

DS #: 4946

APN: 139-35-814-0001 thru 083

PROJECT: Update to Fremont Street Lofts

SUBMITTAL: 1st

SCANNED BY/DATE: _____

CHECKED BY/DATE: _____



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		January 16, 2018
TO: Land Development Services Department of Public Works		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:	COPIES TO:
	Update to Fremont Street Loft Homes	Hauntec, PLLC
Cross Streets:	S. of Fremont St. Between Eastern & Bruce	Urban Lofts XVII Ltd.
File Number:	F:\Depot\DSMemos\DS4946A.doc	Bart Anderson, P.E., DevCo
Parcel Number:	139-35-816-0001 thru 083	
Zoning Action:	TMP-6134; SDR-5286; L-11347, Plan # 107Y4945	
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	1/2/2018	1/11/2018	Approved	\$400.00	492375: \$400
TOTAL FEES (LDDRS):				\$400.00	----

REMARKS: Update to DS3860.

Submittal to change the storm drain pipe class from Class V to Class IV and Class III.

The 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 the following conditions:

- The City takes no exception to the storm drain pipe class change to Class IV and Class III.

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 Amendment 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

ays/pbj

T/R/S: T20S/R61E/35
AREA M-35

**UPDATE TO THE
TECHNICAL DRAINAGE STUDY
FOR
FREMONT STREET LOFTS**

**Date
December 22, 2017**

**Project Number
17-0083**

Prepared for

INTERURBAN CONSTRUCTION, LLC
211 Tower Street
Las Vegas, NV 89101

Prepared by

HAUNTEC, PLLC
Civil Engineering Services
2721 Ironside Drive
Las Vegas, Nevada 89108
Phone: (702) 219-5785
Email: jhaun@haunteceng.com

HAUNTEC
CIVIL ENGINEERING AND LAND SURVEYING SERVICES

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HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: FREMONT STREET LOFTS HOMES Date: 12/27/2017

Location of Development: a) Descriptive (Cross Streets) North/South: EASTERN AVENUE

East/West: FREMONT STREET

b) Section: 35 Township: 20 SOUTH Range: 61 EAST

c) APN: 139-35-816-001 THROUGH 083, 139-35-895-001 & 139-35-899-086 (139-35-803-010 ORIGINALLY)

Name of Owner: URBAN LOFTS XVII LTD

Telephone No.: (702) Fax No.: N/A E-Mail Address: _____

Address: 4512 MONTROSE BLVD, HOUSTON, TX 77006

Contact Person-Name: JOE ALVIN HAUN, P.E. Telephone No.: (702) 219-5785

* E-Mail Address: jhaun@haunteceng.com Fax No.: N/A

Firm: HAUNTEC

Address: 2721 IRONSIDE DRIVE, LAS VEGAS, NV 89108

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: 3.76 ± AC Being Developed/Disturbed: 3.76 ± AC

2. Is a portion or all of the subject property located in a designated 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.): RESIDENTIAL

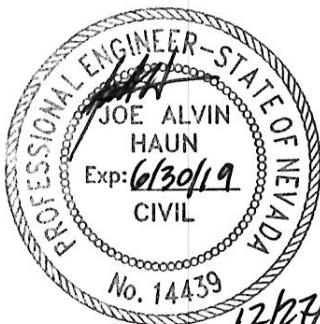
5. Approximate upstream land area which drains to the subject site: 15.24 ± AC

6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: (DS3860)

TECHNICAL DRAINAGE STUDY FOR FREMONT STREET LOFTS HOMES

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: NORTH TO FREMONT STREET

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



Engineer's Seal

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.

***New Required Field**

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

Revision	Date

Local Entity File No. _____

REFERENCE:

STANDARD FORM 1

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL																										
DRAINAGE SUBMITTAL CHECKLIST																										
Project Name: <u>PREMONT STREET LOFT</u>	Map ID:																									
Firm Name: <u>HAUNTEC</u>	Engineer: <u>JOE ALVIN HANN, P.E.</u>																									
Address: <u>2721 IRONSIDE DRIVE</u>																										
City: <u>LAS VEGAS</u>	State: <u>NEVADA</u>	Zip: <u>89108</u>																								
Phone Number: <u>(702) 219-5785</u>	Fax Number: <u>N/A</u>																									
Property Owner: <u>URBAN LOFTS XVII LTD</u>																										
Address: <u>4512 MONTROSE BLVD</u>																										
City: <u>HOUSTON</u>	State: <u>TEXAS</u>	Zip: <u>77006</u>																								
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 (CCRFCDD) 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 <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">Yes</td> <td style="width: 10%; text-align: center;">No</td> <td></td> </tr> <tr> <td style="text-align: center;"><u>✓</u></td> <td style="text-align: center;">_____</td> <td>Design Manual Standard Form 1 with the engineer's seal and signature.</td> </tr> <tr> <td style="text-align: center;"><u>✓</u></td> <td style="text-align: center;">_____</td> <td>Design Manual Standard Form 4.</td> </tr> <tr> <td style="text-align: center;"><u>✓</u></td> <td style="text-align: center;">_____</td> <td>2 copies of the 24" x 36" Drainage Plan.</td> </tr> <tr> <td style="text-align: center;"><u>N/A</u></td> <td style="text-align: center;">_____</td> <td>A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.</td> </tr> </table> II. MAPS AND EXHIBITS <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">Yes</td> <td style="width: 10%; text-align: center;">No</td> <td></td> </tr> <tr> <td style="text-align: center;"><u>✓</u></td> <td style="text-align: center;">_____</td> <td>A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.</td> </tr> <tr> <td style="text-align: center;"><u>✓</u></td> <td style="text-align: center;">_____</td> <td>A copy of the current CCRFCDD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.</td> </tr> </table>			Yes	No		<u>✓</u>	_____	Design Manual Standard Form 1 with the engineer's seal and signature.	<u>✓</u>	_____	Design Manual Standard Form 4 .	<u>✓</u>	_____	2 copies of the 24" x 36" Drainage Plan.	<u>N/A</u>	_____	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.	Yes	No		<u>✓</u>	_____	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.	<u>✓</u>	_____	A copy of the current CCRFCDD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.
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REFERENCE:		STANDARD FORM 2																								

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

Yes	No	
☒	☐	Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.
☒	☐	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.
☒	☐	Vicinity Map with local and major cross streets identified and a north arrow.

III. DRAINAGE PLAN

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
☒	☐	Streets with off-set crowns.
☒	☐	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
☒	☐	Property lines.
☒	☐	Right-of-way lines and widths, existing and proposed.
☒	☐	Existing improvements and their elevations.
☒	☐	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
☒	☐	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
☒	☐	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
☒	☐	Location and cross-section of street capacity calculations.
☒	☐	Cross-sectional detail for channels, including cutoff wall locations.
☒	☐	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.
☒	☐	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
☒	☐	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.
☒	☐	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.
☒	☐	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.
☒	☐	Building and/or lot numbers.
☒	☐	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
☒	☐	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	
<u>N/A</u>	☐	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.
☒	☐	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.
☒	☐	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.
<u>N/A</u>	☐	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.
<u>N/A</u>	☐	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.
<u>N/A</u>	☐	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>N/A</u>	☐	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
☒	☐	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.
☒	☐	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>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.)
☒	☐	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.
☒	☐	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>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.
☒	☐	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
<u>N/A</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.
☒	☐	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
<u>N/A</u>	☐	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2

HAUNTEC

2721 Ironside Drive
Las Vegas, Nevada 89108
702-219-5785

December 22, 2017

City of Las Vegas, Department of Public Works,
5550 Painted Mirage #320
Las Vegas, Nevada 89149

Phone: (702) 818-1724
Office: (702) 682-8124

attn: Albert Sung, P.E.
Flood Control Project Engineer

Subject: Update to the Technical Drainage Study for Fremont Street Lofts
(CLV # DS3860)

Dear Mr. Sung:

The purpose of this letter is to request acceptance of this Update to the reference drainage study. The site is located south of Fremont Street and west of Eastern Avenue. Please see Figure 1, Vicinity Map, attached herein.

This Update to the Technical Drainage Study is requesting to change the proposed Storm Drain Elliptical Concrete Pipe (24" x 38") Class from V to either III or IV along Douglass Street and Louis Avenue (See Attached redlined Improvement Plan Sheets 19 and 21 of 24). Per the Concrete Pipe Design Manual published by the American Concrete Pipe Association and ASTM Standard C 507, the D-Load for an Elliptical Concrete Pipe is determined by the following equation:

$$\text{D-Load} = \left[\frac{W_E + W_F}{B_f} + \frac{W_L}{B_{fLL}} \right] \times FS / S$$

Where,

- W_E = Earth Load, pounds per linear foot
- W_F = Fluid Load, pounds per linear foot
- W_L = Live Load on top of the pipe, pounds per linear foot
- B_f = Bedding Factor
- B_{fLL} = Bedding Factor for a Live Load
- $F.S.$ = Factor of Safety
- S = Inside Horizontal Span of Elliptical Pipe, Feet

The American Concrete Pipe Association has provided a computer software program, PIPEPAC, that will determine the Design Load for Circular, Horizontal Elliptical, Vertical Elliptical, and Arch pipes based on the Equations, Tables, and Figures provided in the Concrete Pipe Design Manual. The software was utilized in determining the D-Load for the proposed 24" x 38" Elliptical Concrete Storm Drain Pipe (See PIPEPAC Analysis Report in the Appendix).

Based on the PIPEPAC Analysis Report, the proposed 24" x 38" Concrete Elliptical Storm Drain

Pipe Class was determined as follows:

- Less than 1-ft: the minimal is CLASS IV,
- Between 1-ft and 5-ft the minimal is CLASS III

The minimal CLASS for the three sections of proposed Storm Drain Pipe is as follows:

- Between Manholes #7 and #10 (Louis Avenue): Minimum cover is about 0.7-ft and Maximum cover of about 1.2-ft – CLASS IV
- Between Manholes #10 and #11 (Louis Avenue): Minimum cover of about 1.0-ft and Maximum cover of about 2.0-ft – CLASS III
- Between Manholes #4 and #7 (Dougram Street between Louis Avenue and Yaupon Avenue): Minimum cover of about 0.5-ft and Maximum cover of about 0.9-ft – CLASS IV

Attached are the redlined Improvement Plan Sheets UPP2 and UPP4 (Sheets 19 and 21 of 24) showing the concrete elliptical pipe CLASS change from V to either III or IV. The pipe CLASS revisions meet the above criteria.

In summary, based on the proposed storm drain design as shown on the Improvement Plan Sheets UPP2 and UPP4 (Sheets 19 and 21 of 24) and the PIPEPAC computer software results, the engineer is requesting to reduce the 24" x 38" Concrete Elliptical Pipe CLASS from V to III for depths of cover over the pipe between 1-ft and 5-ft and IV for depths of cover of less than 1-ft.

If you have any questions or need additional information, please contact me at (702) 219-5785.

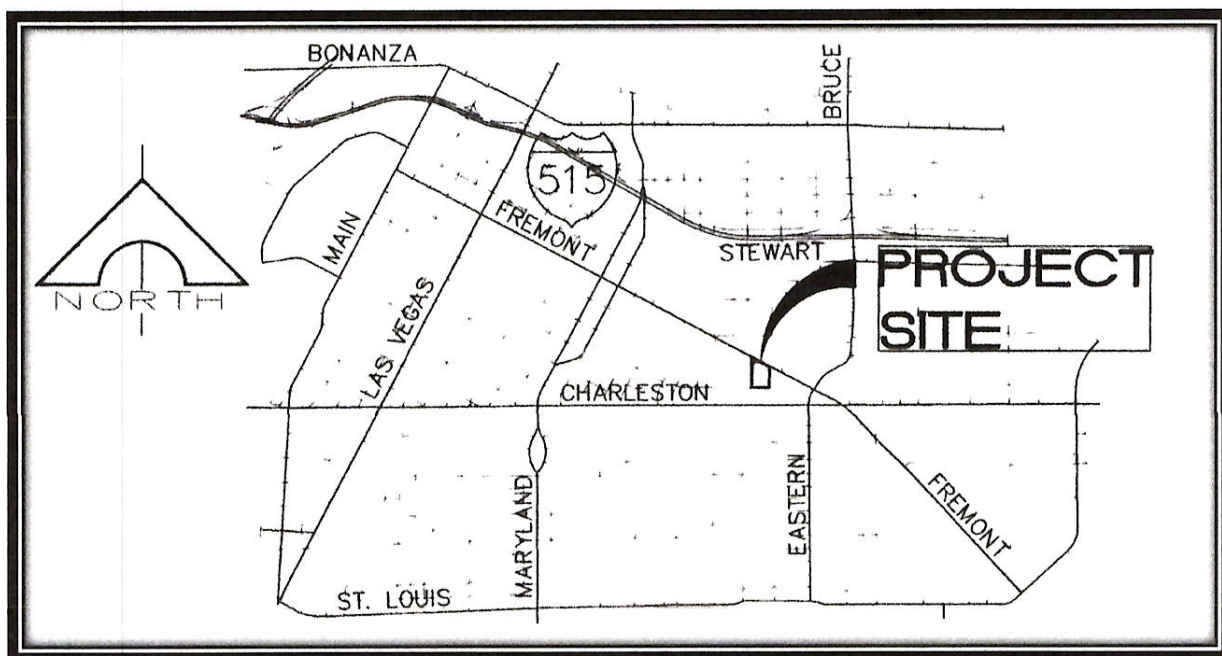
Sincerely,



Joe Alvin Haun, PE, MSE
Owner
jhaun@HauntecEng.com

12/27/2017

Figure 1 – Location Map



APPENDIX A

PIPEPAC Summary Analysis Report

Three Edge Bearing Analysis - Results

Project Description

Project Title: Fremont Lofts	Consultant: HAUNTEC, PLLC
Project Location: Las Vegas, NV	Contractor: INTERURBAN CONSTRUCTION LLC
Contract Number: 17-0083	Analyzed By: Joe Alvin Haun, P.E.
Country: US	Date: 12/27/2017
Units: US Units	Comply To: ASTM (AASHTO)
Alternative: Fremont	

D-LOAD REQUIREMENTS FOR A 38 (in) SPAN HORIZONTAL ELLIPTICAL PIPE

PIPE DATA

Span (in.)	38
Rise (in.)	24
Wall Thickness (in.)	3.750

INSTALLATION CONDITIONS

Minimum Depth of Fill (ft)	1.00
Maximum Depth of Fill (ft)	5.00
Soil Density (lb/cu. ft)	120.0
Installation Type	Trench
Trench Width (ft)	7.13
Soil Lateral Pressure/Friction Term ($k\mu$)	0.1924
Parameters to compute Transition Width	
Positive Projection Ratio	0.50
Soil Lateral Pressure Ratio	0.33
Soil Lateral Pressure/Friction Term ($k\mu$)	0.1
Soil Lateral Fraction 'm'	0.50
Settlement Ratio	0.70

ADDITIONAL LOADS

Live Load	AASHTO HS-SERIES (HS-20)
	Single Axle Load = 32 (kips), Double Axle - Load per Axle = 25 (kips), Space = 4.0 (ft)
	Live Load Distribution Factor = 1.15
	Default I.F. Used.
No Surcharge Load	
Fluid Load (lb/ft)	310

FACTOR OF SAFETY

Factor of Safety on 0.01 Inch Crack D-Load (Earth, Live)	1.50 1.50
Factor of Safety on Ultimate D-Load (Earth, Live)	1.50 1.50

D-LOAD REQUIREMENTS FOR 38 in. SPAN HORIZONTAL ELLIPTICAL PIPE
Results of Analysis for Bedding Type 2

Pipe Depth	Arching Factor	>Trans	Earth Load (lb/ft)	Live Load (lb/ft)	Surch Load (lb/ft)	Total Load (lb/ft)	Bed Fact DL	Bed Fact LL	Required D-Load 0.01 in. (lb/ft/ft)
1.00	1.03	Y	467	4226	0	5004	2.27	1.67	1363 (CL-IV)
2.00	1.05	Y	960	3497	0	4767	2.26	2.17	1031 (CL-III)
3.00	1.08	Y	1479	2721	0	4511	2.24	2.20	964 (CL-II)
4.00	1.11	Y	2026	1898	0	4235	2.24	2.20	904 (CL-II)
5.00	1.14	Y	2603	1394	0	4308	2.23	2.20	919 (CL-II)

Selected Depth: 1.2 ft. (closest pipe depth: 2 ft)

(N/A) = SAMM analysis is not accurate at this depth use direct analysis for more accurate results.
(i.e. Bedding Types 2 or 3)

Fluid Load (310 lbs/ft) included in the calculation of the Total Load

D-LOAD REQUIREMENTS FOR 38 in. SPAN HORIZONTAL ELLIPTICAL PIPE
Results of Analysis for Bedding Type 3

Pipe Depth	Arching Factor	>Trans	Earth Load (lb/ft)	Live Load (lb/ft)	Surch Load (lb/ft)	Total Load (lb/ft)	Bed Fact DL	Bed Fact LL	Required D-Load 0.01 in. (lb/ft/ft)
1.00	1.03	Y	467	4226	0	5004	1.85	1.67	1400 (CL-IV)
2.00	1.05	Y	960	3497	0	4767	1.85	1.85	1224 (CL-III)
3.00	1.08	Y	1479	2721	0	4511	1.84	1.84	1164 (CL-III)
4.00	1.11	Y	2026	1898	0	4235	1.83	1.83	1097 (CL-III)
5.00	1.14	Y	2603	1394	0	4308	1.82	1.82	1118 (CL-III)

Selected Depth: 1.2 ft. (closest pipe depth: 2 ft)

(N/A) = SAMM analysis is not accurate at this depth use direct analysis for more accurate results.
(i.e. Bedding Types 2 or 3)

Fluid Load (310 lbs/ft) included in the calculation of the Total Load

Pipe Analysis Report

Pipe Depth – The height of cover from the top of the pipe to the soil surface, m (ft).

Earth Load

Arching Factor – The ratio of the design soil load on the pipe to the load from the prism of soil immediately above the pipe (prism load). By multiplying the soil prism load by the Arching Factor, the Earth Load on the pipe will be determined. The Arching Factor is constant for Standard Installations in the positive projecting condition, but variable for all other bedding and installation conditions.

>Trans - (Applicable for Trench and Negative Projecting Conditions only) – When a trench or negative projecting design is performed, the soil load above the pipe may or may not be reduced by frictional forces between the insitu and placed soils, depending on the depth and width of the trench. A symbol of "Y" is shown when the trench width exceeds the width at which frictional forces reduce the soil load on the pipe (Yes, the transition width has been exceeded, and the positive projecting design governs). A symbol of "N" is shown if frictional forces reduce the load on the pipe (No, the transition width has not been exceeded).

Load – The load in kN/m (lbs/ft) imposed on the pipe from the soil.

Live Load – The load on the pipe resulting from a dynamic load at the surface, kN/m (lbs/ft).

Surcharge Load – The load in kN/m (lbs/ft) imposed on the pipe from surcharge loads such as buildings, stationary equipment, etc. on the soil surface above the pipe.

Total Load – The summation of all the loads on the pipe. This would include when applicable; Earth Load + Surcharge Load + Live Load + Fluid Load.

Note: Since the internal fluid load for a pipe is constant regardless of fill height it is not listed in the table. When the user chooses to consider fluid load, it is written below the table and included in the total load.

Bedding Factor

DL – The dead load bedding factor applied to the pipe at that depth. The higher the bedding factor, the greater the support that is given to the pipe by the surrounding soil. This factor is divided by the Total Load for the B, C, and D beddings only.

LL – The live load bedding factor applied to the pipe at that depth. The live load bedding factor accounts for concentrated loads resulting from live loads over pipe with shallow cover. For the Type 1, 2, 3, 4 and Jacking Installations the Live Load is divided by the lower of this value or the DL value, and all other loads are summed up and divided by the DL value.

Required D-Load 0.3mm (0.01 in) – The load the pipe is required to support in the three-edge bearing test with a crack equal to or less than 0.3 mm (0.01 in) which equates to the maximum stress induced on the pipe in the installed condition. The load is given in kN (lbs) per m (ft) length of pipe per mm (ft) of diameter (or span for noncircular pipe).

Required TEB-Load Ultimate – The load that the pipe is required to be able to support in the three-edge bearing test prior to failure. The load is given in kN (lbs) per m (ft) length of pipe.

Liability Agreement

The successful application and use of this software product is dependent on the application of skilled engineering judgement supplied by the user and/or their consultant. The user of this software must select input values suitable to describe their specific engineering situation. The information presented in the computer output is for review, interpretation application, and approval by a qualified engineer who must assume full responsibility for verifying that all output is appropriate and correct.

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APPENDIX B

Redlined Grading Plans

BASIS OF BEARING

N001°31'6"W
BEING THE WEST LINE OF THE SE 1/4 OF SECTION 35, TOWNSHIP 20
SOUTH, RANGE 61 EAST, W.D.M. CLARK COUNTY, NEVADA, AS PER
RECORD OF SURVEY FILE 117 PAGE 75, CLARK COUNTY, NEVADA
RECORDS.

BENCHMARK

BM NO. 70013556
ELEVATION = 1905.28' NAVD'88

RIVET AND PLATE IN T/C, NW COR. OF FREMONT ST.
AND BRUCE ST. NEAR THE P.C. OF FREMONT ST.

FEMA INFORMATION

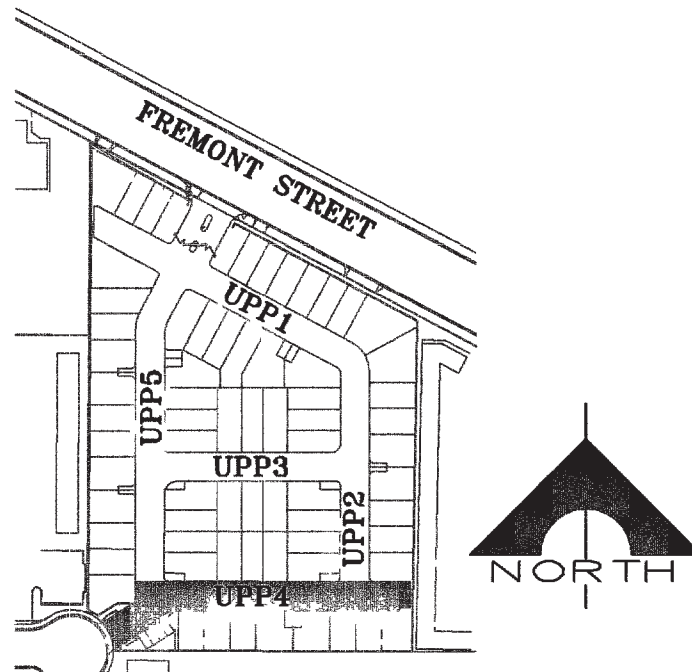
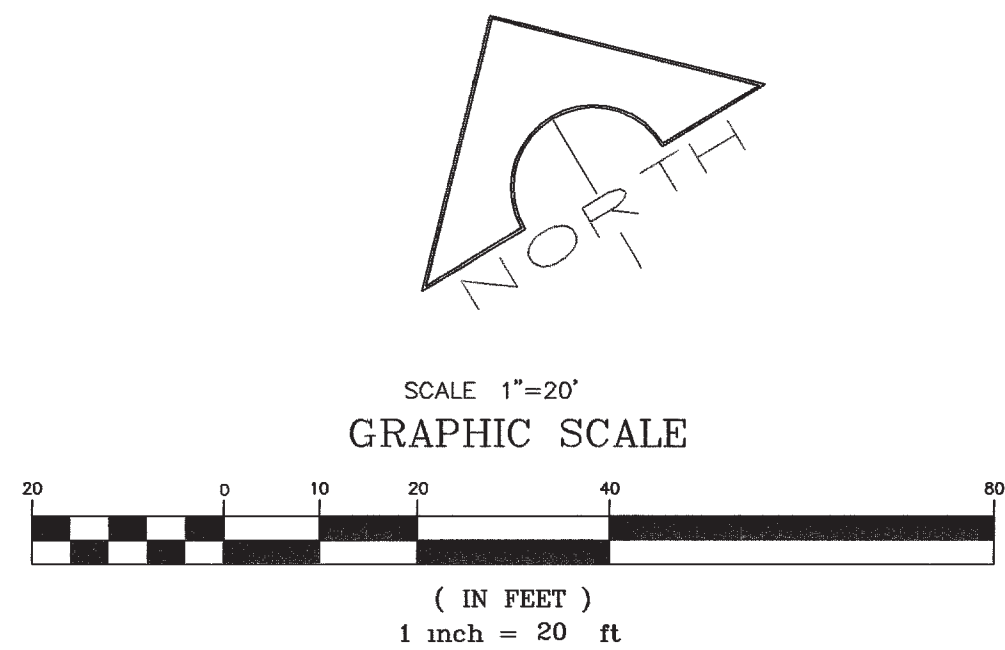
SITE IS LOCATED IN ZONE "X". AREA DETERMINED TO BE
OUTSIDE OF 500 YEAR FLOOD ZONE PER FIRM MAP NO.
52003 C 2170 E EFFECTIVE SEPT. 27, 2002.

NOTE:

ALL PRIVATE DRIVES ARE P.U.E., PUBLIC SEWER
EASEMENTS, AND PUBLIC DRAINAGE EASEMENTS TO
BE PRIVATELY MAINTAINED BY HOA

GENERAL NOTES

1. JPL ENGINEERING, INC. ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITIES
SHOWN OR NOT SHOWN. THE UTILITIES SHOWN ON THIS DRAWING HAVE
BEEN PLOTTED FROM RECORD INFORMATION AND ARE FOR THE
CONVENIENCE OF THE CONTRACTOR ONLY. IT IS THE CONTRACTOR'S
RESPONSIBILITY TO FIELD VERIFY BOTH THE HORIZONTAL AND VERTICAL
LOCATION OF ALL RELEVANT UTILITIES PRIOR TO COMMENCEMENT OF
CONSTRUCTION. IF A CONFLICT OR DISCREPANCY IS DISCOVERED, THE
CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING IMMEDIATELY.
2. ALL WATER FACILITIES CONSTRUCTION SHALL BE IN ACCORDANCE WITH
THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER
DISTRIBUTION SYSTEMS (UDACS), LATEST EDITION.
3. WATER AND SEWER SERVICE LATERALS SHALL BE INSTALLED A MINIMUM
OF FOURTY-EIGHT (48) INCHES APART IN SEPARATE TRENCHES. WATER
LATERALS SHALL BE A MINIMUM OF TWELVE (12) INCHES ABOVE THE SEWER
LATERAL (REF. UNIFORM PLUMBING CODE)



KEY MAP
SCALE: NTS

LEGEND

- CENTERLINE
PROPERTY LINE/LOT LINE
PROPOSED DRAINAGE EASEMENT
PROPOSED AC AREA
ASSESSOR'S PARCEL NUMBER
PROPOSED FIRE HYDRANT
EXISTING FIRE HYDRANT
PROPOSED WATER VALVE
EXISTING WATER VALVE
STUB & CAP
EXISTING CONTOUR
FLOW LINE
EDGE OF PAVEMENT
EX. EDGE OF PAVEMENT
ELECTRICAL TRANSFORMER
ELECTRICAL PANEL
SIGHT VISIBILITY ZONE (SVZ)
STORM DRAIN MANHOLE
DROP INLET
SEWER MANHOLE
LANDSCAPING FEATURE

STORMDRAIN SCHEDULE

- | | |
|--|---|
| 1. PROP. 3'x3' DI
STA 13+12.16
RIM = 1883.59
INV. OUT = 1881.64 | 7. PROP. 60" TYPE I SDMH
STA 12+24.17
RIM = 1885.65
INV. IN = 1882.62
INV. OUT = 1882.42
BOLT DOWN MH LID |
| 2. PROP. 3'x3' DI
STA 13+16.62
RIM = 1883.57
INV. IN = 1881.61 | 10. PROP. 60" TYPE I SDMH
STA 10+51.07
RIM = 1887.05
INV. IN = 1883.73
INV. OUT = 1883.53
BOLT DOWN MH LID |
| 3. PROP. 60" TYPE III SDMH
STA 13+23.89
RIM = 1883.58
INV. IN = 1881.00
INV. OUT = 1880.80
BOLT DOWN MH LID | 11. PROP. 60" TYPE III SDMH
STA 0+00
RIM = 1886.55
INV. IN = 1884.26
INV. OUT = 1884.06 |
| 4. PROP. 60" TYPE III SDMH
STA 14+39.22
RIM = 1884.55
INV. IN = 1881.68
INV. OUT = 1881.58
BOLT DOWN MH LID | 12. PROP. 15" MODIFIED
TYPE "CM" DI #12
STA 0+00
GRATE = 1888.55
INV. OUT = 1884.40 |
| 6. PROP. 3'x3' DI
STA 11+51.36
RIM = 1885.25
INV. OUT = 1881.95 | 13. PROP. 15" MODIFIED
TYPE "CM" DI #13
STA 0+00
GRATE = 1888.20
INV. OUT = 1884.40 |

SEWER SCHEDULE

- | | | |
|--|---|---|
| 1. MH#1 48" TYP I CONC
STA 22+42.55
RIM = 1880.20
EX INV IN = 1873.48
EX INV OUT = 1873.48 | 5. MH#5 48" TYP I CONC
STA 15+90.22
RIM = 1885.75
INV IN = 1876.79
INV IN = 1876.79
INV OUT = 1876.59 | 9. MH#9 48" TYP I CONC
STA 10+04.22
RIM = 1885.50
RIM = 1885.50
INV IN = 1877.74
INV IN = 1877.74
INV OUT = 1877.54 |
| 2. MH#2 48" TYP I CONC
STA 12+61.97
RIM = 1881.96
INV IN = 1874.37
INV OUT = 1874.17 | 6. MH#6 48" TYP I CONC
STA 12+61.97
RIM = 1885.75
INV IN = 1876.79
INV OUT = 1877.47 | 10. MH#10 48" TYP I CONC
STA 10+71.55
RIM = 1885.62
RIM = 1885.62
INV IN = 1876.68
INV IN = 1876.68
INV OUT = 1876.48 |
| 3. MH#3 48" TYP I CONC
STA 13+18.91
RIM = 1883.74
INV IN = 1874.71
INV IN = 1874.71
INV OUT = 1874.51 | 7. MH#7 48" TYP I CONC
STA 10+04.22
RIM = 1885.50
RIM = 1885.50
INV IN = 1876.81
INV IN = 1876.81
INV OUT = 1876.81 | 11. MH#11 48" TYP I CONC
STA 9+89
RIM = 1885.22
RIM = 1885.22
INV IN = 1876.07
INV IN = 1876.07
INV OUT = 1875.87 |
| 4. MH#4 48" TYP I CONC
STA 13+29.99
RIM = 1883.70
INV IN = 1875.01
INV OUT = 1874.81 | 8. MH#8 48" TYP I CONC
STA 11+36.66
RIM = 1886.90
RIM = 1886.90
INV IN = 1878.61
INV IN = 1878.61 | 12. MH#12 48" TYP I CONC
STA 10+04.45
RIM = 1886.28
RIM = 1886.28
INV IN = 1876.72
INV IN = 1876.72 |

APPROVALS

Robert Morgan
LAS VEGAS VALLEY WATER DISTRICT
PROJECT NO. (11)870

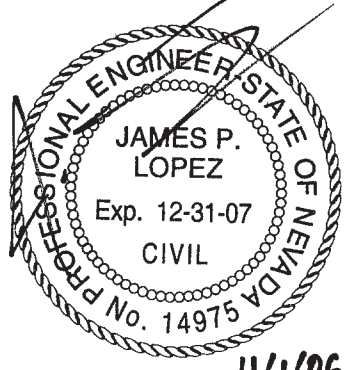
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NOVEMBER 2006



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Las Vegas, NV 89123
phone (702) 898-6269 * fax (702) 898-0647

REV DATE DESCRIPTION

DATE

APPROVAL

Call before you UnderGround

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CLARK COUNTY TRAFFIC OPERATIONS

AND

1-702-229-6611

FREWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

CALL BEFORE YOU DIG

1-800-227-2600

UNDERGROUND SERVICE ALERT (USA)

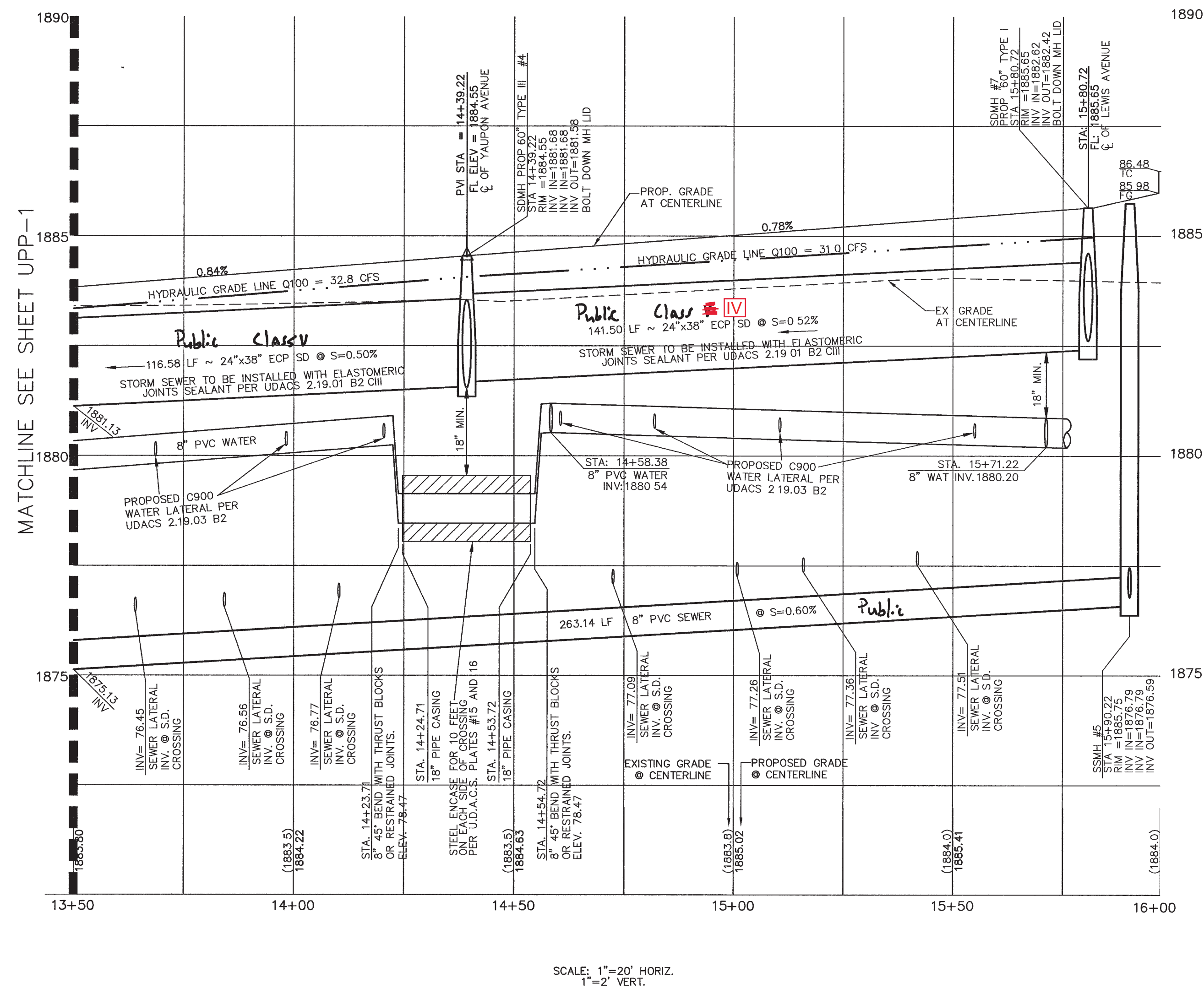
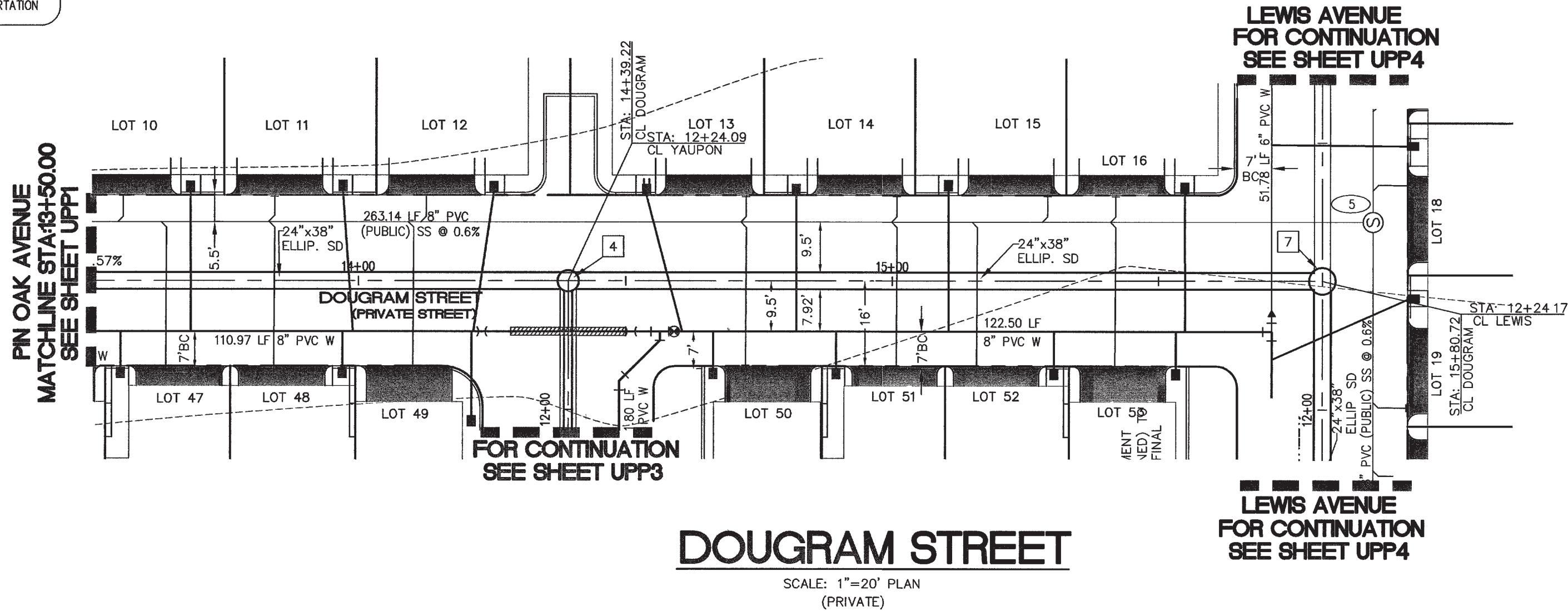
CALL BEFORE YOU OVERHEAD

1-702-227-2929

NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

SEWER SCHEDULE

- MH#1 48" TYP I CONC STA 22+42.55 RIM = 1883.20 INV IN= 1873.68 EX INV OUT= 1873.48
- MH#2 48" TYP I CONC RIM = 1881.96 INV IN= 1874.37 INV OUT= 1874.17
- MH#3 48" TYP I CONC RIM = 1883.74 INV IN= 1874.71 INV OUT= 1874.51
- MH#4 48" TYP I CONC STA 13+29.99 RIM = 1883.59 INV IN= 1875.01 INV OUT= 1874.81
- MH#5 48" TYP I CONC STA 15+90.22 RIM = 1885.75 INV IN= 1876.79 INV OUT= 1876.59
- MH#6 48" TYP I CONC STA 12+61.97 RIM = 1885.75 INV IN= 1874.37 INV OUT= 1874.17
- MH#7 48" TYP I CONC STA 10+04.22 RIM = 1887.50 INV IN= 1878.81 INV OUT= 1878.61
- MH#8 48" TYP I CONC STA 11+36.66 RIM = 1886.80 INV IN= 1878.61 INV OUT= 1878.41
- MH#9 48" TYP I CONC STA 10+04.22 RIM = 1885.90 INV IN= 1877.74 INV OUT= 1877.54
- MH#10 48" TYP I CONC STA 10+71.55 RIM = 1885.62 INV IN= 1876.68 INV OUT= 1876.48
- MH#11 48" TYP I CONC STA 9+88 RIM = 1885.22 INV IN= 1876.07 INV OUT= 1875.87
- MH#12 48" TYP I CONC STA 10+04.45 RIM = 1886.28 INV IN= 1876.72 INV OUT= 1876.52



BASIS OF BEARING

N00°13'16"W
BEING THE WEST LINE OF THE SE 1/4 OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.M. CLARK COUNTY, NEVADA, AS PER RECORD OF SURVEY FILE 117 PAGE 75, CLARK COUNTY, NEVADA RECORDS.

BENCHMARK

BM NO. 7C013556
ELEVATION = 1905.28' NAVD'88

RIVET AND PLATE IN T/C, NW COR. OF FREMONT ST. AND BRUCE ST. NEAR THE P.C. OF FREMONT ST.

FEMA INFORMATION

SITE IS LOCATED IN ZONE "X", AREA DETERMINED TO BE OUTSIDE OF 500 YEAR FLOOD ZONE PER FIRM MAP NO. 32003 C 2170 E EFFECTIVE SEPT. 27, 2002.

NOTE:

ALL PRIVATE DRIVES ARE P.U.E., PUBLIC SEWER EASEMENTS, AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA

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- WATER AND SEWER SERVICE LATERALS SHALL BE INSTALLED A MINIMUM OF FOURTY-EIGHT (48) INCHES APART IN SEPERATE TRENCHES. WATER LATERALS SHALL BE A MINIMUM OF TWELVE (12) INCHES ABOVE THE SEWER LATERAL (REF. UNIFORM PLUMBING CODE)

STORMDRAIN SCHEDULE

- PROP. 3'x3' DI STA 13+12.16 RIM = 1883.59 INV OUT=1881.64
- PROP. 3'x3' DI STA 13+16.82 RIM = 1883.57 INV = 1881.61
- PROP. 60" TYPE III SDMH STA 13+23.89 RIM = 1883.58 INV IN=1881.00 INV IN=1881.00 INV OUT=1880.80 BOLT DOWN MH LID
- PROP. 60" TYPE III SDMH STA 14+39.22 RIM = 1884.55 INV IN=1881.68 INV IN=1881.68 INV OUT=1881.58 BOLT DOWN MH LID
- PROP. 3'x3' DI STA 11+51.36 RIM = 1885.25 INV OUT=1881.95
- PROP. 60" TYPE I SDMH STA 12+24.17 RIM = 1885.65 INV IN=1882.62 INV OUT=1882.42 BOLT DOWN MH LID
- PROP. 60" TYPE I SDMH STA 10+51.07 RIM = 1887.05 INV IN=1883.73 INV OUT=1883.53 BOLT DOWN MH LID
- PROP. 60" TYPE III SDMH STA 0+00 RIM = 1888.55 INV IN=1884.26 INV IN=1884.26 INV OUT=1884.06
- PROP. 15' MODIFIED TYPE "CM" DI #12 STA 0+00 GRATE = 1888.55 INV OUT=1884.40
- PROP. 15' MODIFIED TYPE "CM" DI #13 STA 0+00 GRATE = 1888.20 INV OUT=1884.40

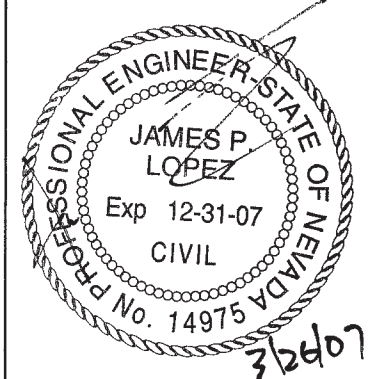
APPROVALS

Robert J. Morgan
LAS VEGAS VALLEY WATER DISTRICT
PROJECT NO (10870)

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