



TECHINICAL DRAINAGE STUDY UPDATE NO. 2

Sunstone Phase 1A Infrastructure (Iron Mountain Road & Tee Pee Lane)

NOVEMBER 2021

PREPARED FOR:
SC East LandCo, LLC
Las Vegas, NV

PREPARED BY:
Westwood

Sunstone Phase 1A Infrastructure (Iron Mountain Road and Tee Pee Lane)

Technical Drainage Study Update No. 2

City of Las Vegas, NV

Prepared For:

SC East LandCo, LLC
9275 Russell Road, Suite 400
Las Vegas, Nevada 89148

Prepared By:

Westwood Professional Services
5725 W. Badura Avenue, Suite 100
Las Vegas, NV 89118
Phone: (702) 284-5300
Fax: (702) 284-5339

Project Number: EST1911.000
Date: November 2021



Amy Poechmann, P.E.
NV Professional Engineer No. 18320
Assisted by: Kevin Hurtado

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Sunstone Phase 1A Infrastructure - Iron Mountain Road and Tee Pee Lane Date: November 2021
 Location of Development: a) Descriptive (Cross Streets): North/South: Tee Pee Lane
East/West: Iron Mountain Road
 b) Section: 6 & 7 Township: 19 South Range: 60 East
 c) APN: 125-06-810-006, 125-06-810-002, 125-06-501-001, 125-06-701-001 & 125-07-501-005

Name of Owner: SC East LandCo, LLC
 Telephone No.: (702) 736-9100 Fax No.: (702) 736-9200 E-mail Address: Efraim.Balizan@Lennar.com
 Address: 9275 W. Russell Road, Suite 400 Las Vegas, NV 89148

Contact Person – Name: Amy Poechmann, P.E. Telephone No.: (702) 284-5300
 *E-mail Address: Amy.Poechmann@westwoodps.com Fax No.: (702) 284-5399
 Firm: Westwood Professional Services
 Address: 5725 Badura #100 Las Vegas NV 89118

Type of Land Development/Land Disturbance Process:

☐ Rezoning	☐ Subdivision Map	☐ Clearing and grading Only
☐ Parcel Map	☐ Planned Unit Development	☒ Other (Please specify below)
☐ Large Parcel Map	☐ Building Permit	☐

1. Total Owned Land Area: At Site: approx 600 acres Being Developed/Disturbed: approx 10 acres
 2. Is a portion or all of the subject property located in a FEMA Flood Hazard Area? ☐ Yes** ☒ No
 3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ Yes** ☐ No
 4. Proposed type of development (Residential, Commercial, Etc.): Master planned community infrastructure improvements
 5. Approximate upstream land area which drains to the subject site: approximately 7.8 square miles
 6. Has the site drainage been evaluated in the past? ☒ Yes** ☐ No If yes, please identify documentation: Skye Canyon Master Drainage Study Update #5 (Sunstone MDS), CLV# DS5081

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Moccasin Regional Storm Drain Facility,
Iron Mountain Road, Brent Lane

8. Briefly describe your proposed schedule for the subject project: ASAP



Submit this form as part of the required drainage study to the local entity which has jurisdiction over The subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

***Newly Required Field**

****Review and concurrence of the Clark County Regional Flood Control District is required**

Local Entity File No.	Revision	Date

REFERENCE: STANDARD FORM 1



CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

The following checklist is intended as a supplemental guide for the engineer preparing a Technical Drainage Study submittal to the City of Las Vegas. This supplement focuses on requirements specific to the City of Las Vegas. The requirements presented are in addition to the Clark County Regional Flood Control District (CCRFCDD) Manual Standard Form 2. The listed items are the minimum information required prior to the City performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the CCRFCDD Hydrologic Criteria and Drainage Design Manual (Design Manual).

An appointment must be made to preview this checklist in conjunction with CCRFCDD Standard Form 2 prior to the City accepting a new drainage study for review. The engineer must contact the Flood Control Section at (702) 229-6541 to schedule a submittal appointment.

If items are not applicable for the subject site, provide N/A.

I. GENERAL REQUIREMENT		
Yes	No	
-	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading. (A copy of the letter must be received prior to final acceptance of the drainage study.)
-	X	Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions.
X	-	An electronic copy of the complete submittal is required to be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output device replicating your submittal. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats. If figures are in color, they must be scanned in color and saved as a separate file. <u>4p</u> by initial here, the engineer on record acknowledges that the electronic copy is an identical replicate of the original hard copy submitted to the City of Las Vegas.

II. GRADING PLAN INFORMATION		
Yes	No	
X	-	(1) 24" X 36" copy of the Grading Plan, (including all Detail Sheets) sealed by the engineer.
X	-	Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street. Note: Proposed top of curb elevations must be provided for both sides of roadways even if only half street construction is required.
X	-	Label existing topography at a minimum 5 foot elevation interval including adjacent developments, finished floor elevations of existing buildings and top of existing curbs extending 100 feet around the perimeter of the site. (*Measured from the centerline of the adjacent roadway.)

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

II. GRADING PLAN INFORMATION		
Yes	No	
X	-	Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains.
-	N/A	All existing and "to be constructed" walls with cross-sections showing wall type, (e.g. block wall, retaining wall, flood wall, etc.), with limits clearly defined, adjacent ground elevations. Wall heights must meet current ordinances and in no case exceed 14 feet above the adjacent property.
X	-	Street slopes for both interior and perimeter streets. Note: The minimum slope for a roadway is 0.4 percent, a minimum 18-inch storm drain must be provided where minimum slopes cannot be met.
-	N/A	Back of lot elevations and lot drainage pattern for all lots including common lots.
-	N/A	Sites with a grade difference two feet above or below existing ground are required to have approval from City of Las Vegas Current Planning. Current Planning approval is required prior to final approval of the drainage study.
X	-	On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners. (The project must pass flows through the site every 600 feet where the project is blocking flow paths.)
-	N/A	This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included.
-	N/A	Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
-	N/A	Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
-	N/A	Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
-	N/A	The limits of the flood zones and the base flood elevations (BFE) must be shown on all grading plans for all developments within a Special Flood Hazard Zone A, AO, AE, etc.
-	N/A	Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections.
-	N/A	Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
	N/A	Lots with "B and C Type Drainage" that drain from one lot to another through a drainage easement shall be required to install an underground nuisance drainage system or a 2-foot valley gutter. 16" x 24" minimum block wall openings are required for both options.
	N/A	Bubblers are required across 80 foot and greater ROW streets. When flows exceed 10 cfs, bubblers larger than 18 inches will be required up to a maximum of 36". Inlets must be sized to match the pipe size provided.

- Contact the Flood Control Section regarding the drainage study review fee. These fees are payable at the time of submittal.
- The Drainage Study must be conditionally approved prior to submitting improvement plans to the Civil and Planning Development of the Department of Building and Safety for review.

This document is intended as an **aid** in preparing Technical Drainage Studies for the City of Las Vegas. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all-inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Sunstone Phase 1a Infrastructure - Iron Mountain		Map ID:
Firm Name: Westwood Professional Services		Engineer: Amy Poechmann, P.E.
Address: 5725 Badura #100		
City: Las Vegas	State: NV	Zip: 89118
Phone Number: (702) 284-5300	Fax Number: (702) 284-5399	
Property Owner: SC East LandCo, LLC		
Address: 9275 W. Russell Road, Suite 400		
City: Las Vegas, NV	State: 89148	Zip:
Reviewed By:	Date Received:	Date Accepted for Review:

The following checklist is intended as a guide for the engineer preparing a Technical Drainage Study to submit to the local entity and Clark County Regional Flood Control District (if necessary). The listed items are the minimum information required prior to the entity performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (MANUAL).

This document is intended as an aid in preparing Technical Drainage Studies. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

If items are not applicable for the subject site, provide N/A.

I. GENERAL REQUIREMENT

Yes	No	
<u>X</u>	<u>-</u>	Design Manual Standard Form 1 with the engineer's seal and signature.
<u>X</u>	<u>-</u>	Design Manual Standard Form 4 .
<u>X</u>	<u>-</u>	2 copies of the 24" x 36" Drainage Plan.
<u>-</u>	<u>-</u>	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

Yes	No	
<u>X</u>	<u>-</u>	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
<u>X</u>	<u>-</u>	A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

Yes	No	
<u>X</u>	<u>-</u>	Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.
<u>X</u>	<u>-</u>	On-site drainage basin maps for existing and proposed conditions showing the existing topography, basin boundaries, concentration points, and on-site and off-site flows in cfs.
<u>X</u>	<u>-</u>	Vicinity Map with local and major cross streets identified and a north arrow.

III. DRAINAGE PLAN

Yes	No	
<u>X</u>	<u>-</u>	Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada.
<u>X</u>	<u>-</u>	Minimum scale: 1" = 60'.
<u>X</u>	<u>-</u>	Project name.
<u>X</u>	<u>-</u>	Vicinity Map with local and major cross streets.
<u>X</u>	<u>-</u>	Revision box.
<u>X</u>	<u>-</u>	North arrow and bar scale.
<u>X</u>	<u>-</u>	Engineer's/consultant's address and phone number.
<u>X</u>	<u>-</u>	Elevation datum and benchmark.
<u>X</u>	<u>-</u>	Legend for symbols and abbreviations.
<u>X</u>	<u>-</u>	Cut/fill scarps, where applicable.
<u>X</u>	<u>-</u>	Street names, grades, widths.
<u>X</u>	<u>-</u>	Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street.
<u>X</u>	<u>-</u>	Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.
<u>-</u>	<u>N/A</u>	Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
<u>X</u>	<u>-</u>	Proposed typical street sections.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
<u>X</u>	<u>-</u>	Streets with off-set crowns.
<u>X</u>	<u>-</u>	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
<u>X</u>	<u>-</u>	Property lines.
<u>X</u>	<u>-</u>	Right-of-way lines and widths, existing and proposed.
<u>X</u>	<u>-</u>	Existing improvements and their elevations.
<u>X</u>	<u>-</u>	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
<u>X</u>	<u>-</u>	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
<u>X</u>	<u>-</u>	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
<u>X</u>	<u>-</u>	Location and cross-section of street capacity calculations.
<u>X</u>	<u>-</u>	Cross-sectional detail for channels, including cutoff wall locations.
<u>X</u>	<u>-</u>	Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
<u>X</u>	<u>-</u>	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
<u>-</u>	<u>N/A</u>	Location and detail of existing, proposed, and future block wall openings. Minimum size is 16" x 48". Wrought iron gate is required for flows > 10 cfs.
<u>-</u>	<u>N/A</u>	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.
<u>-</u>	<u>N/A</u>	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit.
<u>-</u>	<u>N/A</u>	Building and/or lot numbers.
<u>-</u>	<u>N/A</u>	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
<u>-</u>	<u>N/A</u>	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
☐	☐ N/A	For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
☐	☐ N/A	Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q ₁₀₀ flows.
☒	☐	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
☐	☐ N/A	Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

Yes	No	
☒	☐	Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
☒	☐	Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
☒	☐	Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
☒	☐	Use of correct precipitation values in and around the McCarran Airport rainfall area.
☒	☐	A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
☒	☐	A summary table of stormwater flows showing basin area, Q ₁₀ and Q ₁₀₀ for both individual basins and combined basin flows, where applicable.
☒	☐	Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
☒	☐	On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.
☐	☐ N/A	Calculation for impervious area for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
<u>-</u>	<u>N/A</u>	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
<u>X</u>	<u>-</u>	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. $Q_{100} d \times v \leq 8$. $Q_{10} d \times v \leq 6$ and 12 foot dry lane for rights-of-way ≥ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
<u>X</u>	<u>-</u>	A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
<u>-</u>	<u>N/A</u>	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
<u>-</u>	<u>N/A</u>	Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.
<u>-</u>	<u>N/A</u>	Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the Q_{100} weir height or flow depth, whichever is greater.
<u>-</u>	<u>N/A</u>	A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones. • Field survey data. • Input and output information. • Plotted cross-sections based on survey with proper encroachments. • A map showing the location of the cross-sections. • Analysis of both sub and super-critical flow segments. • A summary table and a discussion of the results in the text of the report.
<u>-</u>	<u>N/A</u>	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
<u>X</u>	<u>-</u>	Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation.
<u>X</u>	<u>-</u>	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
<u>-</u>	<u>N/A</u>	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2

EST1911.000

November 2, 2021

Jennifer Shinn, P.E.
Flood Control, Engr. Associate
City of Las Vegas
495 S. Main Street
1st Floor
Las Vegas, Nevada 89101

**Subject: Technical Drainage Study Update No. 2 for
Sunstone Phase 1A Infrastructure (Iron Mountain Road to Tee Pee Lane)
(TDS CLV DS5199)**

Dear Ms. Shinn,

Submitted for your review is this Technical Drainage Study Update No. 2 for the subject project. The original Technical Drainage Study (TDS) was approved by City of Las Vegas (CLV) in March 2020 and Update No. 1 was approved in August 2021. Refer to Appendix A for a copy of the latest approval letter.

Purpose: This Update has been prepared to support the modifications to the storm drain mainline in Iron Mountain Road. The existing utilities were potholed and based on the as-built information SDMH#1 was shifted slightly east (downstream).

Storm Drain Analysis: The storm drain mainline has been revised and modeled with the minor changes to the lengths and inverts around SDMH#1. The updated WSPG model has been provided in Appendix B.

Conclusions: The provided hydraulic analysis shows that the updates to the proposed storm drain are in compliance with CCRFCD Manual criteria and show no adverse impacts. The improvement plans included in the last appendix supports the conclusions and recommendations detailed in this Update. If you have any questions or require additional information, please do not hesitate to contact us at (702) 284-5300.

Respectfully Submitted,
WESTWOOD PROFESSIONAL SERVICES


Amy Poehmann, P.E.
Project Manager
Water Resources Department

Pc: Mark Failla, P.E., CFM
Josh Johnson, P.E., WPS

List of Appendices

Appendix A	Reference Material Technical Drainage Study for Sunstone Phase 1A Infrastructure (Iron Mountain Road to Tee Pee Lane) (DS5199) • Approval Letter • Referenced Storm Drain Computations • Referenced Plan Sheets
Appendix B	Storm Drain Computations • Main WSPGW Model
Appendix C	Improvement Plans

EST1911.000

November 2, 2021

Jennifer Shinn, P.E.
Flood Control, Engr. Associate
City of Las Vegas
495 S. Main Street
1st Floor
Las Vegas, Nevada 89101

**Subject: Technical Drainage Study Update No. 2 for
Sunstone Phase 1A Infrastructure (Iron Mountain Road to Tee Pee Lane)**

Ms. Shinn:

This letter certifies that all items provided on electronic submittal CD matches 100% of the *Technical Drainage Study Update for Sunstone Phase 1A Infrastructure (Iron Mountain Road to Tee Pee Lane)* bound paper version.

Respectfully Submitted,
WESTWOOD PROFESSIONAL SERVICES



Amy Poechmann, P.E.
Project Manager – Water Resources Department

APPENDIX A

Reference Material

**Technical Drainage Study for
Sunstone Phase 1A Infrastructure
(Iron Mountain Road to Tee Pee Lane)
(DS5199)**

Approval Letter

CITY OF LAS VEGAS			DATE:
INTER-OFFICE MEMORANDUM			August 17, 2021
TO: Land Development Services Department of Public Works			FROM: Jennifer Shinn, P.E. Flood Control, Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for:		COPIES TO:
SUNSTONE - Phase 1A Infrastructure			Slater Hanifan Group
Cross Streets:	Iron Mountain Road & Tee Pee Lane		Eastland Co., LLC
File Number:	F:\PW Flood\DSMEMOS\DS5199C.docx		Bart Anderson, P.E., DevCo
Parcel Number:	125-06-501-001, 125-06-701-001, 125-07-501-005		CCRFCD NDOT
Zoning Action:	Eastland Development Agreement		
FEMA Flood Zone	YES	NO	X
Proposed Storm Drain	YES	X	NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1 st Submittal	10/3/2019	11/27/2019	See Comments Below	\$400.00	3596425: \$400
2 nd Submittal	2/17/2020	3/18/2020		\$400.00	3744731: \$400
3 rd Submittal	7/19/2021	8/16/2021	Approved	\$100.00	4379910: \$100
TOTAL FEES (LDDRS):				\$900.00	----

REMARKS:

3rd Submittal: Update #1 to extend the Iron Mountain storm drain west to US-95 and north within Sky Pointe Drive.

SUNSTONE – Phase 1A Infrastructure Improvements as well as the Master Study (DS5081) are predicated upon the completion of the ultimate condition offsite drainage facilities impacting the SUNSTONE development being in place prior to issuance of certificates of occupancy. Permits for development within Designated Builder Parcels shall not be issued if the associated Master Plan facilities are not under construction.

The Master Drainage Study for the subject project has been reviewed and:

X	is approved subject to conformance to all City standards and the following conditions:
	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Nevada Department of Transportation concurrence.

The SUNSTONE – Phase 1A Infrastructure includes storm drain facilities that are sized based upon the design parameter of US-95 being a flow cut-off. **This Study assumes ultimate condition offsite drainage facilities impacting the SUNSTONE development will be in place prior to issuance of certificates of occupancy.** The ultimate condition infrastructure drainage facilities that are assumed to be in place include:

- The Moccasin Master Plan Regional Facility – Upper Las Vegas Wash to west of US-95. This includes the Interim Collection Facility west of US-95.

- Skye Canyon Detention Basin #2.
- Skye Canyon Phase 3A regional Facility – Skye Canyon Park Dr. to Iron Mountain Rd.
- The US-95 Local Facility – Brent Lane to Kyle Canyon Interchange. This connects into the existing MPU Facility along US-95.

The construction of these Ultimate Facilities will make the west side of US 95 a 100-yr cutoff through the reach south of the Moccasin Master Plan Regional Facility crossing, thereby meeting the full intent of the CCRFCD Master Plan.

Changes and timing of the corresponding infrastructure improvements that protect the SUNSTONE Development shall require Updating the Master Drainage Study Phasing.

1. The SUNSTONE - Phase 1A Infrastructure Improvements include the following roadways:
 - Iron Mountain Road – Skye Canyon Park Drive to Tee Pee Lane
 - Tee Pee Lane – Iron Mountain Road to Brent Lane
2. The Storm Drain System design includes lateral stubs at most Designated Builder Parcels that will convey the 100-year Ultimate flows from each parcel. Technical Drainage Studies are required for each of the Designated Builder Parcels and shall provide on-site collection for the 100-year facilities
3. Structural plans for the storm drain improvements including special junction structures and modified manholes and drop inlets must be submitted for review. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the Building Department for processing. The engineer must provide a copy of Building Department approval of the structures to *Flood Control* prior to final acceptance of the drainage study.
4. Technical drainage studies are required for each of the Designated Builder Parcels. The technical drainage studies for the Designated Builder Parcels shall not be submitted until the conditional approval of the pertinent infrastructure drainage study is obtained. Final approval for the infrastructure drainage study shall be obtained prior to conditional approval of the impacted Builder Parcels drainage studies.
5. Building permits for the homes within the individual Designated Builder Parcels shall not be issued until construction of the street and flood control infrastructure around the Designated Builder Parcels is substantially complete or interim protection is provided per the approved technical drainage study.
6. The interim drainage channels and sumps adjacent to the infrastructure roadways are the Maintenance responsibility of the Master Developer.
7. The project proposes to build temporary drainage facilities including drainage berms/swales over the *Phase 1A Infrastructure* site. Interim drainage facilities are normally shown on the Improvement Plans, bonded for construction, and bonded under a separate Maintenance Agreement. As an alternative to including interim drainage improvements that are privately maintained as a part of the *Phase 1A Infrastructure*, and prior to the final plan approval for each set of improvement plans that will be bonded separately, the Improvement Plans shall show concrete pads and rip-rap berms at the culvert stubs for interim flows, and the developer must complete a ***Maintenance and Liability Agreement*** and bond for 100% of the costs. The Maintenance Bond shall include exhibits showing the interim drainage improvements at each culvert and the associated costs to complete the improvements. This shall be in the form of a 50% cash bond and a 50% standard bond for Maintenance. The cash bond gives the City the ability to perform work and draw down funds as needed in the interim condition. The engineer must submit an estimate of the quantities for the construction of the facilities and an exhibit that adequately shows the location and limits of the drainage facilities to *City Flood Control* for approval. Once the drainage study is conditionally approved, the engineer/developer should contact the *City's Land Development Section* (702-229-6371) to begin the agreement process.

In order for the maintenance bond to be released in the future, a drainage update/letter will be required to justify that the berms/swales are no longer necessary and can be removed.

A. Iron Mountain Road Improvement Plans:

OS-1: Provide fencing around the headwall at the storm drain system head works at the north end of the subject site.

DT-1: Call out Type II for 12' storm drain access road shown in Detail E.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Update and accepted by the *City of Las Vegas Flood Control Section*. Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the *City of Las Vegas* reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see <http://ndep.nv.gov/bwpc/storm01.htm> or call (775) 687-9429.

END OF REMARKS

JKS/PBJ

T/R/S: T19S/R60E/6 & 7

AREA G-6 & 7

Referenced WSPG Model

T1 EST1911: SUNSTONE IM & TP
T2 MAINLINE (MAIN)

18 PROPOSED DRAINAGE CONDITION									
SO	1000.0002704.970	30						2706.970	
R	1108.9502706.060	30	.013						0.0
WE	1108.9502706.060	1							
R	1109.9502706.070	1	.015						0.0
JX	1110.9502706.080	1	1	.015			2706.080		90.0
R	1112.9502706.160	1	.015						0.0
WX	1112.9502706.160	30							
R	1501.6802721.730	30	.013						0.0
R	1892.4102733.850	30	.013						0.0
R	2281.8702745.128	30	.013						6.0
JX	2284.3702745.200	30	24	.013	14.0		2745.700		37.0
R	2456.5602749.517	30	.013						12.0
R	2457.3932749.538	30	.013						12.0
R	2458.2272749.559	30	.013						11.0
R	2459.0602749.580	30	.013						11.0
R	2625.1502754.280	30	.013						5.0
R	2875.1502758.640	30	.013						4.0
R	3045.1502761.030	30	.013						5.0
R	3196.6202762.958	30	.013						5.0
R	3197.8702762.974	30	.013						15.0
R	3199.1202762.990	30	.013						15.0
R	3229.3102763.140	30	.013						15.0
SH	3229.3102763.140	30							
CD	24	4	1	0.000	2.000				
CD	30	4	1	0.000	2.500				
CD	1	3	0	0.000	5.000				
Q					25.000				

WSPG MODEL HAS BEEN REVISED

W S P G W - EDIT LISTING - Version 14.10
 WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD	SECT	CHN	NO OF	AVE	PIER	HEIGHT	1	BASE	ZL	ZR	INV	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CODE	NO	TYPE	PIER/PIP	WIDTH	DIAMETER	WIDTH					DROP										

CD	24	4	1		2.000																
CD	30	4	1		2.500																
CD	1	3	0	.000	5.000	3.500	.000	.000	.000	.000	.00										

PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

EST1911: SUNSTONE IM & TP

HEADING LINE NO 2 IS -

MAINLINE (MAIN)

HEADING LINE NO 3 IS -

PROPOSED DRAINAGE CONDITION

W S P G W

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1	IS	A	SYSTEM	OUTLET	*	STATION	INVERT	SECT												

ELEMENT NO	2	IS	A	REACH		*	1000.000	2704.970	30												

ELEMENT NO	3	IS	A	WALL	ENTRANCE	*	1108.950	2706.060	30												

ELEMENT NO	4	IS	A	REACH		*	1108.950	2706.060	1												

ELEMENT NO	5	IS	A	JUNCTION		*	1109.950	2706.070	1												

ELEMENT NO	6	IS	A	REACH		*	1110.950	2706.080	1												

ELEMENT NO	7	IS	A	WALL	EXIT	*	1112.950	2706.160	1												

ELEMENT NO	8	IS	A	REACH		*	1112.950	2706.160	30												

ELEMENT NO	9	IS	A	REACH		*	1501.680	2721.730	30												

ELEMENT NO	10	IS	A	REACH		*	1892.410	2733.850	30												

U/S DATA		STATION	INVERT	SECT	MAIN. EDT				RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	11 IS A JUNCTION	2281.870	2745.128	30	N	.013	*	*	.000	6.000	1	
U/S DATA		STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	INVERT-3	INVERT-4	PHI 3	PHI 4
		2284.370	2745.200	30	24	0	.013	14.000	.000	2745.700	.000	37.000
									RADIUS	ANGLE		.000
PAGE NO 3												
W S P G W												
WATER SURFACE PROFILE - ELEMENT CARD LISTING												
ELEMENT NO	12 IS A REACH	STATION	INVERT	SECT	*							
U/S DATA		2456.560	2749.517	30	N	.013			RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	13 IS A REACH	STATION	INVERT	SECT	*				.000	.000	12.000	1
U/S DATA		2457.393	2749.538	30	N	.013			RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	14 IS A REACH	STATION	INVERT	SECT	*				.000	.000	12.000	0
U/S DATA		2458.227	2749.559	30	N	.013			RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	15 IS A REACH	STATION	INVERT	SECT	*				.000	.000	11.000	0
U/S DATA		2459.060	2749.580	30	N	.013			RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	16 IS A REACH	STATION	INVERT	SECT	*				.000	.000	11.000	0
U/S DATA		2625.150	2754.280	30	N	.013			RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	17 IS A REACH	STATION	INVERT	SECT	*				.000	.000	5.000	1
U/S DATA		2875.150	2758.640	30	N	.013			RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	18 IS A REACH	STATION	INVERT	SECT	*				.000	.000	4.000	1
U/S DATA		3045.150	2761.030	30	N	.013			RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	19 IS A REACH	STATION	INVERT	SECT	*				.000	.000	5.000	1
U/S DATA		3196.620	2762.958	30	N	.013			RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	20 IS A REACH	STATION	INVERT	SECT	*				.000	.000	15.000	1
U/S DATA		3197.870	2762.974	30	N	.013			RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	21 IS A REACH	STATION	INVERT	SECT	*				.000	.000	15.000	0
U/S DATA		3199.120	2762.990	30	N	.013			RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	22 IS A REACH	STATION	INVERT	SECT	*				.000	.000	15.000	0
U/S DATA		3229.310	2763.140	30	N	.013			RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	23 IS A SYSTEM HEADWORKS	STATION	INVERT	SECT	*			*	.000	.000	.000	0
U/S DATA		3229.310	2763.140	30								
W S ELEV .000												

EST1911: SUNSTONE IM & TP
MAINLINE (MAIN)
WATER SURFACE PROFILE LISTING

Date: 7-13-2021 Time:12:50:51

PROPOSED DRAINAGE CONDITION

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	2704.970	1.951	2706.921	39.10	9.51	1.41	2708.33	.00	2.11	2.07	2.500	.000	.00	1 .0
25.499	.0100					.0100	.26	1.95	1.19	1.95	.013	.00	.00	PIPE
1025.499	2705.225	1.951	2707.176	39.10	9.51	1.41	2708.58	.00	2.11	2.07	2.500	.000	.00	1 .0
68.014	.0100					.0098	.66	1.95	1.19	1.95	.013	.00	.00	PIPE
1093.513	2705.906	2.001	2707.906	39.10	9.29	1.34	2709.24	.00	2.11	2.00	2.500	.000	.00	1 .0
15.437	.0100					.0091	.14	2.00	1.13	1.95	.013	.00	.00	PIPE
1108.950	2706.060	2.109	2708.169	39.10	8.85	1.22	2709.39	.00	2.11	1.82	2.500	.000	.00	1 .0
WALL ENTRANCE														
1108.950	2706.060	4.082	2710.142	39.10	2.74	.12	2710.26	.00	1.57	3.50	5.000	3.500	.00	0 .0
1.000	.0100					.0006	.00	4.08	.24	1.35	.015	.00	.00	BOX
1109.950	2706.070	4.072	2710.142	39.10	2.74	.12	2710.26	.00	1.57	3.50	5.000	3.500	.00	0 .0
JUNCT STR	.0100					.0006	.00	4.07	.24		.015	.00	.00	BOX
1110.950	2706.080	4.063	2710.144	39.00	2.74	.12	2710.26	.00	1.57	3.50	5.000	3.500	.00	0 .0
2.000	.0399					.0006	.00	4.06	.24	.83	.015	.00	.00	BOX
1112.950	2706.160	3.980	2710.140	39.00	2.80	.12	2710.26	.00	1.57	3.50	5.000	3.500	.00	0 .0
WALL EXIT														
1112.950	2706.160	3.981	2710.140	39.00	7.95	.98	2711.12	.00	2.11	.00	2.500	.000	.00	1 .0
11.984	.0401					.0090	.11	3.98	.00	1.21	.013	.00	.00	PIPE

WATER SURFACE PROFILE LISTING

Date: 7-13-2021 Time:12:50:51

EST1911: SUNSTONE IM & TP

MAINLINE (MAIN)

PROPOSED DRAINAGE CONDITION

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.	Height/FT or I.D.	Base Wt	ZL	No With Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
1124.934	2706.640	3.609	2710.249	39.00	7.95	.98	2711.23	.00	2.11	.00	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
HYDRAULIC JUMP															
1124.934	2706.640	1.213	2707.853	39.00	16.51	4.23	2712.09	.00	2.11	2.50	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
54.084	.0401					.0401	2.17		2.99	1.21	.013	.00	.00	PIPE	
1179.018	2708.806	1.213	2710.019	39.00	16.51	4.23	2714.25	.00	2.11	2.50	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
141.980	.0401					.0400	5.68		2.99	1.21	.013	.00	.00	PIPE	
1320.998	2714.493	1.214	2715.707	39.00	16.50	4.23	2719.93	.00	2.11	2.50	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
137.353	.0401					.0376	5.16		2.99	1.21	.013	.00	.00	PIPE	
1458.351	2719.994	1.260	2721.254	39.00	15.73	3.84	2725.10	.00	2.11	2.50	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
43.329	.0401					.0331	1.43		2.78	1.21	.013	.00	.00	PIPE	
1501.680	2721.730	1.308	2723.038	39.00	15.00	3.49	2726.53	.00	2.11	2.50	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
245.368	.0310					.0310	7.61		2.59	1.31	.013	.00	.00	PIPE	
1747.048	2729.341	1.308	2730.649	39.00	15.00	3.49	2734.14	.00	2.11	2.50	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
145.362	.0310					.0300	4.36		2.59	1.31	.013	.00	.00	PIPE	
1892.410	2733.850	1.336	2735.186	39.00	14.61	3.32	2738.50	.00	2.11	2.49	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
85.135	.0290					.0290	2.47		2.49	1.34	.013	.00	.00	PIPE	
1977.546	2736.315	1.336	2737.651	39.00	14.61	3.32	2740.97	.00	2.11	2.49	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
146.109	.0290					.0280	4.09		2.49	1.34	.013	.00	.00	PIPE	

EST1911: SUNSTONE IM & TP

MAINLINE (MAIN)

PROPOSED DRAINAGE CONDITION

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.-FT	Height/ I.D.	Base Wt	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2123.655	2740.546	1.364	2741.910	39.00	14.24	3.15	2745.06	.00	2.11	2.49	2.500	.000	.00	1 .0
66.286	.0290	- -	- -	- -	- -	.0255	1.69	1.36	2.39	1.34	.013	.00	.00	PIPE
2189.941	2742.466	1.418	2743.884	39.00	13.57	2.86	2746.74	.00	2.11	2.48	2.500	.000	.00	1 .0
31.419	.0290	- -	- -	- -	- -	.0225	.71	1.42	2.22	1.34	.013	.00	.00	PIPE
2221.360	2743.376	1.475	2744.851	39.00	12.94	2.60	2747.45	.00	2.11	2.46	2.500	.000	.00	1 .0
19.449	.0290	- -	- -	- -	- -	.0199	.39	1.47	2.06	1.34	.013	.00	.00	PIPE
2240.809	2743.939	1.535	2745.474	39.00	12.34	2.36	2747.84	.00	2.11	2.43	2.500	.000	.00	1 .0
13.332	.0290	- -	- -	- -	- -	.0176	.23	1.53	1.91	1.34	.013	.00	.00	PIPE
2254.142	2744.325	1.599	2745.924	39.00	11.77	2.15	2748.07	.00	2.11	2.40	2.500	.000	.00	1 .0
9.572	.0290	- -	- -	- -	- -	.0156	.15	1.60	1.76	1.34	.013	.00	.00	PIPE
2263.714	2744.602	1.667	2746.269	39.00	11.22	1.95	2748.22	.00	2.11	2.36	2.500	.000	.00	1 .0
6.960	.0290	- -	- -	- -	- -	.0139	.10	1.67	1.63	1.34	.013	.00	.00	PIPE
2270.674	2744.804	1.740	2746.543	39.00	10.70	1.78	2748.32	.00	2.11	2.30	2.500	.000	.00	1 .0
5.008	.0290	- -	- -	- -	- -	.0124	.06	1.74	1.50	1.34	.013	.00	.00	PIPE
2275.682	2744.949	1.818	2746.767	39.00	10.20	1.62	2748.38	.00	2.11	2.23	2.500	.000	.00	1 .0
3.429	.0290	- -	- -	- -	- -	.0111	.04	1.82	1.37	1.34	.013	.00	.00	PIPE
2279.110	2745.048	1.904	2746.952	39.00	9.72	1.47	2748.42	.00	2.11	2.13	2.500	.000	.00	1 .0
2.049	.0290	- -	- -	- -	- -	.0100	.02	1.90	1.25	1.34	.013	.00	.00	PIPE

EST1911: SUNSTONE IM & TP

MAINLINE (MAIN)

PROPOSED DRAINAGE CONDITION

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.	Height/FT or I.D.	Base Wt	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
2281.160	2745.107	1.998	2747.106	39.00	9.27	1.33	2748.44	.00	2.11	2.00	2.500	.000	.00	1	.0
.710	.0290					.0091	.01	2.00	1.13	1.34	.013	.00	.00	PIPE	
2281.870	2745.128	2.107	2747.234	39.00	8.84	1.21	2748.45	.00	2.11	1.82	2.500	.000	.00	1	.0
JUNCT STR	.0288					.0062	.02	2.11	1.00		.013	.00	.00	PIPE	
2284.370	2745.200	3.166	2748.365	25.00	5.09	.40	2748.77	.00	1.70	.00	2.500	.000	.00	1	.0
27.908	.0251					.0037	.10	3.17	.00	1.08	.013	.00	.00	PIPE	
2312.278	2745.900	2.587	2748.487	25.00	5.09	.40	2748.89	.00	1.70	.00	2.500	.000	.00	1	.0
HYDRAULIC JUMP															
2312.278	2745.900	1.076	2746.976	25.00	12.37	2.38	2749.35	.00	1.70	2.48	2.500	.000	.00	1	.0
29.331	.0251					.0251	.74	1.08	2.41	1.08	.013	.00	.00	PIPE	
2341.629	2746.635	1.076	2747.712	25.00	12.37	2.38	2750.09	.00	1.70	2.48	2.500	.000	.00	1	.0
114.931	.0251					.0264	3.03	1.08	2.41	1.08	.013	.00	.00	PIPE	
2456.560	2749.517	1.046	2750.563	25.00	12.84	2.56	2753.12	.00	1.70	2.47	2.500	.000	.00	1	.0
.833	.0252					.0278	.02	1.05	2.55	1.07	.013	.00	.00	PIPE	
2457.393	2749.538	1.046	2750.584	25.00	12.85	2.56	2753.15	.00	1.70	2.47	2.500	.000	.00	1	.0
.834	.0252					.0278	.02	1.05	2.55	1.07	.013	.00	.00	PIPE	
2458.227	2749.559	1.045	2750.604	25.00	12.86	2.57	2753.17	.00	1.70	2.47	2.500	.000	.00	1	.0
.833	.0252					.0279	.02	1.05	2.55	1.07	.013	.00	.00	PIPE	

*****														No Wth
Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Height/ Base Wt	ZL	Prs/Pip	
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
2459.060	2749.580	1.045	2750.625	25.00	12.86	2.57	2753.19	.00	1.70	2.47	2.500	.000	.00	1 .0
86.417	.0283					.0268	2.32	1.04	2.55	1.04	.013	.00	.00	PIPE
2545.477	2752.026	1.069	2753.095	25.00	12.48	2.42	2755.51	.00	1.70	2.47	2.500	.000	.00	1 .0
43.046	.0283					.0241	1.04	1.07	2.44	1.04	.013	.00	.00	PIPE
2588.522	2753.244	1.109	2754.352	25.00	11.90	2.20	2756.55	.00	1.70	2.48	2.500	.000	.00	1 .0
22.305	.0283					.0212	.47	1.11	2.28	1.04	.013	.00	.00	PIPE
2610.828	2753.875	1.150	2755.025	25.00	11.34	2.00	2757.02	.00	1.70	2.49	2.500	.000	.00	1 .0
14.322	.0283					.0186	.27	1.15	2.13	1.04	.013	.00	.00	PIPE
2625.150	2754.280	1.193	2755.473	25.00	10.81	1.82	2757.29	.00	1.70	2.50	2.500	.000	.00	1 .0
90.448	.0174					.0174	1.58	1.19	1.98	1.19	.013	.00	.00	PIPE
2715.598	2755.857	1.193	2757.050	25.00	10.81	1.82	2758.87	.00	1.70	2.50	2.500	.000	.00	1 .0
115.115	.0174					.0167	1.92	1.19	1.98	1.19	.013	.00	.00	PIPE
2830.713	2757.865	1.224	2759.089	25.00	10.46	1.70	2760.79	.00	1.70	2.50	2.500	.000	.00	1 .0
44.437	.0174					.0150	.67	1.22	1.89	1.19	.013	.00	.00	PIPE
2875.150	2758.640	1.271	2759.910	25.00	9.98	1.55	2761.46	.00	1.70	2.50	2.500	.000	.00	1 .0
59.935	.0141					.0141	.84	1.27	1.76	1.27	.013	.00	.00	PIPE
2935.085	2759.483	1.271	2760.753	25.00	9.98	1.55	2762.30	.00	1.70	2.50	2.500	.000	.00	1 .0
110.065	.0141					.0133	1.47	1.27	1.76	1.27	.013	.00	.00	PIPE

EST1911: SUNSTONE IM & TP
WATER SURFACE PROFILE LISTING

MAINLINE (MAIN)

PROPOSED DRAINAGE CONDITION

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT	Base Wt or I.D.	No Wth Prs/Pip	
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
3045.150	2761.030	1.312	2762.343	25.00	9.58	1.42	2763.77	.00	1.70	2.50	2.500	.000	.00	1 .0
92.221	.0127					.0119	1.10	1.31	1.65	1.31	.013	.00	.00	PIPE
3137.371	2762.204	1.359	2763.563	25.00	9.17	1.31	2764.87	.00	1.70	2.49	2.500	.000	.00	1 .0
30.587	.0127					.0106	.32	1.36	1.54	1.31	.013	.00	.00	PIPE
3167.958	2762.593	1.412	2764.005	25.00	8.74	1.19	2765.19	.00	1.70	2.48	2.500	.000	.00	1 .0
15.267	.0127					.0094	.14	1.41	1.43	1.31	.013	.00	.00	PIPE
3183.225	2762.788	1.469	2764.256	25.00	8.34	1.08	2765.34	.00	1.70	2.46	2.500	.000	.00	1 .0
8.611	.0127					.0083	.07	1.47	1.33	1.31	.013	.00	.00	PIPE
3191.836	2762.897	1.529	2764.426	25.00	7.95	.98	2765.41	.00	1.70	2.44	2.500	.000	.00	1 .0
4.784	.0127					.0073	.04	1.53	1.23	1.31	.013	.00	.00	PIPE
3196.620	2762.958	1.592	2764.550	25.00	7.58	.89	2765.44	.00	1.70	2.40	2.500	.000	.00	1 .0
1.250	.0129					.0067	.01	1.59	1.14	1.30	.013	.00	.00	PIPE
3197.870	2762.974	1.622	2764.596	25.00	7.42	.85	2765.45	.00	1.70	2.39	2.500	.000	.00	1 .0
.323	.0127					.0065	.00	1.62	1.10	1.31	.013	.00	.00	PIPE
3198.193	2762.978	1.632	2764.610	25.00	7.36	.84	2765.45	.00	1.70	2.38	2.500	.000	.00	1 .0
.927	.0127					.0061	.01	1.63	1.09	1.31	.013	.00	.00	PIPE
3199.120	2762.990	1.704	2764.694	25.00	7.02	.76	2765.46	.00	1.70	2.33	2.500	.000	.00	1 .0
14.491	.0050					.0054	.08	1.70	1.00	1.80	.013	.00	.00	PIPE

Page 6

Date: 7-13-2021 Time:12:50:51

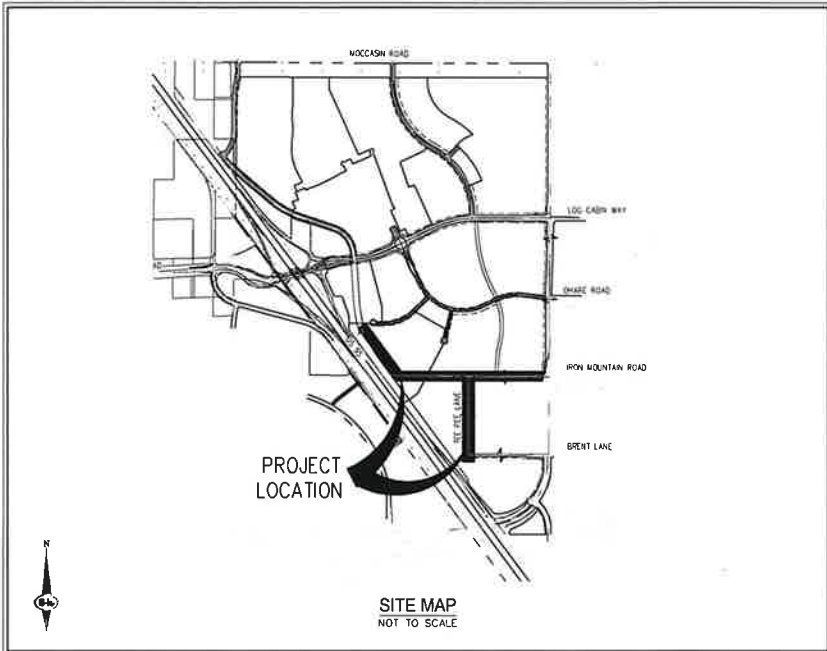
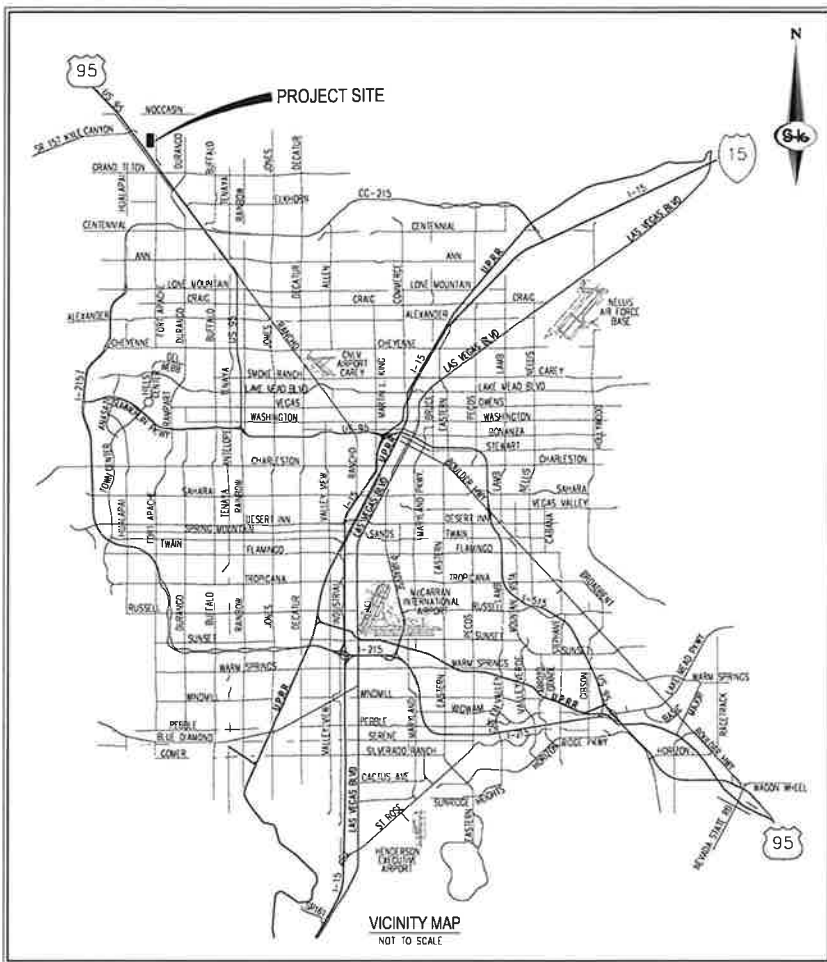
EST1911: SUNSTONE IM & TP
WATER SURFACE PROFILE LISTING

MAINLINE (MAIN)

PROPOSED DRAINAGE CONDITION

*****																	*****																
Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.-FT	Height/ or I.D.	Base Wt	ZL	No Wth Prs/pip	*****										ZR	Type	Ch					
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall				*****																	
3213.611	2763.062	1.779	2764.841	25.00	6.69	.70	2765.54	.00	1.70	2.26	2.500	.000	.00	1	.0																		
15.699	.0050					.0050	.08	1.78	.92	1.80	.013	.00	.00		PIPE																		
3229.310	2763.140	1.787	2764.927	25.00	6.66	.69	2765.62	.00	1.70	2.26	2.500	.000	.00	1	.0																		

Referenced Improvement Plans



IMPROVEMENT PLANS FOR SUNSTONE PHASE 1 IRON MOUNTAIN ROAD AND TEE PEE LANE

CITY OF LAS VEGAS, NEVADA

APN: 125-06-701-001, 125-07-501-005, 125-07-602-001,
125-07-602-005, 125-07-501-003, 125-07-501-004



SHEET INDEX		
NO.	SHEET	TITLE
1	CS-1	COVER SHEET
2	CS-2	GENERAL NOTES
3	CS-3	ABBREVIATIONS, LEGEND, AND QUANTITIES
4	PP-1	PLAN & PROFILE I - "MR" 10+00.00 TO "MR" 15+50.00
5	PP-2	PLAN & PROFILE II - "MR" 15+50.00 TO "MR" 22+00.00
6	PP-3	PLAN & PROFILE III - "MR" 22+00.00 TO "MR" 28+50.00
7	PP-4	PLAN & PROFILE IV - "TPI" 9+00.00 TO "TPI" 13+50.00
8	PP-5	PLAN & PROFILE V - "TPI" 13+50.00 TO "TPI" 20+00.00
9	PP-6	PLAN & PROFILE VI - "TPI" 20+00.00 TO "TPI" 24+00.00
10	PP-7	PLAN & PROFILE VII - "BL" 9+00.00 TO "BL" 13+50.00
11	MU	MASTER UTILITY PLAN
12	UT-1	UTILITY PLAN I - "MR" 22+00.00 TO "MR" 28+50.00
13	UT-2	UTILITY PLAN II - "TPI" 9+00.00 TO "TPI" 13+50.00
14	UT-3	UTILITY PLAN III - "TPI" 13+50.00 TO "TPI" 20+00.00
15	UT-4	UTILITY PLAN IV - "TPI" 20+00.00 TO "TPI" 24+00.00
16	UT-5	UTILITY LATERAL I
17	UT-6	WATER EASEMENT I
18	DT-1	DETAIL SHEET I
19	DT-2	DETAIL SHEET II
20	ST-1	SIGNING & STRIPING I - "MR" 9+50 TO "MR" 22+00
21	ST-2	SIGNING & STRIPING II - "MR" 22+00 TO "MR" 26+62
22	ST-3	SIGNING & STRIPING III - "TPI" 9+00 TO "TPI" 22+00
23	LL-1	LIGHTING & ITS I - "MR" 9+50 TO "MR" 22+00
24	LL-2	LIGHTING & ITS II - "MR" 22+00 TO "MR" 26+62
25	LL-3	LIGHTING & ITS III - "TPI" 9+00 TO "TPI" 22+00
26	TS-1	PEDESTRIAN FLASHER PLAN 1
27	TS-2	PEDESTRIAN FLASHER PLAN 2
28	S-1	MODIFIED TYPE CM2 DROP INLET DETAILS
29	HC-1	HORIZONTAL CONTROL PLAN
30	HC-2	HORIZONTAL CONTROL PLAN
31	HC-3	HORIZONTAL CONTROL PLAN
32	HC-4	HORIZONTAL CONTROL PLAN
33	HC-5	HORIZONTAL CONTROL PLAN
34	HC-6	HORIZONTAL CONTROL PLAN
35	HC-7	HORIZONTAL CONTROL PLAN
36	HC-8	HORIZONTAL CONTROL PLAN
37	HC-9	HORIZONTAL CONTROL PLAN
38	HC-10	HORIZONTAL CONTROL PLAN
39	HC-11	HORIZONTAL CONTROL PLAN
40	HC-12	HORIZONTAL CONTROL PLAN
41	HC-13	HORIZONTAL CONTROL PLAN
42	HC-14	HORIZONTAL CONTROL PLAN
43	HC-15	HORIZONTAL CONTROL PLAN
44	HC-16	HORIZONTAL CONTROL PLAN
45	HC-17	HORIZONTAL CONTROL PLAN
46	HC-18	HORIZONTAL CONTROL PLAN
47	HC-19	HORIZONTAL CONTROL PLAN
48	HC-20	HORIZONTAL CONTROL PLAN
49	HC-21	HORIZONTAL CONTROL PLAN
50	HC-22	HORIZONTAL CONTROL PLAN
51	HC-23	HORIZONTAL CONTROL PLAN

NV ENERGY SHEET INDEX ADDENDUM 1		
NO.	SHEET	TITLE
1	---	SHEET 1
2	---	SHEET 2
3	---	SHEET 3
4	---	SHEET 4
5	---	SHEET 5
6	---	SHEET 6
7	---	SHEET 7
8	---	SHEET 8
9	---	SHEET 9
10	---	SHEET 10
11	---	SHEET 11
12	---	SHEET 12
13	---	SHEET 13

OFF-SITE STORM DRAIN SHEET INDEX		
NO.	SHEET	TITLE
1	OS-1	OFF-SITE STORM DRAIN 1
2	OS-2	OFF-SITE STORM DRAIN 2
3	OS-3	OFF-SITE STORM DRAIN 3
4	OS-4	OFF-SITE STORM DRAIN 4
5	OS-5	OFF-SITE STORM DRAIN 5
6	OS-6	OFF-SITE STORM DRAIN 6

BENCHMARK
MONUMENT ID: USDA (1934) 19
U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER
OF U.S. 95 AND KYLE CANYON ROAD
ELEVATION = 2817.61 FEET, 858.810 METERS
NAVD 83 DATUM
PER THE CITY OF LAS VEGAS BENCHMARK BOOK -
2008 ADJUSTMENT (UPDATED 05/24/2010)

BASIS OF BEARINGS
NORTH 00°15'50" WEST, BEING THE BEARING OF THE EAST LINE OF THE
NORTHEAST QUARTER (NE 1/4) OF SECTION 8, TOWNSHIP 19 SOUTH, RANGE 60
EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY
MAP THEREON IN FILE 151, PAGE 14 OF SURVEYS IN THE CLARK COUNTY
RECORDER'S OFFICE, NEVADA

FEMA FLOOD ZONE INFORMATION
THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (OUTSIDE THE 0.2%
ANNUAL CHANCE FLOODPLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM)
PANELS 5000301735C AND 5000301750C BOTH DATED SEPTEMBER 27, 2002

APPROVALS	
Q.V. ENGINEERING OFFICE	
CLV FIRE & RESCUE	
CLV PLANNING DEPARTMENT	
CENTRAL TELEPHONE CO DBA CENTURYLINK	DATE
THE AFFIXED CENTURYLINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUTES AND / OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.	
APPROVED FOR CONSTRUCTION	
LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES PROJECT NO. 137259 - FIRST APPROVED DATE LVWID APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL MAXIMUM AVAILABLE FIRE SPRINKLER FLOW 0 GPM SHEETS: 11, 12, 13, 14	
NV ENERGY	DATE
NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.	
SOUTHWEST GAS CORPORATION	SWG UID DATE
CDX COMMUNICATIONS (LAS VEGAS, INC)	DATE

OWNER NORTHLAND LLC, EASTLAND LLC, EAST OF 95 LLC &/O NINETY FIVE MANAGEMENT, LLC 11411 SOUTHERN HIGHLANDS, SUITE 300 LAS VEGAS, NV 89141 PH: 702-770-5555	DEVELOPER SC EAST LANDCO, LLC 9275 RUSSELL ROAD, SUITE 400 LAS VEGAS, NV 89148 PH: 702-821-4508	ENGINEER SLATER HANIFAN GROUP, INC. a WESTWOOD TEAM 5740 S. ARVILLE STREET, SUITE 216 LAS VEGAS, NV 89118 PH: 702-284-5300 CONTACT: JOSH JOHNSON
--	--	---

M.O.U. ITEMS
TMP-76718 JULY 23, 2019
NONE

DEVIATIONS FROM STANDARDS
NONE

SWPPP NOTE
NOTE: ALL LAND SURFACE AREA DISTURBANCES OVER 1 ACRE REQUIRE A
STORMWATER DISCHARGE PERMIT ISSUED BY THE NEVADA DIVISION OF ENVIRONMENTAL
PROTECTION (NDPEP). A PHASED CONSTRUCTION UNIT IN A CONTIGUOUS SUBDIVISION IS
CONSIDERED UNDER CONSTRUCTION UNTIL ALL STRIPPED SURFACE AREAS HAVE BEEN
COVERED BY PAVING, BUILDING CONSTRUCTION OR PLANTING. A STORMWATER
DISCHARGE PERMIT APPLICATION AND ASSOCIATED INFORMATION MAY BE DOWNLOADED
FROM THE WEB SITE: [HTTP://WWW.STATE.NV.US/DNRC/STORMWATER.HTM](http://www.state.nv.us/dnrc/stormwater.htm). PROJECTS THAT
DISTURB MORE THAN ONE ACRE OF LAND MUST SUBMIT TO NDPEP A "NOTICE OF
INTENT" FOR INCLUSION UNDER STORMWATER PERMIT NO. NV1000000 ALONG WITH THE
APPROPRIATE FILING FEE.

GEOTECHNICAL ENGINEER
PREPARED BY: FIRM
ADDRESS: ADDRESS
PHONE: PHONE
PROJECT NO: PROJECT NUMBER
DATED: DATE

AVOID HITTING OVERHEAD
POWER LINES IT'S
COSTLY
CALL BEFORE
YOU DIG
OVERHEAD
1-702-227-2929

FAST
Call before you dig
UnderGround
1-702-432-5300
FREEMAN & ARTERIAL SYSTEM
OF TRANSPORTATION (F.A.S.T.)

Call before you Dig
AVOID CUTTING UNDERGROUND
UTILITY LINES IT'S COSTLY
Call
811
OR
1-800-642-2444

SLATER
HANIFAN
GROUP
a Westwood team

5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

CITY OF LAS VEGAS

SC EAST LANDCO, LLC

SUNSTONE PHASE 1
IRON MOUNTAIN ROAD AND TEE PEE LANE
COVER SHEET

DATE: 09/26/19

DRAFTER: SB/JR

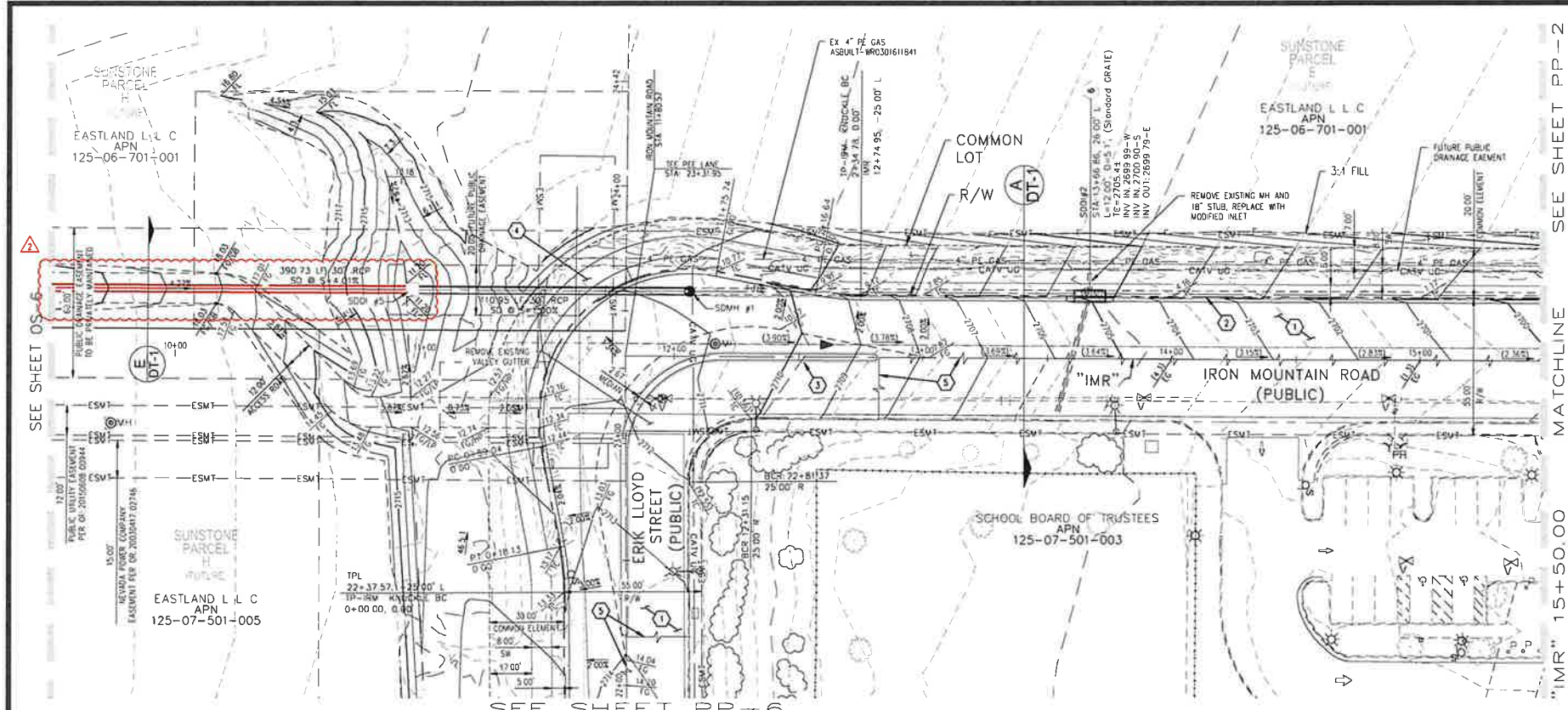
DESIGNER: BC

CHECKED: JJ

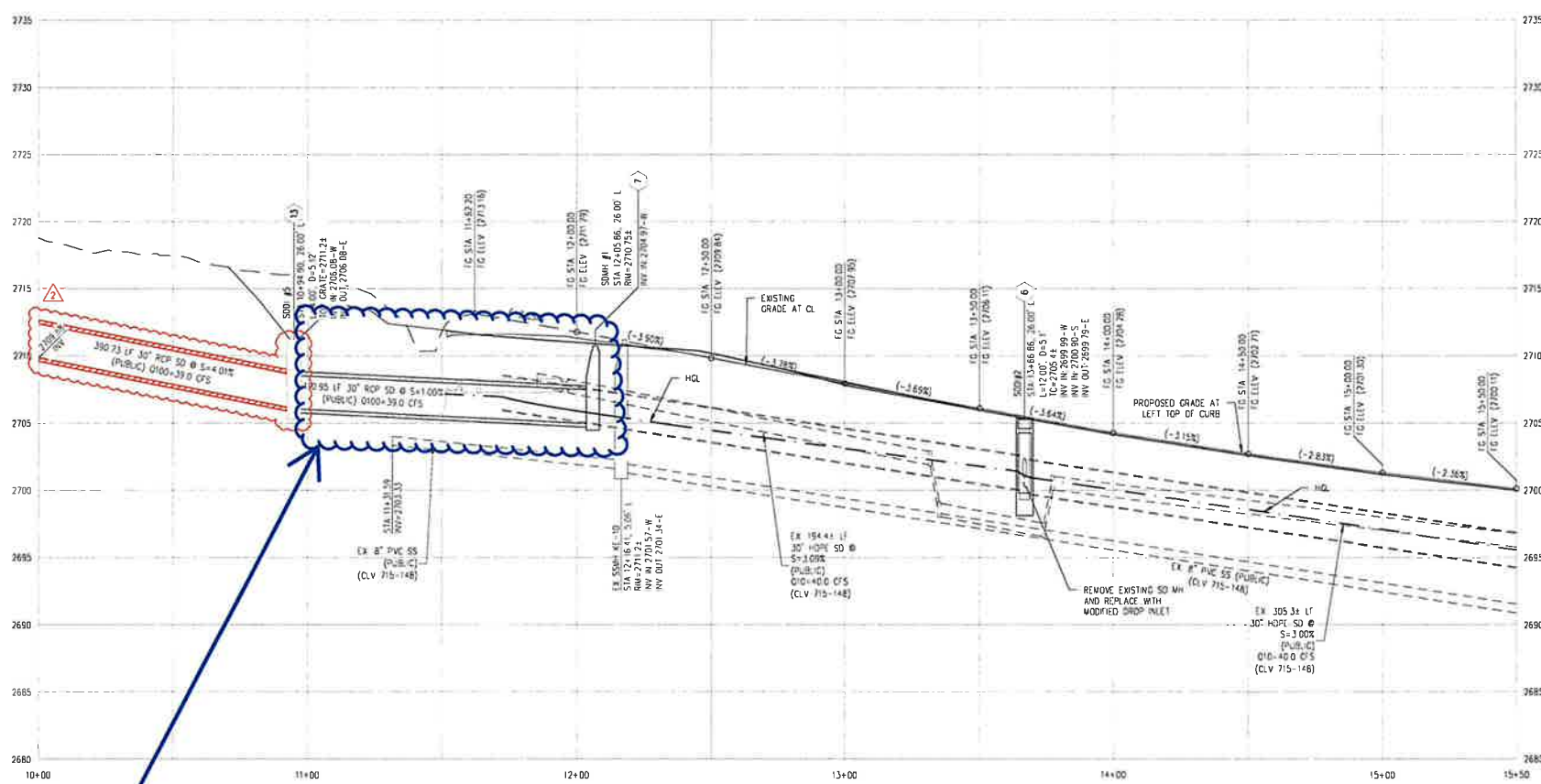
PROJECT NO.
EST1911-000

ENGINEER - STATE OF NEVADA
JOSH JOHNSON
Exp. 10/2013
No. 15785
07/14/2021

CS-1
SHEET 1 OF 51
L20-00626
107V8289



IRON MOUNTAIN ROAD - PLAN VIEW
(PUBLIC)



IRON MOUNTAIN ROAD - PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 6'

SDMH#1 SHIFTED TO EAST;
PIPE LENGTHS AND INVERT
AND RIMS UPDATED

CALL SOUTHWEST GAS AT
702-651-2111 FOR STANDBY
WHEN EXCAVATING OVER OR
NEAR HIGH PRESSURE GAS
LINES

SURVEY NOTE
OWNER RESPONSIBLE TO PROVIDE
SURVEY MONUMENTATION AS SHOWN
AND TO REPLACE ALL SURVEY
MONUMENTATION DAMAGED,
DISTURBED, DESTROYED, OR
OBSOLETE DURING CONSTRUCTION

ELEVATION NOTE
ADD 3600 TO ALL SPOT GRADES WHERE THE HUNDREDS AND
THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E.
0100 REPRESENTS 180100)

DISCLAIMER NOTE
1) EXISTING UTILITY LOCATIONS SHOWN HEREON ARE
APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S
RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND
HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND
UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO
REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE
SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY
FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.
2) FOR ROADWAY MOVING AND HALF STREET IMPROVEMENTS
THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM
EXISTING PAVEMENT SLOPE LINE TO PROPOSED EDGE OF
PAVEMENT OR PROJECTED TOP OF CURB PRIOR TO SUBGRADE
PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE.
IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET
AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE
ENGINEER.

GRADING NOTES
1. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND
DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE
ENGINEER.
2. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY
SWPPP.
3. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS
NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
4. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
5. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE
BONDED FOR AND INSPECTED.
6. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE
BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS
BUILDING DEPARTMENT.
7. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING
UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF
ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO
PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER
SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES
PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE
FOR REPAIR/REPLACING FACILITIES IF ENGINEER/OWNER IS NOT
NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION
COMMENCING.
8. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS
PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT
(MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB
EXISTS) WITHIN THE SIGHT VISIBILITY ZONES.

**LAS VEGAS VALLEY CONSTRUCTION
SITE BMP GUIDELINES**
(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560
SQ FT))
1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR
AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT,
MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL
POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR
ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK
COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES
ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION
PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM
ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT
PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER
AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE
SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE
STANDARDS SPECIFIED IN CLARK COUNTY TITLE 24.40 AND IN
THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE
MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE
INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE
AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION
ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR
PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY, REFER
TO THE NEVADA STORMWATER GENERAL PERMIT FOR
CONSTRUCTION ACTIVITY NVR100000, SECTION III A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL
INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE
OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO
PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND
ALL BMPS WEEKLY AND WITHIN 24 HOURS AFTER A RAIN
EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS
AGENT SHALL UPDATE OR MODIFY THE STORMWATER
POLLUTION PREVENTION PLAN AS NECESSARY. SOME
EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS
SUSPENSION OF LAND DISTURBANCE ACTIVITIES REFER TO THE
NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION
ACTIVITY NVR100000, SECTION III A.12.
5. ACCUMULATED SEDIMENT IN BMPs SHALL BE REMOVED WITHIN
SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR
TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS
EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN
CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.



CONSTRUCTION NOTES
1. INSTALL 3" ASPHALT PAVEMENT OVER 4" TYPE II
MODIFIED BASE.
2. CONSTRUCT 1" TYPE CURB PER CCAUSD NO. 216.
3. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD NO. 219.
4. CONSTRUCT 6" WIDE SIDEWALK PER CCAUSD NO. 234.
5. SAWCUT AND MATCH EXISTING PAVEMENT PER CCAUSD NO.
5001 AND 503.
6. CONSTRUCT MODIFIED TYPE "CM2" DROP INLET PER
STRUCTURAL DETAILS ON SHEET S-1 & CCAUSD STD
DWG. NO. 421.
7. CONSTRUCT 60" TYPE II MANHOLE PER CCAUSD STD. DWG.
NO. 405.
8. INSTALL BRICK AND MORTAR PLUG PER DETAIL C ON
SHEET DT-1.
9. CONSTRUCT NODOT TYPE 4 MANHOLE PER DETAIL NUMBER
DS-4B.
10. CONSTRUCT 60" TYPE II SD MANHOLE PER CCAUSD STD
DWG. NO. 403.2.
11. CONSTRUCT 60" TYPE II MANHOLE PER CCAUSD STD DWG.
NO. 405.
12. CONSTRUCT 48" TYPE I MANHOLE PER CCAUSD STD DWG.
NO. 405.
13. CONSTRUCT NODOT TYPE 2 DROP INLET (4"x4") PER NODOT
STD DWG DS-32, SEE DETAIL D ON SHEET DT-1.

EXISTING EASEMENTS
E1 RIGHT-OF-WAY GRANTED BY DECISION, DATED JANUARY
16, 2003 BY THE BUREAU OF LAND MANAGEMENT UNDER
SERIAL NUMBER N-75502 TO LAS VEGAS VALLEY WATER
DISTRICT FOR WATER PIPELINE UNDER RIGHT-OF-WAY
GRANT FILED IN THE OFFICE OF THE BUREAU OF LAND
MANAGEMENT OVER A PORTION OF SAID LAND, AS
RECORDED IN THE OFFICE OF THE COUNTY RECORDER OF
CLARK COUNTY, NEVADA ON FEBRUARY 10, 2003 IN BOOK
20030210, AS INSTRUMENT NO. 00538 OF OFFICIAL
RECORDS.
E2 RIGHT-OF-WAY GRANTED BY DECISION, DATED JANUARY
16, 2003 BY THE BUREAU OF LAND MANAGEMENT UNDER
SERIAL NUMBER N-75502-01 TO LAS VEGAS VALLEY
WATER DISTRICT FOR TEMPORARY WORK AREAS FOR A
42" UNDERGROUND WATER PIPELINE UNDER RIGHT-OF-WAY
GRANT FILED IN THE OFFICE OF THE BUREAU OF LAND
MANAGEMENT OVER A PORTION OF SAID LAND, AS
RECORDED IN THE OFFICE OF THE COUNTY RECORDER OF
CLARK COUNTY, NEVADA ON FEBRUARY 10, 2003 IN BOOK
20030210, AS INSTRUMENT NO. 00541 OF OFFICIAL
RECORDS.
E3 EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL
PURPOSES IN THE DOCUMENT RECORDED JUNE 8, 2015 IN
BOOK 20150608 AS INSTRUMENT NO. 00948 OF OFFICIAL
RECORDS.
E4 COVENANTS, CONDITIONS, EASEMENTS AND RESTRICTIONS
IN A FINAL ORDER OF CONDEMNATION RECORDED OCTOBER
2, 2015, IN BOOK 20151002 AS INSTRUMENT NO. 03298
OF OFFICIAL RECORDS.
E5 RIGHT-OF-WAY GRANTED BY DECISION, DATED APRIL 04,
2003, BY THE BUREAU OF LAND MANAGEMENT UNDER
SERIAL NUMBER N-75707 TO NEVADA POWER COMPANY
FOR UNDERGROUND ELECTRICAL DISTRIBUTION LINE UNDER
RIGHT-OF-WAY GRANT FILED IN THE OFFICE OF THE
BUREAU OF LAND MANAGEMENT OVER A PORTION OF SAID
LAND, AS RECORDED IN THE OFFICE OF THE COUNTY
RECORDER OF CLARK COUNTY, NEVADA ON APRIL 17, 2003
IN BOOK 20030417, AS INSTRUMENT NO. 02746 OF
OFFICIAL RECORDS.
E6 A RIGHT-OF-WAY GRANTED BY DECISION, DATED AUGUST
21, 1970, BY THE BUREAU OF LAND MANAGEMENT UNDER
SERIAL NUMBER NEV013376 ET (N-171) TO STATE OF
NEVADA, DEPARTMENT OF HIGHWAYS FOR HIGHWAY (U.S.
93) INCLUDING ACCESS RIGHTS UNDER RIGHT-OF-WAY
GRANT FILED IN THE OFFICE OF THE BUREAU OF LAND
MANAGEMENT OVER A PORTION OF SAID LAND, AS
RECORDED IN THE OFFICE OF THE COUNTY RECORDER OF
CLARK COUNTY, NEVADA ON DECEMBER 22, 1972 IN BOOK
268, AS INSTRUMENT NO. 247599 OF OFFICIAL RECORDS
MANUAL.
E7 AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL
PURPOSES IN THE DOCUMENT RECORDED JUNE 8, 2015 IN
BOOK 20150608 AS INSTRUMENT NO. 00947 OF OFFICIAL
RECORDS.
E8 NODOT EASEMENT PER NEV-043376, N-43063, CC-016234,
CC-016138, CC-016191.
RESERVATIONS, PROVISIONS AND EASEMENTS AS
CONTAINED IN PATENT FROM THE UNITED STATES OF
AMERICA, RECORDED AUGUST 03, 2003, IN BOOK
20030803 OF OFFICIAL RECORDS, AS INSTRUMENT NO.
01359.

FLOOD CERTIFICATION
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE
APPROVED TECHNICAL DRAINAGE STUDY 02-5192 ON FILE AT CITY
OF LAS VEGAS.
07/14/2021
DATE

SOUTHWEST GAS APPROVAL
JORDIN PENNIMAN 2020AP114857 7/9/20
SOUTHWEST GAS CORPORATION DATE

FLOOD ZONE
THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (OUTSIDE THE 0.2% ANNUAL CHANCE
FLOOD PLAIN) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1735E AND
32003C1750E, BOTH DATED SEPTEMBER 27, 2002.



SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5309

CITY OF LAS VEGAS

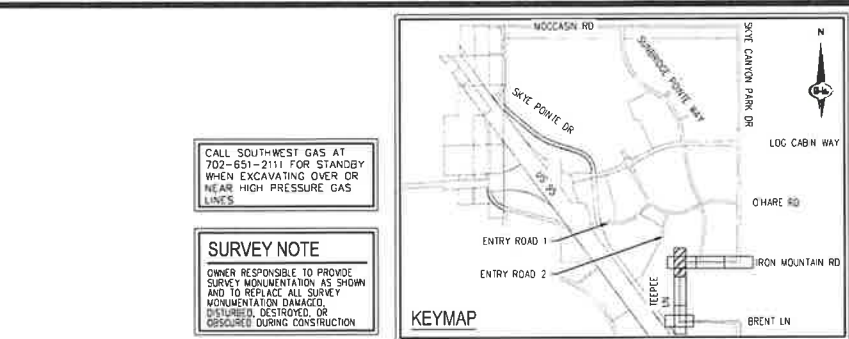
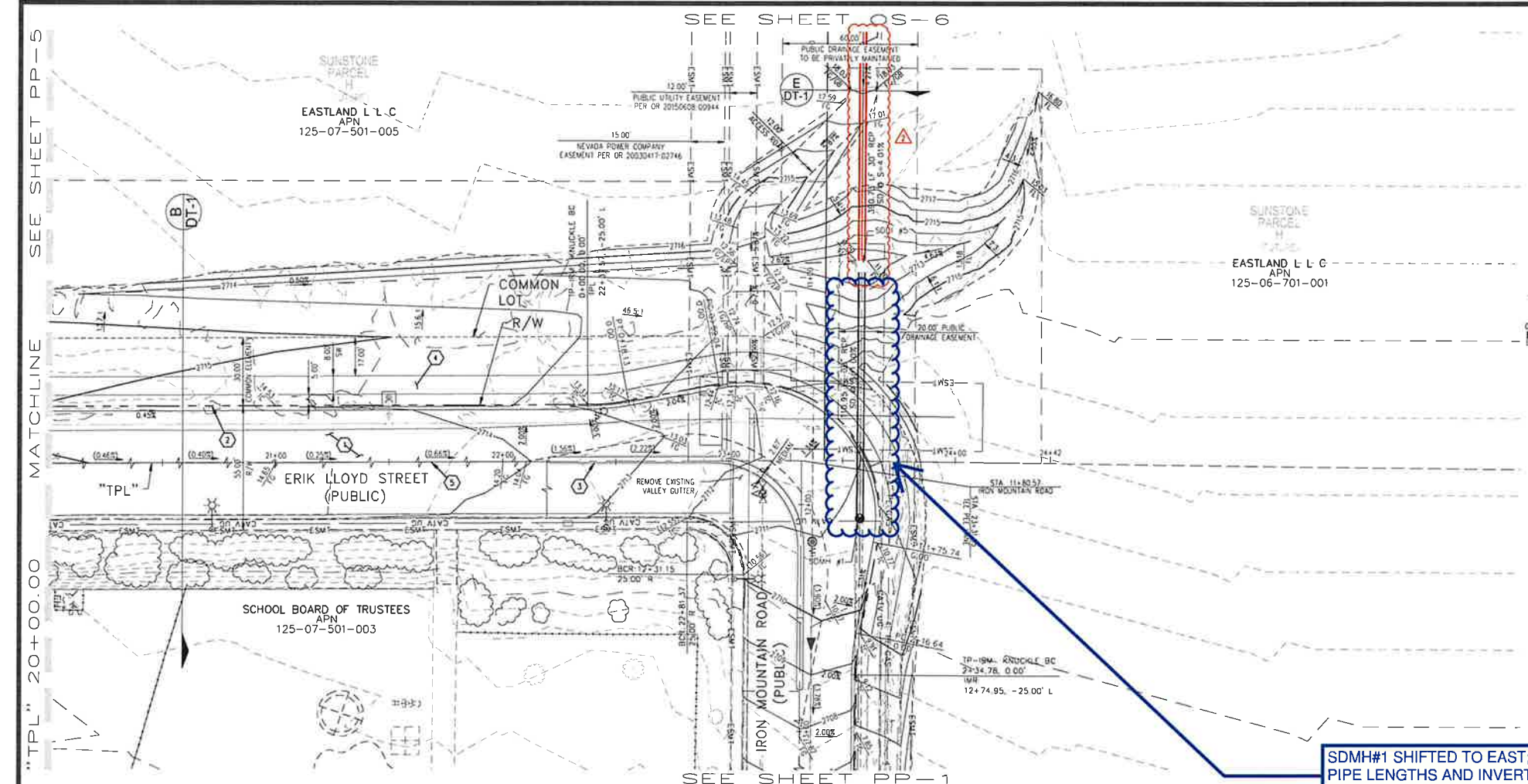
SC EAST LANDCO, LLC

SUNSTONE PHASE 1
IRON MOUNTAIN ROAD AND TEE PEE LANE
PLAN & PROFILE I - "IMR" 10+00.00 TO "IMR" 15+50.00

DATE: 09/26/19
DRAFTER: SB/JR
DESIGNER: BC
CHECKED: JJ
PROJECT NO.
EST1911-000

07/14/2021
DATE

PP-1
SHEET 4 OF 51
L20-00626
107V8289



CALL 'SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OR NEAR HIGH PRESSURE GAS LINES

SURVEY NOTE
OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE SURVEY MONUMENTATION DAMAGED, EXCLUDED, DESTROYED, OR DISAPPEARED DURING CONSTRUCTION

ELEVATION NOTE
ADD 2600 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 1801.00)

DISCLAIMER NOTE
1) EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.
2) FOR ROADWAY WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF CURB PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OF MINIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

GRADING NOTES
1. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
2. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
3. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON CLOTHES REPORT.
4. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
5. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
6. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
7. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLACING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
8. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXISTS) WITHIN THE SIGHT VISIBILITY ZONES.

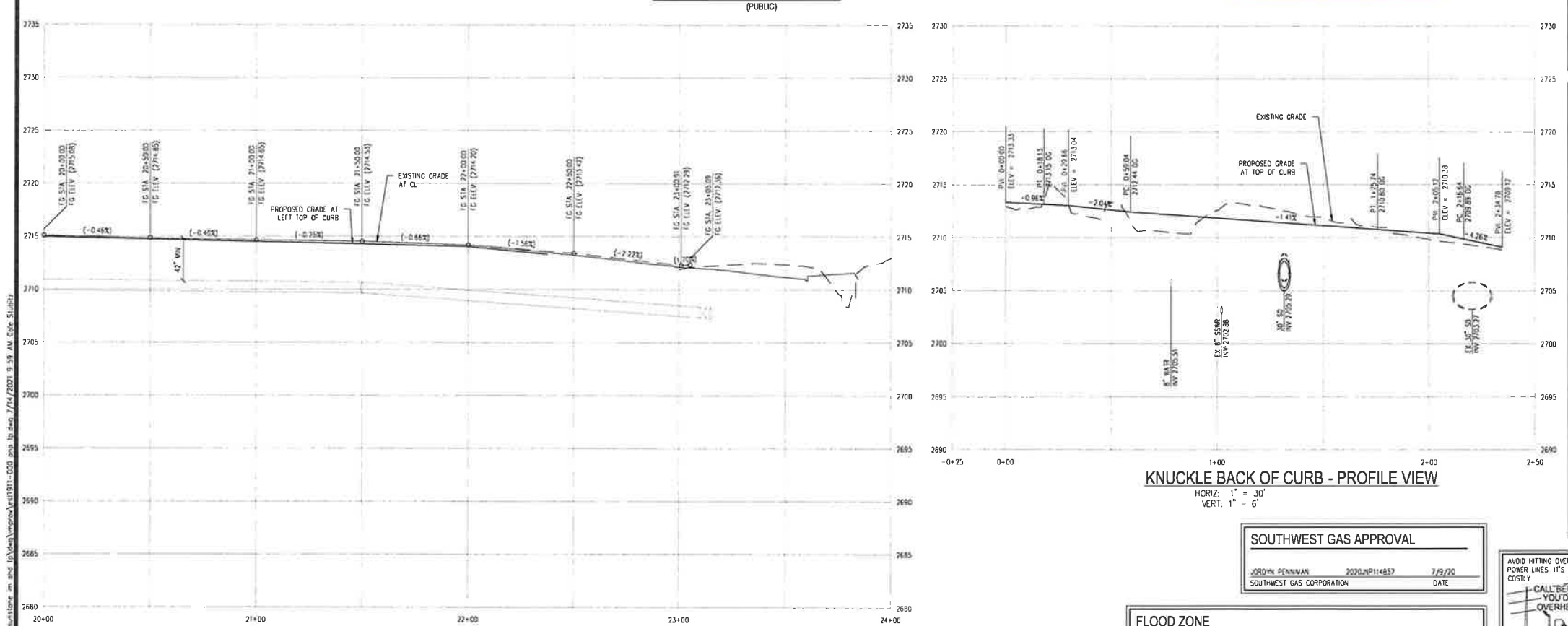
LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES
(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ FT))
1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN CLARK COUNTY TITLE 24.40 AND IN THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NV000000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPs WEEKLY AND WITHIN 24 HOURS AFTER A RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY. SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NV000000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPs SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

- CONSTRUCTION NOTES**
1. INSTALL 3" ASPHALT PAVEMENT OVER 4" TYPE II AGGREGATE BASE
 2. CONSTRUCT "L" TYPE CURB PER CCAUSD NO. 216
 3. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD NO. 219
 4. CONSTRUCT 8" WIDE SIDEWALK PER CCAUSD NO. 234
 5. SAWCUT AND MATCH EXISTING PAVEMENT PER CCAUSD NO. 500.1 AND 503
 6. CONSTRUCT MODIFIED TYPE "CM2" DROP INLET PER CCAUSD STD. DWG. NO. 431
 7. CONSTRUCT 60" TYPE II MANHOLE PER CCAUSD STD. DWG. NO. 405
 8. INSTALL BRICK AND MORTAR PLUG PER DETAIL C ON SHEET DT-1
 9. CONSTRUCT 1800 TYPE 4 MANHOLE PER DETAIL NUMBER 95-48
 10. CONSTRUCT 60" TYPE II MANHOLE PER CCAUSD STD. DWG. NO. 405.2
 11. CONSTRUCT 60" TYPE II MANHOLE PER CCAUSD STD. DWG. NO. 406
 12. CONSTRUCT 48" TYPE II MANHOLE PER CCAUSD STD. DWG. NO. 405
 13. CONSTRUCT 1800 TYPE 2 DROP INLET (4'x4') PER DETAIL STD. DWG. DS-32. SEE DETAIL D ON SHEET DT-1

- EXISTING EASEMENTS**
- E1. RIGHT-OF-WAY GRANTED BY DECISION, DATED JANUARY 16, 2003 BY THE BUREAU OF LAND MANAGEMENT UNDER SERIAL NUMBER N-75502 TO LAS VEGAS VALLEY WATER DISTRICT FOR WATER PIPELINE UNDER RIGHT-OF-WAY GRANT FILED IN THE OFFICE OF THE BUREAU OF LAND MANAGEMENT OVER A PORTION OF SAID LAND, AS RECORDED IN THE OFFICE OF THE COUNTY RECORDER OF CLARK COUNTY, NEVADA ON FEBRUARY 10, 2003 IN BOOK 20030210, AS INSTRUMENT N-00538 OF OFFICIAL RECORDS.
 - E2. RIGHT-OF-WAY GRANTED BY DECISION, DATED JANUARY 16, 2003 BY THE BUREAU OF LAND MANAGEMENT UNDER SERIAL NUMBER N-75502-01 TO LAS VEGAS VALLEY WATER DISTRICT FOR TEMPORARY WORK AREAS FOR A 42" UNDERGROUND WATER PIPELINE UNDER RIGHT-OF-WAY GRANT FILED IN THE OFFICE OF THE BUREAU OF LAND MANAGEMENT OVER A PORTION OF SAID LAND, AS RECORDED IN THE OFFICE OF THE COUNTY RECORDER OF CLARK COUNTY, NEVADA ON FEBRUARY 10, 2003 IN BOOK 20030210, AS INSTRUMENT N-00541 OF OFFICIAL RECORDS.
 - E3. EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES IN THE DOCUMENT RECORDED JUNE 8, 2015 IN BOOK 20150608 AS INSTRUMENT N-00548 OF OFFICIAL RECORDS.
 - E4. COVENANTS, CONDITIONS, EASEMENTS AND RESTRICTIONS IN A FINAL ORDER OF CONDEMNATION RECORDED OCTOBER 2, 2015 IN BOOK 20151002 AS INSTRUMENT N-03298 OF OFFICIAL RECORDS.
 - E5. RIGHT-OF-WAY GRANTED BY DECISION, DATED APRIL 04, 2003 BY THE BUREAU OF LAND MANAGEMENT UNDER SERIAL NUMBER N-75502 TO LAS VEGAS VALLEY WATER DISTRICT FOR UNDERGROUND ELECTRICAL DISTRIBUTION LINE UNDER RIGHT-OF-WAY GRANT FILED IN THE OFFICE OF THE BUREAU OF LAND MANAGEMENT OVER A PORTION OF SAID LAND, AS RECORDED IN THE OFFICE OF THE COUNTY RECORDER OF CLARK COUNTY, NEVADA ON APRIL 17, 2003 IN BOOK 20030417, AS INSTRUMENT N-02746 OF OFFICIAL RECORDS.
 - E6. A RIGHT-OF-WAY GRANTED BY DECISION, DATED AUGUST 21, 1970 BY THE BUREAU OF LAND MANAGEMENT UNDER SERIAL NUMBER NEV03395 ET (N-121) TO STATE OF NEVADA, DEPARTMENT OF HIGHWAYS (U.S. 95) INCLUDING ACCESS RIGHTS UNDER RIGHT-OF-WAY GRANT FILED IN THE OFFICE OF THE BUREAU OF LAND MANAGEMENT OVER A PORTION OF SAID LAND, AS RECORDED IN THE OFFICE OF THE COUNTY RECORDER OF CLARK COUNTY, NEVADA ON DECEMBER 22, 1972 IN BOOK 788, AS INSTRUMENT N-247595 OF OFFICIAL RECORDS.
 - E7. AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES IN THE DOCUMENT RECORDED JUNE 8, 2015 IN BOOK 20150608 AS INSTRUMENT N-00847 OF OFFICIAL RECORDS.
 - E8. NDOT EASEMENT PER NEV-043376, N-43063, CC-018234, CC-018138, CC-018191
- RESERVATIONS, PROVISIONS AND EASEMENTS AS CONTAINED IN PATENT FROM THE UNITED STATES OF AMERICA, RECORDED AUGUST 03, 2005 IN BOOK 20050803 OF OFFICIAL RECORDS, AS INSTRUMENT N-01359

FLOOD CERTIFICATION
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-5159 ON FILE AT CITY OF LAS VEGAS
Carl Johnson 07/14/2021 DATE

SDMH#1 SHIFTED TO EAST; PIPE LENGTHS AND INVERT AND RIMS UPDATED



KNUCKLE BACK OF CURB - PROFILE VIEW

SOUTHWEST GAS APPROVAL
JORDYN PENNIMAN 2020LNP114857 7/5/20 DATE
SOUTHWEST GAS CORPORATION

FLOOD ZONE
THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1735E AND 32003C1750E, BOTH DATED SEPTEMBER 27, 2002.



Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call 811
1-800-227-2600

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5330 FAX (702) 284-5389

DATE	BY	APP	DATE	BY	APP
7/14/2021	SB/JR		7/14/2021	SB/JR	
7/14/2021	BC		7/14/2021	BC	
7/14/2021	JJ		7/14/2021	JJ	

SC EAST LANDCO, LLC
SUNSTONE PHASE 1
IRON MOUNTAIN ROAD AND TEE PEE LANE
PLAN & PROFILE VI - "TPL" 20+00.00 TO "TPL" 24+00.00

DATE: 09/26/19
DRAFTER: SB/JR
DESIGNER: BC
CHECKED: JJ
PROJECT NO. **EST1911-000**

PP-6
SHEET 9 OF 51
L20-00626
107V8289

APPENDIX B

Storm Drain Computations

T1 EST1911: SUNSTONE IM & TP									
T2 MAINLINE (MAIN)									
T3 PROPOSED DRAINAGE CONDITION									
SO	1000.00	02705.000	30				2706.970		
R	1132.75	02706.064	30	.013				0.0	
WE	1132.75	02706.064	1						
R	1133.75	02706.072	1	.015				0.0	
JX	1134.75	02706.080	1	1	.015	0.1	2706.080	90.0	
R	1136.75	02706.160	1	.015				0.0	
WX	1136.75	02706.160	30						
R	1525.48	02721.730	30	.013				0.0	1
R	1916.21	02733.850	30	.013				0.0	1
R	2305.67	02745.128	30	.013				6.0	1
JX	2308.17	02745.200	30	24	.013	14.0	2745.700	37.0	
R	2480.36	02749.517	30	.013				12.0	1
R	2481.19	32749.538	30	.013				12.0	
R	2482.02	72749.559	30	.013				11.0	
R	2482.86	02749.580	30	.013				11.0	
R	2648.95	02754.280	30	.013				5.0	1
R	2898.95	02758.640	30	.013				4.0	1
R	3068.95	02761.030	30	.013				5.0	1
R	3220.42	02762.958	30	.013				15.0	1
R	3221.67	02762.974	30	.013				15.0	
R	3222.92	02762.990	30	.013				15.0	
R	3253.11	02763.140	30	.013				15.0	
SH	3253.11	02763.140	30						
CD	24	4	1	0.000	2.000	0.000	0.000	0.000	0.00
CD	30	4	1	0.000	2.500	0.000	0.000	0.000	0.00
CD	1	3	0	0.000	5.000	3.500	0.000	0.000	0.00
Q				25.000					

U/S DATA		STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	MAIN.EDT				
U/S DATA		2308.170	2745.200	30	24	0	.013	14.000	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
									.000	2745.700	.000	37.000	.000
										RADIUS	ANGLE		
										.000	.000		
WATER SURFACE PROFILE - ELEMENT CARD LISTING													
W S P G W													
ELEMENT NO	12 IS A REACH	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	2480.360	2749.517	30	*		.013			.000	.000	12.000	1
ELEMENT NO	13 IS A REACH	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	2481.193	2749.538	30	*		.013			.000	.000	12.000	0
ELEMENT NO	14 IS A REACH	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	2482.027	2749.559	30	*		.013			.000	.000	11.000	0
ELEMENT NO	15 IS A REACH	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	2482.860	2749.580	30	*		.013			.000	.000	11.000	0
ELEMENT NO	16 IS A REACH	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	2648.950	2754.280	30	*		.013			.000	.000	5.000	1
ELEMENT NO	17 IS A REACH	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	2898.950	2758.640	30	*		.013			.000	.000	4.000	1
ELEMENT NO	18 IS A REACH	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	3068.950	2761.030	30	*		.013			.000	.000	5.000	1
ELEMENT NO	19 IS A REACH	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	3220.420	2762.958	30	*		.013			.000	.000	15.000	1
ELEMENT NO	20 IS A REACH	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	3221.670	2762.974	30	*		.013			.000	.000	15.000	0
ELEMENT NO	21 IS A REACH	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	3222.920	2762.990	30	*		.013			.000	.000	15.000	0
ELEMENT NO	22 IS A REACH	STATION	INVERT	SECT			N			RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	3253.110	2763.140	30	*		.013			.000	.000	.000	0
ELEMENT NO	23 IS A SYSTEM HEADWORKS	STATION	INVERT	SECT						W S ELEV			
	U/S DATA	3253.110	2763.140	30				*		.000			

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.-FT	Height/ or I.D.	No Wth Prs/Pip
L/Elem	Ch Slope												
1000.000	2705.000	2.109	2707.109	39.10	8.85	1.22	2708.33	.00	2.11	1.82	2.500	.000	1 .0
52.939	.0080					.0083	.44	2.11	1.00	2.24	.013	.00	PIPE
1052.939	2705.424	2.237	2707.662	39.10	8.44	1.11	2708.77	.00	2.11	1.53	2.500	.000	1 .0
79.811	.0080					.0080	.64	2.24	.86	2.24	.013	.00	PIPE
1132.750	2706.064	2.243	2708.307	39.10	8.42	1.10	2709.41	.00	2.11	1.52	2.500	.000	1 .0
WALL ENTRANCE													
1132.750	2706.064	4.102	2710.166	39.10	2.72	.12	2710.28	.00	1.57	3.50	5.000	3.500	0 .0
1.000	.0081					.0006	.00	4.10	.24	1.46	.015	.00	BOX
1133.750	2706.072	4.094	2710.166	39.10	2.73	.12	2710.28	.00	1.57	3.50	5.000	3.500	0 .0
JUNCT STR	.0081					.0006	.00	4.09	.24		.015	.00	BOX
1134.750	2706.080	4.087	2710.167	39.00	2.73	.12	2710.28	.00	1.57	3.50	5.000	3.500	0 .0
2.000	.0399					.0006	.00	4.09	.24	.83	.015	.00	BOX
1136.750	2706.160	4.003	2710.163	39.00	2.78	.12	2710.28	.00	1.57	3.50	5.000	3.500	0 .0
WALL EXIT													
1136.750	2706.160	4.004	2710.163	39.00	7.95	.98	2711.14	.00	2.11	.00	2.500	.000	1 .0
12.729	.0401					.0090	.12	4.00	.00	1.21	.013	.00	PIPE
1149.479	2706.670	3.610	2710.279	39.00	7.95	.98	2711.26	.00	2.11	.00	2.500	.000	1 .0
HYDRAULIC JUMP													

MAIN.OUT

EST1911: SUNSTONE IM & TP

MAINLINE (MAIN)

PROPOSED DRAINAGE CONDITION

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.	Height/FT or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
1149.479	2706.670	1.213	2707.883	39.00	16.51	4.23	2712.12	.00	2.11	2.50	2.500	.00	.00	1 .0
53.384	.0401					.0401	2.14	1.21	2.99	1.21	.013	.00	.00	PIPE
1202.863	2708.808	1.213	2710.021	39.00	16.51	4.23	2714.25	.00	2.11	2.50	2.500	.00	.00	1 .0
141.936	.0401					.0400	5.68	1.21	2.99	1.21	.013	.00	.00	PIPE
1344.798	2714.493	1.214	2715.707	39.00	16.50	4.23	2719.93	.00	2.11	2.50	2.500	.00	.00	1 .0
137.353	.0401					.0376	5.16	1.21	2.99	1.21	.013	.00	.00	PIPE
1482.151	2719.994	1.260	2721.254	39.00	15.73	3.84	2725.10	.00	2.11	2.50	2.500	.00	.00	1 .0
43.329	.0401					.0331	1.43	1.26	2.78	1.21	.013	.00	.00	PIPE
1525.480	2721.730	1.308	2723.038	39.00	15.00	3.49	2726.53	.00	2.11	2.50	2.500	.00	.00	1 .0
245.368	.0310					.0310	7.61	1.31	2.59	1.31	.013	.00	.00	PIPE
1770.848	2729.341	1.308	2730.649	39.00	15.00	3.49	2734.14	.00	2.11	2.50	2.500	.00	.00	1 .0
145.362	.0310					.0300	4.36	1.31	2.59	1.31	.013	.00	.00	PIPE
1916.210	2733.850	1.336	2735.186	39.00	14.61	3.32	2738.50	.00	2.11	2.49	2.500	.00	.00	1 .0
85.137	.0290					.0290	2.47	1.34	2.49	1.34	.013	.00	.00	PIPE
2001.347	2736.315	1.336	2737.651	39.00	14.61	3.32	2740.97	.00	2.11	2.49	2.500	.00	.00	1 .0
146.108	.0290					.0280	4.09	1.34	2.49	1.34	.013	.00	.00	PIPE
2147.455	2740.546	1.364	2741.910	39.00	14.24	3.15	2745.06	.00	2.11	2.49	2.500	.00	.00	1 .0
66.286	.0290					.0255	1.69	1.36	2.39	1.34	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING

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EST1911: SUNSTONE IM & TP

MAINLINE (MAIN)

PROPOSED DRAINAGE CONDITION

MAIN, OUT

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.	Height/FT or I.D.	ZL	No Wth Prs/Pip		
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch		
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****		
2213.741	2742.466	1.418	2743.884	39.00	13.57	2.86	2746.74	.00	2.11	2.48	2.500	.000	.00	1 .0		
31.419	.0290					.0225	.71	1.42	2.22	1.34	.013	.00	.00	PIPE		
2245.160	2743.376	1.475	2744.851	39.00	12.94	2.60	2747.45	.00	2.11	2.46	2.500	.000	.00	1 .0		
19.449	.0290					.0199	.39	1.47	2.06	1.34	.013	.00	.00	PIPE		
2264.609	2743.939	1.535	2745.474	39.00	12.34	2.36	2747.84	.00	2.11	2.43	2.500	.000	.00	1 .0		
13.332	.0290					.0176	.23	1.53	1.91	1.34	.013	.00	.00	PIPE		
2277.941	2744.325	1.599	2745.924	39.00	11.77	2.15	2748.07	.00	2.11	2.40	2.500	.000	.00	1 .0		
9.572	.0290					.0156	.15	1.60	1.76	1.34	.013	.00	.00	PIPE		
2287.514	2744.602	1.667	2746.269	39.00	11.22	1.95	2748.22	.00	2.11	2.36	2.500	.000	.00	1 .0		
6.960	.0290					.0139	.10	1.67	1.63	1.34	.013	.00	.00	PIPE		
2294.474	2744.804	1.740	2746.543	39.00	10.70	1.78	2748.32	.00	2.11	2.30	2.500	.000	.00	1 .0		
5.008	.0290					.0124	.06	1.74	1.50	1.34	.013	.00	.00	PIPE		
2299.481	2744.949	1.818	2746.767	39.00	10.20	1.62	2748.38	.00	2.11	2.23	2.500	.000	.00	1 .0		
3.429	.0290					.0111	.04	1.82	1.37	1.34	.013	.00	.00	PIPE		
2302.910	2745.048	1.904	2746.952	39.00	9.72	1.47	2748.42	.00	2.11	2.13	2.500	.000	.00	1 .0		
2.049	.0290					.0100	.02	1.90	1.25	1.34	.013	.00	.00	PIPE		
2304.959	2745.107	1.998	2747.106	39.00	9.27	1.33	2748.44	.00	2.11	2.00	2.500	.000	.00	1 .0		
.710	.0290					.0091	.01	2.00	1.13	1.34	.013	.00	.00	PIPE		

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WATER SURFACE PROFILE LISTING

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EST1911: SUNSTONE IM & TP

MAINLINE (MAIN)

PROPOSED DRAINAGE CONDITION

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel	Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.	Height/FT or I.D.	Base Wt	ZL	No Wth Prs/Pip
---------	-------------	------------	------------	---------	-----------	-----	------	----------------	------------	----------------	------------	----------	-------------------	---------	----	----------------

MAIN.OUT														
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
2305.670	2745.128	2.107	2747.234	39.00	8.84	1.21	2748.45	.00	2.11	1.82	2.500	.000	.00	1 .0
JUNCT STR	.0288	- -	- -	- -	- -	.0062	.02	2.11	1.00	- -	.013	.00	.00	PIPE
2308.170	2745.200	3.166	2748.365	25.00	5.09	.40	2748.77	.00	1.70	.00	2.500	.000	.00	1 .0
27.908	.0251	- -	- -	- -	- -	.0037	.10	3.17	.00	1.08	.013	.00	.00	PIPE
2336.078	2745.900	2.587	2748.487	25.00	5.09	.40	2748.89	.00	1.70	.00	2.500	.000	.00	1 .0
HYDRAULIC JUMP		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	-
2336.078	2745.900	1.076	2746.976	25.00	12.37	2.38	2749.35	.00	1.70	2.48	2.500	.000	.00	1 .0
29.354	.0251	- -	- -	- -	- -	.0251	.74	1.08	2.41	1.08	.013	.00	.00	PIPE
2365.432	2746.636	1.076	2747.712	25.00	12.37	2.38	2750.09	.00	1.70	2.48	2.500	.000	.00	1 .0
114.928	.0251	- -	- -	- -	- -	.0264	3.03	1.08	2.41	1.08	.013	.00	.00	PIPE
2480.360	2749.517	1.046	2750.563	25.00	12.84	2.56	2753.12	.00	1.70	2.47	2.500	.000	.00	1 .0
.833	.0252	- -	- -	- -	- -	.0278	.02	1.05	2.55	1.07	.013	.00	.00	PIPE
2481.193	2749.538	1.046	2750.584	25.00	12.85	2.56	2753.15	.00	1.70	2.47	2.500	.000	.00	1 .0
.834	.0252	- -	- -	- -	- -	.0278	.02	1.05	2.55	1.07	.013	.00	.00	PIPE
2482.027	2749.559	1.045	2750.604	25.00	12.86	2.57	2753.17	.00	1.70	2.47	2.500	.000	.00	1 .0
.833	.0252	- -	- -	- -	- -	.0279	.02	1.05	2.55	1.07	.013	.00	.00	PIPE
2482.860	2749.580	1.045	2750.625	25.00	12.86	2.57	2753.19	.00	1.70	2.47	2.500	.000	.00	1 .0
86.417	.0283	- -	- -	- -	- -	.0268	2.32	1.04	2.55	1.04	.013	.00	.00	PIPE
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MAINLINE (MAIN)

PROPOSED DRAINAGE CONDITION

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Height/Dia.-FT	Base Wt or I.D.	No Wth Prs/Pip
L/Elem	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****

MAIN, OUT														
2569.277	2752.026	1.069	2753.095	25.00	12.48	2.42	2755.51	.00	1.70	2.47	2.500	.000	.00	1 .0
43.046	.0283	- -	- -	- -	- -	.0241	1.04	1.07	2.44	1.04	.013	.00	.00	PIPE
2612.323	2753.244	1.109	2754.352	25.00	11.90	2.20	2756.55	.00	1.70	2.48	2.500	.000	.00	1 .0
22.305	.0283	- -	- -	- -	- -	.0212	.47	1.11	2.28	1.04	.013	.00	.00	PIPE
2634.628	2753.875	1.150	2755.025	25.00	11.34	2.00	2757.02	.00	1.70	2.49	2.500	.000	.00	1 .0
14.322	.0283	- -	- -	- -	- -	.0186	.27	1.15	2.13	1.04	.013	.00	.00	PIPE
2648.950	2754.280	1.193	2755.473	25.00	10.81	1.82	2757.29	.00	1.70	2.50	2.500	.000	.00	1 .0
90.448	.0174	- -	- -	- -	- -	.0174	1.58	1.19	1.98	1.19	.013	.00	.00	PIPE
2739.398	2755.857	1.193	2757.050	25.00	10.81	1.82	2758.87	.00	1.70	2.50	2.500	.000	.00	1 .0
115.115	.0174	- -	- -	- -	- -	.0167	1.92	1.19	1.98	1.19	.013	.00	.00	PIPE
2854.513	2757.865	1.224	2759.089	25.00	10.46	1.70	2760.79	.00	1.70	2.50	2.500	.000	.00	1 .0
44.437	.0174	- -	- -	- -	- -	.0150	.67	1.22	1.89	1.19	.013	.00	.00	PIPE
2898.950	2758.640	1.271	2759.910	25.00	9.98	1.55	2761.46	.00	1.70	2.50	2.500	.000	.00	1 .0
59.935	.0141	- -	- -	- -	- -	.0141	.84	1.27	1.76	1.27	.013	.00	.00	PIPE
2958.885	2759.483	1.271	2760.753	25.00	9.98	1.55	2762.30	.00	1.70	2.50	2.500	.000	.00	1 .0
110.065	.0141	- -	- -	- -	- -	.0133	1.47	1.27	1.76	1.27	.013	.00	.00	PIPE
3068.950	2761.030	1.312	2762.343	25.00	9.58	1.42	2763.77	.00	1.70	2.50	2.500	.000	.00	1 .0
92.221	.0127	- -	- -	- -	- -	.0119	1.10	1.31	1.65	1.31	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING

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MAINLINE (MAIN)

PROPOSED DRAINAGE CONDITION

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope	*****	*****	*****	*****	SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
3161.171	2762.204	1.359	2763.563	25.00	9.17	1.31	2764.87	.00	1.70	2.49	2.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

MAIN.OUT														
Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Width	Height/Dia.	Base I.D.	No Wth Prs/pip
30.587	.0127													
3191.758	2762.593	1.412	2764.005	25.00	8.74	1.19	2765.19	.00	1.70	2.48	2.500	.000	.00	1 .0
15.267	.0127													
3207.025	2762.788	1.469	2764.256	25.00	8.34	1.08	2765.34	.00	1.70	2.46	2.500	.000	.00	1 .0
8.611	.0127													
3215.636	2762.897	1.529	2764.426	25.00	7.95	.98	2765.41	.00	1.70	2.44	2.500	.000	.00	1 .0
4.784	.0127													
3220.420	2762.958	1.592	2764.550	25.00	7.58	.89	2765.44	.00	1.70	2.40	2.500	.000	.00	1 .0
1.250	.0129													
3221.670	2762.974	1.622	2764.596	25.00	7.42	.85	2765.45	.00	1.70	2.39	2.500	.000	.00	1 .0
.323	.0127													
3221.992	2762.978	1.632	2764.610	25.00	7.36	.84	2765.45	.00	1.70	2.38	2.500	.000	.00	1 .0
.927	.0127													
3222.920	2762.990	1.704	2764.694	25.00	7.02	.76	2765.46	.00	1.70	2.33	2.500	.000	.00	1 .0
14.490	.0050													
3237.409	2763.062	1.779	2764.841	25.00	6.69	.70	2765.54	.00	1.70	2.26	2.500	.000	.00	1 .0
15.701	.0050													
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WATER SURFACE PROFILE LISTING

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MAINLINE (MAIN)

PROPOSED DRAINAGE CONDITION

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Width	Height/Dia.	Base I.D.	No Wth Prs/pip
L/Elem	Ch Slope													
3253.110	2763.140	1.787	2764.927	25.00	6.66	.69	2765.62	.00	1.70	2.26	2.500	.000	.00	1 .0

APPENDIX C

Improvement Plans