

DS #:

4842

APN:

126-12-000-001

PROJECT:

Skye Canyon Parcel 2.16

SUBMITTAL:

1st Submittal

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: November 29, 2016
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: Skye Canyon Parcel 2.16	
Cross Streets:	NWC of Egan Crest Dr. & Eagle Canyon Av.	COPIES TO: Slater Hanifan Group
File Number:	F:\Depot\DSMemos\DS4842A.doc	Section 12, LLC / Ninety Five Mangt.
Parcel Number:	126-12-000-001	Bart Anderson, P.E., DevCo
Zoning Action:	TMP-65809	CCRFCD
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES	NO X

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	11/3/2016	11/29/2016	See Comments Below	\$400.00	464250: \$400
TOTAL FEES (LDDRS):				\$400.00	----

REMARKS:

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

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

All Onsite **Skye Canyon Phase 2 Developments** such as **Parcel 2.xx series** are allowed to proceed with the following conditions:

1. The engineer provides the City with a letter stating that the partial detention basin has adequate capacity to protect downstream construction. That should be for the 100-year flows based on reducing the peak flows.
2. No **Certificate of Occupancy** on the houses will be issued until after the detention basin has been accepted for Substantial Completion by the City.
3. The *Developer* provides a bond for the detention basin now, showing good faith that the *Developer's* intentions are to get started with the final detention basin as soon as permitting allows.
4. That the *Developer, Olympia* provides the City with a letter stating that it is willing to take all the risk including any damages to the downstream properties / infrastructure / cleanup cost including offsite properties.

The following are comments pertaining to the subject site specific drainage study and grading plans:

5. Provide a copy of the zoning/planning conditions associated with this site (**TMP-65809**) with the next submittal to verify compliance with conditions. *Flood Control* will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the *City Council*). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.

6. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.
7. All roadways and flood control facilities as proposed and approved in ***Skye Canyon Phase 2 Infrastructures*** must be substantially constructed prior to the final acceptance of the subject improvement plans.
8. ***Exhibit E (Developed Condition Drainage Map)***: Offsite basin **WL4A**** appears to discharge into a natural wash to the north. However, this does not match the ***Interim Condition Drainage Map*** of the ***Skye Canyon Phase 2 Infrastructure*** study and the pertinent mass grading plans which showed that **WL4A**** perpetuate through the subject basin **ON1D** to the east instead of discharge to the north.

Review and revise ***Exhibit E*** and the pertinent subject grading plans accordingly in the next submittal.

9. **Grading Plan I (Sheet G-1)**: As discussed in *Comment #8* above, Revise the cul-de-sac of ***Skye Arroyo Avenue*** to provide a public drainage easement to accept flow from the offsite basin to the west.
10. **Grading Plan II (Sheet G-2)**: The plan shows a portion of the storm drain system in ***Egan Crest Drive*** has been relocated. Provide an update to ***Skye Canyon Phase 2 Infrastructure*** for the proposed revision.

It appears that ***Parcel 2.16*** will be developed after ***Parcel 2.15*** adjacent to the east of ***Egan Crest Drive***. Show developed condition of ***Parcel 2.15*** on **Sheet G-2** and **Sheet G-4**.
11. **Details & Sections Sheet D-1 and Sheet D-2: 3/D-1, 7/D-1, 8/D-1, 19/D-1 and 28/D-2**: Revise to solid grout a minimum of **3-courses** of 8"-CMU (or equivalent) above adjacent highest FG.
12. **Detail Section 25/D-2**: The surface material within the limit of the 20'-wide public drainage easement must be concrete lined.
13. **Detail Section 25/D-2**: Wrought iron fence / gate must be constructed per *Uniform Standard Drawing 425.S1*.
14. Revise all callout of proposed drop inlets to include only the length of the inlets without adding the number of grates. There were projects constructed in which the contractors followed only the number of grates without double checking the total length whether matching the length callout. Shorter inlets were constructed as a result. Review and revise accordingly.
15. All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map.
16. The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.
17. Private streets must be public drainage easements. Provide a note on the grading plans: "Note: All private streets are P.U.E., Public Sewer Easements and Public Drainage Easements to be privately maintained by HOA".

18. Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (*Stormwater Quality Management Stamp and Sign Detail*).

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

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T/R/S: T19S/R59E/12
AREA F-12

 *** FAX TX REPORT ***

TRANSMISSION OK

JOB NO. 2317
 DESTINATION ADDRESS 7022845399
 PSWD/SUBADDRESS
 DESTINATION ID
 ST. TIME 11/29 16:11
 USAGE T 00' 49
 PGS. 3
 RESULT OK

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: November 29, 2016
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3. The *Developer* provides a bond for the detention basin now, showing good faith that the *Developer's* intentions are to get started with the final detention basin as soon as permitting allows.

TRANSMITTAL

To: Albert Sung, P.E.

Date: November 3, 2016

City of Las Vegas

Project No.: OLY1607.002

333 N. Rancho Drive

Las Vegas, NV 89106

From: Cameron Bencini, P.E.

Subject: Technical Drainage Study for Skye Canyon Parcel 2.16

CC: Tim Mulrooney

CC: Stanley Amadi, SHG

CC: Chelsea Peltier, SHG

CC: Steve Jones, SHG

CC: Mark Failla, SHG

CC: _____

Transmitting Via:

- ☐ Mail
☒ Messenger / MDS
☐ Federal Express
☐ Pickup

For:

- ☒ Review & Comment
☐ Per your Request
☐ Information/File

Acknowledgement of Receipt:

- ☐ Not Required
☒ Acknowledgement Required

Received By: [Signature]

Date: 11/3/16 Time: Noon

Copies	Description
<u>1</u>	<u>Subject Study</u>
<u>1</u>	<u>Grading Plan, Profile and Detail Sheets</u>
<u>1</u>	<u>Stamped and Signed Standard Form 1</u>
<u>1</u>	<u>\$400 Submittal Fee from Ninety Five Management LLC (Chk#1229)</u>
<u>1</u>	<u>CD containing PDF of submittal documents</u>

Comments:

Enclosed please find the above listed items in support of proposed improvements required for the project entitled *Skye Canyon Parcel 2.16*. The project is located on the northwest corner of Eagle Canyon Avenue and Egan Crest Drive.

Please contact us if there are any questions at 702-284-5300. Thanks.

Signed: _____

[Signature]
Cameron Bencini, P.E.
Flood Control Division

Please, notify us at (702) 284-5300 if there are any problems receiving this transmission.

TECHNICAL DRAINAGE STUDY

Skye Canyon Parcel 2.16

City of Las Vegas, Nevada

Job No.: OLY1607.001

Date: November 2016

Prepared By:

Slater Hanifan Group, Inc.
5740 S. Arville Street, Suite 216
Las Vegas, Nevada 89118
Phone: 702-284-5300 • Fax: 702-284-5399

Prepared For:

Ninety-Five Management, LLC
11411 Southern Highlands Parkway, Suite 300
Las Vegas, NV 89141
Phone: 702-220-6565 • Fax: 702-220-6566



Stanley Okey Amadi, P.E.
NV Professional Engineer No. 21724

Assisted by: Cameron Bencini, P.E.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Skye Canyon – Parcel 2.16 Date: November 2016
 Location of Development: a) Descriptive (Cross Streets): North/South: Egan Crest Drive
East/West: Eagle Canyon Avenue
 b) Section: 12 Township: 19 South Range: 59 East
 c) APN: Portions of 126-12-000-001

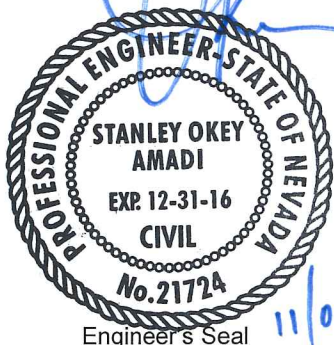
Name of Owner/Developer: SECTION 12, LLC / Ninety-Five Management, LLC
 Telephone No.: 702-220-6565 Fax No.: 702-220-6566 E-mail Address: mbolduc@olympiacompanies.com
 Address: 11411 Southern Highlands Parkway, Suite 300; Las Vegas, NV 89141

Contact Person – Name: Stanley Okey Amadi, P.E. Telephone No.: 702-284-5300
 *E-mail Address: samadi@shg-inc.com Fax No.: 702-284-5399
 Firm: Slater Hanifan Group
 Address: 5740 S. Arville Street, Suite 216; 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	☐

- Total Owned Land Area: At Site: +/- 16.0 Acres Being Developed/Disturbed: All
- Is a portion or all of the subject property located in a FEMA Flood Hazard Area? ☐ Yes** ☒ No
- Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ Yes** ☐ No
- Proposed type of development (Residential, Commercial, Etc.): Single-Family Residential
- Approximate upstream land area which drains to the subject site: ±715 Acres
- Has the site drainage been evaluated in the past? ☒ Yes** ☐ No If yes, please identify documentation: Master Drainage Study for Kyle Canyon (SHG, DS4420); Master Drainage Study for Kyle Canyon (GCW, DS4091)
Technical Drainage Study for Skye Canyon – Phase 2 Infrastructure (SHG, DS4739)
- If known, please briefly identify the proposed discharge point(s) of runoff from the site: Eagan Crest - Local storm drain
- Briefly describe your proposed schedule for the subject project: 1 Phase after completion of Phase 2 Infrastructure (DS4739)



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: *SHG Job No. OLY1607.001*

STANDARD FORM 1

Updated 05/01/2008

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Skye Canoyon Parcel 2.16		Map ID:
Firm Name: Slater Hanifan Group		Engineer: Stanley Okey Amadi, P.E.
Address: 5740 S. Arville Street, Suite 216		
City: Las Vegas	State: NV	Zip: 89118
Phone Number: 702-284-5300	Fax Number: 702-284-5399	
Property Owner: SECTION 12 LLC/Ninety-Five Management, LLC		
Address: 114111 Southern Highlands Parkway, Suite 300		
City: Las Vegas	State: NV	Zip: 89141
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>X</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
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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>X</u>	<u>-</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	
-	N/A	Streets with off-set crowns.
X	-	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X	-	Property lines.
X	-	Right-of-way lines and widths, existing and proposed.
X	-	Existing improvements and their elevations.
X	-	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
X	-	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X	-	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
X	-	Location and cross-section of street capacity calculations.
-	N/A	Cross-sectional detail for channels, including cutoff wall locations.
X	-	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.
X	-	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
-	N/A	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.
-	N/A	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.
X	-	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.
X	-	Building and/or lot numbers.
X	-	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
-	N/A	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>-</u>	<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.
<u>X</u>	<u>-</u>	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.
<u>X</u>	<u>-</u>	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
<u>-</u>	<u>N/A</u>	Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

Yes	No	
<u>X</u>	<u>-</u>	Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
<u>-</u>	<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>X</u>	<u>-</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.
<u>X</u>	<u>-</u>	Use of correct precipitation values in and around the McCarran Airport rainfall area.
<u>X</u>	<u>-</u>	A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
<u>X</u>	<u>-</u>	A summary table of stormwater flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where applicable.
<u>X</u>	<u>-</u>	Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
<u>X</u>	<u>-</u>	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>-</u>	<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	
-	N/A	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
X	-	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.
X	-	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.
-	N/A	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
X	-	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.
X	-	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.
-	N/A	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.
X	-	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
X	-	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.
X	-	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
-	N/A	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2



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 (CCRFCD) 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 CCRFCD Hydrologic Criteria and Drainage Design Manual (Design Manual).

An appointment must be made to preview this checklist in conjunction with CCRFCD 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>S.O.A.</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.
X	-	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.
X	-	Back of lot elevations and lot drainage pattern for all lots including common lots.
X	-	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.
X	-	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	
X	-	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.
X	-	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.
X	-	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.

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- Exhibit B – FEMA FIRM Panel Map
- Exhibit C – CCRFCD 2013 MPU Facilities Exhibit
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- Curve Number
- Lag Time – Standard Form 4 Computations
- HEC-1 Analysis – Developed Conditions

Appendix C Hydraulic Computations

- Drainage Swales
- Roadway & Emergency Overflow Sections
- Drop Inlet & Inlet Control Nomograph
- WSPGW Model

Appendix D Finished Floor Analyses

Appendix E Reference Material

Master Drainage Study for the Skye Canyon Master Plan - Update #3, by SHG

- Approval Letter
- HEC-1 Model
- Exhibits

Appendix F Reference Material

Technical Drainage Study for Skye Canyon – Phase 2 Infrastructure, by SHG

- Approval Letter
- Perimeter Streets
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- Improvement Plan Sheets

Appendix G CD of Electronic Files & Improvement Plans

1 INTRODUCTION

1.1 Project Overview & Study Purpose

Ninety-Five Management, LLC is proposing a single-family residential development, identified as *Skye Canyon Parcel 2.16*, within the city limits of Las Vegas, Nevada. The proposed development is approximately 14.6 acres in area, and located at the northwest corner of the intersection of Eagle Canyon Avenue and Egan Crest Drive.

The proposed development is located within the master planned Skye Canyon property and specifically in the Phase 2 area supported by the *Technical Drainage Study for Skye Canyon – Phase 2 Infrastructure* (DS4739E). All roadways and perimeter drainage infrastructure required for development of Parcel 2.16 have been technically addressed in the Phase 2 Infrastructure drainage study. Parcel 2.16 proposes utilization of drainage facilities provided by the Phase 2 Infrastructure. It is the objective of this study to show conformance to the drainage patterns established by the Phase 2 Infrastructure drainage study.

Additionally, the 1,662 acre Skye Canyon property has been master planned and a *Master Drainage Study for the Skye Canyon Master Plan – Update #3*, by SHG (DS4420N) has been approved by the City of Las Vegas. The subject Parcel 2.16 has been proposed within the framework set forth in the Master Drainage Study.

1.2 Description of Improvements

The project is located within Township 19 South, Range 59 East and Section 12, generally within a portion of APN 126-12-000-001. Parcel 2.16 is bound by Eagle Canyon Avenue to the south, Egan Crest Drive to the east, an existing wash to the north and undeveloped land with typical desert shrub to the west. A location map identifying the site in relation to major streets in the vicinity has been prepared as Exhibit A, included in Appendix A.

The project consists of construction of single-family residential lots averaging 6,000 ft² in area and all associated interior roadways. The typical onsite roadway is to be proposed as a 49-ft wide private street with roll curb and sidewalks. The adjacent perimeter roadways are to be installed by separate Phase 2 Infrastructure improvements and considered existing for development of Parcel 2.16.

Drainage and storm drain improvements necessary to control storm runoff and satisfy local drainage criteria onsite have been proposed by Parcel 2.16. The proposed storm drain improvements are intended to connect into the existing Phase 2 Infrastructure facilities in Egan Crest Drive.

1.3 FEMA Flood Zone Designation

The Parcel 2.16 site boundary has been delineated on the current FEMA FIRM Panel Map 32003C1750E, dated September 27, 2002, as Exhibit B included in Appendix A. Per the FIRM Panel, the project site is located within a FEMA designated unshaded Zone 'X', defined as areas located outside the 0.2% (500-year) annual chance floodplain. An

unshaded Zone 'X' is located outside a FEMA designated Special Flood Hazard Area (SFHA).

1.4 CCRFCD Facility Information

The project site has been delineated on the current 2013 Clark County Regional Flood Control District (CCRFCD) Las Vegas Valley Flood Control Master Plan Update (2013 MPU, Reference 1) facility figure as Exhibit C, included in Appendix A. Per the 2013 MPU, one (1) CCRFCD regional facility alignments are considered pertinent to Parcel 2.16. The following is a summary of the pertinent regional facility alignments, per the 2013 MPU, addressed by this study:

- MOHU 0118 located north of the project site. Runoff from Parcel 2.16 discharges into the wash north of the project site.

1.5 Referenced Documents

The following documents have been utilized as reference materials in the preparation of this drainage study. The referenced documents have been reviewed and determined acceptable for reference. Reference materials are included within the appropriate appendix. Slater Hanifan Group concurs with all referenced and adopted hydrologic and hydraulic analyses from the studies and the results established therein.

1. *Master Drainage Study for Skye Canyon*, prepared by Slater Hanifan Group (hereinafter referred to as the SHG Master Study, Reference 4), has conceptually planned drainage patterns required for the current land plan on the property. Pertinent information from the SHG Master Study is provided in Appendix E.
2. *Technical Drainage Study for Skye Canyon – Phase 2 Infrastructure*, prepared by Slater Hanifan Group (hereinafter referred to as the Phase 2 Infrastructure Study, Reference 5), has technically designed the adjacent perimeter roadways and associated drainage infrastructure utilized by Parcel 2.16. Phase 2 Infrastructure improvements were shown to be in conformance with the master drainage patterns per the SHG Master Study. The Phase 2 Infrastructure Study has been referenced to show the Parcel 2.16 development conformance to the drainage patterns for the perimeter infrastructure. The following specific items have been referenced from the Phase 2 Infrastructure Study and included in Appendix F:
 - Hydraulic modeling of Egan Crest Drive storm drain for utilization in proposed Parcel 2.16 storm drain design (conservative flows obtained from the ultimate condition analysis).
 - Offsite flow impacts from the adjacent perimeter roadways.

•

2 METHODOLOGY

2.1 Compliance

The methodologies utilized in the preparation of this study are in compliance with the Clark County Regional Flood Control District's Hydrologic and Drainage Design Manual (CCRFCD Manual, Reference 2).

2.2 Hydrologic Modeling

Modeling:

The SCS Unit Hydrograph Method (SCS Method) was utilized to determine peak flow rates. The SCS Method utilizes precipitation, drainage area, curve number and lag time parameters to determine peak flow rates. The SCS Method routine within the U.S. Army Corp of Engineers HEC-1 Flood Hydrograph Package program was utilized to model the drainage basins analyzed by this study.

Precipitation:

The site is located outside of the McCarran Airport Rainfall Area. Per CCRFCD Manual precipitation exhibits, the precipitation values utilized in this study's HEC-1 models are 3.00 and 1.67 inches for the 100-year and 10-year storm event, respectively. Note that the precipitation values have been referenced from the Phase 2 Infrastructure Study. No drainage area exceeds 8 square miles; thus, an SDN 3 design storm distribution referenced from Table 503 of the CCRFCD Manual is used. Relevant tables and figures from the CCRFCD Manual have been included in Appendix B.

Curve Number:

The SCS curve number loss rate methodology was utilized to approximate infiltration for the drainage basins. The soils information within the watershed was obtained from the NRCS Natural Resources Conservation Service of the Las Vegas Valley Area, Nevada, Part of Clark County (Soil Survey, Reference 3). This study's drainage basins lie within the following soil types delineated on Exhibit D, included in Appendix A:

- Soil 155 – Cave gravelly fine sandy loam, 4 to 15 percent slopes. This soil is composed of 100% HSG 'D'.

A composite curve number for land use utilized in this study's hydrologic analysis has been obtained utilizing the percentage identified above, and the computations are included in Appendix B.

Note that this project proposes lots that are an average of 6,000 ft² in area which utilizes a "6,000 sq-ft" lot curve number per CCRFCD Manual Table 602A; therefore, the curve numbers utilized are in conformance with the SHG Master Study as well as the Phase 2 Infrastructure Study that designed the receiving drainage facilities.

Lag Time:

The lag time is defined as the time measured from the center of mass of excess rainfall to the time to peak of the outflow hydrograph. The lag time is related to the time of concentration as 0.6 times the time of concentration. The time of concentration is defined as the time required for runoff to flow from the hydraulically most distant point of a basin to the outlet point of the basin. Standard Form 4, as outlined in the CCRFCD Manual, was utilized to determine the lag times for basins modeled. The lag time computations have been included in Appendix B.

2.3 Hydraulic Modeling & Criteria

Street Flow:

Street flows have been analyzed utilizing the Flowmaster Version 8.0 software by Haestad Methods. In accordance with the CCRFCD Manual, the following criteria apply:

- 10-year minor storm event: maximum flow depth of 1-ft from gutter flowline, and depth times velocity factor ($D \times V$) not exceeding 6.
- 100-year major storm event: maximum flow depth of 2-ft from gutter flowline, and depth times velocity factor ($D \times V$) not exceeding 8. In addition, site entrances are humped to be elevated 6-in above the anticipated 100-yr flow depth of the respective perimeter street.

Curb Inlets:

Curb inlets have been assessed using an in-house computation spreadsheet which utilizes equations outlined in Section 805 of the CCRFCD Manual, which includes a 50% clogging factor in determining sizes.

Storm Drains:

The hydraulic analysis for the proposed storm drain has been performed utilizing the Water Surface and Pressure Gradient (WSPG) Hydraulic Analysis System software by the Los Angeles County Department of Public Works. As outlined in the CCRFCD Manual, storm drain facilities are designed to maintain its hydraulic gradient line (HGL) a minimum of 1-ft below above finished grade and limit the flow velocities in the facility to less than 25 ft/s.

3 EXISTING DRAINAGE CONDITION

3.1 Definition/Discussion of Existing Condition

The existing condition considers the Phase 2 infrastructure as existing and the project site composed of existing desert shrub draining in a south easterly direction. The site has been assessed by the Phase 2 Infrastructure study and SHG Master Study in the past. Due to the site being surrounded by perimeter streets provided by the Phase 2 Infrastructure study, there are no impacts to the Parcel 2.16 project site that will differ from what has been previously analyzed in approved studies. As a result, no additional analyses have been performed by this study to demonstrate an existing drainage condition for Parcel 2.16.

4 DEVELOPED DRAINAGE CONDITION

4.1 Definition of Developed Condition

The developed condition considers the Parcel 2.16 area constructed, inclusive of the proposed interior roadway infrastructure. The offsite storm drain improvements in Egan Crest Drive are installed per the Phase 2 Infrastructure Study. The Egan Crest Storm drain discharges into the wash northeast of Parcel 2.16. Note that portions of the Egan Crest storm drain will be removed and/or relocated to align with proposed storm drain. More specifically, the west Type CM2 inlet will be relocated approximately 30-ft south and the existing 36-in RCP pipe extending to and from the inlet shall be removed and relocated.

Included in this project are the proposed drainage facilities required to collect and convey storm runoff produced by the entire Parcel 2.16 area and conform to master planned drainage patterns established in the Phase 2 Infrastructure Study.

The offsite drainage areas are adopted to be developed in the ultimate condition and quantify the most conservative flows as illustrated by the Phase 2 Infrastructure Study.

4.2 Discussion of Developed Condition

Refer to Exhibit E, included in Appendix A, for a detailed illustration of the developed condition drainage patterns.

Parcel 2.16 is analyzed as a single onsite basin ON1D. Basin ON1D is comprised of both Basins WL5A and WL5B per the SHG Master Study and Phase 2 Infrastructure Studies.

Basin ON1D storm runoff is conveyed in a northeasterly direction via onsite curb and gutter to a proposed drop inlet (Facility 1) where it is collected and conveyed into the Egan Crest Drive storm drain and discharged into the existing wash.

Offsite basins WL4A and WL4B are referenced from the Ultimate condition of the SHG Master Study. Storm runoff from these basins are conveyed east to the western boundary of Parcel 2.16. Drainage swales will convey flow from Basin WL4A north towards the wash and flow from Basin WL4B south to Eagle Canyon Avenue. Note that the discharge location of the offsite basins are in conformance with both the SHG Master Study as well as the Phase 2 Infrastructure Study.

4.3 Summary of Developed Condition Flows

A summary of the developed condition flow, as determined by HEC-1 analysis, has been presented below in Table 1. Refer to Appendix B for the applicable HEC-1 analysis.

Table 1: Developed Condition Flow Rate Summary			
Basin	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
WL4A**	8.0	23	10

Table 1: Developed Condition Flow Rate Summary			
Basin	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
WL4B**	8.9	27	12
ON1D	14.2	42	19
** Referenced from the Master Drainage Study (DS4420N)			

Basin ON1D consists of Basins WL5A and WL5B illustrated within the SHG Master Study. A comparative analysis of the basins is provided in Table 2 below:

Table 2: Comparative Analysis – 2.16 vs. Master Plan						
Basin	Parcel 2.16 TDS			Master Plan Study		
	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
ON1D	14.2	42	19	-	-	-
WL5A**	-	-	-	10.9	32	15
WL5B**	-	-	-	3.8	12	5
Total	14.2	42	19	14.7	44	20
** Referenced from the SHG Master Study (DS4420N)						

As shown on the table above for the analyzed area, the developed conditions of Parcel 2.16 reduces in area and runoff as compared to the SHG Master Study. The area reduction is due to the slight adjustment of the north basin boundary of Basin WL5A to provide adequate setback between the wash and the northern perimeter screen wall of the subdivision. The unaccounted area sheet flows north towards the wash. Regardless, the unaccounted area combines with flow from Basin ON1D in the wash and conveys east to maintain the master planned drainage patterns.

Runoff from Basins ON1D is conveyed into the Egan Crest Drive trunk storm drain designed to receive 67-cfs from the combined flow of Parcel 2.16 and offsite Basin WL4A. To reduce the impacts of offsite flow through Parcel 2.16, flow from Basin WL4A will be redirected north towards the wash. This change should be considered minor since runoff from Basin WL4A and Basin ON1D will still combine downstream in the wash.

4.4 Summary of Developed Condition Street Flows

Onsite Streets

Onsite street flows were evaluated to verify that the finished floor elevations will be adequately flood protected. A summary of the onsite streets hydraulic calculations is provided below in Table 3:

Table 3: 100-Year Onsite Roadway Flow Summary					
Cross Section	Slope (%)	Q ₁₀₀ (cfs)	Depth (ft)	Velocity (fps)	DxV
R-1 (Q = ON1D)	0.60	42	0.55	3.5	1.9
	4.98		0.42	7.1	3.0

Please note that the street flows in the developed condition meet CCRFCD criteria, as set forth in Section 2.3 of this report. Since the 100-year flow properties meet the 10-year criteria, only the 100-year street flow hydraulics have been analyzed.

Perimeter Streets

Offsite street flow had been previously evaluated by the Phase 2 Infrastructure Study and are referenced to verify that the finished floor elevations and site entrance humps were elevated enough to meet CCRFCD and City of Las Vegas criteria. A summary of the perimeter streets flow hydraulics is provided below in Table 4:

Table 4: 100-Year Perimeter Street Flow Summary						
Cross Section	Roadway	Slope (%)	Q ₁₀₀ (cfs)	Depth (ft)	Velocity (fps)	DxV
ECA2*	Eagle Canyon	4.90	44	0.50	6.5	3.2
EGN2*	Eagan Crest	0.50	4	0.35	1.6	0.5
*Referenced from the Skye Canyon Phase 2 Infrastructure Update No.2 Study						

The site entrance is located off of Eagle Canyon Avenue and an elevated hump is provided to keep offsite flows from traversing through Parcel 2.16. However, due to the steep slope of Eagle Canyon Avenue, the 6-in of additional freeboard above the flow depth is not met on the upstream (west) side of the entrance, while the centerline and downstream (east) side maintains more than 1.0-ft of freeboard. The proposed entrance hump should be acceptable because:

- The flow depth in Eagle Canyon Avenue is 0.50-ft which is contained by the curb. A minimum depth of 0.67-ft (i.e. freeboard of 0.17-ft) has been provided to keep offsite flows away from the site.
- The flow momentum along Eagle Canyon Avenue is significant in street direction due to the steep slope (4.90%) of the street. Thus, flows are not expected to crest sideways over the entrance hump.
- As the entrance extends east, the freeboard depth increases to 1.0-ft and 1.5-ft at the centerline and east flowline (downstream), respectively.

4.5 Summary of Drainage Facilities

Drainage Swales

Drainage swales are proposed along the western boundary of Parcel 2.16 to convey offsite flows away from the development. A hydraulic summary of the drainage swales are provided in Table 5 below:

Table 5: 100-Year Open Channel Flow Summary					
Cross Section	Slope (%)	Q ₁₀₀ (cfs)	Depth (ft)	Velocity (fps)	DxV
D-1 (Q = WL4A**)	1.00	23	0.69	3.6	2.5
	2.00		0.58	4.6	2.7

Table 5: 100-Year Open Channel Flow Summary					
Cross Section	Slope (%)	Q ₁₀₀ (cfs)	Depth (ft)	Velocity (fps)	DxV
D-2 (Q = WL4B**)	0.75	27	0.80	3.3	2.6
	1.00		0.74	3.7	2.7
**Referenced from the SHG Master Study					

Storm Drain

The site proposes onsite drainage facilities that ties to the trunk line in Egan Crest Drive. Table 6 below provides a summary of the proposed facilities and their design 100-year flows.

Table 6: Flood Control Facility Summary				
Facility ID	Facility	Proposed Q ₁₀₀ (cfs)	Previous Design Q ₁₀₀ (cfs)	Comment
1	20-ft Type CM2 DI	42	N/A	Conveyed to 30-in RCP Facility 2
2	Proposed 30" RCP	42	N/A	Tie into Facility P9a
3	Relocated 7.5-ft Type CM2 DI	2	2*	Outlets NE to 30-in RCP
4	Proposed 30" RCP	44	N/A	Tie to Proposed Manhole
P9	Existing 7.5-ft Type CM2 DI	2	2*	18" RCP East Lateral
P9A	Existing 36" RCP	46	71*	Outlets to wash
*Referenced from the Skye Canyon Phase 2 Infrastructure Update No.2 Study				

As shown in the table above, the proposed flow to the existing facilities are less than the design flow mainly due to the redirection of offsite basin WL4A. A WSPGW model is provided to ensure that the proposed storm drain meets manual criteria. Note that the flow and HGL is substantially less than previously estimated/designed at the existing connecting manhole, therefore the existing 18-in drop inlet lateral for facility P9 was not reanalyzed.

5 ULTIMATE DRAINAGE CONDITION

5.1 Definition/Discussion of Ultimate Condition

The ultimate condition considers that Skye Canyon is entirely developed, inclusive of the future residential areas bound by the Phase 2 Infrastructure improvements. A conceptual ultimate drainage condition had been defined by the referenced Phase 2 Infrastructure Study, and it has been utilized in preparation of this study's developed condition analysis.

6 PROPOSED FINISHED FLOORS

The proposed finished floor elevations satisfy the local City of Las Vegas policy and are elevated minimum 6-inches above the adjacent top of curb elevation measured at the high side of the lot. In addition, all finished floors are adequately flood protected and elevated above twice the depth of flow in the adjacent street. The hydraulic evaluation of proposed finished floors, utilizing the applicable flow depths established by this study, has been included in Appendix D.

Additionally, an emergency overflow path is provided at the low point proposed to allow for storm flows to exit onto Eagan Crest Drive in the case that the onsite drop inlet become clogged or considered inefficient. After inspection of weir computations included in Appendix C, the adjacent affected lots have been determined to be above the overflow water surface elevation at the exit points; therefore, considered adequately flood protected.

7 CONCLUSIONS & RECOMMENDATIONS

1. The proposed improvements are not located within a FEMA designated SFHA.
2. Parcel 2.16 drains to an onsite storm drainage facility that ties into an existing drainage facility that discharges into existing regional alignment MOHU 0118 adjacent to the site. Therefore, CCRFCD concurrence is anticipated to be required for this study.
3. The proposed drainage patterns are in conformance with the Phase 2 Infrastructure Study as well as the SHG Master Study. It is anticipated that the Phase 2 Infrastructure improvements are in place and functioning prior to start of Parcel 2.16 development.
4. The site entrance of Parcel 2.16 was designed to prevent offsite flow to impact the site from Eagle Canyon Avenue. Although the 6-in freeboard is not provided at the upstream side of the site entrance, the flow depth in the street is contained by the curb and the hump provided is above curb height and considered adequate to flood protect the site.
5. The proposed street flow and storm drain facilities are designed to satisfy the local CLV and all the CCRFCD criteria.
6. The proposed finished floors are adequately flood protected meeting criteria against design flows and potential overflow conditions.
7. The grading plan, storm drain profile and detail sheets for this project have been included with this study. These plans support the drainage patterns and conclusions detailed in this study.

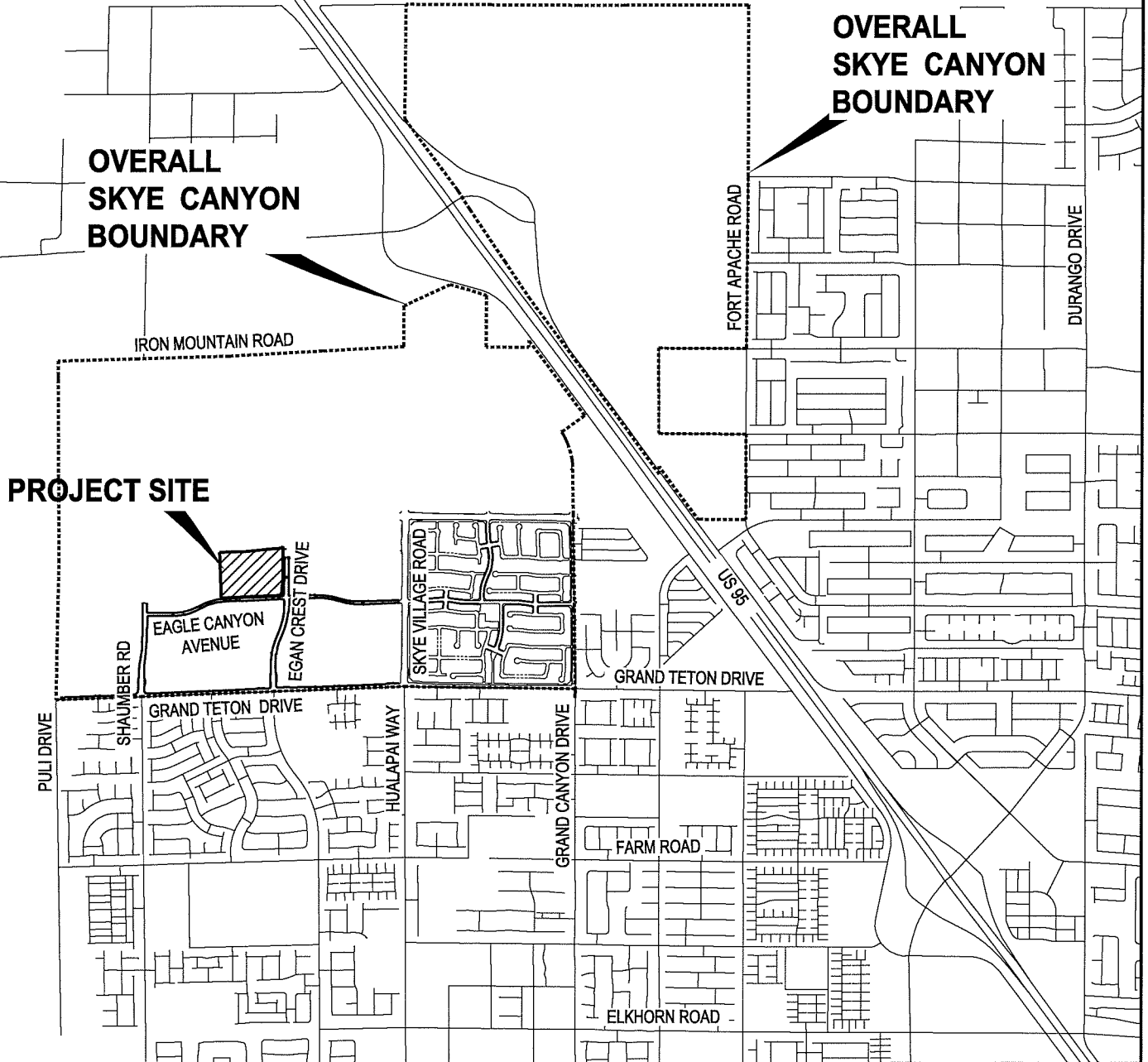
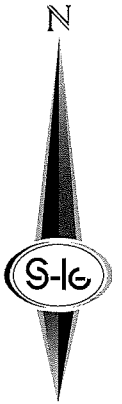
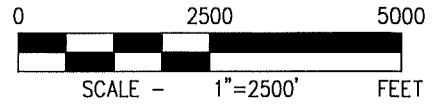
8 REFERENCES

1. *Las Vegas Valley Flood Control Master Plan Update*. PBS&J, Louis Berger Group and Parsons Brinckerhoff, 2013.
2. *Hydrologic Criteria and Drainage Design Manual*. Clark County Regional Flood Control District, 1999.
3. *Soil Survey of Las Vegas Valley Area, Nevada*. U.S. Department of Agriculture, Natural Resources Conservation Service, August 2014.
4. *Master Drainage Study for the Skye Canyon Master Plan – Update #3*; Slater Hanifan Group, August 2016.
5. *Technical Drainage Study for Skye Canyon – Phase 2 Infrastructure*; Slater Hanifan Group, June 2016.

APPENDIX A

Drainage Exhibits

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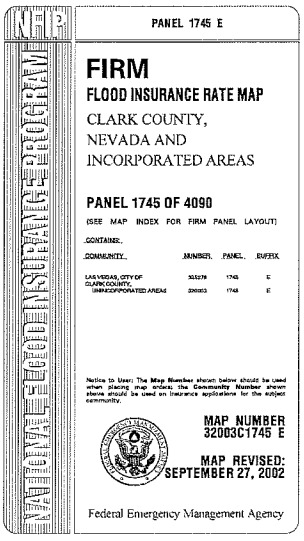
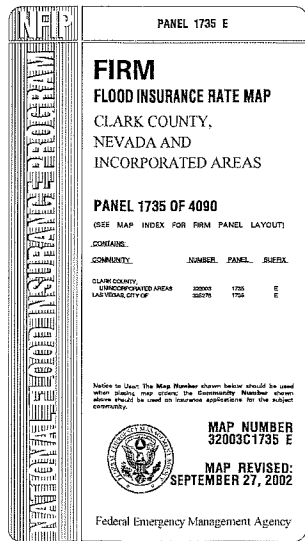
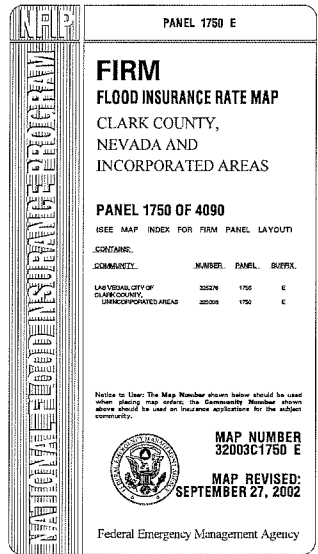
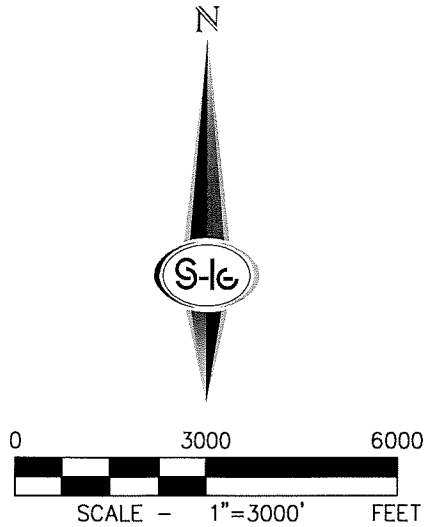
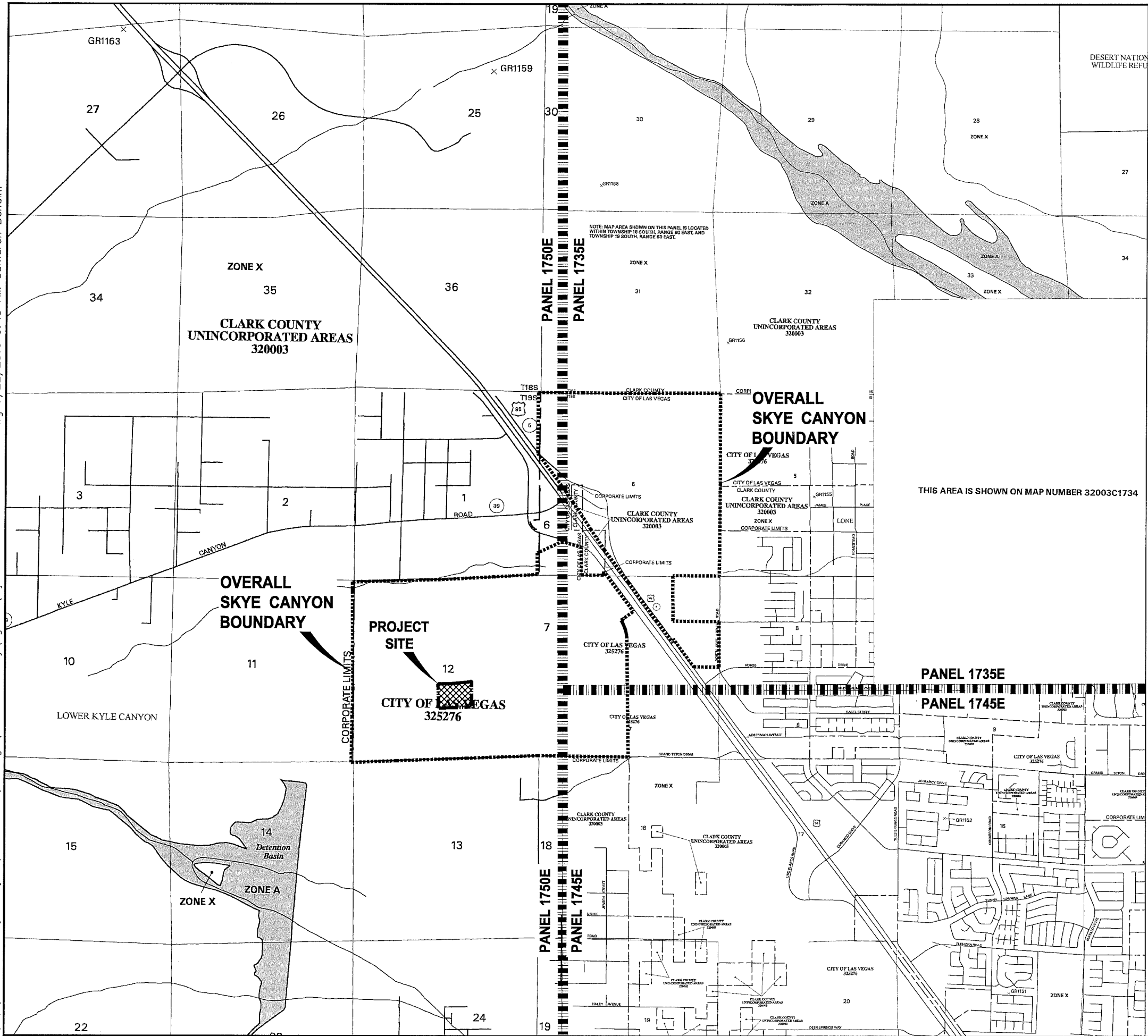


S-16
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NINETY-FIVE MANAGEMENT, LLC.
SKYE CANYON - PARCEL 2.16
LOCATION MAP

DATE: OCTOBER 2016	PROJECT NO. OLY1607.002
DRAFTER: ETM	
DESIGNER: ETM	
CHECKED: SOA	EXHIBIT A SHEET 1 OF 1

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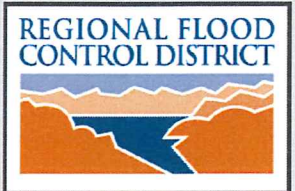
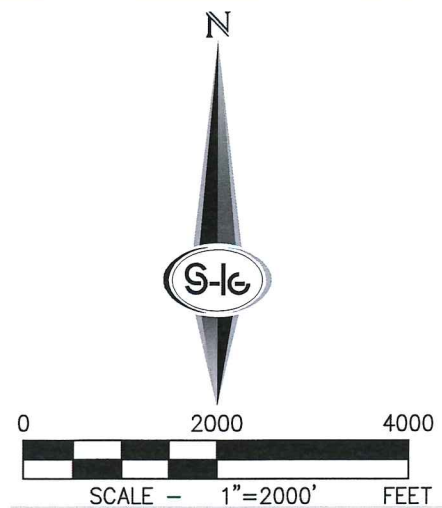
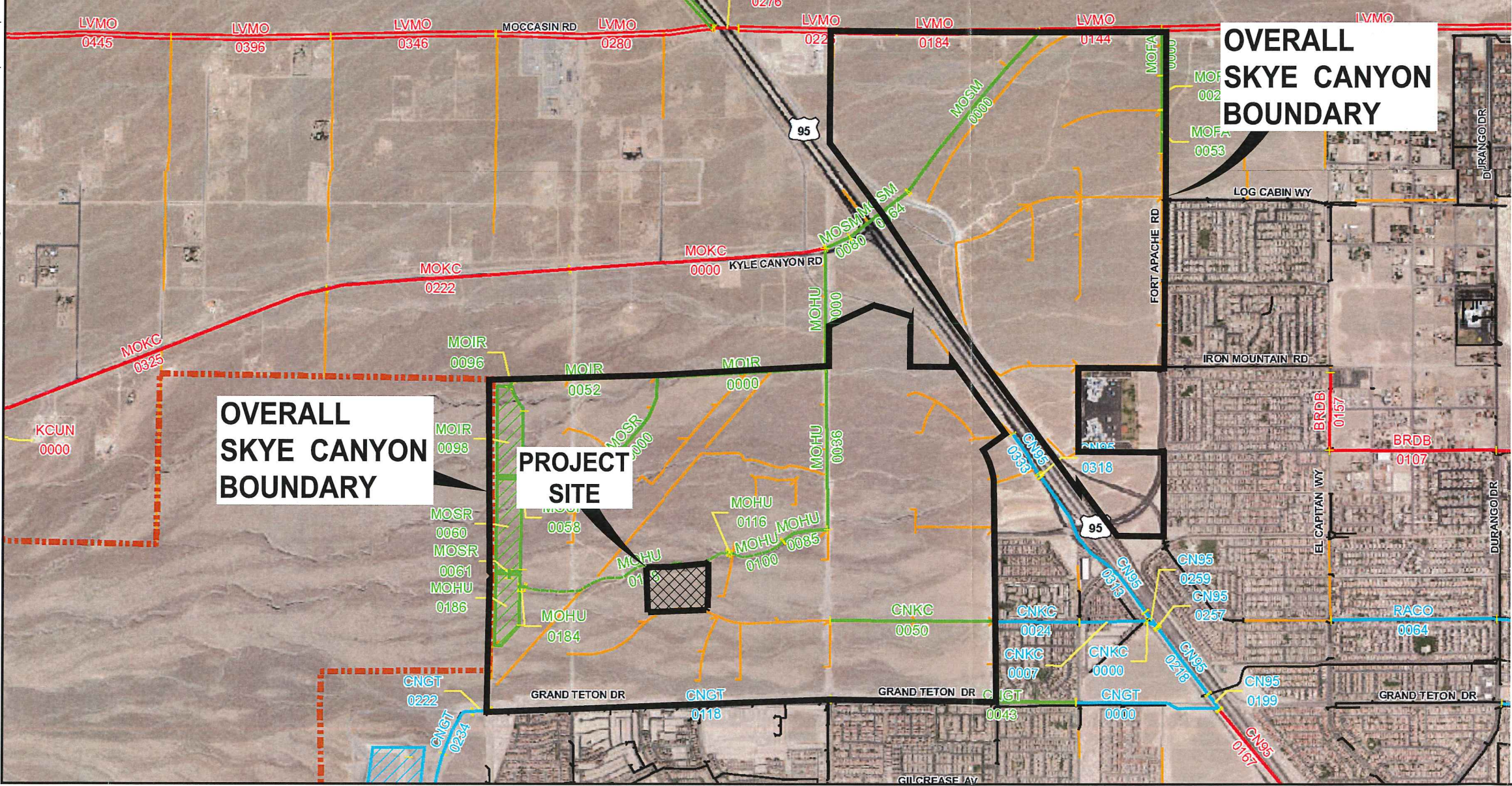
NINETY-FIVE MANAGEMENT, LLC.
SKYE CANYON - PARCEL 2.16
FEMA FIRM MAP

DATE: OCTOBER 2016
DRAFTER: ETM
DESIGNER: ETM
CHECKED: SOA
PROJECT NO. OLY1607.002
EXHIBIT B
SHEET 1 OF 1

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ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
CNGT 0000	E	CENTENNIAL PKWY CHANNEL WEST / GRAND TETON BRANCH	2376	600	CNW71-E	WEST3	0.47	2.58
0043	P0	10' X 5' RCB	3980	600	CNW71-E	WEST3	0.47	3.00
0118	E	6' X 6' RCB	5472	363	KYLEDET*	KYLEDB	57.73	3.72
CNKC 0000	E	CENTENNIAL PKWY CHANNEL WEST / KYLE CANYON BRANCH	377	999	CNW72-C	WEST3	0.71	4.58
0007	E	12' X 4' RCB	874	999	CNW72-C	WEST3	0.71	3.28
0024	E	10' X 5' RCB	1385	999	CNW72-C	WEST3	0.71	2.40
0050	P0	84" RCP	2610	854	CNW72-C	WEST3	0.71	3.60
LVMO 0000	P1	LAS VEGAS WASH - MOCCASIN	7530	12520	CNW130-W	LOWER5	77.85	2.10
0144	P1	Conc Chnl 30"W 13"D 0:1 SS	1915	12502	2C64-E	LOWER5	77.49	3.10
0184	P1	Conc Chnl 27"W 12.5"D 0:1 SS	2440	12478	2CNW64-C	LOWER5	76.76	3.10
0226	P1	Conc Chnl 27"W 12.5"D 0:1 SS	2500	12478	2CNW64-C	LOWER5	76.76	3.10
0276	P1	Bridge 30"W 10"D	400	11877	CNW51-C	LOWER5	71.44	3.10
0280	P1	Conc Chnl 16"W 8"D 0:1 SS	3500	3095	CNW23-C	LOWER3	5.71	2.86
MOFA 0000	P0	MOCCASIN - FORT APACHE	913	403	CNW64-E	LOWER3	0.73	0.50
0024	P0	10' X 6' RCB	537	403	CNW64-E	LOWER3	0.73	0.50
0053	P0	8' X 6' RCB	721	403	CNW64-E	LOWER3	0.73	0.50
MOHU 0000	P0	MOCCASIN - HUALAPAI BRANCH	1920	761	2CNW45-N	LOWER3	2.10	0.50
0036	P0	14' X 8' RCB	2590	368	CNW45-N	LOWER3	1.15	0.50
0085	P0	72" RCP	790	368	CNW45-N	LOWER3	1.15	3.00
0100	P0	Natural Wash	850	65	DMODB1	LOWER3	0.81	3.00
0116	P0	60" RPCP	12	65	DMODB1	LOWER3	0.81	3.00
0118	P0	Natural Wash	3485	65	DMODB1	LOWER3	0.81	3.00
0184	P0	30" RCP Outlet	50	65	DMODB1	LOWER3	0.81	3.00
0185	P0	3,145 cfs PMF Spillway		3145	COFF20	LOWER3	0.81	
0186	P0	55 ac-ft Moccasin Outfall Detention Basin #1		721	COFF20	LOWER3	0.81	

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
MOIR 0000	P0	MOCCASIN - IRON MOUNTAIN BRANCH	2770	446	2CNW33-C	LOWER3	1.76	3.60
0052	P0	66" RCP	2530	51	MODB3	LOWER3	0.39	3.60
0096	P0	42" RCP	50	51	MODB3	LOWER3	0.39	3.00
0097	P0	30" RCP Outlet			MODB3	LOWER3	0.39	
0098	P0	3,310 cfs PMF Spillway		3310	MODB3	LOWER3	0.39	
0098	P0	60 ac-ft Moccasin Outfall Detention Basin #3		396	OFF16	LOWER3	0.39	
MOKC 0000	P1	MOCCASIN AND KYLE CANYON	5450	2662	CNW35-C	LOWER3	2.69	3.40
0000	P1	11' X 8' RCB	3900	2192	CNW-7	LOWER3	2.19	3.46
0222	P1	9' X 8' RCB	5700	2192	CNW-7	LOWER3	2.19	3.65
0325	P1	9' X 8' RCB	3000	1146	COFF5-1	LOWER3	1.02	3.73
0380	P1	90" RCP						
MOSM 0000	P0	MOCCASIN AND SHEEP MOUNTAIN PARKWAY	3370	3778	CNW64-C	LOWER3	5.32	2.40
0000	P0	14' X 8' RCB	880	3505	CNW50-C	LOWER3	4.99	3.00
0064	P0	14' X 8' RCB	710	3325	2CNW35-C	LOWER3	4.80	3.00
0080	P0	14' X 8' RCB						
MOSR 0000	P0	MOCCASIN - SHAUMBER BRANCH	1860	94	MODB2	LOWER3	1.44	2.40
0000	P0	54" RCP	1215	46	MODB2	LOWER3	1.05	3.00
0035	P0	Natural Wash	50	46	MODB2	LOWER3	1.05	3.00
0058	P0	27" RCP Outlet			MODB2	LOWER3	1.05	
0059	P0	3,145 cfs PMF Spillway		3145	COFF18	LOWER3	1.05	
0060	P0	40 ac-ft Moccasin Outfall Detention Basin #2		275	COFF18	LOWER3	1.05	
0061	P0	30" RCP Outlet from MOHU0186 to MOSR0060	100	76	DMODB2	LOWER3	0.81	3.00



2013
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE
FIGURE F- 7
FIGURE F- 8
FIGURE F- 12
FIGURE F- 13
FLOOD CONTROL FACILITIES

- LEGEND**
- Ultimate Development Boundary
 - Existing Facilities
 - Category A Proposed Facilities
 - Category B Proposed Facilities
 - Local Existing Facilities
 - Local Proposed Facilities
 - Detention Basin
 - Stormdrain
 - Lined Channel
 - Unlined Channel
 - Levee/Dike
 - Natural Wash/Floodway
 - ID-Mile Separator
 - Remove & Replace/Parallel Facilities
 - Category A Channel
 - Category A Stormdrain
 - Category B Channel
 - Category B Stormdrain

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - PHASE 2 INFRASTRUCTURE

CCRFCD 2013 MPU FACILITIES MAP

DATE: JUNE 2015

DRAFTER: ETM

DESIGNER: ETM

CHECKED: SOA

PROJECT NO. OLY1501.001

EXHIBIT C

SHEET 1 OF 1

155

ON1D

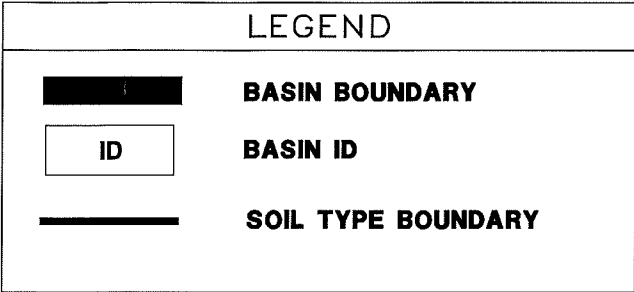
LEGEND

- BASIN BOUNDARY**
- BASIN ID**
- SOIL TYPE BOUNDARY**

0 500 1000
SCALE - 1"=500' FEET

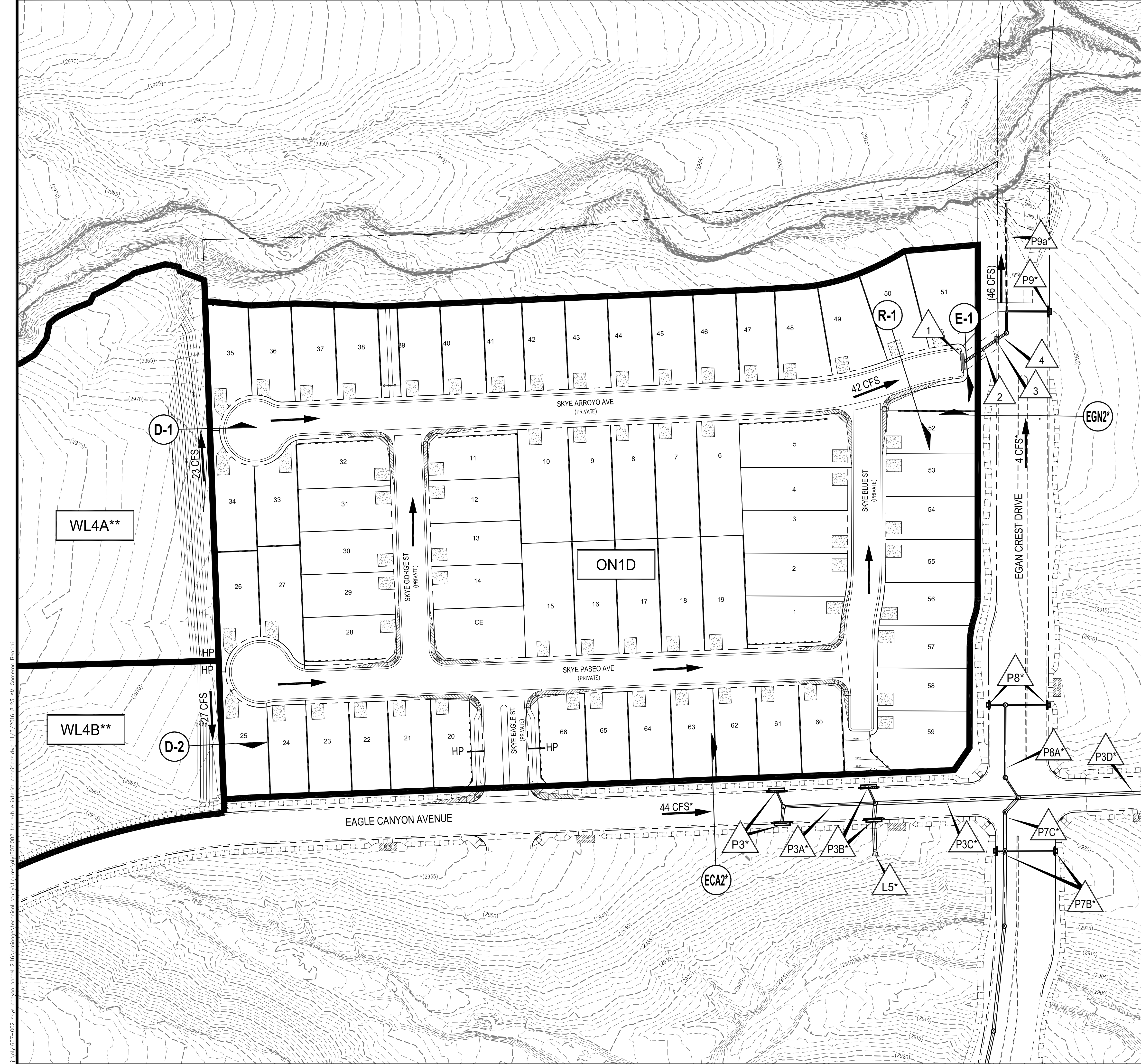
N

S-16



NINETY-FIVE MANAGEMENT, LLC. SKYE CANYON - PARCEL 2.16 SOILS MAP		NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.
DATE: OCT. 2016							
DRAFTER: CWB							
DESIGNER: CWB							
CHECKED: SOA							
PROJECT NO. OLY1607.002							
EXHIBIT D							
SHEET 1 OF 1							

<



Developed Condition Flow Rate Summary			
Basin	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
WL4A**	8.0	23	10
WL4B**	8.9	27	12
ON1D	14.2	42	19

100-Year Open Channel Flow Summary					
Developed Condition					
Cross Section	Slope (%)	Q ₁₀₀ (cfs)	Depth (ft)	Velocity (fps)	DxV
ECA2*	4.90	44	0.50	6.5	3.2
EGN2*	0.50	4	0.35	1.6	0.5
R-1 (Q = DON1)	0.60	42	0.55	3.5	1.9
	4.98		0.42	7.1	3.0
D-1 (Q = WL4A)	1.00	23	0.69	3.6	2.5
	2.00		0.58	4.6	2.7
D-2 (Q = WL4B)	0.75	27	0.80	3.3	2.6
	1.00		0.74	3.7	2.7

Egan Crest Drive Flood Control Facility Summary				
Facility ID	Facility	Proposed Q ₁₀₀ (cfs)	Previous Design Q ₁₀₀ (cfs)	Comment
1	20-ft Type CM2 DI	42	N/A	Conveyed to 30-in RCP Facility 2
2	Proposed 30" RCP	42	N/A	Tie into Facility P9a
3	Relocated 7.5-ft Type CM2 DI	2	2"	Outlets NE to 30-in RCP
4	Proposed 30" RCP	44	N/A	Tie to Proposed Manhole
P9	Existing 7.5-ft Type CM2 DI	2	2"	18" RCP East Lateral
P9a	Existing 36" RCP	46	71*	Outlets to wash

Eagle Canyon Drive Flood Control Facility Summary		
Facility ID	Facility	Comment
P3	(2) Existing 20-ft Type CM2 DIs	18" RCP North, 36" RCP South Lateral
P3A	Existing 36" RCP	18" RCP North, 48" RCP South Lateral
P3B	(2) Existing 20-ft Type CM2 DIs	
P3C	Existing 48" RCP	
P3D	Existing 48" RCP	
P7B	(2) Existing 5-ft Type CM2 DIs	18" RCP laterals (West Inlet Provided as Nuisance)
P7C	Existing 42" RCP	
P8	(2) Existing 5-ft Type CM2 Nuisance DIs	18" RCP laterals
P8A	Existing 18" RCP	
L5	Existing 48" RCP	

100-Year Emergency Overflow Summary				
Cross Section	Flow Condition	Slope (%)	Q ₁₀₀ (cfs)	Depth / Headwater (ft)
E-1	Channel	10.0	42	0.22
	Weir	N/A		0.84

NOTES:
** REFERENCED PER THE MASTER DRAINAGE STUDY (DS4420N)
* REFERENCED PER PHASE 2 INFRASTRUCTURE (DS4739E)

LEGEND

—

BASIN BOUNDARY

ID

BASIN ID

ID

→

FLOW DIRECTION

ID

→

FLOWMASTER SECTION

ID

△

FACILITY ID

N

S-16

0 40 80

SCALE 1"=40' FEET

F:\oly1607-002_skye canyon parcel 2.16\drainage\technical study\figures\oly1607.002_tds_ext_e_interim_conditions.dwg 11/3/2016 8:23 AM Cameron Becerra

APPENDIX B

Hydrologic Computations

Precipitation

* REFERENCED FROM PHASE 2 INFRASTRUCTURE STUDY



Precipitation Worksheet Rainfall Data and Computations

Project: Kyle Canyon Master Drainage Study
Date: 6/11/2010

Data:

Project is located in: Township: 19 S. Range: 59 E. Section: 12

Reference

APN Map

Figure 513*

Rainfall Depth-Duration-Frequency 10-Year, 6-Hour: 1.35 inches

Figure 503*

Rainfall Depth-Duration-Frequency 100-Year, 6-Hour: 2.1 inches

Figure 506*

Precipitation Adjustment Ratios:

10-Year: 1.24

Table 501*

100-Year: 1.43

Table 501*

Six Hour Depth Area Reduction Factors (DARF):

Area (gross acres): 10.0 = 0.0156 square miles
DARF = 1.00

Table 502*

Calculations:

$P_{10} = 1.67$ 10-Year Precipitation (in)

$P_{100} = 3.00$ 100-Year Precipitation (in)

$P_{10}/P_{100} = 0.56$ HEC-1 Multiple Ratio Value

Equations:

$$P = (\text{Rainfall}) * (\text{Precipitation Adjustment Ratio}) * (\text{Depth Area Reduction Factor})$$

Comments:

* Kyle Canyon West Basins, West of Hualapai

* Equations taken from the Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX HOUR DEPTH-AREA REDUCTION FACTORS

<u>Drainage Area (Square Miles)</u>	<u>Six-Hour Depth-Area Reduction Factor</u>
0.0	1.00
0.5	0.98
1.0	0.97
2.0	0.93
4.0	0.91
6.0	0.90
8.0	0.88
10.0	0.86
20.0	0.79
30.0	0.74
50.0	0.68
100.0	0.60
150.0	0.55
200.0	0.51
300.0	0.46
400.0	0.42
500.0	0.39

- NOTES: 1. A graphical representation of these factors is presented in Figure 514.
2. Consult with the local entity and/or the CCRFCD for guidance in using the Depth-Area Reduction Factors for drainage areas greater than 200 square miles.

<i>Revision</i>	<i>Date</i>

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX-HOUR STORM DISTRIBUTIONS

Percent of Total Storm Depth				Percent of Total Storm Depth			
Storm Time (In Minutes)	SDN3	SDN4	SDN5	Storm Time (In Minutes)	SDN3	SDN4	SDN5
0	0.0	0.0	0.0	185	32.2	37.6	43.0
5	2.0	2.0	2.0	190	35.2	41.5	47.7
10	5.7	5.8	5.9	195	40.9	46.2	51.4
15	7.0	7.5	8.0	200	49.9	53.0	56.1
20	8.7	9.9	11.0	205	59.0	61.0	63.0
25	10.8	12.6	14.4	210	71.0	71.0	71.0
30	12.4	13.7	15.0	215	74.4	73.2	72.0
35	13.0	14.5	16.0	220	78.1	75.6	73.1
40	13.0	14.9	16.8	225	81.2	78.2	75.2
45	13.0	15.1	17.1	230	81.9	79.9	77.9
50	13.0	15.5	18.0	235	83.5	81.3	79.0
55	13.0	15.6	18.2	240	85.1	82.3	79.5
60	13.0	15.9	18.7	245	85.6	83.0	80.4
65	13.3	16.2	19.0	250	86.0	83.5	81.0
70	14.0	16.9	19.7	255	86.8	84.4	82.0
75	14.2	17.2	20.2	260	87.6	85.1	82.6
80	14.8	17.9	21.0	265	88.8	86.4	84.0
85	15.8	18.9	22.0	270	91.0	88.5	85.9
90	17.2	20.1	23.0	275	92.6	90.8	88.9
95	18.1	21.1	24.1	280	93.7	92.4	91.0
100	19.0	22.0	25.0	285	95.0	94.4	93.8
105	19.7	22.8	25.9	290	97.0	96.8	96.6
110	19.9	23.2	26.5	295	97.6	97.3	97.0
115	20.0	24.0	28.0	300	98.2	97.8	97.4
120	20.1	24.6	29.0	305	98.5	98.2	97.9
125	20.4	25.2	30.0	310	98.7	98.4	98.1
130	21.4	26.0	30.5	315	98.9	98.6	98.3
135	22.9	26.9	30.9	320	99.0	98.8	98.5
140	24.1	27.6	31.0	325	99.3	99.1	98.9
145	24.9	28.3	31.7	330	99.3	99.2	99.0
150	25.1	28.6	32.1	335	99.4	99.3	99.2
155	25.6	29.2	32.7	340	99.5	99.4	99.3
160	27.0	30.2	33.3	345	99.8	99.7	99.6
165	27.8	31.2	34.6	350	99.8	99.8	99.7
170	28.1	32.1	36.1	355	99.9	99.9	99.9
175	28.3	33.2	38.1	360	100.0	100.0	100.0
180	29.5	35.2	40.8				

- Notes: 1. For drainage areas less than 8 square miles in size, use SDN 3.
 2. For drainage areas greater than or equal to 8 square miles and less than 12 square miles in size, use SDN 4.
 3. For drainage areas greater than or equal to 12 square miles, use SDN 5.
 4. A graphical representation of these values is presented on Figure 515.

Revision	Date

REFERENCE:

TABLE 503

Curve Number



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

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

Custom Soil Resource Report for Las Vegas Valley Area, Nevada, Part of Clark County

Skye Canyon - Parcel 2.16



October 13, 2016

Preface

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

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

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

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

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

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

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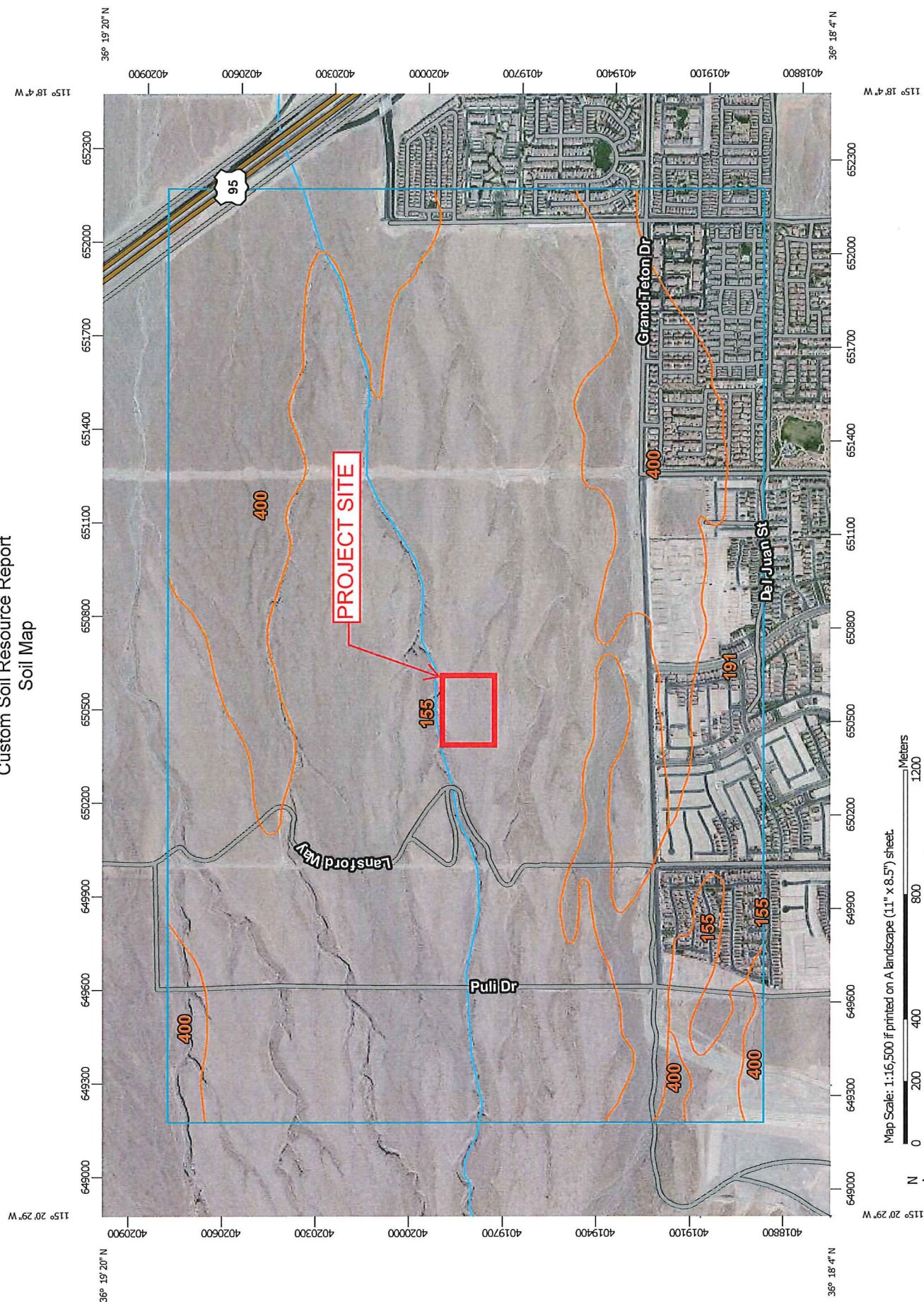
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Soil Map	5
Soil Map.....	6
Legend.....	7
Map Unit Legend.....	8
Map Unit Descriptions.....	8
Las Vegas Valley Area, Nevada, Part of Clark County.....	10
155—Cave gravelly fine sandy loam, 4 to 15 percent slopes.....	10
191—Dalian very cobbly fine sandy loam, 2 to 8 percent slopes.....	11
400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes.....	12
Soil Information for All Uses	13
Soil Reports.....	13
Water Features.....	13
Hydrologic Soil Group and Surface Runoff.....	13
References	15

Soil Map

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

Custom Soil Resource Report Soil Map



Map Scale: 1:16,500 if printed on A landscape (11" x 8.5") sheet.

0 200 400 800 1200 Meters
0 500 1000 2000 3000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

MAP INFORMATION

- Area of Interest (AOI)

Area of Interest (AOI)
- Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points
- Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

- Water Features

Streams and Canals
- Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads
- Background

Aerial Photography

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Las Vegas Valley Area, Nevada, Part of Clark County
Survey Area Data: Version 10, Aug 22, 2014

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

Date(s) aerial images were photographed: May 7, 2011—Jun 2, 2011

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

Map Unit Legend

Las Vegas Valley Area, Nevada, Part of Clark County (NV788)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
155	Cave gravelly fine sandy loam, 4 to 15 percent slopes	864.1	60.9%
191	Dalian very cobbly fine sandy loam, 2 to 8 percent slopes	202.0	14.2%
400	Tencee very gravelly fine sandy loam, 2 to 8 percent slopes	353.5	24.9%
Totals for Area of Interest		1,419.5	100.0%

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments

Custom Soil Resource Report

on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Las Vegas Valley Area, Nevada, Part of Clark County

155—Cave gravelly fine sandy loam, 4 to 15 percent slopes

Map Unit Setting

National map unit symbol: hr9w

Elevation: 2,000 to 4,800 feet

Mean annual precipitation: 4 to 12 inches

Mean annual air temperature: 57 to 70 degrees F

Frost-free period: 180 to 280 days

Farmland classification: Not prime farmland

Map Unit Composition

Cave and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cave

Setting

Landform: Fan remnants

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Mixed alluvium

Typical profile

H1 - 0 to 15 inches: gravelly fine sandy loam

H2 - 15 to 60 inches: indurated

Properties and qualities

Slope: 4 to 15 percent

Depth to restrictive feature: 4 to 20 inches to petrocalcic

Natural drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 40 percent

Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)

Available water storage in profile: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Other vegetative classification: LIMY 3-5" P.Z. (030XB019NV_3)

Hydric soil rating: No

191—Dalian very cobbly fine sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hrb4
Elevation: 2,200 to 3,400 feet
Mean annual precipitation: 4 to 6 inches
Mean annual air temperature: 61 to 66 degrees F
Frost-free period: 210 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Dalian and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dalian

Setting

Landform: Fan skirts
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Alluvium derived from limestone and dolostone

Typical profile

H1 - 0 to 5 inches: very cobbly fine sandy loam
H2 - 5 to 60 inches: very gravelly fine sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hrc1
Elevation: 2,400 to 5,700 feet
Mean annual precipitation: 4 to 10 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 180 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Tencee and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tencee

Setting

Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Alluvium derived from limestone and dolomite

Typical profile

H1 - 0 to 9 inches: very gravelly fine sandy loam
H2 - 9 to 15 inches: very gravelly sandy loam
H3 - 15 to 19 inches: indurated

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 7 to 20 inches to petrocalcic
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Water Features

This folder contains tabular reports that present soil hydrology information. The reports (tables) include all selected map units and components for each map unit. Water Features include ponding frequency, flooding frequency, and depth to water table.

Hydrologic Soil Group and Surface Runoff

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Custom Soil Resource Report

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Report—Hydrologic Soil Group and Surface Runoff

Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

Hydrologic Soil Group and Surface Runoff—Las Vegas Valley Area, Nevada, Part of Clark County			
Map symbol and soil name	Pct. of map unit	Surface Runoff	Hydrologic Soil Group
155—Cave gravelly fine sandy loam, 4 to 15 percent slopes			
Cave	100	Very high	D
191—Dalian very cobbly fine sandy loam, 2 to 8 percent slopes			
Dalian	100	Low	A
400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes			
Tencee	100	Very high	D

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Custom Soil Resource Report

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HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RUNOFF CURVE NUMBERS (URBAN AREAS¹)

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area ²	A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.): ³					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ⁴ ...		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93

Residential districts by average lot size:

See Table 602A

Developing urban areas

Newly graded areas (pervious areas only, no vegetation) ⁵	77	86	91	94
--	----	----	----	----

1 Average runoff condition, and $I_p = 0.2S$.

2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system. Impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figure 603.

3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

4 Composite CN's for natural desert landscaping should be computed using Figure 603 based on the impervious area percentage (CN #98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using Figure 603 based on the degree of development impervious area percentage) and the CN's for the newly graded pervious areas.

Revision	Date

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RUNOFF CURVE NUMBERS - RESIDENTIAL DISTRICTS

Average Lot Size or Usage ¹	Percent Impervious ²	Curve Number for Hydrologic Soil Groups			
		A	B	C	D
Apartments/Condos	72	81	88	91	93
Townhouses/6,000 sq ft lots or less ³	69	80	87	90	92
7,000 sq ft lots	63	76	84	89	91
8,000 sq ft lots	58	73	82	88	90
10,000 sq ft lots	38	61	75	83	87
14,000 sq ft lots	30	57	72	81	86
20,000 sq ft lots	25	54	70	80	85
40,000 sq ft lots	20	51	68	79	84
80,000 sq ft lots	12	46	65	77	82

1 Lot size should represent the size of the average lot and not the gross acreage divided by the number of lots.

2 Actual percent impervious value should be compared to selected land use type.

3 In cases where average residential lots are smaller than 6,000 sq ft, commercial/business/industrial land use should be used.

Revision	Date

REFERENCE:

TABLE 602A

Soil Data & Curve Number Computation

Project Name: OLY1607.002 - Skye Canyon - Parcel 2.16

Date: 10/25/2016

File Name: Curve Number Calcs v160623.xlsx

By: CWB

Data:

Reference:

Exhibit D
NRCS Soil Data

Soil Type - Soil Survey Area & Version, Soil Description

	A	B	C	D
LV 155 Las Vegas Valley 2014 Cave gravelly fine sandy loam, 4 to 15 percent slopes	0%	0%	0%	100%

Land Use	A	B	C	D
Residential (6,000 sf)	80	87	90	92

*Commercial land use per Note 3

Interim / Ultimate Conditions

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
ON1D	LV	155	100.0%	Residential (6,000 sf)	0%	0%	0%	100%	80	87	90	92	14.20	92.00
TOTAL PERCENT			100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									14.20	92.0

5740 S. Arville St., Suite 216 - Las Vegas, NV 89118

Ph. 702-284-5300 - Fx. 702-284-5399

Lag Time - Standard Form 4 Computations

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL TIME OF CONCENTRATION

Project Name: OLY1607.002 - Skye Canyon - Parcel 2.16
 Description:
 File Name: Lag Time Standard Form 4 v130321.xls
 By: CWB
 Date: 10/25/2016

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)						Tc	Tc Check	Flag	
DESIG:	DEV./EX. (D or E)	CN	K	AREA Ac	AREA Mi^2	INITIAL	SLOPE	Ti	TRAVEL	SLOPE	V1	VELOCITY	V2	Tt	Tc	Total	Tc	
						LENGTH Feet	%	Min	LENGTH Feet	%	FPS	FPS	FPS	Min	Calc.	Length Feet	Check	
			[1]		[2]			[3]				[4]	[5]	[6]	[7]	[8]	[9]	[10]
ON1D	D	92.0	0.824	14.20	0.0222	100	1.00	4.96	1270	2.80	3.38	5.12	4.97	4.97	9.93	1370	17.611	0.099
[1]	K = 0.0132 (CN) - 0.39																	
[2]	A = Area/640																	
[3]	Ti = (1.8 (1.1-K) L^0.5)/S^0.33																	
[4]	For Existing Conditions: V1 = 14.8 * (S/100)^0.5 For Developed Conditions: V1 = 20.2 * (S/100)^0.5																	
[5] For Existing Conditions: V2 = 29.4 * (S/100)^0.5 [6] For Developed Conditions: V2 = 30.6 * (S/100)^0.5 [7] Tt = L/(60*V) [8] Tc = Ti + Tt [9] Tc = (L/180) + 10 [10] Tlag = (0.6*Tc)/60 [11] Min Tlag =0.05 Note: For Travel Time Calcs: V1 applies to first 500 feet and V2 applies to remaining distance.																		

REFERENCE : STANDARD FORM 4

HEC-1 Analysis – Developed Conditions

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*   JUN 1998
*   VERSION 4.1
*
* RUN DATE 24OCT16 TIME 10:48:56
*
*****
DEV
*****
*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*
*****

```

```

X  X  XXXXXX  XXXXX  X
X  X  X  X  X  XX
X  X  X  X  X  X
XXXXXXX XXXX  XXXXX  X
X  X  X  X  X  X
X  X  X  X  X  X
X  X  XXXXXX  XXXXX  XXX

```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
 THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
 NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
 DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
 KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
*DIAGRAM
1 ID SLATER HANIFAN GROUP
2 ID SKYE CANYON PARCEL 2.16
3 ID DEVELOPED CONDITION
4 ID
5 ID RETURN PERIOD ----- 100-YR & 10-YR
6 ID DISTRIBUTION ----- 6-HOUR SDN3
7 ID PROJECT NO. ----- OLY1607.001
8 ID FILENAME ----- DEV.H1
9 ID DATE ----- 10/24/2016
10 ID MODELED BY ----- CWB
11 ID
12 ID PRECIPITATION STORM EVENT RATIOS
13 ID STORM EVENT RATIO
14 ID 10-YR 0.56
15 ID 100-YR 1
16 ID
17 IT 5 0 0 300
18 IO 5 0 0
19 IN 5 0 0
20 JR PREC 1.00 0.56
*
21 KK ON1D
22 KM DEVELOPED ONSITE BASIN
23 BA 0.0222
24 PB 3.00
25 PC 0 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
26 PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
27 PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
28 PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
29 PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
30 PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
31 PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
32 PC 0.998 0.999 1
33 LS 0 92.0
34 UD 0.099
*
35 ZZ

```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

```

INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW
21 ON1D

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*   JUN 1998
*   VERSION 4.1
*
* RUN DATE 24OCT16 TIME 10:48:56
*
*****
*****
*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*
*****

```

SLATER HANIFAN GROUP
 SKYE CANYON PARCEL 2.16
 DEVELOPED CONDITION
 RETURN PERIOD ----- 100-YR & 10-YR

DISTRIBUTION ----- 6-HOUR SDN3
 PROJECT NO. ----- OLY1607.001
 FILENAME ----- DEV.H1
 DATE ----- 10/24/2016
 MODELED BY ----- CWB

DEV

PRECIPITATION STORM EVENT RATIOS
 STORM EVENT RATIO
 10-YR 0.56
 100-YR 1

18 IO OUTPUT CONTROL VARIABLES
 IPRNT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA
 NMIN 5 MINUTES IN COMPUTATION INTERVAL
 IDATE 1 0 STARTING DATE
 ITIME 0000 STARTING TIME
 NQ 300 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 2 0 ENDING DATE
 NDTIME 0055 ENDING TIME
 ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
 TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS
 DRAINAGE AREA SQUARE MILES
 PRECIPITATION DEPTH INCHES
 LENGTH, ELEVATION FEET
 FLOW CUBIC FEET PER SECOND
 STORAGE VOLUME ACRE-FEET
 SURFACE AREA ACRES
 TEMPERATURE DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
 NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF PRECIPITATION
 1.00 .56

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
				1.00	.56
HYDROGRAPH AT	ON1D	.02	1	42.	19.
+			FLOW TIME	3.50	3.50

*** NORMAL END OF HEC-1 ***

APPENDIX C

Hydraulic Computations

Drainage Swales

Worksheet for Section D-1 (Min. Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.01000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	23.00	ft³/s

Results

Normal Depth	0.69	ft
Flow Area	6.48	ft²
Wetted Perimeter	14.06	ft
Hydraulic Radius	0.46	ft
Top Width	13.91	ft
Critical Depth	0.65	ft
Critical Slope	0.01206	ft/ft
Velocity	3.55	ft/s
Velocity Head	0.20	ft
Specific Energy	0.88	ft
Froude Number	0.92	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.69	ft
Critical Depth	0.65	ft
Channel Slope	0.01000	ft/ft

Worksheet for Section D-1 (Min. Slope)

GVF Output Data

Critical Slope

0.01206 ft/ft

Cross Section for Section D-1 (Min. Slope)

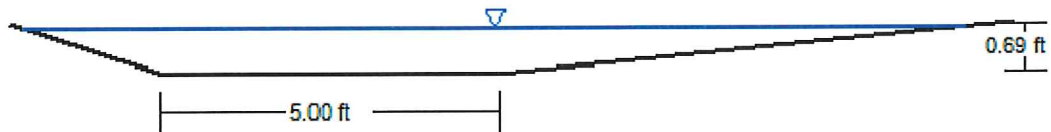
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.025
Channel Slope	0.01000 ft/ft
Normal Depth	0.69 ft
Left Side Slope	3.00 ft/ft (H:V)
Right Side Slope	10.00 ft/ft (H:V)
Bottom Width	5.00 ft
Discharge	23.00 ft ³ /s

Cross Section Image



V: 1
H: 1

Worksheet for Section D-1 (Max. Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.02000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	23.00	ft ³ /s

Results

Normal Depth	0.58	ft
Flow Area	5.04	ft ²
Wetted Perimeter	12.62	ft
Hydraulic Radius	0.40	ft
Top Width	12.49	ft
Critical Depth	0.65	ft
Critical Slope	0.01206	ft/ft
Velocity	4.56	ft/s
Velocity Head	0.32	ft
Specific Energy	0.90	ft
Froude Number	1.27	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.58	ft
Critical Depth	0.65	ft
Channel Slope	0.02000	ft/ft

Worksheet for Section D-1 (Max. Slope)

GVF Output Data

Critical Slope 0.01206 ft/ft

Cross Section for Section D-1 (Max. Slope)

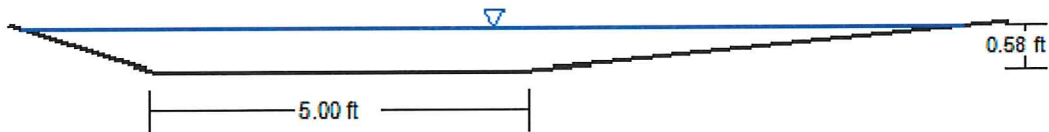
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.025
Channel Slope	0.02000 ft/ft
Normal Depth	0.58 ft
Left Side Slope	3.00 ft/ft (H:V)
Right Side Slope	10.00 ft/ft (H:V)
Bottom Width	5.00 ft
Discharge	23.00 ft ³ /s

Cross Section Image



V: 1
H: 1

Worksheet for Section D-2 (Min. Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.00750	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	27.00	ft ³ /s

Results

Normal Depth	0.80	ft
Flow Area	8.09	ft ²
Wetted Perimeter	15.51	ft
Hydraulic Radius	0.52	ft
Top Width	15.34	ft
Critical Depth	0.71	ft
Critical Slope	0.01179	ft/ft
Velocity	3.34	ft/s
Velocity Head	0.17	ft
Specific Energy	0.97	ft
Froude Number	0.81	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.80	ft
Critical Depth	0.71	ft
Channel Slope	0.00750	ft/ft

Worksheet for Section D-2 (Min. Slope)

GVF Output Data

Critical Slope 0.01179 ft/ft

Cross Section for Section D-2 (Min. Slope)

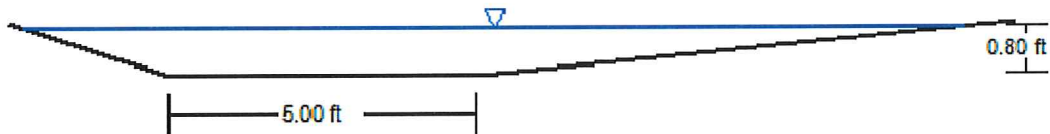
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.025
Channel Slope	0.00750 ft/ft
Normal Depth	0.80 ft
Left Side Slope	3.00 ft/ft (H:V)
Right Side Slope	10.00 ft/ft (H:V)
Bottom Width	5.00 ft
Discharge	27.00 ft³/s

Cross Section Image



V: 1
H: 1

Worksheet for Section D-2 (Max. Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.01000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	27.00	ft³/s

Results

Normal Depth	0.74	ft
Flow Area	7.29	ft²
Wetted Perimeter	14.80	ft
Hydraulic Radius	0.49	ft
Top Width	14.65	ft
Critical Depth	0.71	ft
Critical Slope	0.01179	ft/ft
Velocity	3.70	ft/s
Velocity Head	0.21	ft
Specific Energy	0.96	ft
Froude Number	0.93	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.74	ft
Critical Depth	0.71	ft
Channel Slope	0.01000	ft/ft

Worksheet for Section D-2 (Max. Slope)

GVF Output Data

Critical Slope 0.01179 ft/ft

Cross Section for Section D-2 (Max. Slope)

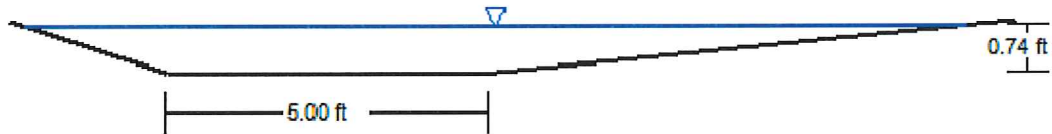
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025
Channel Slope	0.01000 ft/ft
Normal Depth	0.74 ft
Left Side Slope	3.00 ft/ft (H:V)
Right Side Slope	10.00 ft/ft (H:V)
Bottom Width	5.00 ft
Discharge	27.00 ft ³ /s

Cross Section Image



V: 1
H: 1

Roadway & Emergency Overflow Sections

Project Description

Normal Depth

Section Definitions

Worksheet for Section R-1 (Min. Slope)

Options

Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.61	ft
Elevation Range	0.00 to 0.51 ft		
Flow Area		13.28	ft ²
Wetted Perimeter		49.59	ft
Hydraulic Radius		0.27	ft
Top Width		49.00	ft
Normal Depth		0.61	ft
Critical Depth		0.62	ft
Critical Slope		0.00516	ft/ft
Velocity		3.16	ft/s
Velocity Head		0.16	ft
Specific Energy		0.77	ft
Froude Number		1.07	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.61	ft
Critical Depth	0.62	ft
Channel Slope	0.00600	ft/ft
Critical Slope	0.00516	ft/ft

Cross Section for Section R-1 (Min. Slope)

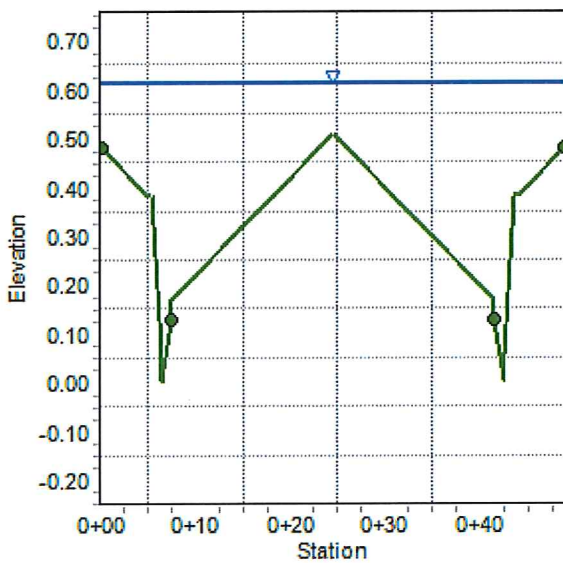
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope	0.00600	ft/ft
Normal Depth	0.61	ft
Discharge	42.00	ft ³ /s

Cross Section Image



Worksheet for Section R-1 (Max. Slope)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.04980 ft/ft
Discharge 42.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.48
0+05	0.38
0+05	0.38
0+06	0.06
0+06	0.00
0+08	0.13
0+08	0.17
0+25	0.51
0+42	0.17
0+42	0.13
0+43	0.00
0+43	0.06
0+44	0.38
0+44	0.38
0+49	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.48)	(0+08, 0.13)	0.013
(0+08, 0.13)	(0+42, 0.13)	0.016
(0+42, 0.13)	(0+49, 0.48)	0.013

Options

Current Roughness Weighted Method Pavlovskii's Method

Worksheet for Section R-1 (Max. Slope)

Options

Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.48	ft
Elevation Range	0.00 to 0.51	ft
Flow Area	6.82	ft ²
Wetted Perimeter	46.20	ft
Hydraulic Radius	0.15	ft
Top Width	45.88	ft
Normal Depth	0.48	ft
Critical Depth	0.62	ft
Critical Slope	0.00513	ft/ft
Velocity	6.16	ft/s
Velocity Head	0.59	ft
Specific Energy	1.07	ft
Froude Number	2.81	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.48	ft
Critical Depth	0.62	ft
Channel Slope	0.04980	ft/ft
Critical Slope	0.00513	ft/ft

Cross Section for Section R-1 (Max. Slope)

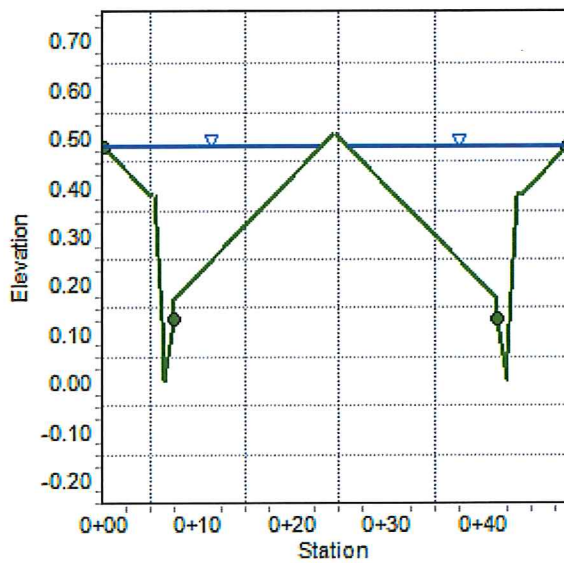
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope	0.04980	ft/ft
Normal Depth	0.48	ft
Discharge	42.00	ft ³ /s

Cross Section Image



Worksheet for Section E-1 - Emergency Overflow Channel

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.10000	ft/ft
Bottom Width	29.00	ft
Discharge	42.00	ft³/s

Results

Normal Depth	0.22	ft
Flow Area	6.27	ft²
Wetted Perimeter	29.43	ft
Hydraulic Radius	0.21	ft
Top Width	29.00	ft
Critical Depth	0.40	ft
Critical Slope	0.01279	ft/ft
Velocity	6.70	ft/s
Velocity Head	0.70	ft
Specific Energy	0.91	ft
Froude Number	2.54	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.22	ft
Critical Depth	0.40	ft
Channel Slope	0.10000	ft/ft
Critical Slope	0.01279	ft/ft

Cross Section for Section E-1 - Emergency Overflow Channel

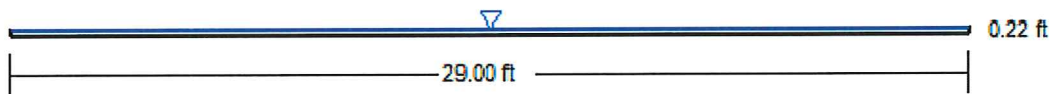
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.10000	ft/ft
Normal Depth	0.22	ft
Bottom Width	29.00	ft
Discharge	42.00	ft³/s

Cross Section Image



V: 1
H: 1

Worksheet for Section E-1 - Emergency Overflow Weir

Project Description

Solve For

Headwater Elevation

Input Data

Discharge	42.00	ft³/s
Crest Elevation	0.22	ft
Weir Coefficient	3.00	US
Crest Length	29.00	ft

Results

Headwater Elevation	0.84	ft
Headwater Height Above Crest	0.62	ft
Flow Area	17.85	ft²
Velocity	2.35	ft/s
Wetted Perimeter	30.23	ft
Top Width	29.00	ft

Cross Section for Section E-1 - Emergency Overflow Weir

Project Description

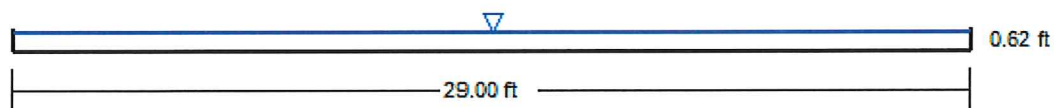
Solve For

Headwater Elevation

Input Data

Discharge	42.00	ft ³ /s
Headwater Elevation	0.84	ft
Crest Elevation	0.22	ft
Weir Coefficient	3.00	US
Crest Length	29.00	ft

Cross Section Image



V: 1
H: 1

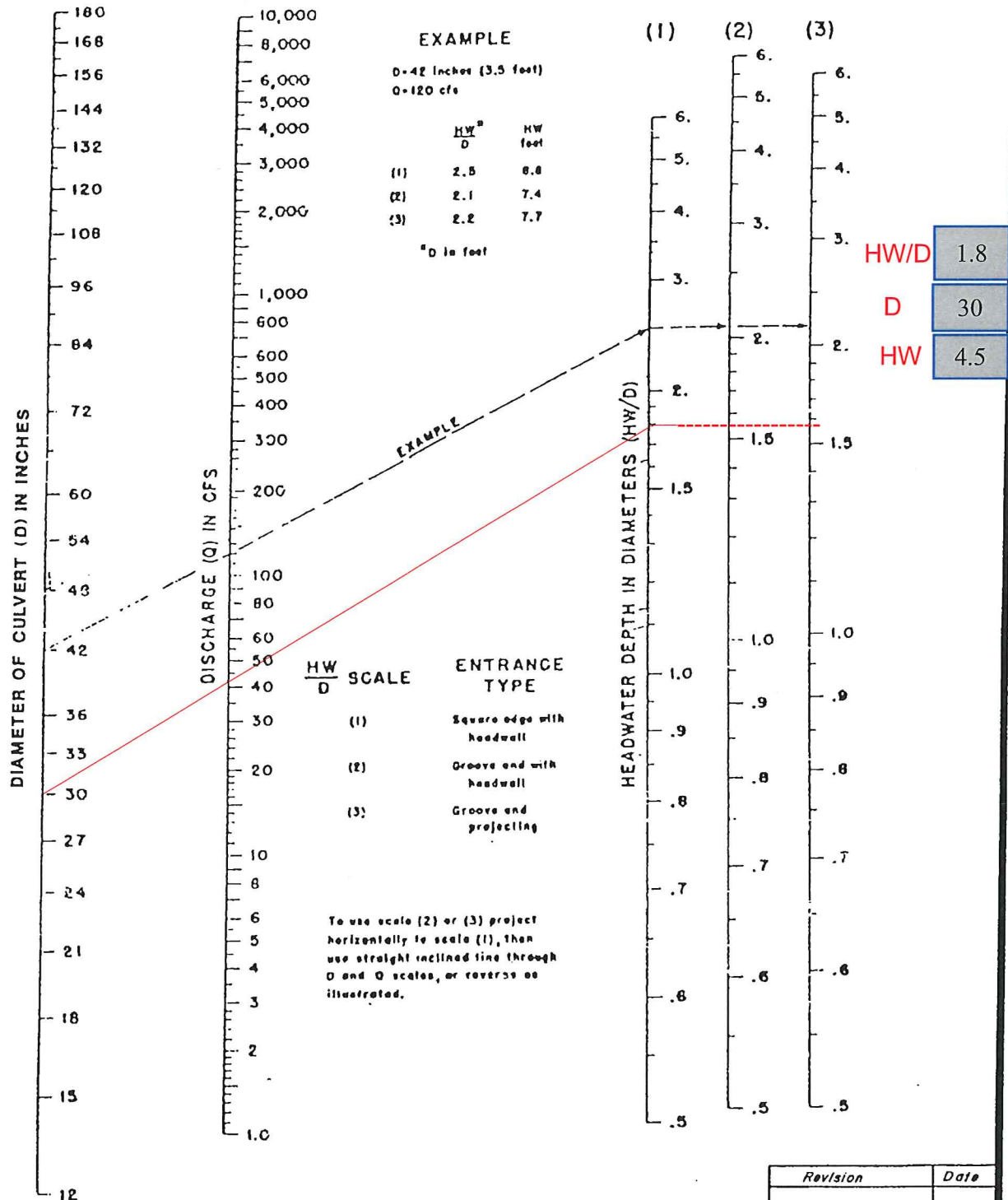
Drop Inlet & Inlet Control Nomograph

Project Name:	Skye Canyon - Parcel 2.16	 SLATER HANIFAN GROUP CONSULTING ENGINEERS & PLANNERS
By:	CWB	
Date:	10/19/2016	
Notes:		
Facility ID:	SDDI#1	
Drainage Condition	Developed	
Source of Flow	Q100 = Basin ON1	
Design Flow (cfs)	42.0	
Inlet Type:	Type CM (Sump)	
Inlet Length:	20.-ft	
Number of Grates:	7	
Input:	Variable:	Input:
Depth at Inlet (ft)	D	0.83
Grate Width (ft)	W	1.50
Length of Grate (ft)	L_g	17.50
Length of Curb Opening (ft)	L_c	20.00
Height of Curb Opening (ft)	H	0.50
Weir Coef. - Curb Opening	W_c	2.3
Weir Coef. - Grate	W_g	3.0
Orifice Coef.	O_c	0.67
Grate Coef.	G_c	0.60
Clogging Factor - Grate (%)	CF_g	50
Clogging Factor - Curb (%)	CF_c	50
Output (Grate):	Equation:	Output (Grate):
Effective Weir Length (ft)	$2*W+L_g$	20.50
Adjusted Effective Weir Length (ft)	$2*(1-CF_g/100)*W+(1-CF_g/100)*L_g$	10.25
Grate Open Area (sf)	$W*L_g$	26.25
Adjusted Grate Open Area (sf)	Grate Open Area * $G_c*(1-CF_g/100)$	7.88
Controlling Flow Type (weir/orifice)	If $D < 1.792*(Adj. \text{ Grate Open Area}/Adj. \text{ Eff. Length})$ use weir, else orifice	weir
Intercepted Flow (cfs)	weir: $W_g*(Adj. \text{ Eff. Weir Length})*D^{1.5}$ orifice: $O_c*(Adj. \text{ Grate Open Area})*(64.4*D)^{0.5}$	23.3
Output (Curb):	Equation:	Output (Curb):
Effective Weir Length (ft)	$L+1.8*W$	22.70
Adjusted Effective Weir Length (ft)	$L+1.8*(1-CF_c/100)*W$	21.41
Curb Open Area (sf)	$L*H$	10.00
Adjusted Curb Open Area (sf)	Curb Open Area * $(1-CF_c/100)$	5.00
Controlling Flow Type (weir/orifice)	If $D < H$, weir, else orifice	orifice
Intercepted Flow (cfs)	weir: $W_c*(Adj. \text{ Eff. Weir Length})*D^{1.5}$ orifice: $O_c*(Adj. \text{ Curb Open Area})*(64.4*(D-H/2))^{0.5}$	24.43
Output (Total):	Equation:	Output (Total):
Capacity Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	47.69
Design Flowrate = 42cfs		

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP

30-in RCP: Q=42 CFS



Revision	Date

WRC
ENGINEERING

REFERENCE:

USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

WSPGW Model

DEV

FILE: DEV.WSW

DEV
W S P G W - EDIT LISTING - Version 14.06

Date:10-19-2016 Time:10:17:19

PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIER	AVE PIP WIDTH	WATER SURFACE HEIGHT 1 DIAMETER	W S P G W	PROFILE - CHANNEL DEFINITION LISTING	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	18	4	1		1.500															
CD	30	4	1		2.500															
CD	36	4	1		3.000															

W S P G W

PAGE NO 1

HEADING LINE NO 1 IS - WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 2 IS - SKYE CANYON - PARCEL 2.16 - OLY1607-000

HEADING LINE NO 3 IS - DEVELOPED CONDITIONS OF EAGAN CREST (NORTH) - TRUNK STORM DRAIN

W S P G W

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	IS	A	SYSTEM OUTLET	STATION	INVERT	SECT	W S ELEV	RADIUS	ANGLE	ANG PT	MAN H					
1	IS	A	SYSTEM OUTLET	1000.000	2905.680	36	2751.970									
2	IS	A	REACH	1139.000	2906.600	36		.000	.000	.000	1					
3	IS	A	JUNCTION	1139.000	2906.600	30		.000	.000	.000	1					
				STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4	
				1139.000	2906.600	30	18	0	.013	2.000	.000	2908.100	.000	90.000	.000	
												RADIUS	ANGLE			
												.000	.000			
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING																
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING																
4	IS	A	REACH	1167.000	2907.710	30		.000	.000	55.000	1					
5	IS	A	REACH	1182.000	2908.290	30		.000	.000	.000	1					
6	IS	A	JUNCTION	1182.000	2908.290	30		.000	.000	.000	1					
				STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4	
				1182.000	2908.290	30	18	0	.013	2.000	.000	2908.290	.000	90.000	.000	
												RADIUS	ANGLE			
												.000	.000			
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING																
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING																
7	IS	A	REACH	1233.000	2910.330	30		.000	.000	.000	1					
8	IS	A	SYSTEM HEADWORKS	1233.000	2910.330	30										
				STATION	INVERT	SECT					W S ELEV					
				1233.000	2910.330	30					.000					

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	2905.680	1.861	2907.541	46.00	9.98	1.55	2909.09	.00	2.21	2.91	3.000	.000	.00	1 .0
17.901	.0066					.0100	.18	1.86	1.40	2.12	.013	.00	.00	PIPE
1017.901	2905.799	1.805	2907.604	46.00	10.35	1.66	2909.27	.00	2.21	2.94	3.000	.000	.00	1 .0
21.172	.0066					.0111	.24	1.81	1.48	2.12	.013	.00	.00	PIPE
1039.073	2905.939	1.734	2907.673	46.00	10.86	1.83	2909.50	.00	2.21	2.96	3.000	.000	.00	1 .0
19.621	.0066					.0126	.25	1.73	1.60	2.12	.013	.00	.00	PIPE
1058.694	2906.069	1.668	2907.737	46.00	11.39	2.01	2909.75	.00	2.21	2.98	3.000	.000	.00	1 .0
18.120	.0066					.0143	.26	1.67	1.72	2.12	.013	.00	.00	PIPE
1076.814	2906.188	1.605	2907.793	46.00	11.94	2.22	2910.01	.00	2.21	2.99	3.000	.000	.00	1 .0
16.926	.0066					.0162	.27	1.61	1.86	2.12	.013	.00	.00	PIPE
1093.740	2906.301	1.545	2907.846	46.00	12.53	2.44	2910.28	.00	2.21	3.00	3.000	.000	.00	1 .0
15.927	.0066					.0183	.29	1.55	2.00	2.12	.013	.00	.00	PIPE
1109.667	2906.406	1.488	2907.894	46.00	13.14	2.68	2910.57	.00	2.21	3.00	3.000	.000	.00	1 .0
15.062	.0066					.0208	.31	1.49	2.14	2.12	.013	.00	.00	PIPE
1124.729	2906.506	1.434	2907.940	46.00	13.78	2.95	2910.89	.00	2.21	3.00	3.000	.000	.00	1 .0
14.271	.0066					.0237	.34	1.43	2.30	2.12	.013	.00	.00	PIPE
1139.000	2906.600	1.383	2907.983	46.00	14.45	3.24	2911.23	.00	2.21	2.99	3.000	.000	.00	1 .0
JUNCT STR	.0000					.0269	.00	1.38	2.47		.013	.00	.00	PIPE

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
1139.000	2906.600	1.445	2908.045	44.00	14.97	3.48	2911.52	.00	2.21	2.47	2.500	.000	.00	1 .0
11.105	.0396					.0278	.31	1.44	2.42	1.31	.013	.00	.00	PIPE
1150.105	2907.040	1.473	2908.513	44.00	14.62	3.32	2911.83	.00	2.21	2.46	2.500	.000	.00	1 .0
16.895	.0396					.0254	.43	1.47	2.33	1.31	.013	.00	.00	PIPE
1167.000	2907.710	1.534	2909.244	44.00	13.94	3.02	2912.26	.00	2.21	2.43	2.500	.000	.00	1 .0
2.730	.0387					.0236	.06	1.53	2.16	1.32	.013	.00	.00	PIPE
1169.730	2907.815	1.545	2909.361	44.00	13.81	2.96	2912.32	.00	2.21	2.43	2.500	.000	.00	1 .0
12.270	.0387					.0220	.27	1.55	2.13	1.32	.013	.00	.00	PIPE
1182.000	2908.290	1.610	2909.900	44.00	13.17	2.69	2912.59	.00	2.21	2.39	2.500	.000	.00	1 .0
JUNCT STR	.0000					.0231	.00	1.61	1.96		.013	.00	.00	PIPE
1182.000	2908.290	1.455	2909.745	42.00	14.17	3.12	2912.86	.00	2.17	2.47	2.500	.000	.00	1 .0
12.380	.0400					.0242	.30	1.45	2.28	1.27	.013	.00	.00	PIPE
1194.380	2908.785	1.505	2910.291	42.00	13.59	2.87	2913.16	.00	2.17	2.45	2.500	.000	.00	1 .0
10.830	.0400					.0216	.23	1.51	2.13	1.27	.013	.00	.00	PIPE
1205.210	2909.219	1.567	2910.786	42.00	12.96	2.61	2913.39	.00	2.17	2.42	2.500	.000	.00	1 .0
8.223	.0400					.0192	.16	1.57	1.97	1.27	.013	.00	.00	PIPE
1213.432	2909.547	1.633	2911.180	42.00	12.36	2.37	2913.55	.00	2.17	2.38	2.500	.000	.00	1 .0
6.300	.0400					.0170	.11	1.63	1.82	1.27	.013	.00	.00	PIPE

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

L/Elem	Ch Slope					SF Ave	DEV	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type	Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
1219.732	2909.799	1.704	2911.503	42.00	11.78	2.16	2913.66	.00	2.17	2.33	2.500	.000	.00	1	.0	
4.876	.0400	-	-	-	-	.0152	.07	1.70	1.68	1.27	.013	.00	.00	PIPE		
1224.608	2909.994	1.779	2911.773	42.00	11.24	1.96	2913.73	.00	2.17	2.26	2.500	.000	.00	1	.0	
3.638	.0400	-	-	-	-	.0136	.05	1.78	1.54	1.27	.013	.00	.00	PIPE		
1228.246	2910.140	1.861	2912.001	42.00	10.71	1.78	2913.78	.00	2.17	2.18	2.500	.000	.00	1	.0	
2.587	.0400	-	-	-	-	.0122	.03	1.86	1.41	1.27	.013	.00	.00	PIPE		
1230.833	2910.243	1.951	2912.195	42.00	10.21	1.62	2913.81	.00	2.17	2.07	2.500	.000	.00	1	.0	
1.595	.0400	-	-	-	-	.0110	.02	1.95	1.28	1.27	.013	.00	.00	PIPE		
1232.427	2910.307	2.052	2912.359	42.00	9.74	1.47	2913.83	.00	2.17	1.92	2.500	.000	.00	1	.0	
.573	.0400	-	-	-	-	.0100	.01	2.05	1.14	1.27	.013	.00	.00	PIPE		
1233.000	2910.330	2.170	2912.500	42.00	9.28	1.34	2913.84	.00	2.17	1.69	2.500	.000	.00	1	.0	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

8
F

SKYE CANYON - PARCEL 2.16 - OLY1607-000

DEVELOPED CONDITIONS OF EAGAN CREST (NORTH) - TRUNK STORM DRAIN

STARTING WSE TAKEN FROM TOP OF PIPE

1000.00	.I		W	C	H	E										R
1004.76	.															
1009.51	.															
1014.27	.															
1019.02	.I		W	C	H	E										R
1023.78	.															
1028.53	.															
1033.29	.															
1038.04	.															
1042.80	.I		W	C	H	E										R
1047.55	.															
1052.31	.															
1057.06	.															
1061.82	.I		W	C	H	E										R
1066.57	.															
1071.33	.															
1076.08	.															
1080.84	.I		W	C	H	E										R
1085.59	.															
1090.35	.															
1095.10	.I		W	C	H	E										R
1099.86	.															

2905.680 2906.496 2907.311 2908.127 2908.943 2909.758 2910.574 2911.390 2912.205 2913.021 2913.838

2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

APPENDIX D

Finished Floor Analyses

SKYE CANYON - PARCEL 2.16										
FINISH FLOOR - CITY OF LAS VEGAS JURISDICTION										
INPUT INFORMATION				FINISHED FLOORS						NOTES
Lot Number	Hydraulic Section Utilized	T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline F.F. _{min} ³ (ft)	T/C + 6" F.F. _{min} ⁴ (ft)	F.F. _{Design} (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
1	R-1	2925.19	2924.81	0.55	2925.91	2925.69	2927.4	OK	OK	
2	R-1	2924.91	2924.53	0.55	2925.63	2925.41	2927.0	OK	OK	
3	R-1	2924.56	2924.18	0.55	2925.28	2925.06	2926.6	OK	OK	
4	R-1	2924.22	2923.84	0.55	2924.94	2924.72	2926.3	OK	OK	
5	R-1	2923.87	2923.49	0.55	2924.59	2924.37	2926.0	OK	OK	
6	R-1	2930.39	2930.01	0.55	2931.11	2930.89	2932.3	OK	OK	
7	R-1	2932.31	2931.93	0.55	2933.03	2932.81	2934.2	OK	OK	
8	R-1	2934.24	2933.86	0.55	2934.96	2934.74	2936.1	OK	OK	
9	R-1	2936.16	2935.78	0.55	2936.88	2936.66	2938.1	OK	OK	
10	R-1	2938.44	2938.06	0.55	2939.16	2938.94	2940.3	OK	OK	
11	R-1	2944.29	2943.91	0.55	2945.01	2944.79	2946.2	OK	OK	
12	R-1	2944.85	2944.47	0.55	2945.57	2945.35	2946.8	OK	OK	
13	R-1	2945.34	2944.96	0.55	2946.06	2945.84	2947.2	OK	OK	
14	R-1	2945.84	2945.46	0.55	2946.56	2946.34	2947.7	OK	OK	
15	R-1	2941.03	2940.65	0.55	2941.75	2941.53	2942.9	OK	OK	
16	R-1	2938.43	2938.05	0.55	2939.15	2938.93	2940.3	OK	OK	
17	R-1	2936.14	2935.76	0.55	2936.86	2936.64	2938.0	OK	OK	
18	R-1	2933.76	2933.38	0.55	2934.48	2934.26	2935.7	OK	OK	
19	R-1	2931.02	2930.64	0.55	2931.74	2931.52	2932.9	OK	OK	
20	R-1	2946.01	2945.63	0.55	2946.73	2946.51	2947.9	OK	OK	
21	R-1	2948.21	2947.83	0.55	2948.93	2948.71	2950.1	OK	OK	
22	R-1	2950.21	2949.83	0.55	2950.93	2950.71	2952.1	OK	OK	
23	R-1	2952.37	2951.99	0.55	2953.09	2952.87	2954.3	OK	OK	
24	R-1	2954.11	2953.73	0.55	2954.83	2954.61	2956.0	OK	OK	
25	R-1	2955.97	2955.59	0.55	2956.69	2956.47	2957.3	OK	OK	
26	R-1	2955.97	2955.59	0.55	2956.69	2956.47	2958.8	OK	OK	
27	R-1	2955.43	2955.05	0.55	2956.15	2955.93	2957.3	OK	OK	
28	R-1	2946.26	2945.88	0.55	2946.98	2946.76	2948.2	OK	OK	
29	R-1	2945.88	2945.50	0.55	2946.60	2946.38	2947.8	OK	OK	
30	R-1	2945.38	2945.00	0.55	2946.10	2945.88	2947.3	OK	OK	
31	R-1	2944.89	2944.51	0.55	2945.61	2945.39	2946.8	OK	OK	
32	R-1	2944.38	2944.00	0.55	2945.10	2944.88	2946.8	OK	OK	
33	R-1	2950.69	2950.31	0.55	2951.41	2951.19	2952.6	OK	OK	

SKYE CANYON - PARCEL 2.16										
FINISH FLOOR - CITY OF LAS VEGAS JURISDICTION										
INPUT INFORMATION				FINISHED FLOORS						
Lot Number	Hydraulic Section Utilized	T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline F.F. _{min} ³ (ft)	T/C + 6" F.F. _{min} ⁴ (ft)	F.F. _{Design} (ft)	Flowline Check	T/C + 6" Check	NOTES
34	R-1	2951.22	2950.84	0.55	2951.94	2951.72	2954.3	OK	OK	See References on Last Sheet
35	R-1	2951.22	2950.84	0.55	2951.94	2951.72	2953.3	OK	OK	
36	R-1	2950.11	2949.73	0.55	2950.83	2950.61	2952.0	OK	OK	
37	R-1	2948.41	2948.03	0.55	2949.13	2948.91	2950.3	OK	OK	
38	R-1	2946.41	2946.03	0.55	2947.13	2946.91	2948.3	OK	OK	
39	R-1	2943.57	2943.19	0.55	2944.29	2944.07	2945.5	OK	OK	
40	R-1	2941.65	2941.27	0.55	2942.37	2942.15	2943.6	OK	OK	
41	R-1	2939.72	2939.34	0.55	2940.44	2940.22	2941.6	OK	OK	
42	R-1	2937.97	2937.59	0.55	2938.69	2938.47	2939.9	OK	OK	
43	R-1	2936.05	2935.67	0.55	2936.77	2936.55	2938.0	OK	OK	
44	R-1	2934.12	2933.74	0.55	2934.84	2934.62	2936.0	OK	OK	
45	R-1	2932.20	2931.82	0.55	2932.92	2932.70	2934.1	OK	OK	
46	R-1	2930.27	2929.89	0.55	2930.99	2930.77	2932.2	OK	OK	
47	R-1	2928.35	2927.97	0.55	2929.07	2928.85	2930.3	OK	OK	
48	R-1	2926.60	2926.22	0.55	2927.32	2927.10	2928.5	OK	OK	
49	R-1	2924.07	2923.69	0.55	2924.79	2924.57	2926.0	OK	OK	
50	R-1	2921.34	2920.96	0.55	2922.06	2921.84	2923.2	OK	OK	
51	R-1	2919.73	2919.35	0.55	2920.45	2920.23	2921.6	OK	OK	
52	R-1	2923.45	2923.07	0.55	2924.17	2923.95	2925.4	OK	OK	
53	R-1	2924.12	2923.74	0.55	2924.84	2924.62	2926.0	OK	OK	
54	R-1	2924.45	2924.07	0.55	2925.17	2924.95	2926.5	OK	OK	
55	R-1	2924.77	2924.39	0.55	2925.49	2925.27	2926.9	OK	OK	
56	R-1	2925.10	2924.72	0.55	2925.82	2925.60	2927.2	OK	OK	
57	R-1	2925.49	2925.11	0.55	2926.21	2925.99	2927.5	OK	OK	
58	R-1	2925.84	2925.46	0.55	2926.56	2926.34	2927.9	OK	OK	
59	R-1	2925.97	2925.59	0.55	2926.69	2926.47	2928.2	OK	OK	
60	R-1	2926.46	2926.08	0.55	2927.18	2926.96	2928.4	OK	OK	
61	R-1	2928.28	2927.90	0.55	2929.00	2928.78	2930.2	OK	OK	
62	R-1	2930.62	2930.24	0.55	2931.34	2931.12	2932.5	OK	OK	
63	R-1	2933.33	2932.95	0.55	2934.05	2933.83	2935.2	OK	OK	
64	R-1	2935.79	2935.41	0.55	2936.51	2936.29	2937.7	OK	OK	
65	R-1	2938.07	2937.69	0.55	2938.79	2938.57	2940.0	OK	OK	
66	R-1	2940.49	2940.11	0.55	2941.21	2940.99	2942.4	OK	OK	

SKYE CANYON - PARCEL 2.16									
FINISH FLOOR - CITY OF LAS VEGAS JURISDICTION									
INPUT INFORMATION				FINISHED FLOORS				NOTES	
Lot Number	Hydraulic Section Utilized	T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline F.F. _{min} ³ (ft)	T/C + 6" F.F. _{min} ⁴ (ft)	F.F. _{Design} (ft)	Flowline Check	T/C + 6" Check
									See References on Last Sheet
Where: 1: Top of Curb at High Side of Lot 2: TC-0.38 (For Roll Curb), TC-0.5 (For L Curb) 3: Minimum Allowable Finished Floor Elevation above flowline elevation @ high side of lot = (2 x D ₁₀₀) + F/L 4: City of Las Vegas minimum allowable finished floor elevation = T.C. @ high side of lot + 6-inches 5: These lots have an adjacent solid grouted wall that protects the FF. City of Las Vegas Finished Floor Criteria: -The finished floor shall be set a vertical distance above the gutter flowline of at least twice the depth of flow in the gutter flowline up to a maximum of 18 inches above the WSEL in the street. -The finished floor shall be set a vertical distance of at least 6-inches above the highest adjacent top of curb.									

Perimeter Street Check									
Lot Number	Street	High TC ¹	High FL ²	Section	Flow Depth ³	Min FF ⁴	Design FF	Check	Solid Grout
20	Eagle Canyon	2947.72	2947.22	EAC2	0.50	2948.22	2947.9	CHECK	Yes
21	Eagle Canyon	2950.17	2949.67	EAC2	0.50	2950.67	2950.1	CHECK	Yes
22	Eagle Canyon	2952.62	2952.12	EAC2	0.50	2953.12	2952.1	CHECK	Yes
23	Eagle Canyon	2955.07	2954.57	EAC2	0.50	2955.57	2954.3	CHECK	Yes
24	Eagle Canyon	2957.52	2957.02	EAC2	0.50	2958.02	2956.0	CHECK	Yes
25	Eagle Canyon	2959.97	2959.47	EAC2	0.50	2960.47	2957.3	CHECK	Yes
51	Egan Crest	2914.70	2914.20	EGN2	0.35	2914.90	2921.6	OK	No
52	Egan Crest	2915.45	2914.95	EGN2	0.35	2915.65	2925.4	OK	No
53	Egan Crest	2915.95	2915.45	EGN2	0.35	2916.15	2926.0	OK	No
54	Egan Crest	2916.20	2915.70	EGN2	0.35	2916.40	2926.5	OK	No
55	Egan Crest	2916.39	2915.89	EGN2	0.35	2916.59	2926.9	OK	No
56	Egan Crest	2916.92	2916.42	EGN2	0.35	2917.12	2927.2	OK	No
57	Egan Crest	2918.00	2917.50	EGN2	0.35	2918.20	2927.5	OK	No
58	Egan Crest	2918.25	2917.75	EGN2	0.35	2918.45	2927.9	OK	No
59	Egan Crest	2918.91	2918.41	EGN2	0.35	2919.11	2928.2	OK	No
59	Eagle Canyon	2922.40	2921.90	EAC2	0.50	2922.90	2928.2	OK	No
60	Eagle Canyon	2926.89	2926.39	EAC2	0.50	2927.39	2928.4	OK	No
61	Eagle Canyon	2929.13	2928.63	EAC2	0.50	2929.63	2930.2	OK	No
62	Eagle Canyon	2931.38	2930.88	EAC2	0.50	2931.88	2932.5	OK	No
63	Eagle Canyon	2933.62	2933.12	EAC2	0.50	2934.12	2935.2	OK	No
64	Eagle Canyon	2935.86	2935.36	EAC2	0.50	2936.36	2937.7	OK	No
65	Eagle Canyon	2938.11	2937.61	EAC2	0.50	2938.61	2940.0	OK	No
66	Eagle Canyon	2940.17	2939.67	EAC2	0.50	2940.67	2942.4	OK	No

1: High TC is the elevation at the high side of the adjacent perimeter street

2: 0.50-ft is subtracted from the High TC to obtain the High FL elevation

3: Flow depth is the normal depth in adjacent perimeter street

4: Min FF is the High FL plus twice the depth of flow.

Specific Energy Check							
Lot Number	High TC ¹	High FL ²	Section	Specific Energy ³	Min FF ⁴	Design FF	Check
39	2943.57	2943.19	R-1	1.07	2944.26	2945.50	OK
40	2941.65	2941.27	R-1	1.07	2942.34	2943.60	OK
49	2924.07	2923.69	R-1	1.07	2924.76	2926.00	OK
50	2921.34	2920.96	R-1	1.07	2922.03	2923.20	OK
57	2925.49	2925.11	R-1	1.07	2926.18	2927.50	OK
58	2925.84	2925.46	R-1	1.07	2926.53	2927.90	OK

1: High TC is the elevation at the high side of the adjacent perimeter street

2: 0.38-ft is subtracted from the High TC to obtain the High FL elevation

2: Specific energy depth is taken from FlowMaster calculation for street directing flow toward lot.

3: Min FF is the High FL plus the specific energy depth.

Drainage Easements / Emergency Overflow Check						
Lot Number	High FL ¹	Section	Flow Depth ²	Min FF ³	Design FF	Solid Grout
25	2961.91	D-2	0.80	2964.21	2957.30	CHECK
26	2961.91	D-1	0.69	2964.10	2958.80	CHECK
34	2960.50	D-1	0.69	2962.69	2954.30	CHECK
35	2959.04	D-1	0.69	2961.23	2953.30	CHECK
51	2918.65	E-1 (Weir)	0.84	2920.99	2921.60	OK
52	1918.65	E-1 (Weir)	0.84	1920.99	2921.60	OK

1: High TC/FL is at the high side of the drainage easement flowline or the highest TC adjacent to the easement if flow is weiring over the curb.

2: Flow depth is either normal depth or weir depth (whichever is higher).

3: Min FF is the High TC/FL plus the Flow Depth plus 18 inches.

Adjacent Street Check									
Lot	Street	High TC ¹	High FL ²	Section	Flow Depth ³	Min FF ⁴	Design FF	Check	Solid Grout
1	Skye Paseo Ave	2928.61	2928.23	R-1	0.55	2928.78	2927.4	CHECK	Yes
5	Skye Arroyo Ave	2928.46	2928.08	R-1	0.55	2928.63	2926.0	CHECK	Yes
11	Skye Arroyo Ave	2941.98	2941.60	R-1	0.55	2942.15	2946.2	OK	No
28	Skye Paseo Ave	2952.45	2952.07	R-1	0.55	2952.62	2948.2	CHECK	Yes
32	Skye Arroyo Ave	2948.49	2948.11	R-1	0.55	2948.66	2946.8	CHECK	Yes

1: High TC is the elevation at the high side of the adjacent perimeter street.

2: 0.38-ft is subtracted from the High TC to obtain the High FL elevation.

3: Flow depth is the normal depth of emergency overflow in adjacent perimeter street.

4: Min FF is the High FL plus the depth of emergency overflow.

APPENDIX E

Reference Material

*Master Drainage Study for the Skye Canyon Master Plan - Update #3, by SHG
(DS4420N)*

Approval Letter

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: August 15, 2016
TO: Land Development Services Department of Public Works			FROM: Oh Sang Kwon, P.E. Flood Control Section Department of Public Works
SUBJECT: Drainage Study for: Skye Canyon Master Drainage Study – Update #3			COPIES TO: Slater Hanifan Group
Cross Streets:	Fort Apache Road & Moccasin Road		KAG Development South, LLC
File Number:	F:\Depot\DSMemos\DS4420N.doc		Bart Anderson, P.E., DevCo
Parcel Number:	125-06-001-001		CCRFCFCD
Zoning Action:			CCPW
FEMA Flood Zone	YES	NO X	NDOT; NV Energy
Proposed Storm Drain	YES X	NO	PB America, Inc.

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1 st Submittal	6/22/2010	7/13/2010	Not Approved	\$1,000.00	147216: \$1000
2 nd Submittal	9/17/2010	10/4/2010	Not Approved	\$400.00	153788: \$400
3 rd Submittal	10/15/2011	11/14/2011	Not Approved	\$400.00	153788: \$400
4 th Submittal	2/13/2012	3/1/2012	Conditional Approval	\$400.00	274196: \$400
CCRFCFCD	5/23/2012	5/24/2012	Concurrence Recv'd	N/C	N/C
5 th Submittal NDOT Comments	9/10/2012	9/19/2012	Conditional Approval	N/C	N/C
6 th Submittal	12/4/2014	12/30/2014	Conditional Approval	\$400.00	378889: \$400
7 th Submittal	2/17/2015	3/3/2015	Conditional Approval	\$400.00	385987: \$400
8 th Submittal	3/16/2015	4/6/2015	See Comments Below	\$400.00	388961: \$400
CCRFCFCD	4/2/2015	4/6/2015	Concurrence Recv'd	N/C	N/C
9 th Submittal	6/23/2015	7/21/2015	See Comments Below	\$400.00	403025: \$400
Revised Memo	8/12/2015	8/12/2015	See Comments Below	N/A	N/A
10 th Submittal	10/19/2015	11/23/2015	Conditional Approval	\$400.00	N/A
11 th Submittal	4/19/2016	5/16/2016 & 8/15/2016	See Comments Below	\$400.00	440941: \$400
			TOTAL FEES (LDDRS):	\$4,600.00	----

REMARKS: 11th Submittal: Update # 3 – Overall Master Plan Revision of Skye Canyon development. The proposed size and location of MPU facilities are being changed with the concept of allowing development without impacting the National Monument.

Skye Canyon Master Drainage Study Update #3 proposes substantial changes to amend the previously approved Master Plan Amendment (MPA). A new MPA must be submitted to City of Las Vegas and CCRFCFCD for approval and shall be adopted by the City of Las Vegas City Council prior to the final approval of the subject Master Study Update #3.

The City of Las Vegas will not allow further residential development outside of the limits of Phase 2 at this time until the New Master Plan is approved.

10th Submittal - Phase 2 interim impacts.

Revised Memo – National Monument Drainage Impacts

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

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

1. The overall concept presented in the Master Plan Update #3 for Skye Canyon appears to satisfy the intent of providing regional connectivity of proposed Master Planned facilities without impacting the National Monument. Specific Technical Drainage Studies shall be required to address the specific impacts of each proposed Master Planned facility and the interaction with proposed facilities needed for each phase of development.
2. The Regional Flood Control District has requested that engineering consultants utilize the latest NRCS soils data as a part of the drainage study parameters. The Master Plan Update shall discuss the soil data used in the analysis and discuss the impacts on the overall hydraulic analysis. Provide an updated HEC-1 analysis and address local and MPU facility size modifications, if necessary based upon the revised Soil Survey data. Update the NRCS soils data in the References (Section 7). Review and revise Exhibit & Figures accordingly. This needs to be addressed as supplemental information prior to the MPA approval.
3. The Master Plan shall clearly define when the proposed interim facilities will be taken out of service and the construction of the required MPU facilities. A complete Phasing Plan shall be updated and approved by the City of Las Vegas and Regional Flood Control prior to the approval of the MPA.
4. This Update proposes to construct the *Log Cabin Detention Basin #3* with flows that will increase the runoff volume routed towards the *Tule Springs North Environmental Detention Basin* (TSNEDB). The engineer proposes to modify the TSNEDB by removing the orifice plate at the detention basin outfall pipe to increase the outflow. Detention basin design uses the orifice plate to insure that the basin outfall remains under inlet control parameters per the HCDDM, Section 1200. Discuss the impact of removing the orifice plate and provide calculations verifying that the existing outfall will convey the proposed 78 cfs under inlet control conditions. Discuss the drain time impacts to the TSNEDB and the impacts to the downstream development. Alternatively, the TSNEDB may need modifications to meet the HCDDM requirements. This could include the expansion of the TSNEDB basin to increase the storage volume accordingly or replacement of the TSNEDB outfall. These or other modifications need to be conceptually addressed as supplemental information prior to the MPA approval.
5. The premise of the Master Plan Update #3 for Skye Canyon is to add two (2) new CCRFCD Master Plan Detention Basins that are located outside of the Skye Canyon development. The City of Las Vegas is in the process of applying for BLM grants for these detention basin sites. These ultimate facilities shall be included in the MPA as CCRFCD facilities. The intent of the Detention Basin (157DB) is to reduce developed flows to maintain the existing condition flow rate in the ultimate condition and reduce the size of the downstream regional facilities. The intent of the Log Cabin Detention Basin (DB3) is to reduce developed flows to reduce the size of the downstream regional facilities that impact the TSNEDB. The concept for the addition of these two detention basins to the CCRFCD Master Plan is acceptable and will require the submittal of technical studies to refine the facility parameters. The construction of DB3 shall be the responsibility of the Skye Canyon

development and will be of sufficient size to reduce the flow impacts to development downstream and ultimately the TSNEDB.

6. This Master Study notes that drainage study updates for both Phase 1 and Phase 2 to accommodate the increased system flows impacting these Phases are necessary. A detailed analysis & review of the required updates will determine the system impacts and if any needed system upgrades are necessary to maintain HCDDM criteria.
7. **Exhibit 1:** The developed condition Exhibit 1 shall be updated to include the coordinated Kyle Canyon Interchange drainage improvements. The size of the downstream facilities shall be reviewed based upon the interchange improvements.
8. **Exhibit 1:** The developed condition Exhibit 1 shows that a portion of the developed flows will drain north of Moccasin into the BLM land and the National Monument to mimic existing drainage patterns. Concentrated flow discharges to the north shall require BLM and National Park Service concurrence.
9. **Exhibit J:** The proposed facility 14 that drains from EC18 easterly to the proposed DB3 shall be a permanent facility meeting the requirements of Title 20 and shall be constructed as a permanent MPU facility with this development.
10. **Exhibit J:** The proposed onsite DB1 & DB2 facilities shall include the collection facilities as a part of the detention basins areas.
11. **Exhibit J:** The proposed changes to DB1 will impact the alignment and size of the ultimate collection facility that drains to DB1. The proposed facility shall remain an open channel to allow flow interception from the west in this undeveloped drainage.
12. The **Master Land Use Plan** has been provided however, any further changes to the adopted Master Land Use Plan shall require a complete update to the Master Drainage Study.
13. A copy of the approved 404 Permit from the Army Corps of Engineers has been provided.
14. The Phasing Plan for Phase 1 & 2 have addressed the interim condition and associated downstream impacts to address the impact of the long term discharge from the outfall of the Detention Basin #1. This includes upgrading the existing storm drain system near the intersection of Brent Lane and Fort Apache. These improvements have been included in the Detention Basin #1 improvements.
15. Flood Control requires an interim condition drainage analysis in support of the Phasing Plan that clearly shows the impacts to each Phase, existing washes, upstream concentration points and the downstream concentration points. Flood Control needs to make sure that each Phase of Development is protected during the interim and full build-out of this overall project. The current Phasing Plan does not adequately address these issues beyond Phase 2.
16. The interim conditions of the Phasing Plan need to address the impact of the long term discharge from the outfall of any future detention basins. It is noted that Only Detention Basin #1 has been reviewed. The technical review of Detention Basin #2 will determine the impacts downstream along the Iron Mountain Road alignment and/or other needed facilities to mitigate that impact. The provided Basin Attenuated Outfall Exhibit is only conceptual in nature and is subject to further review as a part of the technical reviews. Existing flow conditions do not have a drawn out discharge from a detention basin. This discharge impact must be accounted for in the interim condition without negatively impacting the existing downstream neighborhoods.
17. CCRFCD concurrence has previously been provided. A new concurrence for Update #3 shall be provided from CCRFCD after Conditional Approval by the City of Las Vegas.

18. CCPW concurrence has previously been provided. A new concurrence for Update #3 shall be provided from CCPW after Conditional Approval by the City of Las Vegas.
19. NDOT concurrence has previously been provided. A new concurrence for Update #3 shall be provided from NDOT after Conditional Approval by the City of Las Vegas.

The following comments are repeated until they are complete:

1. Please note that the Traffic Study must be approved prior to final approval of the Master Drainage Study. If the street layout does not match the Master Drainage Study, an update to the Master Drainage Study must be submitted to address the changes.
2. Per a meeting held in August 18, 2011 between the developer and the *City of Las Vegas*, it was agreed that NV Energy's approval of any proposed drainage facilities within their access easements (such as the proposed detention basins) must be obtained prior to the final approval of the Master Drainage Study. Please provide documentation for such approval or acknowledgment.
3. Please note that any future technical drainage study submittals that differ from the Master Drainage Study (ie. Changes in pods, infrastructure, flows etc.) will require an update to the Master Drainage Study and this update must be approved by the *City of Las Vegas Flood Control Section* prior to final approval of technical drainage study.
4. The proposed detention basins will require coordination with the State of Nevada, Division of Water Resources Dam Safety and will require the State's approval prior to permitting.
5. Please note that the proposed 100-year flood protection facilities identified on Exhibit J must be constructed by the Master Developer as a part of the master planned infrastructure. Technical drainage studies are required for each phase of the master planned infrastructure improvements. The technical drainage studies for the infrastructure improvements may be submitted with conditional approval of this Master Drainage Study. However, final approval for the Master Drainage Study must be obtained prior to conditional approval of the infrastructure drainage studies.
6. Technical drainage studies are required for each of the Pod's. The technical drainage studies for the Pod's may not be submitted until the conditional approval of the pertinent infrastructure drainage study is obtained. Final approval for the infrastructure drainage study must be obtained prior to conditional approval of the impacted Pod drainage studies.
7. Building permits for the homes within the individual Pod's will not be issued until construction of the street and flood control infrastructure around the Pod is substantially complete or interim protection is provided per the approved technical drainage study.
8. The design of debris basins at all major culvert entrances to limit the amount of sediment and debris entering the storm drain facilities will be required in a future infrastructure study.
9. Please note that all detention basins must be designed per CCRFCD criteria including a low flow facility around the detention basin.
10. Please note that all proposed interim facilities must be maintained by the master developer.
11. Provide a legal description of the proposed detention basins prior to recordation of the parent final map.
12. Coordinate the proposed drainage facilities with *Sheep Mountain Parkway* project. Please contact Greg McDermott, P.E., at 702-229-2143 to coordinate the proposed drainage facilities.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved master 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

Osk/pbj

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

AREA G-6, 7, & F-12

HEC-1 Model

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X      X  XXXXXXX  XXXXX      X
X      X  X  XXXXX  X      X  XX
X      X  X      X      X      X
XXXXXXX  XXXX  X      XXXXX  X
X      X  X      X      X      X
X      X  X      X      X      X
X      X  XXXXXXX  XXXXX  XXXX

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HEC-1 INPUT											PAGE 1
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1. HEC-1 INPUT PAGE 2

TIME	ID	1	2	3	4	5	6	7	8	9	10
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Page 1

Ultimate3-TULEDB.OUT

431	UD	0.079	
432	KK	ON4D	
433	BA	.0041	
434	LS	0	95
435	UD	0.096	
436	KK	CP3	
437	KM	COMBINE ON1D AND ON4D	
438	HC	2	
439	KK	CP4	
440	KM	COMBINE CP2 AND CP3	
441	KM	END GRAND CANYON APARTMENTS HEC-1 DATA	
442	HC	2	
443	KK	CENGCA	
444	KM	COMBINE DRCDC1C, C9, CP4	
445	KM	CD1C IS DIVERSION OF FLOW ON TEE PEE FROM CENTENNIAL POINT	
446	KM	CP4 AND C9 ARE ENDING OF THE APARTMENT COMPLEX AND DEVELOPMENT	
447	HC	4	

1

HEC-1 INPUT

PAGE 13

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

448	KK	WML9	
449	KM	WEST BASIN, WEST OF EGAN CREST DRIVE	
450	BA	.0257	
451	PB	3.00	
452	LS	0	94.9
453	UD	0.083	
454	KK	WPRK5	
455	KM	WEST BASIN, WEST OF EGAN CREST DRIVE	
456	BA	.0031	
457	PB	3.00	
458	LS	0	84.0
459	UD	0.064	
460	KK	WC10A	
461	KM	FAR W OF EAGLE CANYON/EGAN CREST INTERSECTION	
462	KM	COMBINE WML9, WPRK5	
463	HC	2	
464	KK	WEGL1	
465	KM	WEST BASIN, EAGLE CANYON AVE	
466	BA	.0052	
467	PB	3.00	
468	LS	0	98.0
469	UD	0.083	

REFERENCE OFFSITE BASIN

470	KK	WL4B	
471	BA	.0140	
472	PB	3.00	
473	LS	0	92.0
474	UD	0.093	

475	KK	WC10B	
476	KM	W OF EAGLE CANYON/EGAN CREST INTERSECTION	
477	HC	3	
478	KK	WML10	
479	KM	WEST BASIN, WEST OF EGAN CREST DRIVE	
480	BA	.0181	
481	PB	3.00	
482	LS	0	95.0
483	UD	0.092	

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HEC-1 INPUT

PAGE 14

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

484	KK	WEGN3	
485	KM	WEST BASIN, EGAN CREST DRIVE	
486	BA	.0051	
487	PB	3.00	
488	LS	0	98.0
489	UD	0.136	
490	KK	WML11	
491	KM	WEST BASIN, WEST OF EGAN CREST DRIVE	
492	BA	.0448	
493	PB	3.00	
494	LS	0	92.7
495	UD	0.121	
496	KK	WC11	
497	KM	W OF EAGLE CANYON/EGAN CREST INTERSECTION	
498	KM	COMBINE WML10, WEGN3, WML11	
499	HC	3	
500	KK	WC12	
501	KM	W OF EAGLE CANYON/EGAN CREST INTERSECTION	
502	KM	COMBINE WC10B, WC11	
503	HC	2	
504	KK	WL6B	
505	KM	WEST BASIN, WEST OF SKY VILLAGE ROAD	
506	BA	.0165	
507	PB	3.00	
508	LS	0	92.0
509	UD	0.106	
510	KK	WL7	
511	KM	WEST BASIN, WEST OF SKY VILLAGE ROAD	
512	BA	.0180	
513	PB	3.00	
514	LS	0	92.0
515	UD	0.095	
516	KK	WML13	
517	KM	WEST BASIN, WEST OF SKY VILLAGE ROAD	
518	BA	.0256	
519	PB	3.00	
520	LS	0	95.0
521	UD	0.117	

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HEC-1 INPUT

Page 6

PAGE 15

892 BA .0399
893 LS 0 86.2
894 UD 0.121
*
895 KK WPF1B
896 KM WEST BASIN, WEST OF SHEEP MT ROAD
897 BA .0295
898 PB 3.00
899 LS 0 94.0
900 UD 0.077
*

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HEC-1 INPUT

PAGE 25

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
901 KK DB1
902 KM COMBINE CP1, WOFF4, WOFF5, WOFF6 AND WPF1B
903 HC 5
*
904 KK RDB1
905 KM OUTLET = 24" ORIFICE @ INVERT ELEVATION = 3013.8-FT
906 KO 1
907 RS 1 ELEV 3025.5
908 SA 4.68 5.56 5.74 5.92 6.10 7.01 7.46 8.36 9.32 10.68
909 SE 3025.5 3027 3028 3029 3030 3035 3037 3040 3043 3046
910 SQ 0 13.7 31.5 48.3 60.6 70.8 74.5 1436.0 3920.5 7136.3
911 SE 3013.8 3017 3020 3025 3030 3035 3037 3040 3043 3046
*

912 KK WSHP3
913 KM WEST BASIN, SHEEP MT ROAD
914 BA .0163
915 PB 3.00
916 LS 0 94.0
917 UD 0.110
*

918 KK WPF2
919 KM WEST BASIN, WEST OF SHEEP MT
920 BA .0048
921 PB 3.00
922 LS 0 94.0
923 UD 0.074
*

924 KK WC19
925 KM FAR N OF GRAND TETON/SHEEP MT INTERSECTION
926 KM COMBINE WPF1B, WSHP3, WPF2
927 HC 3
*

928 KK WPF5
929 KM WEST BASIN, WEST OF SHAUMBER RD
930 BA .0006
931 PB 3.00
932 LS 0 86.0
933 UD 0.052
*

934 KK WML2
935 KM WEST BASIN, WEST OF SHAUMBER ROAD
936 BA .0428
937 PB 3.00
938 LS 0 93.5
939 UD 0.142
*

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HEC-1 INPUT

PAGE 26

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
940 KK WSHA5
941 KM WEST BASIN, SHAUMBER ROAD
942 BA .0037
943 PB 3.00
944 LS 0 98.0
945 UD 0.086
*
946 KK WC20
947 KM S OF EAGLE CANYON/SHAUMBER INTERSECTION
948 KM COMBINE WPF5, WML2, WSHA5
949 HC 3
*

950 KK WARR4
951 KM WEST BASIN, WEST OF SHAUMBER ROAD
952 BA .0020
953 PB 3.00
954 LS 0 88.0
955 UD 0.100
*

956 KK WPF4
957 BA .0090
958 PB 3.00
959 LS 0 94.0
960 UD 0.087
*

961 KK WSHA4
962 BA .0022
963 PB 3.00
964 LS 0 98.0
965 UD 0.051
*

966 KK WC21
967 KM S OF SHAUMBER SPLIT INTERSECTION
968 HC 5
*

REFERENCE OFFSITE BASIN

969 KK WL4A
970 KM WEST BASIN, WEST OF EGAN CREB DRIVE
971 BA .0125
972 PB 3.00
973 LS 0 92.0
974 UD 0.106
*

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HEC-1 INPUT

PAGE 27

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

975 KK WL5A
976 KM WEST BASIN, WEST OF EGAN CREB DRIVE
977 BA .0170
978 PB 3.00
979 LS 0 92.0
980 UD 0.099
*

REFERENCE ONSITE BASIN

981 KK WL5B
982 BA .0059

REFERENCE ONSITE BASIN

983 PB 3.00
 984 LS 0 92.0
 985 UD 0.085
 *

986 KK WC22A
 987 HC 3
 *

988 KK WPRK4
 989 KM WEST BASIN, WEST OF EGAN CREB DRIVE
 990 BA .0016
 991 PB 3.00
 992 LS 0 84.0
 993 UD 0.067
 *

994 KK WARR5
 995 KM WEST BASIN, WEST OF EGAN CREB DRIVE
 996 BA .0100
 997 PB 3.00
 998 LS 0 90.0
 999 UD 0.100
 *

1000 KK WC22
 1001 KM FAR S OF SKYE CANYON PARK/EGAN CREB INTERSECTION
 1002 HC 4
 *

1003 KK WML8
 1004 KM WEST BASIN, WEST OF EGAN CREB DRIVE
 1005 BA .0161
 1006 PB 3.00
 1007 LS 0 95.0
 1008 UD 0.093
 *

1009 KK WPF6
 1010 KM WEST BASIN, WEST OF EGAN CREB DRIVE
 1011 BA .0016
 1012 PB 3.00
 1013 LS 0 94.0
 1014 UD 0.050
 *

1

HEC-1 INPUT

PAGE 28

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1015 KK WEGN1
 1016 KM WEST BASIN, EGAN CREB DRIVE
 1017 BA .0007
 1018 PB 3.00
 1019 LS 0 98.0
 1020 UD 0.050
 *

1021 KK WEGN2
 1022 KM WEST BASIN, EGAN CREB DRIVE
 1023 BA .0007
 1024 PB 3.00
 1025 LS 0 98.0
 1026 UD 0.050
 *

1027 KK WC23
 1028 KM FAR S OF SKYE CANYON PARK/EGAN CREB INTERSECTION
 1029 KM COMBINE WC22, WML8, WPF6, WEGN1, WEGN2
 1030 HC 5
 *

1031 KK WARR6
 1032 KM WEST BASIN, WEST OF SKYE VILLAGE ROAD
 1033 BA .0038
 1034 PB 3.00
 1035 LS 0 88.0
 1036 UD 0.100
 *

1037 KK WPF7
 1038 KM WEST BASIN, WEST OF SKYE VILLAGE ROAD
 1039 BA .0071
 1040 PB 3.00
 1041 LS 0 94.0
 1042 UD 0.097
 *

1043 KK WL6A
 1044 KM WEST BASIN, WEST OF SKYE VILLAGE ROAD
 1045 BA .0096
 1046 PB 3.00
 1047 LS 0 92.0
 1048 UD 0.092
 *

1049 KK WC24
 1050 KM FAR E OF SKYE CANYON PARK/EGAN CREB INTERSECTION
 1051 KM COMBINE WC23, WPF7, WARR6, WL6A
 1052 HC 4
 *

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HEC-1 INPUT

PAGE 29

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1053 KK WSCP2
 1054 KM WEST BASIN, SKYE CANYON PARK DRIVE
 1055 BA .0047
 1056 PB 3.00
 1057 LS 0 98.0
 1058 UD 0.063
 *

1059 KK WPRK3
 1060 KM WEST BASIN, WEST OF EGAN CREB DRIVE
 1061 BA .0028
 1062 PB 3.00
 1063 LS 0 84.0
 1064 UD 0.070
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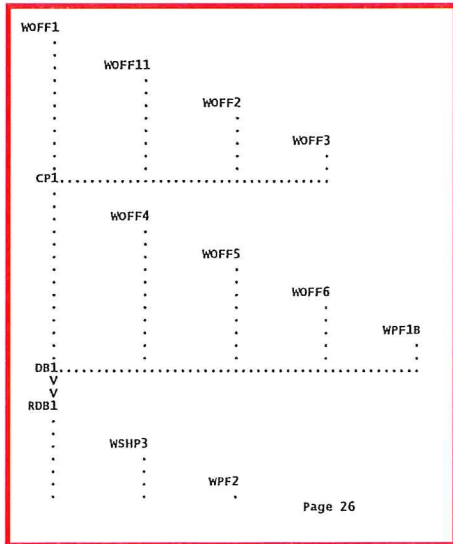
1065 KK WC25
 1066 KM N OF SKYE CANYON PARK/EGAN CREB INTERSECTION
 1067 HC 2
 *

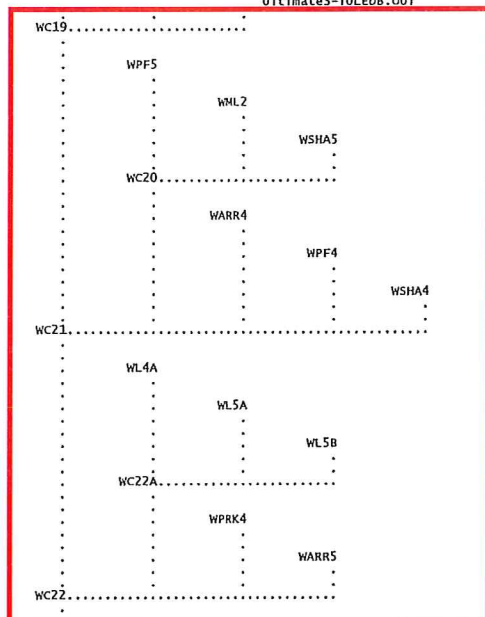
1068 KK WPRK6
 1069 KM WEST BASIN, WEST OF SKYE VILLAGE ROAD
 1070 BA .0207
 1071 PB 3.00
 1072 LS 0 84.0
 1073 UD 0.121
 *

1074 KK WSCP3
 1075 KM WEST BASIN, SKYE CANYON PARK DRIVE

670 Mw29-C
 676 V
 RNW29C
 683 Mw71-W
 689 CNW71W
 694 V
 RCNW71
 701 Mw71-E
 707 CNW71E
 712 WGR11
 718 955TH
 722 OFF4-1
 728 V
 ROFF41
 733 OFF4-2
 739 COFF42
 743 V
 RCOFF4
 748 OFF5-1
 754 COFF51
 758 V
 RCOFF5
 765 OFF5-2
 771 V
 ROFF52
 778 Mw1-C
 784 CNW1-C
 788 ZCNW1C
 792 V
 RZCNW1
 799 Mw7-C
 805 CNW-7
 809 V
 1570B
 817 V
 RCNW7C
 824 Mw21-C
 830 CNW21C
 833 V
 RCNW21
 840 Mw35-C
 846 WPRK10
 852 CNW35C
 855
 861
 867
 872
 877 CP1
 880
 885
 890
 895
 901 DB1
 904 V
 RDB1
 912
 918
 WSH3
 WPF2
 WPF1B

REFERENCE BASINS TO
WASH AT EAGAN CREST





REFERENCE BASINS TO
WASH AT EAGAN CREST

				TIME	3.75	3.75	Ultimate3-TULEDB.OUT 3.75 3.75	3.75	3.75
ROUTED TO	RDB1	.88	1	FLOW	71.	71.	71.	69.	68.
+				TIME	5.58	5.58	5.58	5.50	5.50
				** PEAK STAGES IN FEET **					
			1	STAGE	3035.31	3035.02	3034.86	3034.24	3033.93
				TIME	5.58	5.58	5.58	5.50	5.50
HYDROGRAPH AT	WSHP3	.02	1	FLOW	31.	30.	30.	29.	28.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WPF2	.00	1	FLOW	10.	10.	10.	10.	9.
+				TIME	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT	WC19	.90	1	FLOW	95.	94.	93.	91.	90.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WPF5	.00	1	FLOW	1.	1.	1.	1.	1.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WML2	.04	1	FLOW	78.	76.	75.	72.	70.
+				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	WSHA5	.00	1	FLOW	8.	8.	8.	8.	8.
+				TIME	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT	WC20	.05	1	FLOW	86.	84.	83.	79.	77.
+				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	WARR4	.00	1	FLOW	3.	3.	3.	3.	3.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WPF4	.01	1	FLOW	19.	18.	18.	17.	17.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WSHA4	.00	1	FLOW	6.	5.	5.	5.	5.
+				TIME	3.50	3.50	3.50	3.50	3.50
5 COMBINED AT	WC21	.96	1	FLOW	204.	201.	199.	191.	188.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WL4A	.01	1	FLOW	23.	22.	22.	21.	20.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WL5A	.02	1	FLOW	32.	31.	31.	29.	28.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WL5B	.01	1	FLOW	12.	11.	11.	11.	10.
+				TIME	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT	WC22A	.04	1	FLOW	67.	65.	64.	61.	59.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WPRK4	.00	1	FLOW	3.	2.	2.	2.	2.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WARR5	.01	1	FLOW	18.	17.	17.	16.	15.
+				TIME	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT	WC22	1.01	1	FLOW	291.	285.	282.	270.	264.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WML8	.02	1	FLOW	34.	33.	32.	31.	30.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WPF6	.00	1	FLOW	4.	4.	4.	3.	3.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WEGN1	.00	1	FLOW	2.	2.	2.	2.	2.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WEGN2	.00	1	FLOW	2.	2.	2.	2.	2.
+				TIME	3.50	3.50	3.50	3.50	3.50
5 COMBINED AT	WC23	1.03	1	FLOW	332.	325.	322.	308.	301.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WARR6	.00	1	FLOW	6.	6.	6.	6.	5.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WPF7	.01	1	FLOW	14.	14.	14.	13.	13.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WL6A	.01	1	FLOW	19.	18.	18.	17.	16.
+				TIME	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT	WC24	1.05	1	FLOW	371.	363.	359.	344.	336.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WSCP2	.00	1	FLOW	11.	11.	11.	11.	10.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WPRK3	.00	1	FLOW	4.	4.	4.	4.	4.
+				TIME	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT	WC25	.01	1	FLOW	16.	15.	15.	15.	14.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	WPRK6	.02	1	FLOW	28.	27.	27.	25.	24.
+				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	WSCP3	.01	1	FLOW	13.	13.	12.	12.	12.
+				TIME	3.50	3.50	3.50	3.50	3.50

REFERENCED
OFFSITE BASIN

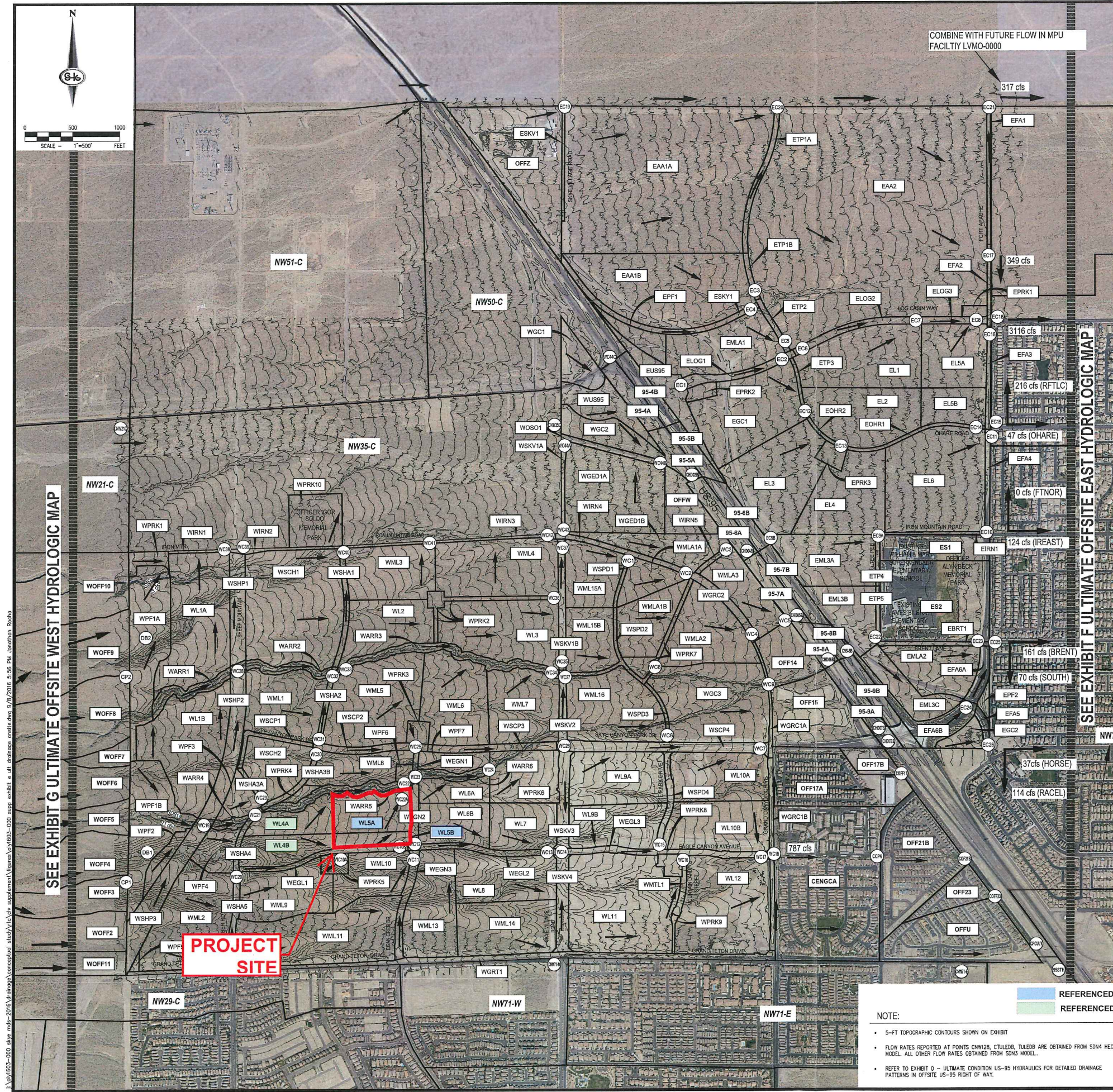
REFERENCED
ONSITE BASINS

REFERENCED
FLOW IN ARROYO
WASH

Exhibits

N:\1603-000\1603-000.dwg (1603-000.dwg) 9/2/2016 2:55 PM Jonathan Rocha

SEE EXHIBIT G ULTIMATE OFFSITE WEST HYDROLOGIC MAP



NOTE:

- 5-FT TOPOGRAPHIC CONTOURS SHOWN ON EXHIBIT
- FLOW RATES REPORTED AT POINTS CWN128, CULDEB, TULEDB ARE OBTAINED FROM SON4 HEC-1 MODEL. ALL OTHER FLOW RATES OBTAINED FROM SON3 MODEL.
- REFER TO EXHIBIT G - ULTIMATE CONDITION US-95 HYDRAULICS FOR DETAILED DRAINAGE PATTERNS IN OFFSITE US-95 RIGHT OF WAY.

Ultimate Condition Flow Rate Summary Skye Canyon West Basins				
Basin/Concentration Point ID	Area (ac)	Q ₁₀ (cfs)	Q ₅₀ (cfs)	Q ₁₀₀ (cfs)
WARR1	2.6	7	3	4
WARR2	2.6	7	3	4
WARR3	1.1	3	1	1
WARR4	1.1	3	1	1
WARR5	8.3	10	8	8
WARR6	2.4	6	2	2
WARR7	8.3	10	8	8
WARR8	8.3	10	8	8
WARR9	8.3	10	8	8
WARR10	8.3	10	8	8
WARR11	8.3	10	8	8
WARR12	8.3	10	8	8
WARR13	8.3	10	8	8
WARR14	8.3	10	8	8
WARR15	8.3	10	8	8
WARR16	8.3	10	8	8
WARR17	8.3	10	8	8
WARR18	8.3	10	8	8
WARR19	8.3	10	8	8
WARR20	8.3	10	8	8
WARR21	8.3	10	8	8
WARR22	8.3	10	8	8
WARR23	8.3	10	8	8
WARR24	8.3	10	8	8
WARR25	8.3	10	8	8
WARR26	8.3	10	8	8
WARR27	8.3	10	8	8
WARR28	8.3	10	8	8
WARR29	8.3	10	8	8
WARR30	8.3	10	8	8
WARR31	8.3	10	8	8
WARR32	8.3	10	8	8
WARR33	8.3	10	8	8
WARR34	8.3	10	8	8
WARR35	8.3	10	8	8
WARR36	8.3	10	8	8
WARR37	8.3	10	8	8
WARR38	8.3	10	8	8
WARR39	8.3	10	8	8
WARR40	8.3	10	8	8
WARR41	8.3	10	8	8
WARR42	8.3	10	8	8
WARR43	8.3	10	8	8
WARR44	8.3	10	8	8
WARR45	8.3	10	8	8
WARR46	8.3	10	8	8
WARR47	8.3	10	8	8
WARR48	8.3	10	8	8
WARR49	8.3	10	8	8
WARR50	8.3	10	8	8
WARR51	8.3	10	8	8
WARR52	8.3	10	8	8
WARR53	8.3	10	8	8
WARR54	8.3	10	8	8
WARR55	8.3	10	8	8
WARR56	8.3	10	8	8
WARR57	8.3	10	8	8
WARR58	8.3	10	8	8
WARR59	8.3	10	8	8
WARR60	8.3	10	8	8
WARR61	8.3	10	8	8
WARR62	8.3	10	8	8
WARR63	8.3	10	8	8
WARR64	8.3	10	8	8
WARR65	8.3	10	8	8
WARR66	8.3	10	8	8
WARR67	8.3	10	8	8
WARR68	8.3	10	8	8
WARR69	8.3	10	8	8
WARR70	8.3	10	8	8
WARR71	8.3	10	8	8
WARR72	8.3	10	8	8
WARR73	8.3	10	8	8
WARR74	8.3	10	8	8
WARR75	8.3	10	8	8
WARR76	8.3	10	8	8
WARR77	8.3	10	8	8
WARR78	8.3	10	8	8
WARR79	8.3	10	8	8
WARR80	8.3	10	8	8
WARR81	8.3	10	8	8
WARR82	8.3	10	8	8
WARR83	8.3	10	8	8
WARR84	8.3	10	8	8
WARR85	8.3	10	8	8
WARR86	8.3	10	8	8
WARR87	8.3	10	8	8
WARR88	8.3	10	8	8
WARR89	8.3	10	8	8
WARR90	8.3	10	8	8
WARR91	8.3	10	8	8
WARR92	8.3	10	8	8
WARR93	8.3	10	8	8
WARR94	8.3	10	8	8
WARR95	8.3	10	8	8
WARR96	8.3	10	8	8
WARR97	8.3	10	8	8
WARR98	8.3	10	8	8
WARR99	8.3	10	8	8
WARR100	8.3	10	8	8

Ultimate Condition Flow Rate Summary Skye Canyon West Concentration Points				
Basin/Concentration Point ID	Area (ac)	Q ₁₀ (cfs)	Q ₅₀ (cfs)	Q ₁₀₀ (cfs)
WC1	0.02	43	21	
Q=WC1+WC2+WC3+WC4+WC5+WC6+WC7+WC8+WC9+WC10+WC11+WC12+WC13+WC14+WC15+WC16+WC17+WC18+WC19+WC20+WC21+WC22+WC23+WC24+WC25+WC26+WC27+WC28+WC29+WC30+WC31+WC32+WC33+WC34+WC35+WC36+WC37+WC38+WC39+WC40+WC41+WC42+WC43+WC44+WC45+WC46+WC47+WC48+WC49+WC50+WC51+WC52+WC53+WC54+WC55+WC56+WC57+WC58+WC59+WC60+WC61+WC62+WC63+WC64+WC65+WC66+WC67+WC68+WC69+WC70+WC71+WC72+WC73+WC74+WC75+WC76+WC77+WC78+WC79+WC80+WC81+WC82+WC83+WC84+WC85+WC86+WC87+WC88+WC89+WC90+WC91+WC92+WC93+WC94+WC95+WC96+WC97+WC98+WC99+WC100	0.02	43	21	
WC2	0.02	43	21	
WC3	0.02	43	21	
WC4	0.02	43	21	
WC5	0.02	43	21	
WC6	0.02	43	21	
WC7	0.02	43	21	
WC8	0.02	43	21	
WC9	0.02	43	21	
WC10	0.02	43	21	
WC11	0.02	43	21	
WC12	0.02	43	21	
WC13	0.02	43	21	
WC14	0.02	43	21	
WC15	0.02	43	21	
WC16	0.02	43	21	
WC17	0.02	43	21	
WC18	0.02	43	21	
WC19	0.02	43	21	
WC20	0.02	43	21	
WC21	0.02	43	21	
WC22	0.02	43	21	
WC23	0.02	43	21	
WC24	0.02	43	21	
WC25	0.02	43	21	
WC26	0.02	43	21	
WC27	0.02	43	21	
WC28	0.02	43	21	
WC29	0.02	43	21	
WC30	0.02	43	21	
WC31	0.02	43	21	
WC32	0.02	43	21	
WC33	0.02	43	21	
WC34	0.02	43	21	
WC35	0.02	43	21	
WC36	0.02	43	21	
WC37	0.02	43	21	
WC38	0.02	43	21	
WC39	0.02	43	21	
WC40	0.02	43	21	
WC41	0.02	43	21	
WC42	0.02	43	21	
WC43	0.02	43	21	
WC44	0.02	43	21	
WC45	0.02	43	21	
WC46	0.02	43	21	
WC47	0.02	43	21	
WC48	0.02	43	21	
WC49	0.02	43	21	
WC50	0.02	43	21	
WC51	0.02	43	21	
WC52	0.02	43	21	
WC53	0.02	43	21	
WC54	0.02	43	21	
WC55	0.02	43	21	
WC56	0.02	43	21	
WC57	0.02	43	21	
WC58	0.02	43	21	
WC59	0.02	43	21	
WC60	0.02	43	21	
WC61	0.02	43	21	
WC62	0.02	43	21	
WC63	0.02	43	21	
WC64	0.02	43	21	
WC65	0.02	43	21	
WC66	0.02	43	21	
WC67	0.02	43	21	
WC68	0.02	43	21	
WC69	0.02	43	21	
WC70	0.02	43	21	
WC71	0.02	43	21	
WC72	0.02	43	21	
WC73	0.02	43	21	
WC74	0.02	43	21	
WC75	0.02	43	21	
WC76	0.02	43	21	
WC77	0.02	43	21	
WC78	0.02	43	21	
WC79	0.02	43	21	
WC80	0.02	43	21	
WC81	0.02	43	21	
WC82	0.02	43	21	
WC83	0.02	43	21	
WC84	0.02	43	21	
WC85	0.02	43	21	
WC86	0.02	43	21	
WC87	0.02	43	21	
WC88	0.02	43	21	
WC89	0.02	43	21	
WC90	0.02	43	21	
WC91	0.02	43	21	
WC92	0.02	43	21	
WC93	0.02	43	21	
WC94	0.02	43	21	
WC95	0.02	43	21	
WC96	0.02	43	21	
WC97	0.02	43	21	
WC98	0.02	43	21	
WC99	0.02	43	21	
WC100	0.02	43	21	

Ultimate Condition Flow Rate Summary Skye Canyon Offsite Basins				
Basin/Concentration Point ID	Area (ac)	Q ₁₀ (cfs)	Q ₅₀ (cfs)	Q ₁₀₀ (cfs)
WEST BASINS				
CEW04	0.06	152	71	
CEW05	0.02	182	14	
ES2	0.05	84	43	
CEW06	0.03	107	15	
OFFP2-1	0.42	662	214	
OFFP2-2	0.02	182	14	
OFFP2-3	0.40	467	161	
OFFP3	0.01	25	13	
OFFP4	0.03	103	23	
OFFP7A	0.03	91	24	
OFFP7B	0.03	91	24	
OFFP18	0.04	75	39	
OFFP23	0.04	75	39	
OFFP4	0.04	74	38	
OFFP6	0.01	25	10	
OFFP7	0.06	29	17	
WOFF1	0.41	403	155	
WOFF2	0.36	253	118	
WOFF3	0.09	55	25	
WOFF5	0.54	48	17	
WOFF6	0.03	19	8	
WOFF4	0.06	84	32	
WOFF9	0.38	228	89	
WOFF10	0.04	29	13	
WOFF7	0.01	10	4	
WOFF8	0.17	74	17	
WOFF9	0.12	14	58	
USRB BASINS				
US-1	0.01	14	7	
US-5	0.01	13	6	
US-6	0.01	13	6	
US-8	0.01	11	5	
US-9	0.01	19	5	
US-10	0.01	19	5	
US-14	0.01	16	7	
US-15	0.01	16	8	
US-3A	0.01	11	6	
US-3B	0.01	11	6	
US-5A	0.01	21	10	
US-9B	0.01	22	10	
EAST BASINS				
NEV1-C	0.28	327	107	
NEV1-D	0.48	503	162	
NEV2-C	0.21	242	110	
NEV2-D	0.13	200	93	
NEV3-C	0.21	242	110	
NEV3-D	0.17	238	87	
NEV10-C	0.34	358	128	
NEV11-W	0.34	358	128	
NEV12-C	0.36	263	110	
NEV13-C	0.36	263	110	
NEV12S-C	0.14	128	44	
NEV13S-C	0.34	193	74	
NEV13S-E	0.29	198	70	
NEV14B-C	0.13	76	29	
NEV17	0.10	76	29	

Ultimate Condition Flow Rate Summary Skye Canyon Offsite Concentration Points				
Basin/Concentration Point ID	Area (ac)	Q ₁₀ (cfs)	Q ₅₀ (cfs)	Q ₁₀₀ (cfs)
WEST CONCENTRATION POINTS				
Q-1CDPT	0.19	1033	380	
Q-1	0.50	471	178	
Q-1 VOFF1 + VOFF2 + VOFF3 + VOFF4	0.17	204	77	
Q-1 VOFF1 + VOFF2	0.01	917	431	
Q-1 VOFF2 + VOFF3	0.69	737	210	
Q-1 VOFF3 + VOFF4	1.70	189	582	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.19	2213	690	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3	2.35	1139	347	
Q-1 VOFF2 + VOFF3 + Q-1 VOFF4	2.31	1224	410	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF4	0.34	108	106	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
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Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
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Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
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Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
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Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
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Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354	107	
Q-1 VOFF1 + Q-1 VOFF2 + VOFF3 + VOFF4	0.24	354		

APPENDIX F

Reference Material

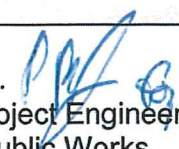
Technical Drainage Study for Skye Canyon – Phase 2 Infrastructure, by SHG
(DS4739E)

Approval Letter

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM

DATE:
REVISED
June 21, 2016

TO:
Land Development Services
Department of Building & Safety

FROM:
Albert Sung, P.E. 
Flood Control Project Engineer
Department of Public Works

SUBJECT: Drainage Study for:
Skye Canyon – Phase 2 Infrastructure

COPIES TO:
Slater Hanifan Group, Inc.

Cross Streets: NWC of Grand Teton Blvd. & Hualapai Way

Section 12, LLC / Ninety Five Mgmt.

File Number: F:\Depot\DSMemos\DS4739E Revised.doc

Bart Anderson, P.E., DevCo

Parcel Number: Portion of 126-12-000-001

CCRFCFCD

Zoning Action: TMP-58560

FEMA Flood Zone YES NO **X**

Proposed Storm Drain YES **X** NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal & Supplemental	6/18/2015, 8/4/2015	8/26/2015	Not Approved	\$400.00	402578: \$400
2 nd Submittal	10/19/2015	11/02/2015	Not Approved	\$400.00	419048: \$400
3 rd Submittal	11/19/2015 & Supplemental	1/7/2016	Conditional Approval	\$400.00	423549: \$400
4 th Submittal	4/4/2016	4/13/2016	Conditional Approval	\$100.00	438958: \$100
5 th Submittal & CCRFCFCD	5/12/2016 & 5/16/2016	6/8/2016 & 6/21/2016	See Comments Below	\$100.00	443735: \$100
TOTAL FEES (LDDRS):				\$1,400.00	----

REMARKS: Revised Memo, Approved "At Risk".

5th Submittal: Update #2 and CCRFCFCD concurrence received

4th Submittal: Update #1 - Widen bike lane within Shaumber Road & Egan Crest Way from 4' to 5'

Supplemental impacts to study from the National Monument and the Detention Basin #1 study.

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

	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.
X	is approved "At Risk" subject to the final approval of the Revised Master Drainage Study.

The City of Las Vegas will not allow further residential building permits for development outside of the limits of Phase I at this time based upon the current MPU impacts from the National Monument. This is a temporary hold of further residential building permits outside of Phase I until the National Monument Grant issues are resolved and/or alternative regional facilities are proposed and constructed to mitigate the development. The City will continue to work with the Developer and CCRFCFCD to help identify and alleviate these impacts.

- Note that the **Skye Canyon Master Drainage Study** has not been approved in the current stage. The subject **Skye Canyon Infrastructure Phase 2** drainage study is approved **"At Risk"** until the final

approval of the Master Drainage Study. Any changes required by the Master Drainage Study shall require a drainage study update to the **Phase 2 Infrastructure Study** and any required facility changes to the Phase 2 Infrastructure shall be provided at the developers' cost.

2. The **Skye Canyon Phase 2 Development** is based on the sole protection of a planned **Skye Canyon Detention Basin #1** from major storm flood events. The Detention Basin #1 drainage study has been approved.
3. No Building Permits for onsite developments within Phase 2 will be issued prior to the construction and substantial completion of the **Skye Canyon Detention Basin #1**. The notice of Substantial Completion from the City of Las Vegas, Department of Public Works is required for the release of Building Permits.
4. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. CCRFCD concurrence has been provided for the Phase 2 Infrastructure.
5. The impacts to existing downstream neighborhoods of the long term discharge from the detention basin(s) without the associated regional outfall facilities is a major concern of both the City and the Clark County Regional Flood Control District. Flood Control understands that these impacts are being addressed with Skye Canyon Detention Basin #1. The proposed impact solution was included as a part of the Skye Canyon Detention Basin #1 improvements until the overall Skye Canyon MPU facilities are completed.
6. The drainage study for Phase 2 Infrastructure assumes that the project will be constructed in one phase. It was noted within this Addendum response that the developer desires to phase the construction of the improvements. If improvement plans are submitted to break the Phase 2 Infrastructure into separate phases, a drainage study update will be required for each phase addressing the interim condition.
7. The provided Phase 2 Infrastructure plans only show the proposed drainage facilities. The complete improvement plans will require additional review for impacts with other needed infrastructure; i.e. sanitary sewer, water, gas, etc. Any changes to the proposed storm drain system shall require a drainage study update.
8. The Storm Drain Plans have been revised to accommodate the proposed cross fall street sections and include added nuisance inlets at low points within the intersections.
9. The plans show preliminary mass grading with collection facilities within the parcels to intercept the flows prior to entering the infrastructure roadway improvements. It was noted that the inlet collection system needs to incorporate stormwater quality (SWQ) features and Best Management Practices (BMP's) at these interim collection points. This information will be provided and shown on the SWPPP, a copy of which shall be provided to Flood Control prior to permits. Additionally, the mass grading plan (Sheet GR-03) shows sheet flow from Basin ON2-IB discharging directly onto Hualapai Way without any interim collection. Revise to incorporate interim collection.
10. All drainage facilities proposed in this **Phase 2 Infrastructure Study** are considered interim facilities and must be maintained by the Master Developer until the facilities are dedicated to and formally accepted by the *City of Las Vegas*.
11. Since the streets network and the associated storm drain facilities will eventually be accepted by the City, the engineer must coordinate with *City of Las Vegas Streets & Sanitation Department* for their review and approval prior to the final approval of the subject drainage study.
12. The provided WSPG Model shows that the storm drain in *Eagle Canyon Avenue* exceeds the maximum allowed velocity (25 fps) per the *CCRFCD Hydrologic & Hydraulic Design Manual*. A *Special Construction Note* has been added to the plan & profile sheets that call out the special construction requirement and the required special inspection for the additional sacrificial concrete.
13. Structural plans for the storm drain improvements must be submitted for review. Provide a soil report, structural calculations and specifications, wet stamped structural sets and a grading plan to

the *City of Las Vegas Building Department* for processing (call *Building Department* to confirm their submittal requirements). The engineer must provide a copy of *Building Department* approval of the structures to *City Flood Control Section* prior to the final acceptance of the technical drainage study.

14. The project proposes to build temporary drainage berms/swales over the *Phase 2* site. Prior to final plan approval the developer must complete a ***Maintenance and Liability Agreement*** for the interim drainage improvements and post a minimum maintenance bond of \$50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for construction the facility and an exhibit that adequately shows the location and limits of the drainage facility 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.

15. Technical drainage studies are required for each of the future PODs. The technical drainage studies for the PODs may not be submitted until the conditional approval of the pertinent infrastructure drainage study is obtained. Final approval for the infrastructure study must be obtained prior to conditional approval of the impacted POD drainage studies.
16. No Building Permits for the homes within the individual PODs will be issued prior to the construction and substantial completion of the ***Skye Canyon Detention Basin #1***. Additionally, Building permits for the homes within the individual PODs will not be issued until construction of the streets and flood control infrastructure around the POD is substantially complete or interim protection is provided per the approved technical drainage study.
17. A note on the Grading Plans has been provided that "*Property Owner is responsible to maintain the best management practices such as but not limited to the removal of accumulated sediment and debris and care of the vegetation.*"
18. Provide numbering system for the manholes and inlets. It was noted in the response that the project may be divided into additional phases. The numbering system is still needed.
19. Show the size of all the proposed riprap areas. The rip-rap pads are shown on the GR-Sheets and some of the SD-Sheets include the pad size. Add the pad size to the grading plans and revise all pertinent plans and callouts accordingly.
20. Revise the pipe penetration detail to include a concrete collar with dowelled rebar connections. The detail has not been provided at this time and was noted that it will be a part of the Structural Details.
21. Provide details for the transition structure modifications to accommodate the 66"-RCP connection and the removal of the existing facilities to allow construction of the proposed improvements. The detail has not been provided at this time and was noted that it will be a part of the Structural Details.

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: T19S/R59E/12
AREA F-12

Perimeter Streets

Section - ECA2 (Ultimate Condition)

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - ECA2 (Ultimate Condition)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	4.90 %
Discharge	44.00 cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results	
Mannings Coefficient	0.016
Water Surface Elevation	0.50 ft
Elevation Range	0.00 to 0.56
Flow Area	6.8 ft ²
Wetted Perimeter	38.09 ft
Top Width	37.03 ft
Actual Depth	0.50 ft
Critical Elevation	0.67 ft
Critical Slope	0.57 %
Velocity	6.50 ft/s
Velocity Head	0.66 ft
Specific Energy	1.16 ft
Froude Number	2.68
Flow Type	Supercritical

Calculation Messages:

Flow is divided.

Water elevation exceeds lowest end station by 0.27115243e-3 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+43.00	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+21.50	0.56
0+41.00	0.17
0+41.00	0.13
0+42.50	0.00
0+42.50	0.48

Section - ECA2 (Ultimate Condition)
Worksheet for Irregular Channel

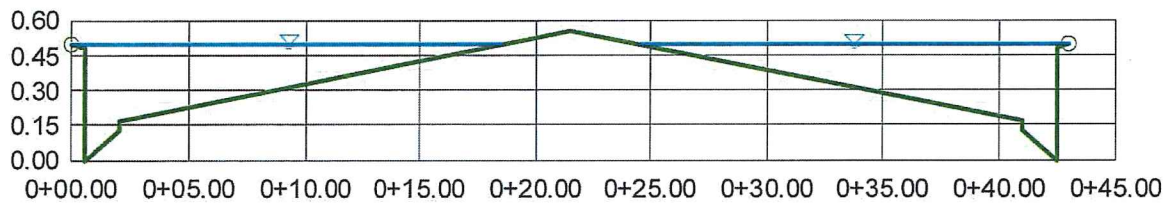
Natural Channel Points	
Station (ft)	Elevation (ft)
0+43.00	0.50

Notes: Q=44 cfs being WL4B + WEGL1 + WPRK5

Section - ECA2 (Ultimate Condition) Cross Section for Irregular Channel

Project Description	
Worksheet	Section - ECA2 (Ultimate Condition)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	4.90 %
Water Surface Elevation	0.50 ft
Elevation Range	0.00 to 0.56
Discharge	44.00 cfs



V:10.0
H:1
NTS

Section - EGN2

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - EGN2
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	0.50 %
Discharge	4.00 cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results	
Mannings Coefficient	0.016
Water Surface Elevation	0.35 ft
Elevation Range	0.00 to 1.18
Flow Area	2.6 ft²
Wetted Perimeter	22.25 ft
Top Width	21.44 ft
Actual Depth	0.35 ft
Critical Elevation	0.33 ft
Critical Slope	0.82 %
Velocity	1.56 ft/s
Velocity Head	0.04 ft
Specific Energy	0.39 ft
Froude Number	0.79
Flow Type	Subcritical

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+67.00	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+27.00	0.67
0+27.01	0.73
0+27.25	1.04
0+27.42	1.06
0+33.50	1.18
0+39.58	1.06

Section - EGN2
Worksheet for Irregular Channel

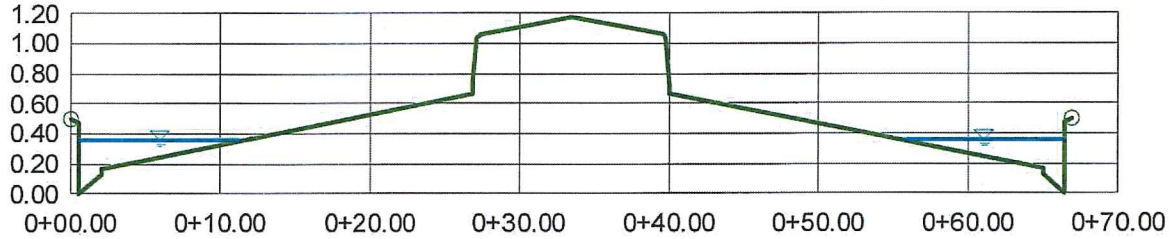
Natural Channel Points	
Station (ft)	Elevation (ft)
0+39.74	1.04
0+39.99	0.73
0+40.00	0.67
0+65.00	0.17
0+65.00	0.13
0+66.50	0.00
0+66.50	0.48
0+67.00	0.50

Section - EGN2

Cross Section for Irregular Channel

Project Description	
Worksheet	Section - EGN2
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	0.50 %
Water Surface Elevation	0.35 ft
Elevation Range	0.00 to 1.18
Discharge	4.00 cfs



V:10.0
H:1
NTS

WSPGW Model

U-ECRN

0	T1	SKYE CANYON INFRASTRUCTURE - PHASE 2
	T2	BY OLYMPIA COMPANIES
	T3	EAGAN CREST (NORTH) - TRUNK STORM DRAIN
	SO	1000.002905.68 36
	R	1139.002906.60 36 .013
	JX	1139.002906.60 36 18 .013 2.0
	R	1149.002906.80 36 .013
	JX	1149.002906.80 36 36 .013 2.0
	R	1205.002909.64 36 .013
	SH	1205.002909.64 36
	CD	18 4 1.5
	CD	24 4 2
	CD	30 4 2.5
	CD	36 4 3
	CD	42 4 3.5
	CD	48 4 4
	CD	54 4 4.5
	CD	60 4 5
	CD	66 4 5.5
	CD	72 4 6
	CD	78 4 6.5

REVISED
PORTION OF
WSPGW MODEL

U-ECRN

0 9 t

67.

U-ECRN

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL NO	AVBPR PIER
L/ELEM	SO	*****											
1200.80	2909.43	2.242	2911.669	67.0	11.82	2.170	2913.839	0.00	2.616	3.00	0.00	0.00	0 0.00
2.26	0.05071					.011614	0.03						
1203.06	2909.54	2.351	2911.893	67.0	11.27	1.973	2913.866	0.00	2.616	3.00	0.00	0.00	0 0.00
1.43	0.05071					.010493	0.02						
1204.49	2909.61	2.473	2912.087	67.0	10.75	1.794	2913.881	0.00	2.616	3.00	0.00	0.00	0 0.00
0.51	0.05071					.009581	0.00						
1205.00	2909.64	2.616	2912.256	67.0	10.24	1.629	2913.885	0.00	2.616	3.00	0.00	0.00	0 0.00*
SKYE CANYON INFRASTRUCTURE - PHASE 2													
BY OLYMPIA COMPANIES													
EAGAN CREST (NORTH) - TRUNK STORM DRAIN													

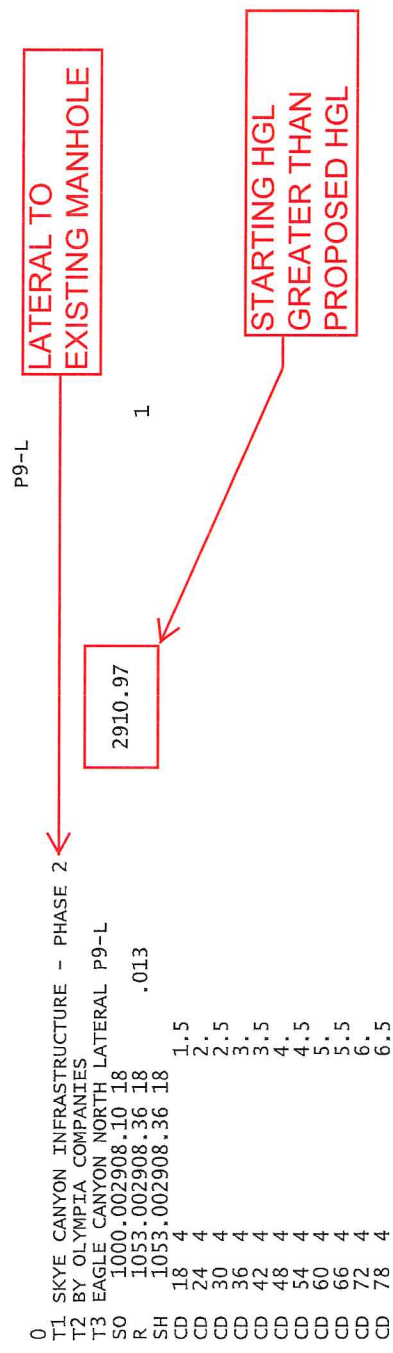
1000.00	.1												R
1004.18	.												.
1008.37	.												.
1012.55	.												.
1016.73	.												.

HGL AT EXISTING
MANHOLE

[illegible]

I. GLOSSARY

2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY 2



0
Q
→

2.0

P9-L

DATE: 5/10/2016
TIME: 18:51

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING
F0515P
PAGE 1

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	PIERS	WIDTH	WIDTH	DIAMETER					DROP										
CD	18	4				1.50															
CD	24	4				2.50															
CD	30	4				2.50															
CD	36	4				3.00															
CD	42	4				3.50															
CD	48	4				4.00															
CD	54	4				4.50															
CD	60	4				5.00															
CD	66	4				5.50															
CD	72	4				6.00															
CD	78	4				6.50															

PAGE NO 3

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGLE CANYON NORTH LATERAL P9-L

‡

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1	IS A SYSTEM OUTLET	*	INVERT	SECT	W S ELEV
		U/S DATA		1000.00	2908.10	2910.97
ELEMENT NO	2	IS A REACH	*	INVERT	SECT	
		U/S DATA		1053.00	2908.36	
ELEMENT NO	3	IS A SYSTEM HEADWORKS	*	INVERT	SECT	
		U/S DATA				
					N	
					0.013	
					RADIUS	
					0.00	
					ANGLE	
					0.00	
					ANG PT	
					0.00	
					MAN H	
					1	
				*	W S ELEV	

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC ‡
LICENSEE: SLATER HANIFAN GROUP

WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

EAGLE CANYON NORTH LATERAL P9-L

STATION	INVERT	DEPTH	W.S.	Q	VEL	VEL	HEAD	ENERGY	SUPER	CRITICAL	HGT/	BASE/	ZL	NO	AVBPR
L/ELEM	ELEV	OF FLOW	ELEV					GRD.EL.	ELEV	DEPTH	DIA	ID NO.		PIER	
1000.00	2908.10	2.870	2910.970	2.0	1.13	0.020	2910.990	0.00	0.533	0.533	1.50	0.00	0.00	0	0.00
53.00	0.00491					.000363	0.02						0.00		
1053.00	2908.36	2.630	2910.990	2.0	1.13	0.020	2911.010	0.00	0.533	0.533	1.50	0.00	0.00	0	0.00‡

** WARNING NO. 22 ** - NO PLOT GENERATED, BAD DATA OR NOT ENOUGH POINTS, 3 OR LESS ‡

Exhibits

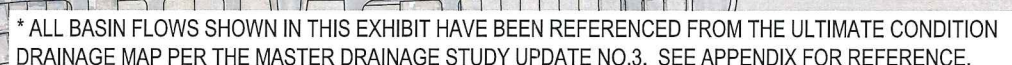
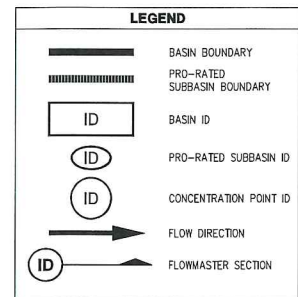
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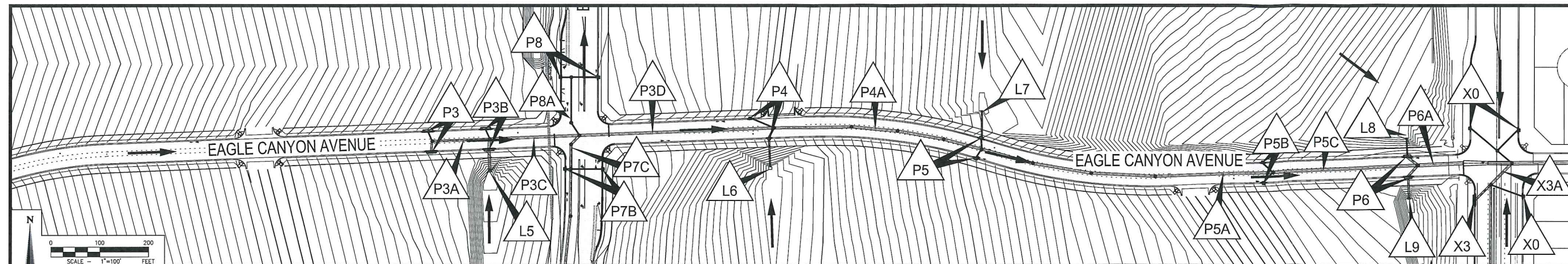
* Modeled as Half Streets

$Q = WL4A + WL5A + WL5B$			
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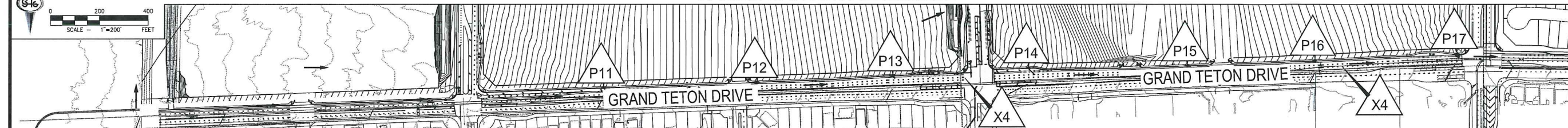
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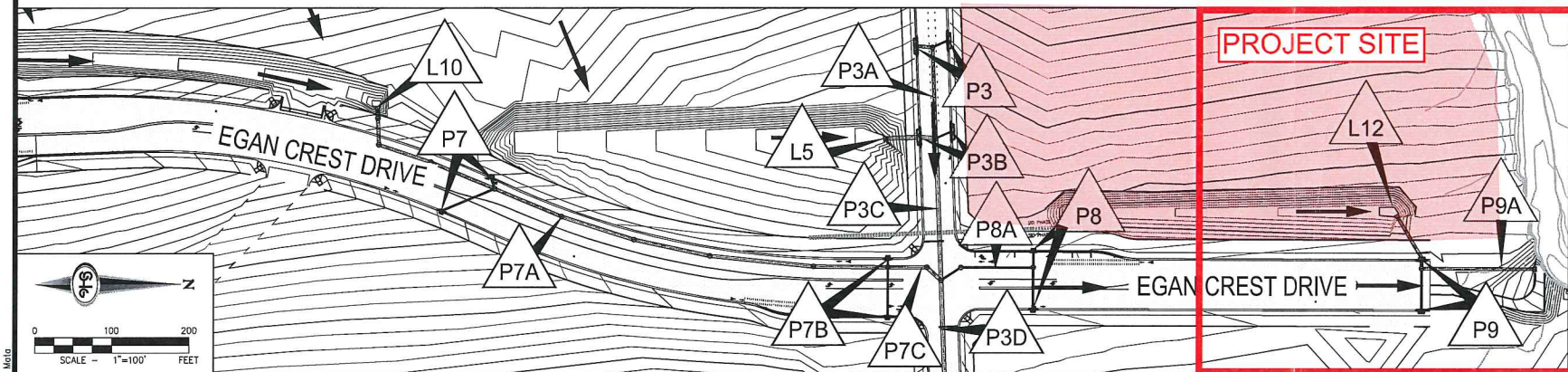




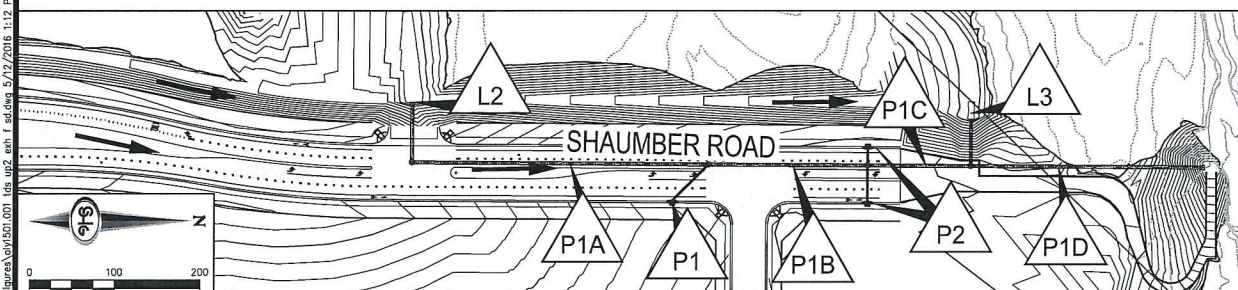
EAGLE CANYON ALIGNMENT



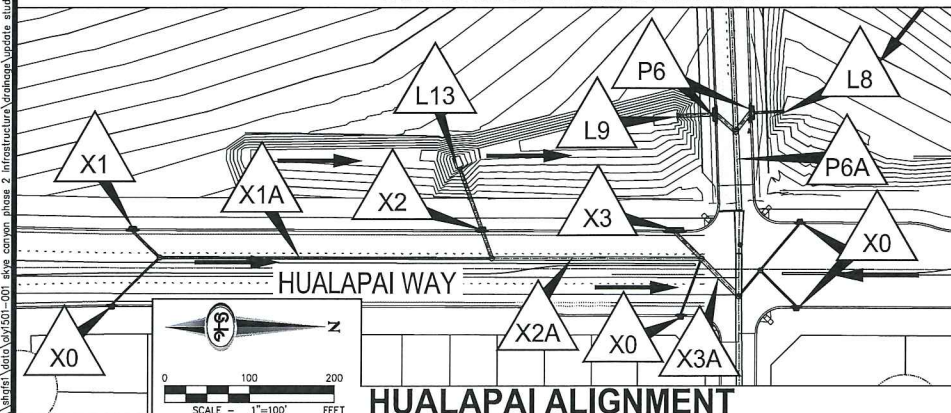
GRAND TETON ALIGNMENT



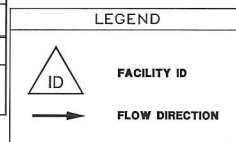
EGAN CREST ALIGNMENT



SHAUMBER ALIGNMENT



HUALAPAI ALIGNMENT



**REFERENCED
STORM DRAIN
SYSTEM**

**DESIGN STORM
DRAIN FOR
ONSITE FLOWS**

Facility ID	Facility	Interim Q ₁₀₀ (cfs)	Ultimate Q ₁₀₀ (cfs)	Comment
X0	Existing 5-ft Type CM2 Dis	N/A	N/A	Provided for 10-yr Flows
X1	Existing 7.5-ft Type CM2 DI	16	16	18" RCP lateral
X1A	Existing 24" RCP	16	16	
X2	Existing 7.5-ft Type CM2 DI	13	13	36" RCP Lateral
X2A	Existing 36" RCP	56.5	53	
X3	Existing 20-ft Sump Drop Inlet	39	44.5	36" RCP Lateral
X3A	Existing 48" RCP	102	97.5	
X4	Existing 8' X 5' RCB	N/A	N/A	Grand Teton Alignment
P1	Proposed 5-ft Type CM2 DI	2	2	18" RCP lateral
P1A	Proposed 36" RCP	54	79	
P1B	Proposed 36" RCP	56	81	
P1C	Proposed 36" RCP	59	84	
P1D	Proposed 36" RCP	91	103	
P2	(2) Proposed 5-ft Type CM2 Sump Dis	3	3	18" RCP lateral
P3	(2) Proposed 20-ft Type CM2 Dis	15	15	18" RCP North, 36" RCP South Lateral
P3A	Proposed 36" RCP	30	30	18" RCP North, 48" RCP South Lateral
P3B	(2) Proposed 20-ft Type CM2 Dis	13	14	
P3C	Proposed 48" RCP	128	137	
P3D	Proposed 48" RCP	218	223	
P4	(2) Proposed 5-ft Type CM2 Dis	4	4	18" RCP North, 30" RCP South Lateral
P4A	Proposed 48" RCP	262	267	
P5	(2) Proposed 7.5-ft Type CM2 Dis	14	12	24" RCP North, 18" RCP South Lateral
P5A	Proposed 48" RCP	292	295	
P5B	(2) Proposed 5-ft Type CM2 Nuisance Dis	Nuisance	Nuisance	
P5C	Proposed 54" RCP	292	295	
P6	(2) Proposed 17.5-ft Type CM2 Sump Dis	51	39	42" RCP laterals
P6A	Proposed 66" RCP	387.5	375	
P7	(2) Proposed 5-ft Type CM2 Dis	3	3	18" RCP laterals
P7A	Proposed 36" to 42" RCP Transition	88	84	
P7B	(2) Proposed 5-ft Type CM2 Dis	2	2	18" RCP laterals (West Inlet Provided as Nuisance)
P7C	Proposed 42" RCP	90	86	
P8	(2) Proposed 5-ft Type CM2 Nuisance Dis	Nuisance	Nuisance	18" RCP laterals
P8A	Proposed 18" RCP	Nuisance	Nuisance	
P9	(2) Proposed 7.5-ft Type CM2 Dis	3	4	36" RCP West, 18" RCP East Lateral
P9A	Proposed 36" RCP	62	71	
P11 thru P14	(4) Proposed 15-ft Type CM2 Dis	Varies	Varies	Tie into Facility X4
P15	Proposed 7.5-ft Type CM2 DI	2.0	2.0	Tie into Facility X4
P16	Proposed 10-ft Type CM2 DI	2.0	2.0	Tie into Facility X4
P17	Proposed 12.5-ft Type CM2 DI	2.0	2.0	Tie into Facility X4
L2	Proposed 36" RCP	54	79	
L3	Proposed 30" RCP	32	19	
L5	Proposed 48" RCP	85	93	
L6	Proposed 30" RCP	40	40	
L7	Proposed 24" RCP	16	16	
L8	Proposed 24" RCP	17	17	
L9	Proposed 36" RCP	27.5	24	
L10	Proposed 36" RCP	85	81	
L12	Proposed 36" RCP	59	67	
L13	Proposed 36" RCP	27.5	24.0	

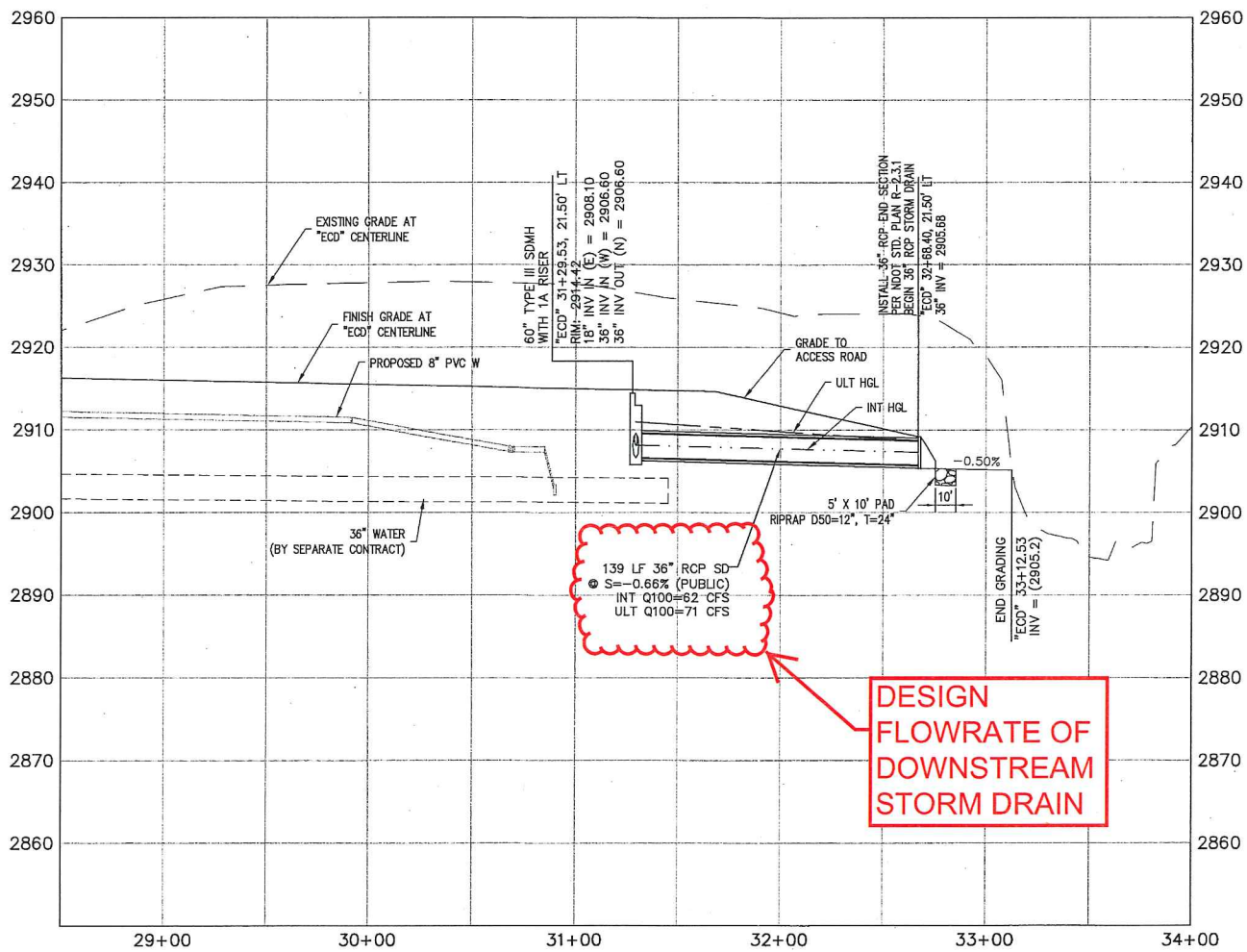
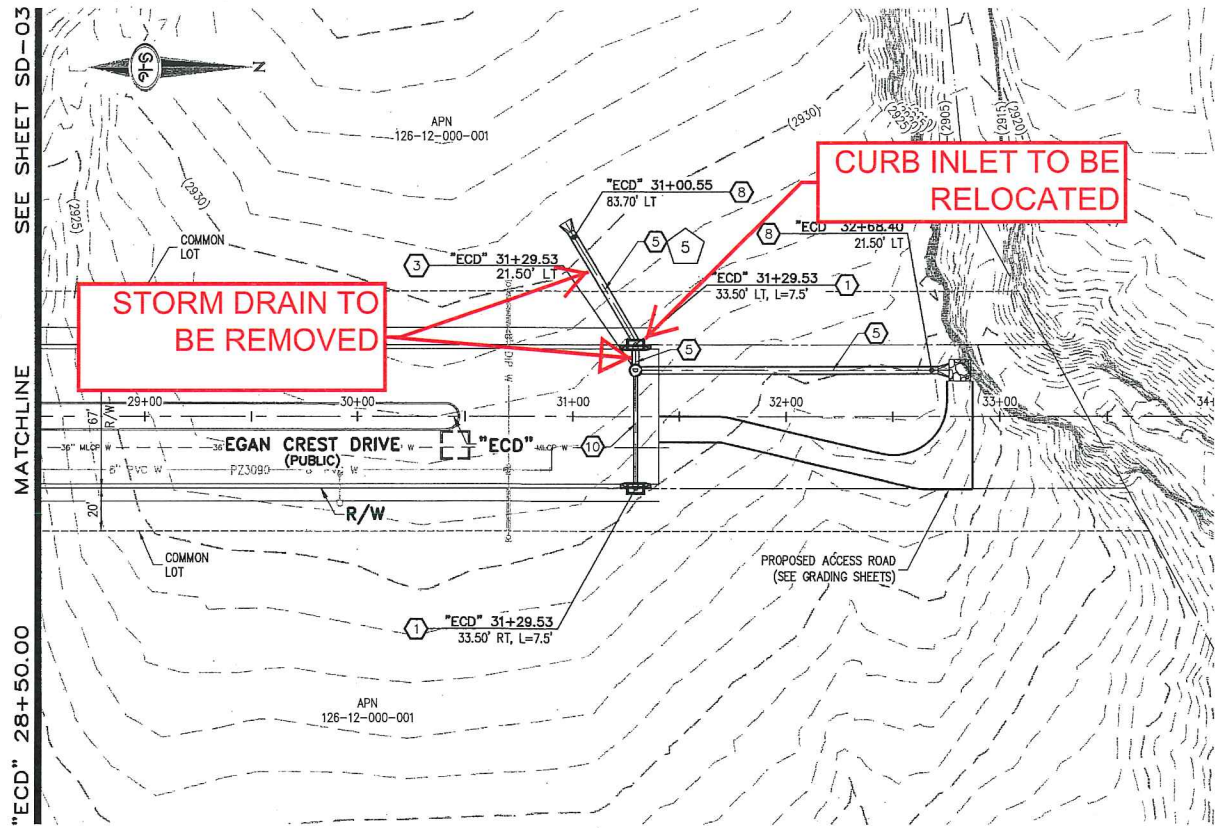
1 - "L" denotes proposed lateral stub
2 - "P" denotes a proposed facility
3 - "X" denotes an existing facility
4 - "Q" in Bold denotes design flow rate

NO.	DESCRIPTION	DATE	BY	APP.

NINETY-FIVE MANAGEMENT, LLC.
SKYE CANYON - PHASE 2 INFRASTRUCTURE UPDATE NO.2
STORM DRAIN SCHEMATIC MAP

DATE: MAY 2016
DRAFTER: ETM
DESIGNER: ETM
CHECKED: SOA
PROJECT NO.
OLY1501.001

Improvement Plan Sheets



- ### STORM DRAIN NOTES
1. CONSTRUCT TYPE "CM2" DROP INLET (USDCCA STD. DWG. NO. 412.1)
 2. CONSTRUCT 60" TYPE III MANHOLE (USDCCA STD. DWG. NO. 406.1)
 3. CONSTRUCT 60" TYPE III MANHOLE WITH TYPE IA RISER (USDCCA STD. DWG. NO. 404.1 AND 406.1)
 4. INSTALL 18" RCP (USDCCA STD. DWG. NO. 503.2)
 5. INSTALL 36" RCP (USDCCA STD. DWG. NO. 503.2)
 6. INSTALL 42" RCP (USDCCA STD. DWG. NO. 503.2)
 7. INSTALL 48" RCP (USDCCA STD. DWG. NO. 503.2)
 8. INSTALL 36" RCP END SECTION (NDOT STD. PLAN R-2.3.1)
 9. INSTALL 48" RCP END SECTION (NDOT STD. PLAN R-2.3.1)
 10. INSTALL 18" WATER QUALITY PVC (C905)

- ### NOTES
1. ALL RCP SHALL BE CLASS III UNLESS OTHERWISE SHOWN.
 2. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF DI OR RCB/RCA.
 3. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
 4. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
 5. ALL PIPES ARE PUBLICLY MAINTAINED.
 6. SPECIAL INSPECTION REQUIRED FOR PIPE SEGMENTS WITH SACRIFICIAL CONCRETE.

DROP INLET NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE:
CAST-IN-PLACE MONOLITHIC POUR WITH WATERSTOP BETWEEN SLAB AND WALLS. BASE, WALLS AND TOP TO BE CONSTRUCTED WITH WATERSTOP, CENTER BULB, OR FLAT STRIP (VINYLEX, GREENSTREAK PLASTIC PRODUCTS OR APPROVED EQUAL).

LEGEND

1 STORM DRAIN LATERAL # (SEE SHEET SD-05)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4739A ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT.

JERRY SLATER, P.E. 14167 5/1/16 DATE

FLOOD ZONE

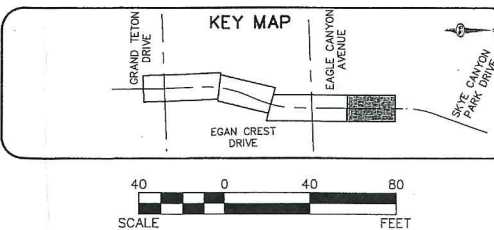
THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL 320003C1750E, DATED SEPTEMBER 27, 2002.

NOTE:

PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION.

APPROVED FOR CONSTRUCTION

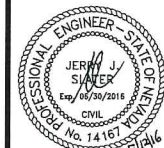
LVVWD ENGINEERING SERVICES MANAGER PROJECT NO. XXXXXXXX DATE



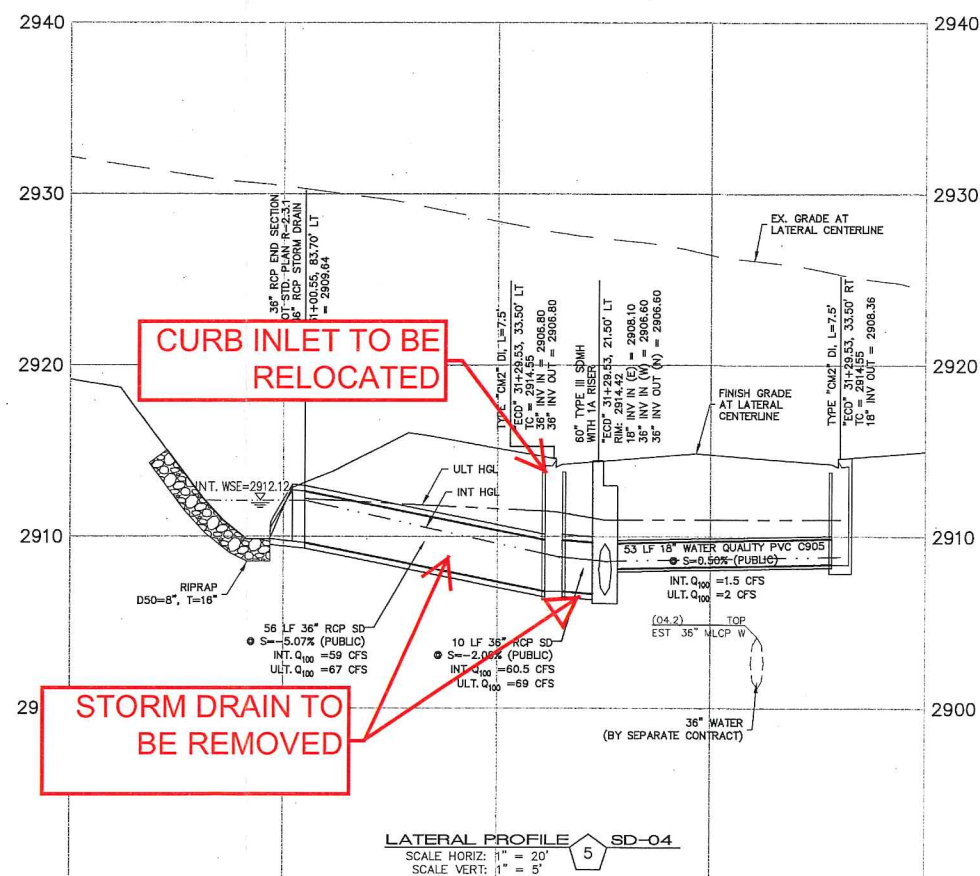
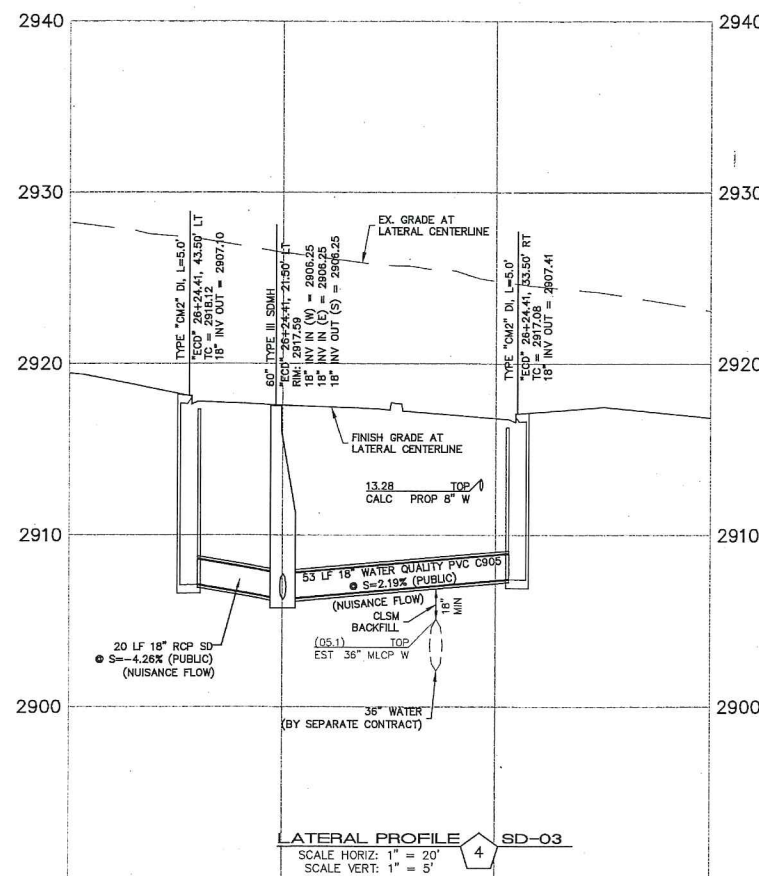
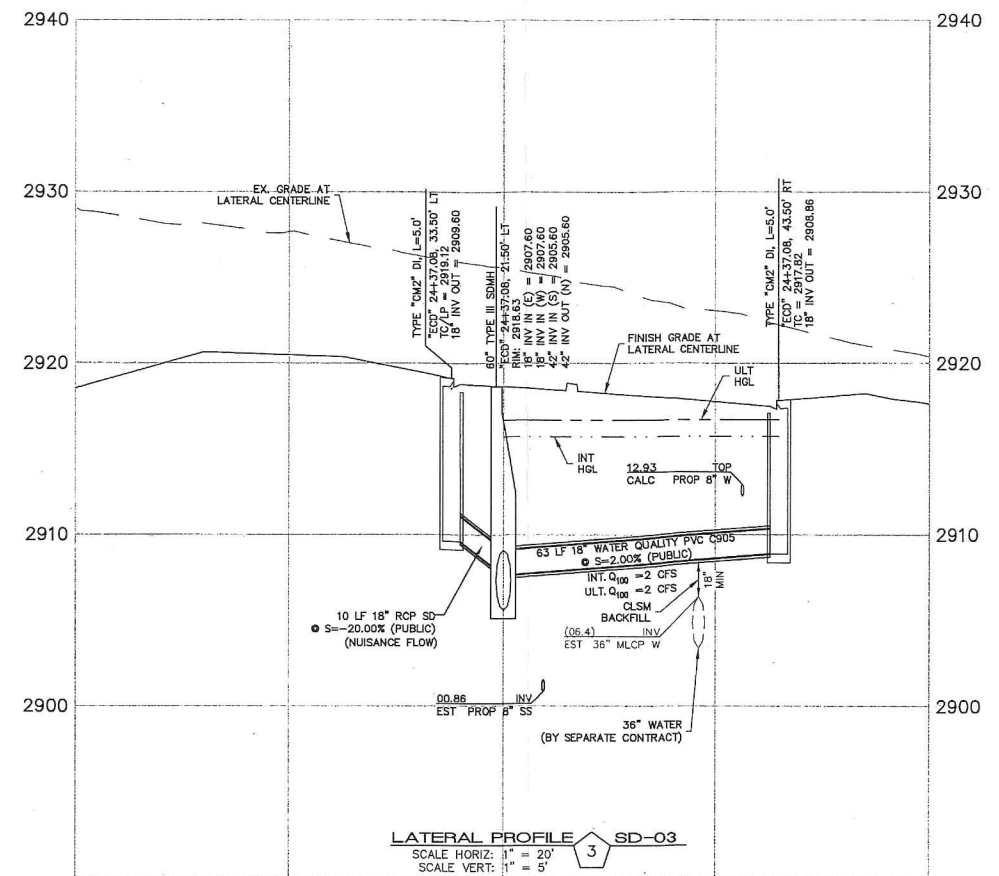
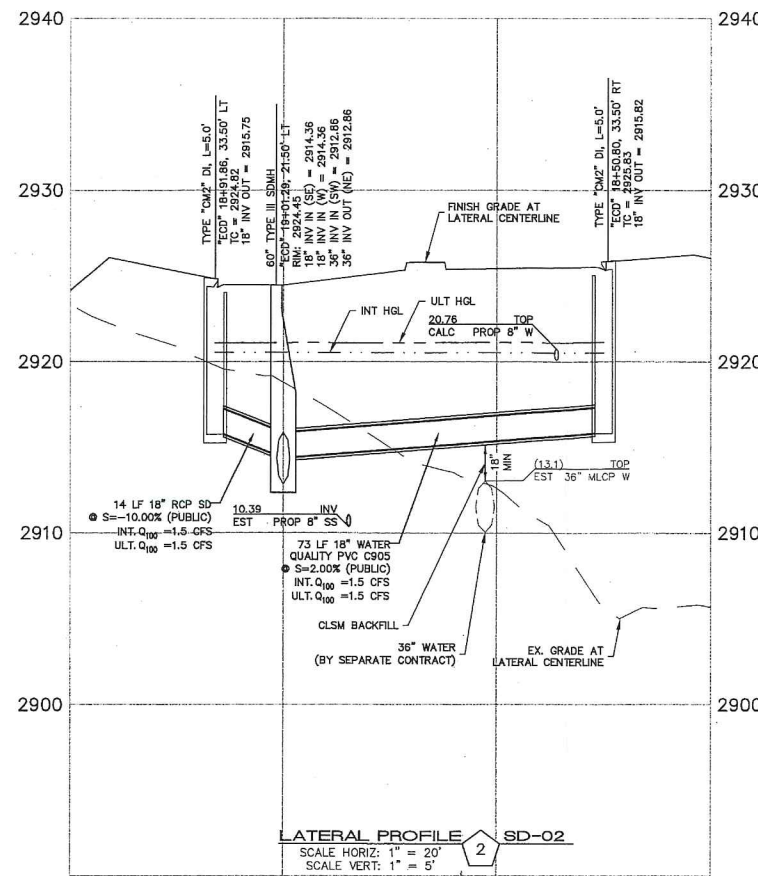
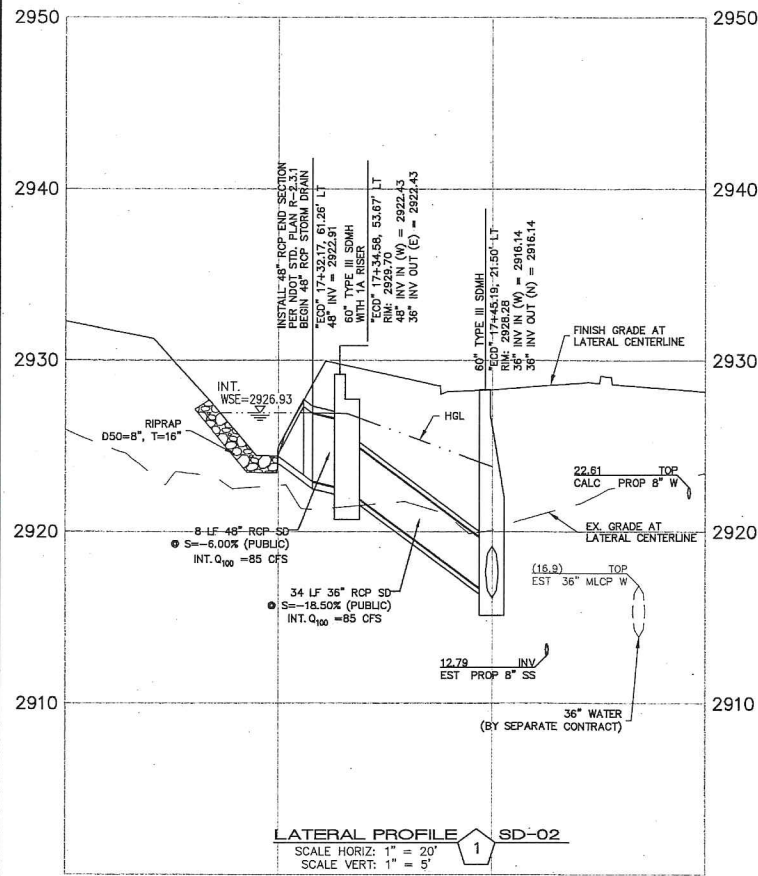
SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 384-5300 FAX (702) 284-5399

NINETY-FIVE MANAGEMENT LLC
SKYE CANYON PHASE 2
EGAN CREST DRIVE
STORM DRAIN PLAN AND PROFILE - "ECD" 28+50.00 TO "ECD" 34+00.00

DATE: 4/5/16
DRAFTER: DAM
DESIGNER: DAM
CHECKED: JSR
PROJECT NO. OLY1501-001



SD-04
SHEET 18 OF 29



DROP INLET NOTE
 WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE:
 CAST-IN-PLACE MONOLITHIC POUR WITH WATERSTOP BETWEEN SLAB AND WALLS. BASE, WALLS AND TOP TO BE CONSTRUCTED WITH WATERSTOPS, CENTER BULB OR FLAT STRIP (VINYLID, GREENSTREAK PLASTIC PRODUCTS OR APPROVED EQUAL).

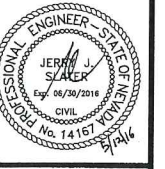
APPROVED FOR CONSTRUCTION

LYWIND ENGINEERING SERVICES MANAGER
 PROJECT NO. XXXXXX

DATE

NINETY-FIVE MANAGEMENT LLC
SKYE CANYON PHASE 2
EGAN CREST DRIVE
STORM DRAIN LATERAL PROFILES

DATE: 4/5/16
 DRAFTER: JAS
 DESIGNER: DAM
 CHECKED: JSR
 PROJECT NO.
OLY1501-001

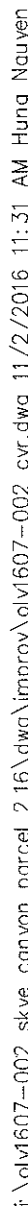
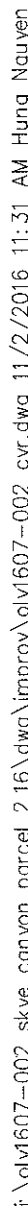


SD-05
 SHEET 19 OF 29

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
 5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
 PHONE (702) 284-5300 FAX (702) 284-5399

APPENDIX G

CD of Electronic Files and Improvement Plans



IMPROVEMENT PLANS FOR SKYE CANYON PARCEL 2.16

CITY OF LAS VEGAS, NEVADA
RESIDENTIAL SUBDIVISION
 A PORTION OF APN: 126-12-000-001



SHEET INDEX

NO	Sheet Description	Sheet Title
1	C-1	COVER SHEET
2	C-2	GENERAL NOTES
3	C-3	GENERAL NOTES AND QUANTITIES
4	C-1	GRADING PLAN I
5	G-2	GRADING PLAN II
6	C-3	GRADING PLAN III
7	G-4	GRADING PLAN IV
8	D-1	STREET SECTIONS AND GRADING DETAILS I
9	D-2	GRADING DETAILS II
10	P-1	10 ~ PLAN AND PROFILE ~ EGAN CREST STORM DRAIN
11	P-2	11 ~ PLAN AND PROFILE ~ SKYE ARROYO ST 15+00 TO 20+50

APPROVALS

CITY ENGINEER—ALLEN PAVELKA PE, #9029 DATE

APPROVAL OF THESE PLANS BY THE CITY ENGINEER IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED OF RIGHT-OF-WAY, AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIALLY LISTED UNDER DEVIATIONS FORM STANDARDS. THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN DEVIATIONS FROM STANDARDS IN FAVOR OF THE UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS, CLARK COUNTY AREA, NEVADA.

LAS VEGAS FIRE AND RESCUE DATE

CHRIS KNIGHT, DIRECTOR BUILDING AND SAFETY	DATE
THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.	

CENTRAL TELEPHONE CO. DBA CENTURYLINK

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 MANAGER
PROJECT NO. ##### DATE: _____
SHEETS: _____

APPROVAL BY THE FIRE DEPARTMENT HAVING JURISDICTION IS REQUIRED PRIOR TO OBTAINING FINAL APPROVAL FROM LAS VEGAS VALLEY WATER DISTRICT.

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	DATE
---------------	------

OWNER/DEVELOPER

K.A.G. LLC / NINETY-FIVE MANAGEMENT LLC
11411 SOUTHERN HIGHLANDS #300
LAS VEGAS, NV 89118
PH: 702-220-6565
FX: 702-220-6566
CONTACT: BOBBY WILLIAMSON

ENGINEER

SLATER HANIFAN GROUP, INC.
5740 S. ARVILLE STREET, SUITE 216
LAS VEGAS, NV 89118
PH: (702) 284-5300
FX: (702) 284-5399
CONTACT: TIM MULROONEY

LEGAL DESCRIPTION

BEING A PORTION OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST
M.D.M., CLARK COUNTY, NEVADA.

BENCHMARK

PROJECT DATUM:
BM 7LV90 7NWS CITY OF LAS VEGAS RIVET AND ROUND PLATE IN
CONCRETE CYLINDER, SOUTHEAST CORNER OF HUALAPAI WAY AND
IRON MOUNTAIN ROAD.

ELEV: 2840.13 FEET (865.67 METERS) (NAVD 1988)

BASIS OF BEARINGS

SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE ¼) OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., AS PER FILE 151, PAGE 14 OF SURVEYS. ON FILE IN THE COUNTY RECORDER'S OFFICE.

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1750 E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

PROJECT INFORMATION

ACREAGE (GROSS):	= 17.09 AC
ACREAGE (NET):	= 15.93 AC
DENSITY (LOTS/NET ACRE):	= 4.14 DU/NET AC
ZONING:	= T-D
TOTAL NO. OF RESIDENTIAL LOTS	= 66
TOTAL NO. OF COMMON ELEMENTS	= 7
MINIMUM LOT SIZE	= 5,799 SF±
MAXIMUM LOT SIZE	= 9,734 SF±
PROVIDED OPEN SPACE	= 143,310 SF±

EARTHWORK SUMMARY (UNADJUSTED)

CUT	268,984 CY.
FILL	663 CY.
NET	268,321 CY.

GEOTECHNICAL ENGINEER

PREPARED BY: GEOTEK RESIDENTIAL, LLC
ADDRESS: 6835 S. ESCONDIDO ST. SUITE B LAS VEGAS, NEVADA 89119
PHONE: 702-897-1424
PROJECT No. 12208-LVR
DATED: 02/08/2015 UPDATED 03/30/2016

SWPPP NOTE

NOTE: ALL LAND SURFACE AREA DISTURBANCES OVER 1 ACRE REQUIRE A STORMWATER DISCHARGE PERMIT ISSUED BY THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION (NDEP). A PHASED CONSTRUCTION UNIT IN A CONTIGUOUS SUBDIVISION IS CONSIDERED UNDER CONSTRUCTION UNTIL ALL STOPPED 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: WWW.STATE.NV.US/BWPC/STORM1.HTM PROJECTS THAT DISTURB MORE THEN ONE ACRE OF LAND MUST SUBMIT TO NDEP A "NOTICE OF INTENT" FOR INCLUSION UNDER STORMWATER PERMIT NO. NVR100000 ALONG WITH THE APPROPRIATE FILING FEE.

FAST

 **Call before you dig**

Underground

1-702-432-5300

FREeway & ARTERIAL SYSTEMS OF TRANSPORTATION (F.A.S.T.)

**AVOID HITTING OVERHEAD
POWER LINES. IT'S
COSTLY.**

**CALL BEFORE
YOU DO
OVERHEAD**



1-702-227-2922

Call before you Dig
 AVOID CUTTING UNDERGROUND
 UTILITY LINES. IT'S COSTLY.

Call

 OR
 1-800-227-2600

S-I-G **SLATER**
HANIFAN
GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

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CITY OF LAS VEGAS

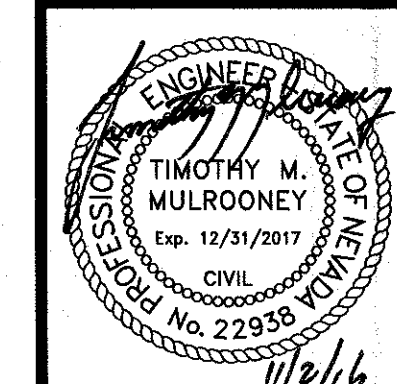
NINETY FIVE MANAGEMENT, LLC

SKYE CANYON PARCEL 2.16

COVER SHEET

THIS DOCUMENT IS THE PROPERTY OF THE CITY OF LAS VEGAS AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT PERMISSION FROM THE CITY OF LAS VEGAS.

S12 T19 R59	
DATE:	10/28/16
DRAFTER:	HN
DESIGNER:	HN
CHECKED:	TMM
PROJECT NO.	OLY1607-002



C-1
SHEET 1 OF 11

STORMWATER RUNOFF MANAGEMENT

(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 ACCUMULATE IN, THE PUBLIC RIGHTS OF WAYS 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 TITLE 24-40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES 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 NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVRI00000, 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 ANY ACTUAL 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 NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVRI00000, 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.

LEGAL DESCRIPTION

BEING A PORTION OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST M.D.M., CLARK COUNTY, NEVADA.

BENCHMARK

PROJECT DATUM:

BM 7LV9D 7NWS CITY OF LAS VEGAS RIVET AND ROUND PLATE IN CONCRETE CYLINDER SOUTHEAST CORNER OF HUALAPAI WAY AND IRON MOUNTAIN ROAD.

ELEV: 2840.13 FEET (865.67 METERS) (NAVD 1988)

BASIS OF BEARINGS

SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE ¼) OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., AS PER FILE 151, PAGE 14 OF SURVEYS, ON FILE IN THE COUNTY RECORDER'S OFFICE.

2.2 CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS, ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "C" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE I AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS, STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE (12") DIAMETER. CONNECTIONS TO FIFTEEN (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" "S" SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

LVVWD PROJECT # #####

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION FOR FUTURE INSPECTIONS. NOTICE MUST BE GIVEN BY 2:00 P.M. BUSINESS DAY PRIOR TO THE START OF CONSTRUCTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE 2010 EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS), THE LATEST EDITION OF UDACS SHALL SUPERSEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB CUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS.
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED, AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOW. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVWD) MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.

ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ADJUTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.

GRADING NOTES

1. INDICATED GRADES OTHER THAN T.C., F.G. & GUTTER F.L. ARE ROUGH GRADES.
2. THE ROUGH GRADING PLANS SHALL BE ON THE JOB SITE AT ALL TIMES. THE ROUGH GRADING SHALL BE FINISHED IN CONFORMANCE WITH THE LINES AND GRADES SHOWN ON THE PLANS. THE GRADING QUANTITIES ARE BASED ON THE ELEVATION AND DETAILS SHOWN ON THE PLANS. ANY DEVIATIONS FROM THE PLANS WILL RESULT IN QUANTITY CHANGES.
3. CARE SHALL BE EXERCISED IN GRADING CORNER LOTS.
4. ROUGH PAD ELEVATIONS SHALL BE GRADED TO WITHIN 0.1' OF THE PAD ELEVATIONS SHOWN ON THE PLANS. WHEN GRADING IS COMPLETE PER THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE LOTS CAN BE INSPECTED. AT THAT TIME THE ENGINEER SHALL ALSO DECIDE IF ANY ADDITIONAL DITCHES OR BERMS ARE REQUIRED. THE CONTRACTOR IS REQUESTED NOT TO REMOVE ANY OF HIS ROUGH GRADING EQUIPMENT UNTIL HE RECEIVES GRADING APPROVAL FROM THE ENGINEER.
5. SOILS REPORT PREPARED BY GEOTEK RESIDENTIAL, LLC, PROJECT NO. 12208-LVR, DATED 02/09/2015. UPDATED 03/30/2016 BY GEOTEK RESIDENTIAL, LLC
6. EARTHWORK QUANTITIES (RAW):
 - CUT = 268,994 CUBIC YARDS.
 - FILL = 663 CUBIC YARDS

A) THE ABOVE QUANTITIES DO NOT REFLECT LOSSES DUE TO SUBSIDENCE OR SHRINKAGE.
B) THE ABOVE QUANTITIES DO REFLECT USING NATIVE MATERIAL IN LIEU OF TYPE I GRAVEL BASE MATERIAL FOR STREET SECTIONS.
C) THE ABOVE QUANTITIES DO NOT REFLECT ANY EARTHWORK WHICH MAY BE REQUIRED BY THE ENGINEER TO CONSTRUCT ADDITIONAL PROTECTIVE DITCHES OR BERMS NOT SHOWN ON THESE DRAWINGS.

CITY OF LAS VEGAS FIRE AND RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE # 6325, FOR HYDRANT SPECIFICATIONS, AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICTS - **APPROVED PRODUCTS LIST** ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR ALL INSTALLATION OF ON-SITE WATER LINES, AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK [FC 105.7.12]
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED CLEAR OF THE MOUTH OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [FC 3310, 3312]
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [FC 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [FC 105.3]
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A. APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [FC 507.2.1, NFPA 24]
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [FC 507]
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. [FC 507.5.7.1]
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [FC 507]
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: [FC C102]
 - RESIDENTIAL - 500 FT UNSPRINKLED; 600 FT SPRINKLED.
 - COMMERCIAL - 300 FT UNSPRINKLED; 400 FT SPRINKLED.
12. WHERE NEW WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT MAXIMUM OF 1,000 FOOT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS, WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. [FC C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FEET OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [FC C102.12]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. [FC C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. [FC C102.7]
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [FC C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE ARE 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [FC C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [FC 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FEET PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. [FC 503.2.7, 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FEET OUTSIDE AND 28 FEET INSIDE TURNING RADIUS. [FC 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13 FT 6 INS. [FC 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FT, FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FT WIDE, FLOW LINE TO FLOW LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD. NOT LESS THAN 24 FT WIDE, FLOW LINE TO FLOW LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LINES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. [FC 503.2.1.1]
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. THE DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS SPRINKLERED. [FC 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROW(S) WITH DEAD-ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR EXCEEDING 62,000 SQUARE FEET IN AREA. [FC 503.1.2]
26. ALL DEAD-END FIRE APPARATUS LINES AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. [FC 503.2.5]
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE. ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 120 FEET ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FEET OR LESS THAN 6 FEET FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. [FC 503.3]
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE IFC 503.6 AND IFC APPENDIX M.

2.5 CITY OF LAS VEGAS GRADING NOTES

1. IN THE EVENT THAT ANY UNFORESEEN CONDITIONS NOT COVERED BY THESE NOTES ARE ENCOUNTERED DURING GRADING OPERATIONS, THE OWNER/ENGINEER SHALL BE IMMEDIATELY NOTIFIED FOR DIRECTION.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM ALL NECESSARY CUTS AND FILLS WITHIN THE LIMITS OF THIS PROJECT AND THE RELATED OFF-SITE WORK, SO AS TO GENERATE THE DESIRED SUBGRADE, FINISH GRADES AND SLOPES SHOWN.
3. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ALL EXCAVATION, ADEQUATE SHORING SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR TO PREVENT UNDERMINING OF ANY ADJACENT FEATURES OR FACILITIES AND/OR CAUSING THE CAUTION.
4. THE CONTRACTOR IS WARNED THAT AN EARTHWORK BALANCE WAS NOT NECESSARILY THE INTENT OF THIS PROJECT. ANY ADDITIONAL MATERIAL REQUIRED OR LEFTOVER MATERIAL FOLLOWING EARTHWORK OPERATIONS BECOMES THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE GRADING CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE OWNER TO PROVIDE FOR THE REQUIREMENTS OF THE PROJECT STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND ASSOCIATED PERMIT.
6. CONTRACTOR SHALL GRADE TO THE LINES AND ELEVATIONS SHOWN ON THE PLANS WITHIN THE FOLLOWING HORIZONTAL AND VERTICAL TOLERANCES AND DEGREES OF COMPACTION, IN THE AREAS INDICATED:

	HORIZONTAL	VERTICAL COMPACTION	
A. PAVEMENT AREA SUBGRADE	0.1"	+0.0' TO -0.1'	SEE SOILS REPORT
B. ENGINEERED FILL	0.5"	+0.1' TO -0.1'	SEE SOILS REPORT

COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.
7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
8. THE USE OF POTABLE WATER WITHOUT A SPECIAL PERMIT FOR BUILDING OR CONSTRUCTION PURPOSES INCLUDING CONSOLIDATION OF BACKFILL OR DUST CONTROL IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.
9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT-OF-WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. ADJACENT PROPERTY, PRIVATE OR PUBLIC SHALL BE MAINTAINED IN A CLEAN, SAFE AND USABLE CONDITION.
10. IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.

2.1 CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE, THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS, EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROVED AND FORWARDED FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF CONSTRUCTION. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCES WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE UP OF ALL CUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY GEOTEK RESIDENTIAL, LLC, REPORT 12208-LVR, 02/09/2015, APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SANCTUARY LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS CIVIL ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATION.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS CUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.
16. WALL NOTES:
17. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC., TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC., THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
21. SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE CITY AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. THE LOCATION SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE OFFICIAL HORIZONTAL AND VERTICAL CONTROL NETWORKS OF THE CITY OF LAS VEGAS. FINAL LOCATION MAPS MUST BE SEALED AND CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINIES OF 40.09 METERS (130.3 FEET) HORIZONTALLY AND VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).
- OR
- SANITARY SEWER AND STORM DRAIN FACILITIES SHOWN ON THESE PLANS SHALL BE USED TO MEET THE REQUIREMENTS OF NRS 455 AND SHALL SHOW AT A MINIMUM THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC MANHOLES, STORM DRAIN MANHOLES, STORM DRAIN LATERALS, AND THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY. ANY DEVIATIONS FROM THE INFORMATION SHOWN SHALL BE NOTED AND SUBMITTED AS A REVISION TO THE PLANS AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION.
22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST EDITION.
23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

UTILITY LOCATION NOTE TO CONTRACTOR

EXISTING UTILITY LOCATIONS SHOWN HEREIN 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 OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS. CALL BEFORE YOU DIG: 1 (800) 227-2600

DEVIATIONS FROM STANDARDS

NONE

2.3 CITY OF LAS VEGAS TRAFFIC NOTES

1. ALL CONSTRUCTION SIGNS, BARRICADE, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.
2. THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.
3. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING CITY STREETS WHERE WARRANTED IMMEDIATELY AFTER FIRST GRADING WORK IS COMPLETED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
4. WHEN A DESIGNATED "SAFE ROUTE TO SCHOOL" IS ENCROACHED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO BE ASSISTED IN THE SAFE CROSSING THROUGH THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A QUALIFIED "CROSSING GUARD". THE GUARD SHALL BE PRESENT FOR THE FULL DURATION OF TIME THAT CHILDREN ARE LIKELY TO BE PRESENT.
5. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW TRAFFIC SIGNS SHALL BE FABRICATED WITH DIAMOND GRADE V.P. CLASS A REFLECTIVE SHEETING OR APPROVED EQUAL. ALL NEW TRAFFIC SIGNS, EXCEPT STREET NAME AND SCHOOL SPEED LIMIT SIGNS, SHALL HAVE 3M SERIES 1160 OR APPROVED EQUIVALENT ANTI-GRAFFITI PROTECTIVE OVERLAY FILM. SCHOOL ZONE SIGNS SHALL HAVE 3M SERIES 1150 ANTI-GRAFFITI PROTECTIVE OVERLAY FILM. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THESE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT CITY STANDARDS.
7. WHEN A PROPOSED STREET LIGHT STANDARD IS LOCATED WITHIN FIVE (5) FEET OF ANY PROPOSED SIGN SHOWN ON THE PLANS TO BE MOUNTED ON A SIGNPOST, THE SIGN SHALL BE MOUNTED ON THE STREET LIGHT STANDARD AND THE SIGNPOST SHALL BE ELIMINATED.
8. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ON THE PORTIONS OF THE ROAD(S) HAVING A CERTIFIED ATSSA TRAFFIC CONTROL, TECHNICIAN OR MSA WORK ZONE SAFETY SPECIALIST SET UP, MAINTAIN AND/OR REMOVE ALL TRAFFIC CONTROL DEVICES IN THE CITY OF LAS VEGAS RIGHT OF WAY.
11. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE EXPEDITED TO COMPLETION SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING CITIZENS AREA TRANSIT (C.A.T.) IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP OR HAS AN ADVERSE EFFECT ON BUS SERVICE ON THAT STREET TO ARRANGE FOR TEMPORARY RELOCATION OF STOP.
13. GUARDS SHALL BE OBTAINED BY CONTACTING THE METROPOLITAN POLICE DEPARTMENT SPECIAL EVENTS UNIT (PHONE # 828-3442) WHO WILL PROVIDE OFFICERS PROPERLY TRAINED IN TRAFFIC CONTROL TO BE SET UP AT THE LOCATION OF THE CONSTRUCTION. THE CITY OF LAS VEGAS WILL BE PAID BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR ALL ARRANGEMENTS WITH METRO.
14. ANY WORK WITHIN 300' OF A SIGNALIZED INTERSECTION WILL BE NIGHT WORK, UNLESS OTHERWISE DIRECTED BY THE CITY OF LAS VEGAS TRAFFIC ENGINEER.
15. THE CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEERING DIVISION (TRANSPORTATION SECTION) THROUGH THE PROJECT'S OFFSITE INSPECTOR PRIOR TO INITIATING PAVING TO RECEIVE DIRECTION FOR ANY PERMANENT OR TEMPORARY MODIFICATIONS TO THE APPROVED DRAWINGS REGARDING FINAL PAVEMENT TRANSITIONS, MARKINGS AND SIGNING. MARKINGS ARE REQUIRED TO MATCH ADJACENT ROADWAY SEGMENTS. THE CONTRACTOR SHALL PROVIDE A DRAWING FOR APPROVAL BY THE TRAFFIC ENGINEERING DIVISION DEPICTING ANY ADJUSTMENTS TO THE FINAL PAVEMENT MARKINGS AND SIGNING, WHICH MAY INCLUDE OMITTING, ADDING OR MODIFYING PAVEMENT MARKINGS AND TRAFFIC CONTROL SIGNS SUCH THAT ADEQUATE TRANSITIONS AND LANE TERMINATIONS BETWEEN ADJACENT ROADWAY SEGMENTS ARE CONSTRUCTED.

2.4 CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND ANY ADOPTED SPECIAL AREA STANDARDS.
2. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF TRAFFIC ENGINEERING AND THE CITY ENGINEER.
3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION.
4. ALL STREET LIGHTING CONDUITS STUB SHALL HAVE AT LEAST ONE GREEN #10 THW WIRE INSTALLED, AS TRACER WIRE. WHEN "EMPTY" CONDUIT IS COMPLETELY INSTALLED FROM PB TO PB, IT SHALL HAVE MINIMUM OF 2 #4 AND 1 #8 THW WIRE WITH THE ENDS TAPPED OR "SAFE OFF" PRIOR TO FINAL INSPECTION.
5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN ACCORDANCE WITH THE USD NO. 320A.
6. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TEFD PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
7. SERVICE POINT SHALL BE COORDINATED WITH NV ENERGY COMPANY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE CIVIL PLANS.
8. IT SHALL BE ASSUMED THAT IN THE ABSENCE OF AN EXISTING, WORKABLE CIRCUIT TO ATTACH TO, ALL INSTALLATIONS SHALL REQUIRE A NEW SERVICE FOR OPERATION OF THE CIRCUIT.
9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREET LIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED, AT NO EXPENSE TO THE CITY OF LAS VEGAS, BEFORE STREETLIGHT BASES ARE INSTALLED.
10. THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.
11. THE DEVELOPER/OWNER WILL BE REQUIRED TO SUPPLY POWER TO ALL NEW PUBLIC STREET LIGHTS INSTALLED UNDER THIS DESIGN PRIOR TO BOND RELEASE OR PROJECT COMPLETION. THE DEVELOPER/OWNER WILL BE RESPONSIBLE FOR ALL ITEMS ASSOCIATED WITH THE INSTALLATION, CONSTRUCTION, ENERGIZING, MAINTENANCE AND OPERATIONAL COST OF SAID STREET LIGHTS PRIOR TO PROJECT COMPLETION. REFER TO THE PLAN FOR ANY NEW SERVICE REQUIREMENTS. THE TRANSFER OF OWNERSHIP FROM THE DEVELOPER/OWNER TO THE CITY OF LAS VEGAS FOR ALL NEW STREET LIGHTS AND/OR SERVICE SHALL BE INSTALLED UNDER THIS PLAN DESIGN WILL BE IN CONJUNCTION WITH THIS PROJECT COMPLETION. COORDINATE ALL MAINTENANCE AND OPERATIONAL TRANSFERS WITH THE CITY OF LAS VEGAS TRAFFIC ENGINEERING DEPARTMENT (TEFD) AT (702) 222-6331.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER

DATE _____ PROJECT No. #####
LVVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL



NO.	DESCRIPTION	DATE	BY	APP. DATE

CITY OF LAS VEGAS

NINETY FIVE MANAGEMENT, LLC

SKYE CANYON PARCEL 2.16

GENERAL NOTES

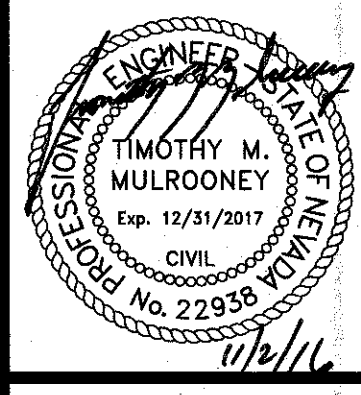
DATE: 10/28/16

DRAFTER: HN

DESIGNER: HN

CHECKED: TMM

PROJECT NO.
OLY1607-002



AC	ASPHALTIC CONCRETE OR ACR	FUT	FUTURE	QTY	QUANTITY
AGG	AGGREGATE BASE	GRO	GRADE OR GROUND	R	RADIUS
APN	ASSESSORS' PARCEL NUMBER	GB	GRADE BREAK OR GRADE CHANGE	RCA	REINFORCED CONCRETE ARCH
APPROX OR ~	APPROXIMATE	GV	GRADE VALVE	ROB	REINFORCED CONCRETE BOX
AVE	AVENUE	HDE	HIGH DENSITY POLYETHYLENE	RCP	REINFORCED CONCRETE PIPE
B	AT	HOA	HOME OWNERS ASSOCIATION	ROD	ROAD
BC	BEGIN CURVE OR BACK OF CURB	HORIZ	HORIZONTAL	ROW	ROADWAY EASEMENT
BE	BEGINNING OF CURB RETURN	HIP	HIGH POINT	REQD	REQUIRED
BHW	BOTTOM OF HEADWALL	HML	HIGH WATER LEVEL	REV	REVISION
BLDG	BUILDING	HDWL OR HW	HEADWALL	RO	ROUGH GRADE
BLVD	BOULEVARD	HYD	HYDRAULIC OR HYDRANT	ROT OR R	RIGHT
BM	BENCHMARK	ID	INSIDE DIAMETER	R/T, ROW	RIGHT OF WAY
BVC	BEGIN VERTICAL CURVE	INCH	INCH	S	SLOPE
CCW	BACK WATER VALVE	INT	INTERSECTION	SD	SCHEDULE
CL	CLARK COUNTY	INV	INVERT ELEVATION	SOD	STORM DRAIN
CLAUD	CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS	IRG	IRRIGATION	SDOI	STORM DRAIN DROP INLET
CCPW	CLARK COUNTY PUBLIC WORKS	IRP	IRRIGATION	SMH	STORM DRAIN MANHOLE
CCFCD	CLARK COUNTY REGIONAL FLOOD DISTRICT	IRRG	IRRIGATION	SEC	SECTION
CLC	CLARK COUNTY WATER RECLAMATION DISTRICT	LF	LINEAR FEET	SEC	SECTION
CLW	CLARK COUNTY WATER RECLAMATION DISTRICT	LP	LOW POINT	SF	SQUARE FEET
CLW	CLARK COUNTY WATER RECLAMATION DISTRICT	LEFT OR L	LEFT	SHEET	SHEET
C/LC/LC	CENTERLINE	LVWD	LAS VEGAS VALLEY WATER DIST	SNWA	SOUTHERN NEVADA WATER AUTHORITY
CLR	CLEAR OR CLEARANCE	LWL	LOW WATER LEVEL	SPECS	SPECIFICATIONS
CLSM	CONTROLLED LOW STRENGTH MATERIAL	LXL	LOW WATER LEVEL	ST	STREET
CM	CONCRETE MASONRY UNIT	MAL	MAXIMUM	STW	SANITARY SENEER MANHOLE
CMU	CONCRETE MASONRY UNIT	MECH	MISCELLANEOUS	STD	STANDARD
CONC	CONCRETE	MH	MANHOLE	STA	STATION
CONC	CONCRETE	MIN	MINIMUM	STD	STANDARD
CO	COURT	MISC	MISCELLANEOUS	STL	STEEL OR STREET LIGHT
CY	CUBIC YARD	MISC	MISCELLANEOUS UTILITY EASEMENT	STL	STEELMAN
CO	COURT	NDOT	NEVADA DEPARTMENT OF TRANSPORTATION	SWG	SOUTHWEST GAS
DCWCS	DESIGN AND CONSTRUCTION FOR WASTEWATER COLLECTION SYSTEMS	NPC	NEVADA POWER COMPANY	SWR OR SS	SANITARY SEWER
DET	DETAIL	NPS	NOT TO SCALE	SWY	SQUARE YARD
DI	DUCTILE IRON OR DRAIN INLET	NUE	NON-EXCLUSIVE UTILITY EASEMENT	TAN	TANGENT
DIA, Ø	DIAMETER	OC	ON CENTER	TC	TOP OF CURB
DIP	DUCTILE IRON PIPE	OD	OUTSIDE DIAMETER OR OVERALL DIMENSION	TCO	TRAFFIC CONTROL DEVICE
DR	DRIVE	OF	OFFSET	TF	TOP OF FLOOR OR TOP OF FOOTING
DWG(S)	DRAWING	ORIG	ORIGINAL	TF	TOP OF GRADE OR TOP OF FOOTING
DWY	DRAINAGE	PAC	PUBLIC OR PEDESTRIAN EASEMENT	THRU	THROUGH
E	EACH	PB	PULL BOX	THW	TOP OF HEADWALL
EA	END CURB RETURN	PC	POINT OF CURVE	TP	TOP OF PIPE
EG	EXISTING GROUND	PCC	POINT OF COMPOUND CURVE	TP	TOP OF PIPE
EL	ELEVATION	PDE	PUBLIC DRAINAGE EASEMENT	TRW	TOP OF RETAINING WALL
ESMT	EASEMENT	R OR PL	PROPERTY LINE	TSW	TOP OF SCREEN WALL
EP	EDGE OF PAVEMENT	PDB	POINT OF BEGINNING	TYP	TYPICAL
EV	END VERTICAL CURVE	PDC	POINT OF CURVATURE	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
EXC	EXISTING	PDE	POINT OF ENDING	VC	VERTICAL CURVE
FC	FACE OF CURB	PRC	POINT OF REVERSE CURVATURE	VERT	VERTICAL
FF	FINISHED FLOOR	PRELIM	PRELIMINARY	VERT	VERTICAL
FH	FINISHED GRADE	PROP	PROPOSED	VG	VALLEY GUTTER
FGL	FINISHED GRADE, HIGH SIDE	PRV	PRESSURE REDUCING VALVE	WI	WROUGHT IRON
FGR	FINISHED GRADE, LOW SIDE	PL	PUBLIC UTILITY EASEMENT	WL	WATER LINE
FI	FIRE HYDRANT	PT	POINT OF TANGENT OR POINT	WPR	WATER PRESSURE ZONE
FL	FLOWLINE	PCV	POLYVINYL CHLORIDE	WT	WEIGHT
FT	FEET OR FOOT	PVC	POINT OF VERTICAL INTERSECTION	WZ	WATER LINE

IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED WHICH IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CLARK COUNTY DEPT. OF PUBLIC WORKS. TEMPORARY CONSTRUCTION ITEMS INCLUDE: PAVEMENT TRANSITIONS, PROTECTIVE DITCHES AND BERMS, ROAD SIGNS AND BARRICADES, ETC.

-QUANTITIES SHOWN ARE ESTIMATES ONLY AND ARE INTENDED TO ILLUSTRATE SCOPE OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXACT QUANTITIES INVOLVED.

EXISTING UTILITY LOCATIONS SHOWN HEREIN 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 OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS. CALL BEFORE YOU DIG: (800) 227-2600

EXISTING	PROPOSED	DESCRIPTION
		5' CONTOUR
		1" CONTOUR
		STRIPING
		SEWER MANHOLE
		CURB AND GUTTER
		SANITARY SEWER PIPE AND FLOW ARROW
		WATER PIPE
		WATER GATE VALVE
		FIRE HYDRANT
		WATER BLOW-OFF
		WATER LATERAL W/ METER
		SANITARY SEWER LATERAL
		STREETLIGHT
		EDGE OF PAVEMENT
		TRAFFIC SIGN
		PAD ELEVATION
		FINISHED FLOOR ELEVATION
		ELEVATION
		RETAINING WALL
		STORM DRAIN W/ MANHOLE
		EXISTING GAS GATE VALVE
		EXISTING UNKNOWN MANHOLE
		EXISTING GAS, SIZE PER PLAN
		EXISTING POWER POLE
		EXISTING TRAFFIC SIGNAL
		EXISTING WALL
		WATER PIPE FITTING
		WATER POINT OF CONNECTION
		SEWER POINT OF CONNECTION
		DAYLIGHT LINE
		STREET CENTERLINE
		RIGHT-OF-WAY
		MATCHLINE
		BOUNDARY LINE
		PHASE LINE
		PROPERTY LINE
		FLOWLINE
		SAWCUT
		CUT/FILL TRANSITION LINE
		SIDEWALK
		EX STRIPING TO BE OBLITERATED
		GRADE BREAK LINE
		REFLECTIVE RAISED PAVEMENT MARKERS
		BACK WATER VALVE
		WROUGHT IRON FENCE
		PONY WALL
		DECORATIVE PERIMETER WALL
		DECORATIVE PERIMETER RETAINING WALL
		PROPOSED CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB
		EXISTING CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB
		FUTURE CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB
		PROPOSED SCARP AREA
		DRIVEWAY
		PROPOSED RIP RAP
		SIGHT VISIBILITY ZONE PER STD DWS NO. 201.2
		HANDICAP RAMP

DRAINAGE				
1.	60" TYPE III STORM DRAIN MANHOLE	EA	--	1
2.	5.0" TYPE "CM2" DROP INLET	EA	--	--
3.	7.5" TYPE "CM2" DROP INLET	EA	--	1
4.	12.5" TYPE "CM2" DROP INLET	EA	--	--
5.	20.0" TYPE "CM2" DROP INLET	EA	1	--
6.	18" RCP CLASS IV STORM DRAIN	LF	--	--
7.	24" RCP CLASS IV STORM DRAIN	LF	--	--
8.	30" RCP CLASS IV STORM DRAIN	LF	51	43
9.	36" RCP CLASS IV STORM DRAIN	LF	--	--
10.	RIPRAP D50=8", THK=16"	SF	--	--
11.	8" WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	3537	--
12.	SIDEWALK UNDER DRAIN	SF	1	--
13.				
SEWER SYSTEM				
1.	4" PVC SEWER LATERAL (PRIVATE)	LF	--	--
2.	8" PVC SEWER PIPE (PUBLIC)	LF	--	--
3.	STANDARD 48" SEWER MANHOLE (PUBLIC)	EA	--	--
4.	8" SEWER PIPE CAP	EA	--	--
5.	BACK WATER VALVE	EA	--	--
6.	8" C-900 WATER QUALITY SEWER PIPE (PUBLIC)	EA	--	--
7.				
WATER SYSTEM				
1.	FIRE HYDRANT ASSEMBLY W/6" GATE VALVE PER UDACS PLATE NO. 40	EA	--	--
2.	6" PVC WATER PIPE (CLASS 150)	LF	--	--
3.	8" PVC WATER PIPE (CLASS 150)	LF	--	--
4.	8" DIP WATER PIPE (CLASS 53)	LF	--	--
5.	8" GATE VALVE WITH VALVE BOX PER UDACS PLATE NO. 30 & 39	EA	--	--
6.	8" x 6" TEE PER UDACS PLATE NO. 31	EA	--	--
7.	8" x 8" TEE PER UDACS PLATE NO. 31	EA	--	--
8.	8" 5 DEGREE BEND WITH RESTRAINED JOINTS	EA	--	--
9.	8" 11.25 DEGREE BEND PER UDACS PLATE NO. 31	EA	--	--
10.	8" 22.5 DEGREE BEND PER UDACS PLATE NO. 31	EA	--	--
11.	8" 45 DEGREE BEND PER UDACS PLATE NO. 31	EA	--	--
12.	8" 90 DEGREE BEND PER UDACS PLATE NO. 31	EA	--	--
13.	CAP AND 2" BLOW-OFF ASSEMBLY W/CAP PER UDACS PLATE NO. 36	EA	--	--
14.	1" COPPER SERVICE W/ 3/4" METER PER UDACS PLATE NO. 2	EA	--	--
15.	1" COPPER SERVICE W/ 1" METER PER UDACS PLATE NO. 4	EA	--	--
16.	1" COPPER SERVICE W/ 3/4" METER & 1" RPPA PER UDACS PLATE NO. 4 & 8	EA	--	--
		EA	--	--
STREET IMPROVEMENTS				
1.	2" A.C. PAVEMENT W/ 4" TYPE II OVER 6" TYPE I AGGREGATE BASE	SY	--	--
2.	STANDARD 18" TYPE "L" ISLAND CURB & GUTTER W/8" TYPE I AGGREGATE BASE	LF	--	--
3.	STANDARD 8" TYPE "A" ISLAND CURB W/6" TYPE I AGGREGATE BASE	LF	--	--
4.	STANDARD 30" TYPE "ROLL" CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	--	--
5.	4" WIDE CONCRETE SIDEWALK W/4" TYPE II AGGREGATE BASE	SF	--	--
6.				
7.				
TRAFFIC SIGNALS				
1.	30" STOP SIGN WITH POST (R1-1)	EA	--	--
2.	9" STREET NAME SIGN (D-3, BROWN W/ WHITE LETTERS)(6 POLES x 2 PER POLE=12)	EA	--	--
3.	BLUE COLORED REFLECTIVE RAISED PAVEMENT MARKER	EA	--	--
4.	CROSSWALK MARKINGS	LF	--	--
5.				
6.				
7.				
8.				
DRY UTILITIES				
1.	100W H.P.S. LUMINAIRE STREET LIGHT W/DECORATIVE POLE	EA	--	--
2.	1-1/4" PVC STREET LIGHT CONDUIT WITH (2) #4 AND (1) #8 CONDUCTORS	LF	--	--
3.	NO. 3-1/2 PULL BOX W/METAL COVER	EA	--	--
4.	150 AMP SERVICE PEDESTAL (RRR)	EA	--	--
5.	200 AMP SERVICE PEDESTAL (SRLT)	EA	--	--
6.				

[illegible]

21-1-R-69	
DATE:	10/28/16
DRAFTER:	HN
DESIGNER:	HN
CHECKED:	TMM
PROJECT NO.	OLY1607-002
C-3 SHEET 3 OF 11	

Professional Engineer Seal for Timothy M. Mulrooney, State of Nevada, No. 22938, Exp. 12/31/2017.

C-3
SHEET 3 OF 11

DATE _____ PROJECT No. #####
LVMMD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL

FAST

 **Call before you**

UnderGround

1-702-432-5300

**FREeway & ARTERIAL SYSTEM
OF TRANSPORTATION (F.A.S.T.)**

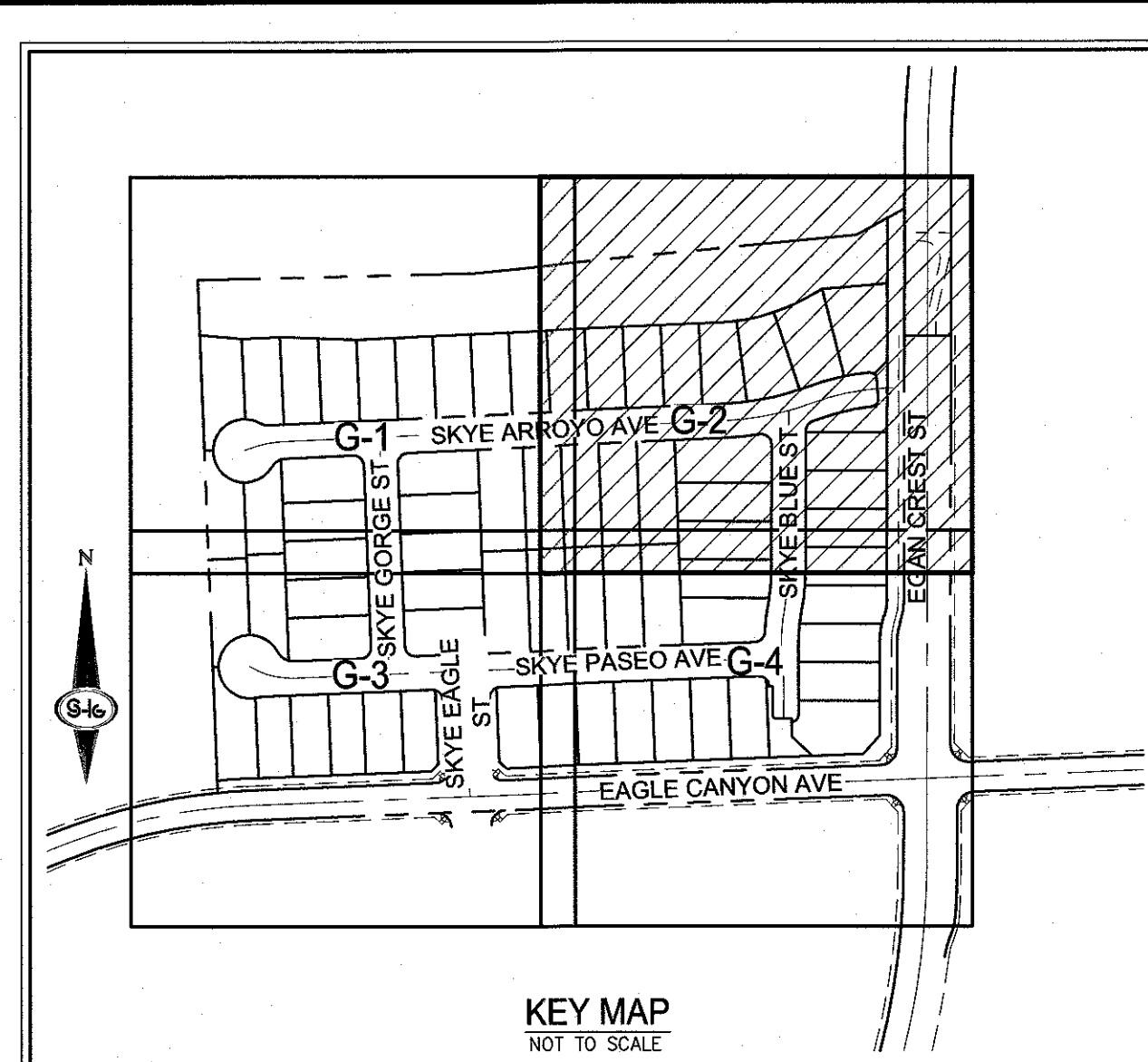
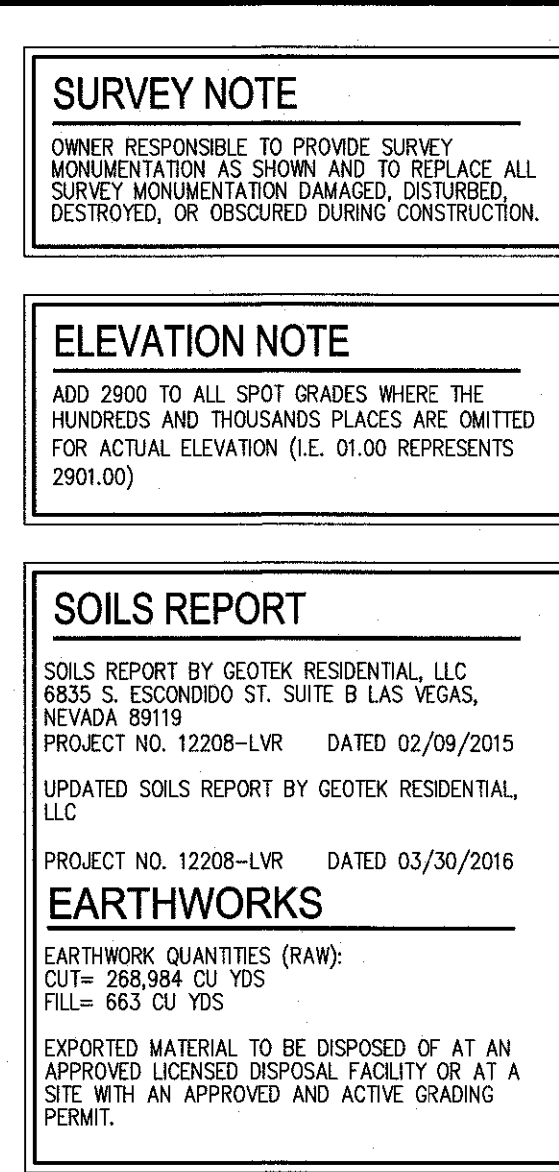
AVOID HITTING OVERHEAD
POWER LINES. IT'S
COSTLY.

CALL BEFORE
YOU DO
OVERHEAD

1-702-227-2929

Call before you Dig
AVOID CUTTING UNDERGROUND
UTILITY LINES. IT'S COSTLY.

Call
811
OR
1-800-227-2600



KEY MAP

NOT TO SCALE

GRADING NOTES

1. INSTALL 30" ROLL CURB RCP PER CCAUSD NO. 217.51 OVER 6" DIRT & AGGREGATE BASE
2. INSTALL 5" WIDE CONCRETE SIDEWALK (5" THICK OVER 6" DIRT & AGGREGATE BASE) PER CCAUSD #234
3. INSTALL 8"-FT CROSS GUTTER PER DETAIL ZD 22 ON STREET D-2
4. INSTALL 8" ASPHALT PAVEMENT OVER 4" TYPE II AGGREGATE BASE
5. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT CCAUSD NO. 235, CASE 1351
6. CONSTRUCT 10' TRANSITION FROM 1" CURB TO ROLL CURB ON ST. 03 ON 03
7. INSTALL 20.0' 7-GRADES TYPE "CM2" DROP INLET PER CCAUSD #412.1 AND #421
8. INSTALL "A" TYPE ISLAND CURB PER CCAUSD #429
9. INSTALL "L" TYPE CURB AND GUTTER PER CCAUSD #216
10. INSTALL 7.5' 2-GRADES TYPE "CM2" DROP INLET PER CCAUSD #412.1 AND #421
11. REMOVE EXISTING 36" STORM DRAIN AND DROP INLET PER SITE CANTON PHASE 2, #24087
12. INSTALL 8"-FT ISLAND DRAIN DRAIN DRAIN PER CCAUSD #408 (REV-2501.61, INV IN 2501.71, INV IN 2501.71)
13. INSTALL 12"-12" 12" RCP 12" SIZE PER PLAN - SEE SHEET P-4 AND P-8 FOR PROFILES
14. INSTALL "L" TYPE ISLAND CURB AND GUTTER #429
15. INSTALL 8"-FT CROSS GUTTER PER STD DWG 228
16. INSTALL 24" SIDEWALK DRAIN PER STD DWG 236
17. INSTALL WROUGHT IRON FENCE, DESIGN BY OTHERS
18. INSTALL WROUGHT IRON FENCE, DESIGN BY OTHERS
19. INSTALL ACCESS GATES, DESIGN BY OTHERS

SEE SHEET C-3 FOR ABBREVIATIONS AND QUANTITIES

LEGAL DESCRIPTION

BEING A PORTION OF SECTION 12, TOWNSHIP 19 SOUTH,
RANGE 59 EAST M.D.M., CLARK COUNTY, NEVADA.

BENCHMARK

BM 7LV90 7NWS CITY OF LAS VEGAS RIVET AND
ROUND PLATE IN CONCRETE CYLINDER, SOUTHEAST
CORNER OF HUALAPAI WAY AND IRON MOUNTAIN
ROAD.

ELEV: 2840.13 FEET
ELEW: (865.67 METERS) (NAVD 1988)

BASIS OF BEARINGS

SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE ¼) OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., AS PER FILE 151, PAGE 14 OF SURVEYS, ON FILE IN THE COUNTY RECORDER'S OFFICE.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY ON FILE AT CITY OF LAS VEGAS DS ##-#### FOR THE SUBJECT PROJECT.

TIMOTHY M. MULROONEY, P.E. 22938

SURVEY NOTE

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

ELEVATION NOTE

ADD 2900 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2901.00)

SOILS REPORT

SOILS REPORT BY GEOTEK RESIDENTIAL, LLC
6835 S. ESCONDIDO ST. SUITE B LAS VEGAS,
NEVADA 89119
PROJECT NO. 12208-LVR DATED 02/09/2015
UPDATED SOILS REPORT BY GEOTEK RESIDENTIAL,
LLC

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= 268,984 CU YDS
FILL = 663 CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.

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 SARCUM LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED CURB PRIOR TO BEGINNING 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. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2012, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CLARK COUNTY BUILDING DEPARTMENT.
8. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND ADVISE ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO VERIFY EXISTING PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLENISHING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO SIGN, VEGETATION, OR OBJECTS OF ANY KIND IS ADMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONE.

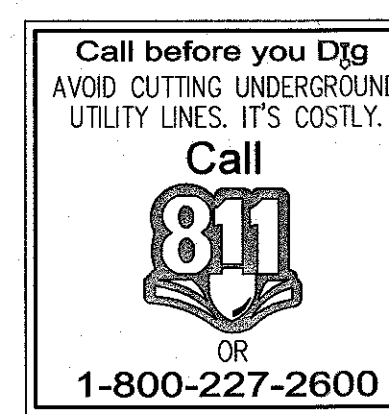
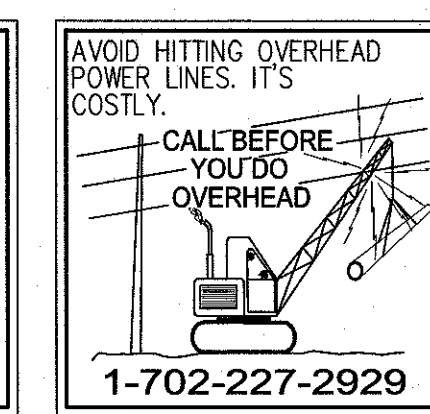
LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

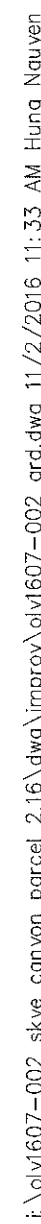
(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ. FT.))

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 ACCUMULATED ON THE CONSTRUCTION SITE DURING RAINY DAYS OF ANY CLARK COUNTY AREA 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 CONTRACTOR 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 NV1000000, 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 BOWLS 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 REQUIRED. ADDITIONAL INSPECTIONS MAY BE REQUIRED, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES, REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NV1000000, 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.

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1750 E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.





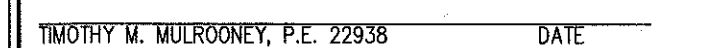
Call before you Dig
 AVOID CUTTING UNDERGROUND
 UTILITY LINES. IT'S COSTLY.

Call

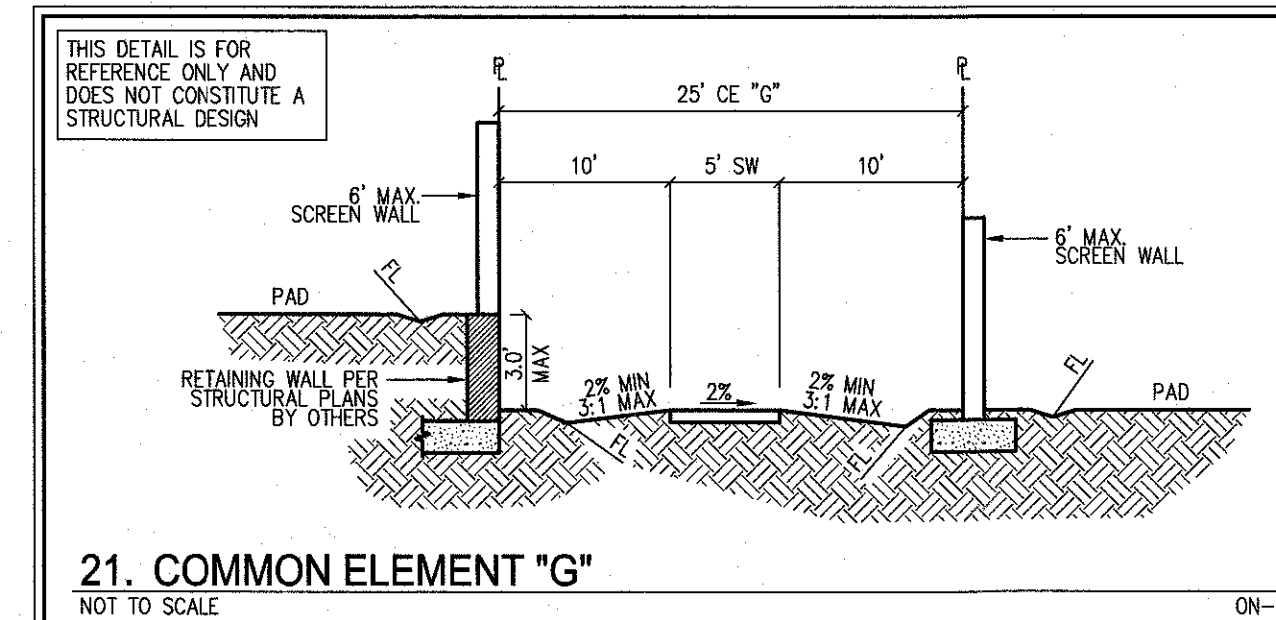
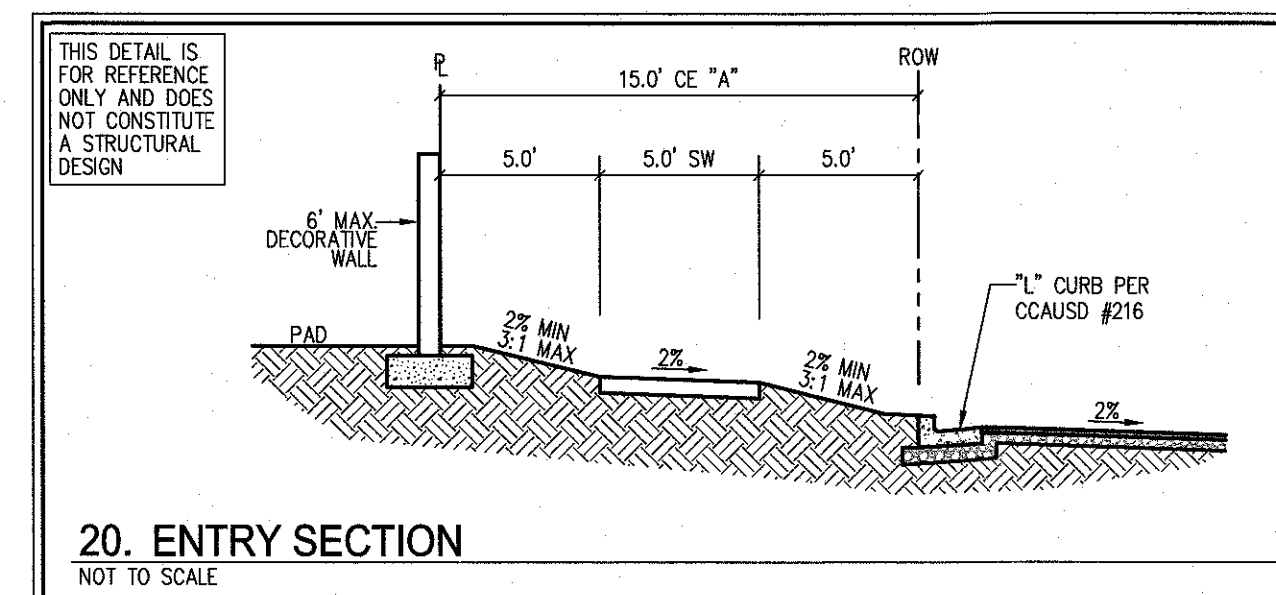
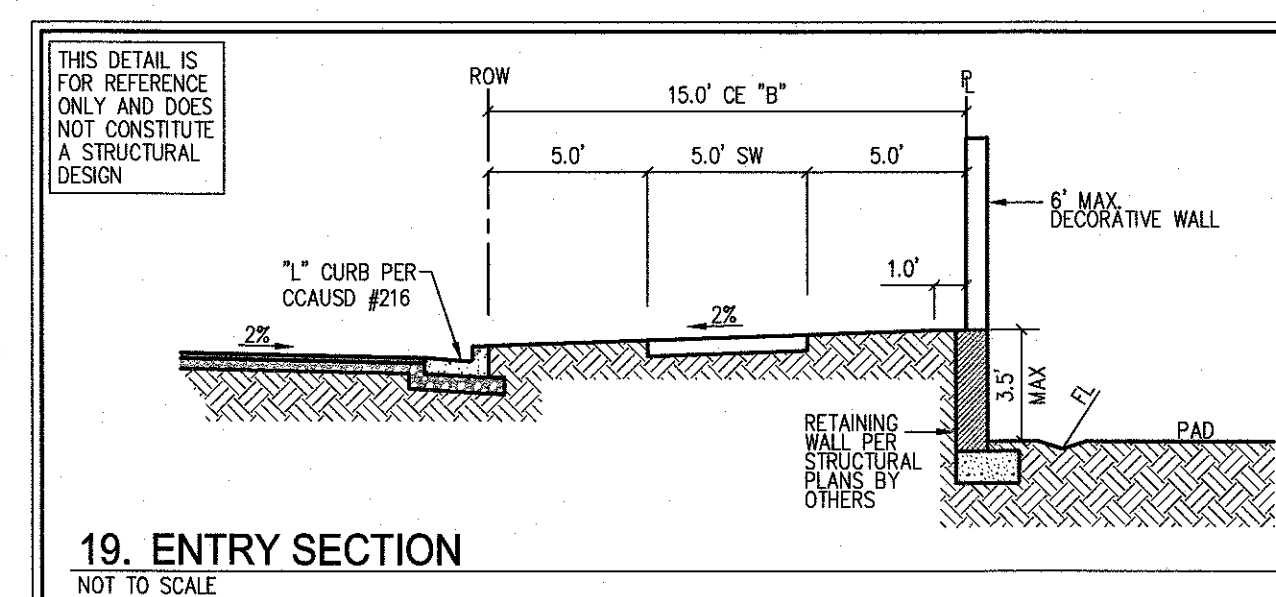
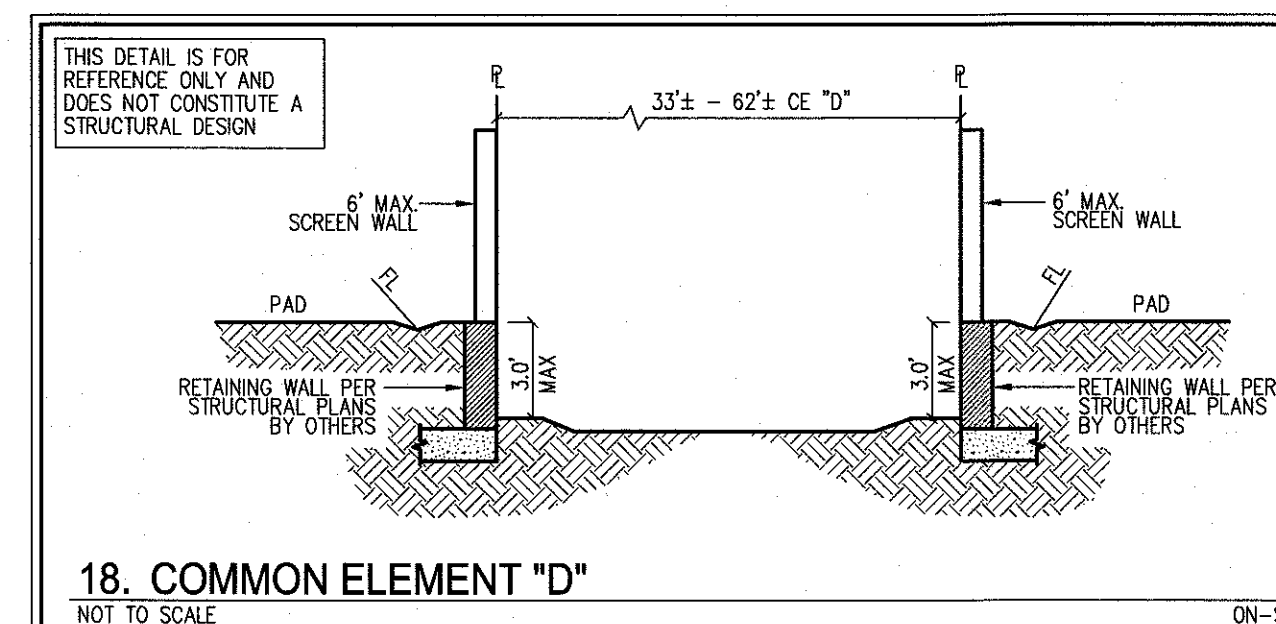
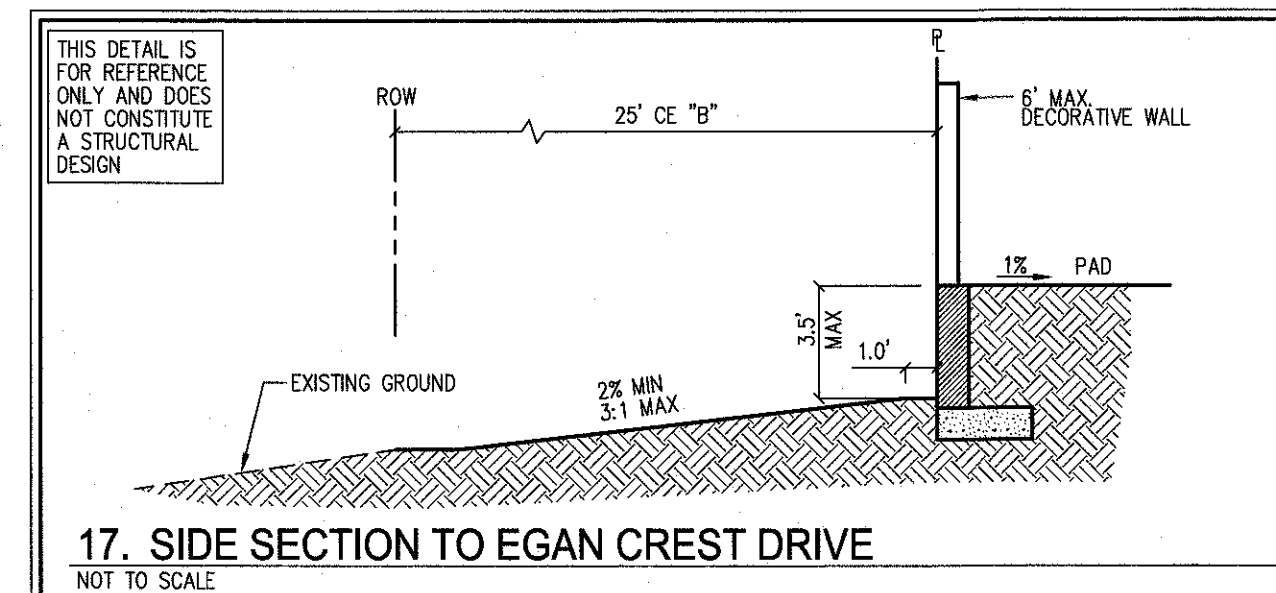
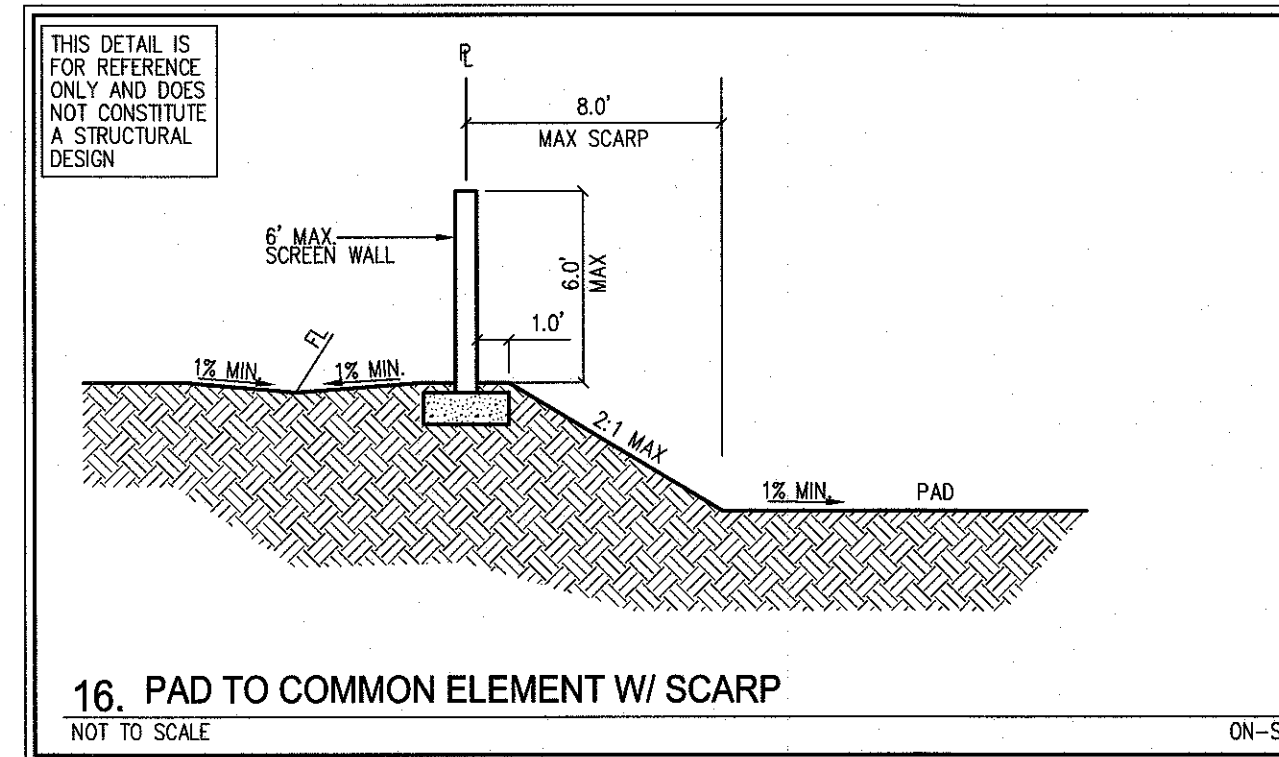
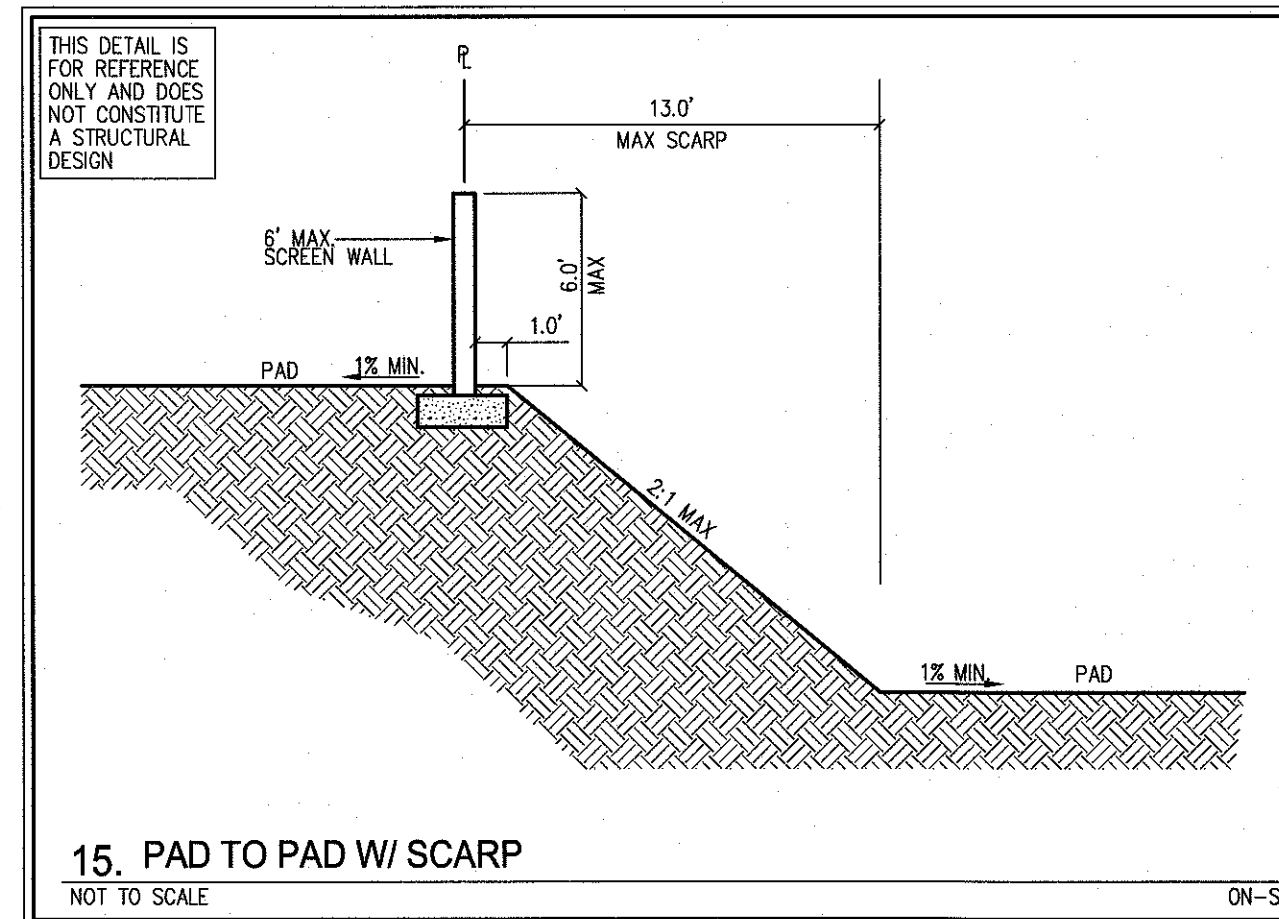
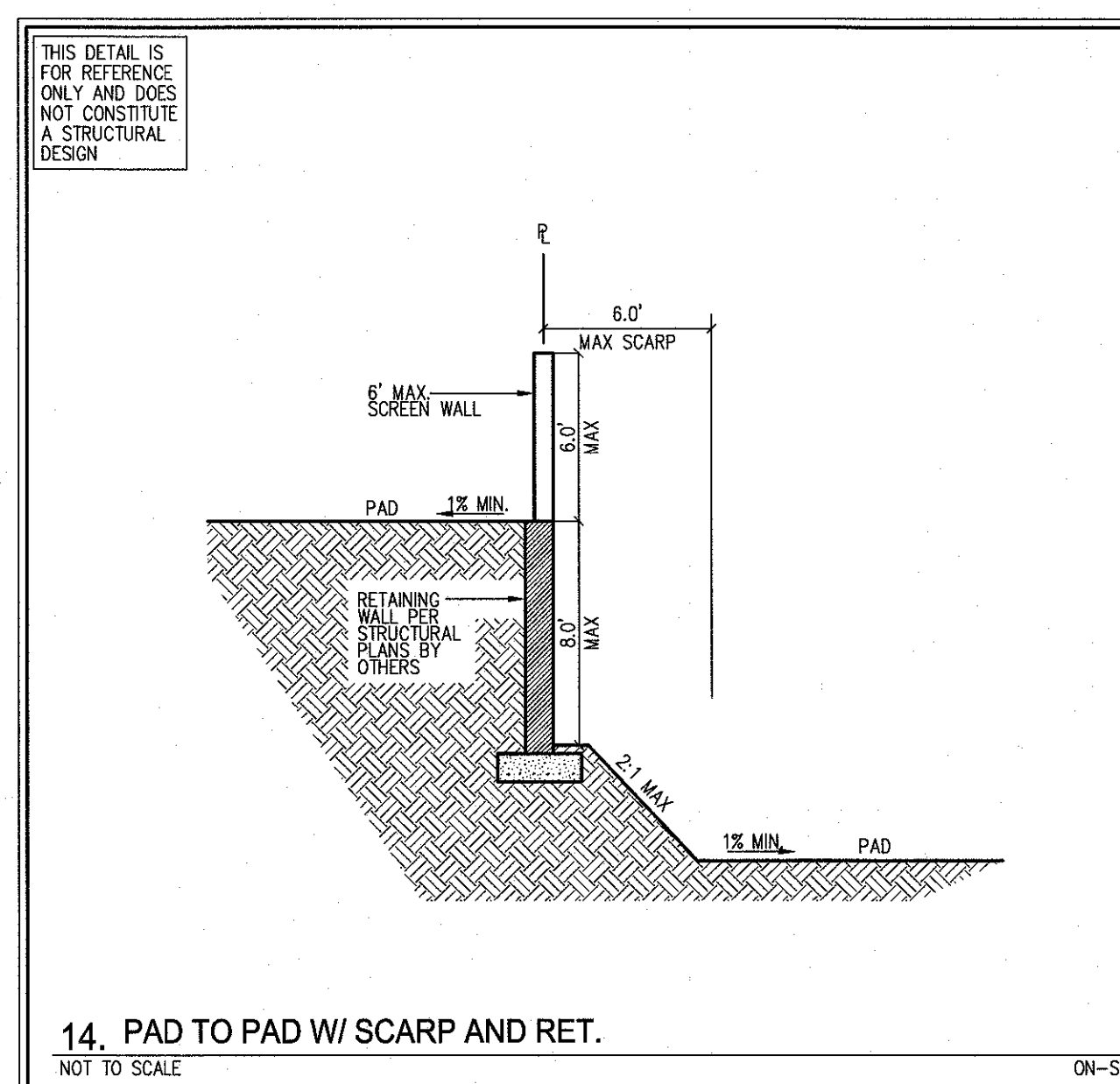
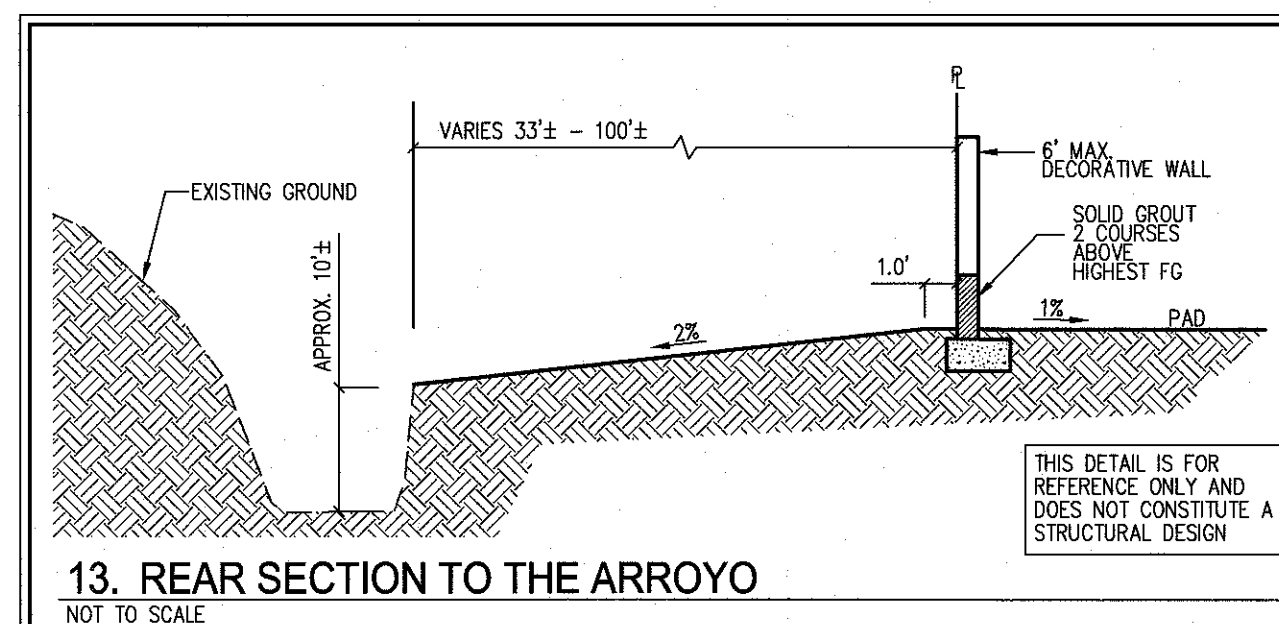
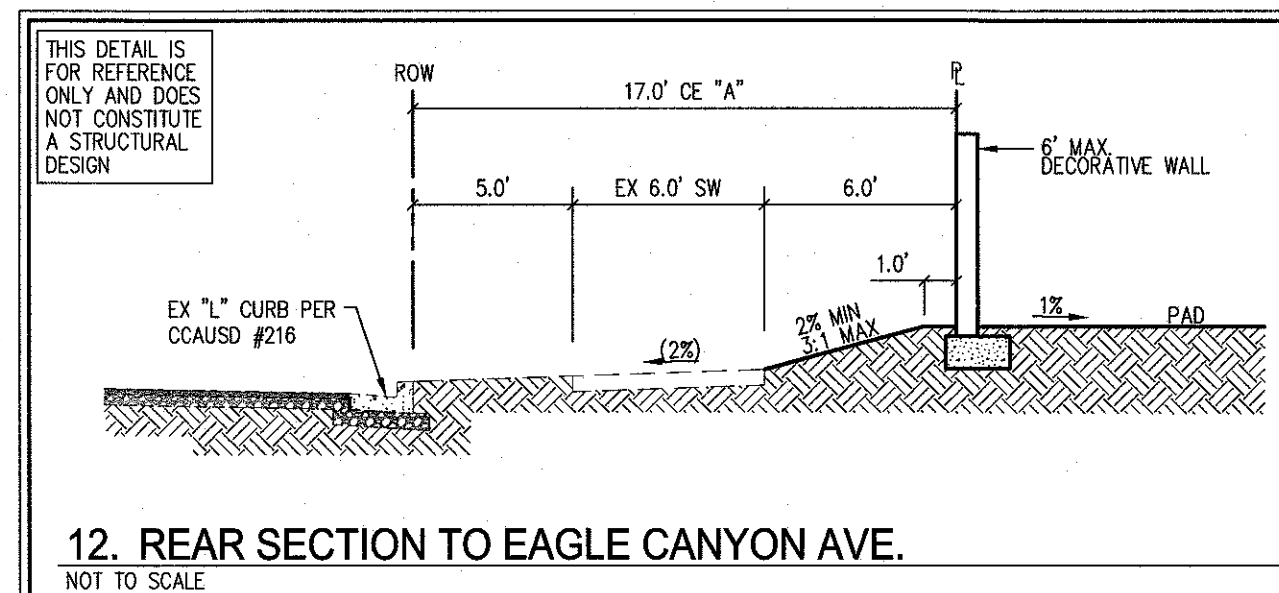
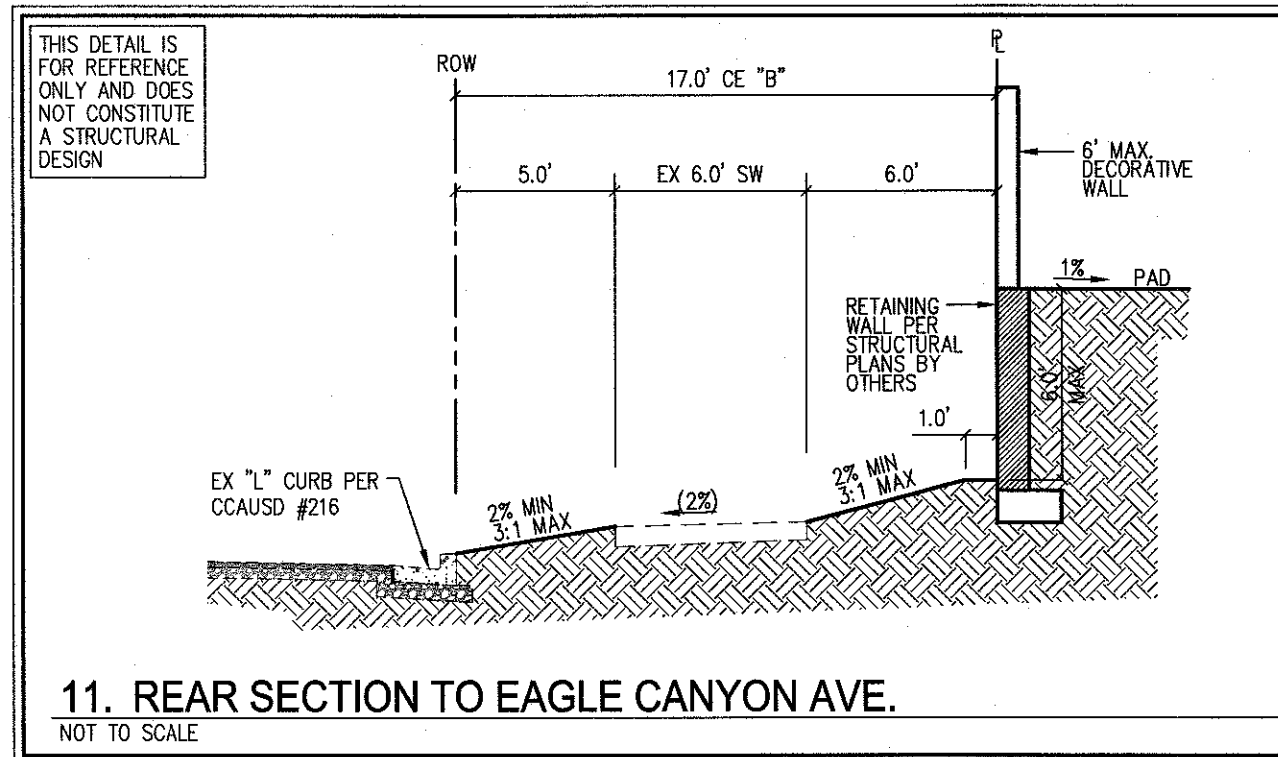
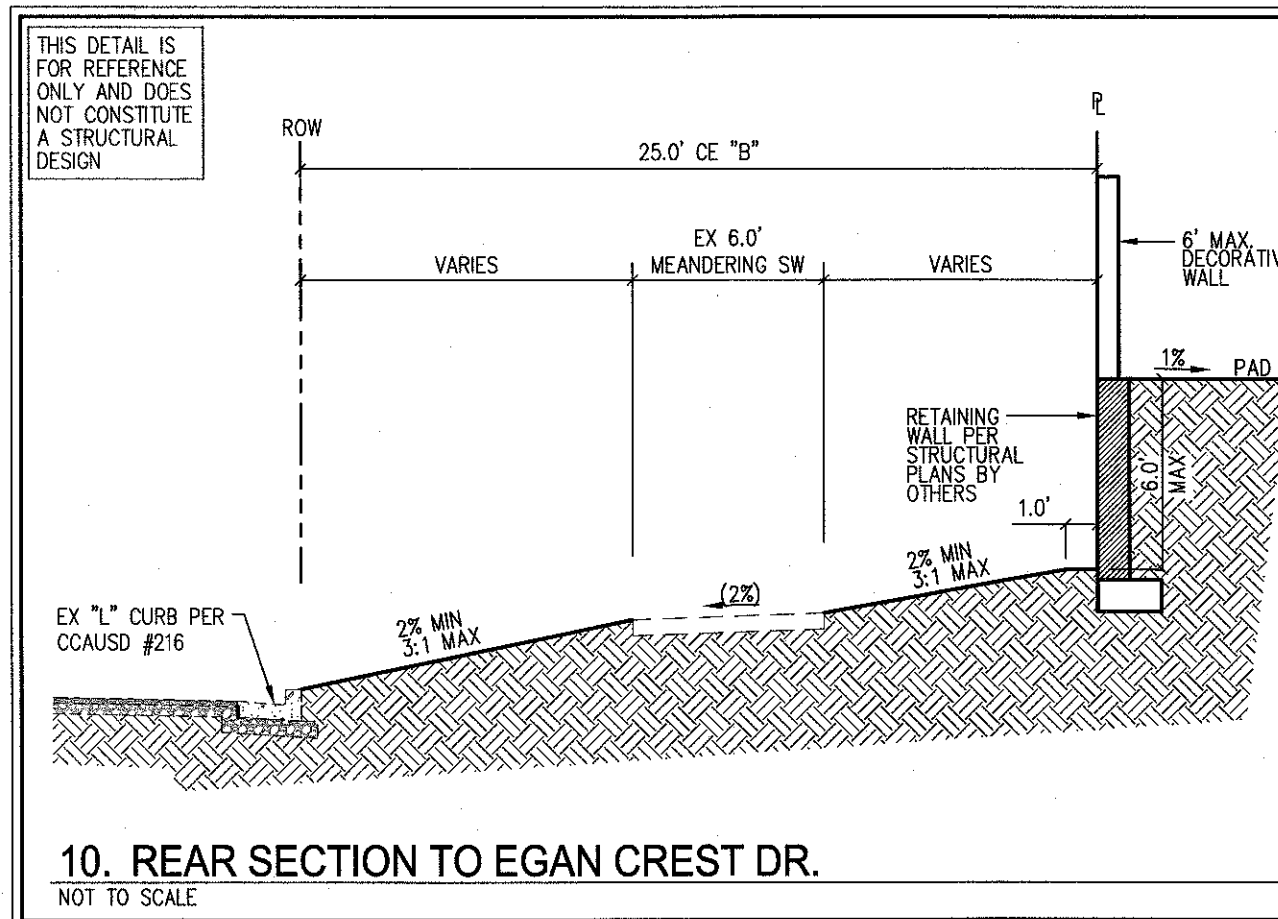
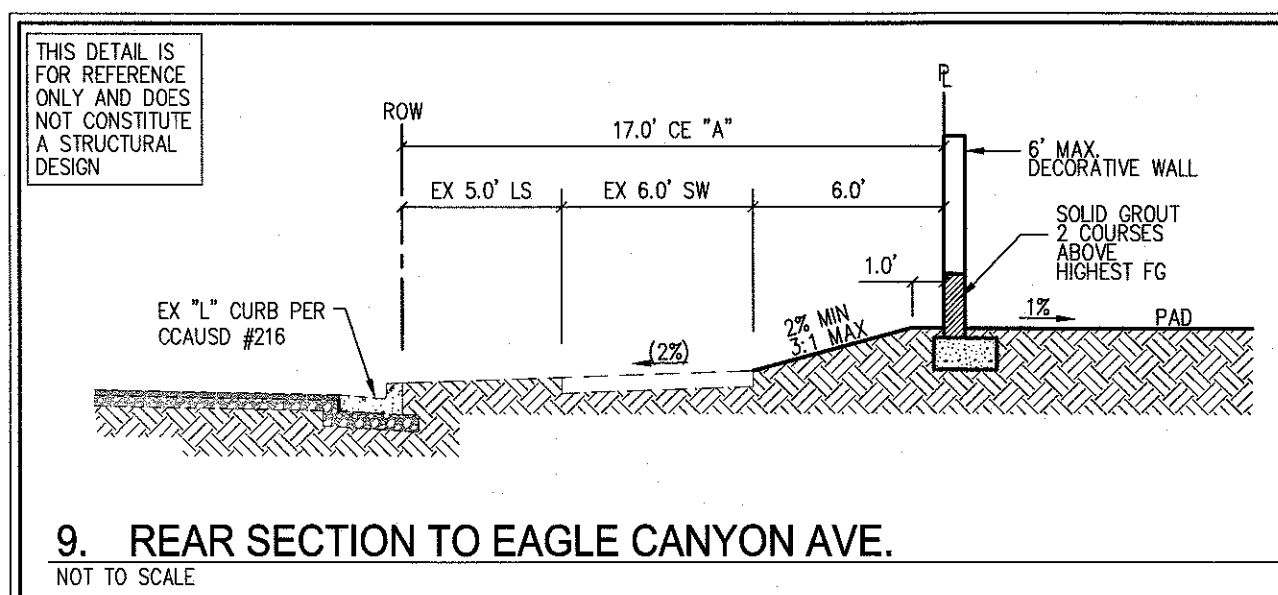
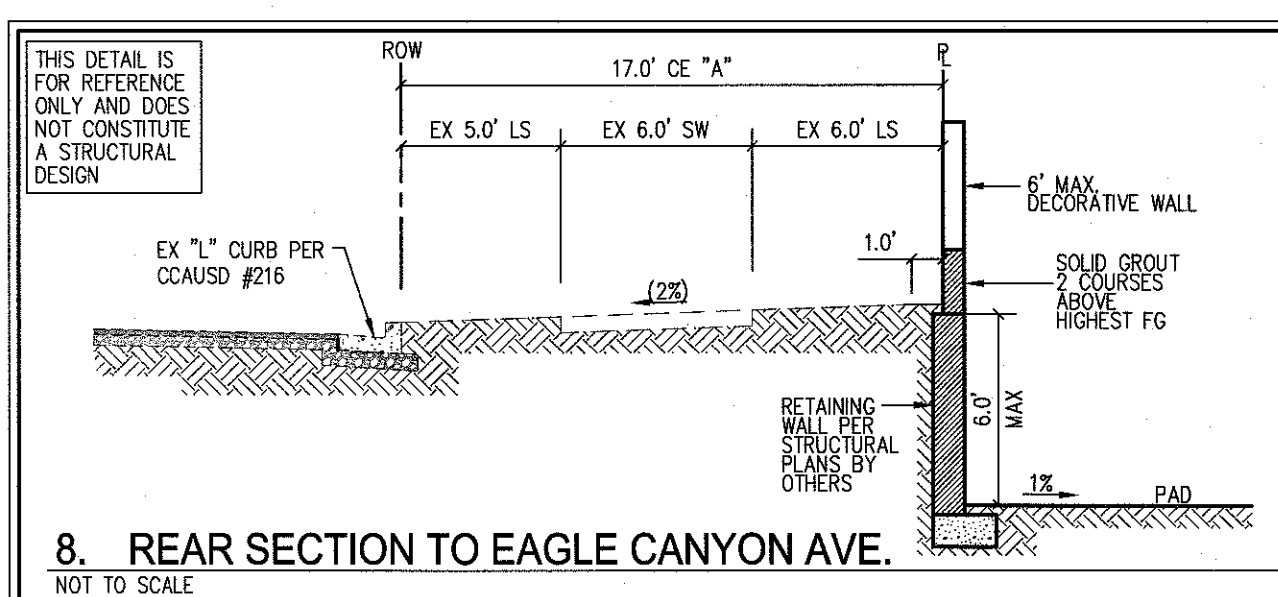
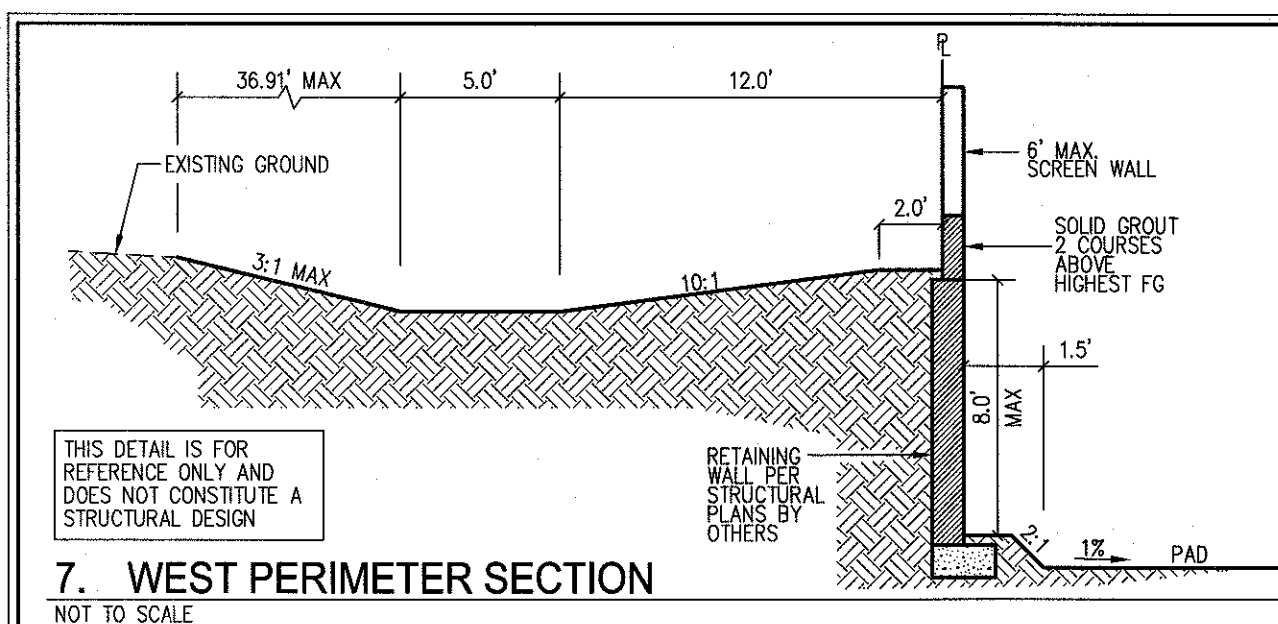
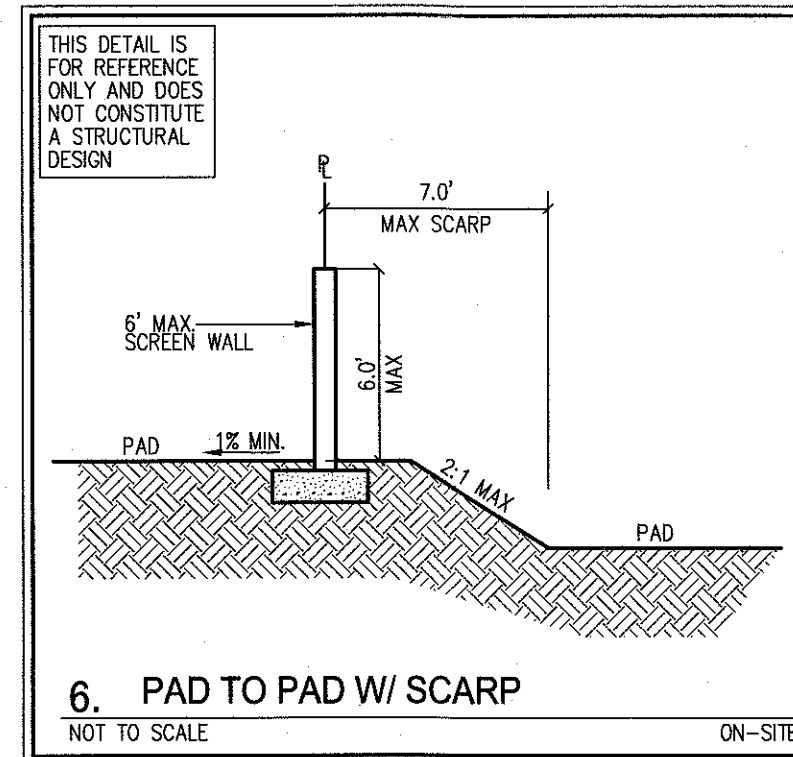
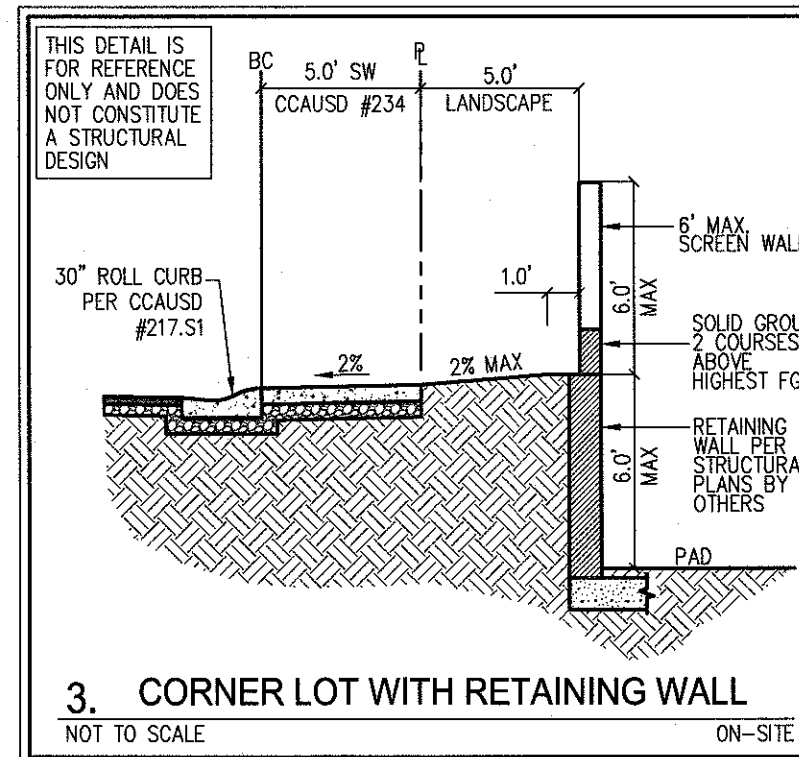
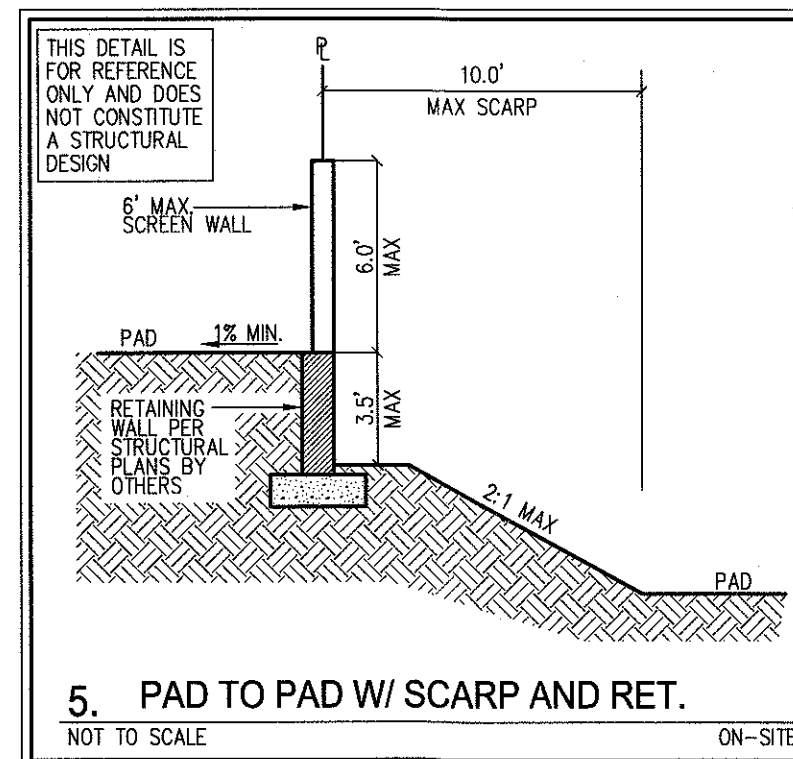
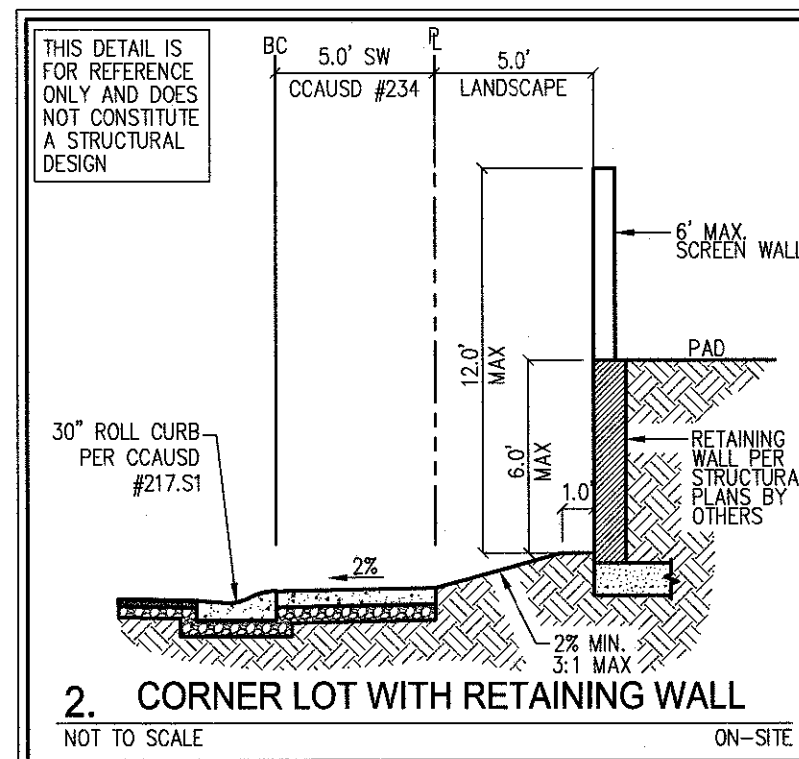
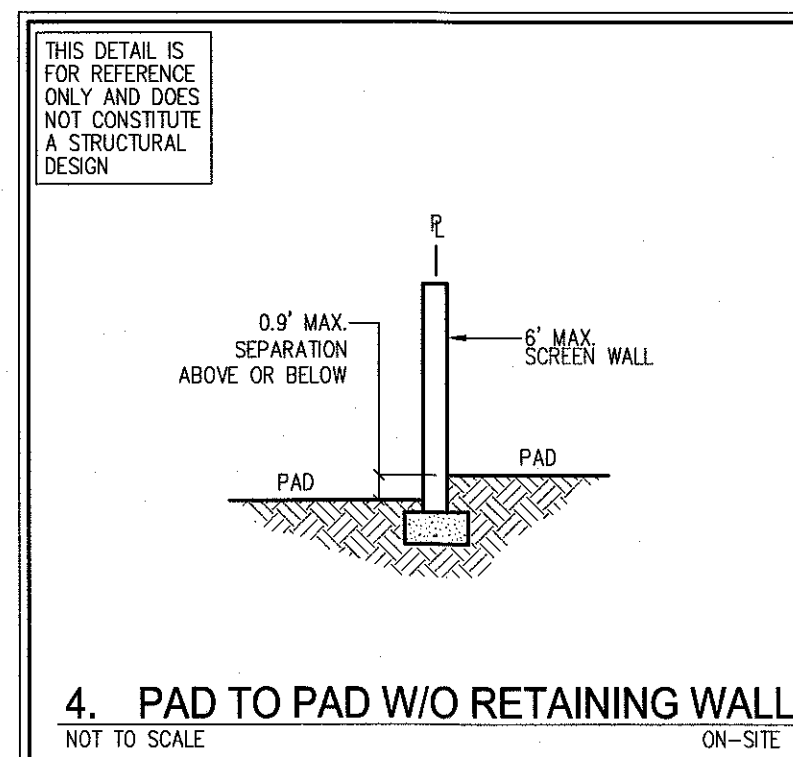
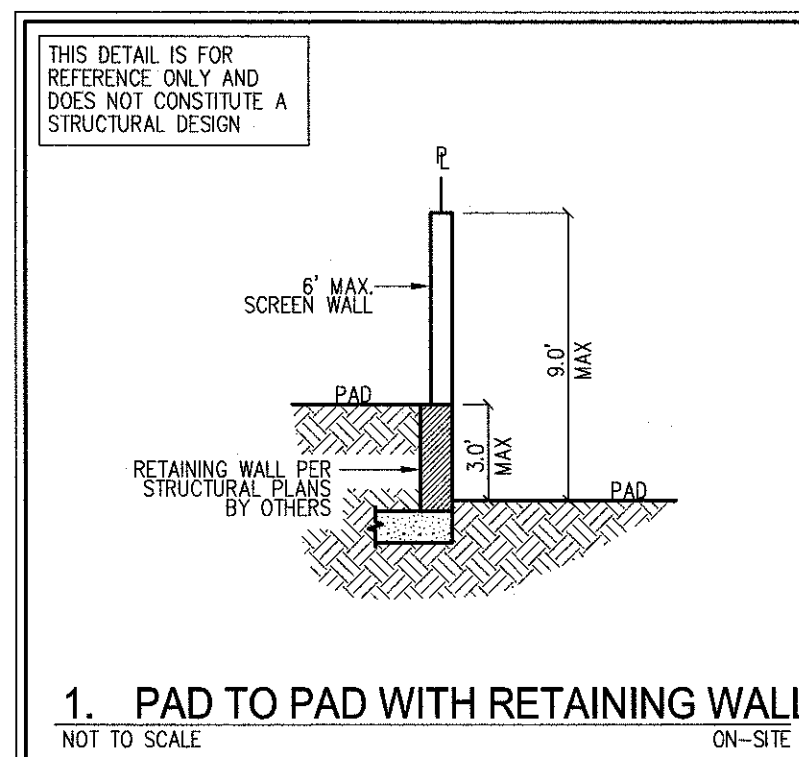
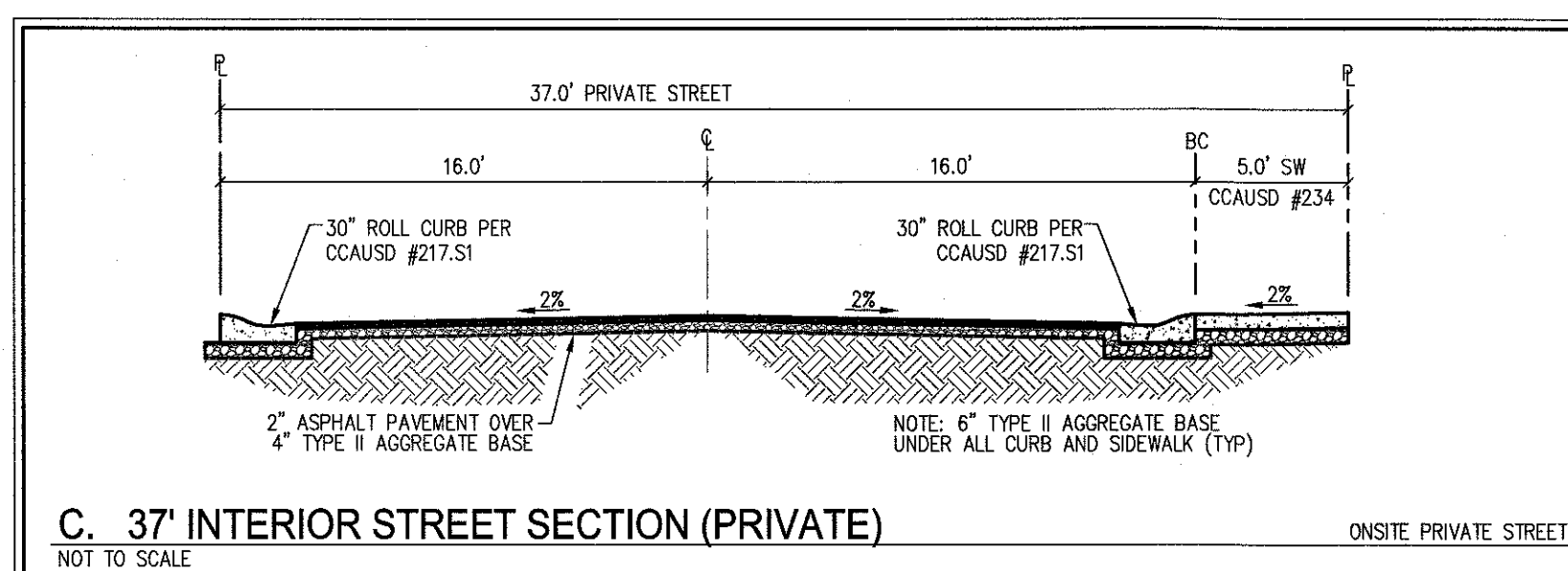
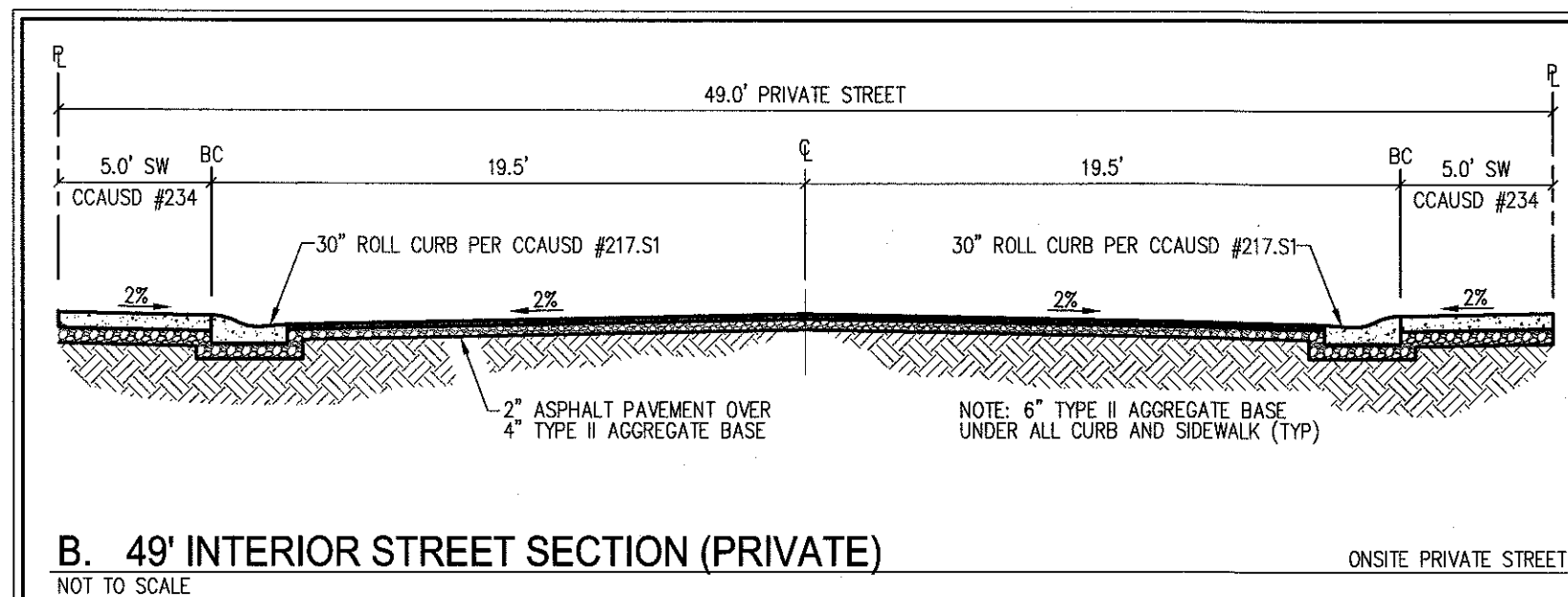
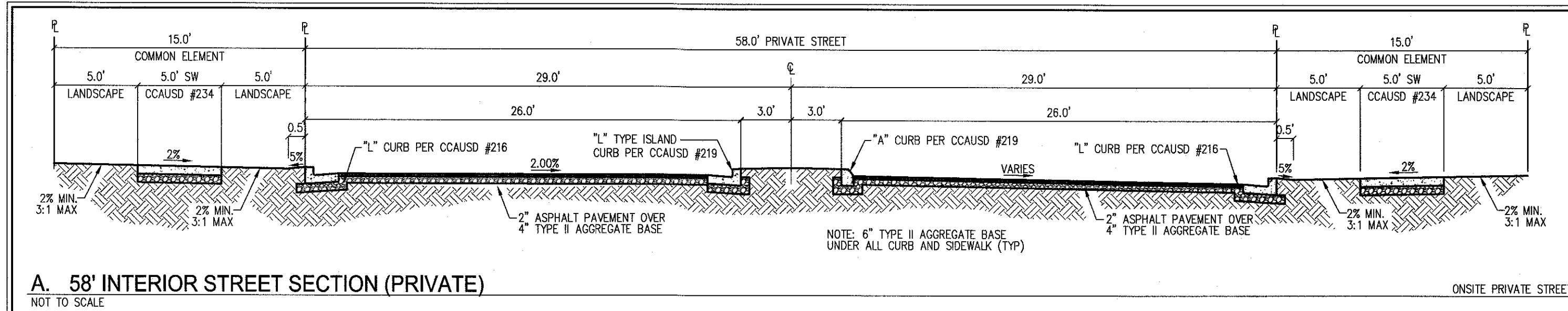
811

OR

1-800-227-2600



G-4
SHEET 7 OF 11



FAST

Call before you

UnderGround

1-702-432-5300

FREEWAY & ARTERIAL SYSTEMS

OF TRANSPORTATION (F.A.S.)

AVOID HITTING OVERHEAD
POWER LINES. IT'S
COSTLY.

CALL BEFORE
YOU DO
OVERHEAD

1-702-227-2929

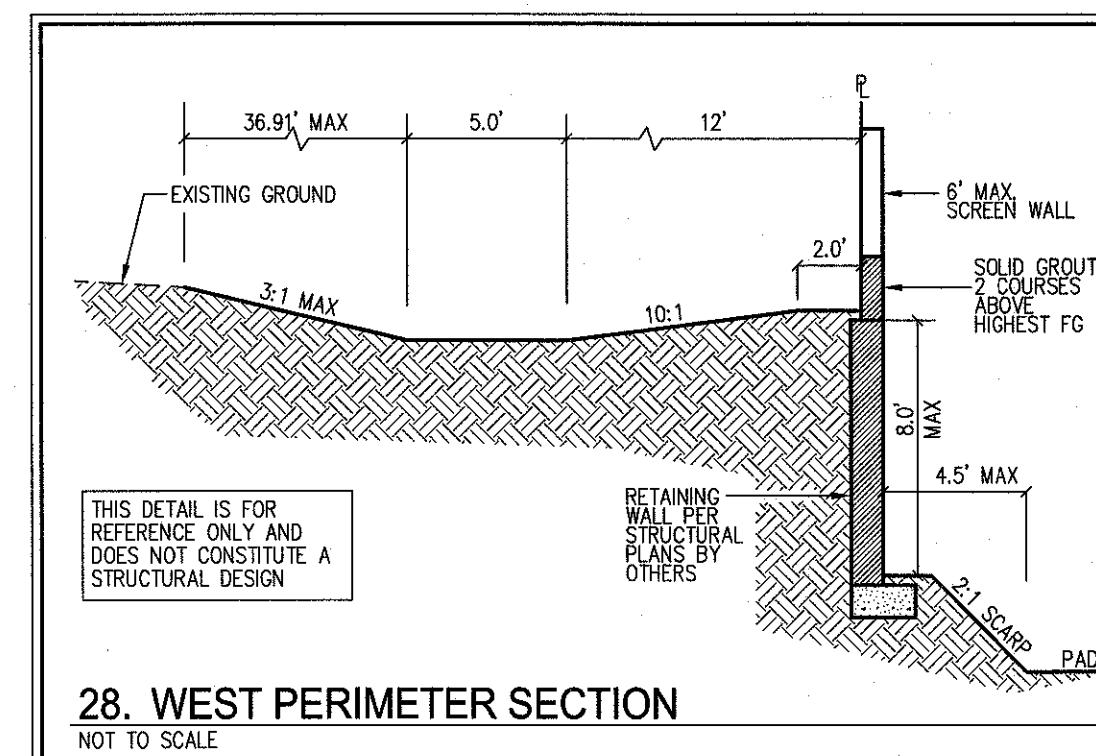
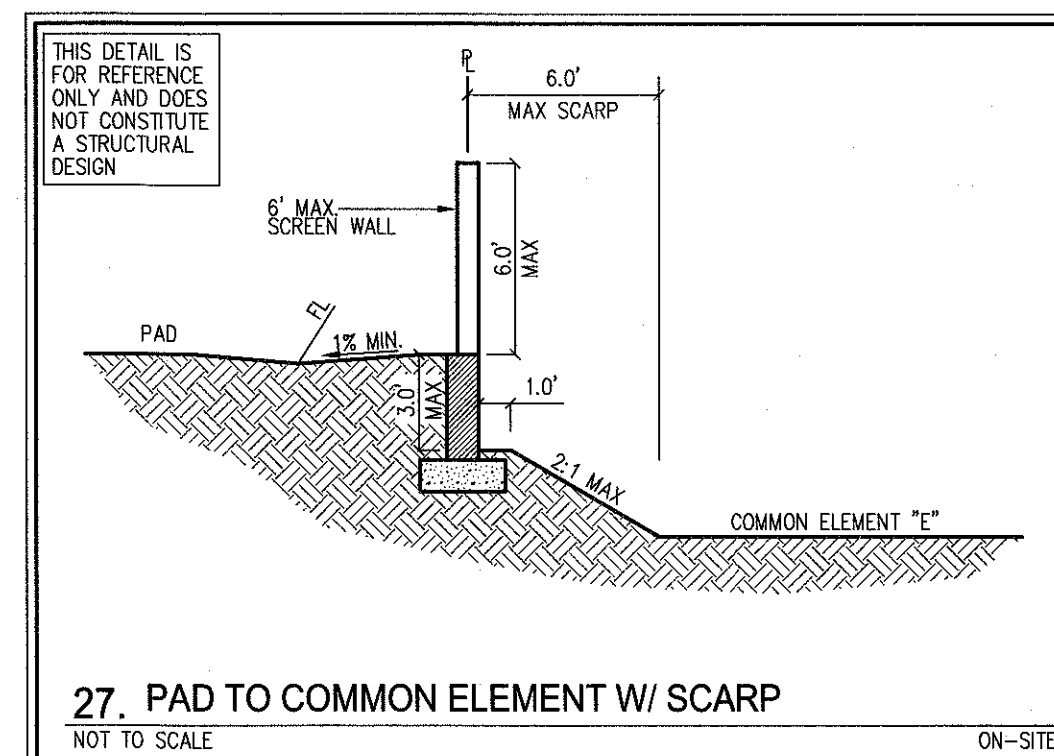
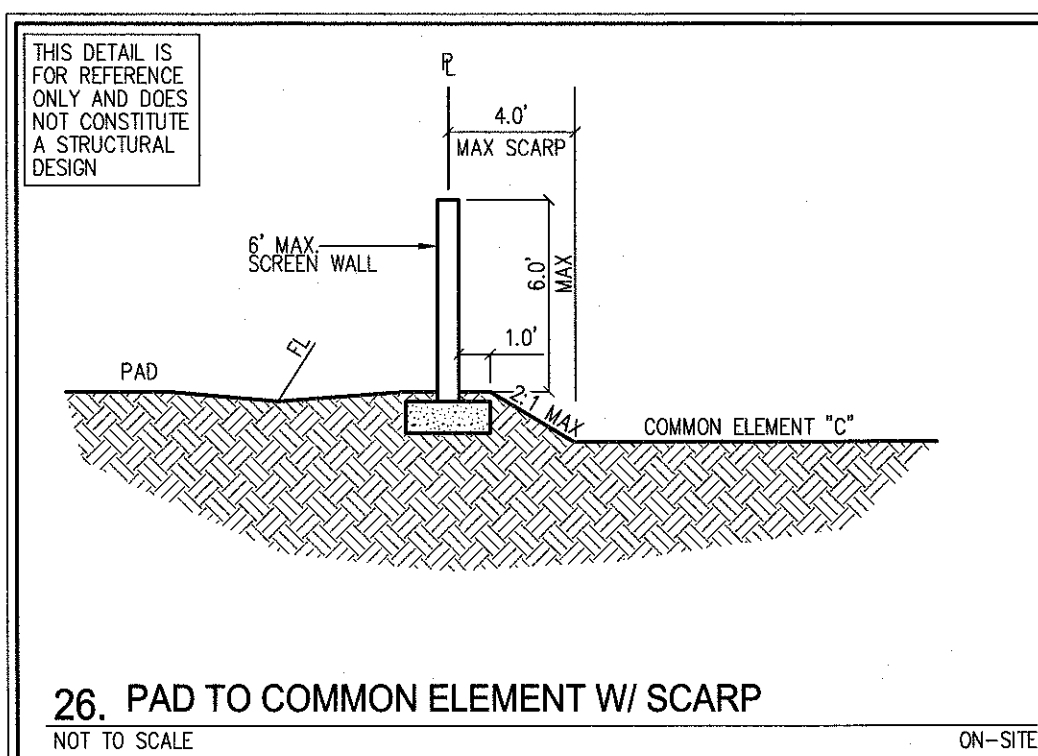
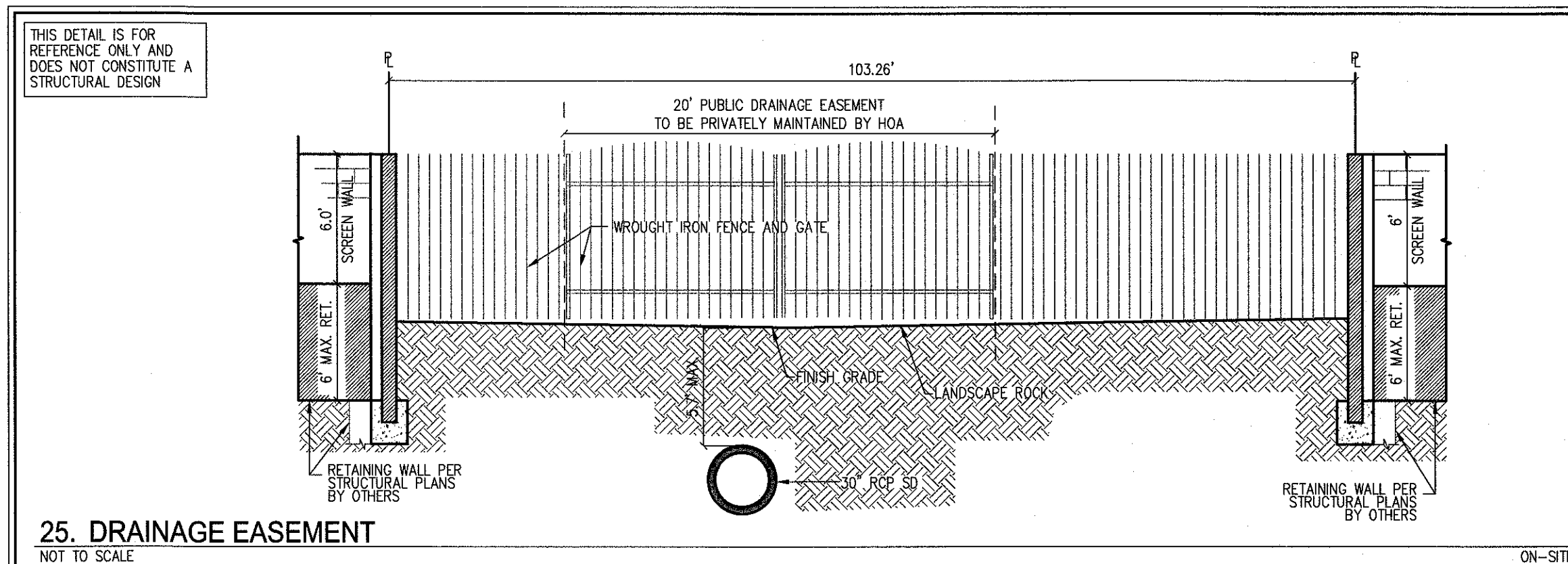
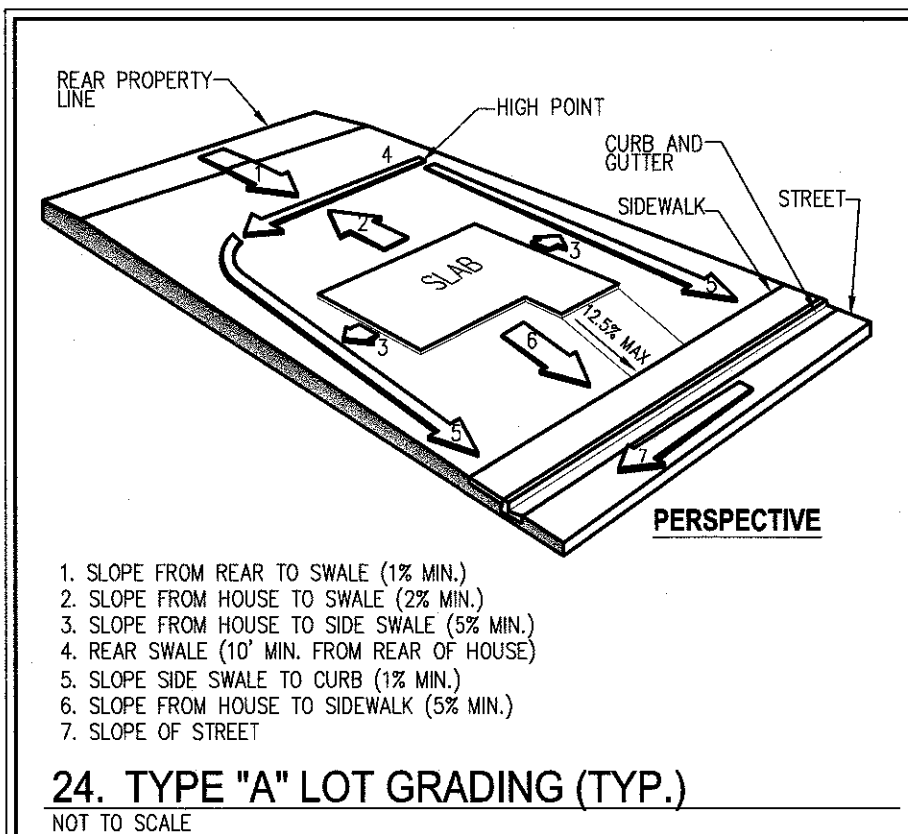
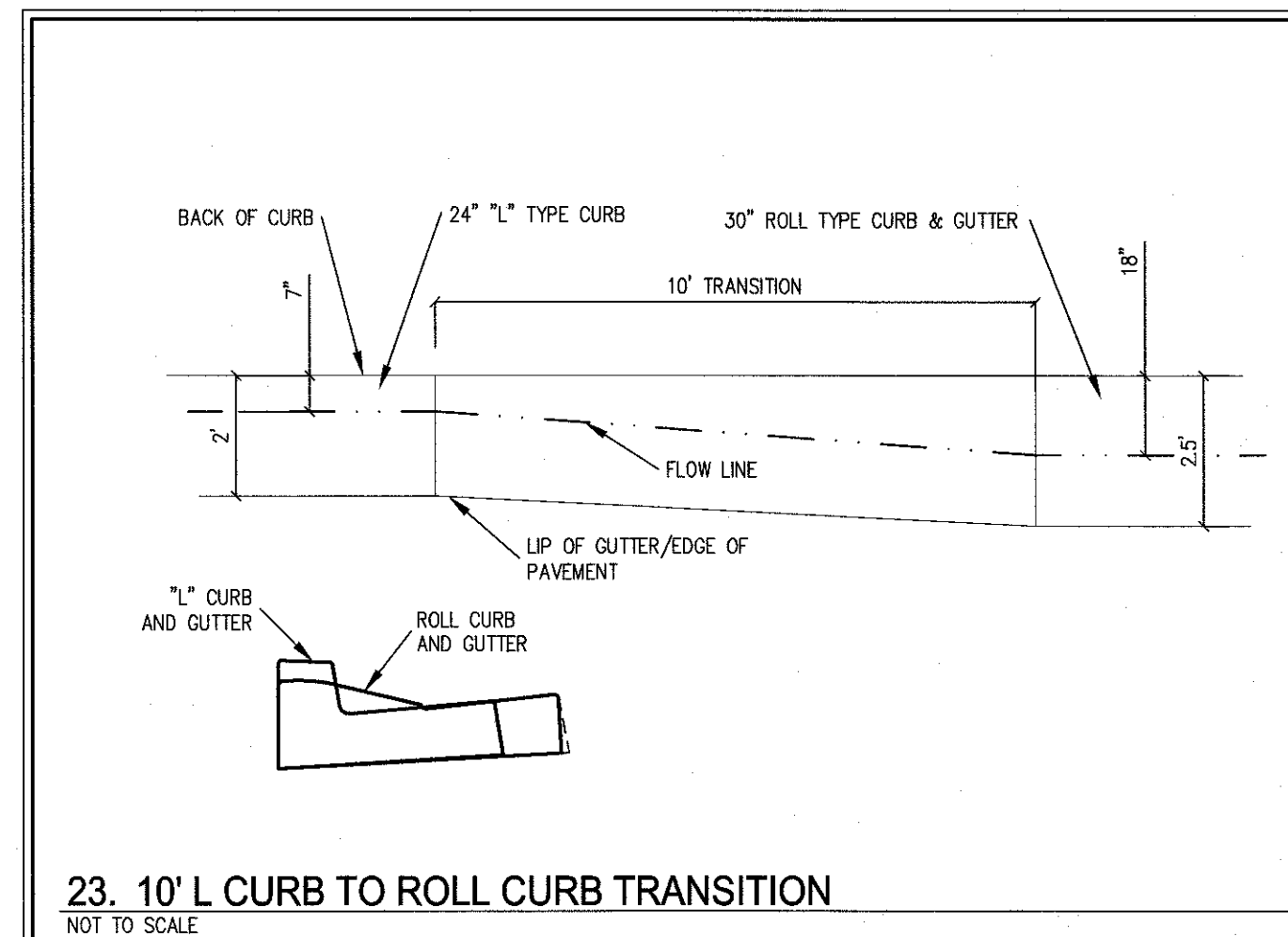
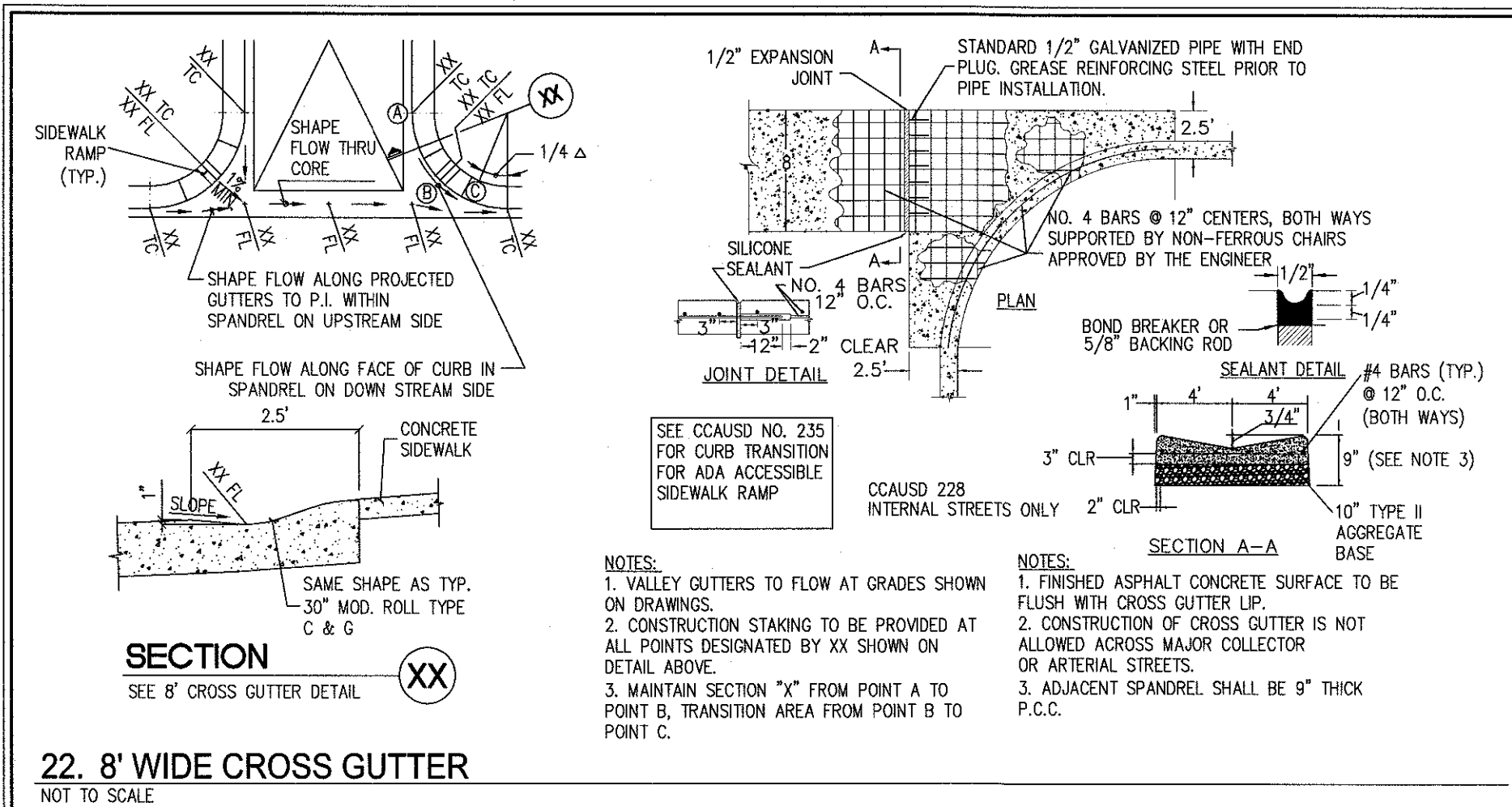
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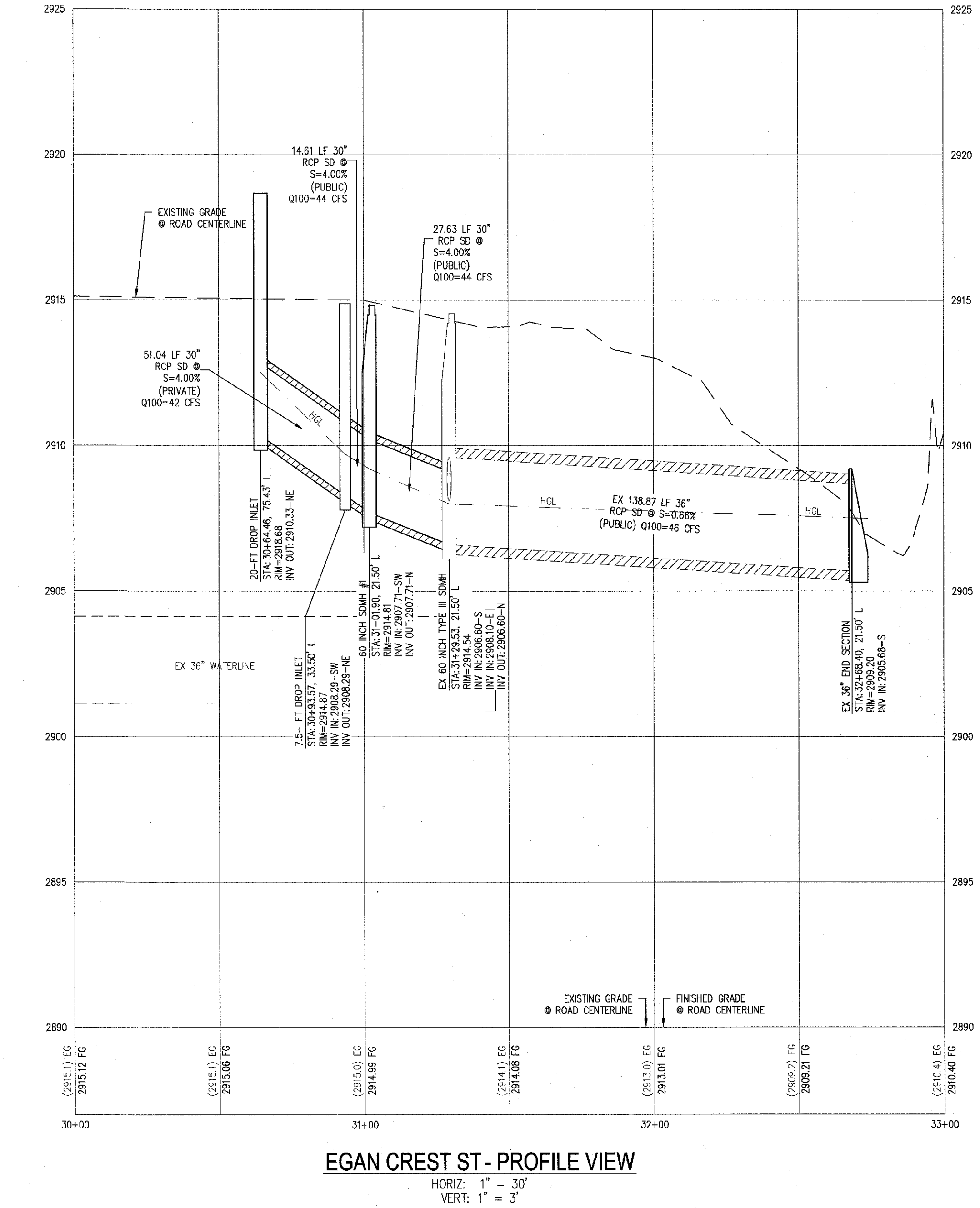
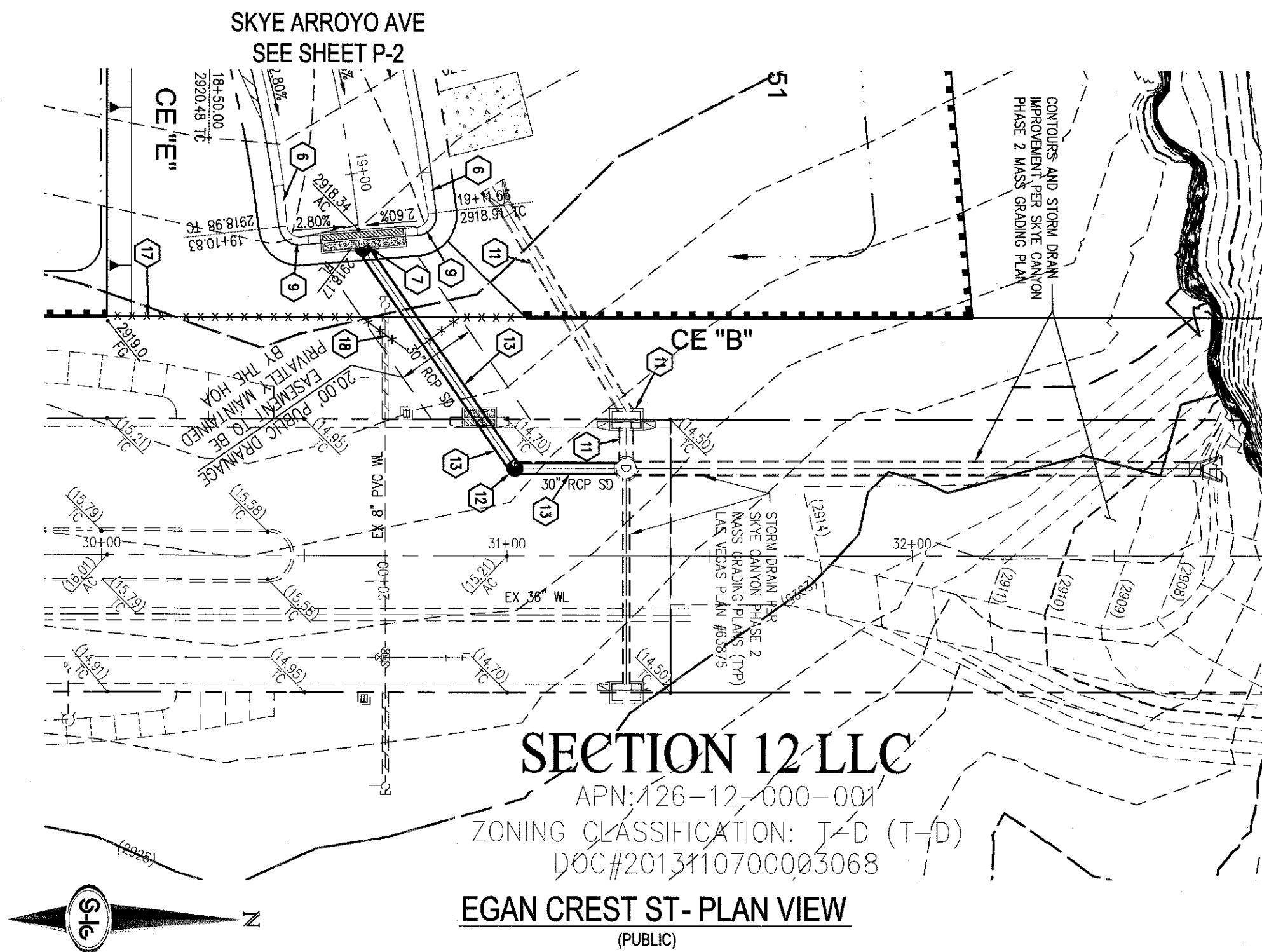
Call



OR

1-800-227-2600





SURVEY NOTE

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

ELEVATION NOTE

ADD 2800 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2901.00)

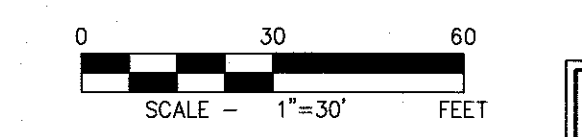
SOILS REPORT

SOILS REPORT BY GEOTEK RESIDENTIAL, LLC, 8835 S. ESCONDIDO ST. SUITE B LAS VEGAS, NEVADA 89119
PROJECT NO. 12208-LVR DATED 02/09/2015
UPDATED SOILS REPORT BY GEOTEK RESIDENTIAL, LLC
PROJECT NO. 12208-LVR DATED 03/30/2016

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= 268,984 CU YDS
FILL= 663 CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.



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 OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

GRADING NOTES

1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2012, SECTION 2304.11.2.2.

2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.

3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SHMPP.

4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.

5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.

6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.

7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CLARK COUNTY BUILDING DEPARTMENT.

8. 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.

9. 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.

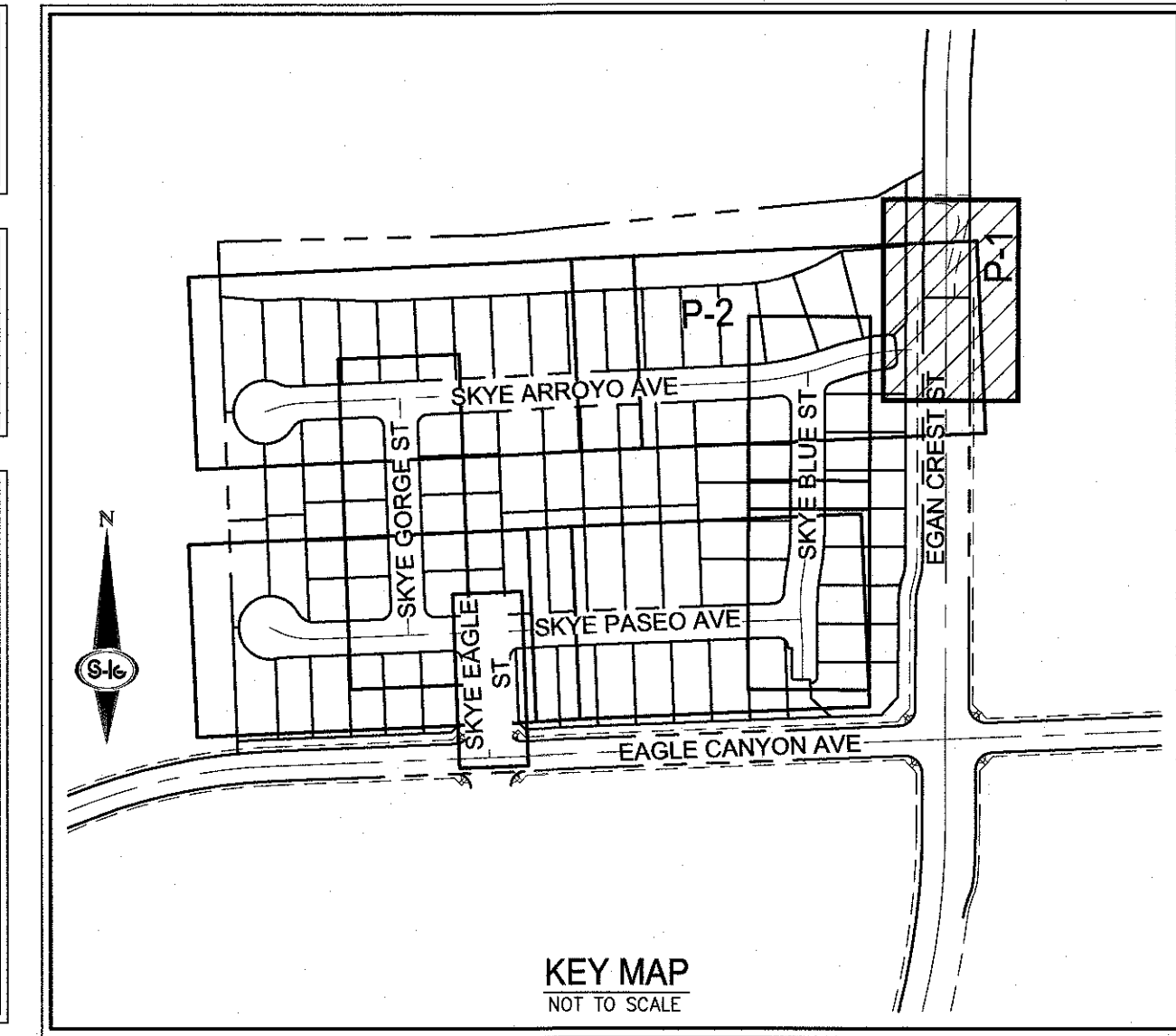
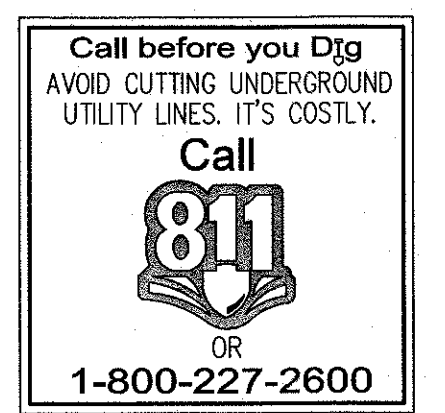
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL 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.

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1750 E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.



GRADING NOTES

1) INSTALL 30" ROLL CURB PER CCAUSD NO. 217.S1 OVER 6" TYPE II AGGREGATE BASE

2) INSTALL 5" WIDE CONCRETE SIDEWALK (5" THICK OVER 6" TYPE II AGGREGATE BASE) PER CCAUSD #234

3) INSTALL 8"-FT CROSS GUTTER PER DETAIL 22 ON SHEET P-2

4) INSTALL 2" ASPHALT PAVEMENT OVER 4" TYPE II AGGREGATE BASE

5) CONSTRUCT SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT CCAUSD NO. 235, CASE 6 & 235

6) CONSTRUCT 10' TRANSITION FROM "L" CURB TO ROLL CURB PER DETAIL 23 ON SHEET P-2

7) INSTALL 20" 7"-GRATES TYPE "CM2" DROP INLET PER CCAUSD #412.1 AND #421

8) INSTALL "A" TYPE ISLAND CURB PER CCAUSD #219

9) INSTALL "L" TYPE CURB AND GUTTER PER CCAUSD #219

10) INSTALL 7.5' 2"-GRATES TYPE "CM2" DROP INLET PER CCAUSD #412.1 AND #421

11) REMOVE EXISTING 36" STORM DRAIN AND DROP INLET PER SKYE CANYON PHASE 2 #4087

12) INSTALL 60" TYPE III STORM DRAIN MANHOLE PER CCAUSD #408 RIM=2914.81, INV IN=2907.71, INV OUT=2907.71 SEE SHEETS P-1 AND P-2

13) INSTALL CLASS III RCP 30" PIPE SIZE PER PLAN - SEE SHEET P-4 AND P-8 FOR PROFILES

14) INSTALL "L" TYPE ISLAND CURB PER CCAUSD #219

15) INSTALL 8"-FT CROSS GUTTER PER STD DWG 228

16) INSTALL 24" SIDEWALK DRAIN PER STD DWG 236

17) INSTALL WROUGHT IRON FENCE, DESIGN BY OTHERS

18) INSTALL WROUGHT IRON GATES, DESIGN BY OTHERS

19) INSTALL ACCESS GATES, DESIGN BY OTHERS

SEE SHEET C-3 FOR ABBREVIATIONS AND QUANTITIES

LEGAL DESCRIPTION

BEING A PORTION OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST M.D.M., CLARK COUNTY, NEVADA.

BENCHMARK

BM 71500 TOWNSHIP CITY OF LAS VEGAS RIVET AND ROUND PLATE IN CONCRETE CYLINDER, SOUTHEAST CORNER OF HUALAPAI WAY AND IRON MOUNTAIN ROAD.

ELEV. 2840.13 FEET
ELEV. (865.67 METERS) (NAVD 1988)

BASIS OF BEARINGS

SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., AS PER FILE 151, PAGE 14 OF SURVEYS, ON FILE IN THE COUNTY RECORDER'S OFFICE.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY ON FILE AT CITY OF LAS VEGAS DS ##-#### FOR THE SUBJECT PROJECT.

TIMOTHY M. MULROONEY, P.E. 22938 DATE

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NINETY FIVE MANAGEMENT, LLC

SKYE CANYON PARCEL 2.16
PLAN AND PROFILE - EGAN CREST STORM DRAIN

DATE: 10/28/16
DRAFTER: HN
DESIGNER: HN
CHECKED: TMM
PROJECT NO. OLY1607-002

P-1
SHEET 10 OF 11



ELEVATION NOTE

ADD 2900 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2901.00)

SOILS REPORT

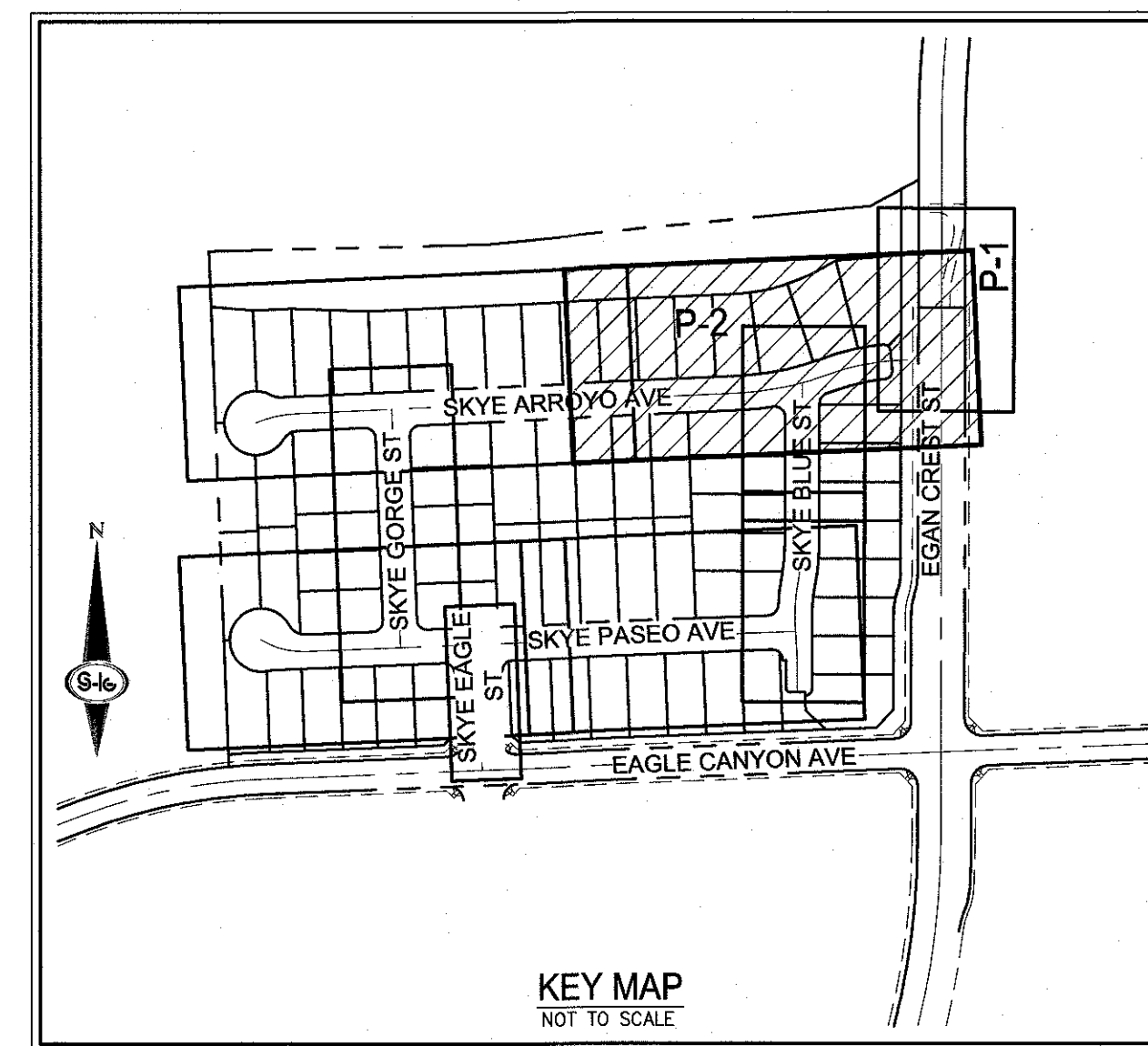
SOILS REPORT BY GEOTEK RESIDENTIAL, LLC
8835 S. ESCONDIDO ST. SUITE B LAS VEGAS,
NEVADA 89119
PROJECT NO. 12208-LVR DATED 02/08/2015

UPDATED SOILS REPORT BY GEOTEK RESIDENTIAL,
LLC
PROJECT NO. 12208-LVR DATED 03/30/2016

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= 288,984 CU YDS
FILL= 663 CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN
APPROVED LICENSED DISPOSAL FACILITY OR AT A
SITE WITH AN APPROVED AND ACTIVE GRADING
PERMIT.



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

DISCLAIMER NOTE

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GRADING NOTES

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3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SMPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
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8. 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/REPLACE/REPAIR FACILITIES IF ENGINEER/OWNER IS NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
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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. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE CONTRACTOR 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 II.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 ONE INCH OR MORE. IF THE CONTRACTOR OR HIS AGENT DOES NOT KNOWIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY, SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISBURGANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NV000000, SECTION II.A.12.
5. ACCUMULATED SEDIMENT IN BMPs SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT THAT EXCEEDS THE DESIGN RAINFALL RATE, WHICHEVER IS GREATER. EARLIER SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1750 E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

FAST

 **Call**
before you

UnderGround
1-702-432-5300
FREEWAY & ARTERIAL SYSTEM
OF TRANSPORTATION (F.A.S.T)

AVOID HITTING OVERHEAD
POWER LINES. IT'S
COSTLY.

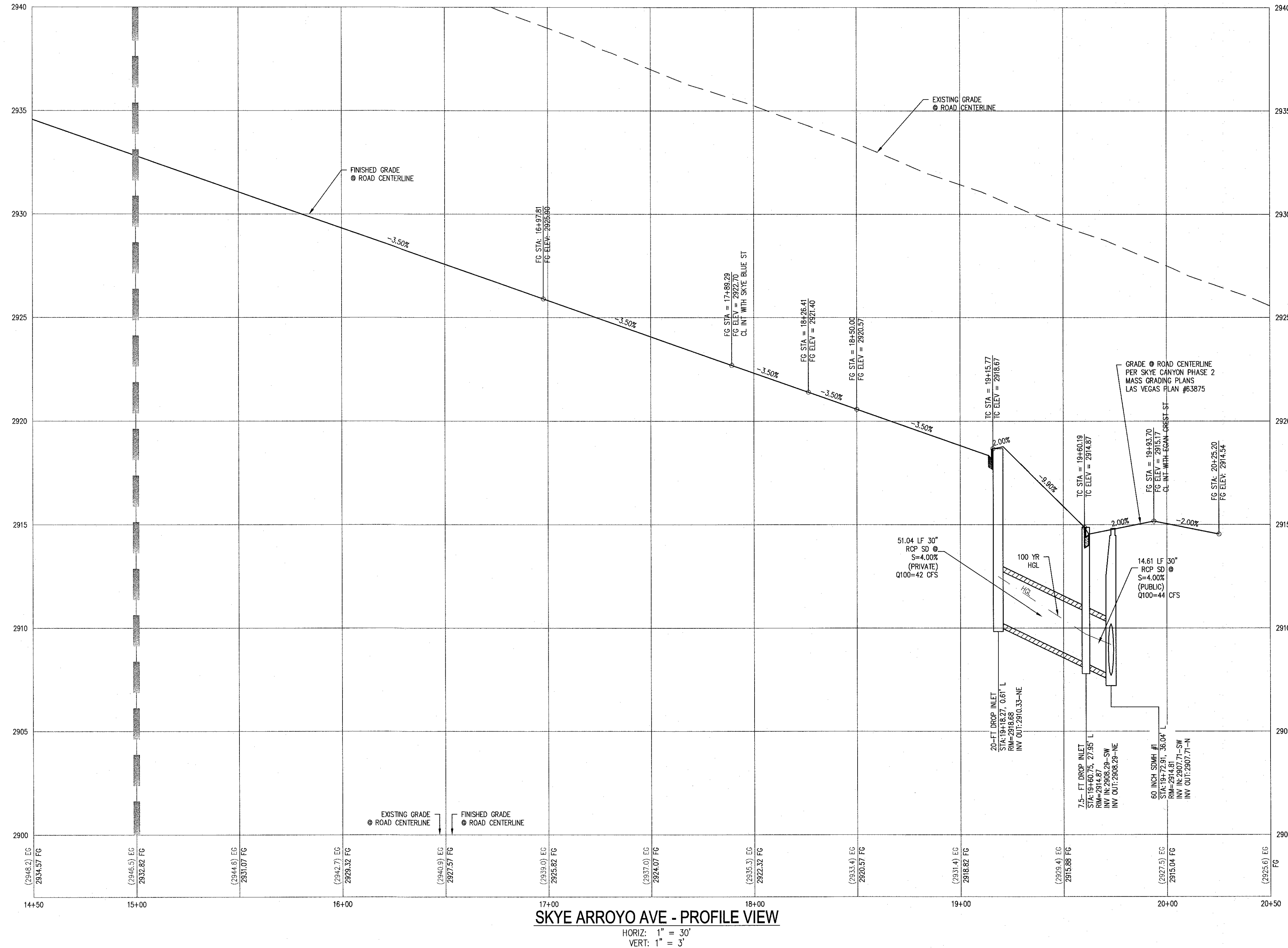
CALL BEFORE
YOU DO
OVERHEAD



1-702-227-2929

Call before you dig
AVOID CUTTING UNDERGROUND
UTILITY LINES. IT'S COSTLY.

Call
811
OR
1-800-227-2600



GRADING NOTES

17. INSTALL 30" ROLL CURB PER CAUSAID NO. 21751 OR 6"
18. INSTALL 5" WIDE CONCRETE SIDEWALK ("3" THICK OVER 6" 2" THICK AGGREGATE BASE) PER CAUSAID #234
19. INSTALL 8'-FT CUSSED GUTTER PER DETAIL 22.24
SHEET D-2
20. INSTALL 4" ASPHALT PAVEMENT OVER "4" TYPE B
21. CONSTRUCT SIDEWALK RAMPS USING ARMOR TYPE 1 DOWNS OR EQUIVALENT CAUSAID NO. 235, CAUSE # 1 & 235.1
22. CONSTRUCT 10' TRANSITION FROM "L" CURB TO ROLL CURB PER DETAIL 23 ON SHEET D-5
23. INSTALL 20.0" 7-GRATES TYPE "CM2" DROP INLET PER CAUSAID #412.1 AND #421
24. INSTALL "A" TYPE ISLAND CURB PER CAUSAID #219
25. INSTALL "L" TYPE CURB AND GUTTER PER CAUSAID #216
26. INSTALL 7.5" 2-GRATES TYPE "CM2" DROP INLET PER CAUSAID #412.1 AND #421
27. REMOVE EXISTING "C" STORM DRAIN AND DROP INLET PER SKYE CANTON PHASE 2 #24087
28. INSTALL 80" TYPE 1 STORM DRAIN MANHOLE PER CAUSAID #401.1 AND #402.1, INV. OUT 2593.7'
29. SEE SHEETS P-1 AND P-2
30. SEE CLASS "A" FOR PIPE SIZE PER PLAN - SEE SHEET P-4 AND P-8 FOR PROFILES
31. INSTALL "L" TYPE ISLAND CURB PER CAUSAID #219
32. INSTALL 8'-FT CUSSED GUTTER PER STD DWS 228
33. INSTALL 24" SIDEWALK DRAIN PER STD DWS 236
34. INSTALL WROUGHT IRON FENCE, DESIGN BY OTHERS
35. INSTALL WROUGHT IRON GATES, DESIGN BY OTHERS
36. INSTALL ACCESS GATES, DESIGN BY OTHERS

SEE SHEET C-3 FOR ABBREVIATIONS AND QUANTITIES

LEGAL DESCRIPTION

BENCHMARK

BM 7LV90 7NWS CITY OF LAS VEGAS RIVET AND
ROUND PLATE IN CONCRETE CYLINDER, SOUTHEAST
CORNER OF HUALAPAI WAY AND IRON MOUNTAIN
ROAD.

ELEV: 2840.13 FEET
ELEV: (865.67 METERS) (NAVD 1988)

BASIS OF BEARINGS

SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE ¼) OF SECTION 12, TOWNS 19 SOUTH, RANGE 59 EAST, M.D.M., AS PER FILE 151, PAGE OF SURVEYS, ON FILE IN THE COUNTY RECORDER'S OFFICE.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY ON FILE AT CITY OF LAS VEGAS DS ##-#### FOR THE SUBJECT PROJECT.

TIMOTHY M. MULROONEY, P.E. 22938 DATE _____

S-I-G **SLATER HANIFAN GROUP**
CONSULTING ENGINEERS & PLANNERS
PHONE (702) 284-5300 FAX (702) 284-5389
300 S. ARVILLE STREET #216, LAS VEGAS, NV 89118

[illegible]

NINETY FIVE MANAGEMENT, LLC

SKYE CANYON PARCEL 2.16

PLAN AND PROFILE - SKYE ARROYO ST 15+00 TO 20+50

S12 IT 19 R 59	
DATE:	10/28/16
DRAFTER:	HN
DESIGNER:	HN
CHECKED:	TMM
PROJECT NO.	
OLY1607-002	

ENGINEER
TIMOTHY M. MULROONEY
Exp. 12/31/2017
CIVIL
No. 22938
4/2/16
PROFESSIONAL ENGINEER
STATE OF NEVADA

i:\olm1607-002 skwe canyon parcel 2 16\dwg\improv\olm1607-002 prf.dwg 11/2/2016 11:35 AM Hung Nguyen