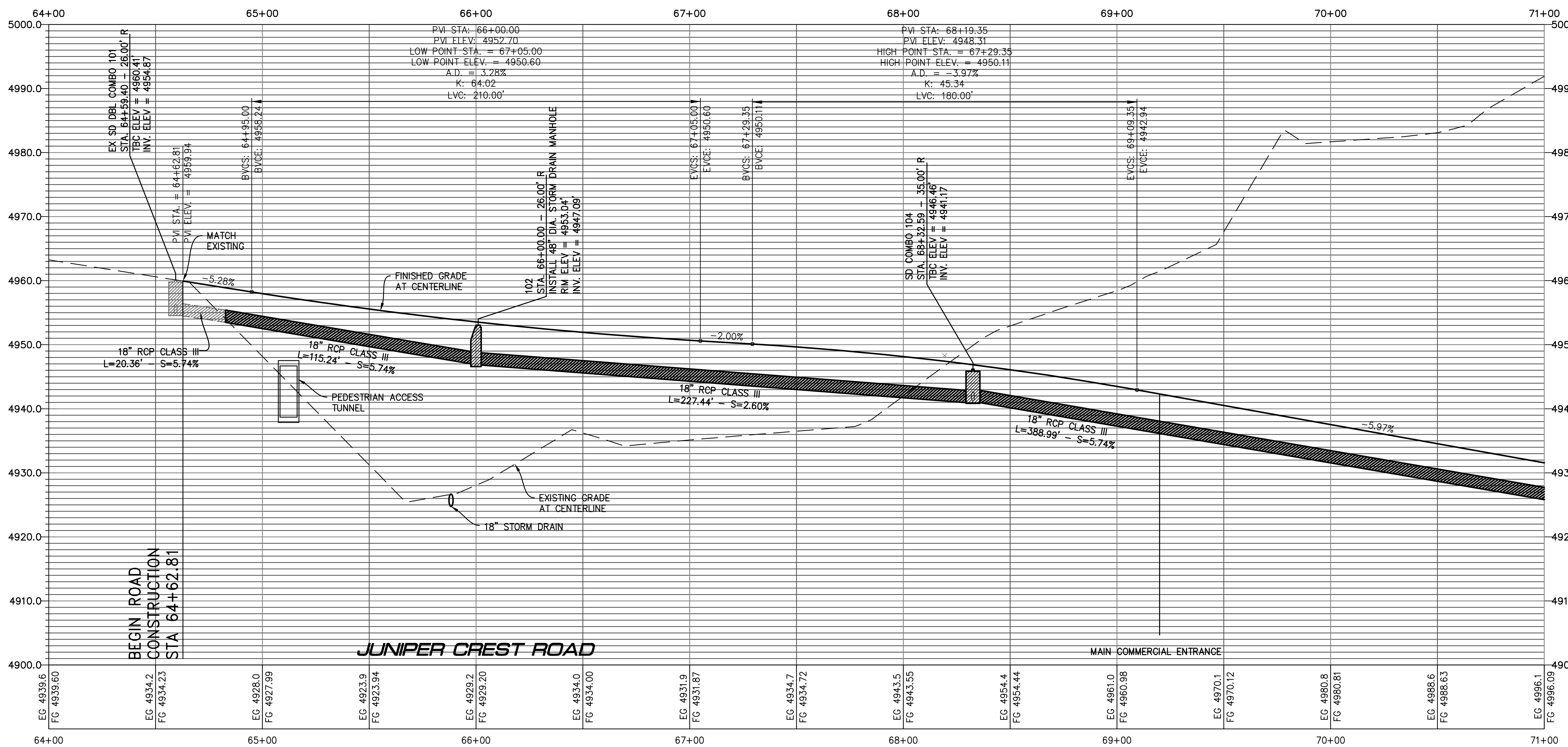
SHEET NUMBER
PP-00

SCALE
HORIZONTAL: 1"=80'
VERTICAL: 1"=N/A

JOB NUMBER
47-0159

RECEIVED
Sep 13, 2024
DIVISION OF OIL, GAS AND MINING





SANITARY SEWER NOTES:

1. ALL CONSTRUCTION SHALL COMPLY WITH SOUTH VALLEY SEWER DISTRICT'S DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS.
2. CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND INVERT ELEVATIONS OF EXISTING MANHOLES AND OTHER UTILITIES BEFORE STAKING OR CONSTRUCTING ANY NEW SEWER LINES.
3. FOUR FEET OF COVER IS REQUIRED OVER ALL SEWER LINES.
4. INSTALL SEWER LATERALS AT MINIMUM 2% SLOPE AND CLEANOUTS AS REQUIRED. CONNECT TO SEWER MAIN PER S.V.S.D. STANDARD DRAWING SS-3A.
5. **ALL MANHOLE CONE SECTIONS ARE TO BE POSITIONED AWAY FROM ROAD MONUMENTS, CURB AND GUTTER, AND LOW POINTS (SUCH AS CENTERLINES OF REVERSE CROWN ROADS), AND TOWARDS HIGH POINTS (SUCH AS CENTERLINES OF CROWNED ROADS).**

STORM DRAIN NOTES:

1. ALL CONSTRUCTION SHALL COMPLY WITH HERRIMAN CITY AND APWA DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS.
2. CONTRACTOR TO ENSURE FRAME AND GRATE TYPE ON ALL STORM DRAIN CATCH BASINS AND COMBINATION BOXES ARE CONSISTENT WITH CURB AND GUTTER TYPE.

CULINARY AND SECONDARY WATER NOTES:

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4. INSTALL IRRIGATION DRAIN AT ALL LOW POINTS IN SECONDARY WATERLINES PER HERRIMAN CITY AND APWA DESIGN STANDARDS.

LEGEND

- PROPOSED R.O.W. LINE
- PROPOSED ROAD CENTERLINE
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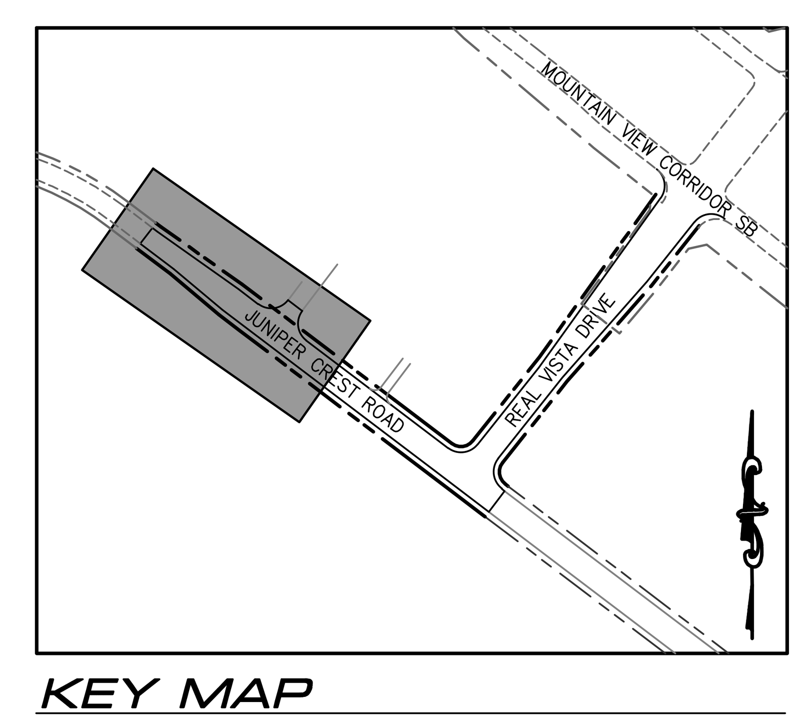
- PROPOSED WATER LINE, VALVE AND HYDRANT
- EXISTING WATER LINE
- PROPOSED STORM DRAIN LINE AND MH
- EXISTING STORM DRAIN LINE
- PROPOSED IRRIGATION LINE
- EXISTING IRRIGATION LINE
- EXISTING OVERHEAD POWER LINE AND POLE
- EXISTING GAS LINE
- EXISTING UNDER GROUND TELECOMMUNICATIONS
- **CONTRACTOR TO INSTALL STREET LIGHT SEE STREET LIGHTING PLAN**
- EXISTING MINOR INTERVAL CONTOUR
- EXISTING MAJOR INTERVAL CONTOUR
- PROPOSED MINOR INTERVAL CONTOUR
- PROPOSED MAJOR INTERVAL CONTOUR



KEY MAP

JUNIPER CREST WEST PH2
PLAN AND PROFILE JUNIPER CREST ROAD

STA 64+62.81 TO STA 71+00.00

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

NO. BY DATE REVISIONS

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M2 CIVIL
PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY, SUITE 200, SOUTH JORDAN, UTAH 84095
801-316-3193 TEL

REGISTERED PROFESSIONAL ENGINEER 5048462-2202 AARON KEVIN JONES 6-30-2017 STATE OF UTAH
PRELIMINARY

SHEET NUMBER PP-01

SCALE
HORIZONTAL: 1"=30'
VERTICAL: 1"=10'

JOB NUMBER 47-0159

PROJ. MGR.: DB DESIGNER: AJ
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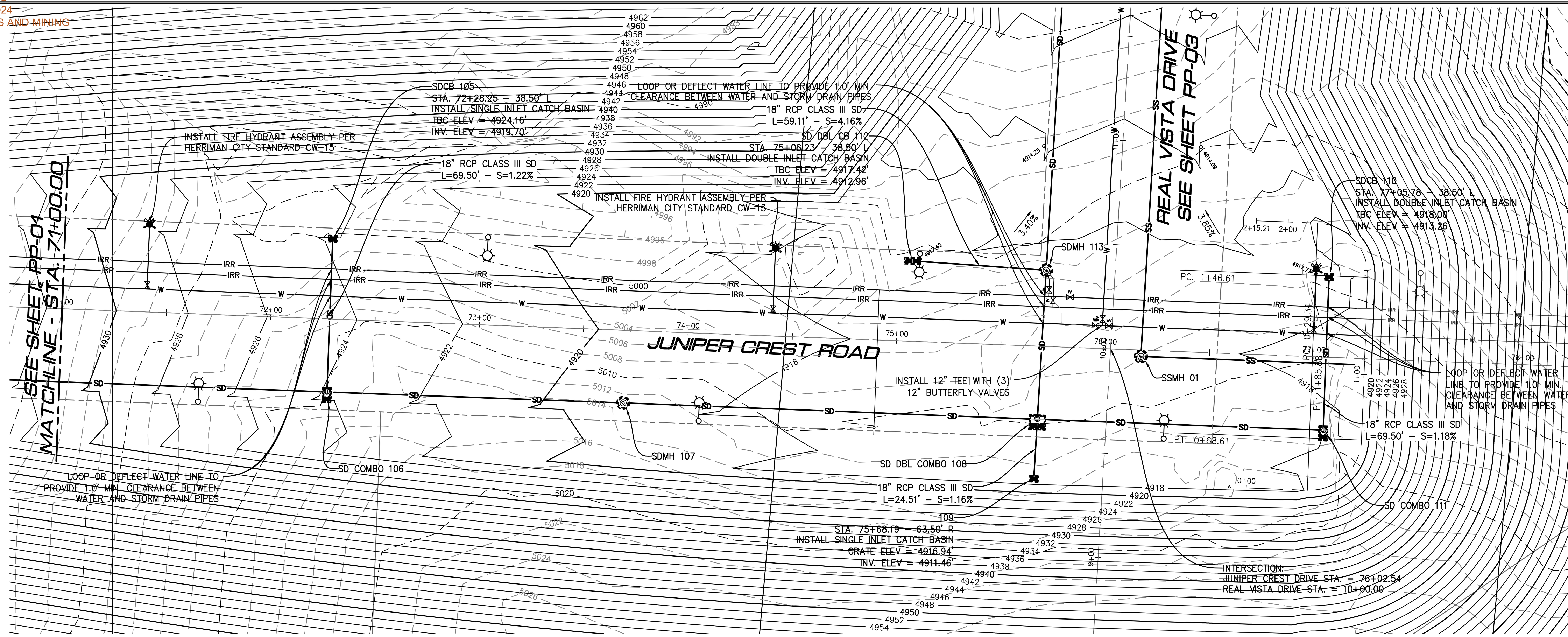

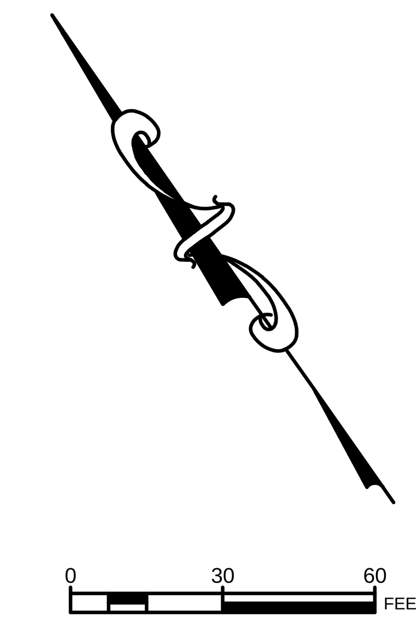

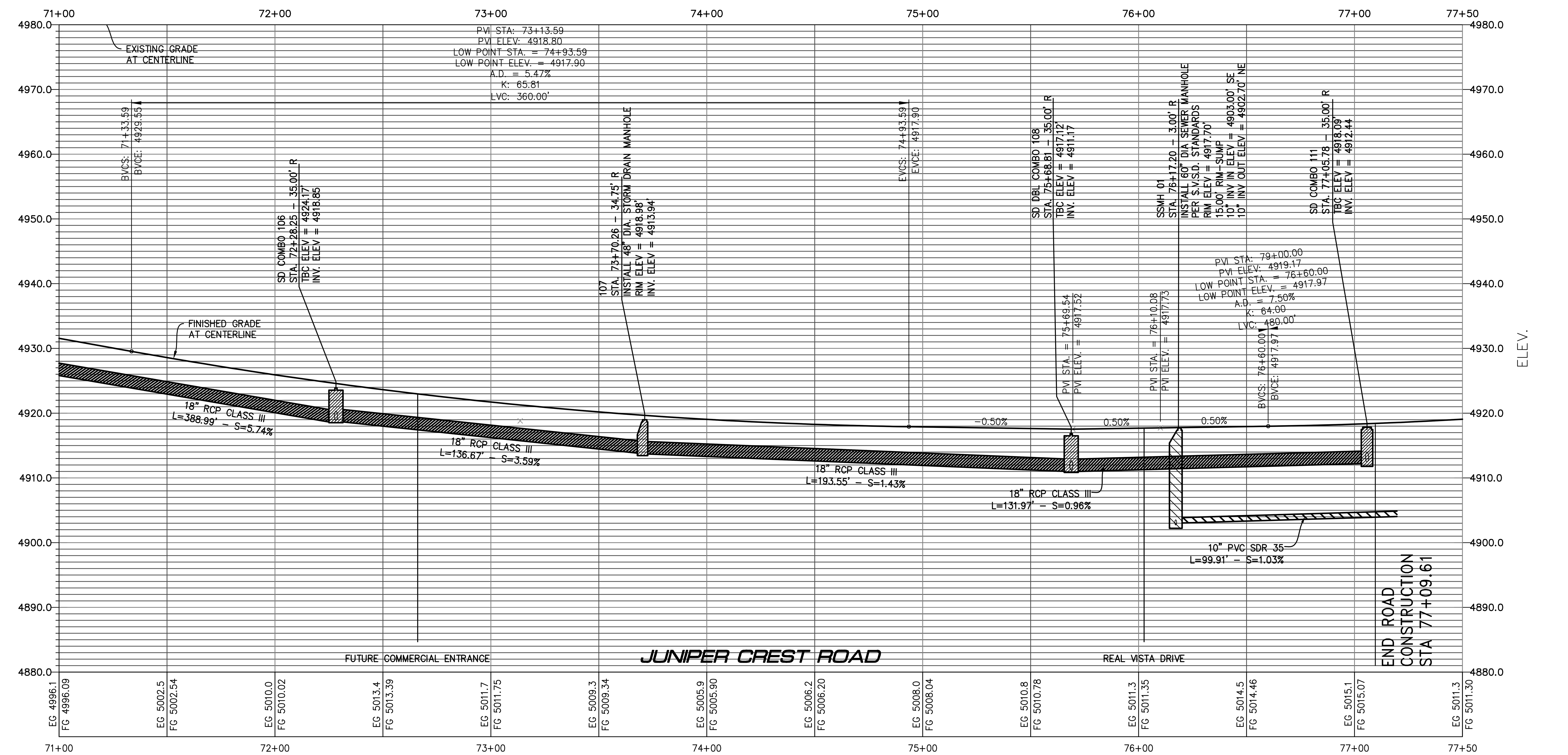

SANITARY SEWER NOTES:

1. ALL CONSTRUCTION SHALL COMPLY WITH SOUTH VALLEY SEWER DISTRICT'S DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS.
2. CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND INVERT ELEVATIONS OF EXISTING MANHOLES AND OTHER UTILITIES BEFORE STAKING OR CONSTRUCTING ANY NEW SEWER LINES.
3. FOUR FEET OF COVER IS REQUIRED OVER ALL SEWER LINES.
4. INSTALL SEWER LATERALS AT MINIMUM 2% SLOPE AND CLEANOUTS AS REQUIRED. CONNECT TO SEWER MAIN PER S.V.S.D. STANDARD DRAWING SS-3A.
5. **ALL MANHOLE CONE SECTIONS ARE TO BE POSITIONED AWAY FROM ROAD MONUMENTS, CURB AND GUTTER, AND LOW POINTS (SUCH AS CENTERLINES OF REVERSE CROWN ROADS), AND TOWARDS HIGH POINTS (SUCH AS CENTERLINES OF CROWNED ROADS).**

STORM DRAIN NOTES:

1. ALL CONSTRUCTION SHALL COMPLY WITH HERRIMAN CITY AND APWA DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS.
2. CONTRACTOR TO ENSURE FRAME AND GRATE TYPE ON ALL STORM DRAIN CATCH BASINS AND COMBINATION BOXES ARE CONSISTENT WITH CURB AND GUTTER TYPE.

CULINARY AND SECONDARY WATER NOTES:

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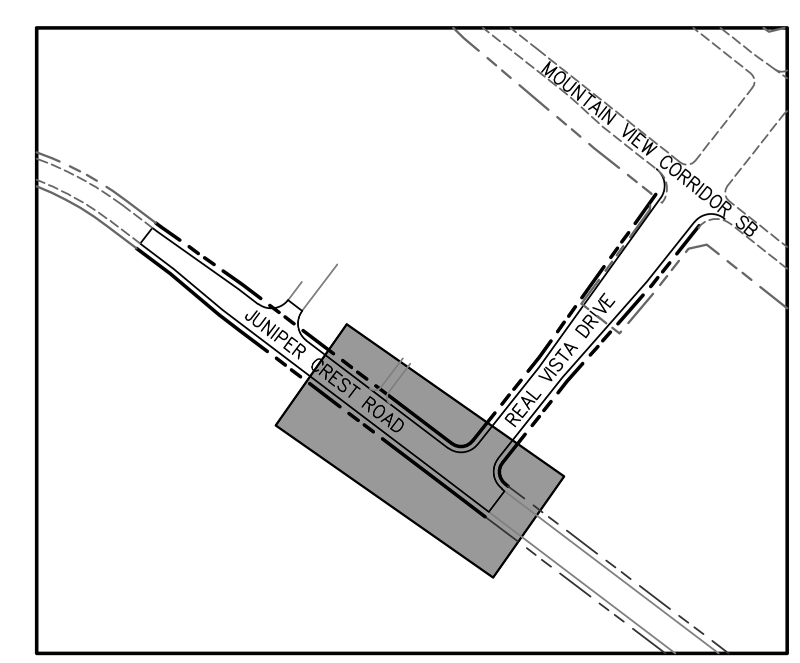
3. INSTALL CAV VALVES AT ALL HIGH POINTS IN CULINARY AND SECONDARY WATERLINES PER HERRIMAN CITY AND APWA DESIGN STANDARDS.
4. INSTALL IRRIGATION DRAIN AT ALL LOW POINTS IN SECONDARY WATERLINES PER HERRIMAN CITY AND APWA DESIGN STANDARDS.

LEGEND

- PROPOSED R.O.W. LINE
- PROPOSED ROAD CENTERLINE
- DITCH FLOWLINE
- DAYLIGHT LINE
- PROPOSED SANITARY SEWER LINE AND MH
- EXISTING SANITARY SEWER LINE
- PROPOSED WATER LINE, VALVE AND HYDRANT
- EXISTING WATER LINE
- PROPOSED STORM DRAIN LINE AND MH
- EXISTING STORM DRAIN LINE
- PROPOSED IRRIGATION LINE
- EXISTING IRRIGATION LINE
- EXISTING OVERHEAD POWER LINE AND POLE
- EXISTING GAS LINE
- EXISTING UNDER GROUND TELECOMMUNICATIONS
- **CONTRACTOR TO INSTALL STREET LIGHT SEE STREET LIGHTING PLAN**
- EXISTING MINOR INTERVAL CONTOUR
- EXISTING MAJOR INTERVAL CONTOUR
- PROPOSED MINOR INTERVAL CONTOUR
- PROPOSED MAJOR INTERVAL CONTOUR



KEY MAP

CAUTION
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NO.	BY	DATE	REVISIONS

JUNIPER CREST WEST PH2
PLAN AND PROFILE
JUNIPER CREST ROAD

STA 71+00.00 TO STA 77+09.61

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

M2 CIVIL
PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY,
SUITE 200, SOUTH JORDAN,
UTAH 84095
801-316-3193 TEL

REGISTERED PROFESSIONAL ENGINEER
5048462-2202
AARON KEVIN JONES
6-30-2017
STATE OF UTAH
PRELIMINARY

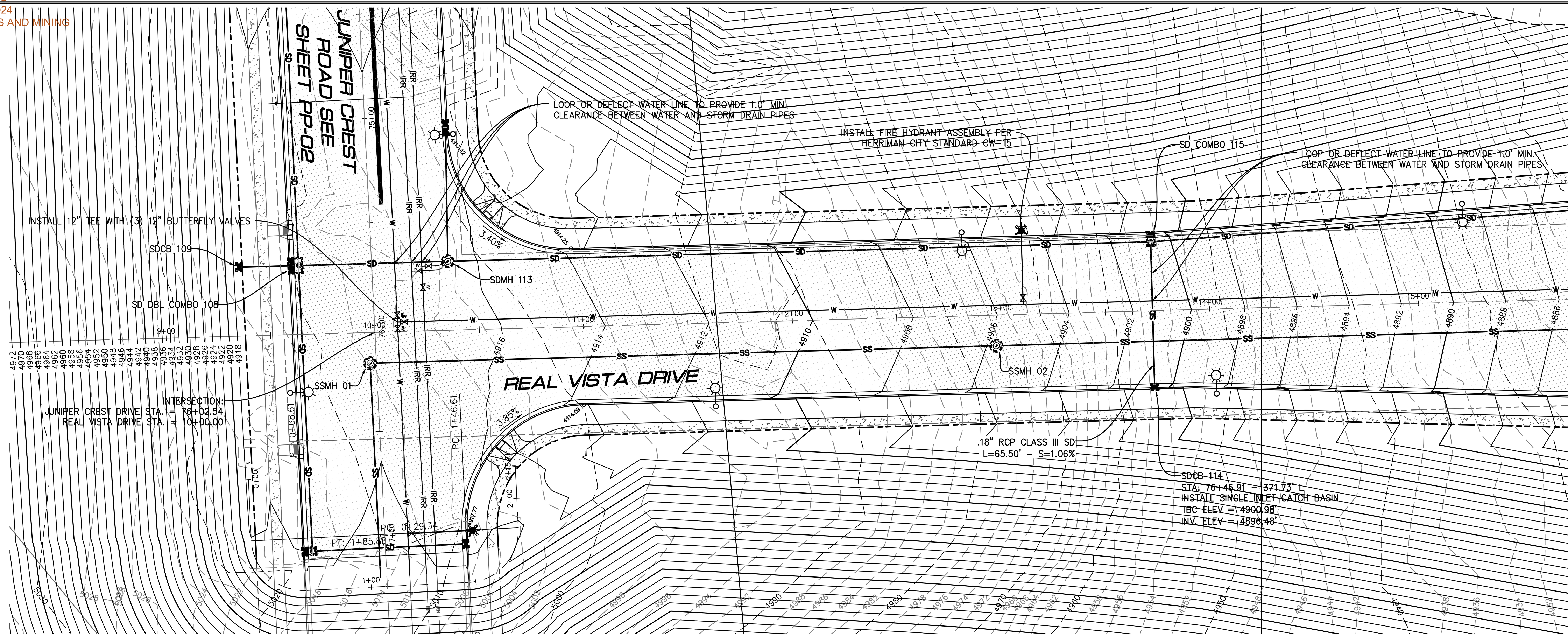
SHEET NUMBER
PP-02

SCALE
HORIZONTAL: 1"=30'
VERTICAL: 1"=10'

JOB NUMBER
47-0159

PROJ. MGR: DB DESIGNER: AJ
T:\M2Civil\Projects\Rosecrest\Juniper Crest West Ph2\CAD\Improvement Plans\JCW-Ph2 PP02.dwg - Jun 30, 2017-11:20am

RECEIVED
Sep 13, 2024
DIVISION OF OIL, GAS AND MINING



SANITARY SEWER NOTES:

1. ALL CONSTRUCTION SHALL COMPLY WITH SOUTH VALLEY SEWER DISTRICT'S DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS.
2. CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND INVERT ELEVATIONS OF EXISTING MANHOLES AND OTHER UTILITIES BEFORE STAKING OR CONSTRUCTING ANY NEW SEWER LINES.
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STORM DRAIN NOTES:

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LEGEND

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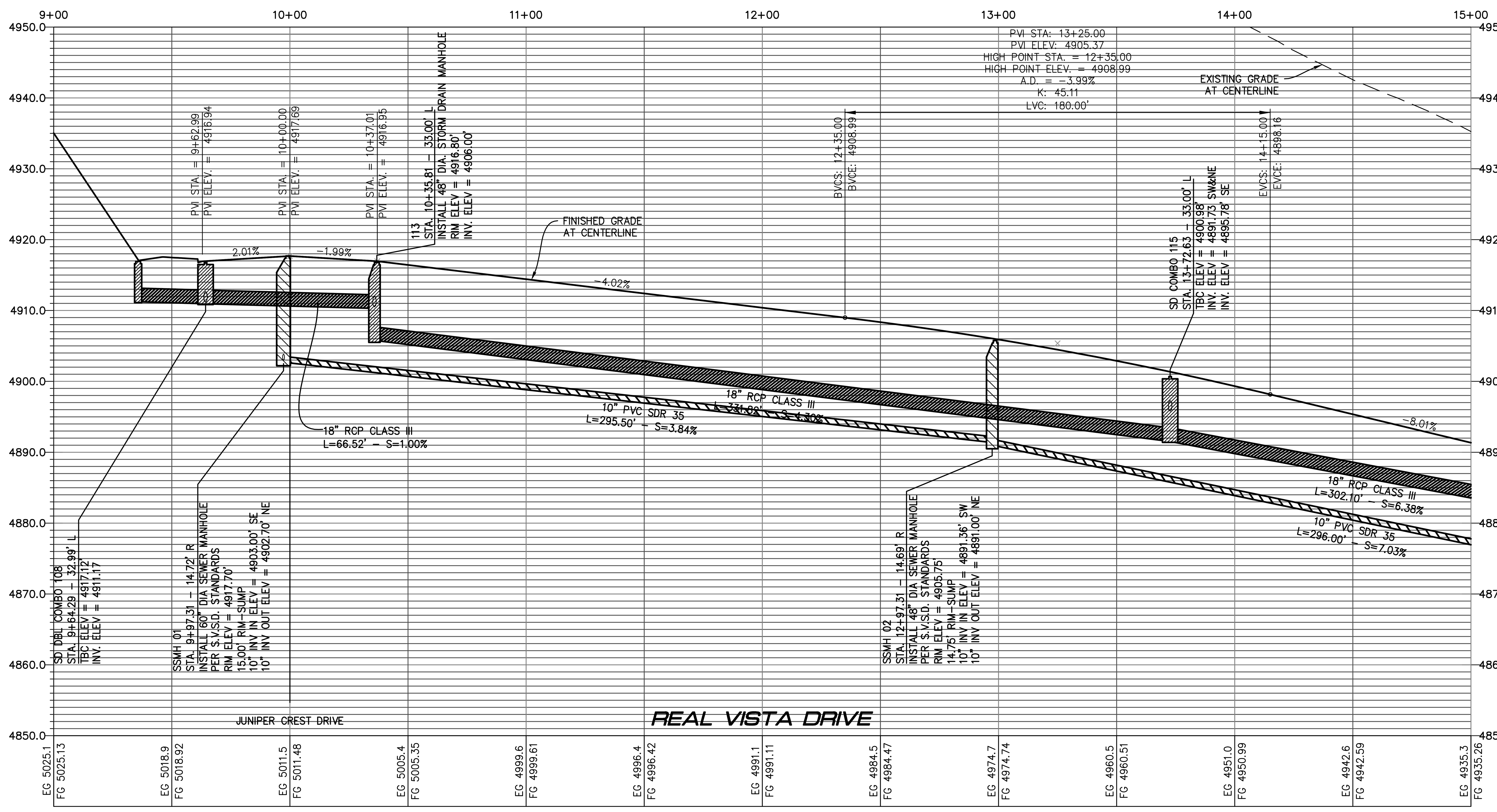
- **CONTRACTOR TO INSTALL STREET LIGHT SEE STREET LIGHTING PLAN**
- EXISTING MINOR INTERVAL CONTOUR
- EXISTING MAJOR INTERVAL CONTOUR
- PROPOSED MINOR INTERVAL CONTOUR
- PROPOSED MAJOR INTERVAL CONTOUR



JUNIPER CREST WEST PH2
PLAN AND PROFILE
REAL VISTA DRIVE

STA 10+00.00 TO STA 15+00.00

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

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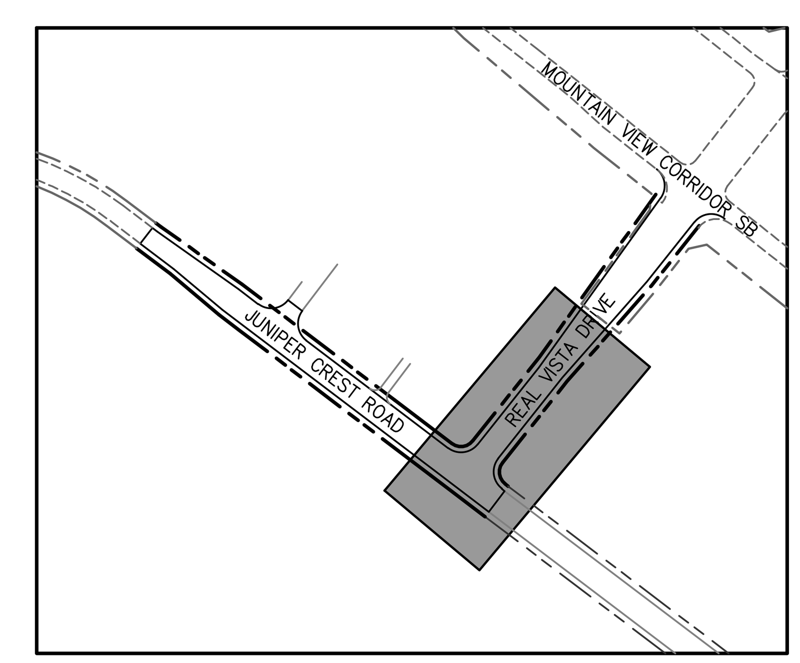
NO.	BY	DATE	REVISIONS

M2 CIVIL
PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY, SUITE 200, SOUTH JORDAN, UTAH 84095
801-316-3193 TEL

REGISTERED PROFESSIONAL ENGINEER 5048464-2202 AARON KEVIN JONES 6-30-2017 STATE OF UTAH
PRELIMINARY

SHEET NUMBER
PP-03

SCALE
HORIZONTAL: 1"=30'
VERTICAL: 1"=10'



KEY MAP

JOB NUMBER
47-0159

PROJ. MGR.: DB DESIGNER: AJ
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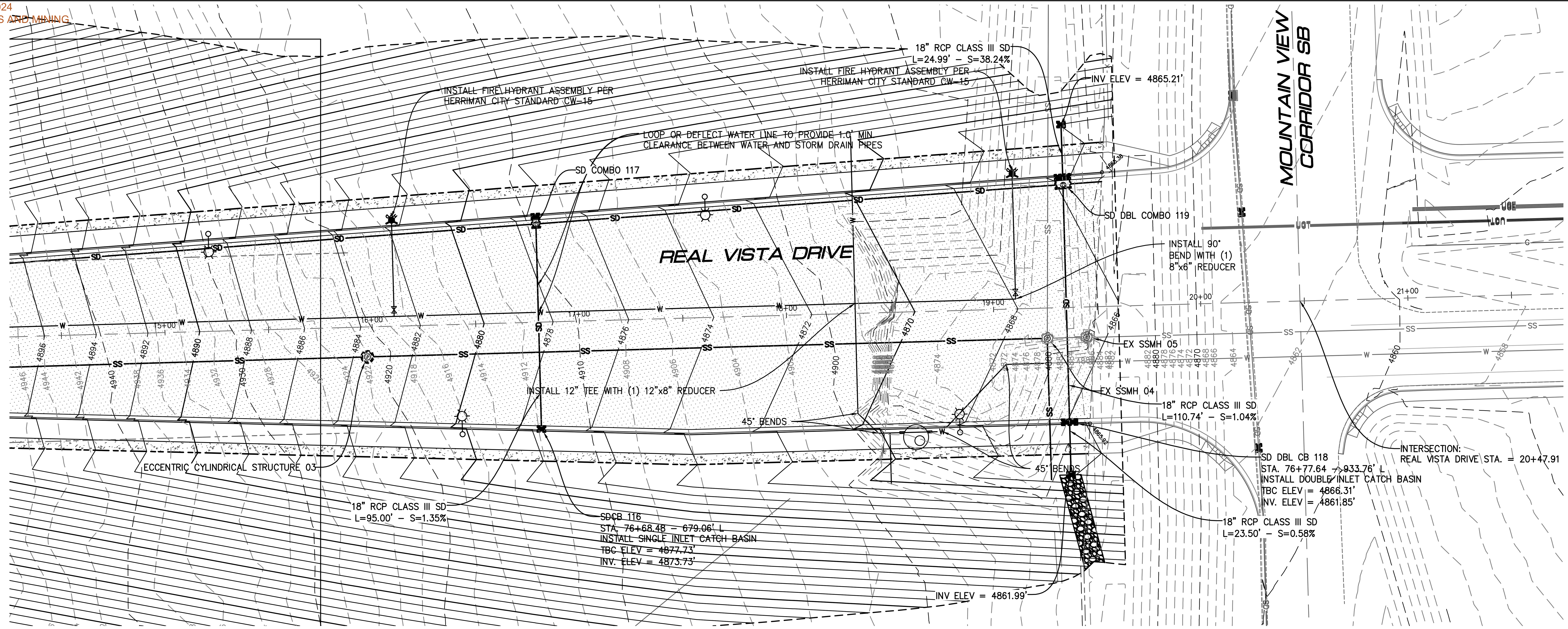

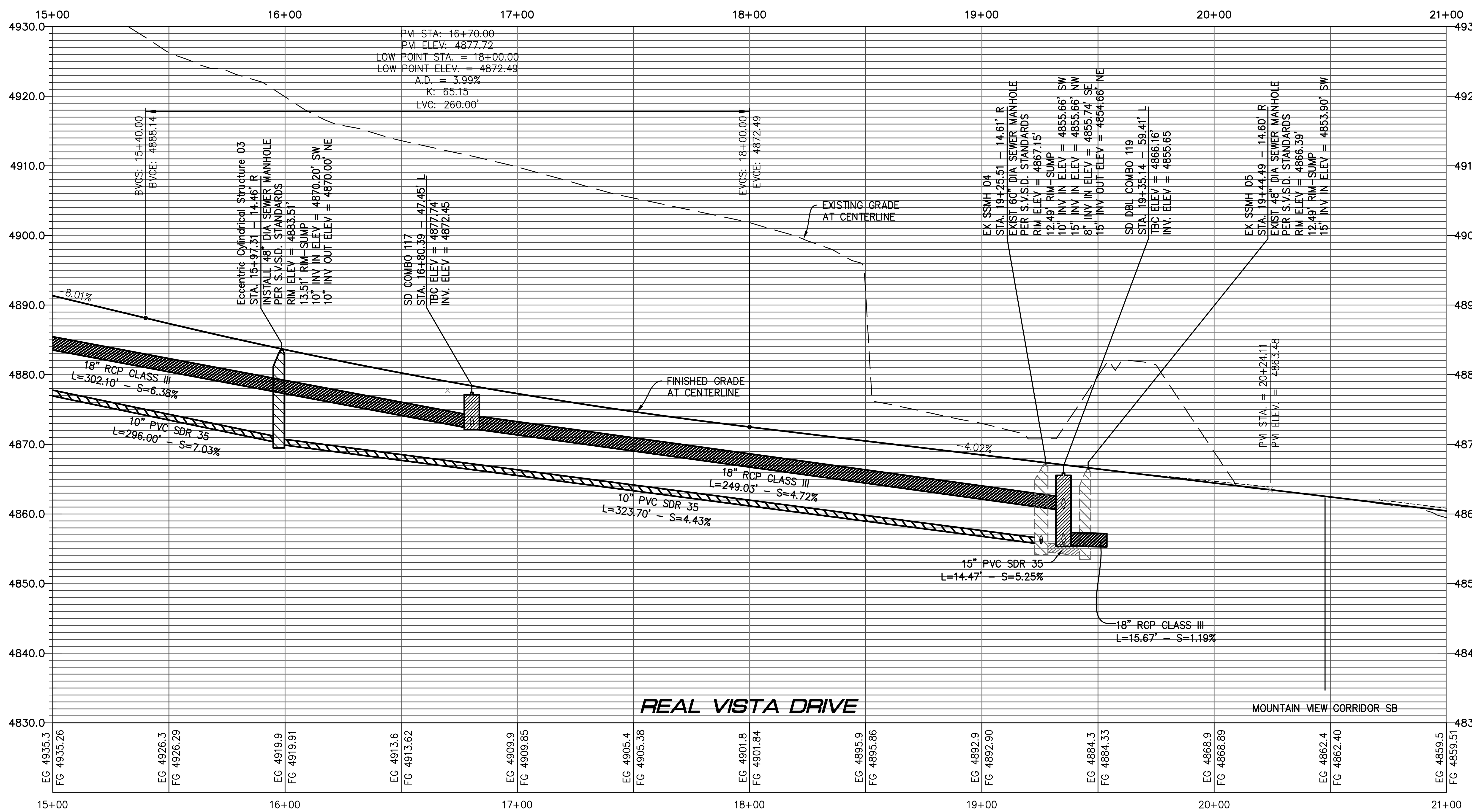

SANITARY SEWER NOTES:

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2. CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND INVERT ELEVATIONS OF EXISTING MANHOLES AND OTHER UTILITIES BEFORE STAKING OR CONSTRUCTING ANY NEW SEWER LINES.
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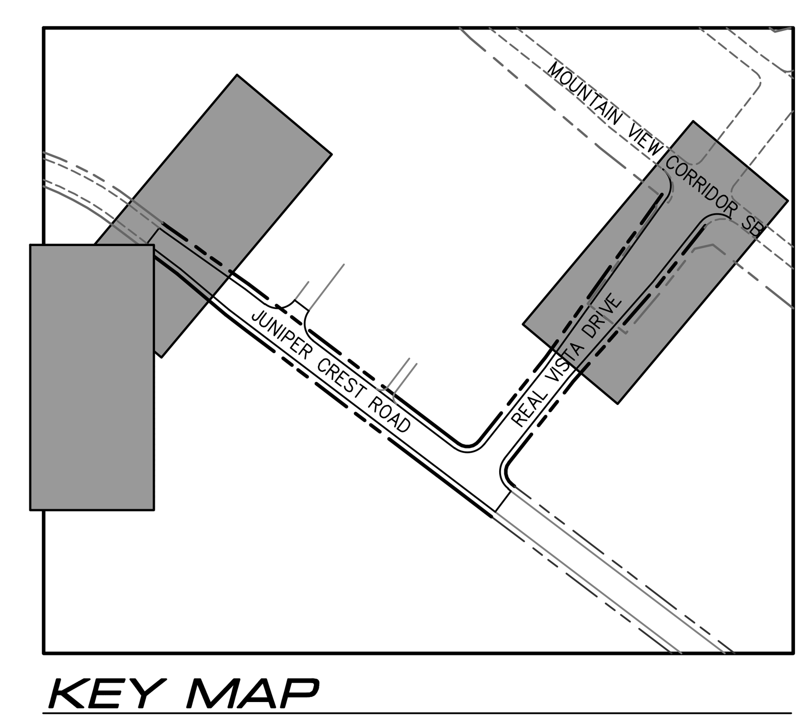
CULINARY AND SECONDARY WATER NOTES:

1. ALL CONSTRUCTION SHALL COMPLY WITH HERRIMAN CITY AND APWA DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS.
2. LOOP OR DEFLECT ALL CULINARY AND SECONDARY WATERLINES AS NECESSARY PER HERRIMAN CITY AND APWA DESIGN STANDARDS.
3. INSTALL CAV VALVES AT ALL HIGH POINTS IN CULINARY AND SECONDARY WATERLINES PER HERRIMAN CITY AND APWA DESIGN STANDARDS.
4. INSTALL IRRIGATION DRAIN AT ALL LOW POINTS IN SECONDARY WATERLINES PER HERRIMAN CITY AND APWA DESIGN STANDARDS.

LEGEND

- PROPOSED R.O.W. LINE
- PROPOSED ROAD CENTERLINE
- DITCH FLOWLINE
- DAYLIGHT LINE
- PROPOSED SANITARY SEWER LINE AND MH
- EXISTING SANITARY SEWER LINE
- PROPOSED WATER LINE, VALVE AND HYDRANT
- EXISTING WATER LINE
- PROPOSED STORM DRAIN LINE AND MH
- EXISTING STORM DRAIN LINE
- PROPOSED IRRIGATION LINE
- EXISTING IRRIGATION LINE
- EXISTING OVERHEAD POWER LINE AND POLE
- EXISTING GAS LINE
- EXISTING UNDER GROUND TELECOMMUNICATIONS
- **CONTRACTOR TO INSTALL STREET LIGHT SEE STREET LIGHTING PLAN**
- EXISTING MINOR INTERVAL CONTOUR
- EXISTING MAJOR INTERVAL CONTOUR
- PROPOSED MINOR INTERVAL CONTOUR
- PROPOSED MAJOR INTERVAL CONTOUR



KEY MAP

JUNIPER CREST WEST PH2
PLAN AND PROFILE REAL VISTA DRIVE

STA 15+00.00 TO STA 20+47.91

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

NO. | BY | DATE | REVISIONS

M2 CIVIL PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY, SUITE 200, SOUTH JORDAN, UTAH 84095
801-316-3193 TEL

PRELIMINARY — REGISTERED PROFESSIONAL ENGINEER 5048468-2202 AARON KEVIN JONES 6-30-2017 STATE OF UTAH

SHEET NUMBER PP-04

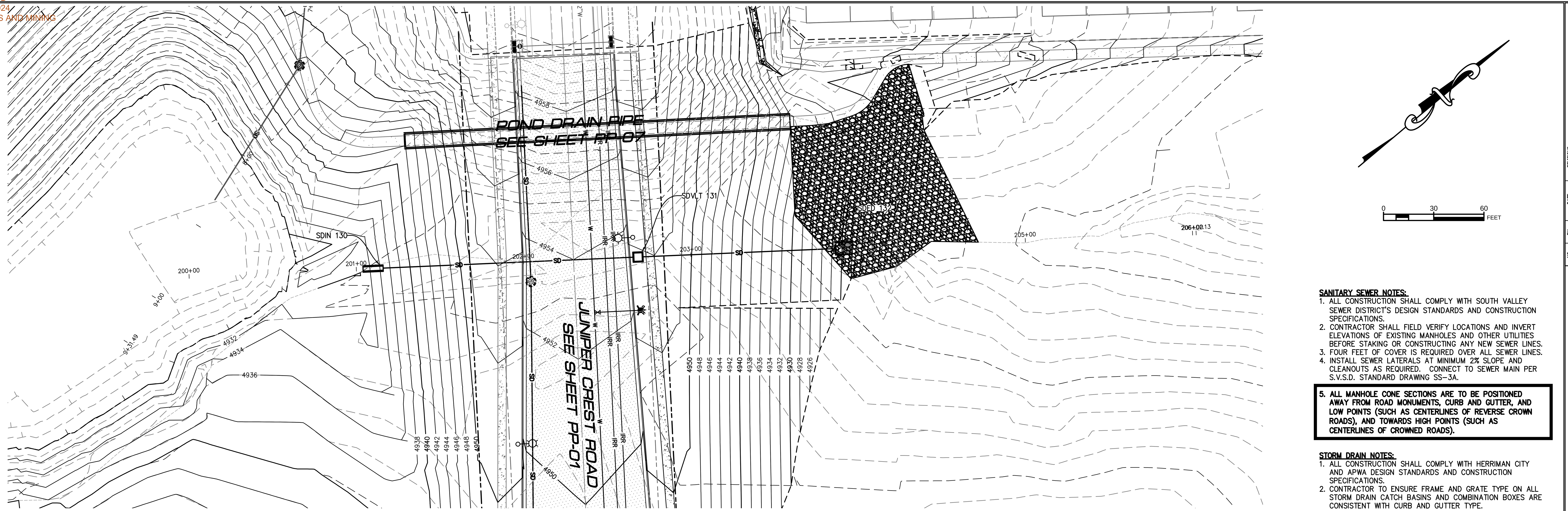
SCALE HORIZONTAL: 1"=30' VERTICAL: 1"=10'

JOB NUMBER 47-0159

PROJ. MGR.: DB DESIGNER: AJ

T:\M2Civil\Projects\Rosecrest\Juniper Crest West Ph2\CAD\Improvement Plans\JCW-Ph2 PP04.dwg – Jun 30, 2017–11:41am

RECEIVED
Sep 13, 2024
DIVISION OF OIL, GAS AND MINING



SANITARY SEWER NOTES:
1. ALL CONSTRUCTION SHALL COMPLY WITH SOUTH VALLEY SEWER DISTRICT'S DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS.
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3. FOUR FEET OF COVER IS REQUIRED OVER ALL SEWER LINES.
4. INSTALL SEWER LATERALS AT MINIMUM 2% SLOPE AND CLEANOUTS AS REQUIRED. CONNECT TO SEWER MAIN PER S.V.S.D. STANDARD DRAWING SS-3A.
5. ALL MANHOLE CONE SECTIONS ARE TO BE POSITIONED AWAY FROM ROAD MONUMENTS, CURB AND GUTTER, AND LOW POINTS (SUCH AS CENTERLINES OF REVERSE CROWN ROADS), AND TOWARDS HIGH POINTS (SUCH AS CENTERLINES OF CROWNED ROADS).

STORM DRAIN NOTES:
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LEGEND
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- DITCH FLOWLINE
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- PROPOSED SANITARY SEWER LINE AND MH
- EXISTING SANITARY SEWER LINE
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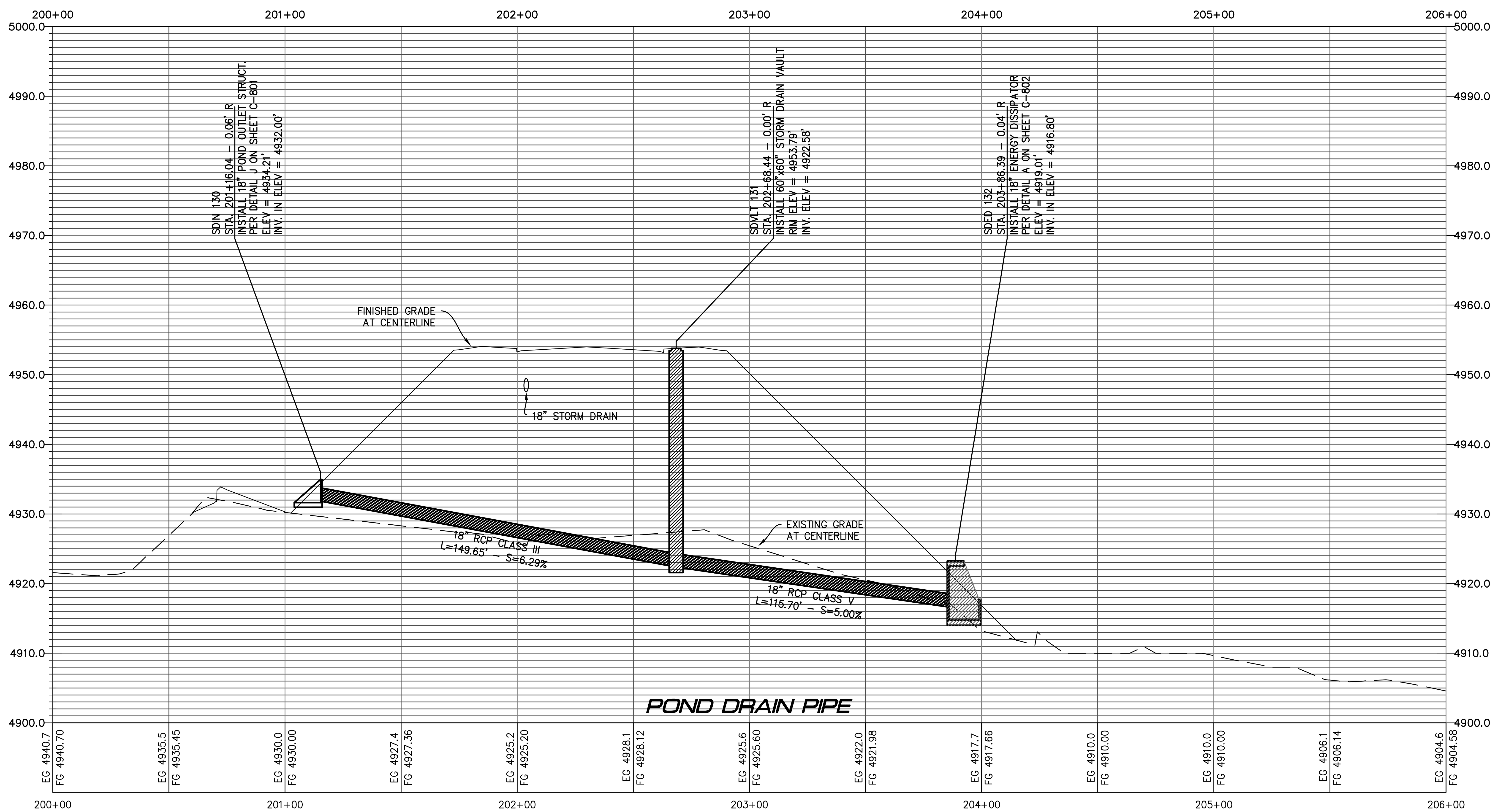
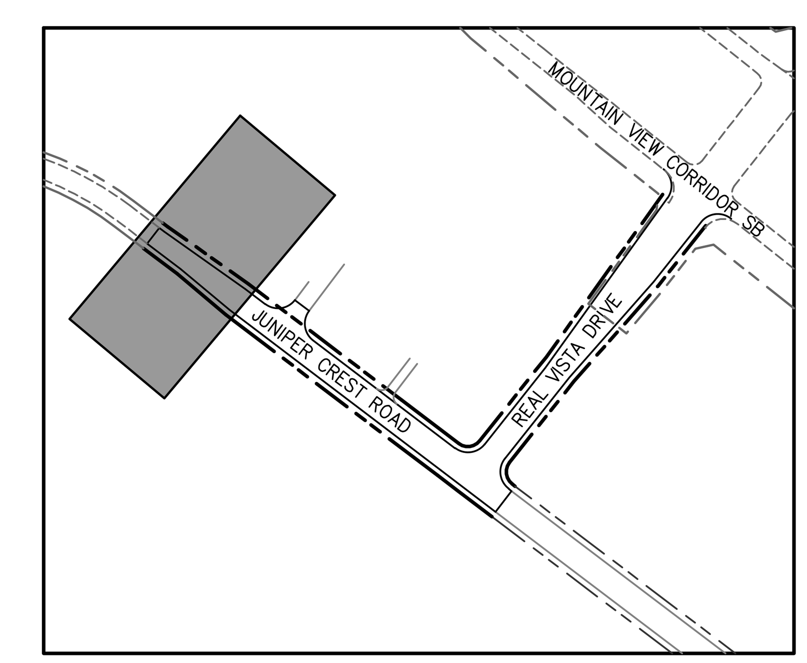
- EXISTING WATER LINE
- PROPOSED STORM DRAIN LINE AND MH
- EXISTING STORM DRAIN LINE
- PROPOSED IRRIGATION LINE
- EXISTING IRRIGATION LINE
- EXISTING OVERHEAD POWER LINE AND POLE
- EXISTING GAS LINE
- EXISTING UNDER GROUND TELECOMMUNICATIONS
- CONTRACTOR TO INSTALL STREET LIGHT SEE STREET LIGHTING PLAN
- EXISTING MINOR INTERVAL CONTOUR
- EXISTING MAJOR INTERVAL CONTOUR
- PROPOSED MINOR INTERVAL CONTOUR
- PROPOSED MAJOR INTERVAL CONTOUR





KEY MAP

JUNIPER CREST WEST PH2
PLAN AND PROFILE POND STORM DRAIN

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

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NO.	BY	DATE	REVISIONS

M2 CIVIL
PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY,
SUITE 200, SOUTH JORDAN,
UTAH 84095
801-316-3193 TEL

PRELIMINARY
REGISTERED PROFESSIONAL ENGINEER 5048462-2202 AARON KEVIN JONES 6-30-2017 STATE OF UTAH

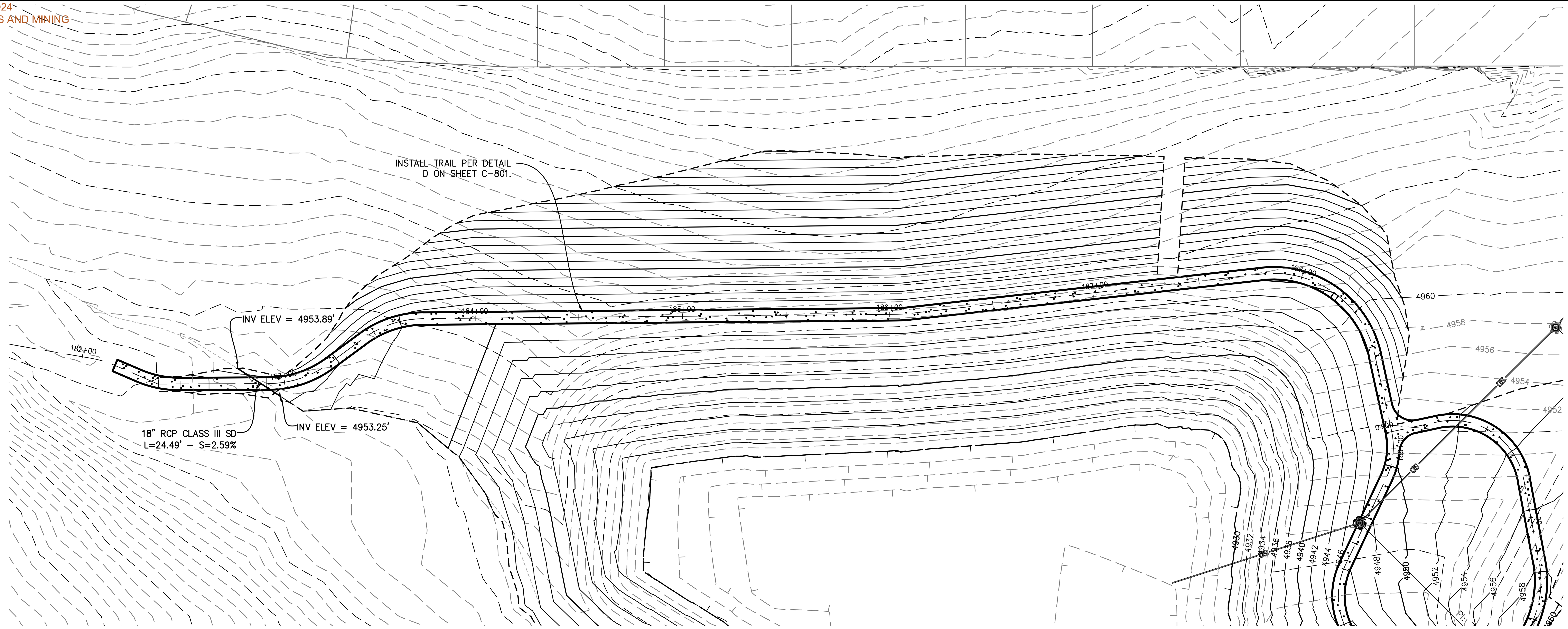
SHEET NUMBER
PP-05

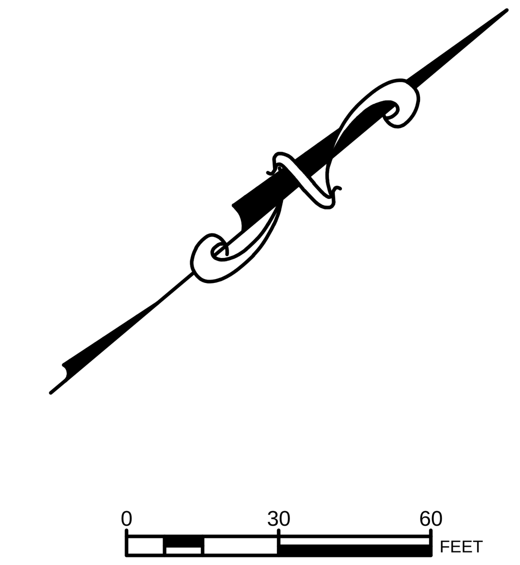
SCALE
HORIZONTAL: 1"=30'
VERTICAL: 1"=10'

JOB NUMBER
47-0159

PROJ. MGR: DB DESIGNER: AJ
T:\M2Civil\Projects\Rosecrest\Juniper Crest West Ph2\CAD\Improvement Plans\JCW-Ph2 PP05.dwg - Jun 30, 2017-11:47am

RECEIVED
Sep 13, 2024
DIVISION OF OIL, GAS AND MINING





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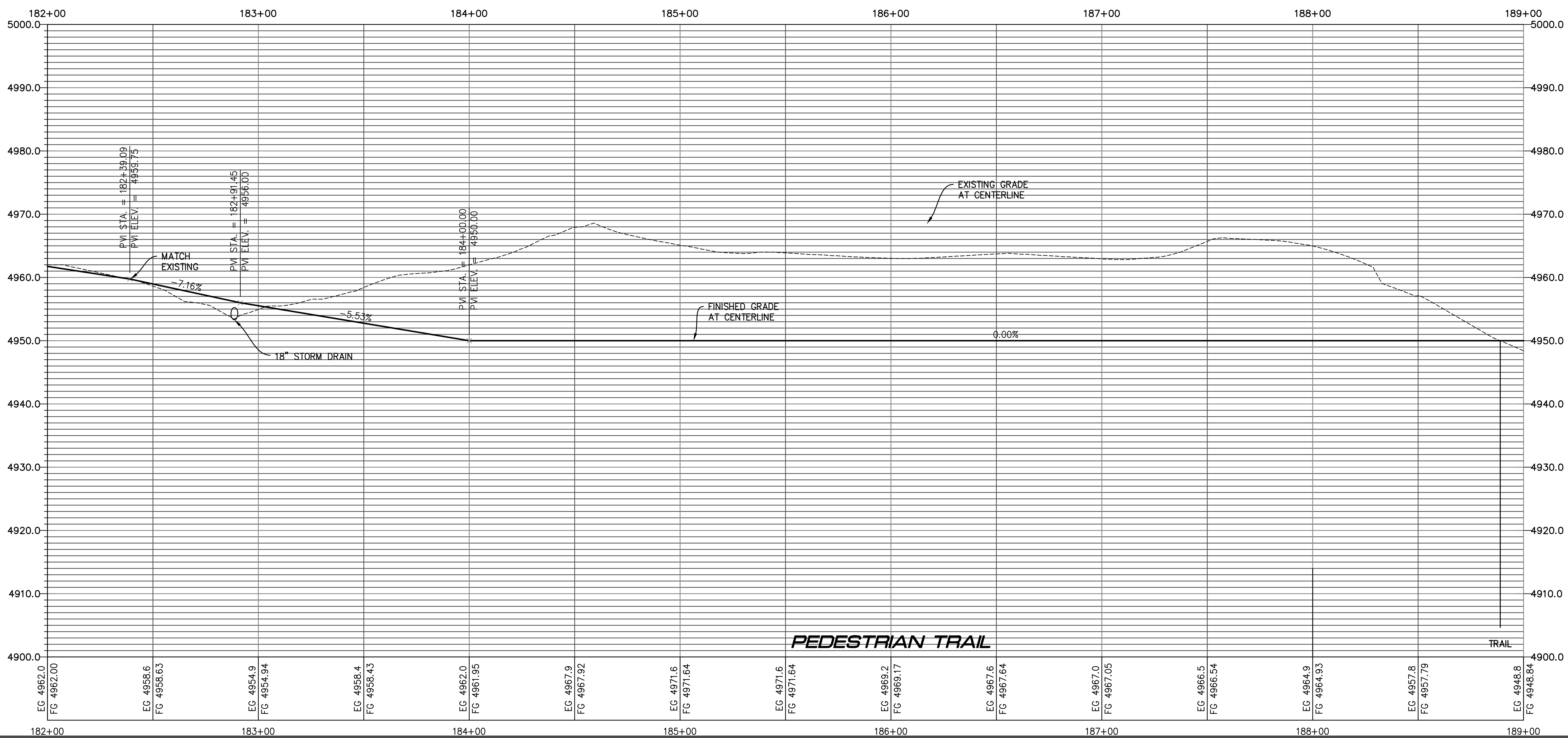

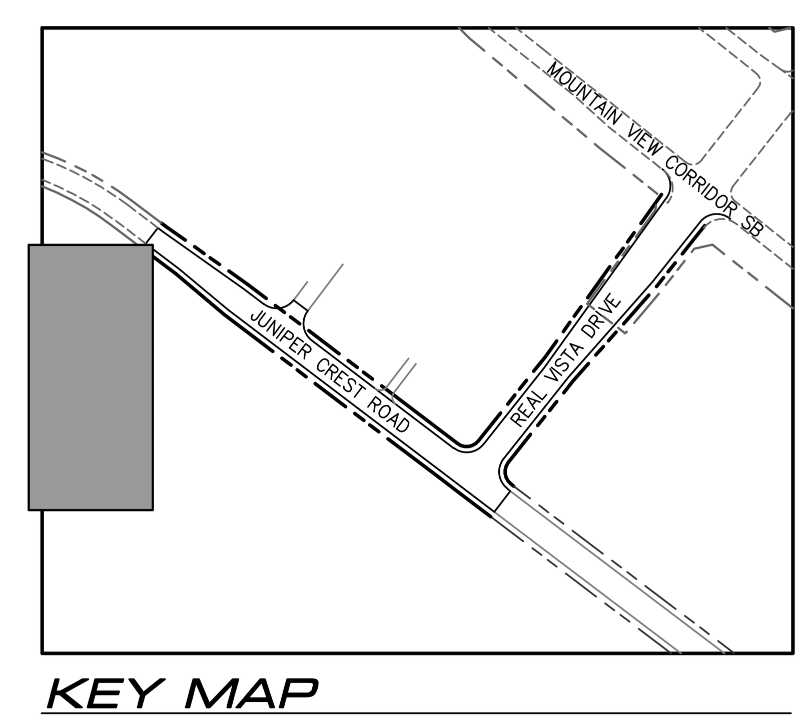

KEY MAP

PROJ. MGR.: DB DESIGNER: AJ
T:\M2Civil\Projects\Rosecrest\Juniper Crest West Ph2\CAD\Improvement Plans\JCW-Ph2 PP06.dwg - Jun 30, 2017-11:55am

NO. | BY | DATE | REVISIONS

CAUTION
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JUNIPER CREST WEST PH2
PLAN AND PROFILE TRAIL

PREPARED FOR: ROSECREST COMMUNITIES
DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

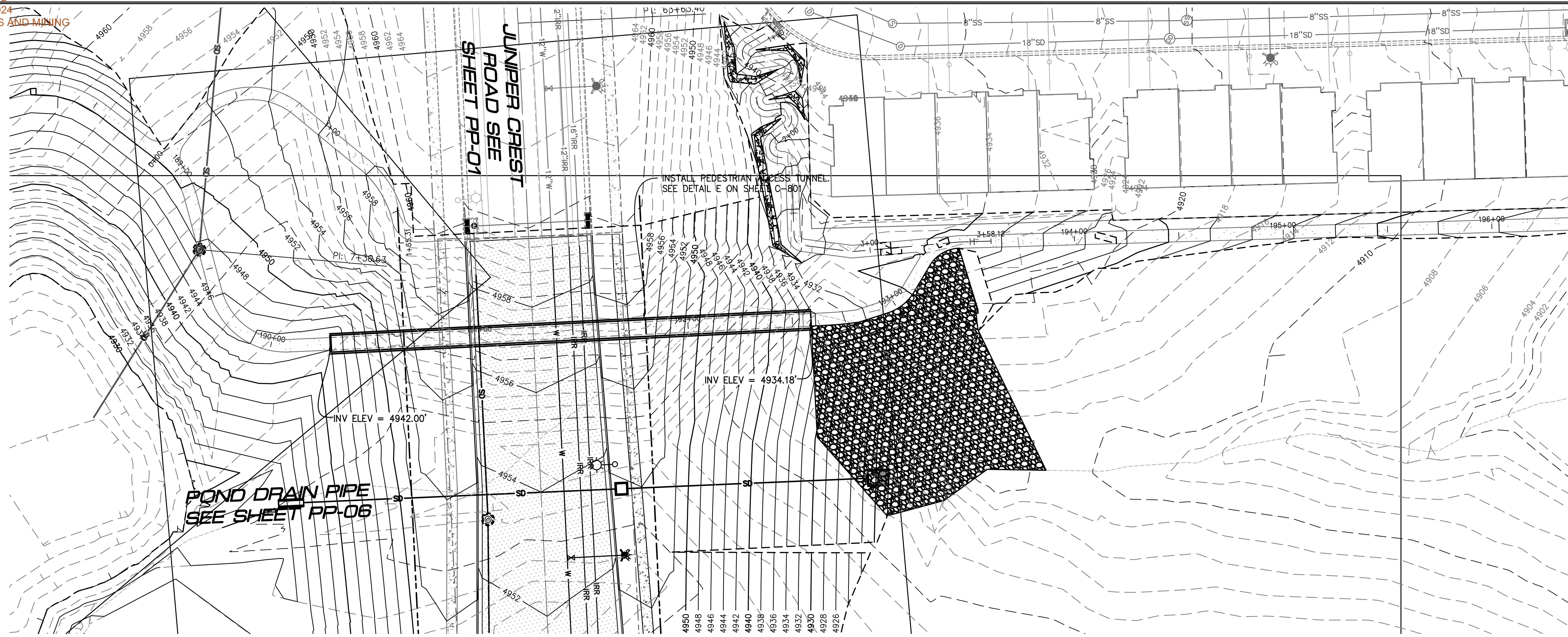
M2 CIVIL
PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY, SUITE 200, SOUTH JORDAN, UTAH 84095
801-316-3193 TEL

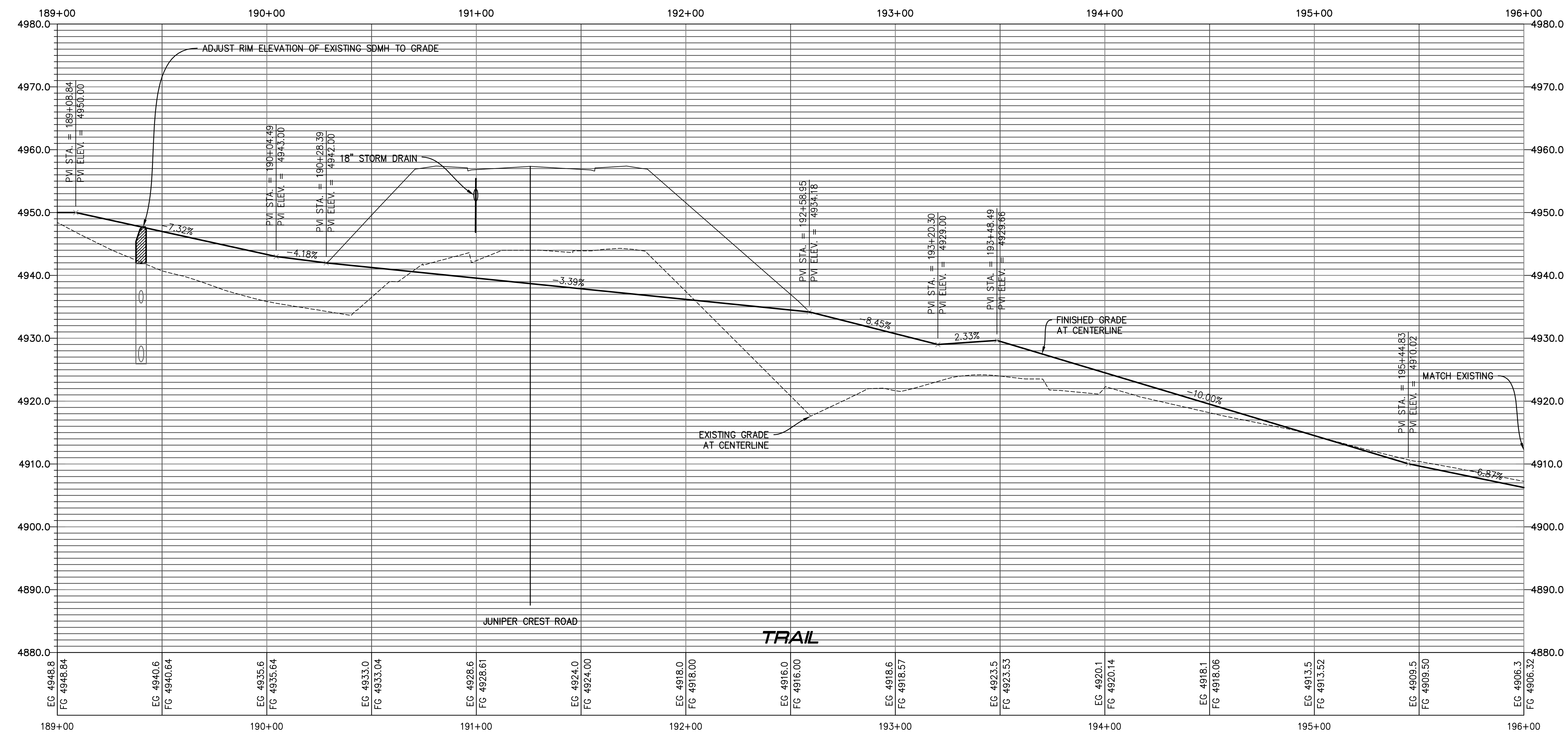
REGISTERED PROFESSIONAL ENGINEER
5048462-2202
AARON KEVIN JONES
6-30-2017
STATE OF UTAH
PRELIMINARY

SHEET NUMBER
PP-06

SCALE
HORIZONTAL: 1"=30'
VERTICAL: 1"=10'

JOB NUMBER
47-0159





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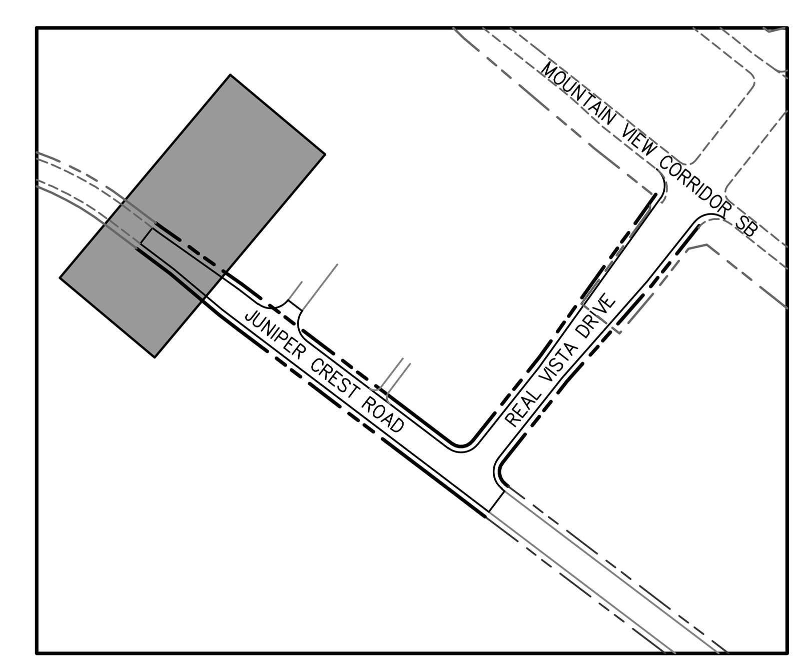
- **CONTRACTOR TO INSTALL STREET LIGHT SEE STREET LIGHTING PLAN**
- EXISTING MINOR INTERVAL CONTOUR
- EXISTING MAJOR INTERVAL CONTOUR
- PROPOSED MINOR INTERVAL CONTOUR
- PROPOSED MAJOR INTERVAL CONTOUR



KEY MAP

NO.	BY	DATE	REVISIONS:

CAUTION
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JUNIPER CREST WEST PH2
PLAN AND PROFILE TRAIL

PREPARED FOR: ROSECREST COMMUNITIES
DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

M2 CIVIL PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY, SUITE 200, SOUTH JORDAN, UTAH 84095
801-316-3193 TEL

REGISTERED PROFESSIONAL ENGINEER 5048468-2202 AARON KEVIN JONES 6-30-2017 STATE OF UTAH
PRELIMINARY

SHEET NUMBER
PP-07

SCALE
HORIZONTAL: 1"= 30'
VERTICAL: 1"= 10'

JOB NUMBER
47-0159

PROJ. MGR: DB DESIGNER: AJ
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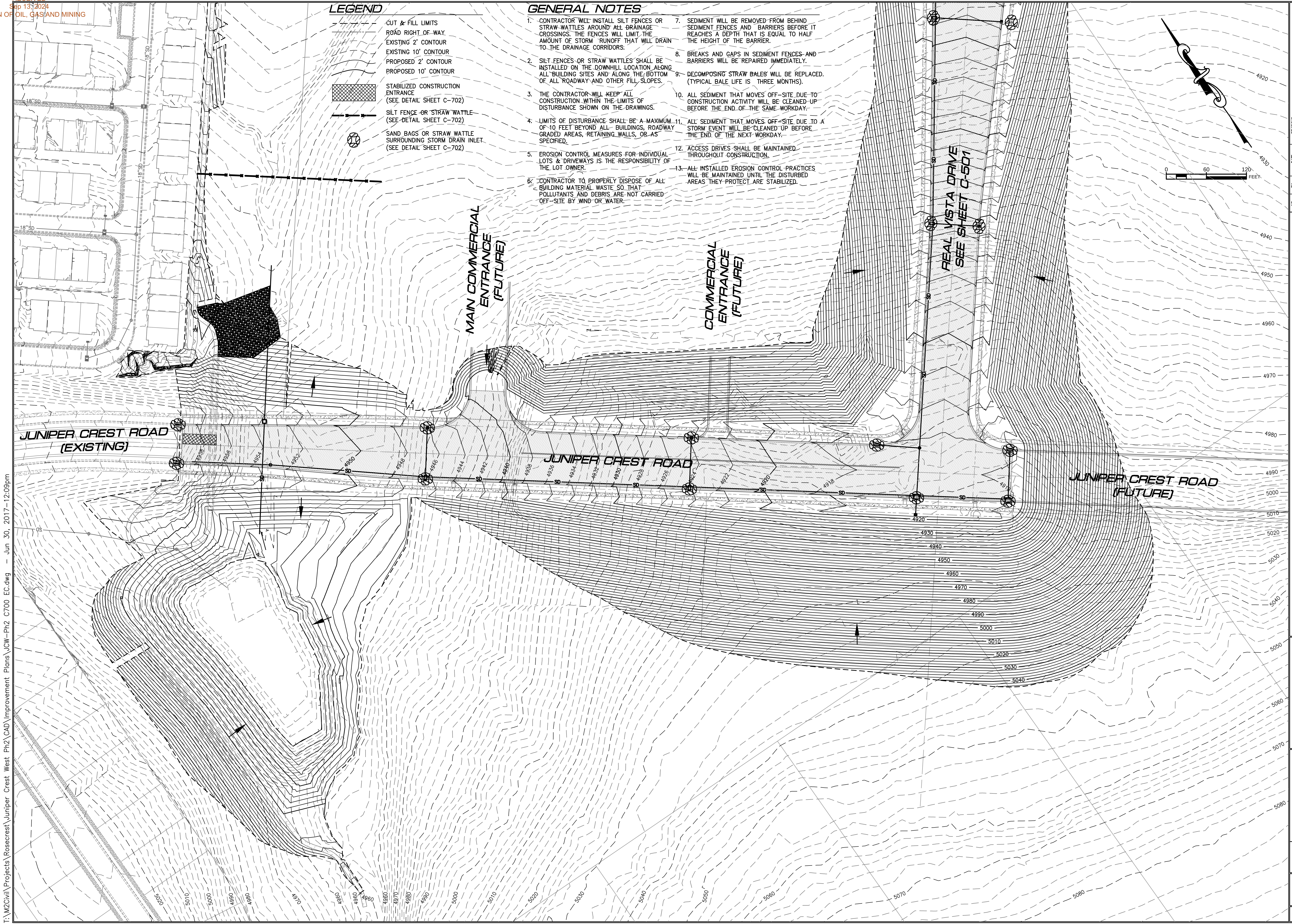
LEGEND

- CUT & FILL LIMITS
- ROAD RIGHT OF WAY
- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR
- PROPOSED 2' CONTOUR
- PROPOSED 10' CONTOUR
- STABILIZED CONSTRUCTION ENTRANCE (SEE DETAIL SHEET C-702)
- SILT FENCE OR STRAW WATTLE (SEE DETAIL SHEET C-702)
- SAND BAGS OR STRAW WATTLE SURROUNDING STORM DRAIN INLET (SEE DETAIL SHEET C-702)

GENERAL NOTES

1. CONTRACTOR WILL INSTALL SILT FENCES OR STRAW WATTLES AROUND ALL DRAINAGE CROSSINGS. THE FENCES WILL LIMIT THE AMOUNT OF STORM RUNOFF THAT WILL DRAIN TO THE DRAINAGE CORRIDORS.
2. SILT FENCES OR STRAW WATTLES SHALL BE INSTALLED ON THE DOWNHILL LOCATION ALONG ALL BUILDING SITES AND ALONG THE BOTTOM OF ALL ROADWAY AND OTHER FILL SLOPES.
3. THE CONTRACTOR WILL KEEP ALL CONSTRUCTION WITHIN THE LIMITS OF DISTURBANCE SHOWN ON THE DRAWINGS.
4. LIMITS OF DISTURBANCE SHALL BE A MAXIMUM OF 10 FEET BEYOND ALL BUILDINGS, ROADWAY GRADED AREAS, RETAINING WALLS, OR AS SPECIFIED.
5. EROSION CONTROL MEASURES FOR INDIVIDUAL LOTS & DRIVEWAYS IS THE RESPONSIBILITY OF THE LOT OWNER.
6. CONTRACTOR TO PROPERLY DISPOSE OF ALL BUILDING MATERIAL WASTE SO THAT POLLUTANTS AND DEBRIS ARE NOT CARRIED OFF-SITE BY WIND OR WATER.
7. SEDIMENT WILL BE REMOVED FROM BEHIND SEDIMENT FENCES AND BARRIERS BEFORE IT REACHES A DEPTH THAT IS EQUAL TO HALF THE HEIGHT OF THE BARRIER.
8. BREAKS AND GAPS IN SEDIMENT FENCES AND BARRIERS WILL BE REPAIRED IMMEDIATELY.
9. DECOMPOSING STRAW BALES WILL BE REPLACED. (TYPICAL BALE LIFE IS THREE MONTHS).
10. ALL SEDIMENT THAT MOVES OFF-SITE DUE TO CONSTRUCTION ACTIVITY WILL BE CLEANED UP BEFORE THE END OF THE SAME WORKDAY.
11. ALL SEDIMENT THAT MOVES OFF-SITE DUE TO A STORM EVENT WILL BE CLEANED UP BEFORE THE END OF THE NEXT WORKDAY.
12. ACCESS DRIVES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
13. ALL INSTALLED EROSION CONTROL PRACTICES WILL BE MAINTAINED UNTIL THE DISTURBED AREAS THEY PROTECT ARE STABILIZED.



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NO.	BY	DATE	REVISIONS

JUNIPER CREST WEST PH2
EROSION CONTROL PLAN

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

M2 CIVIL
PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY, SUITE 200, SOUTH JORDAN, UTAH 84095
801-316-3193 TEL

REGISTERED PROFESSIONAL ENGINEER
5048462-2202
AARON KEVIN JONES
6-30-2017
STATE OF UTAH
PRELIMINARY

SHEET NUMBER
C-700

SCALE
HORIZONTAL: 1"=60'
VERTICAL: 1"=N/A

JOB NUMBER
47-0159

PROJ. MGR.: DB DESIGNER: AJ

T:\M2Civil\Projects\Rosecrest\Juniper Crest West Ph2\CAD\Improvement Plans\JCW-Ph2 C700 EC.dwg – Jun 30, 2017–12:09pm

0 60 120
FEET

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NO.	BY	DATE	REVISIONS:

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JUNIPER CREST WEST PH2
EROSION CONTROL PLAN

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

M2 CIVIL
PLANNING & ENGINEERING
10421 S. JORDAN GATEWAY,
SUITE 200, SOUTH JORDAN,
UTAH 84095
801-316-3193 TEL

REGISTERED PROFESSIONAL ENGINEER
5048462-2202
AARON KEVIN JONES
6-30-2017
STATE OF UTAH
PRELIMINARY

SHEET NUMBER
C-701

SCALE
HORIZONTAL: 1"=1"=60'
VERTICAL: 1"=N/A

JOB NUMBER
47-0159

PROJ. MGR: DB DESIGNER: AJ
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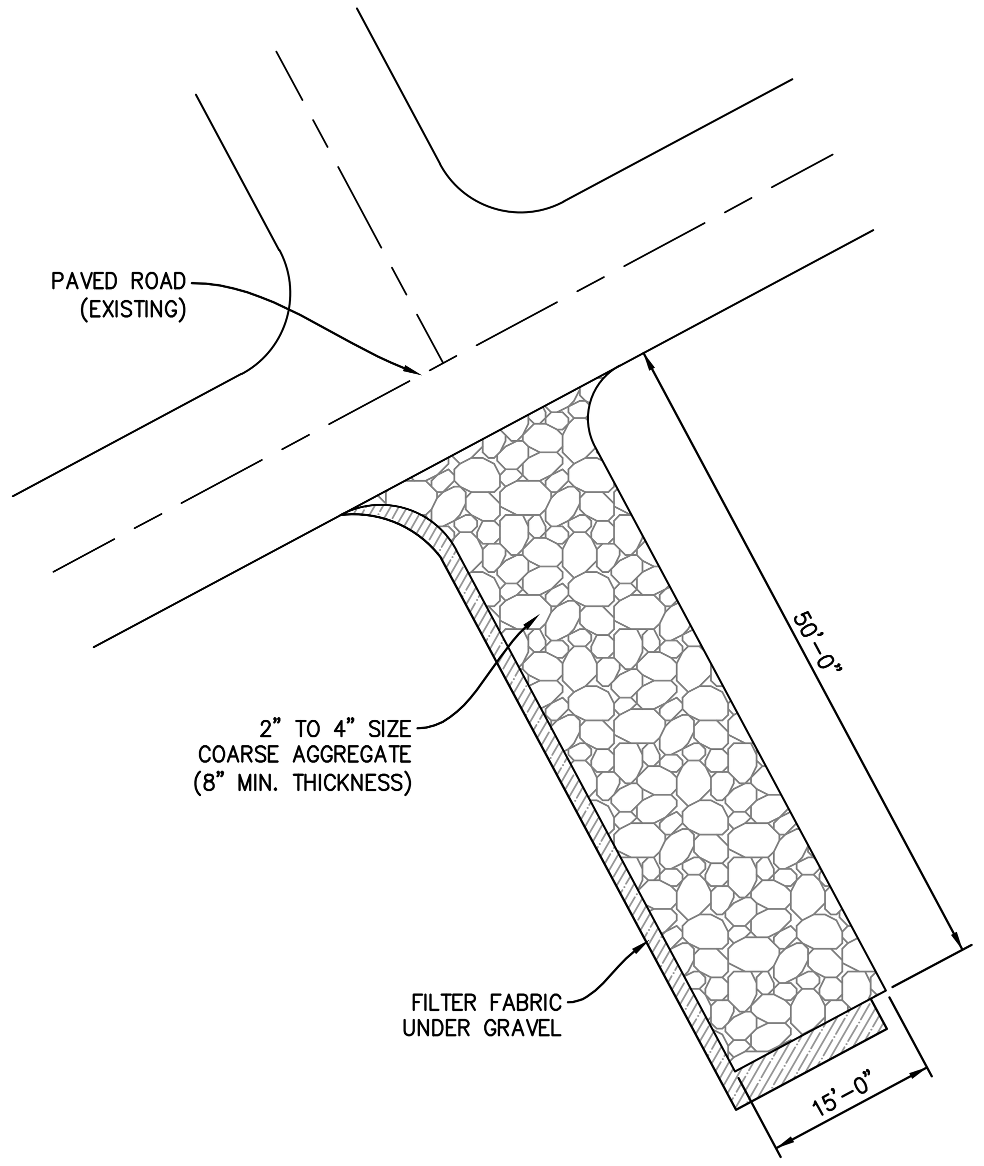
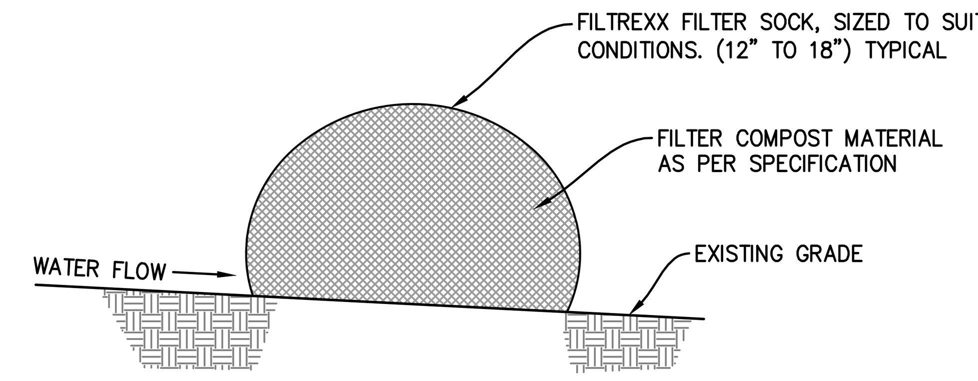


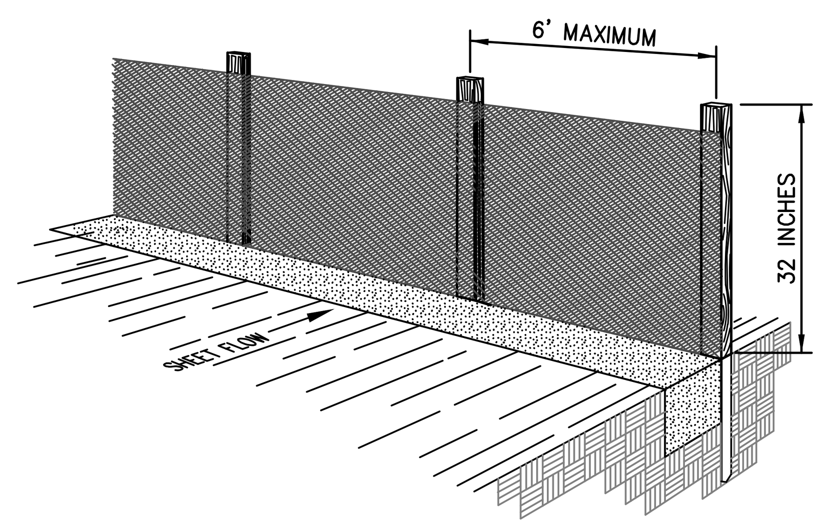
A TYP **STABILIZED CONSTRUCTION ENTRANCE**
N.T.S.

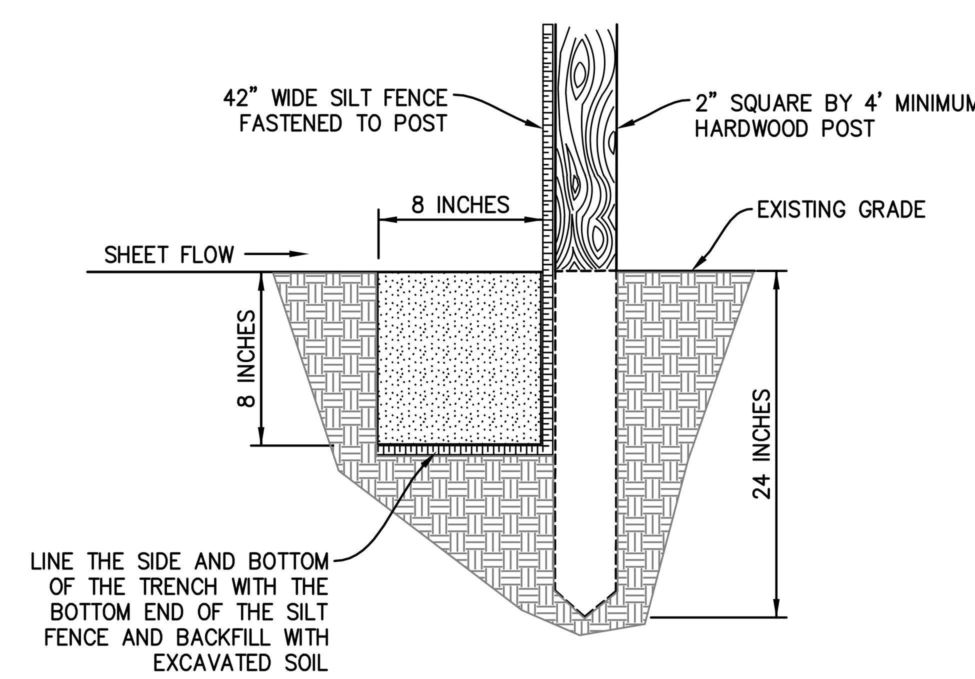


NOTES:

1. ALL MATERIAL TO MEET FILTREXX SPECIFICATIONS.
2. THE CONTRACTOR SHALL MAINTAIN THE COMPOST FILTER BERM IN A FUNCTIONAL CONDITION AT ALL TIMES AND IT SHALL BE ROUTINELY INSPECTED.
3. WHERE THE BERM REQUIRES REPAIR, IT WILL BE ROUTINELY REPAIRED.
4. THE CONTRACTOR SHALL REMOVE SEDIMENTS COLLECTED AT THE BASE OF THE BERM WHEN THEY REACH 1/3 OF THE EXPOSED HEIGHT OF THE BERM, OR AS DIRECTED BY THE ENGINEER.
5. THE COMPOST FILTER BERM WILL BE DISPERSED ON SITE WHEN NO LONGER REQUIRED, AS DETERMINED BY THE ENGINEER.

B TYP **FILTREXX SEDIMENT CONTROL**
N.T.S.





SILT FENCE GENERAL NOTES:

1. WHERE POSSIBLE, LAYOUT THE SILT FENCE 5 FOOT TO 10 FOOT BEYOND THE TOE OF SLOPE.
2. ALIGN THE FENCE ALONG THE CONTOUR AS CLOSE AS POSSIBLE.
3. WHEN EXCAVATING THE TRENCH, USE MACHINERY THAT WILL PRODUCE NO MORE THAN THE DESIRED DIMENSIONS.
4. AVOID USING JOINTS ALONG THE FENCE AS MUCH AS POSSIBLE. IF A JOINT IS NECESSARY, SPLICE THE SILT FENCE AT A POST WITH A 6 INCH OVERLAP AND SECURELY FASTEN BOTH ENDS TO THE POST.
5. MAINTAIN A PROPERLY FUNCTIONING SILT FENCE THROUGHOUT THE DURATION OF THE PROJECT OR UNTIL DISTURBED AREAS HAVE BEEN VEGETATED.
6. REMOVE SEDIMENT AS IT ACCUMULATES AND PLACE IT IN A STABLE AREA APPROVED BY RIVERTON AND HERRIMAN CITY.

C TYP **SILT FENCE DETAIL**
N.T.S.

PROJ. MGR.: DB DESIGNER: AJ
T:\M2Civil\Projects\Rosecrest\Juniper Crest West Ph2\CAD\Improvement Plans\JCW-Ph2 C702 ED.dwg - Jun 30, 2017-12:15pm

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JUNIPER CREST WEST PH2
EROSION CONTROL DETAILS

PREPARED FOR: ROSECREST COMMUNITIES
DATE SUBMITTED: 6/30/17

NOT FOR CONSTRUCTION

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REGISTERED PROFESSIONAL ENGINEER
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AARON KEVIN JONES
6-30-2017
STATE OF UTAH
PRELIMINARY

SHEET NUMBER
C-702

SCALE
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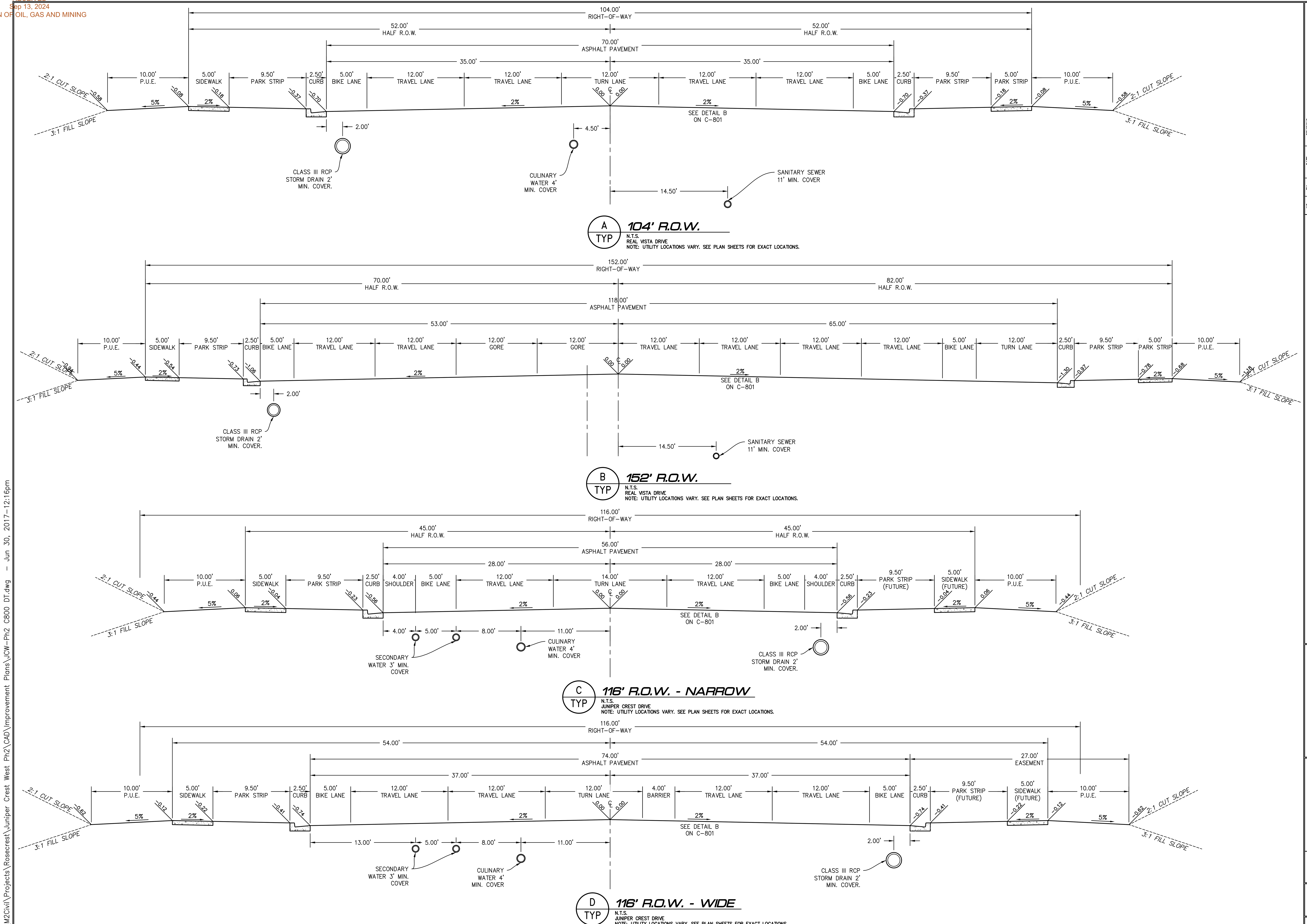
VERTICAL: 1"=N/A

JOB NUMBER
47-0159



JUNIPER CREST WEST PH2
TYPICAL ROAD SECTIONS

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

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6-30-2017
STATE OF UTAH
PRELIMINARY

SHEET NUMBER
C-800

SCALE
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VERTICAL: 1"=N/A

JOB NUMBER
47-0159

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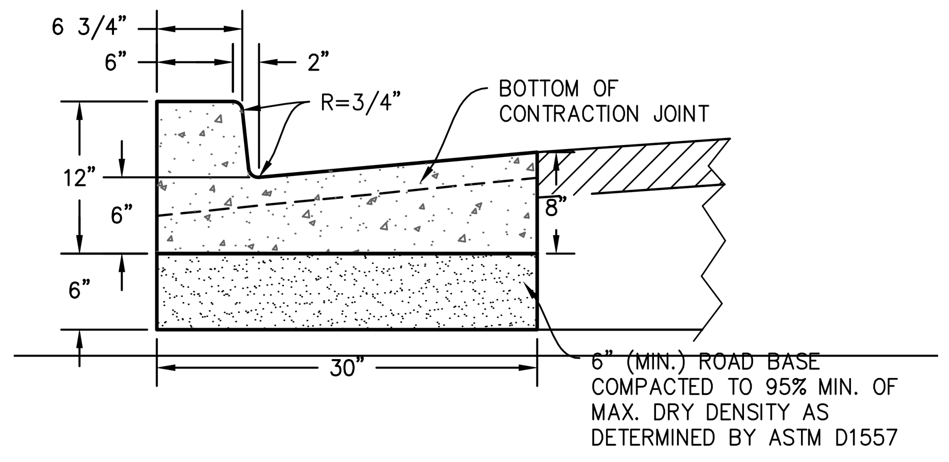

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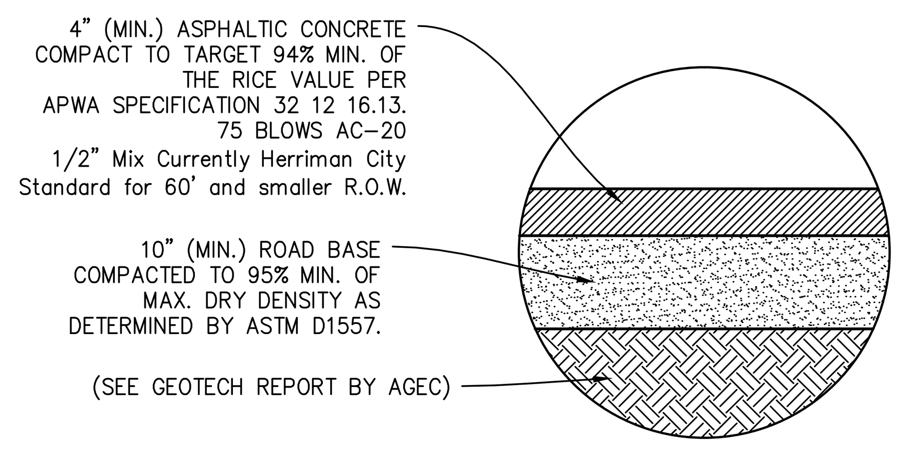

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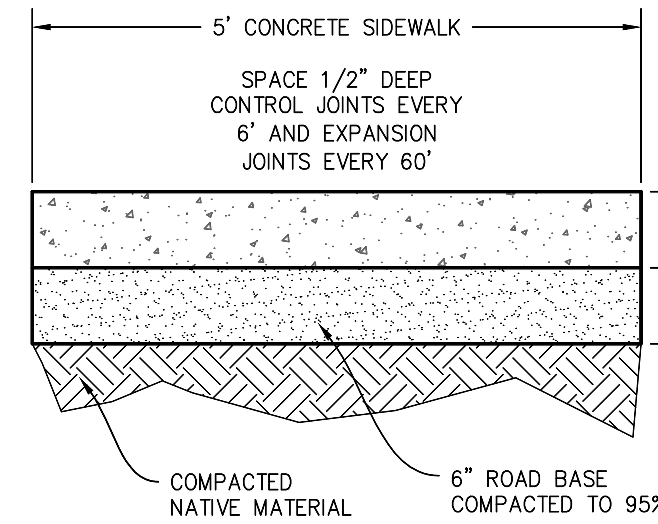

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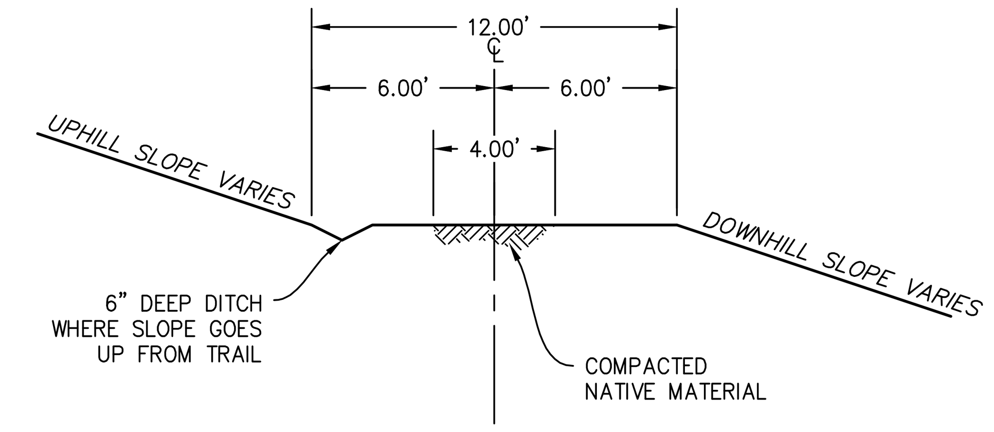

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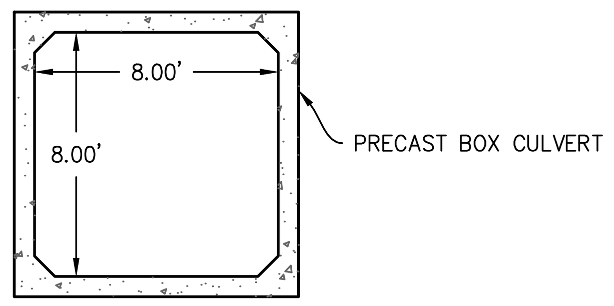

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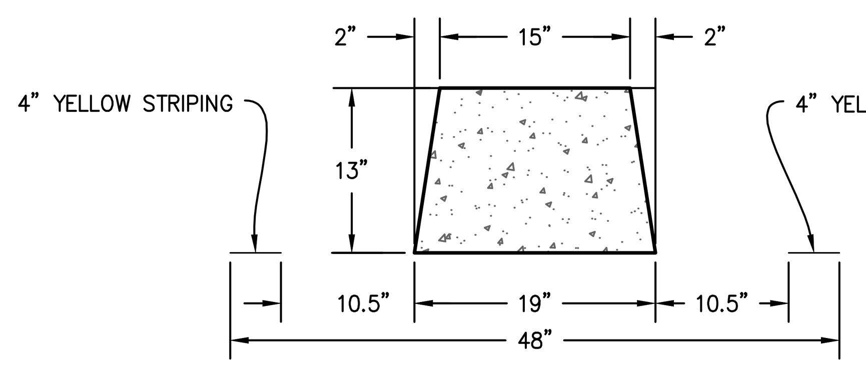

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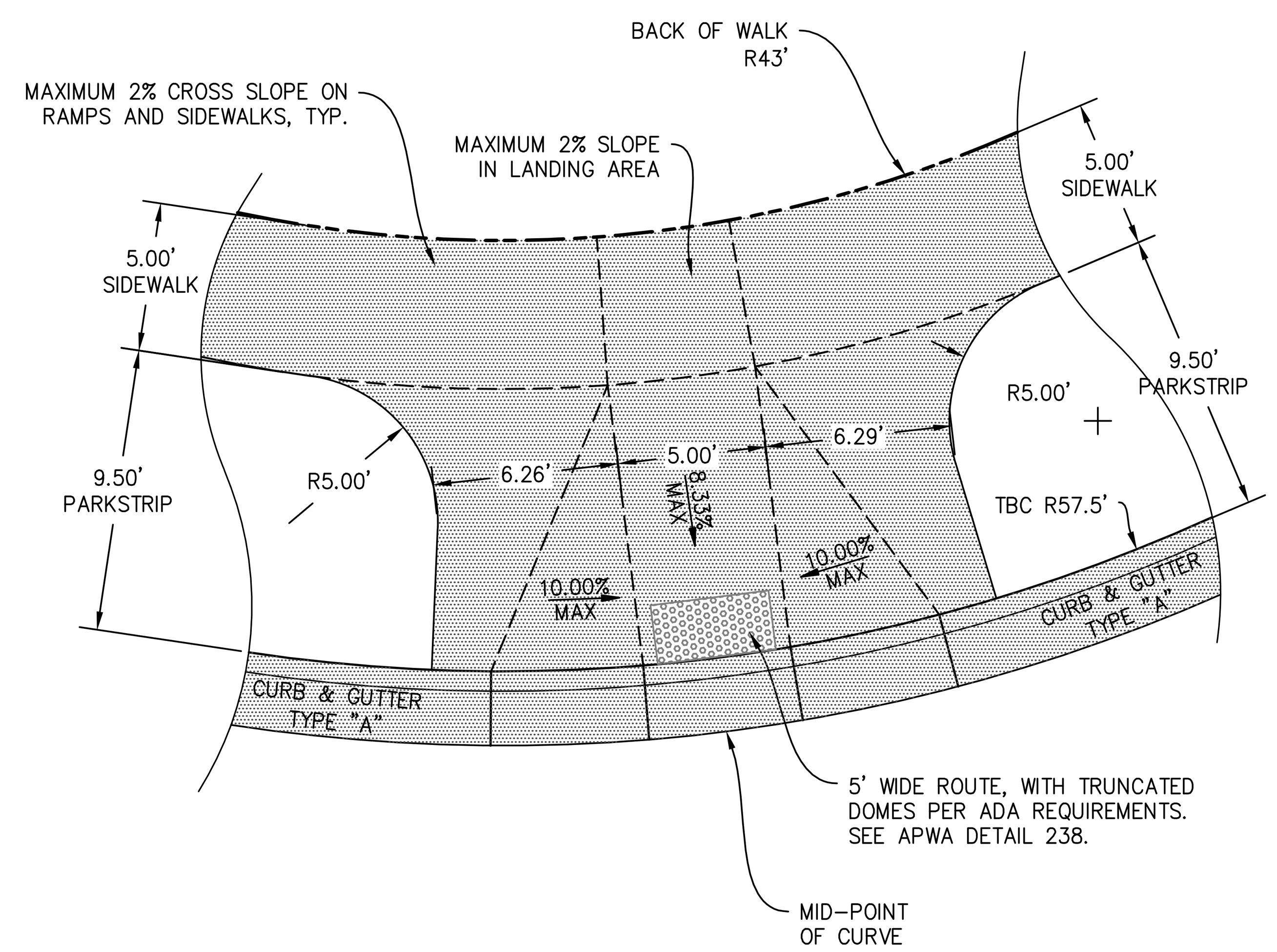

G TYP **CURB RAMP A**
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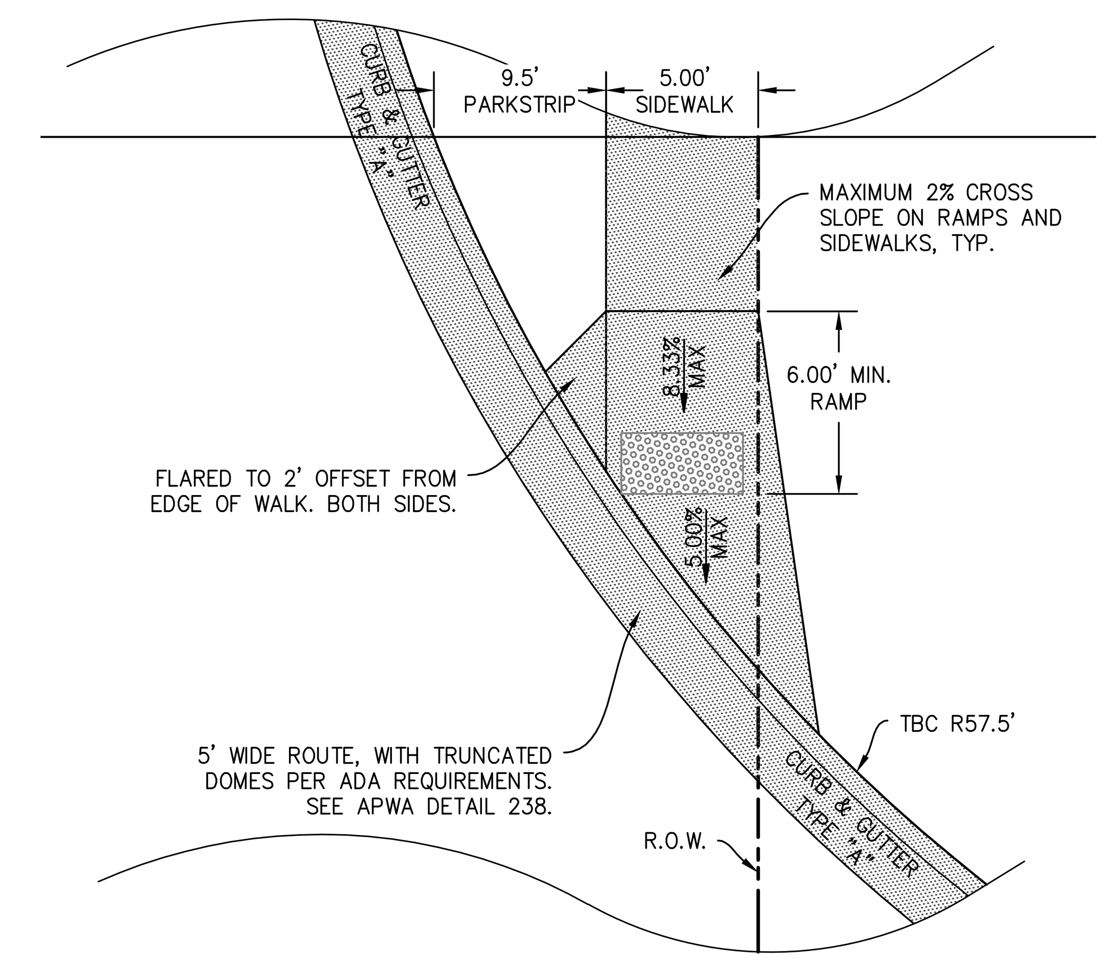

H TYP **CURB RAMP B**
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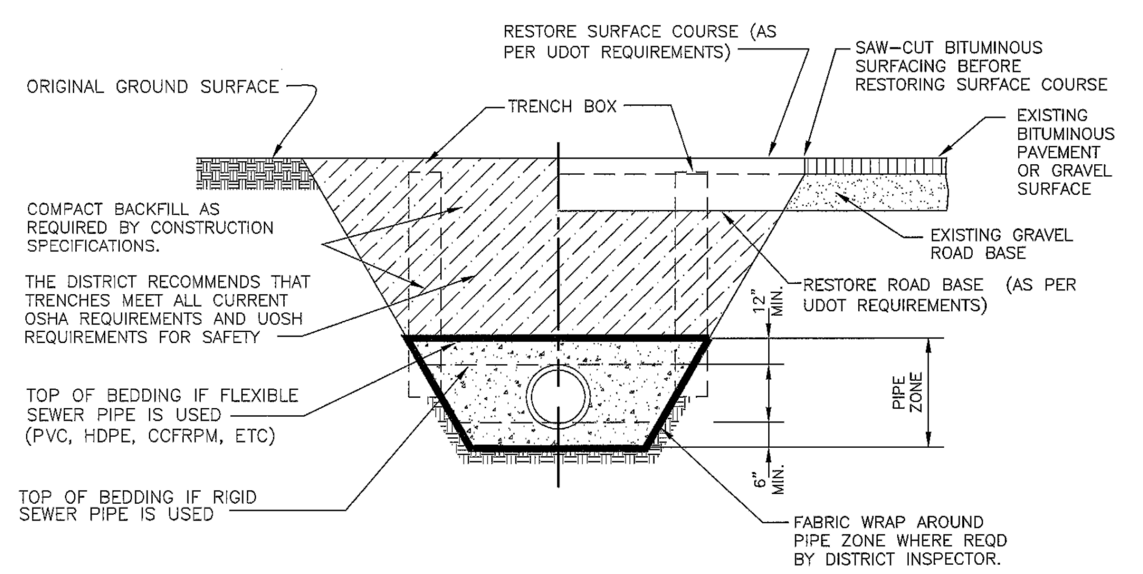


CROSS-SECTION: TYPICAL TRENCH

NOTES:

1. THE DISTRICT RECOMMENDS CONTRACTOR MEET ALL OF THE REQUIREMENTS ESTABLISHED FOR SAFE TRENCHING. (SEE OSHA AND UOSH REQUIREMENTS, LATEST EDITIONS).

2. CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES BEFORE LAYING PIPE WITHIN 50' OF SAID UTILITIES WHICH MAY BE EXPOSED, DAMAGED OR CROSSED AS SHOWN ON THE DRAWINGS OR AS "BLUE STAKED". THE CONTRACTOR WILL MAKE ARRANGEMENTS WITH THE UTILITY COMPANY TO MOVE THE UTILITY IF NECESSARY OR OBTAIN PERMISSION FROM THE DISTRICT ENGINEER TO MODIFY GRADE OF PIPELINE IN ORDER TO GO AROUND UTILITIES.

3. TESTING: ALL NEW SANITARY SEWERS TO BE "TELEVISED" AND NECESSARY REPAIRS MADE BEFORE ACCEPTANCE. ALL LINES SHALL BE PRESSURE TESTED TO 3.5 psi MIN. FOR 5 MINUTES. A MANDRAL OR BALL CAN BE USED TO VERIFY DEFORMATION OF A PIPE AS DETERMINED FROM THE VIDEO UNLESS SPECIFIED OTHERWISE.

4. ALL SEWER LINES TO BE INSTALLED IN PUBLIC RIGHT-OF-WAY OR RECORDED SEWER EASEMENT UNLESS OTHERWISE APPROVED BY SOUTH VALLEY SEWER DISTRICT.

5. ASPHALT RESTORATION SHALL MATCH EXISTING TO A MAXIMUM OF 6" AND SHALL INCLUDE A 6" UNTREATED BASE COURSE AND 12" GRANULAR BORROW COURSE AS PER UDOT STANDARDS.

NO SCALE

SOUTH VALLEY SEWER DISTRICT

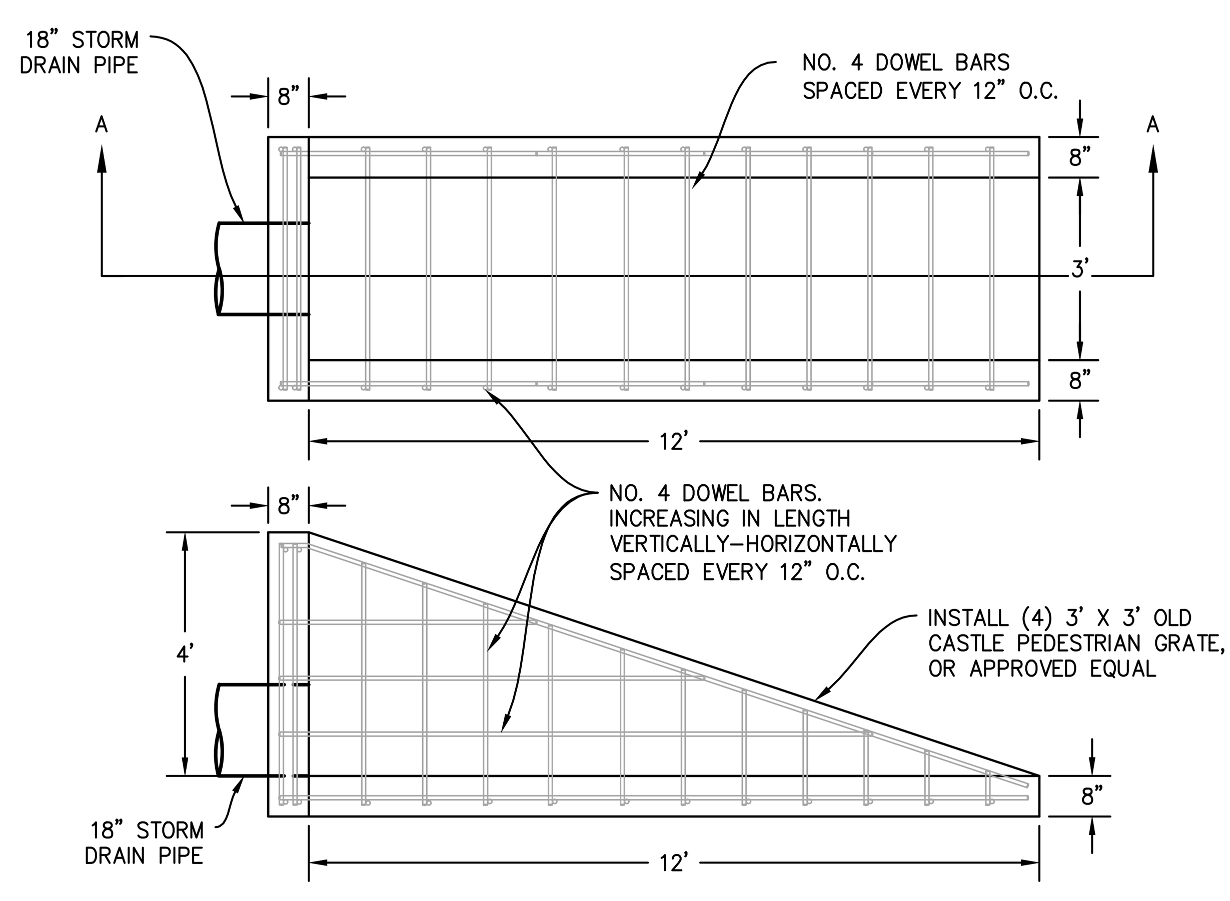
NO	DATE	REVISION	BY	CK	APP
5					
4					
3					
2					
1					

SOUTH VALLEY SEWER DISTRICT
STANDARD SEWER TRENCH DETAIL

DRAWN:	DESIGNED:	CHECKED:	APPROVED:

DATE	FILE NAME	DRAWING NAME
JUNE 98	STANDARD\SAN~SEW	SS-1A

I TYP **TYPICAL SANITARY SEWER PIPE TRENCH**
N.T.S.



J TYP **18" INLET STRUCTURE DETAIL**
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PROJ. MGR: DB DESIGNER: AJ
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JUNIPER CREST WEST PH2
TYPICAL DETAILS

PREPARED FOR: ROSECREST COMMUNITIES

DATE SUBMITTED: 6/30/17

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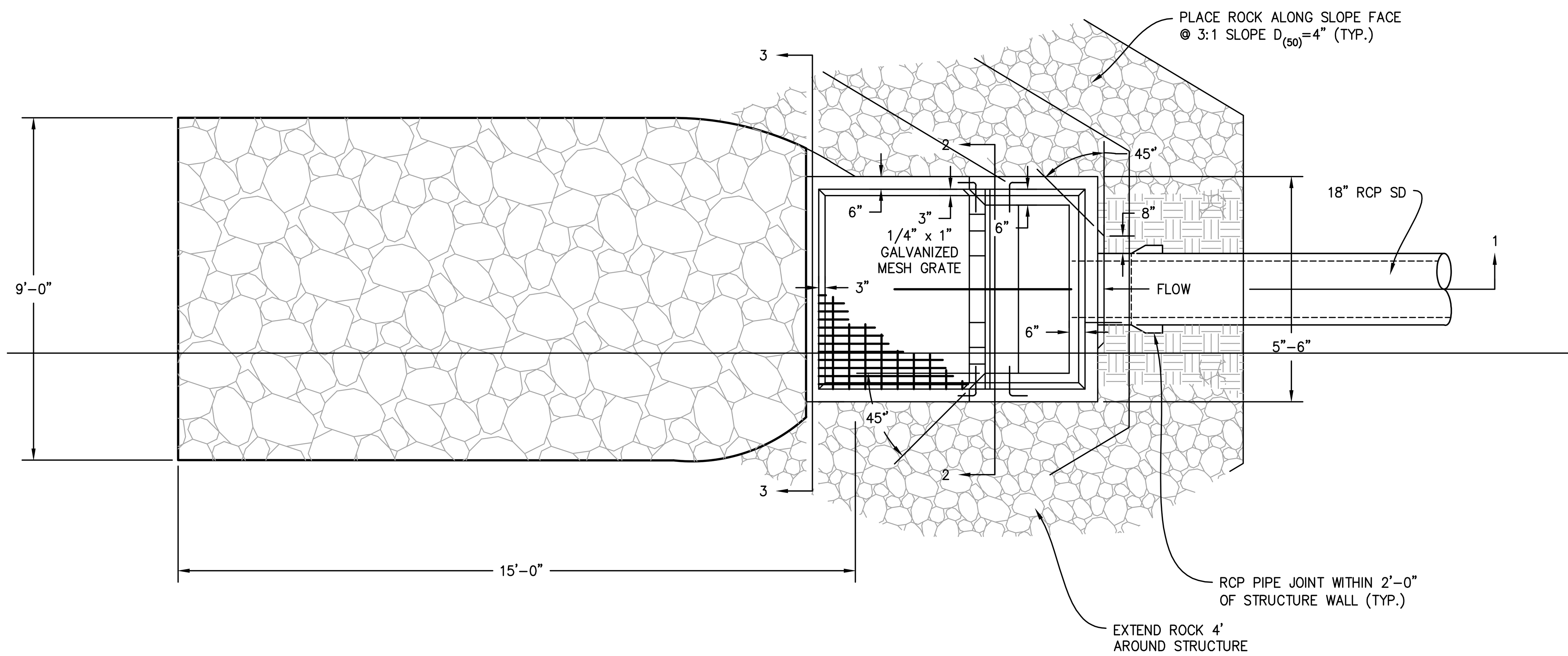
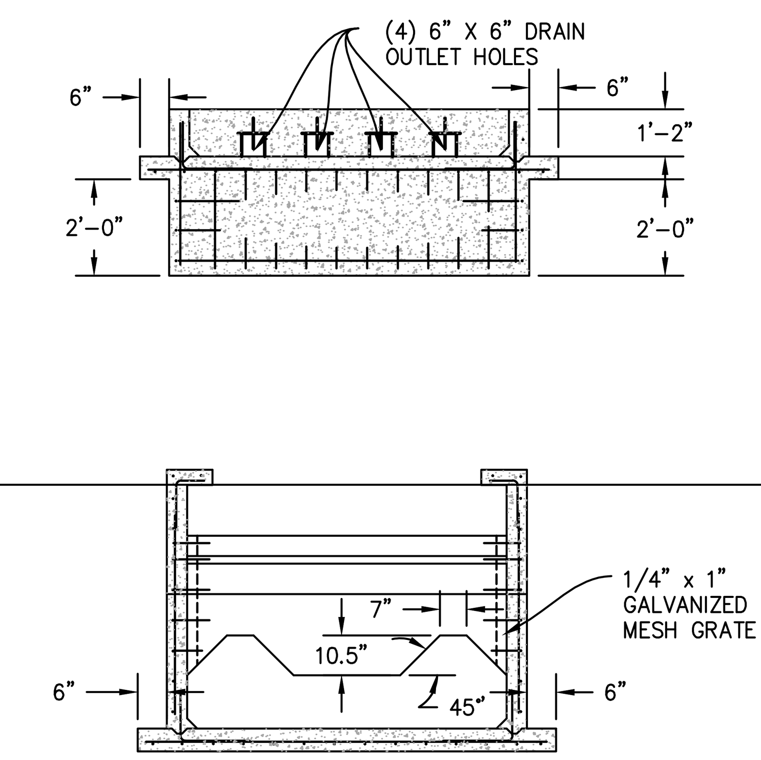
PRELIMINARY

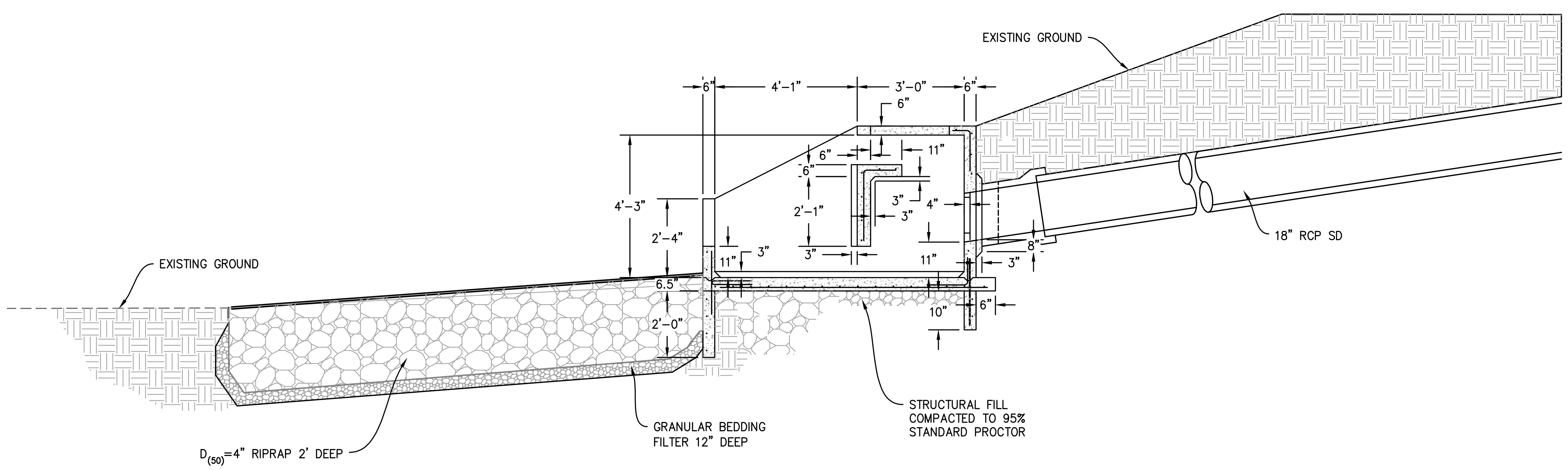
SHEET NUMBER
C-801

SCALE
HORIZONTAL: 1"=N/A
VERTICAL: 1"=N/A

JOB NUMBER
47-0159







A / TYP **18" ENERGY DISSIPATOR STRUCT.**
N.T.S.

PROJ. MGR.: DB DESIGNER: AJ
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JUNIPER CREST WEST PH2
DETAILS

PREPARED FOR: ROSECREST COMMUNITIES
DATE SUBMITTED: 6/30/17

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SHEET NUMBER
C-802

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Appendix C

Applied Geotechnical Engineering Consultants, Inc.

GEOTECHNICAL INVESTIGATION

PROPOSED EAST HERRIMAN - PHASE I
DEVELOPMENT

APPROXIMATELY 14400 SOUTH
BETWEEN 3900 AND 4800 WEST

HERRIMAN, UTAH

PREPARED FOR:

ROSECREST, INC.
2511 SOUTH WEST TEMPLE
SALT LAKE CITY, UTAH 84115

ATTENTION: MICHAEL BRADSHAW/DAVE BARBEE

PROJECT NO. 1071288

DECEMBER 21, 2007

600 West Sandy Parkway • Sandy, Utah 84070 • (801) 566-6399 • FAX (801) 566-6493

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

1. Up to approximately 9 inches of topsoil was encountered in the upper portion of test pits excavated at the site.

   The natural soil encountered at the site consists predominantly of sand and gravel with occasional areas of clay and silt.

2. No free water was encountered in the test pits at the time of excavation to the maximum depth investigated, approximately 17½ feet.

3. Portions of the upper soil consist of lean clay and silt. Clay and silt, when encountered near the ground surface may result in construction access difficulties for rubber-tired construction equipment when the clay and silt are very moist to wet such as in the winter or spring or at times of prolonged rainfall. Placement of granular fill or excavation down to the granular soil will generally improve site conditions for construction in areas where the subgrade soils consist of very moist to wet silt and clay. Care will be required during construction to minimize disturbance of the natural soil to remain below building and pavement areas.

4. Cemented soils, dense gravels, cobbles and boulders up to approximately 5 feet in size and possibly bedrock were encountered in the test pits. Excavation in some areas of the site was slow and difficult using tracked excavation equipment. Practical excavation equipment refusal was encountered in Test Pits TP-2, TP-6 through TP-14, TP-16, TP-17, TP-22 through TP-25, TP-28, TP-30, TP-32 through TP-35, TP-37, TP-38 and TP-40 at depths ranging from approximately 2½ to 13½ feet below the ground surface.

   Based on previous work done by contractors for adjacent developments and our experience in the area, we anticipate that excavation for basements and utility trenches can be accomplished with heavy-duty excavation equipment. Cemented soils, dense gravels, cobbles, boulders and bedrock will be particularly troublesome in confined excavations. Light blasting, jackhammering or other rock excavation methods may be needed.

5. The proposed structures may be supported on spread footings bearing on the undisturbed, natural soil/bedrock or on compacted structural fill extending down to the undisturbed, natural soil/bedrock. Footings bearing on the undisturbed, natural soil or on compacted structural fill may be designed using an allowable net bearing pressure of 2,000 pounds per square foot.

   Footings bearing entirely on bedrock or at least 2 feet of natural gravel or compacted structural fill may be designed for an allowable net bearing pressure of 3,500 pounds per square foot.

6. Geotechnical information related to foundations, subgrade preparation, pavement design and materials is included in the report.

SCOPE

This report presents the results of a geotechnical investigation for the proposed East Herriman- Phase I Development to be located at approximately 14400 South between approximately 3900 West and 4800 West in Herriman, Utah. The approximate area of the East Herriman - Phase I Development is shown on Figure 1. The report presents the subsurface conditions encountered, laboratory test results, and recommendations for foundations and pavement. The study was conducted in general accordance with our proposal dated October 1, 2007.

Field exploration was conducted to obtain information on the subsurface conditions and to obtain samples for laboratory testing. Information obtained from the field and laboratory was used to define conditions at the site for our engineering analysis. Results of the field exploration and engineering analysis were analyzed to develop recommendations for the proposed construction.

This report has been prepared to summarize the data obtained during the study and to present our conclusions and recommendations based on the proposed construction and the subsurface conditions encountered. Design parameters and a discussion of geotechnical engineering considerations related to construction are included in the report.

PREVIOUS STUDIES

AGEC previously conducted a geotechnical investigation for the proposed Rosecrest Development, Plat I and presented our findings and recommendations in a report dated January 21, 2002 under AGEC Project No. 1010842.

AGEC previously conducted a geotechnical investigation for the Rosecrest Development, Plats M-2, 7 and O (also known as M-3, O and Q) and presented our findings and recommendations in a report dated June 1, 2004 under AGEC Project No. 1040358.

These areas previously investigated are located adjacent along the west boundary of the East Herriman - Phase I area. Information obtained from this study was augmented with information presented in the above-referenced geotechnical reports and was used to define conditions at the site for our engineering analysis and to develop recommendations for the proposed construction.

SITE CONDITIONS

The site consists primarily of undeveloped land. There are no permanent structures or pavements on the site.

There is a buried water storage reservoir along the west side of the site. There are areas of stockpiled boulders throughout the southeastern portion of the site.

The ground surface at the site slopes down to the north and northeast. A drainage extends along the southern property boundary. Vegetation at the site consists primarily of brush, weeds and grass. Occasional cobbles and boulders were encountered at the ground surface throughout the site.

Undeveloped land and areas used for farming extend along the north and south sides of the site. Several phases of the Rosecrest Development, which include single-family residences and paved access roads, extend along the west side of the site. Single-family residences and small agricultural parcels extend along the east side of the site. The Provo Reservoir Canal extends along the east property boundary. No water was in the canal at the time of our field investigation.

FIELD STUDY

The field study was conducted on November 5 through 8, 2007. Forty-three test pits were excavated at the approximate locations indicated on Figure 1. The test pit locations were laid out and surveyed by representatives of Rosecrest, Inc. The test pits were excavated with tracked excavation equipment (Caterpillar 320D trackhoe). The test pits were logged and soil samples obtained by an engineer from AGEC. Logs of the subsurface conditions encountered in the test pits are graphically shown on Figures 2 through 5, with Legend and Notes on Figure 6.

The test pits were backfilled without significant compaction. The backfill in the test pits should be properly compacted where it will support proposed buildings, floor slabs or pavement.

SUBSURFACE CONDITIONS

Up to approximately 9 inches of topsoil was encountered in the upper portion of test pits excavated at the site.

The natural soil encountered at the site consists predominantly of sand and gravel with occasional areas of clay and silt.

Cemented soils, dense gravels, cobbles and boulders up to approximately 5 feet in size and possibly bedrock were encountered in the test pits. Excavation in some areas of the site was slow and difficult using tracked excavation equipment. Practical excavation equipment refusal was encountered in Test Pits TP-2, TP-6 through TP-14, TP-16, TP-17, TP-22 through TP-25, TP-28, TP-30, TP-32 through TP-35, TP-37, TP-38 and TP-40 at depths ranging from approximately 2½ to 13½ feet below the ground surface.

A description of the various materials encountered in the test pits follows:

Topsoil - The topsoil consists primarily of silty and clayey sand with small to moderate amounts of gravel. Cobbles and boulders were also encountered at the ground surface. The topsoil is slightly moist to moist, brown to dark brown and contains roots and organics.

Lean Clay - The clay has low to moderate plasticity. The clay contains small to moderate amounts of sand and occasional gravel. The clay is stiff to very stiff, slightly moist and brown to dark brown.

Laboratory tests conducted on samples of the clay indicate that it has natural moisture contents ranging from 10 to 22 percent and natural dry densities ranging from 80 to 90 pounds per cubic foot (pcf).

Consolidation tests conducted on samples of the clay indicate that the soil will compress a small to moderate amount with the addition of light to moderate loads. Results of the consolidation tests are presented on Figures 7, 8 and 12 through 15.

Fat Clay - The clay has moderate to high plasticity. The clay contains small to moderate amounts of sand and occasional gravel. The clay is stiff to very stiff, slightly moist to moist and brown to dark brown.

Laboratory tests conducted on a sample of fat clay indicate that is has a natural moisture content of 38 percent and a natural dry density of 81 pcf.

A consolidation test conducted on a sample of fat clay indicates that it will compress a small to moderate amount with the addition of light to moderate loads. Results of the test conducted on the sample obtained from Test Pit TP-26 at a depth of 15 feet indicate that the sample expanded 0.9 percent under a constant pressure of 1,000 pounds per square foot (psf) when wetted. Results of the test are presented on Figure 14.

Clayey Sand - The clayey sand contains small to moderate amounts of clay and gravel with occasional cobbles. It is medium dense to dense, slightly moist to moist and light brown to brown.

Silt - The silt has low to high plasticity (some elastic silt). The silt contains occasional pinhole structure and small to moderate amounts of sand and occasional sand layers. It is stiff to very stiff, slightly moist to moist and light brown.

Laboratory tests conducted on samples of the silt indicate that it has natural moisture contents ranging from 6 to 50 percent and natural dry densities ranging from 47 to 86 pcf.

Based on the relatively high natural moisture contents, low natural dry densities and presence of sulfates measured for samples of the silt, we assumed that soil mineralogy may have influenced the test results where a high temperature oven was used. Therefore, additional laboratory tests were conducted on a sample of silt obtained from Test Pit TP-15. The sample was split and portions tested in high and low temperature ovens. The first sample, tested in a 230°F oven, has a moisture content of 48 percent. The second sample, tested in a 100°F oven, has a moisture content of 43 percent. The second sample was then placed in the high temperature oven and a moisture content of 49 percent was measured.

Based on the results of the additional testing, there is a relatively small variation in the test results conducted with a low temperature oven. This variation may apply to the reported results of moisture content, dry density and Atterberg Limit testing.

Results of consolidation tests conducted on samples of the silt indicate that it will compress a small to moderate amount with the addition of light to moderate loads. The results of the consolidation tests are presented on Figures 9 through 11.

Moderately to highly compressible silt was encountered in Test Pit TP-16 at a depth of approximately 2 feet. Consideration should be given to conducting additional subsurface exploration and laboratory testing to better determine the depth and extent of the compressible soil and evaluate it suitability.

Silty Sand - The silty sand contains small to large amounts of silt, occasional silt layers and gravel, and occasional cemented layers. It is medium dense, slightly moist and brown to reddish-brown and yellowish-gray.

Laboratory tests conducted on a sample of the silty sand indicate that it has a natural moisture content of 6 percent.

Poorly-Graded Sand - The sand contains small amounts of silt and gravel. It is loose to dense, slightly moist and brown to dark gray.

Results of a gradation test conducted on a sample of sand are presented on Figure 16.

Clayey Gravel - The clayey gravel contains small to moderate amounts of clay and sand and cobbles and boulders up to approximately 3 feet in size. It is dense to very dense, slightly moist and brown to light brown.

Laboratory tests conducted on a sample of clayey gravel indicate it has a natural moisture content of 3 percent.

Silty Gravel - The silty gravel contains small to moderate amounts of silt and sand, cobbles and boulders up to approximately 3 feet in size. It is dense to very dense, slightly moist to moist and brown.

Laboratory tests conducted on a sample of silty gravel indicate it has a natural moisture content of 8 percent.

Results of gradation tests conducted on a sample of silty gravel are presented on Figure 17.

Poorly-Graded Gravel - The gravel contains small amounts of silt, clay and sand, cobbles and boulders up to approximately 5 feet in size. The gravel is dense to very dense, slightly moist to moist and brown to reddish-brown and gray.

Laboratory tests conducted on a sample of the gravel indicate that it has a natural moisture content of 3 percent.

Results of gradation tests conducted on a sample of gravel are presented on Figures 16 through 18.

Results of the laboratory tests are summarized on Table I and are included on the logs of exploratory test pits, Figures 2 through 5.

SUBSURFACE WATER

No free water was encountered in the test pits at the time of excavation to the maximum depth investigated, approximately 17½ feet. Moist soil was encountered at depth in Test Pits TP-4, TP-5, TP-20, TP-21, and TP-36.

Slotted PVC pipe was installed in the test pits indicated to facilitate future measurement of the subsurface water level, if present.

PROPOSED CONSTRUCTION

We understand that the East Herriman - Phase I area contains several development pods. The area of the proposed development is approximately 425 acres in size. The development pods are planned to consist primarily of single-family and multi-family residential subdivisions. We anticipate that the residences will consist of one to three-story, wood-frame structures with the potential for basements. We have assumed building loads consisting of wall loads of less than 3 kips per lineal foot and column loads of less than 30 kips based on typical residential construction in the area.

We anticipate that roads are planned to extend through the proposed development and will consist of two and three-lane roads.

The following estimate of traffic conditions was used for our pavement analysis:

Traffic	Condition #1	Condition #2	Condition #3	Condition #4
Cars per day	up to 4,000	3,000	8,000	12,000
Trucks per day	—	90	240	360

The traffic conditions indicated above are assumed to be one-way traffic with an average gross vehicle weight of 20 kips for trucks.

If the proposed construction, building loads or anticipated traffic is significantly different from what is described above, we should be notified so that we can reevaluate the recommendations given.

RECOMMENDATIONS

Based on the subsoil conditions encountered, the laboratory test results, our understanding of the proposed construction and our experience in the area, the following recommendations are given.

A. Site Grading

Final site grading plans were not available at the time of our investigation. We anticipate cuts and fills on the order of 5 to 10 feet will be required to facilitate construction at the site. Localized areas of increased amounts of fill will likely be required in areas of existing drainages. Fill placed for the proposed development should be placed as soon as possible prior to construction.

1. Pavement Subgrade Preparation

Prior to placing site grading fill or base course, the topsoil, organics, unsuitable fill and other deleterious material should be removed.

The subgrade in proposed pavement areas and areas to receive site grading fill should be scarified to a depth of approximately 8 inches, the moisture adjusted to within 2 percent of the optimum moisture content and the subgrade compacted to at least 90 percent of the maximum dry density as determined by ASTM D-1557. The subgrade should then be proof-rolled to identify soft areas. Soft areas should be removed and replaced with granular fill containing less than 15 percent passing the No. 200 sieve.

If construction occurs when the upper fine-grained soil (clay and silt) is very moist to wet, the subgrade in areas of fine-grained soil should not be scarified, but cut to undisturbed, natural soil below the fill and topsoil, and a sufficient thickness of granular fill placed to provide support for construction equipment or the fine-grained soil be removed. We anticipate that placement of granular fill or excavation down to granular soil may be needed in traffic areas when the upper fine-grained soil is very moist to wet.

2. Excavation

Cemented soils, dense gravels, cobbles and boulders up to approximately 5 feet in size and possibly bedrock were encountered in the test pits. Excavation in some areas of the site was slow and difficult using tracked excavation equipment. Practical excavation equipment refusal was encountered in Test Pits TP-2, TP-6 through TP-14, TP-16, TP-17, TP-22 through TP-25, TP-28, TP-30, TP-32 through TP-35, TP-37, TP-38 and TP-40 at depths ranging from approximately 2½ to 13½ feet below the ground surface.

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Based on previous work done by contractors for adjacent developments and our experience in the area, we anticipate that excavation for basements and utility trenches can be accomplished with heavy-duty excavation equipment. Cemented soils, dense gravels, cobbles, boulders and bedrock will be particularly troublesome in confined excavations. Light blasting, jackhammering or other rock excavation methods may be needed.

3. Cut and Fill Slopes

Temporary unretained cut slopes may be constructed at approximately 1½ horizontal to 1 vertical or flatter. Excavation in the clay and bedrock may be constructed with steeper slopes. Additional evaluation of steeper excavation slopes can be conducted.

Permanent unretained cut and fill slopes may be constructed at 2 horizontal to 1 vertical and flatter. Permanent unretained cut and fill slopes in clay may be constructed at 2½ horizontal to 1 vertical or flatter with a maximum vertical height of 10 feet. Additional evaluation of proposed cut and fill slopes may be performed once the final site grading has been determined.

The ground surface underlying fill slopes should be prepared by removing the significant organic matter, unsuitable fill and other deleterious matter.

Grading should be planned to direct surface runoff away from the cut and fill slopes. Permanent cut and fill slopes should be protected from erosion by re-vegetation or other methods.

4. Fill Placement

Fill should be placed in horizontal lifts with relatively uniform thickness. The fill should be placed and compacted in thin enough lifts to allow for proper compaction. The lift thickness will depend on the soil type, placement and compaction methods and type of equipment used. Care should be taken to avoid significant amounts of over-sized particles and nesting of over-sized particles resulting in significant voids between rocks.

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Fills placed on slopes exceeding 5 horizontal to 1 vertical should be keyed into the existing slope. A horizontal bench or key should be excavated into the slope for every approximately 2 feet of rise.

5. Materials

Listed below are materials recommended for imported structural fill.

Fill to Support	Recommendations
Footings	Non-expansive granular soil Passing No. 200 Sieve < 35% Liquid Limit < 30% Maximum size 4 inches
Floor Slab (Upper 4 inches)	Sand and/or Gravel Passing No. 200 Sieve < 5% Maximum size 2 inches
Slab Support	Non-expansive granular soil Passing No. 200 Sieve < 50% Liquid Limit < 30% Maximum size 6 inches

The on-site clay and silt are not recommended for use as fill below structures. The on-site clay and silt may be used in pavement areas or as utility trench backfill if the topsoil, organics and other deleterious materials are removed or it may be used in landscaping areas. The on-site sand and gravel exclusive of topsoil, organics, roots, oversized particles and other deleterious materials meeting the criteria above may be used as fill below structures, as site grading fill or as utility trench backfill.

Large cobbles, boulders and bedrock which can be broken down to compactible size may be considered for use as fill for the project.

The on-site soil will likely require moisture-conditioning (wetting or drying) prior to use as fill or backfill. Drying of the soil may not be practical during cold or wet times of the year.

6. Compaction

Compaction of materials placed at the site should equal or exceed the minimum densities as indicated below when compared to the maximum dry density as determined by ASTM D-1557.

Fill To Support	Compaction
Foundations	≥ 95%
Concrete Flatwork and Pavement	≥ 90%
Landscaping	≥ 85%
Retaining Wall Backfill	85 - 90%

To facilitate the compaction process, fill should be compacted at a moisture content within 2 percent of the optimum moisture content.

Base course should be compacted to at least 95 percent of the maximum dry density as determined by ASTM D-1557.

Fill and pavement materials placed for the project should be frequently tested during construction for compaction.

7. Drainage

The ground surface surrounding the proposed buildings should be sloped away from the buildings in all directions. Roof down spouts and drains should discharge beyond the limits of backfill.

The collection and diversion of drainage away from the pavement surface is important to the satisfactory performance of the pavement section. Proper drainage should be provided.

Due to the sloping ground surface and the potential for perched water above less permeable soil/bedrock at depth which may direct water toward the residences during wet time of the year or heavy irrigation, we recommend that subsurface drains be provided for the below-grade portion of structures in areas of more permeable soil overlying less permeable soil/bedrock.

The subsurface drain should consist of a perforated pipe installed in a gravel-filled trench around the perimeter of the subgrade floor portion of the structure. The flowline of the pipe should be placed at least 18 inches below the finished floor level and should slope to a sump or outlet where water can be removed by pumping or gravity flow. A filter fabric should be placed between the drain gravel and the natural soil. This will help reduce the potential for fine-grained material filling in the void spaces of the gravel. The underslab gravel should connect to the perimeter drain.

B. Foundations

1. Bearing Material

With the proposed construction and the subsurface conditions encountered, the structures may be supported on spread footings bearing on the undisturbed natural soil/bedrock or on compacted structural fill extending down to the undisturbed, natural soil/bedrock. Structural fill placed below foundations should extend out away from the edge of the footings at least a distance equal to the depth of fill beneath footings.

Boulders up to approximately 5 feet in size were encountered at the site. If boulders over 2 feet in size and/or bedrock are encountered below the proposed building areas and the proposed foundation will bear on the boulders/bedrock and partially on soil, we recommend that the foundation be extended down to bear entirely on the bedrock or structural fill. This will provide a more uniform foundation support for the proposed structure.

The topsoil, organics, unsuitable fill and other deleterious material should be removed from below the proposed foundation areas.

2. Bearing Pressure

Footings bearing on the undisturbed, natural soil or on compacted structural fill may be designed for an allowable net bearing pressure of 2,000 psf. Spread footings bearing on at least 2 feet of natural gravel, on at least 2 feet of compacted structural fill or entirely on undisturbed bedrock may be designed for an allowable net bearing pressure of 3,500 psf.

Footings should have a minimum width of 18 inches and a minimum depth of embedment of 10 inches.

3. Temporary Loading Conditions

The allowable bearing pressure may be increased by one-half for temporary loading conditions such as wind or seismic loads.

4. Settlement

We estimate that total settlement will be less than 1 inch for footings bearing on the undisturbed soil. Total settlement is estimated to be less than ½ inch for footings bearing on at least 2 feet of undisturbed, natural gravel, on at least 2 feet of properly compacted granular fill or footings bearing entirely on undisturbed bedrock.

Differential settlement is estimated to be approximately three-quarters of the estimated total settlement for footings designed and constructed as indicated above.

Disturbance of soil below the foundations can result in greater settlement. Care should be taken to minimize disturbance of the soil to remain below foundations so that settlement can be maintained within tolerable limits.

5. Frost Depth

Exterior footings and footings beneath unheated areas should be placed at least 30 inches below grade for frost protection.

6. Foundation Base

The base of footing excavations should be cleared of loose or deleterious material prior to structural fill or concrete placement.

7. Construction Observation

A representative of the geotechnical engineer should observe footing excavations prior to structural fill or concrete placement.

C. Concrete Slabs-on-Grade

1. Slab Support

Concrete slabs may be supported on the undisturbed, natural soil, bedrock or on compacted structural fill extending down to the soil or bedrock.

Topsoil, organics, unsuitable fill and other deleterious material should be removed from below floor slab areas.

2. Underslab Sand and/or Gravel

A 4-inch layer of free draining sand and/or gravel (less than 5 percent passing

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the No. 200 sieve) should be placed below the concrete slabs for ease of construction and to promote even curing of the slab concrete.

3. Vapor Barrier

A vapor barrier should be placed under the concrete floor if the floor will receive an impermeable floor covering. The barrier will reduce the amount of for water vapor passing from below the slab to the floor covering.

D. Lateral Earth Pressures

1. Lateral Resistance for Footings

Lateral resistance for spread footings placed on the natural soil or on compacted structural fill is controlled by sliding resistance between the footing and the foundation soils. A friction values of 0.35 and 0.45 may be used in design for ultimate lateral resistance for footings bearing on clay/silt and sand/gravel/bedrock, respectively.

2. Subgrade Walls and Retaining Structures

The following equivalent fluid weights are given for design of subgrade walls and retaining structures. The active condition is where the wall moves away from the soil. The passive condition is where the wall moves into the soil and the at-rest condition is where the wall does not move. The values listed below assume a horizontal surface adjacent the top and bottom of the wall.

Soil Type	Active	At-rest	Passive
Clay and Silt	50 pcf	65 pcf	250 pcf
Sand and Gravel	40 pcf	55 pcf	300 pcf

3. Seismic Conditions

Under seismic conditions, the equivalent fluid weight should be increased by 25 pcf for active and at-rest conditions and decreased by 25 pcf for the passive condition. This assumes a short period spectral response acceleration of 1.07g which represents a 2 percent probability of exceedance in a 50-year period (IBC 2006).

4. Safety Factors

The values recommended above for active and passive conditions assume mobilization of the soil to achieve the soil strength for the indicated lateral load. Conventional safety factors used for structural analysis for such items as overturning and sliding resistance should be used in design.

E. Seismicity, Faulting and Liquefaction

1. Seismicity

Listed below is a summary of the site parameters for the 2006 International Building Code.

a.	Site Class	C
b.	Short Period Spectral Response Acceleration, S_S	1.07g
c.	One Second Period Spectral Response Acceleration, S_1	0.43g

2. Faulting

There are no mapped active faults extending through the project site. The nearest mapped fault which is considered active are the Wasatch Fault located approximately 4 miles southeast of the site (Black, 2003).

3. Liquefaction

The Salt Lake County Liquefaction Hazard Map indicates that the site is located in an area mapped as having a "very low" liquefaction potential (Salt Lake County, 1995). Research indicates that the soil type most susceptible to liquefaction during a large magnitude earthquake is loose, clean sand. In order for liquefaction to occur, the soil must be saturated. The liquefaction potential for soil tends to decrease with an increase in fines content and density.

The subsurface soil encountered at the site consists primarily of sand and gravel with localized areas of clay and silt. No free-water was encountered in the test pits at the time of excavation to the maximum depth investigated, approximately 17½ feet. Materials encountered in the test pits are not considered susceptible to liquefaction. Based on the subsurface conditions encountered at the site and our understanding of the geologic conditions in the area, it is our professional opinion that liquefaction is not a concern for the proposed development.

F. Water Soluble Sulfates

Three samples of the natural soil were tested in the laboratory for water soluble sulfate content. Test results indicate that there is less than 0.1 percent water soluble sulfate in the samples tested from Test Pit TP-1 at a depth of approximately 8 feet and Test Pit TP-36 at a depth of approximately 4 feet. Based on the results of the tests and published literature, the natural soil in these areas possesses negligible sulfate attack potential on concrete.

Test results from a sample obtained from Test Pit TP-15 at depth of approximately 5 feet indicate that the soil tested has a moderate sulfate attack potential on concrete based on a rating of negligible, moderate, severe and very severe. The concentration of water soluble sulfates present in the soil in the area of Test Pits TP-15 indicate that sulfate resistant cement should be used for concrete placed in contact with the natural soil. The area of higher sulfates appears to be localized and additional testing could be performed to better identify areas of sulfate concern. Type II cement, a maximum water-cementitious materials ratio and concrete with a compressive strength of at least 4,000 psf are recommend for concrete placed in contact with the sulfate exposure.

G. Pavement

Based on the subsoil conditions encountered, laboratory test results and the assumed traffic indicated in the Proposed Construction section of the report, the following pavement support recommendations are given.

1. Subgrade Support

   The near surface soil consists primarily of sand and gravel with localized areas of clay and silt. California Bearing Ratio (CBR) values of 3 and 15 percent were used in the analysis which assumes a clay and granular subgrade, respectively.

2. Pavement Thickness

   Based on the subsoil conditions, assumed traffic as described in the Proposed Construction section of the report, a design life of 20 years for flexible pavement and 30 years for rigid pavement and methods presented by the Utah Department of Transportation the following pavement sections are calculated.

		Rigid Pavement	Flexible Pavement		
Traffic Condition	Subgrade	Portland Cement Concrete Thickness	Asphaltic Concrete Thickness	Base Course Thickness	Granular Borrow Thickness
#1	Clay	5"	—	—	—
		—	3"	8"	—
	Granular	5"	—	—	—
		—	3"	6"	—
#2	Clay	6"	—	—	—
		—	4"	16"	—
		—	4"	6"	12"
	Granular	5½"	—	—	—
		—	4"	6"	—
#3	Clay	7"	—	—	—
		—	4½"	20"	—
		—	4½"	6"	16"
	Granular	6"	—	—	—
		—	4½"	8"	—
#4	Clay	7½"	—	—	—
		—	5"	20"	—
		—	5"	6"	16"
	Granular	6½"	—	—	—
		—	5"	8"	—

Note: Traffic conditions are described in the proposed construction section of the report. Other pavement sections could be provided using different combinations of pavement materials and traffic loads.

3. Pavement Materials and Construction

a. Flexible Pavement (Asphaltic Concrete)

The pavement materials should meet the specifications for the applicable jurisdiction. Other materials may be considered for use in the pavement section. The use of other materials may result in the need for different pavement material thicknesses.

b. Rigid Pavement (Portland Cement Concrete)

The pavement thickness assumes that the pavement will have aggregate interlock joints and that a concrete shoulder or curb will be provided.

Pavement materials should meet the specifications for the applicable jurisdiction. The pavement thickness indicated above assumes that the concrete will have a 28 day compressive strength of 4,000 pounds per square inch. Concrete should be air entrained with approximately 6 percent air. Maximum allowable slump will depend on the method of placement but should not exceed 4 inches.

Joints for concrete pavement should be laid out in a square or rectangular pattern. Joint spacings should not exceed 30 times the thickness of the slab. The joint spacings indicated should accommodate contraction of the concrete and under these conditions steel reinforcing will not be required. The depth of the joints should be approximately one-fourth of the slab thickness.

LIMITATIONS

This report has been prepared in accordance with generally accepted soil and foundation engineering practices in the area for the use of the client for design purposes. The conclusions and recommendations included within the report are based on the information obtained from the test pits excavated at the approximate locations indicated on Figure 1, the data obtained from laboratory testing and our experience in the area. Variations in the subsurface conditions may not become evident until additional exploration or excavation is conducted. If the proposed construction, subsurface conditions or groundwater level are found to be significantly different from what is described in this report, we should be notified to reevaluate the recommendations given.

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

LICENSED PROFESSIONAL ENGINEER
12-21-07
No. 264456
CHRISTOPHER J. BECKMAN
STATE OF UTAH

Christopher J. Beckman

Christopher J. Beckman, P.E.

Douglas R Hawkes

Reviewed by Douglas R. Hawkes, P.E.

CJB/hl

REFERENCES

Black, B.D., Hecker, S., Hylland, M.D., Christenson, G.E., and McDonald, G.N., 2003; Quaternary fault and fold database and map of Utah; Utah Geological Survey Map 193DM.

International Building Code, 2006; International Code Council, Inc., Falls Church, Virginia.

Salt Lake County Planning Department, 1995, Surface Rupture and Liquefaction Potential Special Study Areas Map, Salt Lake County, Utah, adopted March 31, 1989, revised March 1995, Salt Lake County Public Works, Planning Department, 2001 South State Street, Salt Lake City, Utah.

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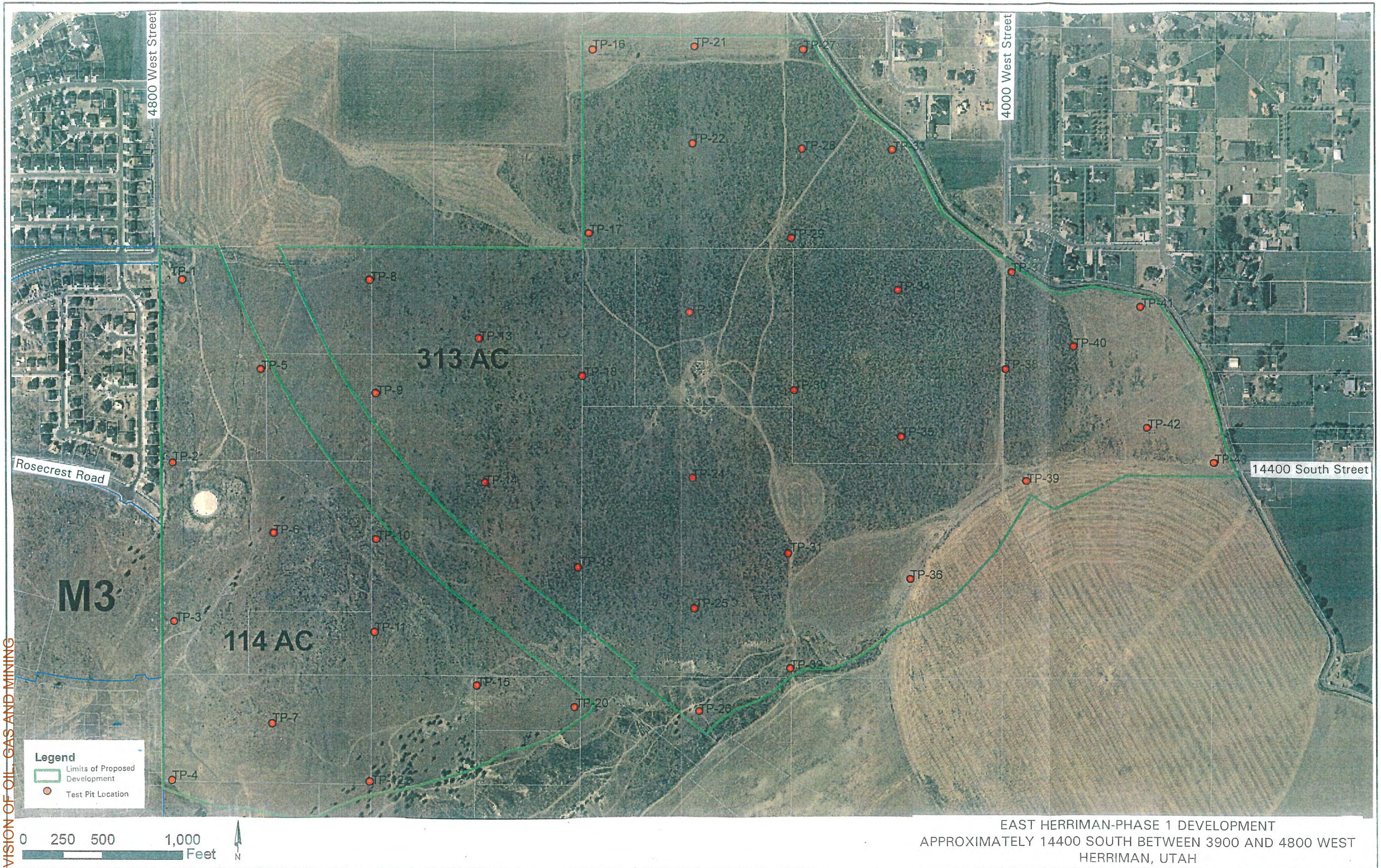
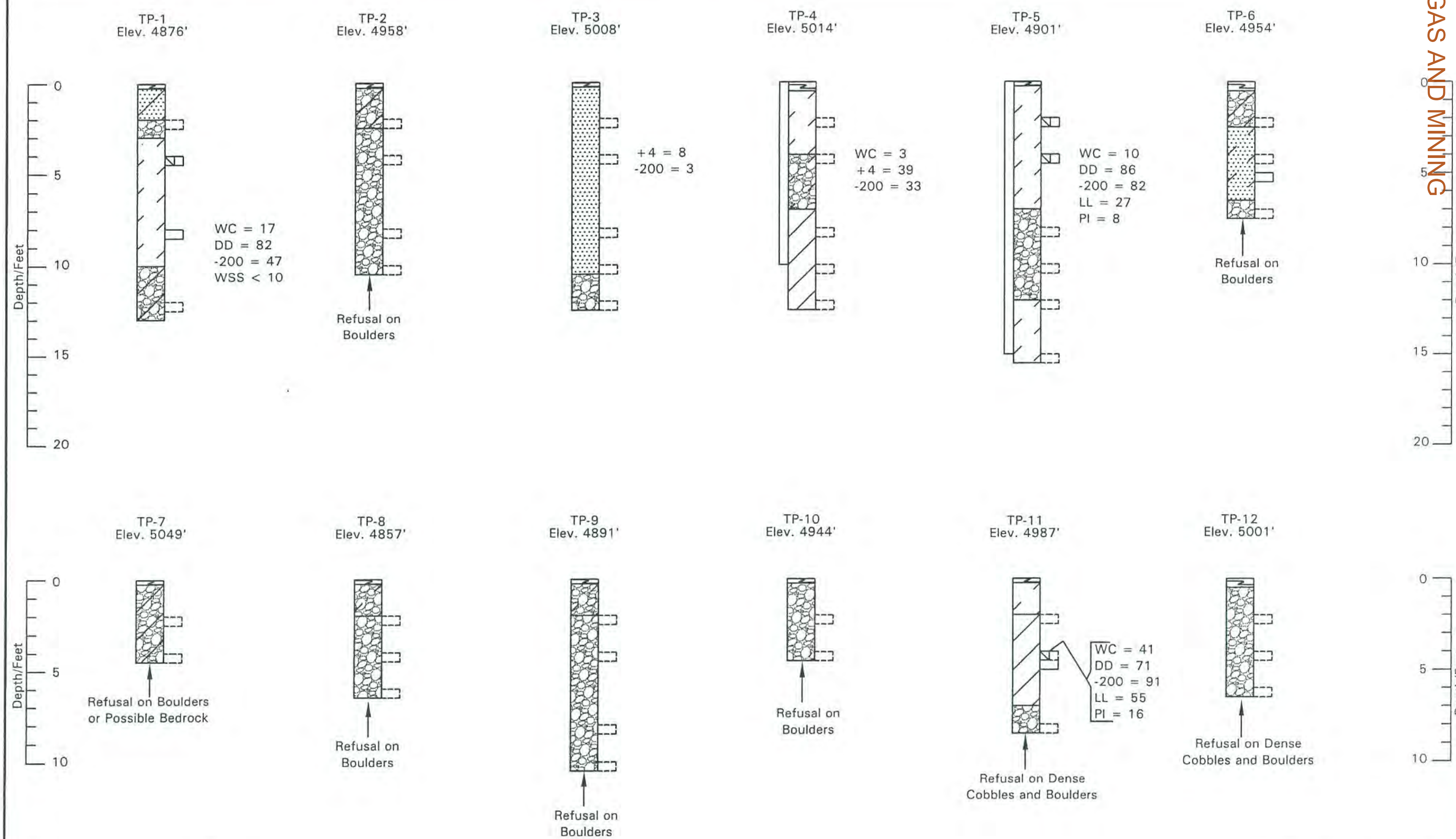


EAST HERRIMAN-PHASE 1 DEVELOPMENT
APPROXIMATELY 14400 SOUTH BETWEEN 3900 AND 4800 WEST
HERRIMAN, UTAH

1071288	AGEC	Locations of Test Pits	Figure 1



Approximate Vertical Scale 1" = 8'

See Figure 6 for Legend and Notes

1071288	AGEC	Logs of Test Pits	Figure 2

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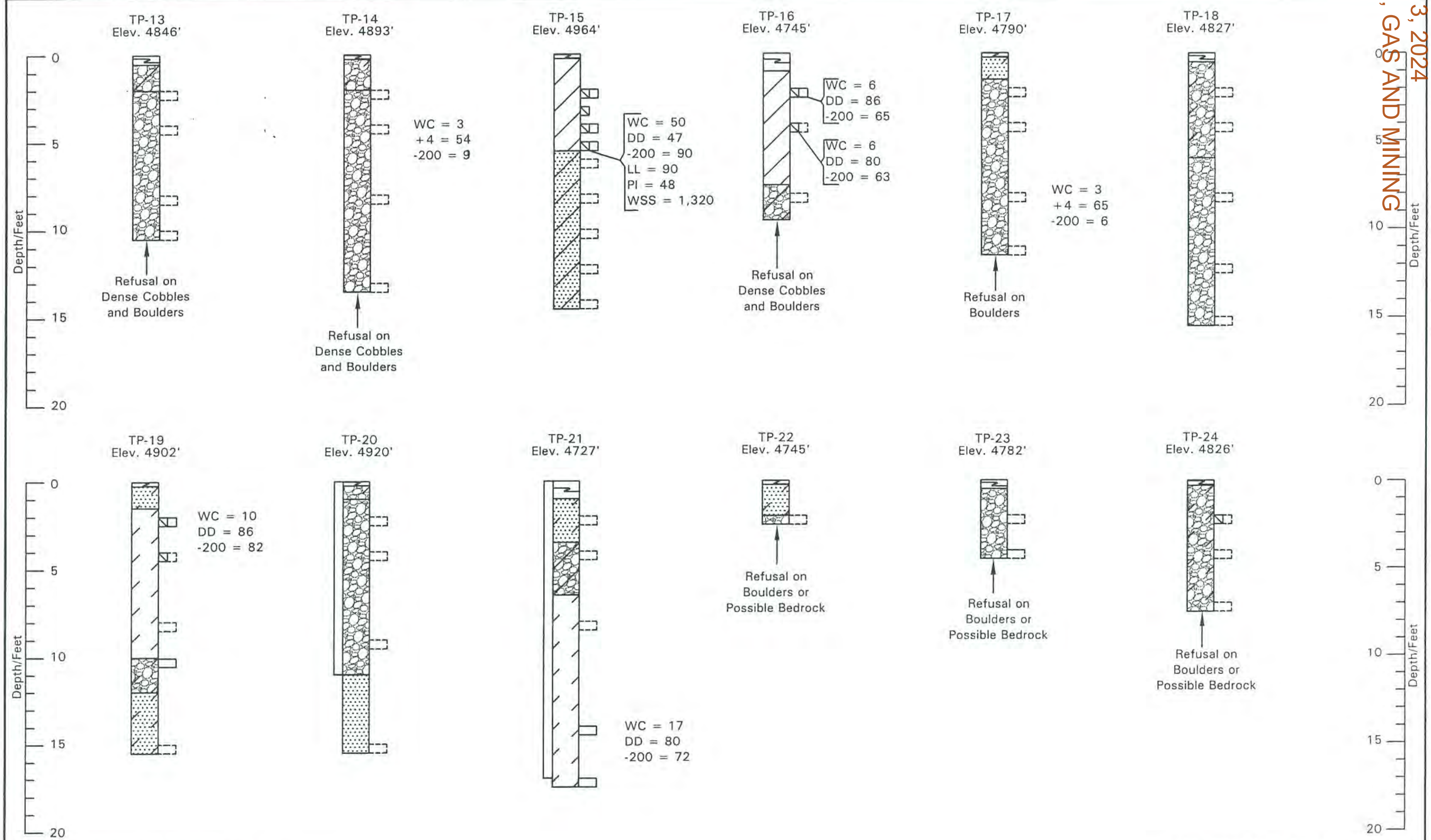
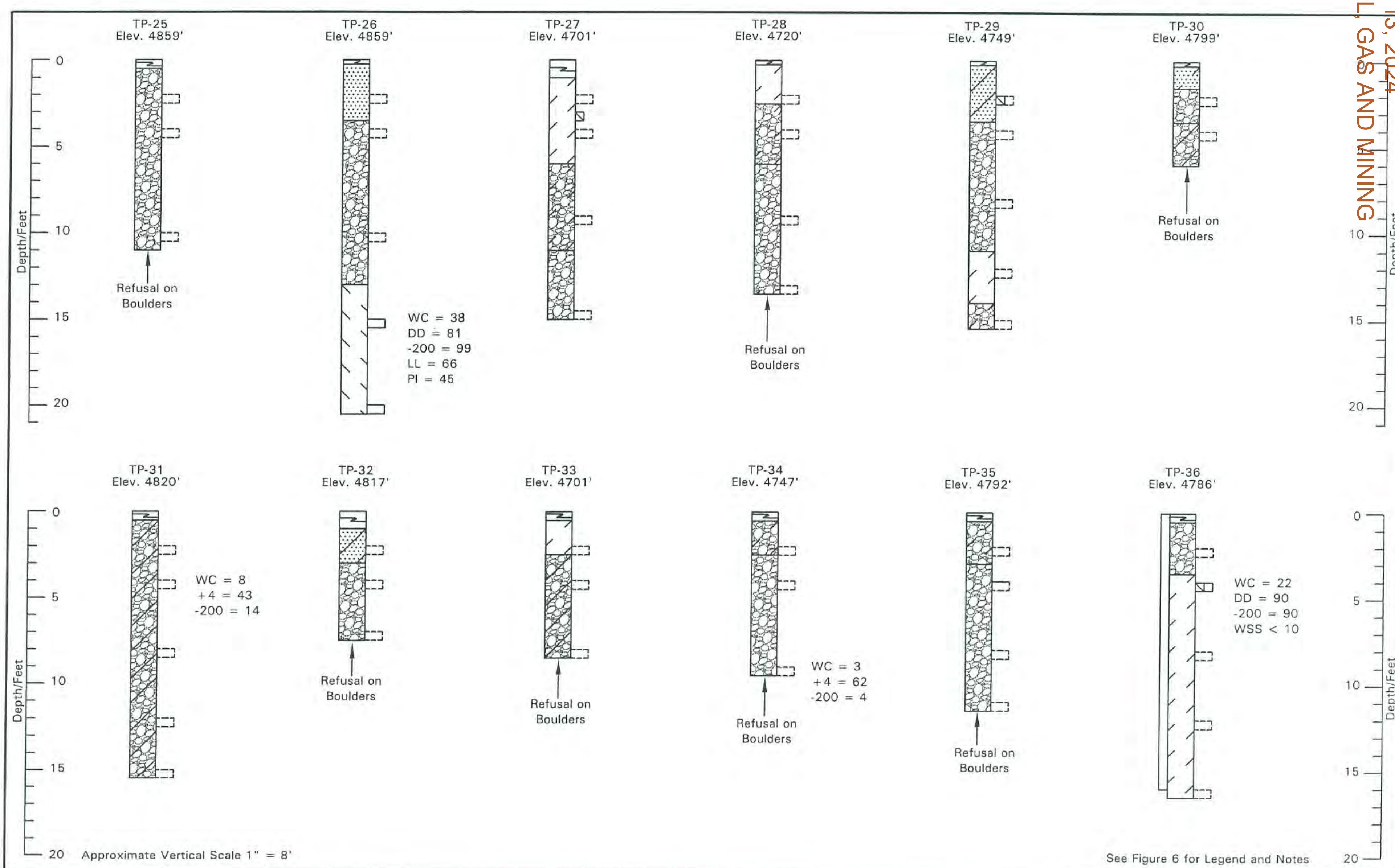


Approximate Vertical Scale 1" = 8'

See Figure 6 for Legend and Notes

1071288	AGEC	Logs of Test Pits	Figure 3



1071288	AGEC	Logs of Test Pits	Figure 4

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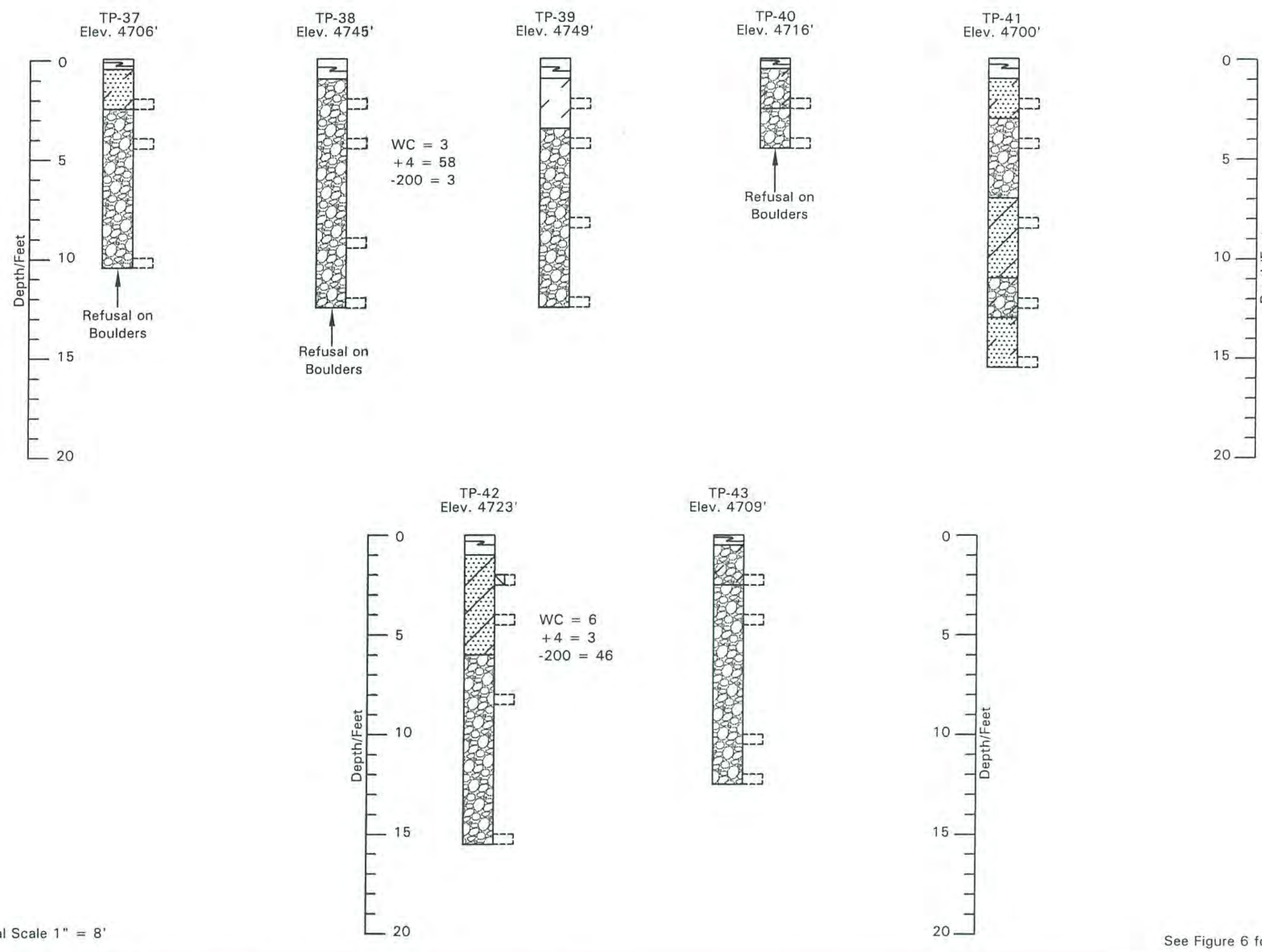

Approximate Vertical Scale 1" = 8'

See Figure 6 for Legend and Notes

1071288	AGEC	Logs, Legend and Notes of Test Pits	Figure 5

LEGEND:

Topsoil; silty and clayey sand, small to moderate amounts of gravel, cobbles and boulders at the ground surface, slightly moist to moist, brown to dark brown, roots and organics.

Lean Clay (CL); low to moderate plasticity, small to moderate amounts of sand, occasional gravel, stiff to very stiff, slightly moist, brown to dark brown.

Fat Clay (CH); moderate to high plasticity, small to moderate amounts of sand, occasional gravel, stiff to very stiff, slightly moist to moist, brown to dark brown.

Clayey Sand (SC); small to moderate amounts of clay and gravel, occasional cobbles, medium dense to dense, slightly moist to moist, light brown to brown.

Silt (ML and MH); low to high plastic (elastic) silts, occasional pinhole structure, small to moderate amounts of sand, occasional sand layers, stiff to very stiff, slightly moist to moist, light brown.

Silty Sand (SM); small to large amounts of silt, occasional silt layers and gravel, occasional cemented layers, medium dense to dense, slightly moist, brown to reddish brown and yellowish gray.

Poorly Graded Sand (SP); small amounts of silt and gravel, loose to dense, slightly moist, brown to dark gray.

Clayey Gravel (GC); small to moderate amounts of clay and sand, cobbles and occasional boulders up to approximately 3 feet in size, dense to very dense, slightly moist to moist, brown to light brown.

Silty Gravel (GM); small to moderate amounts of silt and sand, cobbles and occasional boulders up to approximately 3 feet in size, dense to very dense, slightly moist to moist, brown.

Poorly Graded Gravel (GP); small amounts of silt, clay and sand, cobbles and boulders up to approximately 5 feet in size, dense to very dense, slightly moist to moist, brown to reddish brown and gray.

Indicates relatively undisturbed hand drive sample taken.

Indicates relatively undisturbed block sample taken.

Indicates disturbed sample taken.

Indicates slotted 1½ inch PVC pipe installed in the test pit to the depth shown.

Indicates practical excavation refusal.

NOTES:

1. Test pits were excavated on November 5, 6, 7 and 8, 2007, with a tracked excavator.
2. Locations and elevations of test pits were established by GPS survey performed by representatives of Rosecrest, Inc.
3. The test pit locations and elevations should be considered accurate only to the degree implied by the method used.
4. The lines between the materials shown on the test pit logs represent the approximate boundaries between material types and the transitions may be gradual.
5. No free water was encountered in the test pits at the time of excavation.
6. WC = Water Content (%);
   DD = Dry Density (pcf);
   +4 = Percent Retained on the No. 4 Sieve;
   -200 = Percent Passing No. 200 Sieve;
   LL = Liquid Limit (%);
   PI = Plasticity Index (%);
   UC = Unconfined Compressive Strength (psf);
   WSS = Water Soluble Sulfates (ppm).

1071288	AGEC	Legend and Notes of Test Pits	Figure 6

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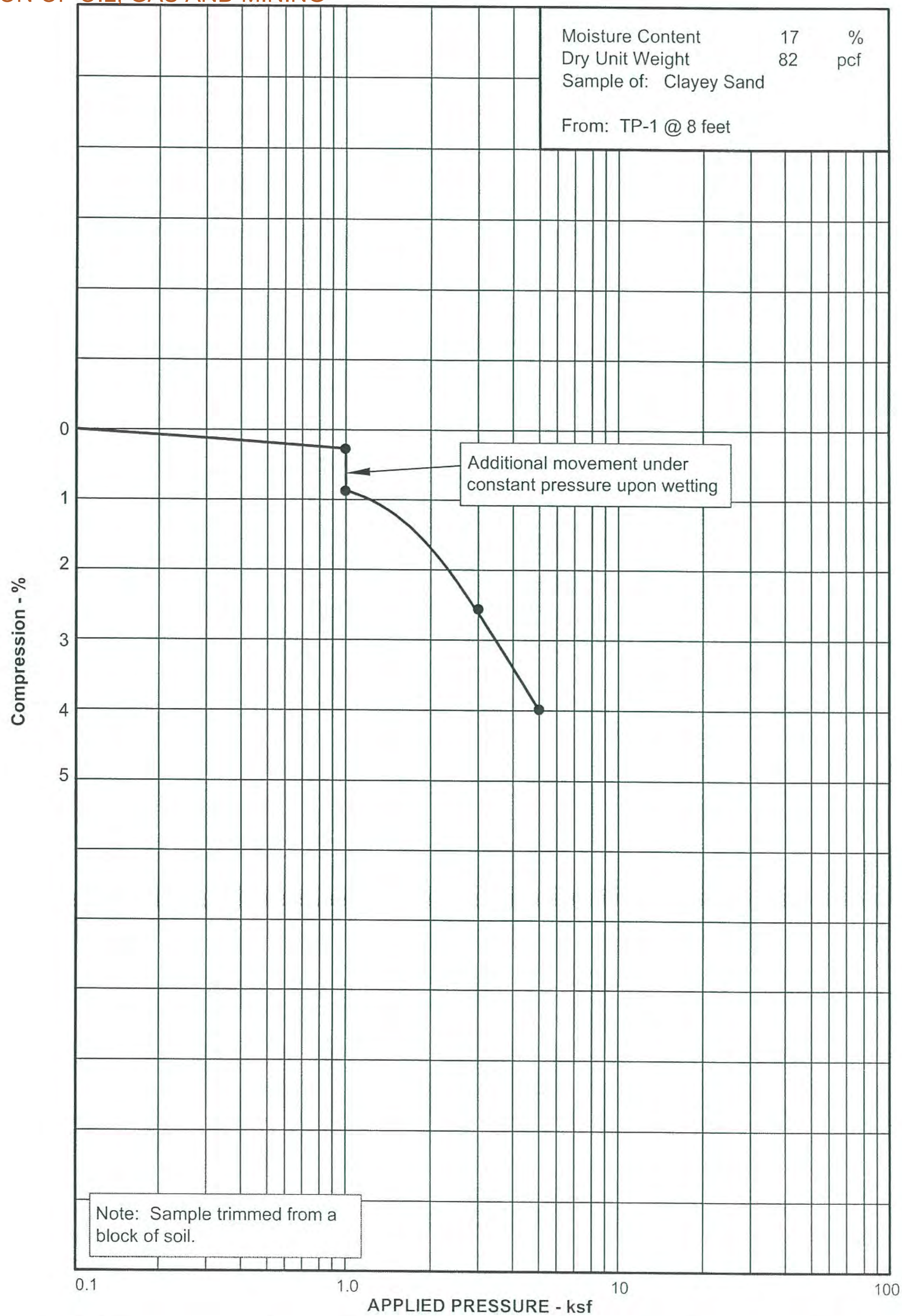
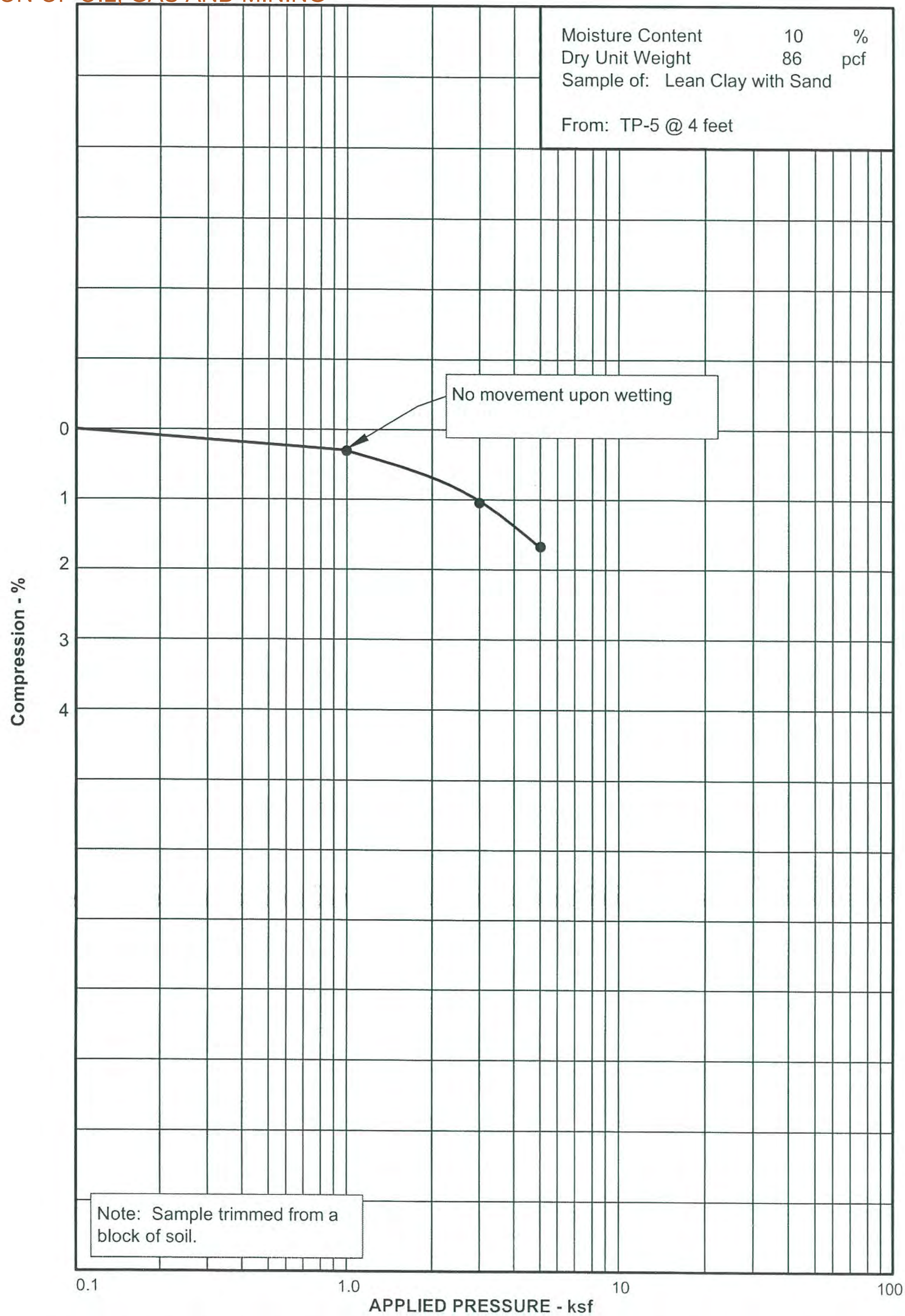


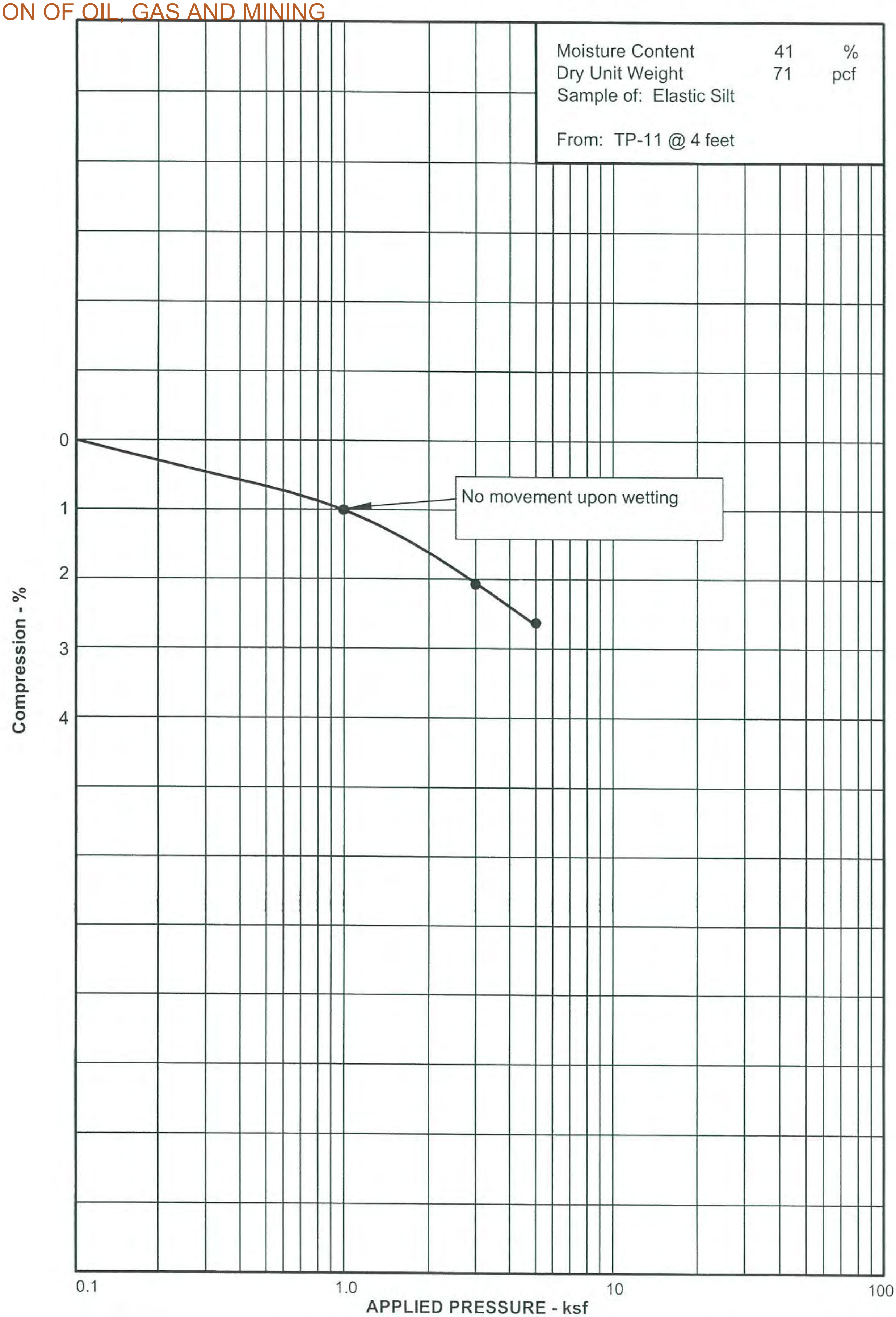
Project No. 1071288 CONSOLIDATION TEST RESULTS Figure 7

Applied Geotechnical Engineering Consultants, Inc.



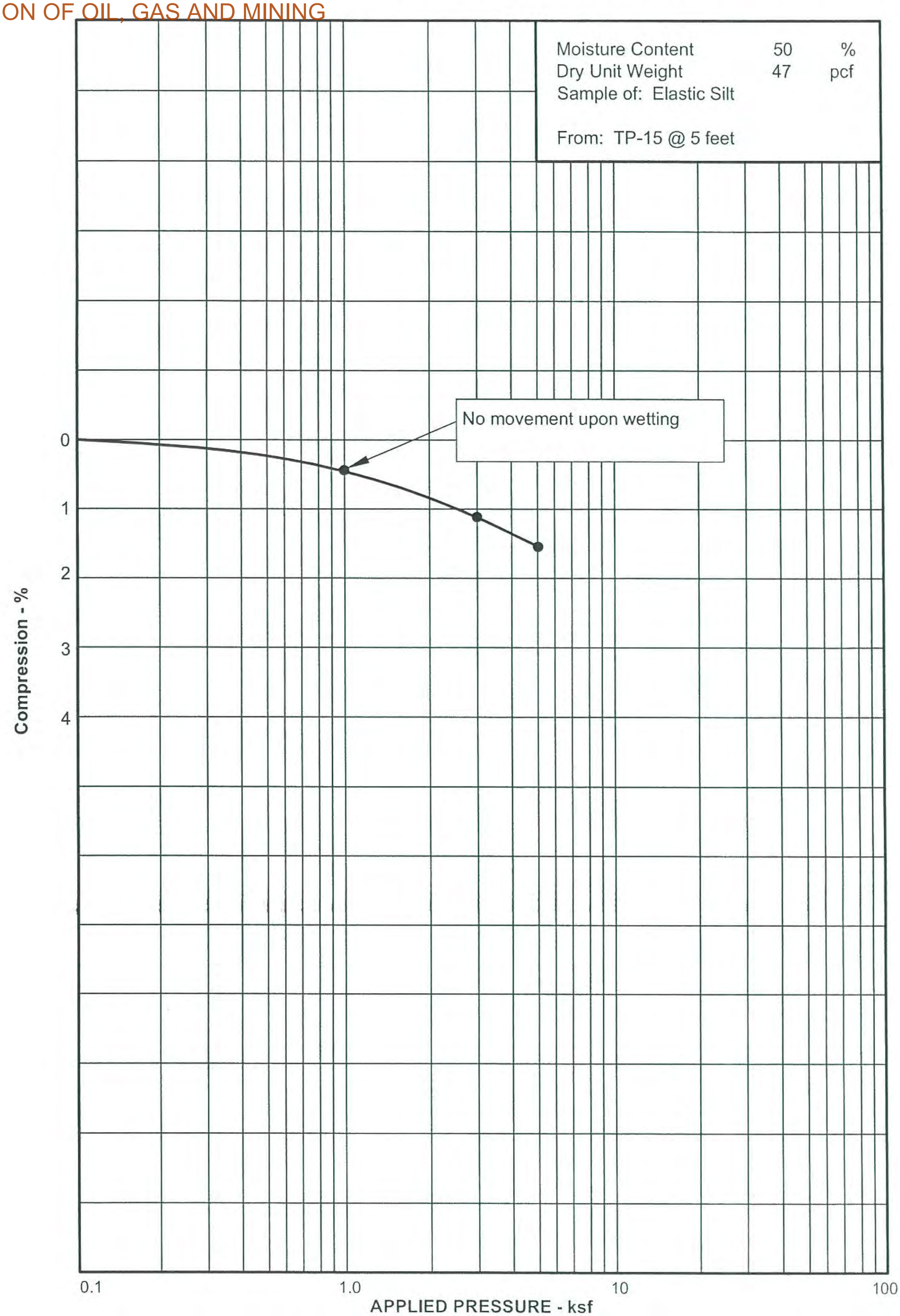
Project No. 1071288 CONSOLIDATION TEST RESULTS Figure 8

Applied Geotechnical Engineering Consultants, Inc.



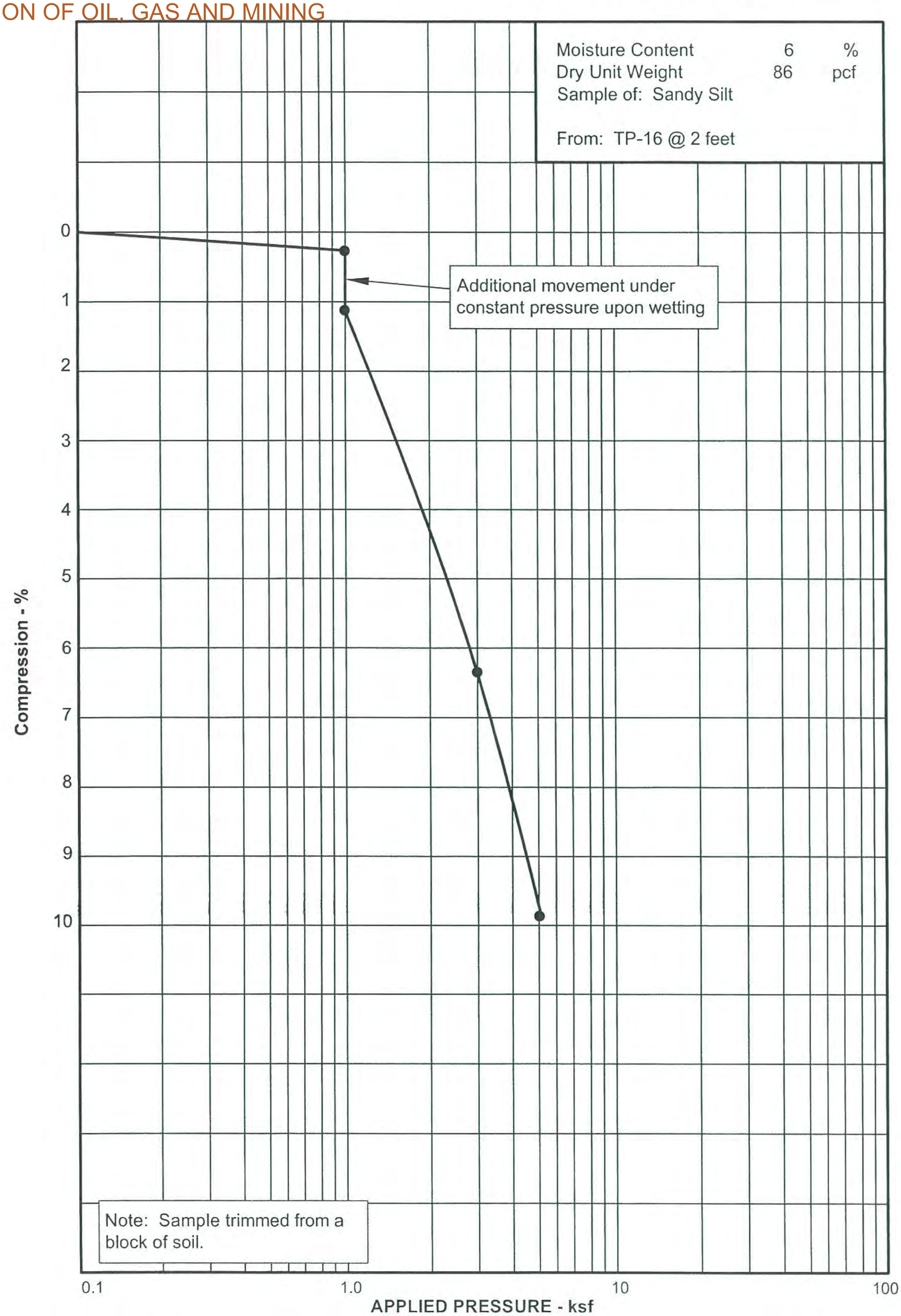
Project No. 1071288 CONSOLIDATION TEST RESULTS Figure 9

Applied Geotechnical Engineering Consultants, Inc.



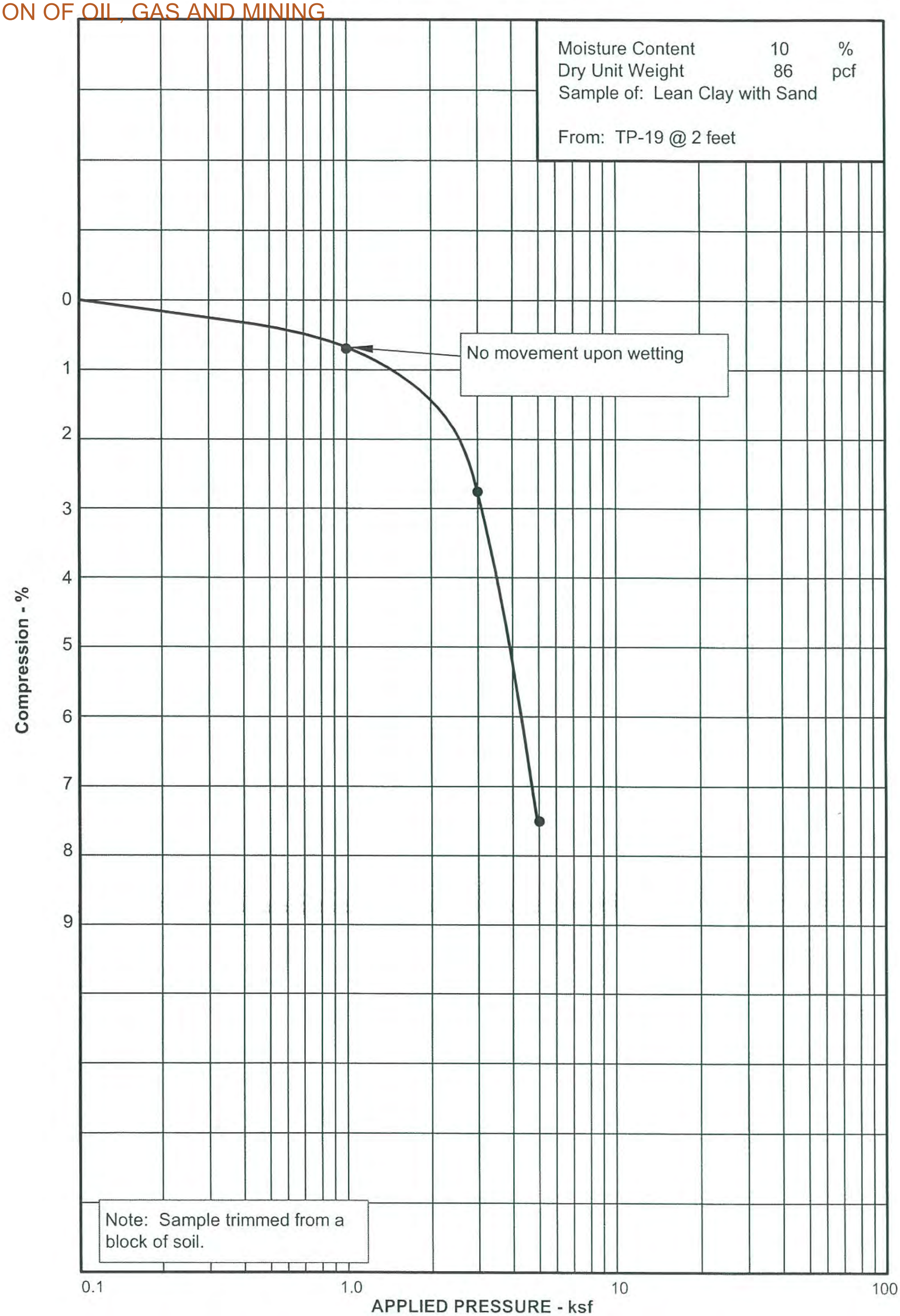
Project No. 1071288 CONSOLIDATION TEST RESULTS Figure 10

Applied Geotechnical Engineering Consultants, Inc.



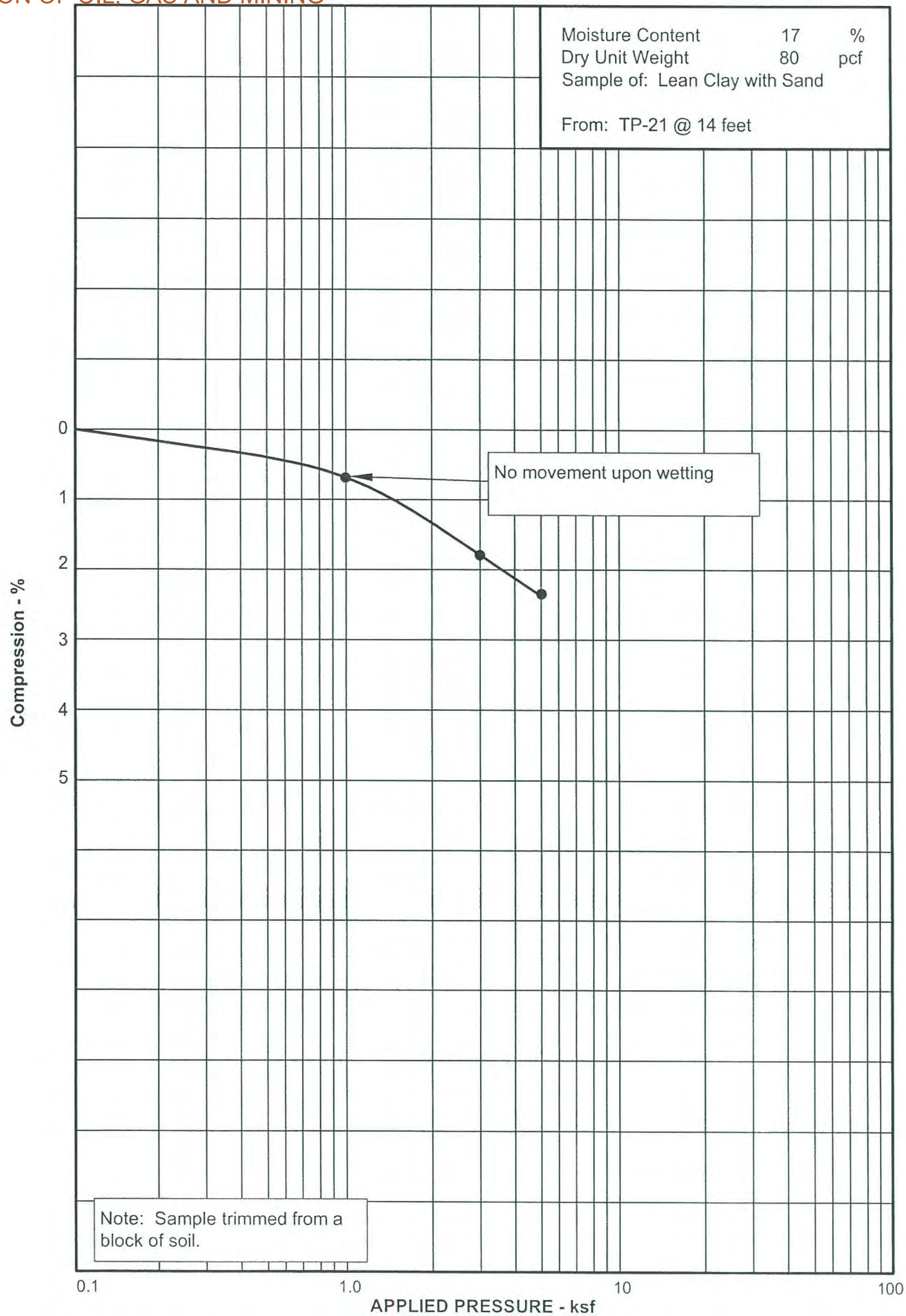
Project No. 1071288 CONSOLIDATION TEST RESULTS Figure 11

Applied Geotechnical Engineering Consultants, Inc.



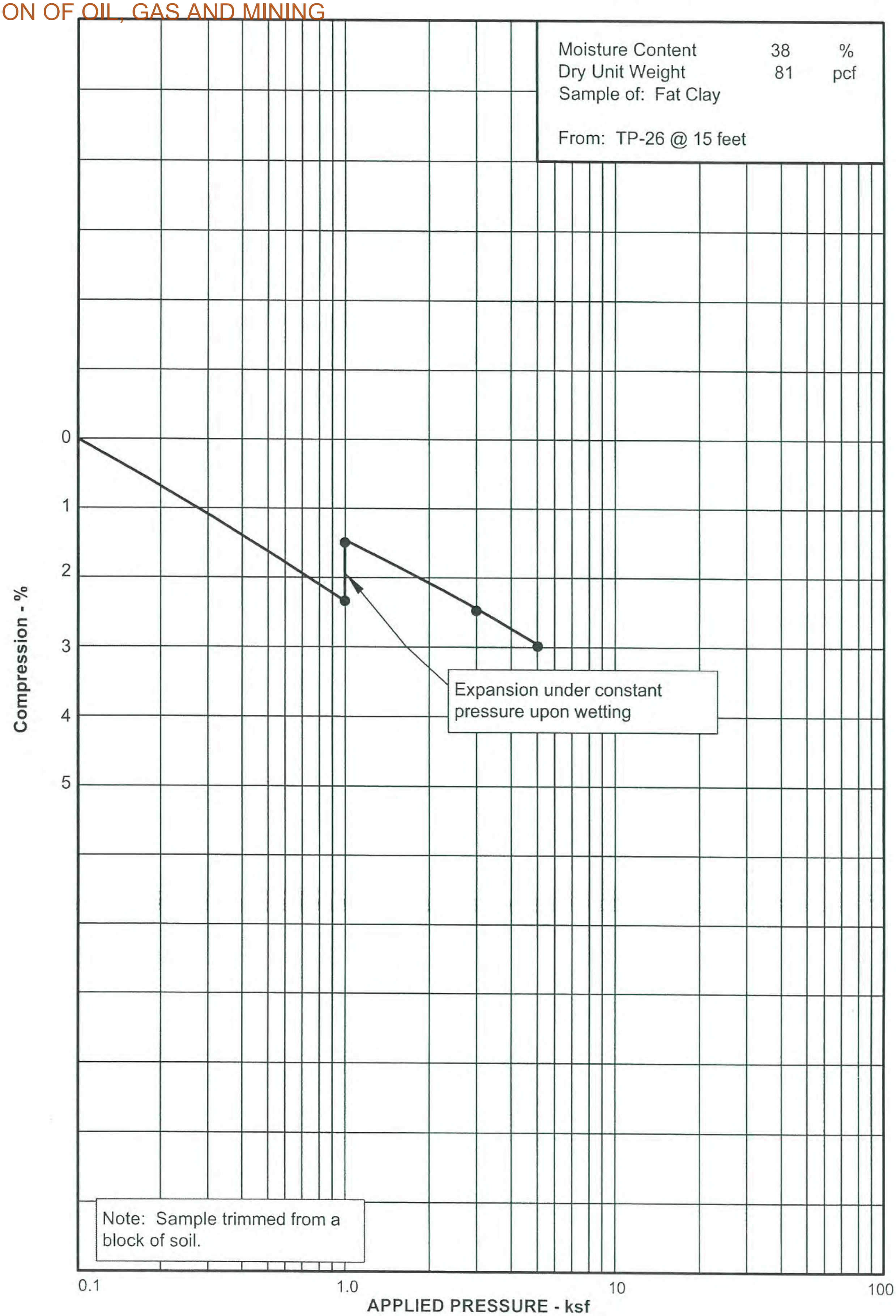
Project No. 1071288 CONSOLIDATION TEST RESULTS Figure 12

Applied Geotechnical Engineering Consultants, Inc.



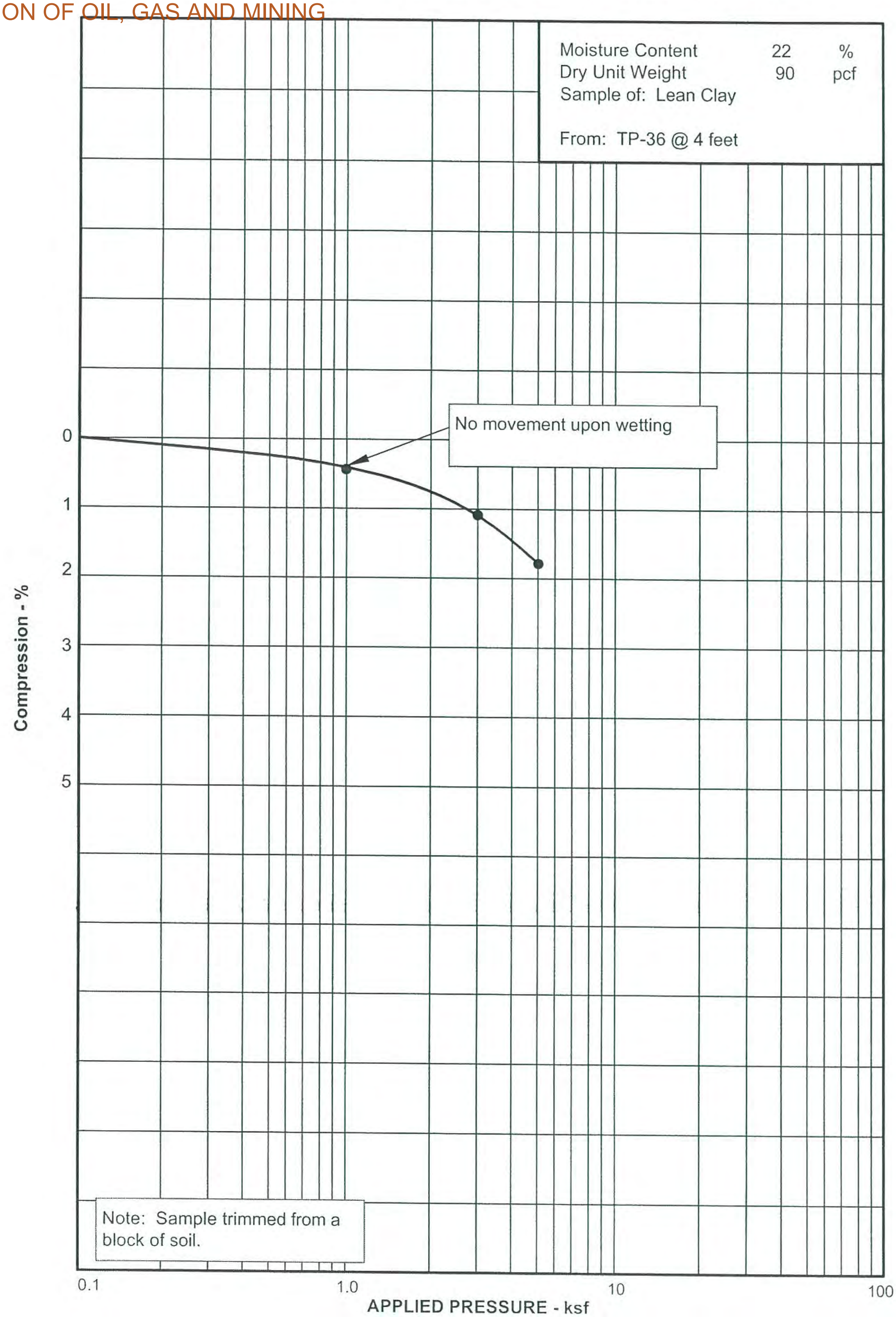
Project No. 1071288 CONSOLIDATION TEST RESULTS Figure 13

Applied Geotechnical Engineering Consultants, Inc.



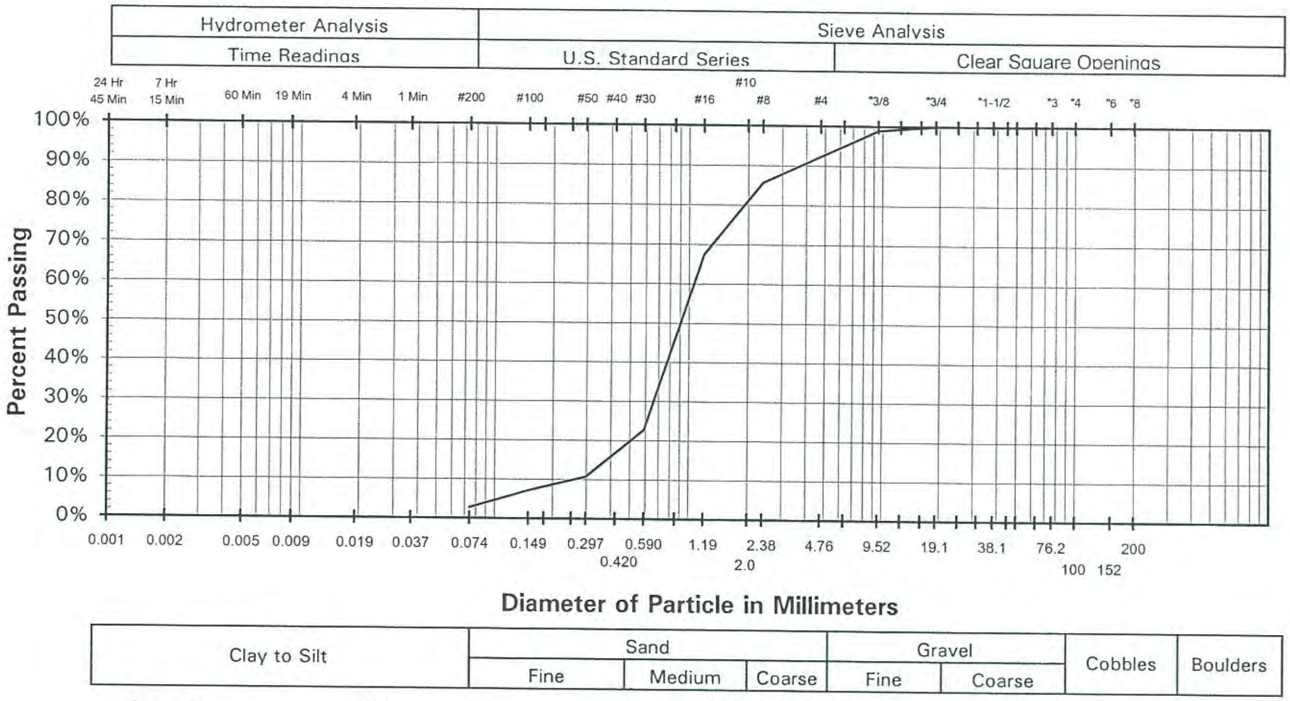
Project No. 1071288 CONSOLIDATION TEST RESULTS Figure 14

Applied Geotechnical Engineering Consultants, Inc.



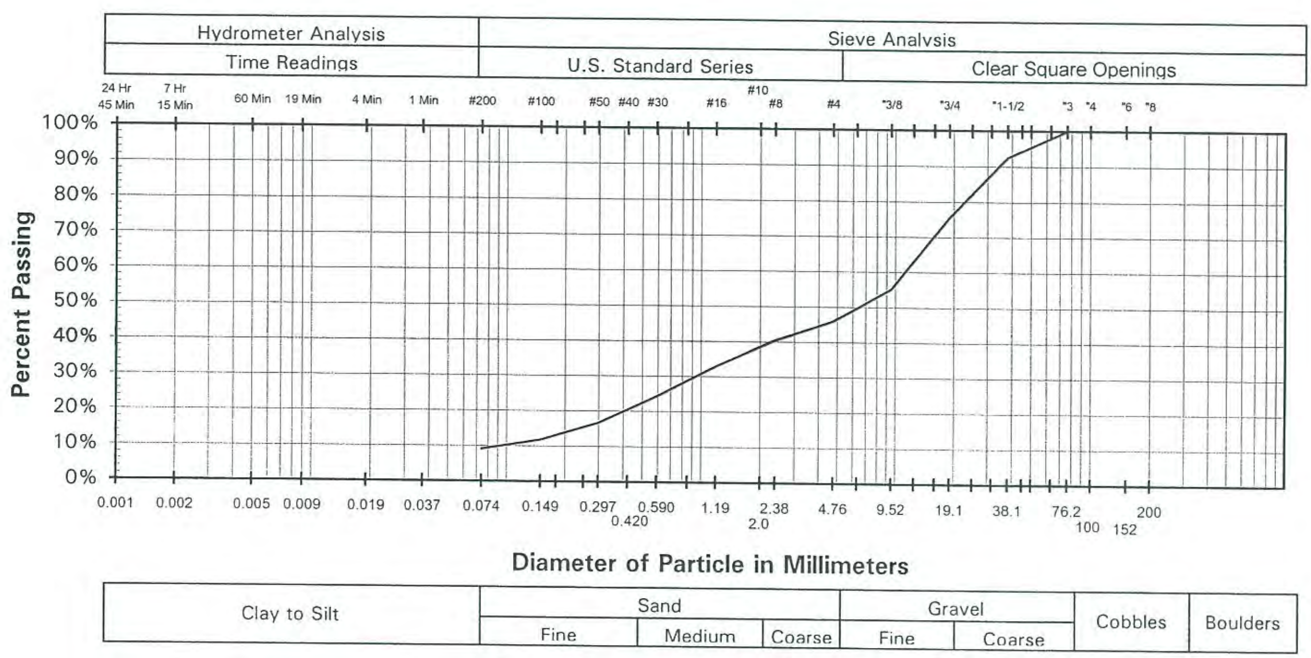
Project No. 1071288 CONSOLIDATION TEST RESULTS Figure 15

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, Inc.



Gravel 8%
Sand 89%
Silt and Clay 3%
Sample Description Poorly Graded Sand (SP)

Liquid Limit -
Plasticity Index -
Sample Location TP-3 @ 4 feet



Gravel 54%
Sand 37%
Silt and Clay 9%
Sample Description Poorly Graded Gravel with Silt and Sand (GP-GM)

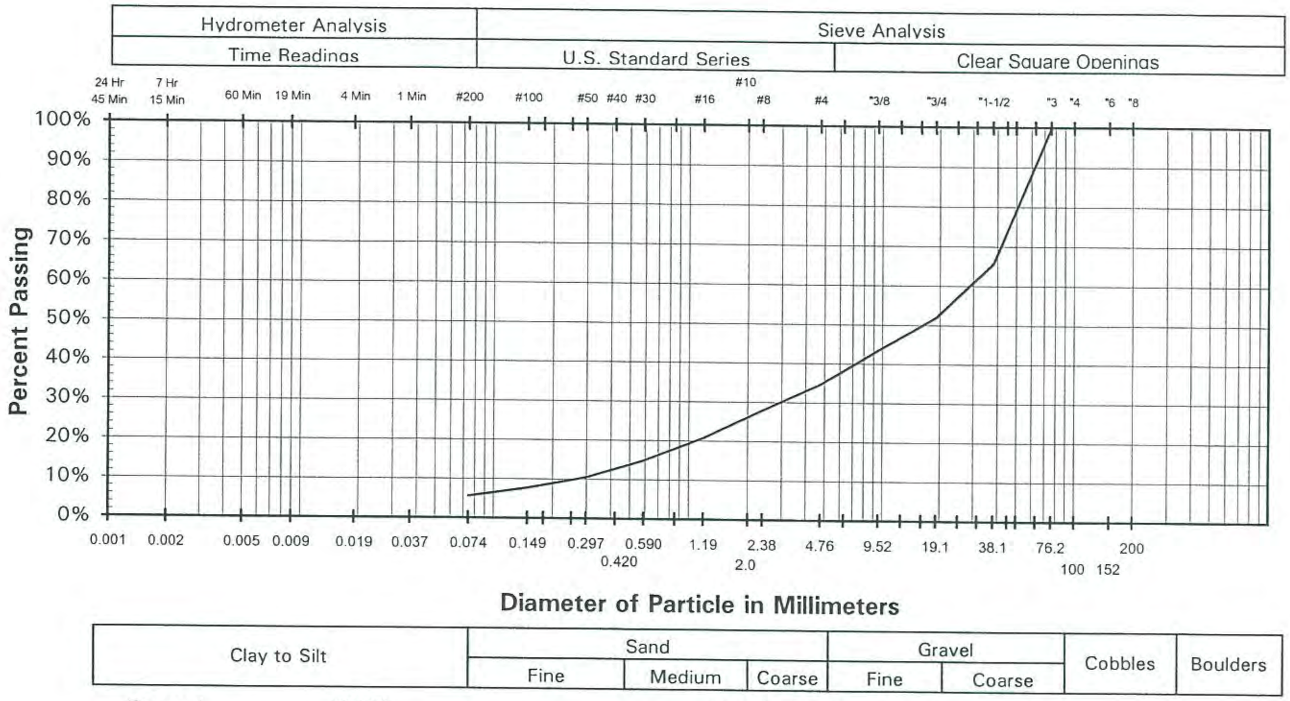
Liquid Limit -
Plasticity Index -
Sample Location TP 14 @ 4 feet

Project No. 1071288

GRADATION TEST RESULTS

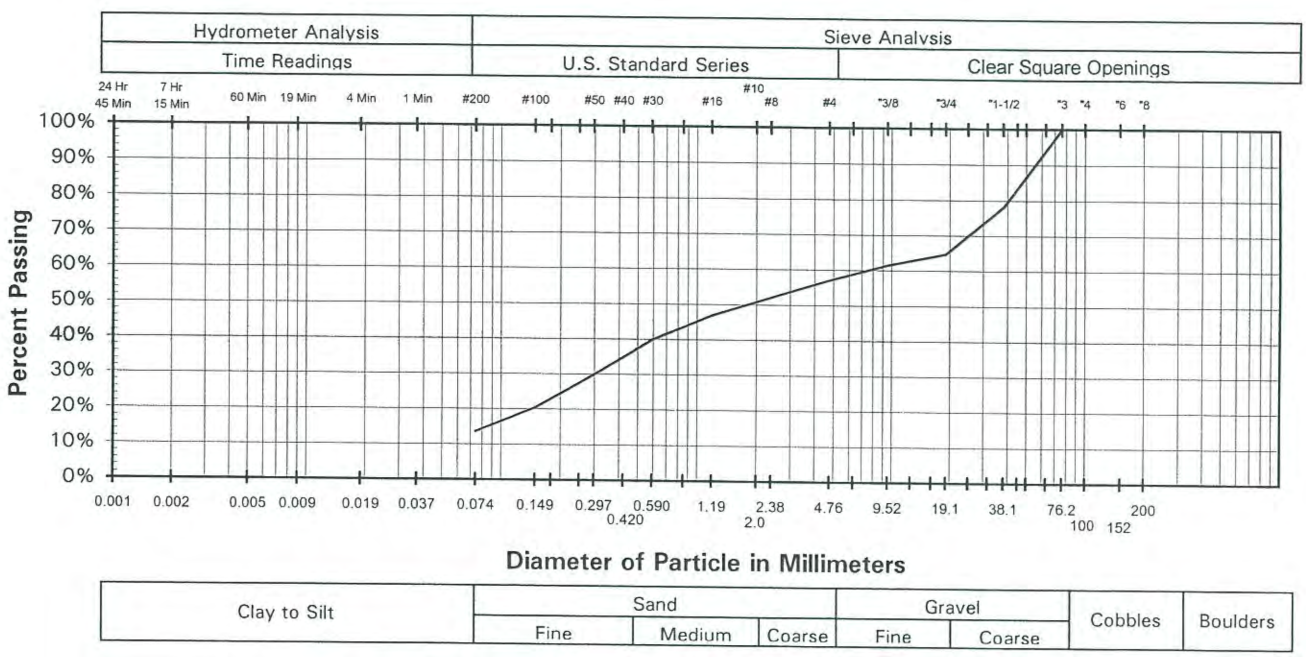
Figure 16

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, Inc.



Gravel	65%	Liquid Limit	-
Sand	29%	Plasticity Index	-
Silt and Clay	6%	Sample Location	TP-17 @ 8 feet

Sample Description Well Graded Gravel with Silt and sand (GW-GM)



Gravel	43%	Liquid Limit	-
Sand	43%	Plasticity Index	-
Silt and Clay	14%	Sample Location	TP-31 @ 4 feet

Sample Description Silty Sand with Gravel (SM)

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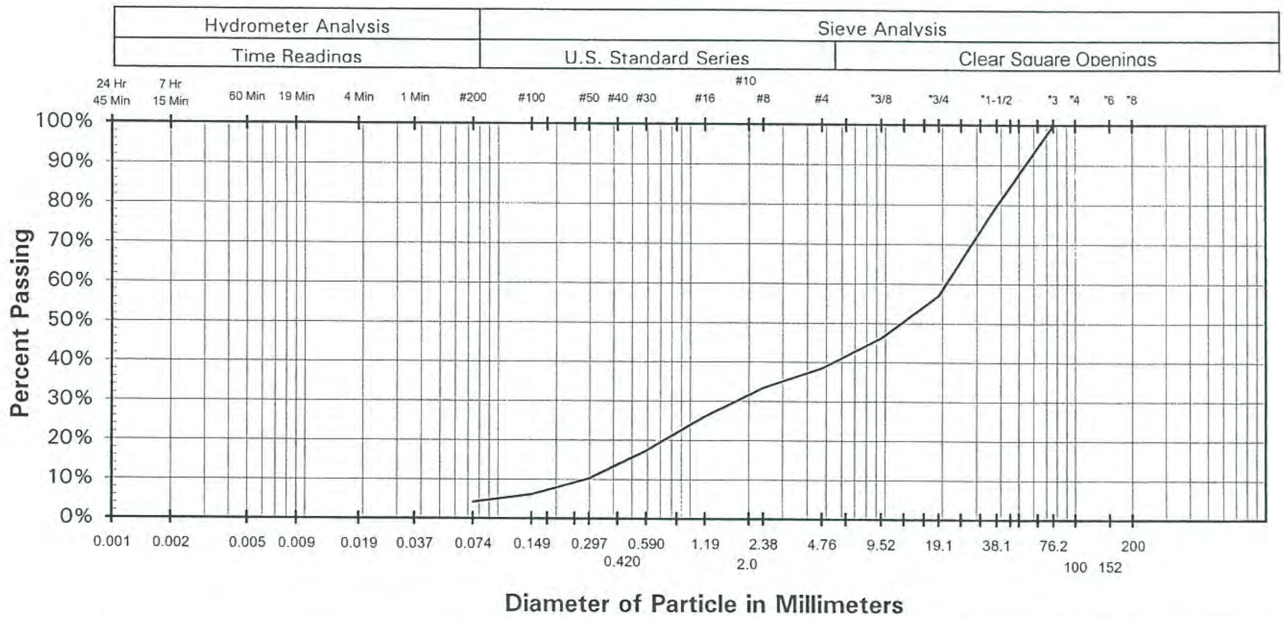
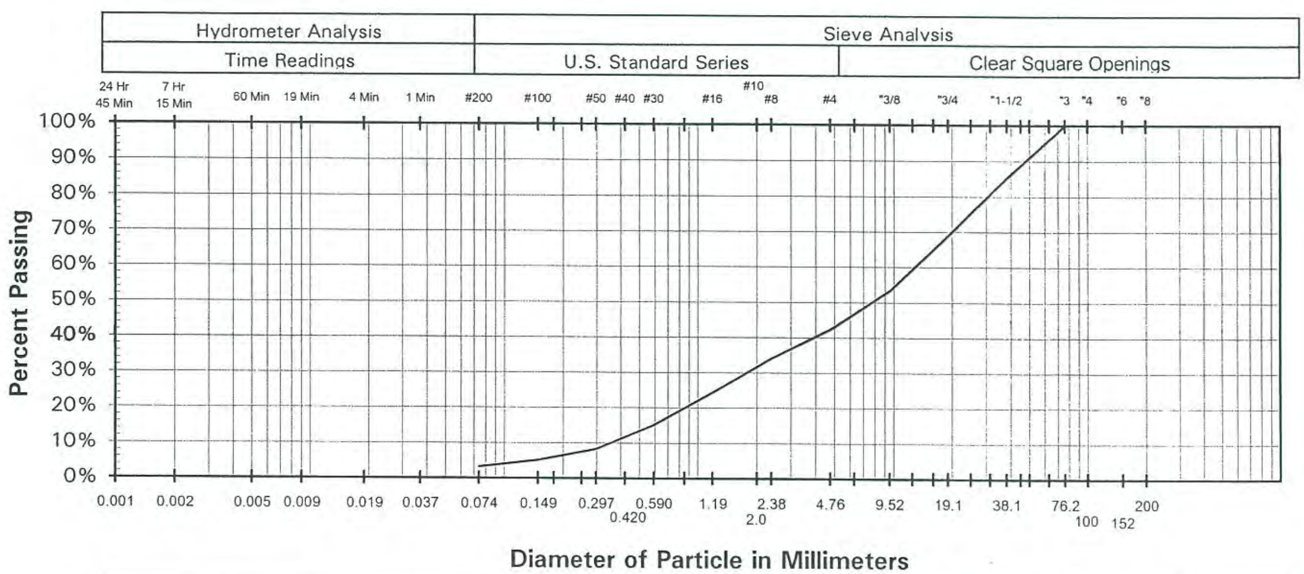


Clay to Silt	Sand			Gravel		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

Gravel	62%	Liquid Limit	-
Sand	34%	Plasticity Index	-
Silt and Clay	4%	Sample Location	TP-34 @ 9 feet

Sample Description Poorly Graded Gravel with Sand (GP)



Clay to Silt	Sand			Gravel		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

Gravel	58%	Liquid Limit	-
Sand	39%	Plasticity Index	-
Silt and Clay	3%	Sample Location	TP-38 @ 4 feet

Sample Description Poorly Graded Gravel with Sand (GP)

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

TABLE I
SUMMARY OF LABORATORY TEST RESULTS

PROJECT NUMBER 1071288

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (PCF)	GRADATION			ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH (PSF)	WATER SOLUBLE SULFATE (ppm)	SAMPLE CLASSIFICATION
TEST PIT	DEPTH (FEET)			GRAVEL (%)	SAND (%)	SILT/ CLAY (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)			
TP-1	8	17	82			47				<10	Clayey Sand (SC)
TP-3	4			8	89	3					Poorly Graded Sand (SP)
TP-4	4	3		39	28	33					Clayey Gravel with Sand (GC)
TP-5	4	10	86			82	27	8			Lean Clay with Sand (CL)
TP-11	4	41	71			91	55	16			Elastic Silt (MH)
TP-14	4	3		54	37	9					Poorly Graded Gravel with Silt and Sand (GP-GM)
TP-15	5	50	47			90	90	48		1,320	Elastic Silt (MH)
TP-16	2	6	86			65					Sandy Silt (ML)
	4	6	80			63					Sandy Silt (ML)
TP-17	8	3		65	29	6					Well Graded Gravel with Silt and Sand (GW-GM)

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

TABLE I

SUMMARY OF LABORATORY TEST RESULTS

PROJECT NUMBER 1071288

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (PCF)	GRADATION			ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH (PSF)	WATER SOLUBLE SULFATE (ppm)	SAMPLE CLASSIFICATION
TEST PIT	DEPTH (FEET)			GRAVEL (%)	SAND (%)	SILT/ CLAY (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)			
TP-19	2	10	86			82					Lean Clay with Sand (CL)
TP-21	14	17	80			72					Lean Clay with Sand (CL)
TP-26	15	38	81			99	66	45			Fat Clay (CH)
TP-31	4	8		43	43	14					Silty Sand with Gravel (SM)
TP-34	9	3		62	34	4					Poorly Graded Gravel with Sand (GP)
TP-36	4	22	90			90				<10	Lean Clay (CL)
TP-38	4	3		58	39	3					Poorly Graded Gavel with Sand (GP)
TP-42	4	6		3	51	46					Silty Sand (SM)

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Appendix D

Utah Division of Wildlife Resources
Utah Natural Heritage Program
1594 W. North Temple
PO Box 146301
Salt Lake City, UT 84116

Report Number: 12358
May 25, 2021

Utah Natural Heritage Program Online Species Search Report

Project Information

Project Name
DOGM Permit

Project Description
Looking for T&E Species

Location Description
40°28'49.4"N 111°59'31.1"W 40.480393, -111.991982

May 25, 2021

1:75,151,530
0 500 1,000 2,000 mi
0 500 1,000 2,000 km
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Animals within a ½ mile radius

Common Name	Scientific Name	State Status	U.S. ESA Status	Last Observation Year
No Species Found				

Plants within a ½ mile radius

Common Name	Scientific Name	State Status	U.S. ESA Status	Last Observation Year
No Species Found				

Animals within a 2 mile radius

Common Name	Scientific Name	State Status	U.S. ESA Status	Last Observation Year
No Species Found				

Plants within a 2 mile radius

Common Name	Scientific Name	State Status	U.S. ESA Status	Last Observation Year
No Species Found				

Definitions

State Status

SGCN	Species of greatest conservation need listed in the Utah Wildlife Action Plan

U.S. Endangered Species Act

LE	A taxon that is listed by the U.S. Fish and Wildlife Service as "endangered" with the probability of worldwide extinction
LT	A taxon that is listed by the U.S. Fish and Wildlife Service as "threatened" with becoming endangered
LE;XN	An "endangered" taxon that is considered by the U.S. Fish and Wildlife Service to be "experimental and nonessential" in its designated use areas in Utah
C	A taxon for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threats to justify it being a "candidate" for listing as endangered or threatened
PT/PE	A taxon "proposed" to be listed as "endangered" or "threatened" by the U.S. Fish and Wildlife Service

Disclaimer

The information provided in this report is based on data existing in the Utah Division of Wildlife Resources' central database at the time of the request. It should not be regarded as a final statement on the occurrence of any species on or near the designated site, nor should it be considered a substitute for on-the-ground biological surveys. Moreover, because the Utah Division of Wildlife Resources' central database is continually updated, any given response is only appropriate for its respective request.

The UDWR provides no warranty, nor accepts any liability, occurring from any incorrect, incomplete, or misleading data, or from any incorrect, incomplete, or misleading use of these data.

The results are a query of species tracked by the Utah Natural Heritage Program, which includes all species listed under the U.S. Endangered Species Act and species on the Utah Wildlife Action Plan. Other significant wildlife values might also be present on the designated site. Please contact UDWR's regional habitat manager if you have any questions.

Contact the U.S. Fish and Wildlife Service at (801) 975-3330 for the purpose of consultation under the Endangered Species Act.

Please contact our office at (801) 538-4759 or habitat@utah.gov if you require further assistance.

Your project is located in the following UDWR region(s): Central region

---

Report generated for:
Telford Myers
JWright Companies
357 West 6160 South
Murray, UT 84107
(801) 597-3598
telford@jwright.biz

UTAH DNR WILDLIFE RESOURCES

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Appendix E

USDA United States Department of Agriculture

NRCS Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Salt Lake Area, Utah

August 30, 2021

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Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

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Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

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Soil Map

Map Scale: 1:5,520 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 50, 100, 200, 300

Feet: 0, 250, 500, 1000, 1500

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

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MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Salt Lake Area, Utah
Survey Area Data: Version 13, Jun 8, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 5, 2018—Sep 14, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8019	Stepmount-Tickville complex, 8 to 20 percent slopes	75.6	86.7%
CA	Clayey terrace escarpments	9.9	11.4%
KsF2	Knutsen-Preston complex, 10 to 30 percent slopes	1.7	2.0%
Totals for Area of Interest		**87.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Salt Lake Area, Utah

8019—Stepmount-Tickville complex, 8 to 20 percent slopes

Map Unit Setting

National map unit symbol: 2tjt4
Elevation: 4,710 to 5,480 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 41 to 51 degrees F
Frost-free period: 70 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Stepmount and similar soils: 70 percent
Tickville and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stepmount

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium over residuum weathered from volcanic breccia

Typical profile

A1 - 0 to 2 inches: very stony loam
A2 - 2 to 11 inches: very cobbly loam
Btk - 11 to 19 inches: very cobbly loam
R - 19 to 29 inches: bedrock

Properties and qualities

Slope: 8 to 20 percent
Surface area covered with cobbles, stones or boulders: 15.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R047XA320UT - Upland Shallow Loam (Wyoming Big Sagebrush)

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Other vegetative classification: Upland Shallow Loam (Wyoming Big Sagebrush) (047XA320UT)
Hydric soil rating: No

Description of Tickville

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Slope alluvium and/or colluvium derived from andesite

Typical profile

A1 - 0 to 4 inches: very cobbly loam
A2 - 4 to 11 inches: very cobbly loam
Bt - 11 to 29 inches: extremely stony silty clay loam
R - 29 to 39 inches: bedrock

Properties and qualities

Slope: 8 to 20 percent
Surface area covered with cobbles, stones or boulders: 5.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: R047XA410UT - Mountain Gravelly Loam (Oak)
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

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CA—Clayey terrace escarpments

Map Unit Setting

National map unit symbol: j6gz
Elevation: 4,200 to 5,200 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 48 to 56 degrees F
Frost-free period: 130 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Clayey terrace escarpments: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clayey Terrace Escarpments

Setting

Landform: Escarpments on terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits

Interpretive groups

Land capability classification (irrigated): None specified
Ecological site: R028AY334UT - Upland Stony Loam (Wyoming Big Sagebrush)
Hydric soil rating: No

Minor Components

Hillfield

Percent of map unit: 6 percent

Taylorsville

Percent of map unit: 4 percent

KsF2—Knutsen-Preston complex, 10 to 30 percent slopes

Map Unit Setting

National map unit symbol: j6jr
Elevation: 4,700 to 5,150 feet
Mean annual precipitation: 16 to 19 inches

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Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 150 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Knutsen and similar soils: 55 percent
Preston and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Knutsen

Setting

Landform: Lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

Ap1&Ap2 - 0 to 8 inches: gravelly coarse sandy loam
B1 - 8 to 11 inches: gravelly coarse sandy loam
B2&B3 - 11 to 25 inches: gravelly coarse sandy loam
C1 - 25 to 33 inches: gravelly coarse sandy loam
C2 - 33 to 60 inches: stratified very gravelly sand to extremely gravelly sand

Properties and qualities

Slope: 10 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: R028AY306UT - Upland Gravelly Loam (Bonneville Big Sagebrush)
Hydric soil rating: No

Description of Preston

Setting

Landform: Lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits

Typical profile

A11 - 0 to 7 inches: sand

A12 - 7 to 19 inches: loamy fine sand
C1 - 19 to 30 inches: loamy fine sand
C2 - 30 to 80 inches: sand

Properties and qualities

Slope: 10 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: R028AY310UT - Upland Loam (Bonneville Big Sagebrush) North
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)
Hydric soil rating: No

Minor Components

Wasatch

Percent of map unit: 5 percent

Unnamed soils

Percent of map unit: 5 percent
Hydric soil rating: No

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Soil Information for All Uses

Ecological Sites

Individual soil map unit components can be correlated to a particular ecological site. The Ecological Site Assessment section includes ecological site descriptions, plant growth curves, state and transition models, and selected National Plants database information.

All Ecological Sites — (South Valley Rock Products)

An "ecological site" is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time; a characteristic hydrology, particularly infiltration and runoff, that has developed over time; and a characteristic plant community (kind and amount of vegetation). The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. For example, the hydrology of the site is influenced by development of the soil and plant community. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production.

An ecological site name provides a general description of a particular ecological site. For example, "Loamy Upland" is the name of a rangeland ecological site. An "ecological site ID" is the symbol assigned to a particular ecological site.

The map identifies the dominant ecological site for each map unit, aggregated by dominant condition. Other ecological sites may occur within each map unit. Each map unit typically consists of one or more components (soils and/or miscellaneous areas). Each soil component is associated with an ecological site. Miscellaneous areas, such as rock outcrop, sand dunes, and badlands, have little or no soil material and support little or no vegetation and therefore are not linked to an ecological site. The table below the map lists all of the ecological sites for each map unit component in your area of interest.

Map—Dominant Ecological Site (South Valley Rock Products)

Map Scale: 1:5,520 if printed on A portrait (8.5" x 11") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

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MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- R028AY306UT
- R028AY334UT
- R047XA320UT
- Not rated or not available

Soil Rating Lines
- R028AY306UT
- R028AY334UT
- R047XA320UT
- Not rated or not available

Soil Rating Points
- R028AY306UT
- R028AY334UT
- R047XA320UT
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Salt Lake Area, Utah
Survey Area Data: Version 13, Jun 8, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 5, 2018—Sep 14, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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Table—Ecological Sites by Map Unit Component (South Valley Rock Products)

Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
8019	Stepmount-Tickville complex, 8 to 20 percent slopes	Stepmount (70%)	R047XA320UT — Upland Shallow Loam (Wyoming Big Sagebrush)	75.6	86.7%
		Tickville (15%)	R047XA410UT — Mountain Gravelly Loam (Oak)		
		Unnamed soils (15%)			
CA	Clayey terrace escarpments	Clayey terrace escarpments (90%)	R028AY334UT — Upland Stony Loam (Wyoming Big Sagebrush)	9.9	11.4%
		HILLFIELD (6%)			
		Taylorsville (4%)			
KsF2	Knutsen-Preston complex, 10 to 30 percent slopes	Knutsen (55%)	R028AY306UT — Upland Gravelly Loam (Bonneville Big Sagebrush)	1.7	2.0%
		Preston (35%)	R028AY310UT — Upland Loam (Bonneville Big Sagebrush) North		
		Unnamed soils (5%)			
		WASATCH (5%)			
Totals for Area of Interest				**87.3**	**100.0%**

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Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the following National Soil Survey Handbook link: "National Soil Survey Handbook."

ABC soil

A soil having an A, a B, and a C horizon.

Ablation till

Loose, relatively permeable earthy material deposited during the downwasting of nearly static glacial ice, either contained within or accumulated on the surface of the glacier.

AC soil

A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil

The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil

Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone

A semiconical type of alluvial fan having very steep slopes. It is higher, narrower, and steeper than a fan and is composed of coarser and thicker layers of material deposited by a combination of alluvial episodes and (to a much lesser degree) landslides (debris flow). The coarsest materials tend to be concentrated at the apex of the cone.

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Alluvial fan

A low, outspread mass of loose materials and/or rock material, commonly with gentle slopes. It is shaped like an open fan or a segment of a cone. The material was deposited by a stream at the place where it issues from a narrow mountain valley or upland valley or where a tributary stream is near or at its junction with the main stream. The fan is steepest near its apex, which points upstream, and slopes gently and convexly outward (downstream) with a gradual decrease in gradient.

Alluvium

Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Alpha,alpha-dipyridyl

A compound that when dissolved in ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction implies reducing conditions and the likely presence of redoximorphic features.

Animal unit month (AUM)

The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions

Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon

A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo

The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in unconsolidated material. It is usually dry but can be transformed into a temporary watercourse or short-lived torrent after heavy rain within the watershed.

Aspect

The direction toward which a slope faces. Also called slope aspect.

Association, soil

A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity)

The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low: 0 to 3
Low: 3 to 6
Moderate: 6 to 9
High: 9 to 12
Very high: More than 12

Backslope

The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Backswamp

A flood-plain landform. Extensive, marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces.

Badland

A landscape that is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes and narrow interfluves. Badlands develop on surfaces that have little or no vegetative cover overlying unconsolidated or poorly cemented materials (clays, silts, or sandstones) with, in some cases, soluble minerals, such as gypsum or halite.

Bajada

A broad, gently inclined alluvial piedmont slope extending from the base of a mountain range out into a basin and formed by the lateral coalescence of a series of alluvial fans. Typically, it has a broadly undulating transverse profile, parallel to the mountain front, resulting from the convexities of component fans. The term is generally restricted to constructional slopes of intermontane basins.

Basal area

The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation

The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope (geomorphology)

A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding plane

A planar or nearly planar bedding surface that visibly separates each successive layer of stratified sediment or rock (of the same or different lithology) from the preceding or following layer; a plane of deposition. It commonly marks a change in the circumstances of deposition and may show a parting, a color difference, a change in particle size, or various combinations of these. The term is commonly applied to any bedding surface, even one that is conspicuously bent or deformed by folding.

Bedding system

A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock

The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography

A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace

A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum

Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout (map symbol)

A saucer-, cup-, or trough-shaped depression formed by wind erosion on a preexisting dune or other sand deposit, especially in an area of shifting sand or loose soil or where protective vegetation is disturbed or destroyed. The adjoining accumulation of sand derived from the depression, where recognizable, is commonly included. Blowouts are commonly small.

Borrow pit (map symbol)

An open excavation from which soil and underlying material have been removed, usually for construction purposes.

Bottom land

An informal term loosely applied to various portions of a flood plain.

Boulders

Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks

A landscape or tract of steep, rough or broken land dissected by ravines and gullies and marking a sudden change in topography.

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Breast height

An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management

Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Butte

An isolated, generally flat-topped hill or mountain with relatively steep slopes and talus or precipitous cliffs and characterized by summit width that is less than the height of bounding escarpments; commonly topped by a caprock of resistant material and representing an erosion remnant carved from flat-lying rocks.

Cable yarding

A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil

A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche

A general term for a prominent zone of secondary carbonate accumulation in surficial materials in warm, subhumid to arid areas. Caliche is formed by both geologic and pedologic processes. Finely crystalline calcium carbonate forms a nearly continuous surface-coating and void-filling medium in geologic (parent) materials. Cementation ranges from weak in nonindurated forms to very strong in indurated forms. Other minerals (e.g., carbonates, silicate, and sulfate) may occur as accessory cements. Most petrocalcic horizons and some calcic horizons are caliche.

California bearing ratio (CBR)

The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy

The leafy crown of trees or shrubs. (See Crown.)

Canyon

A long, deep, narrow valley with high, precipitous walls in an area of high local relief.

Capillary water

Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena

A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material and under similar climatic conditions but that have different characteristics as a result of differences in relief and drainage.

Cation

An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity

The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps

See Terracettes.

Cement rock

Shaly limestone used in the manufacture of cement.

Channery soil material

Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment

Control of unwanted vegetation through the use of chemicals.

Chiseling

Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Cirque

A steep-walled, semicircular or crescent-shaped, half-bowl-like recess or hollow, commonly situated at the head of a glaciated mountain valley or high on the side of a mountain. It was produced by the erosive activity of a mountain glacier. It commonly contains a small round lake (tarn).

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Clay

As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions

See Redoximorphic features.

Clay film

A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clay spot (map symbol)

A spot where the surface texture is silty clay or clay in areas where the surface layer of the soils in the surrounding map unit is sandy loam, loam, silt loam, or coarser.

Claypan

A dense, compact subsoil layer that contains much more clay than the overlying materials, from which it is separated by a sharply defined boundary. The layer restricts the downward movement of water through the soil. A claypan is commonly hard when dry and plastic and sticky when wet.

Climax plant community

The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil

Sand or loamy sand.

Cobble (or cobblestone)

A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material

Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility)

See Linear extensibility.

Colluvium

Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local, unconcentrated runoff.

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Complex slope

Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil

A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions

See Redoximorphic features.

Conglomerate

A coarse grained, clastic sedimentary rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system

Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage

A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil

Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping

Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section

The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat)

A type of limnic layer composed predominantly of fecal material derived from aquatic animals.

Corrosion (geomorphology)

A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations)

Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop

A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management

Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system

Growing crops according to a planned system of rotation and management practices.

Cross-slope farming

Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown

The upper part of a tree or shrub, including the living branches and their foliage.

Cryoturbate

A mass of soil or other unconsolidated earthy material moved or disturbed by frost action. It is typically coarser than the underlying material.

Cuesta

An asymmetric ridge capped by resistant rock layers of slight or moderate dip (commonly less than 15 percent slopes); a type of homocline produced by differential erosion of interbedded resistant and weak rocks. A cuesta has a long, gentle slope on one side (dip slope) that roughly parallels the inclined beds; on the other side, it has a relatively short and steep or clifflike slope (scarp) that cuts through the tilted rocks.

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Culmination of the mean annual increment (CMAI)

The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave

The walls of excavations tend to cave in or slough.

Decreasers

The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing

Postponing grazing or resting grazing land for a prescribed period.

Delta

A body of alluvium having a surface that is fan shaped and nearly flat; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer

A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depression, closed (map symbol)

A shallow, saucer-shaped area that is slightly lower on the landscape than the surrounding area and that does not have a natural outlet for surface drainage.

Depth, soil

Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Desert pavement

A natural, residual concentration or layer of wind-polished, closely packed gravel, boulders, and other rock fragments mantling a desert surface. It forms where wind action and sheetwash have removed all smaller particles or where rock fragments have migrated upward through sediments to the surface. It typically protects the finer grained underlying material from further erosion.

Diatomaceous earth

A geologic deposit of fine, grayish siliceous material composed chiefly or entirely of the remains of diatoms.

Dip slope

A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace)

A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming

A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural)

Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface

Runoff, or surface flow of water, from an area.

Drainageway

A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Draw

A small stream valley that generally is shallower and more open than a ravine or gulch and that has a broader bottom. The present stream channel may appear inadequate to have cut the drainageway that it occupies.

Drift

A general term applied to all mineral material (clay, silt, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or transported by running water emanating from a glacier. Drift includes unstratified material (till) that forms moraines and stratified deposits that form outwash plains, eskers, kames, varves, and glaciofluvial sediments. The term is generally applied to Pleistocene glacial deposits in areas that no longer contain glaciers.

Drumlin

A low, smooth, elongated oval hill, mound, or ridge of compact till that has a core of bedrock or drift. It commonly has a blunt nose facing the direction from which the ice approached and a gentler slope tapering in the other direction. The longer axis is parallel to the general direction of glacier flow. Drumlins are products of streamline (laminar) flow of glaciers, which molded the subglacial floor through a combination of erosion and deposition.

Duff

A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune

A low mound, ridge, bank, or hill of loose, windblown granular material (generally sand), either barren and capable of movement from place to place or covered and stabilized with vegetation but retaining its characteristic shape.

Earthy fill

See Mine spoil.

Ecological site

An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eluviation

The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation

A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian deposit

Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.

Ephemeral stream

A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation

A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion

The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (accelerated)

Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion (geologic)

Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion pavement

A surficial lag concentration or layer of gravel and other rock fragments that remains on the soil surface after sheet or rill erosion or wind has removed the finer soil particles and that tends to protect the underlying soil from further erosion.

Erosion surface

A land surface shaped by the action of erosion, especially by running water.

Escarpment

A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Escarpment, bedrock (map symbol)

A relatively continuous and steep slope or cliff, produced by erosion or faulting, that breaks the general continuity of more gently sloping land surfaces. Exposed material is hard or soft bedrock.

Escarpment, nonbedrock (map symbol)

A relatively continuous and steep slope or cliff, generally produced by erosion but in some places produced by faulting, that breaks the continuity of more gently sloping land surfaces. Exposed earthy material is nonsoil or very shallow soil.

Esker

A long, narrow, sinuous, steep-sided ridge of stratified sand and gravel deposited as the bed of a stream flowing in an ice tunnel within or below the ice (subglacial) or between ice walls on top of the ice of a wasting glacier and left

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behind as high ground when the ice melted. Eskers range in length from less than a kilometer to more than 160 kilometers and in height from 3 to 30 meters.

Extrusive rock

Igneous rock derived from deep-seated molten matter (magma) deposited and cooled on the earth’s surface.

Fallow

Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan remnant

A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, that have been either dissected or partially buried.

Fertility, soil

The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat)

The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity

The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope

A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil

Sandy clay, silty clay, or clay.

Firebreak

An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom

An obsolete, informal term loosely applied to the lowest flood-plain steps that are subject to regular flooding.

Flaggy soil material

Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone

A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain

The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

Flood-plain landforms

A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.

Flood-plain splay

A fan-shaped deposit or other outspread deposit formed where an overloaded stream breaks through a levee (natural or artificial) and deposits its material (commonly coarse grained) on the flood plain.

Flood-plain step

An essentially flat, terrace-like alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface still actively modified by fluvial scour and/or deposition. May occur individually or as a series of steps.

Fluvial

Of or pertaining to rivers or streams; produced by stream or river action.

Foothills

A region of steeply sloping hills that fringes a mountain range or high-plateau escarpment. The hills have relief of as much as 1,000 feet (300 meters).

Footslope

The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb

Any herbaceous plant not a grass or a sedge.

Forest cover

All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type

A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan

A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil

The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai

Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glaciofluvial deposits

Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur in the form of outwash plains, valley trains, deltas, kames, eskers, and kame terraces.

Glaciolacustrine deposits

Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are bedded or laminated.

Gleyed soil

Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping

Growing crops in strips that grade toward a protected waterway.

Grassed waterway

A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel

Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravel pit (map symbol)

An open excavation from which soil and underlying material have been removed and used, without crushing, as a source of sand or gravel.

Gravelly soil material

Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Gravelly spot (map symbol)

A spot where the surface layer has more than 35 percent, by volume, rock fragments that are mostly less than 3 inches in diameter in an area that has less than 15 percent rock fragments.

Green manure crop (agronomy)

A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water

Water filling all the unblocked pores of the material below the water table.

Gully (map symbol)

A small, steep-sided channel caused by erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage whereas a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock

Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to reclaim

Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Hardpan

A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head slope (geomorphology)

A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat)

Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops

Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill

A generic term for an elevated area of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.

Hillslope

A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of a hill.

Horizon, soil

A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon: An organic layer of fresh and decaying plant residue.

L horizon: A layer of organic and mineral limnic materials, including coprogenous earth (sedimentary peat), diatomaceous earth, and marl.

A horizon: The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon: The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon: The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon: The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon: Soft, consolidated bedrock beneath the soil.

R layer: Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

M layer: A root-limiting subsoil layer consisting of nearly continuous, horizontally oriented, human-manufactured materials.

W layer: A layer of water within or beneath the soil.

Humus

The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups

Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties include depth to a seasonal high water table, the infiltration rate, and depth to a layer that significantly restricts the downward movement of water. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock

Rock that was formed by cooling and solidification of magma and that has not been changed appreciably by weathering since its formation. Major varieties include plutonic and volcanic rock (e.g., andesite, basalt, and granite).

Illuviation

The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil

A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers

Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration

The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity

The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate

The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate

The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Very low: Less than 0.2
Low: 0.2 to 0.4
Moderately low: 0.4 to 0.75
Moderate: 0.75 to 1.25
Moderately high: 1.25 to 1.75
High: 1.75 to 2.5
Very high: More than 2.5

Interfluve

A landform composed of the relatively undissected upland or ridge between two adjacent valleys containing streams flowing in the same general direction. An elevated area between two drainageways that sheds water to those drainageways.

Interfluve (geomorphology)

A geomorphic component of hills consisting of the uppermost, comparatively level or gently sloping area of a hill; shoulders of backwearing hillslopes can narrow the upland or can merge, resulting in a strongly convex shape.

Intermittent stream

A stream, or reach of a stream, that does not flow year-round but that is commonly dry for 3 or more months out of 12 and whose channel is generally below the local water table. It flows only during wet periods or when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders

On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions

See Redoximorphic features.

Irrigation

Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin: Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border: Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding: Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation: Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle): Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow: Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler: Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation: Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding: Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame

A low mound, knob, hummock, or short irregular ridge composed of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier; by a supraglacial stream in a low place or hole on the surface of the glacier; or as a ponded deposit on the surface or at the margin of stagnant ice.

Karst (topography)

A kind of topography that formed in limestone, gypsum, or other soluble rocks by dissolution and that is characterized by closed depressions, sinkholes, caves, and underground drainage.

Knoll

A small, low, rounded hill rising above adjacent landforms.

Ksat

See Saturated hydraulic conductivity.

Lacustrine deposit

Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain

A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace

A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Landfill (map symbol)

An area of accumulated waste products of human habitation, either above or below natural ground level.

Landslide

A general, encompassing term for most types of mass movement landforms and processes involving the downslope transport and outward deposition of soil and rock materials caused by gravitational forces; the movement may or may not involve saturated materials. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones

Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lava flow (map symbol)

A solidified, commonly lobate body of rock formed through lateral, surface outpouring of molten lava from a vent or fissure.

Leaching

The removal of soluble material from soil or other material by percolating water.

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Levee (map symbol)

An embankment that confines or controls water, especially one built along the banks of a river to prevent overflow onto lowlands.

Linear extensibility

Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit

The moisture content at which the soil passes from a plastic to a liquid state.

Loam

Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess

Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Low strength

The soil is not strong enough to support loads.

Low-residue crops

Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Marl

An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal proportions; formed primarily under freshwater lacustrine conditions but also formed in more saline environments.

Marsh or swamp (map symbol)

A water-saturated, very poorly drained area that is intermittently or permanently covered by water. Sedges, cattails, and rushes are the dominant vegetation in marshes, and trees or shrubs are the dominant vegetation in swamps. Not used in map units where the named soils are poorly drained or very poorly drained.

Mass movement

A generic term for the dislodgment and downslope transport of soil and rock material as a unit under direct gravitational stress.

Masses

See Redoximorphic features.

Meander belt

The zone within which migration of a meandering channel occurs; the flood-plain area included between two imaginary lines drawn tangential to the outer bends of active channel loops.

Meander scar

A crescent-shaped, concave or linear mark on the face of a bluff or valley wall, produced by the lateral erosion of a meandering stream that impinged upon and undercut the bluff.

Meander scroll

One of a series of long, parallel, close-fitting, crescent-shaped ridges and troughs formed along the inner bank of a stream meander as the channel migrated laterally down-valley and toward the outer bank.

Mechanical treatment

Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil

Very fine sandy loam, loam, silt loam, or silt.

Mesa

A broad, nearly flat topped and commonly isolated landmass bounded by steep slopes or precipitous cliffs and capped by layers of resistant, nearly horizontal rocky material. The summit width is characteristically greater than the height of the bounding escarpments.

Metamorphic rock

Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement at depth in the earth's crust. Nearly all such rocks are crystalline.

Mine or quarry (map symbol)

An open excavation from which soil and underlying material have been removed and in which bedrock is exposed. Also denotes surface openings to underground mines.

Mine spoil

An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation. Also called earthy fill.

Mineral soil

Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage

Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area

A kind of map unit that has little or no natural soil and supports little or no vegetation.

Miscellaneous water (map symbol)

Small, constructed bodies of water that are used for industrial, sanitary, or mining applications and that contain water most of the year.

Moderately coarse textured soil

Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil

Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon

A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine

In terms of glacial geology, a mound, ridge, or other topographically distinct accumulation of unsorted, unstratified drift, predominantly till, deposited primarily by the direct action of glacial ice in a variety of landforms. Also, a general term for a landform composed mainly of till (except for kame moraines, which are composed mainly of stratified outwash) that has been deposited by a glacier. Some types of moraines are disintegration, end, ground, kame, lateral, recessional, and terminal.

Morphology, soil

The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil

Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain

A generic term for an elevated area of the land surface, rising more than 1,000 feet (300 meters) above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are formed primarily by tectonic activity and/or volcanic action but can also be formed by differential erosion.

Muck

Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mucky peat

See Hemic soil material.

Mudstone

A blocky or massive, fine grained sedimentary rock in which the proportions of clay and silt are approximately equal. Also, a general term for such material as clay, silt, claystone, siltstone, shale, and argillite and that should be used only when the amounts of clay and silt are not known or cannot be precisely identified.

Munsell notation

A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon

A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil

A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules

See Redoximorphic features.

Nose slope (geomorphology)

A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

Nutrient, plant

Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter

Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low: Less than 0.5 percent
Low: 0.5 to 1.0 percent
Moderately low: 1.0 to 2.0 percent
Moderate: 2.0 to 4.0 percent
High: 4.0 to 8.0 percent
Very high: More than 8.0 percent

Outwash

Stratified and sorted sediments (chiefly sand and gravel) removed or “washed out” from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of a glacier. The coarser material is deposited nearer to the ice.

Outwash plain

An extensive lowland area of coarse textured glaciofluvial material. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace

An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan

A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material

The unconsolidated organic and mineral material in which soil forms.

Peat

Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped

An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment

A layer of sediment, eroded from the shoulder and backslope of an erosional slope, that lies on and is being (or was) transported across a gently sloping erosional surface at the foot of a receding hill or mountain slope.

Pedon

The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

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Percolation

The movement of water through the soil.

Perennial water (map symbol)

Small, natural or constructed lakes, ponds, or pits that contain water most of the year.

Permafrost

Ground, soil, or rock that remains at or below 0 degrees C for at least 2 years. It is defined on the basis of temperature and is not necessarily frozen.

pH value

A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil

A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Piping

Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting

Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plastic limit

The moisture content at which a soil changes from semisolid to plastic.

Plasticity index

The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plateau (geomorphology)

A comparatively flat area of great extent and elevation; specifically, an extensive land region that is considerably elevated (more than 100 meters) above the adjacent lower lying terrain, is commonly limited on at least one side by an abrupt descent, and has a flat or nearly level surface. A comparatively large part of a plateau surface is near summit level.

Playa

The generally dry and nearly level lake plain that occupies the lowest parts of closed depressions, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff. Playa deposits are fine grained and may or may not have a high water table and saline conditions.

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Plinthite

The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan

A compacted layer formed in the soil directly below the plowed layer.

Ponding

Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded

Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Pore linings

See Redoximorphic features.

Potential native plant community

See Climax plant community.

Potential rooting depth (effective rooting depth)

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning

Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil

The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil

A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use

Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland

Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil

A measure of acidity or alkalinity of a soil, expressed as pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid: Less than 3.5

Extremely acid: 3.5 to 4.4

Very strongly acid: 4.5 to 5.0

Strongly acid: 5.1 to 5.5

Moderately acid: 5.6 to 6.0

Slightly acid: 6.1 to 6.5

Neutral: 6.6 to 7.3

Slightly alkaline: 7.4 to 7.8

Moderately alkaline: 7.9 to 8.4

Strongly alkaline: 8.5 to 9.0

Very strongly alkaline: 9.1 and higher

Red beds

Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations

See Redoximorphic features.

Redoximorphic depletions

See Redoximorphic features.

Redoximorphic features

Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:
   - A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*
   - B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*
   - C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.
2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:
   - A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*
   - B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletans).
3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix

See Redoximorphic features.

Regolith

All unconsolidated earth materials above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits.

Relief

The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material)

Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Rill

A very small, steep-sided channel resulting from erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. A rill generally is not an obstacle to wheeled vehicles and is shallow enough to be smoothed over by ordinary tillage.

Riser

The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

Road cut

A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments

Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop (map symbol)

An exposure of bedrock at the surface of the earth. Not used where the named soils of the surrounding map unit are shallow over bedrock or where “Rock outcrop” is a named component of the map unit.

Root zone

The part of the soil that can be penetrated by plant roots.

Runoff

The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil

A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Saline spot (map symbol)

An area where the surface layer has an electrical conductivity of 8 mmhos/cm more than the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has an electrical conductivity of 2 mmhos/cm or less.

Sand

As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone

Sedimentary rock containing dominantly sand-sized particles.

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Sandy spot (map symbol)

A spot where the surface layer is loamy fine sand or coarser in areas where the surface layer of the named soils in the surrounding map unit is very fine sandy loam or finer.

Sapric soil material (muck)

The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturated hydraulic conductivity (Ksat)

The ease with which pores of a saturated soil transmit water. Formally, the proportionality coefficient that expresses the relationship of the rate of water movement to hydraulic gradient in Darcy's Law, a law that describes the rate of water movement through porous media. Commonly abbreviated as "Ksat." Terms describing saturated hydraulic conductivity are:

Very high: 100 or more micrometers per second (14.17 or more inches per hour)

High: 10 to 100 micrometers per second (1.417 to 14.17 inches per hour)

Moderately high: 1 to 10 micrometers per second (0.1417 inch to 1.417 inches per hour)

Moderately low: 0.1 to 1 micrometer per second (0.01417 to 0.1417 inch per hour)

Low: 0.01 to 0.1 micrometer per second (0.001417 to 0.01417 inch per hour)

Very low: Less than 0.01 micrometer per second (less than 0.001417 inch per hour).

To convert inches per hour to micrometers per second, multiply inches per hour by 7.0572. To convert micrometers per second to inches per hour, multiply micrometers per second by 0.1417.

Saturation

Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification

The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Sedimentary rock

A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

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Sequum

A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil

A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Severely eroded spot (map symbol)

An area where, on the average, 75 percent or more of the original surface layer has been lost because of accelerated erosion. Not used in map units in which “severely eroded,” “very severely eroded,” or “gullied” is part of the map unit name.

Shale

Sedimentary rock that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion

The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Short, steep slope (map symbol)

A narrow area of soil having slopes that are at least two slope classes steeper than the slope class of the surrounding map unit.

Shoulder

The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.

Shrink-swell

The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Shrub-coppice dune

A small, streamlined dune that forms around brush and clump vegetation.

Side slope (geomorphology)

A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

Silica

A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio

The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt

As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone

An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.

Similar soils

Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole (map symbol)

A closed, circular or elliptical depression, commonly funnel shaped, characterized by subsurface drainage and formed either by dissolution of the surface of underlying bedrock (e.g., limestone, gypsum, or salt) or by collapse of underlying caves within bedrock. Complexes of sinkholes in carbonate-rock terrain are the main components of karst topography.

Site index

A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides (pedogenic)

Grooved, striated, and/or glossy (shiny) slip faces on structural peds, such as wedges; produced by shrink-swell processes, most commonly in soils that have a high content of expansive clays.

Slide or slip (map symbol)

A prominent landform scar or ridge caused by fairly recent mass movement or descent of earthy material resulting from failure of earth or rock under shear stress along one or several surfaces.

Slope

The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

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Slope alluvium

Sediment gradually transported down the slopes of mountains or hills primarily by nonchannel alluvial processes (i.e., slope-wash processes) and characterized by particle sorting. Lateral particle sorting is evident on long slopes. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. Burnished peds and sorting of rounded or subrounded pebbles or cobbles distinguish these materials from unsorted colluvial deposits.

Slow refill

The slow filling of ponds, resulting from restricted water transmission in the soil.

Slow water movement

Restricted downward movement of water through the soil. See Saturated hydraulic conductivity.

Sodic (alkali) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodic spot (map symbol)

An area where the surface layer has a sodium adsorption ratio that is at least 10 more than that of the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has a sodium adsorption ratio of 5 or less.

Sodicity

The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to Ca^{++} + Mg^{++}. The degrees of sodicity and their respective ratios are:

Slight: Less than 13:1

Moderate: 13-30:1

Strong: More than 30:1

Sodium adsorption ratio (SAR)

A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock

Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil

A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates

Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand: 2.0 to 1.0

Coarse sand: 1.0 to 0.5

Medium sand: 0.5 to 0.25

Fine sand: 0.25 to 0.10

Very fine sand: 0.10 to 0.05

Silt: 0.05 to 0.002

Clay: Less than 0.002

Solum

The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Spoil area (map symbol)

A pile of earthy materials, either smoothed or uneven, resulting from human activity.

Stone line

In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial. Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

Stones

Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony

Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stony spot (map symbol)

A spot where 0.01 to 0.1 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surrounding soil has no surface stones.

Strath terrace

A type of stream terrace; formed as an erosional surface cut on bedrock and thinly mantled with stream deposits (alluvium).

Stream terrace

One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

Stripcropping

Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil

The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are:

Platy: Flat and laminated
Prismatic: Vertically elongated and having flat tops
Columnar: Vertically elongated and having rounded tops
Angular blocky: Having faces that intersect at sharp angles (planes)
Subangular blocky: Having subrounded and planar faces (no sharp angles)
Granular: Small structural units with curved or very irregular faces

Structureless soil horizons are defined as follows:

Single grained: Entirely noncoherent (each grain by itself), as in loose sand
Massive: Occurring as a coherent mass

Stubble mulch

Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil

Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling

Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum

The part of the soil below the solum.

Subsurface layer

Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow

The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit

The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer

The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil

The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus

Rock fragments of any size or shape (commonly coarse and angular) derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts

Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine

An end moraine that marks the farthest advance of a glacier. It typically has the form of a massive arcuate or concentric ridge, or complex of ridges, and is underlain by till and other types of drift.

Terrace (conservation)

An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geomorphology)

A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Terracettes

Small, irregular steplike forms on steep hillslopes, especially in pasture, formed by creep or erosion of surficial materials that may be induced or enhanced by trampling of livestock, such as sheep or cattle.

Texture, soil

The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer

Otherwise suitable soil material that is too thin for the specified use.

Till

Dominantly unsorted and nonstratified drift, generally unconsolidated and deposited directly by a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders; rock fragments of various lithologies are embedded within a finer matrix that can range from clay to sandy loam.

Till plain

An extensive area of level to gently undulating soils underlain predominantly by till and bounded at the distal end by subordinate recessional or end moraines.

Tilth, soil

The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope

The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil

The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements

Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread

The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Tuff

A generic term for any consolidated or cemented deposit that is 50 percent or more volcanic ash.

Upland

An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Valley fill

The unconsolidated sediment deposited by any agent (water, wind, ice, or mass wasting) so as to fill or partly fill a valley.

Variegation

Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve

A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very stony spot (map symbol)

A spot where 0.1 to 3.0 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surface of the surrounding soil is covered by less than 0.01 percent stones.

Water bars

Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering

All physical disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered material.

Well graded

Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wet spot (map symbol)

A somewhat poorly drained to very poorly drained area that is at least two drainage classes wetter than the named soils in the surrounding map unit.

Wilting point (or permanent wilting point)

The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow

The uprooting and tipping over of trees by the wind.

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Appendix F

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Utah Department of
Environmental Quality

195 North 1950 West
Salt Lake City, Utah 84114-4820
Attn: DAQ, Fugitive Dust Control Plan

Fugitive Dust Control Plan Application

Applicants have the option to complete the online dust control plan on the DEQ Online Services webpage or to submit a hard copy application.

Activities regulated by R307-309 may not commence before obtaining approval of the fugitive dust control plan. Therefore, online filing is encouraged because it provides instant approval.

Blank spaces must be completed for the application to be processed. If not applicable, enter N/A.

1. Applicant Information

Name:	Param Ghuman
Address:	357 W 6160 S Murray, UT 84107
Phone:	8013022200
Email:	param@jwright.biz
Applicant Type:	

2. Project Information

Project Name:	South Valley Rock Products
Address:	14822 S Juniper Crest Rd HERRIMAN, UT 84096
County:	SALT LAKE
Directions:	South Bound Mountain View Corridor, approximately 1000 FT South of mile marker 6, on the west side
Acreage:	23.5
Latitude:	40.481111
Longitude:	111.990278

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3. Point of Contact

Name: Param Ghuman

Company Name: JWright Companies Inc.

Address: 357 W 6160 S Murray, UT 84107

Phone: 8013022200

Fax:

Cell:

4. On-site Superintendent/Supervisor/Foreman Contact

Name: Colton Burton

Company Name: JWright Companies Inc

On-Site Phone: 3852662001

Cell:

5. By signing this permit application I certify that:

A. I am authorized, on behalf of the individual or company listed in Section 1, as Applicant, to apply for a Fugitive Dust Control Plan and to commit to all of the terms and conditions of the requested plan.

B. Construction activities will be limited to lands that the applicant either owns or is authorized to use for construction activities.

C. The applicant accepts responsibility for assuring that all contractors, subcontractors, and all other persons on the construction site covered by this plan, comply with the terms and conditions of the Fugitive Dust Control Plan.

D. I understand that any false material statement, representation or certification made in this application may invalidate the plan or cause me to be subject to enforcement action pursuant to Utah Code Ann. 19-2-115.

E. Failure to comply with fugitive dust rules may result in compliance action and penalties up to $10,000 per violation/day.

Date: 10/11/2019
Printed Name: Param Ghuman
Title: null
Company Name: JWright Companies Inc.
Dust Plan Number: 22375

Dust Suppressants

	Check All that Apply
	Clay additives.
	Calcium chloride.
	Lime (calcium oxide).
	Magnesium chloride.
	Organic non-petroleum products, (ligninsulfonate, tall (pine) oil, and vegetable derivatives).
	Synthetic polymers (for example; polyvinyl acetate and vinyl acrylic).

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FUGITIVE DUST CONTROL PLAN

PROJECT ACTIVITIES CHECKLIST INSTRUCTIONS:

PLACE A CHECK MARK NEXT TO EVERY ACTIVITY THAT WILL BE CONDUCTED ON THIS SITE, FOR EACH CHECKED ACTIVITY, COMPLETE THE CORRESPONDING CONTROL MEASURES/BEST MANAGEMENT PRACTICE (BMP) SELECTION PAGE. WHEN COMPLETED, YOU WILL HAVE THE OPTION TO PRINT THE ENTIRE PLAN.

	Project Activity	Check All that Apply
01	Backfilling area previously excavated or trenched.	
02	Blasting soil & rock - drilling and blasting.	**X**
03	Clearing for site preparation and vacant land cleanup.	
04	Clearing forms, foundations, slab clearing and cleaning of forms, foundations and slabs prior to pouring concrete.	
05	Crushing of construction and demolition debris, rock and soil.	**X**
06	Cut and fill soils for site grade preparation.	
07	Demolition - Implosive demolition of a structure, using explosives.	
08	Demolition - mechanical/manual demolition of walls, stucco, concrete, freestanding structures, buildings and other structures.	
09	Disturbed soil throughout project including between structures. THIS ACTIVITY MUST BE SELECTED FOR ALL PROJECTS.	**X**
10	Disturbed land - long term stabilization and erosion control of large tracts of disturbed land that will not have continuing activity for more than 30 days.	**X**
11	Hauling materials.	**X**
12	Paving/subgrade preparation for paving streets, parking lots, etc.	
13	Sawing/cutting material, concrete, asphalt, block or pipe.	
14	Screening of rock, soil or construction debris.	**X**
15	Staging areas, equipment storage, vehicle parking lots, and material storage areas.	**X**
16	Stockpiles materials (storage), other soils, rock or debris, for future use or export.	**X**
17	Tailings piles, ponds and erosion control.	

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18	Trackout Prevention and Cleanup of mud, silt and soil tracked out onto paved roads.	**X**
19	Traffic - unpaved routes and parking, construction related traffic on unpaved interior and/or access roads and unpaved employee/worker parking areas.	**X**
20	Trenching with track or wheel mounted excavator, shovel, backhoe or trencher.	
21	Truck loading with materials including construction and demolition debris, rock and soil.	**X**

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Blasting soil & rock - drilling and blasting.	BMP 02

GENERAL REQUIREMENT: ALL ACTIVITIES MUST MEET OPACITY REQUIREMENTS IN R307-309-5

MAKE AT LEAST ONE SELECTION FROM EACH SECTION.

Stabilize surface soils where drills, support equipment and vehicles will operate.

X 02-01	Pre-water and maintain surface soils in a stabilized condition.
_ 02-02	Apply and maintain a chemical stabilizer on surface soils.

Stabilize soil during blast preparation activities.

X 02-03	Limit the blast footprint area to no larger than what can be practically stabilized immediately following the blast.
X 02-04	Maintain surface rock and vegetation where possible to reduce exposure of disturbed soil to wind.

Stabilize soil after blasting.

X 02-05	Water disturbed soils to form crust immediately following blast and safety clearance.
_ 02-06	Apply and maintain a chemical stabilizer to form crust immediately following blast and safety clearance.

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Crushing of construction and demolition debris, rock and soil.	**BMP 05**

If you have crushers and screening on site, you may be subject to the federal requirements contained in New Source Performance Standards Subpart OOO. It is advised that you read this subpart to determine if these requirements apply to you. Please note that Subpart OOO is NOT included in this Dust Control Plan submission. The link to Subpart OOO is listed below:

http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=4bb7745b4e567b604ad681bc2a46eec2&rgn=div6&view=text&node=40:6.0.1.1.1.80&idno=40

GENERAL REQUIREMENT: ALL ACTIVITIES MUST MEET OPACITY REQUIREMENTS IN R307-309-5

MAKE AT LEAST ONE SELECTION FROM EACH SECTION.

Stabilize surface soils where support equipment and vehicles will operate.

X 05-01	Pre-water and maintain surface soils in a stabilized condition.
_ 05-02	Apply and maintain a chemical stabilizer to surface soils.
_ 05-03	Pave operational area(s).

Stabilize material before crushing.

X 05-04	Pre-water material.
_ 05-05	Test material to determine moisture content and silt loading, crush only material that is at optimum moisture content.

Stabilize material during crushing.

X 05-06	Apply water to stabilize material so as to maintain compliance with opacity standards and permit conditions.
_ 05-07	Monitor opacity. Make adjustments to maintain compliance with opacity standards and permit conditions.
_ 05-08	Install wind break or use enclosure.

Stabilize material after crushing.

X 05-09	Water crushed material immediately following crushing.
_ 05-10	Apply and maintain a chemical stabilizer to crushed material.
_ 05-11	Maintain in enclosure.

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_	05-12	Minimize height of stockpile.

Traffic.

_	05-13	Minimize vehicle miles.
_	05-14	Reduce truck traffic.
X	05-15	Reduce truck speed.

Transfer height.

X	05-16	Minimize transfer and drop point height.

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Disturbed soil throughout project including between structures. THIS ACTIVITY MUST BE SELECTED FOR ALL PROJECTS.	**BMP 09**

GENERAL REQUIREMENT: ALL ACTIVITIES MUST MEET OPACITY REQUIREMENTS IN R307-309-5

MAKE AT LEAST ONE SELECTION FROM EACH SECTION.

Limit disturbance of soils where possible.

X 09-01	Limit disturbance of soils with the use of fencing, barriers, barricades, and/or wind barriers.
_ 09-02	Limit vehicle mileage and reduce speed.

Stabilize and maintain stability of all disturbed soil throughout construction site.

X 09-03	Apply water to stabilize disturbed soils. Soil moisture must be maintained such that soils can be worked without generating fugitive dust.
_ 09-04	Apply and maintain a chemical stabilizer.
_ 09-05	Use wind breaks.
_ 09-06	Apply cover (natural or synthetic).

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Disturbed land - long term stabilization and erosion control of large tracts of disturbed land that will not have continuing activity for more than 30 days.	**BMP 10**

GENERAL REQUIREMENT: ALL ACTIVITIES MUST MEET OPACITY REQUIREMENTS IN R307-309-5

MAKE AT LEAST ONE SELECTION FROM EACH SECTION.

Prevent access to limit soil disturbance.

X 10-01	Prevent access by fencing, ditches, vegetation, berms or other suitable barrier.

Stabilize soil.

_ 10-02	Apply and maintain a chemical stabilizer on disturbed soils.
_ 10-03	Stabilize disturbed soil with vegetation.
_ 10-04	Pave or apply surface rock.
_ 10-05	Use wind breaks.
X 10-06	Apply water and maintain soil moisture sufficient to avoid generating fugitive dust.

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Hauling materials.	**BMP 11**

GENERAL REQUIREMENT: ALL ACTIVITIES MUST MEET OPACITY REQUIREMENTS IN R307-309-5

MAKE AT LEAST ONE SELECTION FROM EACH SECTION.

Limit visible dust opacity from vehicular operations.

X 11-01	Apply and maintain water/chemical suppressant to operational areas and haul routes.
_ 11-02	Limit vehicle mileage and speed.

Stabilize materials during transport on site.

_ 11-03	Use tarps or other suitable enclosures on haul trucks.
X 11-04	Apply water prior to transport.

Clean wheels and undercarriage of haul trucks prior to leaving construction site.

_ 11-05	Clean wheels.
X 11-06	Sweep or water haul road.

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Screening of rock, soil or construction debris.	**BMP 14**

If you have crushers and screens on site, you may be subject to the federal requirements contained in New Source Performance Standards Subpart OOO. It is advised that you read this subpart to determine if these requirements apply to you. Please note that Subpart OOO is NOT included in this Dust Control Plan submission. The link to Subpart OOO is listed below:

http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=4bb7745b4e567b604ad681bc2a46eec2&rgn=div6&view=text&node=40:6.0.1.1.1.80&idno=40

GENERAL REQUIREMENT: ALL ACTIVITIES MUST MEET OPACITY REQUIREMENTS IN R307-309-5

MAKE AT LEAST ONE SELECTION FROM EACH SECTION.

Stabilize surface soils where support equipment and vehicles will operate.

X 14-01	Pre-water and maintain surface soils in a stabilized condition.
_ 14-02	Apply and maintain a chemical stabilizer on surface soils.
_ 14-03	Pave operational area(s).

Pre-treat material prior to screening.

X 14-04	Apply a dust suppressant to material.

Stabilize material during screening.

X 14-05	Dedicate water source to screening operation and apply water as needed to prevent dust.
_ 14-06	Install wind barrier upwind of screen as high as the drop point.

Stabilize material and surrounding area immediately after screening.

X 14-07	Apply water to stabilize screened material and surrounding area.
_ 14-08	Apply and maintain a chemical stabilizer to stabilize screened material and surrounding area.
_ 14-09	Minimize storage pile height.

Transfer height.

X 14-10	Drop material through the screen slowly and minimize drop height.

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Staging areas, equipment storage, vehicle parking lots, and material storage areas.	**BMP 15**

GENERAL REQUIREMENT: ALL ACTIVITIES MUST MEET OPACITY REQUIREMENTS IN R307-309-5

MAKE AT LEAST ONE SELECTION FROM EACH SECTION.

Limit visible dust opacity from vehicular operations.

_ 15-01	Limit vehicle mileage and speed.
X 15-02	Apply water on all vehicle traffic areas in the staging areas and unpaved access routes.

Stabilize staging area soils during use.

X 15-03	Pre-water and maintain surface soils in a stabilized condition.
_ 15-04	Apply and maintain a chemical stabilizer to surface soils.

Stabilize staging area soils at project completion.

_ 15-05	Apply a chemical stabilizer.
_ 15-06	Apply screened or washed aggregate.
_ 15-07	Use wind breaks.
_ 15-08	Pave.
_ 15-09	Completed project will cover staging area with buildings, paving, and/or landscaping.
X 15-10	Apply water to form adequate crust and prevent access.

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Stockpiles materials (storage), other soils, rock or debris, for future use or export.	BMP 16

GENERAL REQUIREMENT: ALL ACTIVITIES MUST MEET OPACITY REQUIREMENTS IN R307-309-5

MAKE AT LEAST ONE SELECTION FROM EACH SECTION.

Stabilize surface soils where support equipment and vehicles will operate.

X	16-01	Pre-water and maintain surface soils in a stabilized condition.
_	16-02	Apply and maintain a chemical stabilizer on surface soils.
_	16-03	Pave area.

Stabilize stockpile materials during handling.

X	16-04	Remove material from the downwind side of the stockpile, when safe to do so.
_	16-05	Reduce height.
_	16-06	Create wind screen

Stabilize stockpiles after handling.

X	16-07	Water stockpiles to form a crust immediately.
_	16-08	Apply and maintain a chemical stabilizer to all outer surfaces of the stockpiles.
_	16-09	Provide and maintain wind barriers on 3 sides of the pile.
_	16-10	Apply a cover (natural or synthetic)
_	16-11	Wind screen.
X	16-12	Avoid steep sides to prevent material sloughing.
X	16-13	Reduce height.

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Trackout Prevention and Cleanup of mud, silt and soil tracked out onto paved roads.	**BMP 18**

GENERAL REQUIREMENT: ALL ACTIVITIES MUST MEET OPACITY REQUIREMENTS IN R307-309-5

MAKE AT LEAST ONE SELECTION FROM EACH SECTION.

Prevent dust from trackout.

_ 18-01	Clean trackout at the end of the work shift from paved surfaces to maintain dust control
X 18-02	Maintain dust control during working hours and clean trackout from paved surfaces at the end of the work shift/day.
_ 18-03	Install gravel pad(s), clean, well-graded gravel or crushed rock. Minimum dimensions must be 30 feet wide by 3 inches deep, and, at minimum, 50' or the length of the longest haul truck, whichever is greater. Re-screen, wash or apply additional rock in gravel pad to maintain effectiveness.
_ 18-04	Install wheel shakers. Clean wheel shakers on a regular basis to maintain effectiveness.
_ 18-05	Install wheel washers. Maintain wheel washers on a regular basis to maintain effectiveness.
_ 18-06	Motorized vehicles will only operate on paved surfaces.
_ 18-07	Install cattle guard before paved road entrance.

All exiting traffic must be routed over selected trackout control device(s).

X 18-08	Clearly establish and enforce traffic patterns to route traffic over selected trackout control device(s).
_ 18-09	Limit site accessibility to routes with trackout control devices in place by installing effective barriers on unprotected routes.

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Traffic - unpaved routes and parking, construction related traffic on unpaved interior and/or access roads and unpaved employee/worker parking areas.	**BMP 19**

GENERAL REQUIREMENT: ALL ACTIVITIES MUST MEET OPACITY REQUIREMENTS IN R307-309-5

MAKE AT LEAST ONE SELECTION.

Stabilize surface soils where support equipment and vehicles will operate.

_	19-01	Limit vehicle mileage and speeds.
X	19-02	Apply and maintain water on surface soils.
_	19-03	Apply and maintain chemical stabilizers on surface soils.
_	19-04	Apply and maintain gravel on surface soils.
_	19-05	Supplement chemical stabilizers, water or aggregate applications as necessary.
_	19-06	Apply recycled asphalt (RAP) to surface soils.

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Truck loading with materials including construction and demolition debris, rock and soil.	BMP 21

GENERAL REQUIREMENT: ALL ACTIVITIES MUST MEET OPACITY REQUIREMENTS IN R307-309-5

MAKE AT LEAST ONE SELECTION.

X 21-01	Pre-water and maintain surface soils in a stabilized condition where loaders, support equipment and vehicles will operate.
_ 21-02	Apply and maintain a chemical stabilizer on surface soils where loaders, support equipment and vehicles will operate.
_ 21-03	Empty loader bucket slowly and keep loader bucket close to the truck to minimize the drop height while dumping.

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Appendix G

Storm Water Pollution Prevention Plan

for:

Herriman Crusher
14822 Juniper Crest Rd
Herriman, UT 84096
801-372-5571

Operator:

Innovative Excavating and Construction, LLC
Parambir Ghuman
PO Box 1844
Draper, UT 84020
801-372-5571
Db.innovative@gmail.com

Primary SWPPP Contact

Innovative Excavating and Construction, LLC
Parambir Ghuman
PO Box 1844
Draper, UT 84020
801-372-5571
Db.innovative@gmail.com

SWPPP Preparation Date:

04/09/2020

UPDES Permit Tracking Number*:

UTRC00271

**This is the unique number assigned to your project after you have applied for coverage under the Utah Pollutant Discharge Elimination System (UPDES) construction general permit. If this template is filled out first, you can leave the tracking number blank until after you have applied for coverage.*

Contents

SECTION 1: CONTACT INFORMATION/ RESPONSIBLE PARTIES

Instructions (CGP 7.3.1./7.3.7.):

- Identify the staff members that are part of the project's storm water team as well as their responsibilities. The storm water team is comprised of individuals who are responsible for the development of the SWPPP, any later modifications to it, installing and maintaining storm water controls, conducting site inspections, and making corrective actions where required.
- Each member of the storm water team must have ready access to either an electronic or paper copy of the 2019 CGP and the SWPPP.
- Starting January 1, 2021: A SWPPP writer for a site greater than 5 acres, with a perennial surface water within 50 feet of the project, or with a steep slope (70% or 35 degrees or more) must hold a certification to demonstrate that they are a "qualified person" per CGP Part 7.2.
- The following personnel, at a minimum, must receive training on their responsibilities (CGP Part 7.3.7/6.1):
  - ✓ Personnel who are responsible for the design, installation, maintenance, and/or repair of storm water controls (including pollution prevention measures);
  - ✓ Personnel responsible for the application and storage of treatment chemicals;
  - ✓ Personnel who are responsible for conducting inspections (must hold a certification) as required in Part 4.1.; and
  - ✓ Personnel who are responsible for taking corrective actions as required in Part 5.
- A sample training log is provided in Appendix F. Certifications can also be recorded in this appendix.
- For more on training, see *SWPPP Guide*, Chapter 8.

1.1 Storm Water Team

Name and/or Position, and Contact	Responsibilities, Qualifications, and Training
Mike Alter Innovative Excavating and Construction Chief Operating Officer 385-266-2001 mikea@jwright.biz	Over all manager of the operations
Anthony Flickinger Innovative Excavating and Construction Site Superintendent 801-386-6823 tonyf@jwright.biz	Site superintendent in charge of over seeing any repairs necessary
~~Vagner Soares~~ ~~Innovative Excavating and Construction~~ ~~Project Engineer~~ ~~801-638-7096~~ ~~vagner@jwright.biz~~	~~Weekly inspection and documentation~~ ~~Certifications in Appendix F~~
Josh Martin Innovative Excavating and Construction Project Engineer 801-903-7861 josh@jwright.biz	Weekly Inspection and Documentation Certifications in Appendix F

[Insert or delete rows as necessary.]

SECTION 2: NATURE OF CONSTRUCTION ACTIVITIES

2.1 Construction Site Estimates

Instructions (CGP 7.3.2.b.-c.):

- Estimate the area to be disturbed by excavation, grading, or other construction activities, including dedicated off-site borrow and fill areas.

The following are estimates for the construction site.

Total project area (lot size): 23.5acres
Construction site area to be disturbed: 10acres

2.2 Construction Activity Descriptions

Instructions (CGP 7.3.2.a., d. & g.):

- Briefly describe the nature of the construction activity and approximate time frames.
- For more information see CGP Part 7.3.2 and *SWPPP Guide*, Chapter 3.A.

Describe the general scope of the work for the project, major phases of construction, etc:
Excavation and grading for Juniper Crest Road alignment and gravel pit
Describe any on-site and off-site construction support activity areas:
N/A
Typical site business days and times:
Monday – Friday 7:00AM – 5:30 PM

2.3 Phase/Sequence of Construction Activity

Instructions (CGP 7.3.2.e.):

- Describe the intended construction sequencing and timing of major activities, including any opportunities for phasing grading and stabilization activities to minimize the overall amount of disturbed soil that will be subject to potential erosion at one time. Also, describe opportunities for timing grading and stabilization so that all or a majority of the soil disturbance occurs during a time of year with less erosion potential (i.e., during the dry or less windy season).
- For more information, see *SWPPP Guide*, Chapter 4, ESC Principle 2. It might be useful to develop a separate, detailed site map for each phase of construction.

Phase I

- Excavation and grading for Juniper Crest Road alignment and gravel pit
- 4/3/2020 – 3/31/2022
- Perimeter control with earthen berms and ditches, silt fence, stabilized entrance
- Perimeter control with earthen berms and ditches, silt fence, stabilized entrance

Phase II

- Describe phase and activities
- Duration of phase (start date, end date)
- List BMPs associated with this phase
- Describe stabilization methods for this phase (describe any temporary stabilization methods that will be used before final stabilization)

[Repeat as needed]

2.4 Maps

Instructions (CGP 7.3.3.):

- Attach site maps. For most projects, a series of site maps is recommended. The first should show the undeveloped site and its current features. An additional map or maps should be created to show the developed site or for more complicated sites show the major phases of development.

These maps should include the following:

- Boundaries of the property
- Locations of earth-disturbing activities, including demolition, and note any phasing;
- Direction(s) of storm water flow and approximate slopes before and after major grading activities;
- Type and extent of pre-construction cover (vegetative cover, pavement, etc.);
- Locations of stockpiles and material storage;
- Water crossings and all water of the state within one mile downstream of the site's discharge point;
- Designated points where vehicles enter onto paved roads;
- Locations of structures and other impervious surfaces upon completion of construction;
- On-site and off-site construction support activity areas covered by the permit;
- Storm water and authorized non-storm water discharge locations to inlets or waters of the state;
- Locations of all potential pollutant-generating activities;
- Locations of storm water controls, including natural buffer areas; and
- Locations where polymers, flocculants, or other treatment chemicals will be used and stored.
- For more information, see *SWPPP Guide*, Chapter 3.C.

The SWPPP site map(s) are filed in Appendix A

SECTION 3: WATER QUALITY

3.1 Discharge Information

Instructions(CGP 1.4.):

– A Municipal Separate Storm Sewer System (MS4) is a storm water conveyance system owned and operated by a state, city, town, county, district, association, or other public body. If you discharge to one of these systems mark "yes" and identify which MS4.You must submit your SWPPP to this MS4 for review. A list of MS4s that are currently designed under a Utah municipal storm water permit can be found here: https://documents.deq.utah.gov/water-quality/stormwater/DWQ-2018-006843.xlsx

Does your project/site discharge storm water into a Municipal Separate Storm Sewer System (MS4)? ☒ Yes ☐ No

List the MS4 that receives the discharge from the construction project: Herriman, UDOT

3.2 Receiving Waters

Instructions (CGP 3.1.):

– In the below table, list the name of the first surface water(s) that would receive discharges from your site. Multiple rows are provided in case your site discharges in multiple locations which flow to different surface waters. For discharges that enter a storm sewer system prior to discharge, the first surface water to which you discharge is the water body that receives the storm water discharge from the storm sewer system. You may need to contact the storm sewer system owner to find out where it discharges to.

– See http://wq.deq.utah.gov for impairment or quality information. Use this to identify the status in column 2 of Table 1. Select the waterbody you wish to look-up and find the results from the 20XX Assessment on the left hand side.

– For more information on TMDLs and impaired waters visit https://deq.utah.gov/water-quality/watershed-monitoring-program/approved-tmdls-watershed-management-program or www.epa.gov/tmdl/impaired-waters-and-stormwater.

– If any of the surface waters you listed are impaired, provide specified information about pollutants causing the impairment in column 3 of Table 1. Your SWPPP should specifically include measures to prevent the discharge of these pollutants.

– If any of the surface waters you listed are identified as a Category 1 or 2 water (a Category 1 water is only found within Forest Service boundaries) provide the category in column 3 of Table 1.

– For more information, see CGP Part 3.1 and 3.2 and *SWPPP Guide*, Chapter 3.B.

Names of Receiving Waters

Name of Receiving Water (first surface water that receives storm water or where storm system discharges to)	Is the water impaired or high quality?	If high quality: Is it Category 1 or 2? If impaired: List pollutants that the waterbody is impaired for
1. Rose Creek and Tributaries	☒ Not high quality/impaired ☐ Impaired, has approved TMDL ☐ Impaired, no TMDL ☐ High quality	E. Coli
2.	☐ Not high quality/impaired ☐ Impaired, has approved TMDL ☐ Impaired, no TMDL ☐ High quality	

[Insert or delete rows as necessary.]

3.3 Impaired Waters

Instructions (CGP 3.2.):

– If you discharge to an impaired water as listed in the above table, provide information on additional efforts that will be taken to control the release of impairment causing pollutants. This is especially important for projects discharging to a surface water with an EPA approved TMDL for sediment or nutrients and an extra effort must be provided to prevent sediment from leaving the site.

Description of additional precautions taken if you are discharging to an impaired surface water. State if no impairment causing pollutants are on site:

Prevent discharge by use of earthen berms

3.4 High Water Quality

Instructions (CGP 3.2.):

– If you discharge to a high quality water as listed in the above, provide information on additional efforts that will be taken to control the release of pollutants. Per CGP Part 1.1.7, you can discharge to a Category 1 water if your discharge is temporary and limited and where best management practices will be employed to minimize pollution effects. Discharge to Category 2 waters is allowed only if the discharge will not lower the water quality of the water body.

Description of additional precautions taken to minimize pollution effects if you are discharging to a high quality surface water:

N/A

SECTION 4: POLLUTION PREVENTION STANDARDS

4.1 Potential Sources of Pollution

Instructions (CGP 7.3.2.f.):

- Identify and list all potential sources of sediment, which may reasonably be expected to affect the quality of storm water discharges from the construction site.
- Identify and describe all potential sources of pollution or pollutant-generating activity (e.g., paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal), other than sediment, which could be exposed to rainfall or snowmelt, and may reasonably be expected to discharges from the construction site.

  For more information, see *SWPPP Guide*, Chapter 3.A.

Pollutant-Generating Activity	**Pollutants or Pollutant Constituents** (that could be discharged if exposed to storm water)	**Location on Site** (or reference SWPPP site map where this is shown)
Fueling and oiling	Fuel, engine oil	See map
Waste disposal dumpster	Solid Waste	See map
Portable Restrooms	Formalehyde, sewer waste	See map
Hauling	Sediment track out	Job entrance/see map

[Include additional rows as necessary.]

4.2 Non-Storm Water Discharges

Instructions (CGP 7.3.4.):

- Identify all allowable sources of non-storm water discharges and how they will be controlled. A list of allowable non-storm water discharges are found in the CGP Part 1.2.3.
- For more information, see *SWPPP Guide*, Chapter 3.A.

Check allowable non-storm water discharges that are present and describe the measures used to reduce them or prevent them from contributing pollutants to discharges:

Authorized Non-Storm Water Discharges	Present	Comments/Controls
Discharges from emergency fire-fighting activities	☐ Y ☒ N	
Fire hydrant flushing	☐ Y ☒ N	
Properly managed landscape irrigation (excludes fertilizer injector systems)	☐ Y ☒ N	
Properly managed vehicle and equipment wash water with no soaps, solvents, or detergents	☒ Y ☐ N	Wash equipment in designated area only
Water used to control dust	☒ Y ☐ N	Refrain from excessive watering
Drinking water, includes uncontaminated water line flushing	☐ Y ☒ N	
External building washdown with no soaps, solvents, detergents, or hazardous substances	☐ Y ☒ N	
Pavement wash waters with no detergents or toxic or hazardous materials. Must have a sediment basin, sediment trap, of similarly effective control prior to discharge.	☐ Y ☒ N	
Uncontaminated air conditioning or compressor condensate	☐ Y ☒ N	
Uncontaminated, non-turbid discharges of ground water (from natural sources) or spring water	☐ Y ☒ N	
Uncontaminated foundation or footing drains	☐ Y ☒ N	

4.3 Dewatering Practices

Instructions (CGP 1.2.5. and 2.3.7.):

If you will be discharging storm water that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, it must be permitted by UPDES permit UTG070000 (Construction Dewatering and Hydrostatic Testing Permit) unless it can be managed onsite through percolation or evaporation. The permit can be found at https://deq.utah.gov/water-quality/current-updes-permits in the bottom table. Call DWQ at 801-536-4300 for more information.

– Include schedule and general locations of dewatering. Dewatering locations must be on the site map.

☒ Check box if section not applicable to this site (Note: If not applicable skip to next section)

Describe the general scope of dewatering practices for the project and any BMPs used to manage the dewatering practices:

INSERT TEXT HERE

4.3.1: (Place name of BMP here – reference to detailed instructions in Appendix H if necessary)

BMP Description:

Installation Schedule/Instructions:	
Maintenance and Inspection:	
Responsible Staff:	
Design Specifications and Drawings:	

4.4 Natural Buffers or Equivalent Sediment Controls

Instructions (CGP Part 7.3.5.b.(1), 2.2.1, and Appendix A):

This section only applies if a surface water is located within 50 feet your construction activities. If this is the case, review CGP Part 2.2.1. and Appendix A of the CGP for information on how to comply with the buffer requirements.

- Describe the compliance alternative that was chosen to meet the buffer requirements, and include any required documentation supporting the alternative selected. The compliance alternative selected must be maintained throughout the duration of permit coverage. However, if you select a different compliance alternative during your period of permit coverage, you must modify your SWPPP to reflect this change.
- If you qualify for one of the exceptions in CGP Part A.2.2., include documentation related to your qualification for such exceptions.
- Review Appendix A of the CGP for step-by-step instructions and examples on how to comply with the different buffer alternatives.

Buffer Compliance Alternatives

Are there any surface waters within 50 feet of your project's earth disturbances?

☐ YES ☒ NO

(Note: If "no", no further documentation is required. Delete the rest of Section 4.3 below this point.)

SECTION 5: EROSION AND SEDIMENT CONTROLS – BMPS

5.1 List of Erosion and Sediment BMPs on Site

Instructions (CGP Part 2.2. and 7.3.5):

- Identify best management practices (BMPs) that will be implemented on site to control erosion and sediment transport from storm water.
- Use the below CGP requirements and the pollutant generating activates identified in SWPPP section 4.1. to determine where BMPs are necessary. Fill out the rightmost column with BMPs you are selecting. Some requirements may not apply to your site.
- For each BMP you must provide a description of the control, any design specifications, routine maintenance specifications, a schedule for storm water control implementation/installation, and the staff responsible for maintaining the BMP. These details are listed in the BMP section below the table.
- BMPs are listed as examples, you may use BMPs not listed.
- Details and design specifications can be provided in this section or in Appendix H if they are large.
- Perimeter control maintenance must include removal of sediment before it has accumulated to one-half the above-ground height of the control.
- For more information, see *SWPPP Guide*, Chapter 4.
- BMP guidance may be found in your MS4's or other local jurisdiction's design manual, guidance manuals listed in Appendix D of the *SWPPP Guide*, or EPA's National Menu of BMPs https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#constr

CGP Requirement	Example BMPs	EPA SWPPP Guide Section	BMPs Selected (Name and Reference Number if applicable)
Preserve vegetation where possible and direct storm water to vegetated areas when feasible (CGP 2.2.2.)	Phasing to minimize disturbance, signs/fences to protect areas not being disturbed.	Chapter 4, ESC Principle 1	N/A
Install sediment controls along perimeter areas that receive pollutant discharges (CGP 2.2.3.).	Silt fence, fiber rolls, earth berms	Chapter 4, ESC Principle 7	Silt Fence, earth berms
Minimize sediment track-out (CGP 2.2.4.)	Restrict access, stabilize exits, track-out pads, tire washing station, clean-up sediments	Chapter 4, ESC Principle 9	One access point, maintain track out by sweeping, track out pad
Manage stockpiles with perimeter controls and locate away from storm water conveyances (CGP 2.2.5.)	Sediment barriers downgradient, proper location, covered stockpiles, diverting storm water from stockpiles	Chapter 4, ESC Principle 4	Keep stockpiles away from storm water conveyances
Minimize dust (CGP 2.2.6.)	Water application, mulching, chemical dust suppression techniques		Water application on haul roads using water truck and at drop points on the conveyor belts
Minimize steep slope disturbance (CGP 2.2.7.)	Erosion control blankets, tackifiers, protect slopes from disturbance	Chapter 4, ESC Principle 5	N/A
Preserve topsoil (CGP 2.2.8.)	Stockpile topsoil	Chapter 4, ESC Principle 1	N/A
Minimize soil compaction where final cover is vegetation (CGP 2.2.9.)	Restrict vehicle access, recondition soils before seeding		N/A
Protect storm drain inlets (CGP 2.2.10.)	Inserts, rock-filled bags, covers	Chapter 4, ESC Principle 6	Rock filled bags and/or curb inlet covers downhill from the entrance (see attached for material specifications)
Slow down runoff with erosion controls and velocity dissipation devices (CGP 2.2.11.)	Check dams, riprap	Chapter 4, ESC Principle 3	Diversion ditch and detention basin, silt fence on the south side of the entrance

Appropriately design any sediment basins or impoundments (CGP 2.2.12.)	Design to 2-year 24-hour storm or 3,600 cubic feet per acre drained, include design specifications	Chapter 4, ESC Principle 8	N/A
Follow requirements for any treatment chemicals (polymers, flocculants, coagulants, etc.)	Store in leak proof containers and cover, proper training, minimize use		N/A
Stabilize exposed portions of site with 14 days of inactivity (CGP 2.2.14).	Seeding, erosion control blankets, gravel, hydromulch	Chapter 9	Track walking, rock face

5.1.1: (Silt Fence)

BMP Description/Instructions: Silt Fence

Installation Schedule:	***4/9/2020***
Maintenance and Inspection:	***Weekly/As needed***
Responsible Staff:	***Vagner Soares/Anthony Flickinger***
Design Specifications and Drawings:	

5.1.2: (Earth Berm)

BMP Description/Instructions: Earth Berms along the perimeter

Installation Schedule:	4/9/2020
Maintenance and Inspection:	Weekly/As needed
Responsible Staff:	Vagner Soares/Anthony Flickinger
Design Specifications and Drawings:	

5.1.3: (Track out pad)

BMP Description/Instructions: Tack out pad at the entrance

Installation Schedule:	4/13/2020
Maintenance and Inspection:	Weekly/As needed
Responsible Staff:	Vagner Soares/Anthony Flickinger

Design Specifications and Drawings:	

5.1.4: (Inlet Protection)	
BMP Description/Instructions: Inlet protection	
Installation Schedule:	4/13/2020
Maintenance and Inspection:	Weekly/As needed
Responsible Staff:	Vagner Soares/Anthony Flickinger
Design Specifications and Drawings:	

5.1.5: (Place name of BMP here – reference to detailed instructions in Appendix H if necessary)	
BMP Description/Instructions:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	
Design Specifications and Drawings:	

[Repeat as needed]

Instructions (CGP 7.3.5.b.(2)):

– For areas where perimeter controls are not feasible on a linear construction site, include a description of why it is not feasible and other practices that will be implemented to minimize discharges of pollutants from the site.

5.2 Linear Site Perimeter Control Exemption

☒ Check box if section not applicable to this site (Note: If not applicable skip to next section)

If the site is linear and perimeter controls are not feasible, describe other practices in use:
INSERT TEXT HERE

5.3 Final Stabilization

Instructions (CGP 7.3.5.b.(6) and 2.2.14.b.):

- Describe procedures for final stabilization. If final cover is vegetation, you must establish uniform perennial vegetation that provides 70% or more of the vegetative cover that existed prior to earth-disturbing activities. Exception: Arid, semi-arid, and drought stricken areas are required to be seeded/planted so that the before mentioned vegetative requirement is expected to be met within 3 years. Establishment of vegetation is not required, however additional erosion controls may be needed.
- You can amend or add to this section as areas of your project are finally stabilized.
- Update your site plans to indicate areas that have achieved final stabilization.

Description of final stabilization practices and schedule:

Type of stabilization (vegetation/landscaped, graveled, paved, etc.)	Location	Implementation Schedule
Hydroseeding, gravel	All disturbed areas	After all the activities have been completed (March 2022)

SECTION 6: BMPS - POLLUTION PREVENTION/OPERATIONAL CONTROLS

6.1 Spill Prevention and Response

Instructions CGP Part 7.3.5.b.(7):

– Describe the spill prevention and control plan. Include ways to reduce the chance of spills, stop the source of spills, contain and clean up spills, dispose of materials contaminated by spills, and train personnel responsible for spill prevention and control.
– Some projects/site may be required to develop a Spill Prevention Control and Countermeasure (SPCC) plan under a separate regulatory program (40 CFR 112). If you are required to develop an SPCC plan, or you already have one, you should include references to the relevant requirements from your plan.
– The plan must include the materials and method of containment and for flowing liquid, cleanup, disposal and follow the minimum spill controls below.
– For more information, see *SWPPP Guide*, Chapter 5, P2 Principle 6.

Describe spill procedures and materials available for expeditious containment, clean-up and disposal of spills:

- Chemical substances should be stored in proper containers to minimize the potential for a spill. Whenever possible, chemicals should be kept in closed containers and stored so they are not exposed to storm water.
- The program must identify chemicals used that may be potentially spilled or released. This will include both liquid chemicals used at our facilities or brought on to owner client sites.
- Spill kits must be adequate for any anticipated spills. A proper spill kit must contain the appropriate supplies for materials that may be spilled. Supplies must be easily accessible when required, and considerations must be made for both the type and quantity of materials. The contents of spill response kits shall be periodically assessed to ensure the availability of adequate spill response supplies and adjust inventory as necessary.
- South Valley Rock Products, LLC shall ensure the availability of adequate spill response supplies by periodic inspection to assess their availability and adjust the inventory as necessary.
- Employees must be instructed on spill prevention and the proper response procedures for spilled materials. The training should include materials available for use, proper waste disposal and communication procedures.
- Areas where chemicals may be used or stored must be maintained using good housekeeping best management practices. This includes, but is not limited to clean and organized storage, labeling and secondary containment where necessary.
- Proper communication measures for employees to initiate in the event of a spill will be created on a site by site basis. Communication procedures will be based on type and quantity of materials spilled.
- Environmental spills shall be reported to environmental authorities when required. Reporting procedures will be based on type and quantity of materials spilled.

Identify the employee responsible for detection and response of spills and leaks:
Anthony Flickinger

Any discharges in 24 hours equal to or in excess of the reportable quantities listed in 40 CFR 117, 40 CFR 110, and 40 CFR 302 will be reported to the National Response Center and the Division of Water Quality (DWQ) as soon as practical after knowledge of the spill is known to the permittees. The permittee shall submit within 14 calendar days of knowledge of the release a written description of: the release (including the type and estimate of the amount of material released), the date that such release occurred, the circumstances leading to the release, and measures taken and/or planned to be taken to the Division of Water Quality (DWQ), 288 North 1460 West, P.O. Box 144870, Salt Lake City, Utah 84114-4870. The Storm Water Pollution Prevention Plan must be modified within14 calendar days of knowledge of the release to provide a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

Agency	Phone Number
National Response Center	(800) 424-8802
Division of Water Quality (DWQ) 24-Hr Reporting	(801)-231-1769 (801) 536-4123
Utah Department of Health Emergency Response	(801) 580-6681

Material	Media Released To	Reportable Quantity
Engine oil, fuel, hydraulic & brake fluid	Land	25 gallons
Paints, solvents, thinners	Land	100 lbs (13 gallons)
Engine oil, fuel, hydraulic & brake fluid	Water	Visible Sheen
Antifreeze, battery acid, gasoline, engine degreasers	Air, Land, Water	100 lbs (13 gallons)
Refrigerant	Air	1 lb

6.2 Pollution Prevention Controls

Instructions (CGP Part 2.3. and 7.3.5):

- Describe the key good housekeeping and pollution prevention (P2) BMPs that will be implemented to control pollutants in storm water (CGP Part 2.3).
- Use the below CGP requirements and the pollutant generating activates identified in SWPPP section 4.1. which were not addressed with the erosion and sediment BMPs to determine where BMPs are necessary.
- For each BMP you must provide a description of the control, any design specifications, routine maintenance specifications, a schedule for storm water control implementation/installation, and the staff responsible for maintaining the BMP.
- BMPs are listed as examples, you may use BMPs not listed.
- Details and design specifications can be provided in this section or in Appendix H.
- For more information, see *SWPPP Guide*, Chapter 5.
- Consult your state's or local jurisdiction's design manual or resources in Appendix D of the *SWPPP Guide*.
- For more information or ideas on BMPs, see EPA's National Menu of BMPs https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#constr

CGP Requirements	Example BMPs	EPA SWPPP Guide Section	BMPs Selected (Name and Reference Number if applicable)
Equipment and vehicle fueling (CGP 2.3.1)	Spill kits, SPCCP, drip pans, locate activities away from conveyances, use secondary containment	Chapter 5, P2 Principle 4	Secondary containment, spill kits, away from conveyances to storm water
Equipment and vehicle washing (CGP 2.3.2.)	Locating away from surface waters and storm water conveyances, directing wash waters to a sediment basin or	Chapter 5, P2 Principle 5	Away from conveyances to storm water, earth berms

	sediment trap, using filtration devices		
Storage, handling, and disposal of building products and waste (CGP 2.3.3.)	Cover (plastic sheeting / temporary roofs), secondary containment, leakproof containers, proper dumpsters, secured portable toilets, locate away from storm water conveyances	Chapter 5, P2 Principle 1 and 2	Metal dumpster, haul off and empty dumpster as soon as it is full.
Washing of stucco, paint, concrete, form release oils, curing compounds, etc. (CGP 2.3.4.)	Leak proof containers, lined pits, locate away from storm water conveyances	Chapter 5, P2 Principle 3	N/A
Properly apply fertilizer (CGP 2.3.5)	Follow manufacture specifications, document deviations in applications, avoid applications to frozen ground, before heavy rains, or to storm water conveyances		N/A

6.2.1.: (Place name of BMP here – reference to detailed instructions in Appendix H if necessary)

BMP Description/Instructions: Secondary Containment	
Installation Schedule:	Install with fuel storage tanks
Maintenance and Inspection:	Weekly
Responsible Staff:	Vagner Soares/Anthony Flickinger
Design Specifications and Drawings:	

6.2.2.: (Place name of BMP here – reference to detailed instructions in Appendix H if necessary)

BMP Description/Instructions: Spill Kit	
Installation Schedule:	As needed
Maintenance and Inspection:	As needed
Responsible Staff:	Vagner Soares/Anthony Flickinger
Design Specifications and Drawings:	

6.2.3.: (Place name of BMP here – reference to detailed instructions in Appendix H if necessary)	
BMP Description/Instructions: Earth Berms	
Installation Schedule:	Start of the Project/As needed
Maintenance and Inspection:	Weekly
Responsible Staff:	Vagner Soares/Anthony Flickinger
Design Specifications and Drawings:	

6.2.4: (Place name of BMP here – reference to detailed instructions in Appendix H if necessary)	
BMP Description/Instructions: Dumpsters	
Installation Schedule:	As needed
Maintenance and Inspection:	Weekly/Empty when full
Responsible Staff:	Vagner Soares/Anthony Flickinger
Design Specifications and Drawings:	

6.2.5: (Place name of BMP here – reference to detailed instructions in Appendix H if necessary)	
BMP Description/Instructions:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	
Design Specifications and Drawings:	

6.2.6: (Place name of BMP here – reference to detailed instructions in Appendix H if necessary)	
BMP Description/Instructions:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	
Design Specifications and Drawings:	

[Repeat as needed]

SECTION 7: SPECIAL CONDITIONS

Instructions:

The conditions listed below require additional details or actions added to your SWPPP. If they do not apply you may delete them from this SWPPP.

7.1 Emergency Related Projects

Instructions (CGP 1.1.5):

- For emergency activities that require immediate authorization but last longer than 30 days, a SWPPP may be submitted within 30 days of starting work.
- To be an emergency related project it must be considered a public emergency and the cause must be documented along with the description of necessary construction to reestablish effected public services.

Emergency-Related Project? ☐ Yes ☒ No

DESCRIBE THE NATURE OF THE PUBLIC EMERGENCY AND WHY IMMEDIATE AUTHORIZATION WAS NECESSARY.

7.2 UIC Class 5 Injection Wells

Instructions (CGP 7.3.8.):

- If you are using any of the following storm water controls at your site as they are described below, you must document any contact you have had with DWQ for implementing the requirements for underground injection wells in the Safe Drinking Water Act and DEQ's implementing regulation at UAC R317-7.
- There may be additional local requirements related to such structures
- For the State UIC Contact at DWQ call (801) 536-4300.

☒ Check box if section not applicable to this site (Note: If not applicable skip to next section)

Class V UIC Wells on site (all must be reported to DWQ for inventory):

☐ Infiltration trenches (if storm water is directed to any shaft or hole that is deeper than its widest surface dimension or has a subsurface fluid distribution system)

☐ Commercially manufactured pre-cast or pre-built subsurface detention vault/infiltration system

☐ Drywell, seepage pit, or improved sinkhole (if storm water is directed to any shaft or hole that is deeper than its widest surface dimension or has a subsurface fluid distribution system)

Description of your Class V Injection Well and any local requirements:

INSERT DESCRIPTION AND ANY DWQ OR LOCAL REQUIREMENTS

Description of any additional BMPs used in conjunction with the UIC well.

7.2.1: (Place name of BMP here – reference to detailed instructions in Appendix H if necessary)	
BMP Description/Instructions:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	
Design Specifications and Drawings:	

7.3 Chemical Treatment

Instructions (see CGP 2.2.13. and 7.3.5.b.(5)):

- If you are using treatment chemicals at your site, provide details for each of the items below. This information is required as part of the SWPPP requirements in CGP Part 7.2.9.b.

☒ Check box if section not applicable to this site (Note: If not applicable skip to next section)

Soil Types

List all the soil types (including soil types expected to be found in fill material) that are expected to be exposed during construction and that will be discharged to locations where chemicals will be applied: INSERT TEXT HERE

Treatment Chemicals

List all treatment chemicals that will be used at the site and explain why these chemicals are suited to the soil characteristics: INSERT TEXT HERE

Describe the dosage of all treatment chemicals you will use at the site or the methodology you will use to determine dosage: INSERT TEXT HERE

Provide information from any applicable Safety Data Sheets (SDS): INSERT TEXT HERE

Describe how each of the chemicals will stored: INSERT TEXT HERE

Include references to applicable state or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer's specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems: INSERT TEXT HERE

Special Controls for Cationic Treatment Chemicals *(if applicable)*

If you have been authorized by DWQ to use cationic treatment chemicals, identify the specific controls and implementation procedures you are required to implement to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards or harm aquatic life: INSERT TEXT HERE

Schematic Drawings of Storm Water Controls/Chemical Treatment Systems
Provide schematic drawings of any chemically-enhanced storm water controls or chemical treatment systems to be used for application of treatment chemicals: INSERT TEXT HERE

Training
Describe the training that personnel who handle and apply chemicals have received prior to permit coverage, or will receive prior to the use of treatment chemicals: INSERT TEXT HERE

SECTION 8: INSPECTIONS & CORRECTIVE ACTIONS

8.1 Inspections

Instructions (CGP Part 4.2-4.4.3):

- Select an inspection schedule. These are minimum frequencies, you may inspect more frequently. If so describe what your schedule would be.
- For more on this topic, see *SWPPP Guide*, Chapters 6 and 8.
- Also, see suggested inspection form in Appendix B of the *SWPPP Guide*.

Minimum Inspection Schedule Requirements:

Standard Frequency:
☒ Once every 7 calendar days.
☐ Once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater. Rain gauge/weather station used: Foothills Station, Herriman, UT
Increased Frequency (if applicable):
☐ *Sites discharging to impaired or high quality waters:* Once every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.
Decreased Frequency (if applicable):
☐ *Arid areas:* once a month and within 24 hours of a 0.5 inch storm event or greater.
☐ *Semi-arid areas*: once a month and within 24 hours of a 0.5 inch storm event or greater during the dry season: List months for dry season (also select the inspection schedule followed outside of the dry season).
☐ *Frozen conditions with work suspended – must have 3 months of continuous expected frozen conditions based on historical averages:* no inspections List months of suspended inspections(also select the inspection schedule followed when not frozen)
☐ *Frozen conditions with continued activities - must have 3 months of continuous expected frozen conditions based on historical averages*: once per month List months of frozen conditions (also select the inspection schedule followed when not frozen)
Other:
☐ Describe alternative frequency: List alternative schedule, must meet minimum requirements

Inspection Reports are filed in Appendix C

8.2 Corrective Actions

Instructions:

- A sample corrective action report is provided in Appendix D.
- Whenever a storm water control requires repair or replacement (beyond routine maintenance), a control necessary for permit compliance was never installed or was installed incorrectly, your discharges cause an exceedance of applicable water quality standards, or a prohibitive discharge has occurred, you must log corrective actions taken.
- This log should describe actions taken, date completed, whether a SWPPP modification was required.
- In some cases corrective actions may be documented on the inspection form. This is an acceptable alternative as long as corrective actions that occur outside of inspections are also documented.

Correction Action Report is filed in Appendix D.

8.3 Delegation of Authority

Instructions:

- Identify the individual(s) or specifically describe the position where the construction site operator has delegated authority for the purposes of signing inspection reports, certifications, or other information in Section 1.1 of the SWPPP.
- Each inspection report must be signed in accordance with CGP Part 9.16 of the permit.
- If a delegation letter is necessary, see Appendix E of this template and keep a signed copy with this SWPPP.
- For more on this topic, see *SWPPP Guide*, Chapter 7.

See the signed delegation of authority forms in Appendix E.

SECTION 9: RECORDKEEPING

9.1 Recordkeeping

Instructions (CGP 7.3.10. and 9.10.):

- The following is a list of records you must have accessible on site (electronically or paper) for inspectors to review:
  - ✓ A copy of the construction general permit (Appendix I)
  - ✓ The signed and certified NOI form or permit application form (Appendix B)
- Copies of the SWPPP and all reports required by the permit must be retained for at least three years from the date that the site is finally stabilized.
- For more on this subject, see *SWPPP Guide*, Chapter 6.C.

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9.2 Log of Changes to the SWPPP

An amendment log of changes made to the SWPPP can be found in appendix F.

Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]

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SECTION 10: CERTIFICATION

Owner

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: Jared Burton Title: Vice President / Manager

Signature: Date: 5/20/2020

Operator

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: MICHAEL ALTER Title: C.O.O.

Signature: Date: 5/20/2020

SWPPP APPENDICES

Attach the following documentation to the SWPPP:

Appendix A – Site Maps

Appendix B – NOI

Appendix C – Inspection Reports

Appendix D –Corrective Action Report

Appendix E – Subcontractor Certifications/Agreements/Delegation of Authority (see CGP 9.16(1)b.)

Appendix F – Training Logs and Certifications (see CGP 6)

Appendix G – Additional Information (i.e., Other permits such as dewatering, stream alteration, wetland; and out of date swppp documents)

Appendix H – BMP Instruction and Detail Specifications

Appendix I – Construction General Permit

Appendix A: Site Maps

Include any site maps in this appendix. For site map requirements review SWPPP section 2.5.

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L E G E N D

Retention Pond (2)

On-Site Water Diversion Ditch (1)

PercolationArea (1)

Property Boundary (2)

Silt Fence (2)

Slopes towards site (8)

Earth Berm (4)

Inlet Protection (1)

Track Out Pad (1)

Street Sweeping with Vac Truck (1)

Dumpster (1)

Equipment storage and washing (1)

Spill Kit (1)

Fuel Tank (1)

Portable Toilet (2)

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new Parcel Viewer beta

Base Maps
Pictometry

Parcel
Land
Structures
Value History
Results

Property Location	owner_name

BOUNDARY MAP

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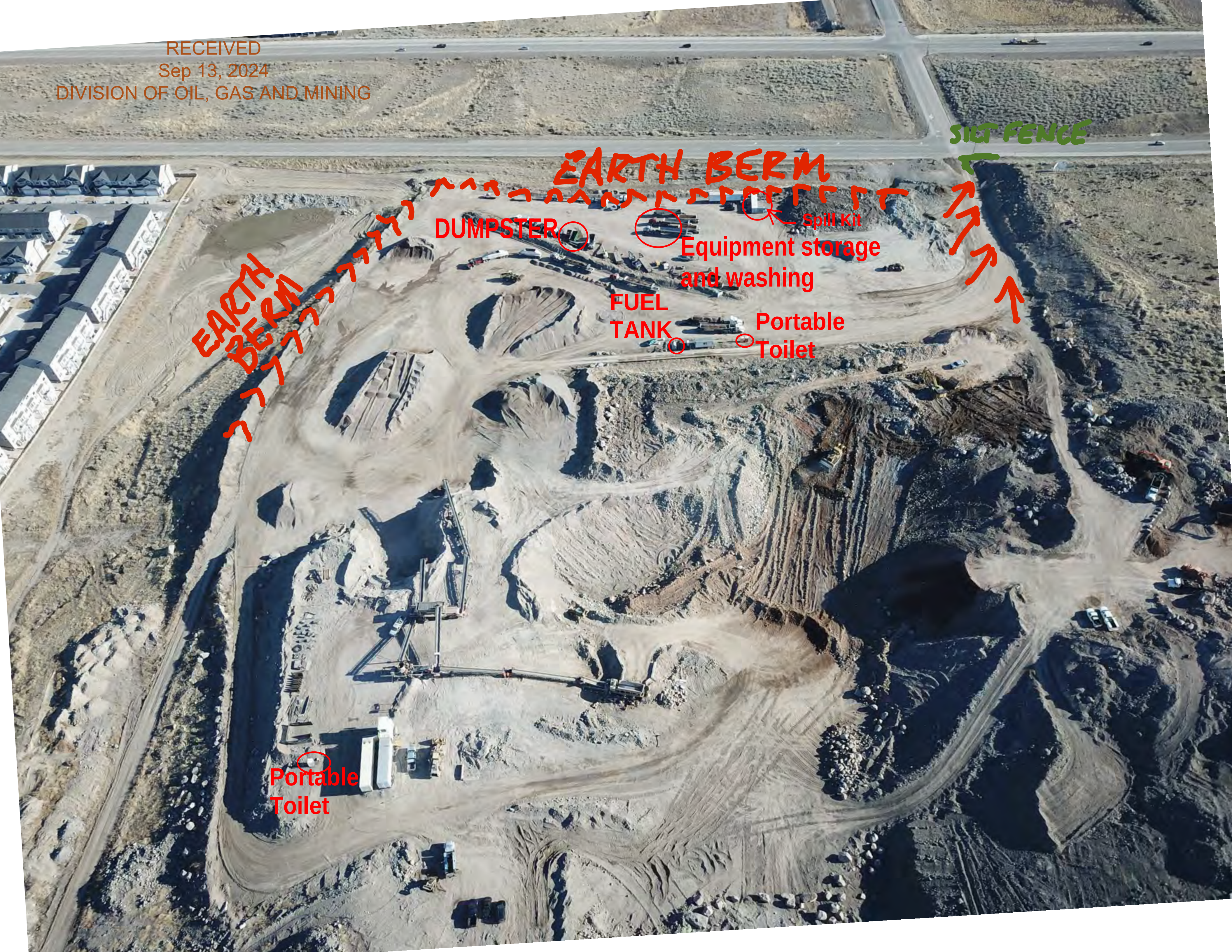

Appendix B: NOI

Include a copy of your NOI in this appendix. The NOI must be signed.

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STATE OF UTAH, DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER QUALITY
195 North 1950 West, P.O Box 144870, Salt Lake City, UT 84114-4870 (801)536-4300

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under the Construction General Permit (CGP) UPDES General Permit No. UTRC00000

NOI

Permit Information

Master Permit Number: UTRC00000

UPDES ID: UTRC00271

Eligibility Information

State/Territory where your project/site is located: UT

Is your project/site located on federally recognized Indian Country Lands? No

Which type of form would you like to submit? Notice of Intent (NOI)

Have stormwater discharges from your project/site been covered previously under an UPDES permit? No

Has a Stormwater Pollution Prevention Plan (SWPPP) been prepared in advance of filling this NOI, as required? Yes

Owner/Operator Information

Owner Information

Owner: Innovative Excavating and Construction, LLC

Status of Owner: Private

Owner Mailing Address:
Address Line 1: PO Box 1844

Address Line 2:

City: Draper

ZIP/Postal Code: 84020

State: UT

Owner Point of Contact Information

First Name, Middle Initial, Last Name: Parambir S Ghuman

Title: Project Manager

Phone: 801-372-5571 **Ext.**

Email: param@jwright.biz

Operator Information

Is the Operator Information the same as the Owner Information? Yes

NOI Preparer Information

☐ **This NOI is being prepared by someone other than the certifier.**

Project/Site Information

Project/Site Name: Herriman Crusher

Project Number:

Project/Site Address

Address Line 1: 14822 Juniper Crest Road

Address Line 2:

City: Herriman

ZIP/Postal Code: 84096

State: UT

County or Similar Division: SALT LAKE

Latitude/Longitude for the Project/Site

Latitude/Longitude: 40.480803°N, 111.990205°W

Estimated Project Start Date: 04/06/2020

Estimated Project End Date: 03/31/2021

Total Area of Plot (in Acres): 23.5

Estimated Area to be Disturbed (in Acres): 10

Proposed Best Management Practices

☑ **Structural Controls (Berms, Ditches, etc.)**

Proposed Good Housekeeping Practices

☑ **Sanitary/Portable Toilet**

☑ **Track Out Controls**

☑ **Spill Control Measures**

Site Activity Information

Municipal Separate Storm Sewer System (MS4) Operator Name: Not Applicable

Receiving Water Body: Rose Creek

➔ This is a guess

What is the estimated distance to the nearest water body? 750

Unit: Feet

Is the receiving water an impaired or high quality body? Yes

Does this project site have any other UPDES permits? No

Subdivision Information

Is this project involved in the development of a subdivision? No

Certification Information

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Signing an electronic document on behalf of another person is subject to criminal, civil, administrative, or other lawful action. I also certify that I have the authority to sign this document as a responsible corporate officer, general partner, proprietor or principal executive officer or ranking elected official as allowed for in the UPDES Signatory requirements in Utah Administrative Code R317-8.3.4.

Certified By: Parambir S. Ghuman

Certifier Title: Project Manager

Certifier Email: param@jwright.biz

Certified On: 04/03/2020 12:48 PM ET

Appendix C: Inspection Reports

Place all completed inspection reports in this appendix. You may also put blank inspection reports here to be completed.

You are encouraged to create your own inspection forms for each site. Inspection reports must have the following information:

1) The inspection date.
2) The UPDES ID number (UTRXXXXXX).
3) Name and title of personnel making the inspections.
4) Summary of inspection findings and any necessary corrective actions:
   a. Are storm water controls properly installed and operational? If failed then why?
   b. Presence of any conditions that could lead to spills or leaks.
   c. Locations where new or modified controls are necessary.
   d. Signs of visible erosion or sediment depositing related to your discharges.
   e. Any incidents of noncompliance.
   f. Visual quality of any discharges occurring.
5) Rainfall amount if the inspection was trigger by a precipitation event.
6) If it was unsafe to inspect any areas of the site, a description of the area and reason.

Appendix D: Corrective Action Report

Place Corrective Action Reports here:

Appendix D – *Sample* Corrective Action Report

Inspection Date	Inspector Name(s)	Description of BMP Deficiency	Corrective Action Needed (including planned date/responsible person)	Date Action Taken/Responsible person

Appendix E: Subcontractor Certifications/Agreements/Delegation of Authority (CGP 9.16.(1)b.)

A link to the signed Delegation of Authority and Owner/Operator Certifications is below:

https://drive.google.com/drive/folders/1j5DCTE0Gq2rV1-orAAduhcSaJfni_R7l?usp=sharing

Appendix F: Training Logs and Certifications (see CGP 6)

Certifications are located on the next four pages:

Training logs and Amendment Logs can be placed here:

Certificate of Completion

presented to

JJ Martin

for the successful completion of

UDOT 2019 Construction Site Stormwater Runoff Control

27-JUL-2020

UDOT U
Learning ▪ Innovation ▪ Culture

Certificate of Completion

presented to

JJ Martin

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UDOT 2019 Long-Term Stormwater Management

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UDOT 2019 Stormwater Pollution Prevention and Illicit Discharge Detection and Elimination

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Appendix F – *Sample* SWPPP Training Log

Storm Water Pollution Prevention Training Log

Project Name:

Project Location:

Instructor's Name(s):

Instructor's Title(s):

Course Location: ______________________________ Date: ________________

Course Length (hours): __________________________

Storm Water Training Topic: *(check as appropriate)*

- ❑ **Erosion Control BMPs**
- ❑ **Emergency Procedures**
- ❑ **Sediment Control BMPs**
- ❑ **Good Housekeeping BMPs**
- ❑ **Non-Storm Water BMPs**

Specific Training Objective:____

____

Attendee Roster: *(attach additional pages as necessary)*

No.	Name of Attendee	Company
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Appendix G: Additional Information

Use this appendix for additional information such as other permits (dewatering, stream alteration, etc.) or out of date SWPPP documents.

LAND DISTURBANCE PERMIT

Email request to: dbodrero@herriman.org
Permit valid for 15 days from issue.
(Because of conditions beyond control of permittee, Herriman may grant written extension of time.)

HERRIMAN CITY

Location of Land Disturbance: (Project/Property Address) 14822 S Juniper Crest Road

Purpose of Land Disturbance: Grading for Juniper Crest West Road alignment | **Application Date:** 04/03/20

Land Use: ☐ Residential ☒ Commercial ☐ Industrial ☐ Multi-Family ☐ Roadway

Activity: ☒ Excavation ☐ Grading ☒ Stockpiling ☐ Site Development ☐ Material Storage ☐ Fill

☒ Other: Gravel Pit | **Estimated Project Cost:** $ 500,000.00

Grading: 30,000.00 Cubic Yards/Acres | **Excavation:** Length: Width: Depth:

Anticipated Start Date: 04/06/20 | **Proposed Completion Date:** 03/31/22

Responsible Party (Applicant): Don Black
Company: Innovative Excavating and C
Phone: (385) 887-1335 | Email: dbinnovative@gmail.com

Mailing Address: PO Box 1844 | City, State, Zip: Draper, UT 84020

Contractor: Innovative Excavating and Construction, LLC | Phone: 3858871335 | Email: db.innovative@gmail.com

Mailing Address: PO Box 1844 | City, State, Zip: Draper, UT 84020

Right of Way: ☐ Asphalt ☐ Shoulder ☐ Sidewalk/PUE ☐ Bore ☐ Curb Cut ☐ Water Meter Move
for ☐ Utility ☐ Landscaping ☒ Other:

Brief Description of work:
Gravel pit to mine materials for construction aggregates.

Documents required at submittal:
- ☐ **Video of the proposed construction site will be required to be submitted with this permit.**
- ☐ **Notification to affected residents/businesses.** (a draft notification needs to be submitted for approval with this permit.)
- ☐ SWPPP & NOI from State DEQ Division (if over 1 acre) – see www.waterquality.utah.gov
- ☐ Erosion/Sediment Control Plan
- ☐ Post construction BMPs (Best Management Practices)
- ☐ Traffic control plan for work in public right-of-way
- ☐ Fugitive dust control permit from State DEQ Division
- ☐ Grading plan to include accurate topography showing contours of the existing and proposed ground elevations

Agreement: This permit becomes null and void if work or construction is not commenced within 180 days, or if construction is not complete with eighteen (18) months from the date of commencement of construction, unless a written extension has been issued by the City Engineer prior to the expiration date. A written extension may only be issued for good cause and may not exceed six (6) months. I hereby certify that I have read and examined this application and know the same to be true and correct. All provisions of laws and ordinances governing this type of work shall be complied with, whether specified herein or not, the granting of this permit does not presume to give authority to violate or cancel the provisions of any other state or local law regulating construction or the performance of construction and that I make this statement under penalty or perjury. By signing this agreement, I understand that the permit and plans must remain on-site and a statement of permit coverage must be clearly represented on site.

Signature of Applicant	**Date:**
Dave Hales	04/03/20

FOR CITY USE ONLY

Approved by Engineering: [signature]	**Date:** 4/6/2020
Inspector Assigned:	**Completion Date:**

Comments:

Pavement Restoration shall be done by T-Patch, see APWA Plan 255 (attached)	**Applicant shall submit video of the proposed work site to the engineering coordinator dbodrero@herriman.org**

Herriman Use Only: Permit #: LD 617 Bond Amount: ______ Paid Date: ______ Fee: $445.00
Bond Type: ☐ Escrow ☐ Cash ☐ Letter of Credit Receipt #

LAND DISTURBANCE PERMIT

HERRIMAN CITY

---FEES---

Grading Fee Calculation		
<=50 cu. yds.	$23.50	$23.50 fixed
51 to 100 cu. yds.	$37.00	$37.00 fixed
101 to 1,000 cu.yds.	$37.00 + $17.50	$37.00 for the first 100 cubic yards, plus $17.50 for each additional 100 cubic yards or fraction thereof
1,001 to 10,000 cu.yds.	$194.50 + $14.50	$194.50 for the first 1,000 cubic yards, plus $14.50 for each additional 1,000 cubic yards or fraction thereof
10,001 to 100,000 cu.yds.	$325.00 + $60.00	$325.00 for the first 10,000 cubic yards, plus $60.00 for each additional 10,000 cubic yards or fraction thereof
100,001 to 200,000 cu.yds.	$919.00 + $36.50	$919.00 for the first 100,000 cubic yards, plus $36.50 for each additional 10,000 cubic yards or fraction thereof
Plan Review Fee (if not part of subdivision)		Based on Cubic Yards

ROW Fee Calculation			
Fee Type	**Quantity**	**Unit Price**	**Cost**
Asphalt/Concrete Fee		$250.00	$
Asphalt/Concrete Sq.Ft.	x	$0.50	$
Shoulder/Landscape Fee		$125.00	$
Shoulder/Landscape Sq.Ft.	x	$0.25	$
Boring Fee		$150.00	$
Boring Sq.Ft.	x	$0.50	$
Lane Closure $50.00/day	x lanes x days	$50.00	$
Curb Cut	$125.00	$125.00	$
Water Meter Move	x .25	$125.00 + $0.25/ln.ft.	$

Estimated Bond Amount:	Total Permit Fee:
$	$

PAYMENT. Permit fee must be paid prior to commencement of work.

BONDS. A completion bond, in the amount set forth above, shall be submitted prior to approval of the work. The bond may be cashier's check or letter of credit, and shall remain in place for a one year warranty period after the work has been completed. At the end of one year, the bondee may request an inspection of the work site by the Public Works Inspector; any defects found must be repaired, and then the bond may be released.

INSURANCE. A certificate of insurance, naming Herriman City as additional insured, is required to be filed with the city by the contractor performing the work prior to issuance of permit, and shall comply with Herriman City Ordinance 7-4-4.

APPLICANT MUST NOTIFY ENGINEERING COORDINATOR OR ENGINEERING INSPECTOR 24 HOURS BEFORE WORK BEGINS. NOTIFICATIONS TO AFFECTED RESIDENTS/BUSINESSES SHALL ALSO BE MADE 48 HOURS IN ADVANCE. PUBLIC WORKS INSPECTORS MUST INSPECT ALL WORK IN PUBLIC RIGHT-OF-WAY AND LAND DISTURBANCES. FOR WATER METER MOVES, THE INSPECTOR MUST BE PRESENT WHEN THE METER IS MOVED.

Prior to commencement of work, applicant must submit a video of the proposed construction area to the engineering coordinator dbodrero@herriman.org

Certain jobs will require a pre-construction meeting prior to commencement of any work. Applicant will be notified during permit application process if this will be required.

LAND DISTURBANCE PERMIT

The City Engineer will review each application for a land disturbance permit to determine conformance with local, State and other related requirements. Ordinance allows up to fifteen (15) days for the review process to be completed. Each Land Disturbance Permit expires in six (6) months from date of issuance if substantial work has not yet commenced. Each land disturbance permit will expire if work is not complete within eighteen (18) months from the date of commencement of construction. Written extension must be issued by the City Engineer prior to the expiration date. A written extension may only be issued for good cause and may not exceed six (6) months.

Permits for Land Disturbance shall be required for the following cases:
- Land disturbing activity generally disturbs one (1) or more acres of land.
- Land disturbing activity of less than one (1) acre of land if such activity is part of a larger common plan of development that affects one (1) or more acre of land.
- Land disturbing activity of less than one (1) acre of land, if in the discretion of the City Engineer such activity poses a unique threat to water quality, air quality, or public health or safety.
- The creation and/or use of borrow pits.
- Development of any parcel.
- Processing of earthen materials such as top soil and gravel screening.
- Construction of parking lots.
- Placement or stockpiling of materials.
- Modification of Sensitive Lands
- Land disturbing activity involving materials storage, stockpiling, grading, excavation, fill, or similar activity.
- Any work done in public right-of-way.

No building permit shall be issued until the applicant has obtained a Land Disturbance Permit where the same is required by this ordinance.

No development plans will be approved and released for construction until the Land Disturbance Permit has been issued.

A Storm Water Maintenance Agreement is required for projects disturbing more than one (1) acre.

REQUIRED DOCUMENT SUBMITTAL INFORMATION	
PERMIT	WHERE/WHO ADMINISTERS
Land Disturbance Permit	Obtained through Herriman City. Allow 15 days for review and comment.
Traffic Control Plan	Must be provided for any and all work that affects traffic flow, including pedestrian traffic.
Certificate of Insurance	Contractor must provide a certificate of insurance naming Herriman City as additional insured.
Bonding	A bond must be filed with the City prior to approval of permit.
Video of site	A video of site shall be submitted prior to commencement of construction
Storm Water Pollution Prevention Plan (SWPPP)	Submitted to the City for review and is required to obtain a Land Disturbance Permit when disturbing an acre or more or if part of a common plan of development of an acre or more. Contact your engineer.
Notice of Intent (NOI)	Obtained through the State of Utah Department of Environmental Quaility Division of Water Quality. http://www.waterquality.utah.gov/UPDES/stormwater.htm
Notice of Termination (NOT)	Submitted to the State of Utah Department of Environmental Quaility Division of Water Quality and verified by the City. Project must be complete and meet requirements of "final stabilization" of all disturbed areas. http://www.waterquality.utah.gov/UPDES/stormwater.htm
Other permits and approvals: Air Quality, Salt Lake County, NRCS, Canal Company, private parties, etc.	Contact the City for direction. 801-446-5323
Notification to Residents	A draft notification to residents and/or businesses that will be impacted by the proposed work will need to be submitted with the permit application. This may be in the form of a door hanger, letter, or other form of notification, and shall include at a minimum the proposed dates of work, a 24/7 field contact name and phone number, the contractor or subcontractors's name and the developer/utility initiating the work.

LAND DISTURBANCE PERMIT

Permittee agrees to comply with all applicable ordinances and laws of the state of Utah and of Herriman and also with Herriman City Standards & Specifications, the Manual on Uniform Traffic Control Devices–Federal Highway Administration and APWA Standards Specifications and Plans, current edition.

This Permit controls grading, excavation and construction operations. It is also implemented to cover special requirements for work in general, maintenance, private construction, and additions to utility systems in public ways. Permittee shall furnish all labor, material, and equipment as required to perform all excavation and rehabilitation for structures, trenches, roadways, including, but not limited to, disposal of excess material, dust control, and drainage.

Work in Rights-of-Way:
No streets shall be cut or excavated within Herriman City; all streets shall be bored or drilled by whatever means possible. However, after all methods have been exhausted, and an onsite inspection has occured by a Herriman City Inspector or City representative, a street excavation may be approved. The following guidelines for street cuts will apply: street surfacing: must be saw cut leaving well defined edges and not gouged with a backhoe or other similar equipment. The trench section shall conform to standards noted on the attached page of this permit. Monuments within the right-of-way shall not be disturbed without authorization of Herriman's engineer. Before permittee begins to dig, all public utility companies must be contacted for information pertaining to the location of utility company lines.

Notification. A draft notification to residents and/or businesses that will be impacted by the proposed work will need to be submitted with the permit application. This may be in the form of a door hanger, letter, or other form of notification, and shall include at a minimum the proposed dates of work, a 24/7 field contact name and phone number, the contractor or subcontractors's name and the developer/utility initiating the work. See APWA 00 72 00 6.12 E.

Safety. Permittee is responsible to conduct all work in a manner that shall protect the safety of workers, residents, pedestrians, and motorists. See APWA 00 72 00 6.12

Purpose. This Permit is for the construction of water, gas, sewer, storm drains, underground cables, pole lines, or other facilities within the rights-of-way of Herriman City. It is issued with the understanding that the Permittee is responsible for restoration of the original ground or paved hard surface area to comply with the City's Standards & Specifications, including but not limited to repair, cleanup, backfilling, compaction, stabilization, paving and other work necessary to place the site in acceptable condition following the conclusion of the work or the expiration or revocation of the Permit. Permittee is responsible for the removal of all asphalt, shoring, cribs, cofferdams, caissons, including all pumping, bailing, draining, sheeting, bracing, and all related items. Contractor is responsible to protect existing facilities, utilities, and structures affected by the excavation.

Non-Transference. This Permit shall not be transferred or assigned, and work shall not be performed under this Permit in any place other than that specified herein. Nothing herein shall prevent a Permittee from subcontracting the work to be performed under this Permit; provided, however, that the Permittee shall be responsible for the performance of the work under this Permit, and for all bonding, insurance, and other requirements of the ordinances of Herriman and of this Permit.

Bonding and Insurance. An irrevocable letter of credit, escrow agreement, or cash deposit bond must be filed with the City prior to excavation. A certificate of insurance must also be provided by the contractor doing the work.

Video of Site. Prior to commencement of work in rights-of-way, applicant must submit a video of the proposed construction area to the permit technician and the public works inspector.

Traffic Control. Prior to approval of the excavation permit, a traffic control plan must be submitted by the Permittee for review and approval of the City. The traffic plan is to be in conformance with the current MUTCD and must be approved prior to excavation, construction, or any occupation of the public right-of-way. Traffic control devices must be in place before traffic disturbance or excavation begins. The devices shall be maintained throughout the construction period and shall not be removed until all equipment and material are removed, excavation is backfilled, and temporary or permanent surface is installed. Traffic Engineer may require certified traffic control personnel during set up and tear-down of all traffic control devices. Lighted early warning arrow boards will be required on all major arterial and collector streets. The Permittee shall not obstruct the view of any traffic control devices. All disturbed traffic control devices shall be immediately replaced, cleaned or repaired as directed by the City. From sunset to sunrise, all barricades and excavations must be clearly outlined by adequate signal lights, etc.

Traffic Obstruction. Construction operations will be conducted in a manner that will minimize interference or interruption of roadway traffic or pedestrian traffic, except during emergency conditions, or unless authorized by the City Engineer. Inconvenience to residents and businesses fronting on the public way shall be minimized.

Access. Permittee shall provide free and unobstructed access to all pedestrian crosswalks, ADA access ramps, driveways, mailboxes, trash receptacles, fire hydrants, water gates, valves, manholes, drainage or other public service structures and property that may be required for emergency use. Permittee shall not remove such public service facilities and property or relocate same without proper coordination with the authorities charged with control and maintenance of same. Barricades in conformance with MUTCD or covered walkways for the protection of the general public shall be provided whenever any work or storage of materials is being done.

Hours of Work. Construction activities shall be limited to normal working hours between 7:00 a.m. and 7:00 p.m., unless otherwise approved or restricted by the Engineer. In addition, construction operations such as excavation, backfill and pavement restoration on arterial/collector streets shall be prohibited during peak traffic hours of 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. Permittee shall notify Herriman Police Department and Unified Fire Department forty-eight (48) hours in advance of all road closures. Permittee shall notify these Emergency Services upon completion and reopening of roadway.

Responsibility. It is further understood and agreed that the Permittee is responsible for any and all costs, damages and liabilities, which may accrue or be claimed to accrue by reason of any work performed under the Permit. The Permittee agrees to save the City, its officers, employees and agents harmless from any and all costs, damages and liabilities which may accrue or be claimed to accrue by reason of any work performed under this

Permit. The issuance and acceptance of this Permit shall constitute such a hold harmless agreement by the Permittee.

Liability. This Permit shall neither be construed as imposing upon the City, its officers, employees, agents, volunteers or assigns any liability or responsibility for damages to any person injured by or by reason of the performance of any work within the public way, or under this Permit; nor shall the City, its officers, officials, employees, agents, volunteers or assigns thereof be deemed to have assumed any such liability or responsibility by reason of inspection, the issuance of this Permit, or the approval of any work.

Excavation Operation:
Locating and Protecting Existing Utilities: The Permittee shall notify Blue Stakes at least two (2) working days prior to commencing work, and shall use extreme caution to avoid conflicts, contact or damage to existing utilities such as waterlines, storm drain lines, power lines, gas lines, street lights, fiber optic lines, telephone lines, television lines, sewer lines, poles and appurtenances during the course of construction. In case damage occurs, the Permittee will immediately notify the utility or company involved and Herriman City (446-5323).

Protection of Paved Surfaces Outside of Excavation Area: In order to avoid unnecessary damage to paved surfaces, backhoes, outriggers, track equipment or any other construction equipment that may prove damaging to asphalt are required to use rubber cleats or paving pads when operating on or crossing roadway surfaces.

Jacking and Boring of Buried Conduits: Jacking or boring of service lines under paved surfaces is preferred to trench excavation and may be required in some city streets as designated by the Engineer. If open excavation for service lines is requested in a street which was paved or resurfaced within the last two years, an engineering evaluation and explanation of why boring is not feasible shall be presented to the Engineer. The Engineer shall approve or disapprove the application based on the merits of the arguments presented.

Tunneling: Tunneling is not allowed except when written permission is obtained from the Engineer.

Cutting of Sidewalks, Curbs Gutters etc.: Removal or alteration of any existing improvement, structures, landscaping or any other facility in the Public Way that is in conflict with the proposed excavation will be identified on the Permit. Sidewalk and curb & gutter may be saw cut and removed to the nearest control joint (score line). Any existing improvements damaged by operations outside of the limits of the trench shall be repaired or replaced in conformance with current Herriman City Standards and Specifications.
Cutting Pavement: Pavement shall be cut in a neat, vertical straight line prior to excavation. All excavations within twenty four (24) inches of any structure, concrete, or edge of existing pavement surface shall remove and replace permanent surfacing to the concrete or structure. If more than 50% of the permanent surfacing of a traveled lane is impacted by the excavation, the entire lane width will be required to be saw cut, removed, and replaced in compliance with current City standards. Trenching or excavation is not permissible within eighteen (18) inches of any concrete structure, unless permitted by the Engineer. Any surface or underlying pavement outside the trench which is undermined or damaged by the trenching operation shall be removed to a neat, straight line, and replaced. In some areas where native, clean sands are present, the Engineer may require that trenching exceeding five (5) feet in depth be required to remove and replace surfacing for a minimum of two (2) times the depth unless direct contact shoring is provided to fully support the trench walls for full depth of the excavation. The use of drop hammer for pavement cutting is not allowed. Saw cutting or use of a (jackhammer) pavement breaker for cutting pavement are the only acceptable cutting methods.

Open Trench: Unpaved and open trench shall not exceed 500 lineal feet within the right-of-way. A maximum of 250 feet may be under construction while 250 feet is being paved. Construction of manholes or other appurtenances requiring added construction and cure time may be left unpaved for additional time provided they are properly barricaded. The Engineer may adjust these limits if conditions warrant.

1. All open trenches within the Public Way shall be barricaded and covered in conformance with the MUTCD. No open trenches will be allowed overnight. Any disturbed surfacing will be stabilized, compacted or temporarily surfaced at the end of each day. In certain circumstances, the Engineer may allow deeper trenches to be left open overnight with proper protection. Trenches more than five (5) feet deep shall not remain open overnight.
2. By approval of the Engineer, when backfill operations of an excavation in the traveled way, whether transverse or longitudinal, cannot be properly completed within a work day, steel plate bridging with non-skid surface and shoring may be required to preserve unobstructed traffic flow. In such cases, the contractor shall ensure that plating is structurally safe and adequate, but in no case less than the following requirements:

Trench Width	Minimum Plate Thickness
10″	½″
1′-11″	¾″
2′-7″	7/8″
3′-5″	1″
5′-3″	1 ¼″

   Approach plate(s) and ending plate (if longitudinal placement) shall be attached to the roadway by minimum of two dowels through pre-drilled holes in the corners of the plate and drilled at least 3″ into the pavement. Subsequent plates are butted to each other. Fine graded asphalt concrete shall be compacted to form ramps, maximum (slope 8.5% with a minimum of 12″ taper) to cover all edges of the steel plates. When steel plates are removed, the dowel holes in the pavement shall be backfilled with either graded fines of asphalt concrete mix, concrete slurry or equivalent slurry that is approved by the Engineer. The contractor is responsible for maintenance of steel plates, shoring, asphalt concrete ramps, and ensuring that they meet minimum specifications.
3. Plates are not allowed between October 15-April 15, or when snow is in the forecast.

Backfilling: Backfill in Pipe Zone: Backfill in the pipe zone shall conform to the respective utility specifications and/or Herriman City Standards & Specifications. Pipe Zone associated with Herriman City utilities shall comply with APWA 2017 (or current edition) Section 33 05 20 untreated base course grade ¾ per select fill target gradation curve. Contractor shall establish an average of 96% percent compaction based on modified proctor throughout the pipe zone.

Backfill above Pipe Zone:

1. Horizontal Trenches: Cement Treated Fill (Flowable Fill) shall be used on all trenches that cross the right-of-way creating a right angle with the travel lanes. Cement Treated Fill shall be used in the trench above the pipe zone to the finished sub-base elevation. Permittee shall submit to Engineer for approval a mix design as established in the APWA 2017 (or current edition) section 33 05 20 and Special Provision Section 33 05 20.
2. Longitudinal Trenches: Cement Treated Fill (Flowable Fill) shall be used on all trenches that are less than 50 feet in length with a right-of-way that runs parallel with the travel lane. Cement Treated Fill shall be used in the trench above the pipe zone to the finished sub-base elevation. Permittee shall submit to Engineer for approval a mix design as established in the APWA 2017 (or current edition) section 32 05 10. Backfill material within longitudinal trenches greater than 50 feet shall comply with APWA 2017 (or current edition) Section 33 05 20 untreated base course grade ¾ per select fill target gradation curve. Contractor shall establish an average of 96% compaction based on modified proctor throughout the pipe zone.
3. Placement of Backfill Lifts: Place backfill lifts such that the new utilities are not displaced or damaged.
   a. Maintain specified lift thickness and compaction density throughout the backfill in compliance with APWA 2017 (or current edition) section 33 05 20 and with Herriman City Standards and Specifications. Maximum lift thickness before compaction is 8-inches. Mechanically compact each lift to 96% average compaction of ASTM D-1557 modified proctor.
   b. Place backfill with ±2% of optimum moisture content. Moisture shall be applied uniformly to material.

Resurfacing:

1. Restoration of Right of Way Improvements: All improvements and appurtenances impacted or damaged by the Permittee shall be restored or replaced to an acceptable condition, at least equal in size, line performance, quality and grade. All restoration shall comply with Herriman City Standards and Specifications. Applications for exceptions must be in writing and approved by the Engineer.
2. Bituminous Materials: Bituminous Material shall comply with APWA 2017 Standard Specification (or current edition) Section 32 12 05 Asphalt Concrete and Section 32 12 16 Plant Mix Asphalt Concrete Paving. The ¾ inch gradation is required for the surface course. Ambient temperatures of fifty (50) degrees are required for permanent asphalting.
3. Tack Coat: Tack coat the exposed vertical edges of asphalt per APWA 2017 (or current edition) Standard Specification Section 32 12 14 Tack Coat.
4. Finishing of Asphalt Surfaces: Pavement surfaces distortion shall not exceed ¼ inch deviation in ten (10) feet. Measurement shall be made using a ten (10) foot long straight edge. Permittee shall provide a seal coat, grinding or approved repair if road restoration does not comply with tolerances. Pavement restoration shall comply with APWA 2017 (or current edition) Standard Plan 255, Bituminous Pavement T-patch.
5. Compaction: Compact each lift in conformance with APWA 2017 (or current edition) Standard Specifications Section 32 12 16 Plant Mix Asphalt Paving. Asphalt compaction shall be accepted when the density reaches a minimum of 96% and maximum of 98% based on laboratory Marshall Method values (ASTM D 5581).
6. Structures to Finish Grade: All manholes and other utility access structures shall be raised and collared according to Herriman City Standard and Specifications. Permittee shall protect concrete collars with metal plates on all collector and arterial streets for a minimum of three (3) days or until specified strength of the concrete is attained.
7. Street Striping Restoration: Permittee shall notify Engineer of any street striping damaged, removed, or marred by construction operations. Herriman City may repair or approve Permittee to repair striping; but, in either case, the cost shall be borne by Permittee.

Sidewalks and streets shall not be obstructed. Excavated materials shall be removed from the job site during the construction process. Finished grades must be restored to original grade immediately upon completion of site / job specific, improvements for work permitted on sidewalks and roads. Temporary materials may be used upon approval of the City's Public Works Inspector. All concrete and asphalt replacement behind curb must be completed within forty-eight (48) hours of completion of all groundwork. All work must be inspected and approved by the City's Public Work Inspector. All inspections shall require one day (24 hours) advance notice by notifying the City at 801-446-5323.

Dust and Debris: Permittee shall control dust and debris at the work site, adjacent neighborhoods, and rights-of-way at all times. If necessary, wet down dusty areas with water and provide containers for debris. The Engineer may issue a stop work order if dust and debris is not controlled. Immediate stop work order with penalties may be issued for tracking mud, soil or debris into the public way or for washing any contaminant or debris into storm drain, ditch, channel, pipe or gutter, etc. To rescind the stop work order, the Engineer may require facilities to be installed such to prevent further tracking of soil or debris into any public way.

Clean up: Permittee shall remove all equipment, material, barricades and similar items from the right-of-way. Areas used for storage of excavated material shall be smoothed and returned to their original contour and condition. Vacuum sweeping or hand sweeping is required when the City determines current cleaning method is ineffective or inadequate.

Restoration. Permittee shall restore any public way to its original condition. All construction activities will utilize Best Management Practices (BMP's) in such a manner as to minimize erosion and deposition of sediments and other pollutants into storm drainage facilities and/or waters of the State. All restoration work shall be guaranteed by City bond requirements. If the Permittee does not restore properties to their original condition within the time indicated herein, it is agreed that the City shall make the necessary restoration at Permittee's expense, including but not limited to, charges against the bond, which expense shall be deemed to include interest at the current rate until paid in full.

Repair of excavation perpendicular to traveled lanes shall be complete within seventy-two (72) hours from the time excavation begins. A penalty of $150.00 per day will be assessed for restoration not completed within such seventy-two (72) hour period without a written time extension from the City Engineer. Repair of excavation parallel to traveled lanes **shall commence within ten (10) days** from the time excavation begins and be **completed within fifteen (15) days** from the time excavation begins. **A penalty of $150.00 per day will be assessed for restoration not completed within such fifteen (15) day**

period without written time extension from the City Engineer. Only a minimal open trench (to be determined by the City Engineer or other designee appointed by the City Engineer) will be allowed overnight.

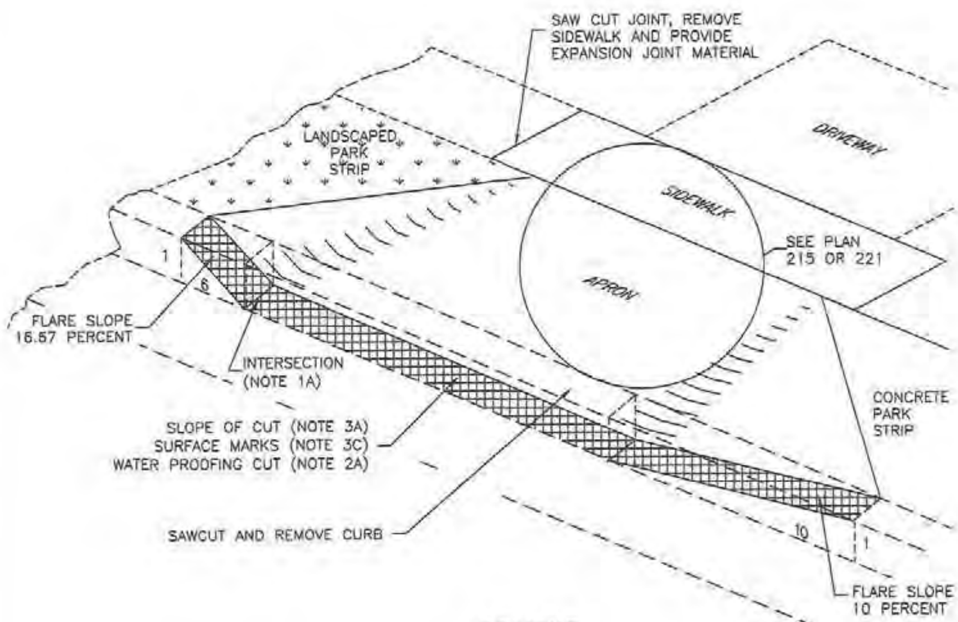
CURB CUT

Permits for curb cuts to widen a driveway or create a second driveway will comply with the above requirements. The curb cut shall be completed in accordance with Plan 222 of APWA Standard Plans, current edition. Driveways may not be more than 35' wide, and single family homes may only have one driveway unless a circular driveway is used. Second driveways or driveways wider than 35' may be approved by the City Engineer upon submittal of a proposed site plan with location or requested driveway and address of property shown.

WATER METER MOVE PERMIT

Permits for the purpose of moving a water meter, out of driveways or for other purposes shall comply with all applicable requirements set forth above. The Water Inspector must be present when the water meter is being moved. **All inspections shall require one day (24 hours) advance notice by notifying the City at 801-446-5323 and scheduling inspection with the water department.**

NARRATIVE: THIS PLAN IS USED IF AN EXISTING CURB MUST BE CUT TO INSTALL A DRIVEWAY APPROACH. THE SLOPE OF THE CURB FLARE DEPENDS UPON WHETHER THE PARK STRIP IS LANDSCAPED OR IF THE PARK STRIP IS CONCRETE.



OBLIQUE

APWA Utah Chapter

Saw-cut driveway approach

Plan
222
February 2011

Bituminous pavement T-patch

1. **GENERAL**
   A. Vertical cuts in bituminous pavement may be done by saw or pavement zipping. If cuts greater than 6 inches are necessary to prevent pavement "break off" consult ENGINEER for directions on handling addtional costs.
   B. Repair a T-patch restoration if any of the following conditions occur prior to final payment or at the end of the one year correction period.
      1) Pavement surface distortion exceeds 1/4-inch deviation in 10 feet. Repair option - plane off surface distortions. coat planed surface with a cationic or anionic mulsion that complies with APWA Section 32 12 03..
      2) Separation appears at a connection to an existing pavement or any Street Fixture. Repair option - blow separation clean and apply joint sealant, Plan 265.
      3) Cracks at least 1-foot long and 1/4-inch wide occur more often than 1 in 10 square feet. Repair option - blow clean and apply crack seal, Plan 265.
      4) Pavement raveling is greater than 1 square foot per 100 square feet. Repair option - Mill and inlay, APWA Sections 32 01 16.71 and 32 12 05.

2. **PRODUCTS**
   A. Base Course: Untreated base course, APWA Section 32 11 23. Do not use gravel as a base course without ENGINEER's permission.
   B. Flowable Fill: Target is 60 psi in 28 days with 90 psi maximum in 28 days, APWA Section 31 05 15. It must flow easily requiring no vibration for consolidation.
   C. Reinforcement. No. 5, galvanized or epoxy coated, deformed, 60 ksi yield grade steel, ASTM A615.
   D. Concrete: Class 4000, APWA Section 03 30 04.
   E. Tack Coat: APWA Section 32 12 13.13.
   F. Bituminous Concrete. APWA Section 32 12 05.
      1) Warm Weather Patch: PG64-22-DM-1/2, unless indicated otherwise.
      2) Cold Weather Patch: Modified MC-250-FM-1 as indicated in APWA Section 33 05 25.

3. **EXECUTION**
   A. Base Course Placement: APWA Section 32 05 10. Maximum lift thickness before compaction is 8-inches when using riding equipment or 6-inches when using hand held equipment. Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 31 23 26.
   B. Flowable Fill: Cure to initial set before placing aggregate base or bituminous pavement. Use in excavations that are too narrow to receive compaction equipment.
   C. Tack Coat. Clean all horizontal and vertical surfaces. Apply full coverage all surfaces.
   D. Pavement Placement: Follow APWA Section 32 12 16.13. Unless indicated otherwise, lift thickness is 3-inches minimum after compaction. Compact to 94 percent of ASTM D2041 (Rice density) plus or minus 2 percent.
   E. Bituminous Concrete Substitution: If bituminous concrete is substituted for Portland cement concrete substrate, omit rebar and provide 1.25 inches of bituminous concrete for each 1 inch of Portland cement concrete. Follow paragraph E requirements.
   F. Reinforcement. Required if thickness of existing Portland-cement concrete substrate is 6-inches or greater. Not required if 1) less than 6-inches thick, 2) if existing concrete is deteriorating, 3) if excavation is less than 3 feet square, or 4) if bituminous pavement is substituted for Portland-cement concrete substrate.
   G. Concrete Substrate. Cure to initial set before placing new bituminous concrete patch.

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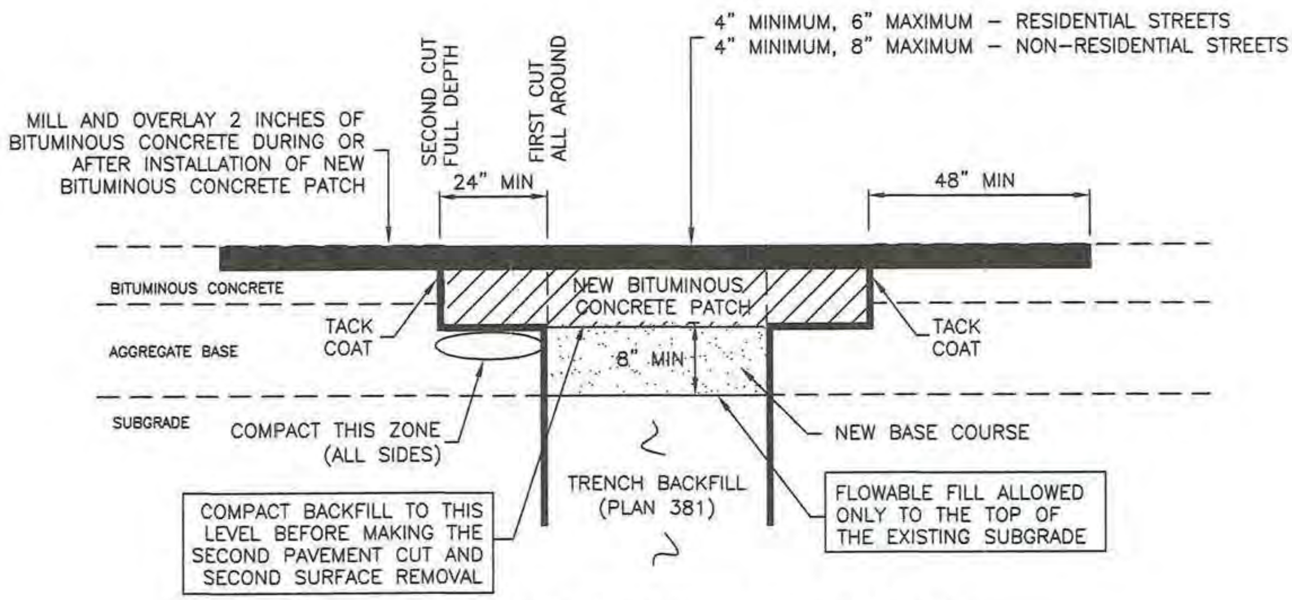
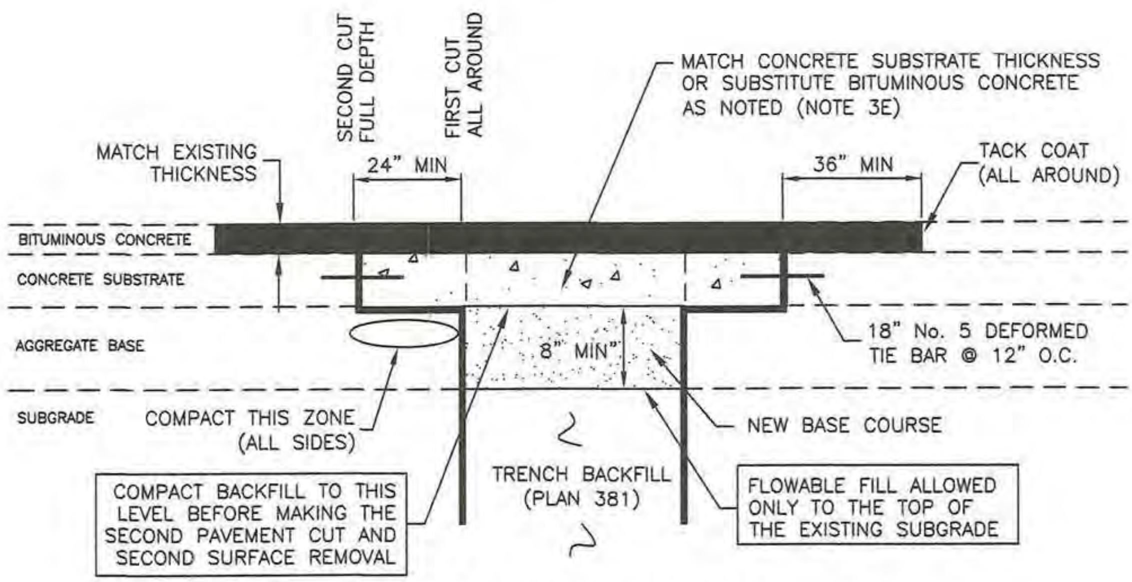
LAND DISTURBANCE PERMIT

HERRIMAN CITY



BITUMINOUS CONCRETE RESTORATION



COMPOSITE RESTORATION

AMERICAN PUBLIC WORKS ASSOCIATION
APWA Utah Chapter

Bituminous pavement T-patch

Plan
255
November 2015

Appendix H: BMP Instruction and Detail Specifications

Use this appendix if complete BMP specifications are not provided in Section 5 or 6 of the SWPPP.

The link below has the BMP specs required:
https://drive.google.com/drive/folders/1csHnxKAa8U1vmDjV6gx_fsYMSmUoyfOK?usp=sharing

Appendix I: Construction General Permit

If all storm water team members access the CGP via the internet while on site the following link to access the Construction General Permit is sufficient:

http://construction.stormwater.utah.gov

Otherwise, include a printed out copy of the Construction General Permit in this appendix.

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DANDY CURB®
GRATELESS CURB INLET AND MEDIAN BARRIER INLET PROTECTION SYSTEM GUIDE SPECIFICATION

PRODUCT:

DANDY CURB®

MANUFACTURER:

Dandy Products Inc.
P.O. Box 1980
Westerville, Ohio 43086
Phone: 800-591-2284
Fax: 740-881-2791
E mail dlc@dandyproducts.com
Web www.dandyproducts.com

1.0 **Description:**

1.1 Work covered under this item consists of installing a Dandy Curb® inlet protection system for inlets and median barrier inlets without grates. The purpose is to keep silt, sediment and construction debris out of the storm system.

2.0 **Material:**

2.1 The Dandy Curb® inlet protection system shall be a **sewn in the U.S.A**. fabric unit enclosing a porous structure in the form of a cylindrical tube placed in front of and extending beyond the inlet opening on both sides.

2.2 The Dandy Curb® inlet protection system shall have a pouch on the street side of the sewn unit for aggregate or other material to hold the unit in place.

2.3 The Dandy Curb® unit shall utilize an orange monofilament fabric that is manufactured in the U.S.A. with the following characteristics:

PROPERTY	TEST METHOD	UNITS	TEST RESULTS
Grab Tensile Strength	ASTM D 4632	lbs	450 x 300
Grab Tensile Elongation	ASTM D 4632	%	40 x 25
Puncture Strength	ASTM D 4833	lbs	130
Mullen Burst Strength	ASTM D 3786	psi	600
Trapezoid Tear Strength	ASTM D 4533	lbs	165 x 150
% Open Area (POA)	COE - 22125-86	%	28
Apparent Opening Size	ASTM D 4751	US Std Sieve	30
Permittivity	ASTM D 4491	sec^{1}	3.5
Permeability	ASTM 4491	cm/sec	0.25
Water Flow Rate	ASTM 4491	$gal/min/ft^2$	250
Ultraviolet Resistance	ASTM D 4355	%	70

Color			Orange[1]

[1]The color orange is a trademark of Dandy Products, Inc.
The property values listed above are effective October 2010 and are subject to change without notice.

3.**0 Installation:**

3.1 Place Dandy Curb® inlet protection unit on ground with aggregate pouch on street side near inlet it will be installed on.

3.2 For oil and sediment model, to install or replace absorbent, place absorbent sock in pouch.

3.3 Fill pouch with aggregate such as #5-7, 8's or similar to a level (at least ½ full) that will keep unit in place during a rain event and create a seal between the Dandy Curb® and the surface of the street. <u>Reseal Velcro access.</u>

3.4 Center the unit against curb or median inlet opening so that the curb side of the unit creates a seal with the curb or median barrier and inlet structure. There will be approximately twelve (12) inches of the inlet protection unit overhanging on each side of the opening. If the unit is not installed in this manner, it will not function properly.

4.**0 Maintenance:**

4.1 The contractor shall remove all accumulated sediment and debris from surface and vicinity of unit after each rain event or as directed by engineer/inspector. Dispose of unit no longer in use at an appropriate recycling or solid waste facility.

4.2 *For oil and sediment model; remove and replace absorbent when near saturation.*

5.0 **Method of Measurement:**

5.1 The quantity to be paid is for the actual number of Dandy Curb® inlet protection units installed.

6.0 **Basis of payment:**

6.1 The unit price shall include labor, equipment, and materials necessary to complete the work and maintain the True Dam® inlet protection units.
6.2 Payment for the completed work will be made at the contract prices for:

ITEM	UNIT	DESCRIPTION
Dandy Curb®	EA	Inlet Protection Unit (#______________Inlet)

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STATE OF UTAH, DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER QUALITY
195 North 1950 West, P.O Box 144870, Salt Lake City, UT 84114-4870 (801)536-4300

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY WATER QUALITY

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under the Construction General Permit (CGP) UPDES General Permit No. UTRC00000

NOI

Permit Information

Master Permit Number: UTRC00000

UPDES ID: UTRC05172

State/Territory to which your project/site is discharging: UT

Is your project/site located on federally recognized Indian Country Lands? No

Which type of form would you like to submit? Notice of Intent (NOI)

Have stormwater discharges from your project/site been covered previously under an UPDES permit? Yes

- **Your most current UPDES Permit Number(permit tracking number) if you had coverage under Utah's CGP 2008 or UPDES permit number if you had coverage under UPDES individual permit:** UTRC00271

Has a Stormwater Pollution Prevention Plan (SWPPP) been prepared in advance of filling this NOI, as required? Yes

Owner/Operator Information

Owner Information

Owner: Innovative Excavating and Construction, LLC

Status of Owner: Private

Owner Mailing Address:

Address Line 1: PO box 1844

Address Line 2: **City:** Draper

ZIP/Postal Code: 84020 **State:** UT

Owner Point of Contact Information

First Name Middle Initial Last Name: Nicholas Anderson

Title: Manager

Phone: 801-386-1774 **Ext.:**

Email: nick@jwright.biz

Operator Information

Is the Operator Information the same as the Owner Information? Yes

NOI Preparer Information

☐ **This NOI is being prepared by someone other than the certifier.**

Project/Site Information

Project/Site Name: Herriman Crusher

Project Number:

Project/Site Address

Address Line 1: 14822 Juniper Crest Road

Address Line 2: **City:** Herriman

ZIP/Postal Code: 84096 **State:** UT

County or Similar Division: Salt Lake

Have you submitted a Fugitive Dust Control Plan to UT Division of Air Quality? Yes

Latitude/Longitude for the Project/Site

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Coordinate System: Decimal Degrees

Latitude/Longitude: 40.480803°N, 111.990205°W

Estimated Project Start Date: 06/02/2022

Estimated Project End Date: 06/02/2024

Total Area of Plot (in Acres): 23.5

Estimated Area to be Disturbed (in Acres): 10

Proposed Best Management Practices

☑ **Structural Controls (Berms, Ditches, etc.)**

Proposed Good Housekeeping Practices

☑ **Sanitary/Portable Toilet**

☑ **Track Out Controls**

☑ **Spill Control Measures**

Site Construction Types

☑ **Other**

Crushing

Site Activity Information

Municipal Separate Storm Sewer System (MS4) Operator Name: Herriman

Receiving Water Body: Rose Creek

➔ This is a guess

What is the estimated distance to the nearest water body? 750

Unit: Feet

Is the receiving water designated as impaired? Yes

Will any part of the project area be located within 50 feet of any Water of the State? Yes

Does this project site have any other UPDES permits? No

Subdivision Information

Is this project involved in the development of a subdivision? No

Certification Information

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Signing an electronic document on behalf of another person is subject to criminal, civil, administrative, or other lawful action.

Certified By: Nicholas Anderson

Certifier Title: Manager

Certifier Email: nick@jwright.biz

Certified On: 05/14/2024 3:01 PM ET