

DS #: 4556

APN: 163-03-806-012 & -013

Falconis Acura, west Sahara -

PROJECT: Planet Mazda

SUBMITTAL: 1st

SCANNED BY/DATE: _____

CHECKED BY/DATE: _____





CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		June 4, 2012
TO: Land Development Services Department of Public Works		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:	COPIES TO:
	Falconi's Acura, West Sahara – Planet Mazda	The LanDesign Consultant
Cross Streets:	NWQ of Sahara Avenue & Rainbow Blvd.	Centennial – Azure LLC
File Number:	F:\Depot\DSMemos\DS4556A.doc	Bart Anderson, P.E., DevCo
Parcel Number:	163-03-806-012 & -013	CCRFCD
Zoning Action:	PMP-45008	CCPW
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	5/29/2012	5/31/2012	See Comments Below	\$400.00	284704: \$400
			TOTAL FEES (LDDRS):		----

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.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. Provide a copy of the zoning/planning conditions associated with this site (**PMP-45008**) 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.
2. A review of the grading plan shows an elevation difference of five feet (5') maximum of cut along the west boundary of the proposed improvements. Sites with a grade difference of two feet (2') above or below existing are required to have approval from the *City Planning and Development Department*. The engineer must submit copies of the grading plans and detail sheets with a letter justifying the grade difference to the *City Planning Department* (229-6301). The engineer must provide *Planning* approval with the next submittal.
3. Provide a copy of the approved *Reversionary Map* for verification that a lot line through the middle of the proposed building no longer exists.
4. 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.
5. The site is also adjacent to the jurisdiction of *Clark County* to the south. The engineer must coordinate with *Clark County Department of Public Works* (CCPW) and incorporate any concerns for

boundary conditions along the *Sahara Avenue* border. CCPW concurrence is required prior to final acceptance of the study.

6. Revise Detail B2/7 and Detail C/7 to provide either a concrete valley gutter or a "U" channel adjacent to the proposed retaining wall to flood proof the wall from inundation. Show the "V" or "U" on the grading plan in the pertinent locations with flow line elevations at regular intervals accordingly.
7. A "North Arrow" has been shown on the grading plan, however, a "Scale Bar" is missing. Provide as such in the grading plan in the next submittal.
8. It appears that *Via Olivero Avenue* is not within the scope of the project. It is not necessary to include the street cross section. Review and remove in the next submittal.

In an effort to increase administrative efficiency, the City of Las Vegas Public Works Department requires all soil reports, drainage studies and traffic impact analysis submittals to be accompanied by an electronic copy of the submittal. Electronic documents must be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output replicating your submittal to be used for archival or display purposes. This may be more than one file if necessary. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats, but provided it is a high quality digitized replication of the submittal, other formats may be acceptable. If figures are in color, they must be scanned in color and saved as a separate file. The new submittal requirement is effective on **July 1, 2011**. If there are any questions regarding these new requirements, please contact Albert Sung in the Flood Section at (702) 229-2001 or Rick Schroder in Traffic Engineering at (702) 229-6327.

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

T/R/S: T21S/R60E/03
AREA Q03

UPDATE No 2
for the
TECHNICAL DRAINAGE STUDY
for
Falconi's Acura, West Sahara
and now including
Planet Mazda

Date Prepared:

May 17, 2012

Project No:

229.00

Prepared by

The LanDesign Consultant

I N C O R P O R A T E D
LAND DEVELOPMENT CIVIL ENGINEERS

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The
LanDesign
Consultant

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The LanDesign Consultant

I N C O R P O R A T E D

LAND DEVELOPMENT CIVIL ENGINEERS

providing insightful solutions for land development

May 17, 2012

Mr. Albert Sung
City of Las Vegas Flood Control Department
333 N. Rancho Drive
Las Vegas, NV 89106

Subject: Technical Drainage Study (TDS) Update No 2 for
Falconi's Acura, West Sahara – Planet Mazda

Dear Mr. Sung:

Submitted for your approval is one copy (1) copy of the Technical Drainage Study Update No 2 for the subject development. Included are a DRAINAGE PLAN and GRADING PLAN for the referenced updated site. We have also included an Adobe Acrobat pdf for your records.

The developer's intent is to construct a second auto dealership on the easterly inventory and display parking lot that was the subject of Update No1 to Falconi's Acura, West Sahara, (CLV 2928). The previous original and Update No 1 were prepared by myself with Cornerstone Engineering as the engineering firm. This update No 2, being prepared again by myself and shall be under the engineering firm, The LanDesign Consultant.

The proposed updated Mazda dealership does not affect any surrounding public improvements as the updated is limited to onsite construction. Therefore, for the purposes of this analysis we shall assume the runoff impacting the development from the adjacent streets remains unchanged from the approved analysis and we shall provide an update of the onsite conditions.

If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely

The LanDesign Consultant

I N C O R P O R A T E D

Telephone
(702) 547-0047

1134
Castle Point
Avenue
Henderson,
NV 89074



Brian Ridinger, PE

Development Planning and Feasibility

Civil Engineering

Entitlements

The
LanDesign
Consultant

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Update No 2 Falconi Acura, West Sahara / Planet Mazda Date: May 17, 2012

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

East/West: Sahara

b) Section: 3 Township: 21S Range: 60E

c) APN : 163-03-806-012 & 013

Name of Owner: Centennial - azure llc

Telephone No.: 702-5016392 Fax No.: 702-243-7788 E-Mail Address: elysium

Address: 1408 Saintsbury Drive, Las Vegas, NV 89144

Contact Person-Name: Brian Ridinger Telephone No.: (702) 547-0047

* E-Mail Address: brianr@landesignconsult.com Fax No.: (702) 547-0049

Firm: The LanDesign Consultant

Address: 1134 Castle Point Ave Henderson, NV 89074

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 8.84 Ac Being Developed/Disturbed: 3 +- AC

2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ Yes** ☒ No

3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ Yes** ☐ No

4. Proposed type of development (Residential, Commercial, Etc.): Commercial

5. Approximate upstream land area which drains to the subject site: n/a

6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: Falconi's Acura West Sahara

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Sahara Ave

8. Briefly describe your proposed schedule for the subject project: As Soon As Possible



Engineer's Seal

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

*New Required Field

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

Local Entity File No.	Revision	Date

REFERENCE:

STANDARD FORM 1

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name:	Update No2 Falconi Acura / Mazda	Map ID
Firm Name:	The LanDesign Consultant	Engineer: Brian Ridinger
Address:	1134 Castle Point Ave, Henderson, NV 89074	
City:	Henderson	State: NV ZIP 89011
Phone Number:	(702) 547-0047	Fax Number: (702) 547-0049
Property Owner:	See Form 1	
Address:		
City:		State: ZIP
Reviewed by:	Date Received:	Date Accepted for Review:

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

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

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

I. GENERAL REQUIREMENT

Yes	No	
<u>Yes</u>	<u> </u>	Design Manual Standard Form 1 with the engineer's seal and signature
<u>Yes</u>	<u> </u>	Design Manual Standard Form 4
<u>Yes</u>	<u> </u>	2 copies of the 24"x36" Drainage Plan
<u> </u>	<u> </u>	CLV 1 copy report plans and electronic pdf
<u> </u>	<u>N/A</u>	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS

Yes	No	
Yes	☐	A COPY OF A CURRENT flood Insurance Rate Map (FIRM) with the site delineated.
Yes	☐	A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.
	No	Off-site drainage basin maps for existing, interim and future conditions showing the existing Topography, basin boundaries, concentration points, and flows in cfs. On-site update only
Yes	☐	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.
Yes	☐	Vicinity Map with local and major cross streets identified and a north arrow.

III. DRAINAGE PLAN

Yes	No	
Yes	☐	Sheet size: 24"x36" sealed by a registered engineer in the State of Nevada.
Yes	☐	Minimum scale 1"=60'
Yes	☐	Project Name
Yes	☐	Vicinity Map with local and major cross streets
Yes	☐	Revision Box
Yes	☐	North arrow and bar scale
Yes	☐	Engineer's/consultant's address and phone number
Yes	☐	Elevation datum and benchmark
Yes	☐	Legend for symbols and abbreviations
Yes	☐	Cut/fill scarps, where applicable
Yes	☐	Street names, grades, widths
Yes	☐	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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes No

Yes _____ Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate

Yes _____ Minimum finish floor elevations with top-of-curb elevations at the upstream end of lot

Yes _____ Proposed typical street sections

_____ N/A _____ Streets with off-set crowns

Yes _____ Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes

Yes _____ Property lines

Yes _____ Right-of-way lines and widths, existing and proposed

Yes _____ Existing improvements and their elevations

Yes _____ Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm Peak flows at basin concentration points

Yes _____ Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets

Yes _____ Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for The 10-year and 100-year flows

Yes _____ Locations and cross-section of street capacity calculations.

Yes _____ Cross-sectional detail for channels, including cutoff wall locations

Yes _____ 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.

_____ N/A _____ Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shown 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.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
<u>Yes</u>	<u> </u>	Perimeter retaining wall locations. All Existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit
<u>Yes</u>	<u> </u>	Building and/or lot numbers
<u>Yes</u>	<u> </u>	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
<u> </u>	<u>N/A</u>	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.
<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> </u>	<u>N/A</u>	Appropriately elevated "humps" 6" above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q ₁₀₀ flows
<u>Yes</u>	<u> </u>	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent

IV. HYDROLOGIC ANALYSIS

Yes	No	
<u> </u>	<u>No</u>	Appropriate soil information and Soils Map for existing and future conditions with sub-basins and property delineated. Update, see approved study
<u>Yes</u>	<u> </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>Yes</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>Yes</u>	<u> </u>	Use of correct precipitation values in and around McCarran Airport rainfall area.
<u>Yes</u>	<u> </u>	A discussion in the text of the hydrologic analysis justifying sub-basin boundaries and cutoffs, supporting assumptions, and calculations.
<u>Yes</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>Yes</u>	<u> </u>	Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
<u> </u>	<u>N/A</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.

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.
☒ Yes	☐	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.
☒ Yes	☐	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.)
☒ Yes	☐	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.
☒ Yes	☐	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, which ever 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 report.
☐	☒ N/A	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
☐	☒ N/A	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.
☒ Yes	☐	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.

REFERENCE:

STANDARD FORM 2

II. GENERAL LOCATION AND DEVELOPMENT DESCRIPTION

1. SCOPE

The scope of this study is to provide an updated onsite hydrologic and hydraulic analysis for and Falconi's Acura auto-dealership. The update amends Update No 1 to include a new structure for the proposed Planet Mazda auto dealership. The update is limited to onsite and for the most part the eastern half of the original development. Our update scope is limited to updating the information for the revised onsite basins and establishing the minimum finish floor elevations from the approved flow parameters discussed in the original analysis. The onsite 10 and 100-year storm flows affecting the site are updated and recommendations for the drainage facilities necessary to convey these flows in accordance with the minimum standards as established by Clark County Regional Flood Control District (CCRFCD) and the City of Las Vegas are within.

2. LOCATION OF PROPERTY

(See Figure 1, Appendix A, *Vicinity Map*).

The site under investigation in this update is located adjacent to the east boundary of the approved Falconi's Acura Auto-dealership. The Planet Mazda addition stretches from Sahara Avenue northerly just short of Via Olivero Avenue and is bordered on the east by the existing Pontiac auto dealership.

A Legal description of the property is as follows: *a portion of the South half of the southeast quarter of Section 3, Township 21 South, Range 60 East, M.D.M., Clark County Nevada.*

Assessor's Parcel Number 163-03-806-012 & 0132 can further identify the subject property. It should be noted, a reversionary map is currently being process to assemble the property into one single parcel.

3. DESCRIPTION OF PROPERTY

The description of the property conforms with the existing analysis as discussed in the original report. For the purposed of this Update, we will only be discussing the items pertinent to the easterly addition of Planet Mazda. Excerpts from the original report and Addendum No 1 will be included for reference.

III. HYDROLOGIC ANALYSIS

1. OFF-SITE DRAINAGE DESCRIPTION

The offsite basins for this update are consistent with the original approved analysis and will not be discussed as a part of this update.

2. ON-SITE DRAINAGE DESCRIPTION

a) EXISTING

The on-site existing basins for this update are consistent with the original and update no 1 analysis and will not be discussed as a part of this update.

b) \PROPOSED

(See DRAINAGE PLAN, within a pocket of this report)

The proposed basins continue to convey runoff as discussed in the approved original and update No 1 studies. There are minor modifications that will be discussed here so as to update the drainage patterns of the proposed development.

Basins ON1 and ON4 is this update remain unchanged as previously modeled. Basin ON5U, for the most part remains unchanged as a small amount of basin area in added increasing the area from 0.85 acres to 0.86 acres. It should be noted, a newer version of the HEC-1 U.S Army Corps software is being use and slightly difference results were obtained for BasinON1 and Basin ON5U. Basin ON1, with unchanged data generated four (4) cfs instead of the previous approved five (5) cfs for the 100 year event. Basin ON5U generated one (1) cfs instead of the previous approved two (2) cfs for the 10 year event. Both changes in reported data in our professional opinion are insignificant and no further analysis is necessary.

Basin ON2U, the southeast corner of the Acura Building, is approximately half the size previously and runoff from this basin is directed to the commercial driveway located in the middle of the frontage on Sahara Avenue instead of the easterly commercial driveway. Basin ON2U yields runoff in the amount of one (1) and two (2) cfs for the ten (10) and one hundred (100) year storm flows, respectively. This runoff, as stated, is conveyed to the center or middle commercial driveway and combines with Basin ON1 at concentration point CPAU and yields three (3) and six(6) cfs for the ten (10) and one hundred (100) year storm flows, respectively. This results in a one (1) cfs increase during the 100 year event at this driveway.

Basin ON3U, for the most part, is the previous basin ON3 and the balance of basin ON2 not incorporated in basin ON2U. Basin ON3U convey runoff on the western half of the Mazda site to the easterly commercial driveway on Sahara Avenue. Basin ON3U generates three (3) and five (5) cfs for the ten (10) and one hundred (100) year storm flows, respectively. This results in a

three (3) and one (1) cfs reduction at this driveway during the 10 and 100 year events, respectively.

Basin ON6 or the Update No 1 analysis is updated to include a small portion of previous basin ON3 and to separate ON6 into a north and south basin. Basin ON6AU, the northern half, includes the small portion from ON3 and generates runoff in the amount of three (3) and five (5) cfs for the ten (10) and one hundred (100) year storm flows, respectively. This runoff is conveyed along the eastern edge of the basin and is discharged into the southern ON6BU basin. Basin ON6BU yields one (1) and two (2) cfs for the ten (10) and one hundred (100) year storm flows, respectively. There runoff from both updated basins is conveyed to the same discharge point as previously approved, a sidewalk underdrain into Sahara Avenue. Concentration Point CP1U has been relocated to this discharge point and results in four (4) and seven (7) cfs for the ten (10) and one hundred (100) year storm flows, respectively. This results in an increase of one (1) cfs for the 10 and 100 year event, respectively.

Basin ON7 is updated to ON7U resulting from a reduction in basin area added to ON6AU. Based on the new basin area, the runoff generated is negligible for the ten (10) and one hundred (100) year storm flows, respectively. This results in a decrease of one (1) cfs for the 100 year event, respectively.

Based on the adjustments proposed and the analysis performed, the runoff from Update No 2 results in a negligible change to the runoff conveyed with Sahara Avenue.

c) PROPOSED BASIN SUMMARY TABLE

PROPOSED BASIN	10 YEAR (CFS)	100 YEAR (CFS)
ON1	2	4
ON2U	1	2
ON3U	3	5
ON4	3	5
ON5U	1	3
ON6AU	3	5
ON6BU	1	2
ON7U	0	0

We have tabulated within Table 3, Appendix B, Time of Concentration the developed basin characteristics. Basin delineation is depicted on the DRAINAGE PLAN, within a pocket of this study. Basin characteristics were determined through field investigation, area technical manuals and area topography.

3. MASTER PLANNING INFORMATION

(See Figure 4, Appendix A, Regional Flood Control Facilities)

Review of Figure 4, Appendix A, Regional Flood Control Facilities, indicates a regional facility is adjacent to the westerly boundary of the proposed development and within the right of way of Via Olivero, north of the proposed development. The facility is referenced as MECH 0400, a "10'x6' RCB conveying 823 cfs. The proposed development does not adversely impact the existing Clark County Regional Flood Control Master Plan Facility. Figure 4 is a reproduction of Figure F-30 from CCRFCD Master Plan Update 2008.

4. FLOODPLAIN INFORMATION

The project is located within an area designated Flood Zone X. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panel number 2165 is an unprinted panel all areas are designated as Flood Zone X, "areas outside 500-year floodplain.

This remains the same as the original approved study.

5. PREVIOUS DRAINAGE STUDIES

There have been a number of hydrology studies in the project vicinity. Information from the following studies was utilized in the preparation of this report:

1. *Technical Drainage Study for Falconi's Acura West Sahara, CornerStone Engineering June 2001.*
2. *Addendum No. 1 to the Technical Drainage Study for Falconi's Acura West Sahara, CornerStone Engineering June 2001.*
3. *Update No 1 for the Technical Drainage Study for Falconi's Acura West Sahara, CornerStone Engineering Dec 2001..*

Please note, the City did not have access to the previous studies for inclusion in this report. We have included the last approval letter.

IV. PROPOSED DRAINAGE FACILITIES

1. GENERAL DESCRIPTION

The intent of this update is to update the addition of the Planet Mazda Auto Dealership to the Falconi's Acura Development. The intent is to construct the Mazda auto dealership as a second phase to the Falconi Acura Development.

The Hydrology Criteria and Facility Calculations presented within the original report and Update No 1 for the most part remain unchanged. The addition of the Planet Mazda to the site does not affect the flow conveyance within the adjacent streets, Sahara Avenue and Via Olivero.

The frontage along Sahara Avenue and Via Oliver will continue to have a six inch curb installed along the back of sidewalk as recommended in the original study and justified in Addendum No. 1.

Detailed on the DRAINAGE PLAN, within a pocket of this report, are the facilities discussed above. Each building has positive drainage away from the building at one percent minimum. The truck well drainage is conveyed in a pipe system to a sump pump and is discharge in the face of curb within Pecos Road. If the sump pump system fails, the maximum depth attainable in the truck well is two feet. By inspection, no on-site areas could possibly jeopardize or flood the proposed buildings.

2. HYDROLOGIC CRITERIA

1. Precipitation

(Determined in thr original analysis and reiterated here)

(See Table 4, Appendix B, *Precipitation Calculation*).

The Clark County Regional Flood Control, *Hydrologic Criteria and Drainage Design Manual*, (CCRFCD Manual) was used to determine the point precipitation values from rainfall distribution SDN3.. The off-site basins and the project site lay within the McCarran International Airport rainfall area. The rainfall depths of 1.58 and 2.77 inches were calculated for the six (6) hour ten (10) year and one hundred (100) year storms, respectively. The ratio of ten (10) year to one hundred (100) year is fifty-seven one hundredths (0.57).

2. Soils Classification

Soils Classification was determined in the original analysis and remains unchanged

3. Methodology

The criteria and methodology set forth in the Clark County Regional Flood Control, *Hydrologic Criteria and Drainage Design Manual*, (CCRFCD Manual) were utilized as the technical guidelines for this study.

The HEC-1 Flood Hydrograph Package, developed by the United States Corps of Engineers as revised June 1998, performed on an IBM compatible computer was used to model the existing and proposed basins. The HEC-1 package determined the existing and design flows using a 6-hour, 10-year and 100-year design storms per CCRFCD Manual. The SCS Unit Hydrograph method was applied to compute peak flow rates. The time of concentration was determined according to section 602 of the CCRFCD Manual.

3. FACILITIES CALCULATIONS

1. Sahara Avenue:

The following is an excerpt from the approved Technical Drainage Study for the flow characteristics for Sahara Avenue:

"... there are significant flows conveyed with the right of way of Sahara Avenue. To reiterate the magnitudes again, three hundred sixteen (316) and six hundred eighty-three (683) cfs for the ten (10) and one hundred (100) year storm flows, respectively. Again, these flows are referenced from the City of Las Vegas, Neighborhood Storm Drainage Plan for the Charleston/Sahara/Rainbow/Durango Area, August 1994. As noted within the referenced study, the presented flows are inclusive of facility flows and must be adjusted to reflect surface conveyance. For the Facility flows, we referenced the City of Las Vegas; City Wide Hydrology Study Update 1997. The referenced study indicates the existing sixty (60) inch storm drain capacity within Sahara Avenue is four hundred twelve (412) cfs. The following is a determination of surface flows by exclusion of the facility flows:

	100 YEAR	10YEAR
1994 inclusive flows	683	316
1997 City Wide Hydrology Study Update		
Facility Conveyance (See Figure6)	412	412
Resulting Surface flows	271	Negligible

Calculation Sheet 1, Appendix D, indicates the surface flow characteristics within Sahara Avenue for the one hundred (100) year event. The following is a summary of that calculation:

Street Slope:	2.50%
Maximum flow rate:	271 cfs
Depth of Flow:	0.94 ft

The depth of flow, as shown above, will exceed the top of curb during the 100 year event. Along Sahara Avenue, a significant amount of landscaping is proposed. To minimize restoration requirements to the landscaping during the 100 year event, we proposed to install a six (6) inch curb, located at the back of the proposed sidewalk. Calculation Sheet 1 reflects the six (6) inch curb as a part of the cross section.

The ten (10) year storm event within Sahara Avenue as reported by the referenced 1994 City analysis will be conveyed within the existing storm drain in Sahara Avenue. There will be negligible flows conveyed within Sahara Avenue between each storm drain drop inlet. Essentially, the ten (10) year event has a negligible impact to the development.

As a part of this scope for this Update No 2 analysis, the information for Sahara remains unchanged.

2. Via Olivero Avenue:

The following is an excerpt from the approved Technical Drainage Study for the flow characteristics for Via Olivero Avenue:

"... indicates larger magnitude flows are conveyed with the right of way of Via Olivero Avenue. The discussed flows were in the magnitude of two hundred sixty-nine (269) and seven hundred five (705) cfs for the ten (10) and one hundred (100) year storm flows, respectively. Again, these flows are referenced from the City of Las Vegas, Neighborhood Storm Drainage Plan for the Charleston/Sahara/Rainbow/Durango Area, August 1994. As noted within the referenced study, the presented flows are inclusive of facility flows and must be adjusted to reflect surface conveyance. For the Facility flows, we referenced the City of Las Vegas; City Wide Hydrology Study Update 1997. The referenced study indicates the existing forty-eight (48) inch storm drain capacity within Via Olivero Avenue is two hundred twenty-seven (227) cfs. The following is a determination of surface flows by exclusion of the facility flows:

	100 YEAR	10 YEAR
1994 inclusive flows	705	269
1997 City Wide Hydrology Study Update		
Facility Conveyance (See Figure 6)	227	227
Resulting Surface flows	478	42

Calculation Sheet 2, Appendix D, indicates the surface flow characteristics within Via Olivero Avenue for the one hundred (100) year event. The following is a summary of that calculation:

Street Slope:	1.05%
Maximum flow rate:	478 cfs
Depth of Flow:	1.32 ft

Along Via Olivero the street improvements, landscaping and perimeter wall are existing. We are limiting our improvements to Via Olivero to the two sidewalk drains we propose to drain the two on-site basins.

The ten (10) year storm event characteristics within Via Olivero Avenue are shown on Calculation Sheet 3, Appendix D, and indicates:

Flow Depth: 0.61 Feet, Average Velocity: 3.44 ft/s VxD: 2.1 < 6 ok.

While the maximum velocity requirement is met, a dry lane for all practical purposes is non-existent. However, it should be noted, a dry lane upstream of the development is not delivered to the site. It is our opinion; this development does not affect the current less than desirable condition.

With this update, the the street flow characteristics remain unchanged.

3. Finish Floor Elevations

As we are proposing a new building structure, MAZDA BUILDING, finish floor calculations are necessary. Finish floor elevations will be as set forth in 304.4, item E of the Clark County Regional Flood Control, *Hydrologic Criteria and Drainage Design Manual*. In Non-Special Flood Hazard Areas for new construction (residential and non-residential): The finish floor shall be set at a vertical distance above the gutter flow line of at least twice the depth of flow in the gutter flow line up to a maximum of 18 inches above the water surface elevation in the street.

The minimum finish floor elevations for the MAZDA Buildings reached by the conclusions of this study, based on the flow in Sahara Avenue are as follows:

Building #	TC Elev	Minimum Flood Protection Elev	Design FF Elev	Meets 2* d Criteria	FLOOD PROTECTED
MAZDA	2411.60	2412.98	2415.85	Yes	Yes

The minimum finish floor elevations for the MAZDA Buildings reached by the conclusions of this study, based on the flow in Via Olivero Avenue are as follows:

Building #	TC Elev	Minimum Flood Protection Elev	Design FF Elev	Meets 2* d Criteria	FLOOD PROTECTED
MAZDA	2417.56	2419.07	2415.85	NO*	Yes

The MAZDA BUILDING finish floor is flood protected through an alternative protective measure approved for the ACURA BUILDING. Paralleling the Via Olivero Avenue right of way is a bermed landscape area and a perimeter block wall. It is our intent to utilize the berming for the required flood protection. In general, the berm exceeds the top of the water surface by six inches. In addition to the existing landscape berm, the existing perimeter wall provides additional protection to the building. It is our opinion, the building is adequately flood protected as this alternative protective measure was approved for the original and Update No1 Study.

Depicted on the DRAINAGE PLAN, within a pocket of this report, are the design finish floor elevations.

4. Interior Alleys

(See Calculation Sheet 9-11, Appendix D).

The interior alleyways onsite meet with CCRFCD and City of Las Vegas minimum requirements. Each of the interior alleyway cross-sections is drawn and flow capacity analysis performed. In no case is twice the depth of flow greater than the finish floor elevations or the product of the flow depth and velocity ($V \times D$) exceeding six.

5. U-CURB SECTION

(See Calculation Sheet 12, Appendix D)

In order for basin ON6AU to drain, it is collected in a concrete U-Curb and conveyed past the site highpoint and to the southerly end of Basin ON6BU. The U-Curb is detailed on the included Grading and Detail plans. The 100 years conveyance is contained within the U- Curb as show on the Appendix D Calculation Sheet 12.

6. Wall Openings:

The wall openings are the same as approved and have not changed in this analysis.

V. CONCLUSION

1. COMPLIANCE with DRAINAGE LAWS, MASTER PLANS and REQUIREMENTS

Based on the data and analysis presented in this study, we conclude the development of PLANET MAZDA on the Falconi Acura Development will not have an unreasonable impact on the surrounding area. The proposed development does not impact any existing or proposed Clark County Regional Flood Control District Master Plan Facilities and does not fall within a FEMA defined Special Flood Hazard Area. The street system and drainage facilities proposed are capable of conveying the flow rates at depths and velocities that meet acceptable design standards. The finish floor elevations of the proposed building are set at least twice the depth of flow in the gutter flow line up to a maximum of 18 inches above the water surface of 100-year floods at the adjacent street and drainage facilities.

2. OVERALL FACILITY EFFECTIVENESS

The project as designed will effectively control storm water runoff for the 100-year and 10-year floods as analyzed within this study. There should be no adverse effects on upstream or downstream properties due to the proposed development. The development attempts to preserve the historical drainage pattern of the site and vicinity. The base for this study is the DRAINAGE PLAN, within a pocket of this report. Changes made invalidating plan assumptions or conclusions reached will require a subsequent analysis and agency review and processing.

VI. REFERENCES

1. Technical Manuals and Software References

1. *Hydrologic Criteria and Drainage Design Manual*, Prepared by WRC Engineering, Inc., Updated by Montgomery Watson, for Clark County Regional Flood Control District, August 1999.
2. *Las Vegas Valley Flood Control Master Plan Update*, Prepare by PBS&J, for Clark County Regional Flood Control District, September 2008.
3. *Soil Survey of Las Vegas Valley Area*, Nevada, Part of Clark County, United States Department of Agriculture Soil Conservation Service, July 1985.
4. *Flood Insurance Rate Map*, Federal Emergency Management Agency, Clark County, Nevada and Incorporated Areas.
5. *HEC-1 Flood Hydrograph Package*, User's Manual, U.S. Army Corps of Engineers, June 1998.
6. *FLOWMASTER*, Pipe and Ditch Sizing Software, HAESTAD Methods Inc.

2. Technical Hydrology Study References

1. Technical Drainage Study for Falconi's Acura West Sahara, CornerStone Engineering June 2001. *Technical Drainage Study for Falconi's Acura West Sahara, CornerStone Engineering June 2001.*
2. *Addendum No. 1 to the Technical Drainage Study for Falconi's Acura West Sahara, CornerStone Engineering June 2001.*
3. *Update No 1 for the Technical Drainage Study for Falconi's Acura West Sahara, CornerStone Engineering Dec 2001..*

VII. APPENDIX A

1. FIGURE 4

REGIONAL FLOOD CONTROL FACILITIES



FIGURE 4, PG 1 of 2

VIII. APPENDIX B

- | | |
|-------------------|----------------------------------|
| 1. TABLE 1 | RUNOFF CURVE NUMBERS |
| 2. TABLE 2 | PRECIPITATION CALCULATION |
| 3. TABLE 3 | TIME OF CONCENTRATION |

**TABLE 1
RUNOFF CURVE NUMBERS**

COVER DESCRIPTION		HYDROLOGIC SOIL GROUP			
COVER TYPE AND HYDROLOGIC CONDITION	% IMPERVIOUS	A	B	C	D
OPEN SPACE (lawns, parks, golf courses):					
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.		98	98	98	98
Streets and Roads :					
Paved; curbs and storm sewers		98	98	98	98
Paved; open ditches		83	89	92	93
Gravel		76	85	89	91
Dirt		72	82	87	89
WESTERN DESERT URBAN AREAS :					
Natural desert landscaping		63	77	85	88
Artificial desert landscaping		96	96	96	96
URBAN DISTRICTS :					
Commercial and Business	85	89	92	94	95
Industrial	72	81	88	91	93
RESIDENTIAL DISTRICTS :					
Apartments/Condos	72	81	88	91	93
Townhouses/6,000 sq ft lots or less	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
NEWLY GRADED AREAS (no vegetation)		77	86	91	94
DESERT SHRUB:					
Poor condition (ground cover < 30%)		63	77	85	88
Fair condition (ground cover 30% to 70%)		55	72	81	86
Good condition (ground cover > 70%)		49	68	79	84

TABLE 2
PRECIPITATION CALCULATION

Since the project site falls within the McCarran International Airport Rainfall Area, the magnitudes of 10-year and 100-year precipitation values may be determined from Figures 503 and 506 of the CCRFCD Manual:

10-year (6-hour) = 1.58"

100-year (6-hour) = 2.77"

RATIO of 10-Year to 100-Year Rainfall = $1.58''/2.77'' = 0.57$

IX. APPENDIX C

1. Updated Existing and Developed Conditions HEC-1 Analysis

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 16MAY12 TIME 19:36:22
*
*****

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*****
*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*
*****

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X X XXXXXXXX XXXX X
X X X X X XX
X X X X X X
XXXXXXX XXXX XXXX X
X X X X X X
X X X X X X
X X XXXXXXXX XXXX XXX

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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

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

*** FREE ***

1	ID	-----									
2	ID	: HYDROLOGY STUDY FOR									
3	ID	: FALCONIS ACURA WEST SAHARA									
4	ID	: UPDATE NO 2 / PLANET MAZDA									
5	ID	: LOCATION									
6	ID	: SAHARA WEST OF RAINBOW									
7	ID	: PREPARED									
8	ID	: Date, MAY 16, 2012									
9	ID	:									
10	ID	: Existing and Developed CONDITIONS:									
11	ID	: JOB NO. 229.00									
12	ID	: FILE NAME: 229hecUP2.IN									
13	ID	:									
14	ID	: PREPARED BY									
15	ID	: THE LanDesign Consultant									
16	ID	: 1134 CASTLE POINT AVE									
17	ID	: HENDERSON, NV 89074									
18	ID	-----									
19	ID	-----									
20	ID	*DIAGRAM									
21	IT	5	0	0	300						
22	IO	5									
23	IN	5									
24	JR	PREC	0.57	1							
25	KK	OF1									
26	KM	DEV OFFSITE BASIN FROM MITSUBISHI									
27	BA	0.0001									
28	PB	2.77	.020	.057	.07	.087	.108	.124	.13	.13	
29	PC	.000	.13	.13	.133	.14	.142	.148	.158	.172	
30	PC	.19	.197	.199	.200	.201	.204	.214	.229	.241	
31	PC	.251	.256	.27	.278	.281	.283	.295	.322	.352	
32	PC	.499	.59	.71	.744	.781	.812	.819	.835	.851	
33	PC	.86	.868	.876	.888	.91	.926	.937	.95	.97	
34	PC	.982	.985	.987	.989	.99	.993	.993	.994	.995	
35	PC	.998	.999	1.00							
36	PC	LS	0	98							
37	LS	0									
38	UD	0.050									
39	KK	EON2									
40	KM	UN-DEV ONSITE BASIN EON2									
41	BA	0.0045									
42	LS	0	88								
43	UD	0.100									
44	KK	CE1									
45	KM	COMBINE TWO BASINS									
46	HC	2									

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
47	KK EON1
48	KM UN-DEV ONSITE BASIN EON1
49	BA 0.0086
50	LS 0 88
51	UD 0.137
52	KK EON3
53	KM UN-DEV ONSITE BASIN EON3
54	BA 0.0004
55	LS 0 88
56	UD 0.100
57	KM *****
58	* *****
59	KM *END OF EXISTING BASINS CALCULATIONS *
60	KM *
61	KM *****
62	KK EOF1
63	KM DEV OFFSITE BASIN FROM MITSUBISHI
64	BA 0.0001
65	LS 0 98
66	UD 0.050
67	KK ON1
68	KM DEV BASIN SW CORNER
69	BA 0.0020
70	LS 0 95
71	UD 0.050
72	KK ON2U
73	KM DEV MODIFIED BASIN SOUTHERN MIDDLE
74	BA 0.0008
75	LS 0 95
76	UD 0.054
77	KK CPAU
78	KM COMBINATION POINT A, COMBINE EOF1, ON1 AND ON2U
79	HC 3
80	KK ON3U
81	KM DEV update BASIN SE CORNER
82	BA 0.0025
83	LS 0 95
84	UD 0.052
85	KK ON6AU
86	KM NORTH HALF OLD BASIN ON6
87	BA 0.0021
88	LS 0 98
89	UD 0.052

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
90	KK ON6BU
91	KM SOUTH HALF OLD BASIN ON6
92	BA 0.0012
93	LS 0 98
94	UD 0.136
95	KK CP1U
96	KM COMBINATION POINT 1U, COMBINE ON6AU AND ON6AB
97	HC 2
98	KK ON4
99	KM DEV BASIN NW CORNER
100	BA 0.0029
101	LS 0 95
102	UD 0.118
103	KK ON5U
104	KM DEV BASIN NE CORNER
105	BA 0.0013
106	LS 0 95
107	UD 0.051
108	KK ON7U
109	KM DEV BASIN EAST PROPERTY LINE
110	BA 0.0002
111	LS 0 88
112	UD 0.059
113	ZZ

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE	NO.	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
25		OF1			
39			EON2		
44		CP1.....			
47			EON1		
52					EON3
62				EOF1	
67				ON1	
72					ON2U
77				CPAU.....	
80				ON3U	
85					ON6AU
90					ON6BU
95				CP1U.....	
98					ON4
103					ON5U
108					ON7U

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 16MAY12 TIME 19:36:22
*

*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*

: HYDROLOGY STUDY FOR :
: FALCONIS ACURA WEST SAHARA :
: UPDATE NO 2 / PLANET MAZDA :
: LOCATION :
: SAHARA WEST OF RAINBOW :
: PREPARED :
: Date, MAY 16, 2012 :
: :
: Existing and Developed CONDITIONS :
: JOB NO. 229.00 :
: FILE NAME: 229hecUP2.IN :
: :
: PREPARED BY :
: THE Landesign Consultant :
: 1134 CASTLE POINT AVE :
: HENDERSON, NV 89074 :

22 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
MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS
JP
JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
.57 1.00

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
HYDROGRAPH AT	OF1	.00	1	.57	1.00
+					
HYDROGRAPH AT	EON2	.00	1	0.	0.
+				3.50	3.50
2 COMBINED AT	CP1	.00	1	3.	7.
+				3.50	3.50
HYDROGRAPH AT	EON1	.01	1	3.	7.
+				3.50	3.50
HYDROGRAPH AT	EON3	.00	1	5.	12.
+				3.58	3.58
HYDROGRAPH AT	EOF1	.00	1	0.	1.
+				3.50	3.50
HYDROGRAPH AT	ON1	.00	1	0.	0.
+				3.50	3.50
HYDROGRAPH AT	ON2U	.00	1	2.	4.
+				3.50	3.50
3 COMBINED AT	CPAU	.00	1	1.	2.
+				3.50	3.50
HYDROGRAPH AT	ON3U	.00	1	3.	6.
+				3.50	3.50
HYDROGRAPH AT	ON6AU	.00	1	3.	5.
+				3.50	3.50
HYDROGRAPH AT	ON6BU	.00	1	3.	5.
+				3.50	3.50
2 COMBINED AT	CP1U	.00	1	1.	2.
+				3.58	3.58
HYDROGRAPH AT	ON4	.00	1	4.	7.
+				3.50	3.50
HYDROGRAPH AT	ON5U	.00	1	3.	5.
+				3.58	3.58
HYDROGRAPH AT	ON7U	.00	1	1.	3.
+				3.50	3.50
				0.	0.
				3.50	3.50

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

X. APPENDIX D

- | | |
|--------------------------------|--|
| 1. CALCULATION SHEET 9 | Interior Alley, See Drainage Plan |
| 2. CALCULATION SHEET 10 | Interior Alley, See Drainage Plan |
| 3. CALCULATION SHEET 11 | Interior Alley, See Drainage Plan |
| 4. CALCULATION SHEET 12 | U Curb |

Cross Section for CALC SHEET 09, INTERIOR ALLEY

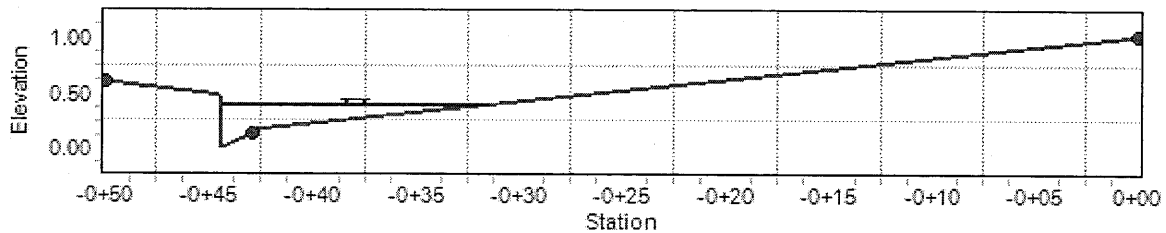
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 1.00000 %
Normal Depth 0.39 ft
Discharge 5.00 cfs

Cross Section Image



Worksheet for CALC SHEET 09, INTERIOR ALLEY

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 1.00000 %
Discharge 5.00 cfs
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.02
-0+43.00	0.17
-0+43.01	0.13
-0+44.42	0.00
-0+44.50	0.48
-0+45.00	0.50
-0+50.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.02)	(-0+43.01, 0.13)	0.017
(-0+43.01, 0.13)	(-0+50.00, 0.60)	0.013

Options

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

Results

Normal Depth 0.39 ft
Elevation Range 0.00 to 1.02 ft
Flow Area 1.81 ft²
Wetted Perimeter 13.40 ft
Hydraulic Radius 0.13 ft

Worksheet for CALC SHEET 09, INTERIOR ALLEY

Results

Top Width	13.02	ft
Normal Depth	0.39	ft
Critical Depth	0.43	ft
Critical Slope	0.00563	ft/ft
Velocity	2.77	ft/s
Velocity Head	0.12	ft
Specific Energy	0.51	ft
Froude Number	1.31	
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	0.39	ft
Critical Depth	0.43	ft
Channel Slope	1.00000	%
Critical Slope	0.00563	ft/ft

Cross Section for CALC SHEET 10, INTERIOR ALLEY

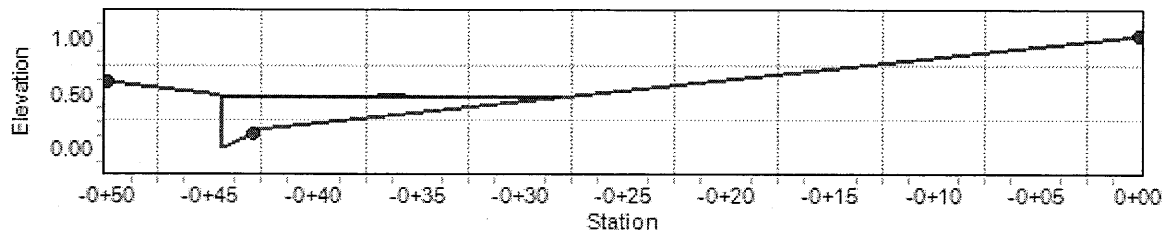
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.50000	%
Normal Depth	0.46	ft
Discharge	6.00	cfs

Cross Section Image



Worksheet for CALC SHEET 10, INTERIOR ALLEY

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.50000 %
Discharge 6.00 cfs
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.02
-0+43.00	0.17
-0+43.01	0.13
-0+44.42	0.00
-0+44.50	0.48
-0+45.00	0.50
-0+50.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.02)	(-0+43.01, 0.13)	0.017
(-0+43.01, 0.13)	(-0+50.00, 0.60)	0.013

Options

Current roughness weighting Method Improved Lotter's Method
Open Channel Weighting Method Improved Lotter's Method
Closed Channel Weighting Method Horton's Method

Results

Normal Depth 0.46 ft
Elevation Range 0.00 to 1.02 ft
Flow Area 2.81 ft²
Wetted Perimeter 16.88 ft
Hydraulic Radius 0.17 ft

Worksheet for CALC SHEET 10, INTERIOR ALLEY

Results

Top Width	16.45	ft
Normal Depth	0.46	ft
Critical Depth	0.45	ft
Critical Slope	0.00608	ft/ft
Velocity	2.14	ft/s
Velocity Head	0.07	ft
Specific Energy	0.53	ft
Froude Number	0.91	
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	0.46	ft
Critical Depth	0.45	ft
Channel Slope	0.50000	%
Critical Slope	0.00608	ft/ft

Cross Section for CALC SHEET 11, INTERIOR ALLEY

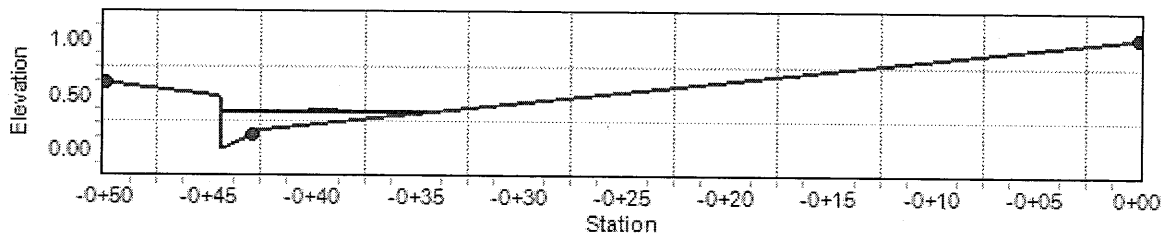
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.50000 %
Normal Depth 0.33 ft
Discharge 2.00 cfs

Cross Section Image



Worksheet for CALC SHEET 11, INTERIOR ALLEY

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.50000 %
Discharge 2.00 cfs
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.02
-0+43.00	0.17
-0+43.01	0.13
-0+44.42	0.00
-0+44.50	0.48
-0+45.00	0.50
-0+50.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.02)	(-0+43.01, 0.13)	0.017
(-0+43.01, 0.13)	(-0+50.00, 0.60)	0.013

Options

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

Results

Normal Depth 0.33 ft
Elevation Range 0.00 to 1.02 ft
Flow Area 1.10 ft²
Wetted Perimeter 10.23 ft
Hydraulic Radius 0.11 ft

Worksheet for CALC SHEET 11, INTERIOR ALLEY

Results

Top Width	9.91	ft
Normal Depth	0.33	ft
Critical Depth	0.33	ft
Critical Slope	0.00544	ft/ft
Velocity	1.82	ft/s
Velocity Head	0.05	ft
Specific Energy	0.38	ft
Froude Number	0.96	
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	0.33	ft
Critical Depth	0.33	ft
Channel Slope	0.50000	%
Critical Slope	0.00544	ft/ft

CALC SHEET 12, U CURB 100 YR

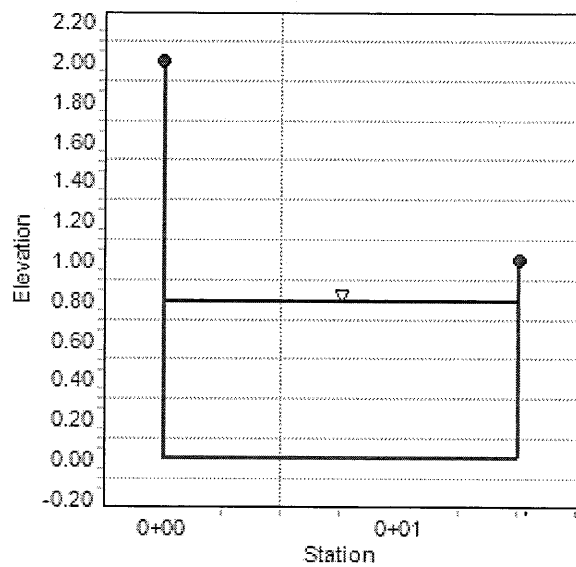
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.50000 %
Normal Depth 0.79 ft
Discharge 5.00 cfs

Cross Section Image



CALC SHEET 12, U CURB 100 YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.50000 %
Discharge 5.00 cfs
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2.00
0+00.01	0.00
0+01.50	0.00
0+01.50	1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2.00)	(0+01.50, 1.00)	0.013

Options

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

Results

Normal Depth 0.79 ft
Elevation Range 0.00 to 2.00 ft
Flow Area 1.17 ft²
Wetted Perimeter 3.06 ft
Hydraulic Radius 0.38 ft
Top Width 1.49 ft
Normal Depth 0.79 ft
Critical Depth 0.70 ft
Critical Slope 0.00670 ft/ft

CALC SHEET 12, U CURB 100 YR

Results

Velocity	4.26	ft/s
Velocity Head	0.28	ft
Specific Energy	1.07	ft
Froude Number	0.85	
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	0.79	ft
Critical Depth	0.70	ft
Channel Slope	0.50000	%
Critical Slope	0.00670	ft/ft

Worksheet for Tc Calc Sheet Basin ON2U

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.90000 %
Discharge 1.00 cfs
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.02
-0+43.00	0.17
-0+43.01	0.13
-0+44.42	0.00
-0+44.50	0.48
-0+45.00	0.50
-0+50.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.02)	(-0+43.01, 0.13)	0.017
(-0+43.01, 0.13)	(-0+50.00, 0.60)	0.013

Options

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

Results

Normal Depth 0.23 ft
Elevation Range 0.00 to 1.02 ft
Flow Area 0.36 ft²
Wetted Perimeter 5.13 ft
Hydraulic Radius 0.07 ft

Worksheet for Tc Calc Sheet Basin ON2U

Results

Top Width	4.90	ft
Normal Depth	0.23	ft
Critical Depth	0.27	ft
Critical Slope	0.00862	ft/ft
Velocity	2.75	ft/s
Velocity Head	0.12	ft
Specific Energy	0.35	ft
Froude Number	1.78	
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	0.23	ft
Critical Depth	0.27	ft
Channel Slope	2.90000	%
Critical Slope	0.00862	ft/ft

Worksheet for Tc Calc Sheet Basin ON3U

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.76000	%
Discharge	2.50	cfs
Section Definitions		

Station (ft)	Elevation (ft)
0+00.00	1.03
0+43.00	0.17
0+43.01	0.13
0+44.42	0.00
0+45.00	0.48
0+45.50	0.50
0+50.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.03)	(0+43.01, 0.13)	0.017
(0+43.01, 0.13)	(0+50.00, 0.60)	0.013

Options

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

Results

Normal Depth	0.35	ft
Elevation Range	0.00 to 1.02	
Flow Area	1.29	ft²
Wetted Perimeter	11.03	ft
Hydraulic Radius	0.12	ft

Worksheet for Tc Calc Sheet Basin ON3U

Results

Top Width	10.87	ft
Normal Depth	0.35	ft
Critical Depth	0.34	ft
Critical Slope	0.00807	ft/ft
Velocity	1.94	ft/s
Velocity Head	0.06	ft
Specific Energy	0.40	ft
Froude Number	0.99	
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	0.35	ft
Critical Depth	0.34	ft
Channel Slope	0.76000	%
Critical Slope	0.00807	ft/ft

Messages

Notes

max depth for this half section before overtops to other side is 1.02 '

Worksheet for Tc Calc Sheet Basin ON6AU

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.50000 %
Discharge 2.50 cfs
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.02
-0+43.00	0.17
-0+43.01	0.13
-0+44.42	0.00
-0+44.50	0.48
-0+45.00	0.50
-0+50.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.02)	(-0+43.01, 0.13)	0.017
(-0+43.01, 0.13)	(-0+50.00, 0.60)	0.013

Options

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

Results

Normal Depth 0.36 ft
Elevation Range 0.00 to 1.02 ft
Flow Area 1.34 ft²
Wetted Perimeter 11.41 ft
Hydraulic Radius 0.12 ft

Worksheet for Tc Calc Sheet Basin ON6AU

Results

Top Width	11.07	ft
Normal Depth	0.36	ft
Critical Depth	0.35	ft
Critical Slope	0.00565	ft/ft
Velocity	1.87	ft/s
Velocity Head	0.05	ft
Specific Energy	0.41	ft
Froude Number	0.95	
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	0.36	ft
Critical Depth	0.35	ft
Channel Slope	0.50000	%
Critical Slope	0.00565	ft/ft

Worksheet for Tc Calc Sheet Basin ON6BU

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.50000 %
Discharge 1.00 cfs
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.02
-0+43.00	0.17
-0+43.01	0.13
-0+44.42	0.00
-0+44.50	0.48
-0+45.00	0.50
-0+50.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.02)	(-0+43.01, 0.13)	0.017
(-0+43.01, 0.13)	(-0+50.00, 0.60)	0.013

Options

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

Results

Normal Depth 0.29 ft
Elevation Range 0.00 to 1.02 ft
Flow Area 0.76 ft²
Wetted Perimeter 8.28 ft
Hydraulic Radius 0.09 ft

Worksheet for Tc Calc Sheet Basin ON6BU

Results

Top Width	7.99	ft
Normal Depth	0.29	ft
Critical Depth	0.27	ft
Critical Slope	0.00911	ft/ft
Velocity	1.32	ft/s
Velocity Head	0.03	ft
Specific Energy	0.32	ft
Froude Number	0.75	
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	0.29	ft
Critical Depth	0.27	ft
Channel Slope	0.50000	%
Critical Slope	0.00911	ft/ft

XI. APPENDIX E

1. REFERENCE MATERIAL Technical Drainage Study for Falconi's Acura West Sahara
2. REFERENCE MATERIAL *Addendum No. 1 to the Technical Drainage Study
for Falconi's Acura West Sahara*
3. REFERENCE MATERIAL *Update No 1 for the Technical Drainage Study for
Falconi's Acura West Sahara*

It should be noted, the City of Las Vegas was unable at the time this study was prepared to provide record copies of the above referenced analysis. Therefore, the engineer has provided what is available including the last approval letter from the City.

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		June 25, 2002
TO: Land Development Services Department of Public Works		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:	
	Falconi's Acura, West Sahara	
Cross Streets:	NEC of Sahara Ave. and Montessori St.	
FILE NO.	F:\Depot\DSMEMOS\DS2928F.doc	
Parcel Number:	163-03-806-003, 004	
Zoning Action:		
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES	NO X
COPIES TO:		
		Falconi's Acura of Las Vegas
		CornerStone Engineering Inc.
		Cheri Edelman, P.E., CLV DevCo
		CCRFGD

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1 st Submittal	6/27/2001	7/3/2001	Not Acceptable	\$250.00
2 nd Submittal	10/5/2001	10/19/2001	Conditional Acceptance	\$250.00
CCRFGD	11/27/2001	11/28/2001	Accepted	N/C
3 rd Submittal	12/31/2001	1/7/2002	Not Acceptable	\$250.00
4 th Submittal	4/18/2002	4/29/2002	Conditional Acceptance	\$250.00
CCRFGD	6/25/2002	6/25/2002	Concurrence	N/C
			TOTAL FEES (LDDRS):	\$1,000.00

REMARKS:

3rd & 4th Submittals: Update to drainage study to include easterly portion and to develop in one phase

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

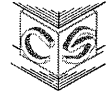
X	is acceptable in concept subject to conformance to all City standards and the following conditions.
	must be resubmitted or supplemented including the following:
	Must have Clark County Regional Flood Control District concurrence

- This update is to include the easterly approximately two acres within the Falconi's Acura development. Parking and landscape will be constructed in this addition. The auto dealership and this easterly addition will be developed in one phase.*

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

END OF REMARKS
Wld/ays

T/R/S: T21S/R60E/3
AREA Q-03



Land Planners

Civil Engineers

Development Entitlements

**TECHNICAL DRAINAGE STUDY
FOR
FALCONI'S ACURA, WEST SAHARA**

**City of
Las Vegas**

**June 22, 2001
File No. 288-00**

Prepared for:

**Falconi's Acura of Las Vegas
Perry Logan
5550 W Sahara Ave
Las Vegas, NV 89146**

Prepared by:

**CornerStone Engineering
I N C O R P O R A T E D
2285-C Renaissance Dr
Las Vegas, Nevada 89109**

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CornerStone Engineering

"Solutions ...by Design"



I N C O R P O R A T E D

Land Planners

Civil Engineers

Development Entitlements

June 13, 2001

Mr. Greg McDermott
City of Las Vegas Flood Control Department
731 S Fourth St
Las Vegas, NV 89101

Subject: Technical Hydrology Study for Falconi's Acura, West Sahara

Dear Mr. McDermott:

Submitted for your approval are two (2) copies of the subject Hydrology Study. Included with the study, within a pocket of this report, is a DRAINAGE PLAN and a GRADING PLAN for the referenced site.

The developer's intent is a proposed auto dealership on the westerly six and one-half acres of the approximate eight and three-quarters acre property. The easterly approximate two and one quarter acres will remain undeveloped at this time. The proposed project is located on Sahara Avenue approximately 1500 feet east of Tenaya Way. The intent is to construct the auto dealership in one current phase and the easterly property in a second future phase. A Legal description of the property is as follows: *a portion of the South half of the southeast quarter of Section 3, Township 21 South, Range 60 East, M.D.M., Clark County Nevada.* Assessor's Parcel Number 163-03-806-003 and 004 can further identify the subject property.

The scope of this study is to provide a hydrologic and hydraulic analysis for the Falconi's Acura development. The 10 and 100-year storm flows affecting the site are determined and recommendations for the drainage facilities necessary to convey these flows in accordance with the minimum standards as established by Clark County Regional Flood Control District (CCRFCD) and the City of Las Vegas are within.

If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,
CornerStone Engineering
I N C O R P O R A T E D

Brian Ridinger, P.E.

2285-C Renaissance Drive, Las Vegas Nevada 89119 Tele. (702)-731-4711 Fax (702)-731-4788
e- CornerStoneLV@aol.com

DRAINAGE STUDY INFORMATION FORM

Name of Development: Falconi's Acura West Sahara Date: June 22, 2001

Location of Development: a) Descriptive (Cross Streets) Sahara Rainbow

b) Sect. 3 Twn. 21S Rng. 60E

Name of Owner: Falconi's Acura Of Las Vegas Assessors Parcel No: 163-03-806-003,004

Telephone No: 702-367-6400 Facsimile No: 702-367-6632

Address: 5550 W Sahara Ave

Las Vegas, NV 89146

Contact Person Name: Brian Ridinger Telephone No: (702) 731-4711

Firm: CornerStone Engineering Inc

Address: 2285-C Renaissance Dr Las Vegas, NV 89119

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: 8.84AC Being Developed/Disturbed: Under 6.50 AC
- Is a portion or all of the subject property located in a designated 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.)? Commercial
- Approximate upstream land area which drains to the subject site? N/A
- Has the site drainage been evaluated in the past? ☐ Yes ☒ NO If yes, please identify documentation:

- If known, please briefly identify the proposed discharge point(s) of runoff from the site:
To Sahara and Via Olivero

- Briefly describe your proposed schedule for the subject project: As Soon as Possible

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.

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

Engineer's Seal

Local Entity File No.

Revision

Date

REFERENCE:

STANDARD FORM 1

II. GENERAL LOCATION AND DEVELOPMENT DESCRIPTION

1. LOCATION OF PROPERTY

(See Figure 1, Appendix A, *Vicinity Map*).

The site under investigation is located approximately fifteen hundred sixty feet east Teneya Way on Sahara Avenue within the jurisdiction of the City of Las Vegas, Nevada. The site stretches from Sahara Avenue northerly to Via Olivero Avenue. The site is between an existing Mitsubishi auto dealership to the west and a Pontiac auto dealership to the east.

A Legal description of the property is as follows: *a portion of the South half of the southeast quarter of Section 3, Township 21 South, Range 60 East, M.D.M., Clark County Nevada.* Assessor's Parcel Number 163-03-806-003 and 004 can further identify the subject property.

2. DESCRIPTION OF PROPERTY

(See Figures 2, Appendix A, SOILS REFERENCE MAP)

(Clark County Regional Flood Control, FLOOD CONTROL MASTER PLAN UPDATE LAS VEGAS VALLEY 1996, FIGURE H-14, Hydrologic Subareas, Land Use & Soils).

The, approximate six and one-half acre, project site is situated in an area underlain by thick lime-cemented hardpan with a thin upper layer of gravelly fine sandy loam. Storm runoff traverses desert terrain with sparse desert vegetation. The Natural soil composition places the site in a poor hydrologic soil group. The site topography generally slopes northwest to the southeast at a rate of approximately two (2%) to three (3%) percent.

III. HYDROLOGIC ANALYSIS

1. OFF-SITE DRAINAGE DESCRIPTION

The offsite basins upstream of the proposed development have been analyzed previously and the conclusions accepted by several subsequent analysis. The approved technical hydrology study for the existing development, Gaudin Las Vegas Jaguar – Porsche auto dealership, west of the proposed development, references and accepts the upstream off-site flows presented with the approved *Technical Drainage Study for the Sahara/Belecastro Business Center*, prepared by Chiatovich Engineering, May 1997. The referenced study utilizes the *City of Las Vegas, Neighborhood Storm Drainage Plan for the Charleston/Sahara/Rainbow/Durango Area, August 1994*. (See Figure 4)

Discussion with City of Las Vegas Flood Control Staff indicates this is still an acceptable study for reference even though there is a 1997 update. Our review of both City studies indicates the 1994-referenced study has larger flows, however the difference is a negligible

amount. For the purpose of this study, we will utilize the flow analysis within the 1994 City referenced study.

The historical upstream off-site basin characteristics and drainage patterns are altered slightly by the construction of the referenced Gaudin Las Vegas Jaguar – Porsche auto dealership and the adjacent Mitsubishi auto dealership. A very small basin, OF1, from the Mitsubishi auto dealership drains to the proposed development. The size of the basin is minimal and generates a negligible amount of drainage impacting the site. The remaining upstream off-site flows do not enter the proposed development and are conveyed past the development through Sahara Avenue and Via Olivero Avenue. The reference 1994 study indicates flows in Sahara Avenue in the magnitude of three hundred sixteen (316) and six hundred eighty-three (683) cfs for the ten (10) and one hundred (100) year storm flows, respectively. Via Olivero Avenue, conveys a larger flow in the magnitude of two hundred sixty-nine (269) and seven hundred five (705) cfs for the ten (10) and one hundred (100) year storm flows, respectively.

2. ON-SITE DRAINAGE DESCRIPTION

(See Figures 3, Appendix A, *Existing Conditions*)

a) EXISTING

Existing conditions on-site are undeveloped and two principal basin appears. We have modeled this basins to evaluate the historic runoff amount and the pattern discharging through and out of the project site.

Existing basin EON1, the larger on-site northerly basin, conveys it runoff to the southeast corner of the proposed development and discharges into Sahara Avenue. The basin generates five (5) and thirteen (13) cfs for the ten (10) and one hundred (100) year storm flows, respectively.

Existing basin EON2 the southerly basin also conveys runoff to the southeast and into Sahara Avenue. The basin generates three (3) and six (6) cfs for the ten (10) and one hundred (100) year storm flows, respectively, to concentration point 1 (CP1).

Historically, approximately one-half of the existing on-site basins drained easterly and then entered Via Olivero Avenue east of the development. The remaining half drained easterly and then entered Sahara Avenue. Resulting from the construction of the Courtesy Mitsubishi to the east and the Pontiac auto dealership to the west the historical drainage patterns are disrupted slightly.

b) PROPOSED

(See DRAINAGE PLAN, within a pocket of this report)

Table 5, Appendix B, *Peak Flow Summary*.

The proposed development generally divides into two drainage basins, northerly half and southerly half. For the purpose of this study we have sub divided the general drainage basins into sub-basins.

The southerly basin is divided into sub-basins OF1, ON1, ON2 and ON3. This is approximately one-half of the development, convey runoff via on-site alley concrete valley gutters and discharge into Sahara Avenue. Basin ON-1, the southwest corner of the site, is combined with of-site basin OF1 generating flows in the magnitude of three (3) and five (5) cfs for the ten (10) and one hundred (100) year storm flows, respectively. This flow is discharged into Sahara Avenue through a commercial driveway at concentration point CPA.

Basin ON-2, drains a portion of the building roof and the middle third of the southerly side of the proposed development. Basin ON-2 generates flows in the magnitude of two (2) and three (3) cfs for the ten (10) and one hundred (100) year storm flows, respectively. Basin ON-3, the southeast corner of the proposed development generates flows in the magnitude of two (2) and five (5) cfs for the ten (10) and one hundred (100) year storm flows, respectively. The flows are combined at concentration point CP1 and discharge through a commercial driveway into Sahara Avenue. The combination generates flows in the magnitude of four (4) and eight (8) cfs for the ten (10) and one hundred (100) year storm flows, respectively.

The northerly basin is divided into two sub-basins, ON4 and ON5. These basins drain to the northeast and discharge through two block wall openings into Via Olivero Avenue. Basin ON-4 drains a portion of the building roof and the northwest corner of the proposed development. Flows are in the magnitude of three (3) and five (5) cfs for the ten (10) and one hundred (100) year storm flows, respectively. Basin ON-5 drains the northeast corner of the proposed development and flows are in the magnitude of two (2) and three (3) cfs for the ten (10) and one hundred (100) year storm flows, respectively.

We have tabulated within Table 3 continued, Appendix B, Time of Concentration the developed basin characteristics and within Table 5, Appendix B, Peak Flow Summary the basin peak flows. Basin delineation is depicted on the DRAINAGE PLAN, within a pocket of this study. Basin characteristics were determined through field investigation, area technical manuals and area topography.

3. MASTER PLANNING INFORMATION

(See Figure 7, Appendix A, Regional Flood Control Facilities)

Review of Figure 7, Appendix A, Regional Flood Control Facilities, indicates a regional facility is adjacent to the westerly boundary of the proposed development. The facility is referenced as MECH 0400, a "10'x8" RCB conveying 764 cfs. Additionally, regional facility MECH 0401, a "60" RCP is within the right of way of Via Olivero, north of the proposed development. The proposed development does not adversely impact the existing Clark County Regional Flood Control Master Plan Facility. Figure 7 is a reproduction of Figure F-14 from CCRFCD Master Plane Update 1997.

4. FLOODPLAIN INFORMATION

The project is located within an area designated Flood Zone X. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panel number 2165 of 4090, map number 32003C2165 D, Clark County, Nevada and Incorporated Areas, effective August 16, 1995 is an unprinted panel all areas are designated as Flood Zone X, "areas outside 500-year floodplain.

5. PREVIOUS DRAINAGE STUDIES

There have been a number of hydrology studies in the project vicinity. Information from the following studies was utilized in the preparation of this report:

1. *Update to the Technical Drainage Study for Gaudin's Las Vegas Jaguar-Porsche, Pentacore, Dec 1998.*
2. *Technical Drainage Study for the Sahara/Belecastro Business Center, Chiatovich Engineering, May 1997.*

IV. PROPOSED DRAINAGE FACILITIES

1. GENERAL DESCRIPTION

The developer's intent is a proposed Acura auto dealership on the westerly six and one-half acres of the approximate eight and three-quarters acre property. The easterly approximate two and one-quarter acres will remain undeveloped at this time. The intent is to construct the auto dealership in one current phase and the easterly property in a second future phase.

A ridgeline is intended at the approximate mid point of the development to directing runoff northerly and southerly and discharging into the public street abutting the site.. Concrete valley gutters and pavement cross-section shall direct the runoff discharge to the proposed commercial driveways and sidewalk drains. The finish floors elevations of the buildings will be determined as set forth in 304.4, item E of the Clark County Regional Flood Control, *Hydrologic Criteria and Drainage Design Manual*.

The facilities discussed above are detailed on the DRAINAGE PLAN located within a pocket of this report. There is positive drainage away from the building at one percent minimum and all onsite areas are conveyed to the public streets. By inspection, no on-site areas could possibly jeopardize or flood the proposed buildings.

2. HYDROLOGIC CRITERIA

1. Precipitation

(See Table 2, Appendix B, *Precipitation Calculation*).

The off-site basins and the project site lay within the McCarran International Airport rainfall area. The rainfall depths of 1.58 and 2.77 inches were calculated for the six (6) hour ten (10) year and one hundred (100) year storms, respectively. The ratio of ten (10) year to one hundred (100) year is fifty-seven one hundredths (0.57).

2. Soils Classification

(See Figure 2, Appendix A, *Soils Reference Map*)

The soil information for the project watershed was obtained from the Master Plan Update of the Las Vegas Valley - Volume II, August 1991 and SCS Soil Survey of Las Vegas Valley Area. Examinations of these maps indicate the presence of type "D" soil within the off-site and on-site basins.

3. Methodology

The criteria and methodology set forth in the Clark County Regional Flood Control, *Hydrologic Criteria and Drainage Design Manual*, (CCRFC Manual) were utilized as the technical guidelines for this study.

The HEC-1 Flood Hydrograph Package, developed by the United States Corps of Engineers as revised May 1991, performed on an IBM compatible computer was used to model the existing and proposed basins. The HEC-1 package determined the existing and design flows using a 6-hour, 10-year and 100-year design storms per CCRFC Manual. The flow rates determined for this study are in tabular form within Table 5, Appendix B, *Peak Flow Summary*. The SCS Unit Hydrograph method was applied to compute peak flow rates. The time of concentration was determined according to section 602 of the CCRFC Manual.

3. FACILITIES CALCULATIONS

1. Sahara Avenue

(See Table 6, Appendix B, *Street Capacity*)

As discussed in section III.1 of this report, there are significant flows conveyed with the right of way of Sahara Avenue. To reiterate the magnitudes again, three hundred sixteen (316) and six hundred eighty-three (683) cfs for the ten (10) and one hundred (100) year storm flows, respectively. Again, these flows are referenced from the *City of Las Vegas, Neighborhood Storm Drainage Plan for the Charleston/Sahara/Rainbow/Durango Area, August 1994*. As noted within the referenced study, the presented flows are inclusive of facility flows and must be adjusted to reflect surface conveyance. For the Facility flows, we referenced the *City of Las Vegas; City Wide Hydrology Study Update 1997*. The referenced

study indicates the existing sixty (60) inch storm drain capacity within Sahara Avenue is four hundred twelve (412) cfs. The following is a determination of surface flows by exclusion of the facility flows:

	100 YEAR	10 YEAR
<i>1994 inclusive flows</i>	683	316
<i>1997 City Wide Hydrology Study Update</i>		
<i>Facility Conveyance (See Figure 6)</i>	412	412
Resulting Surface flows	271	Negligible

Calculation Sheet 1, Appendix D, indicates the surface flow characteristics within Sahara Avenue for the one hundred (100) year event. The following is a summary of that calculation:

Street Slope:	2.50%
Maximum flow rate:	271 cfs
Depth of Flow:	0.94 ft

The depth of flow, as shown above, will exceed the top of curb during the 100 year event. Along Sahara Avenue, a significant amount of landscaping is proposed. To minimize restoration requirements to the landscaping during the 100 year event, we proposed to install a six (6) inch curb, located at the back of the proposed sidewalk. *Calculation Sheet 1* reflects the six (6) inch curb as a part of the cross section.

The ten (10) year storm event within Sahara Avenue as reported by the referenced 1994 City analysis will be conveyed within the existing storm drain in Sahara Avenue. There will be negligible flows conveyed within Sahara Avenue between each storm drain drop inlet. Essentially, the ten (10) year event has a negligible impact to the development.

2. Via Olivero Avenue

(See Table 6, Appendix B, *Street Capacity*).

The discussion in section III.1 indicates larger magnitude flows are conveyed with the right of way of Via Olivero Avenue. The discussed flows were in the magnitude of two hundred sixty-nine (269) and seven hundred five (705) cfs for the ten (10) and one hundred (100) year storm flows, respectively. Again, these flows are referenced from the *City of Las Vegas, Neighborhood Storm Drainage Plan for the Charleston/Sahara/Rainbow/Durango Area, August 1994*. As noted within the referenced study, the presented flows are inclusive of facility flows and must be adjusted to reflect surface conveyance. For the Facility flows, we referenced the *City of Las Vegas; City Wide Hydrology Study Update 1997*. The referenced study indicates the existing forty-eight (48) inch storm drain capacity within Via Olivero Avenue is two hundred twenty-seven (227) cfs. The following is a determination of surface flows by exclusion of the facility flows:

	100 YEAR	10 YEAR
<i>1994 inclusive flows</i>	705	269
<i>1997 City Wide Hydrology Study Update</i>		
<i>Facility Conveyance (See Figure 6)</i>	227	227
Resulting Surface flows	478	42

Calculation Sheet 2, Appendix D, indicates the surface flow characteristics within Via Olivero Avenue for the one hundred (100) year event. The following is a summary of that calculation:

Street Slope:	1.05%
Maximum flow rate:	478 cfs
Depth of Flow:	1.32 ft

Along Via Olivero the street improvements, landscaping and perimeter wall are existing. We are limiting our improvements to Via Olivero to the two sidewalk drains we propose to drain the two on-site basins.

The ten (10) year storm event characteristics within Via Olivero Avenue are shown on *Calculation Sheet 3*, Appendix D, and indicates:

Flow Depth: 0.61 Feet, Average Velocity: 3.44 ft/s VxD: 2.1 < 6 ok.

While the maximum velocity requirement is met, a dry lane for all practical purposes is non-existent. However, it should be noted, a dry lane upstream of the development is not delivered to the site. It is our opinion; this development does not affect the current less than desirable condition.

3. Finish Floor Elevations

Finish floor elevations will be as set forth in 304.4, item E of the Clark County Regional Flood Control, *Hydrologic Criteria and Drainage Design Manual*. In Non-Special Flood Hazard Areas for new construction (residential and non-residential): The finish floor shall be set at a vertical distance above the gutter flow line of at least twice the depth of flow in the gutter flow line up to a maximum of 18 inches above the water surface elevation in the street.

With regard to the flows conveyed within Sahara Avenue, the requirement to establish the finish floor elevation at twice the depth of flow is met and exceeded. The following is a tabulation of the calculations:

Depth of Flow	Flow line Elev	Min Finish Floor Elev	Design Finish Floor
0.94 feet	2420.92	2432.32'	2425.00'

However, within Via Olivero Avenue, the requirement to establish the finish floor elevation at twice the depth of flow is not attainable. Therefore, alternative flood protective measures to effectively attain the minimum requirements are proposed. The following is a tabulation of the minimum requirements with regard to street flow.

Depth of Flow	Flow line Elev	Min Finish Floor Elev	Design Finish Floor
1.32 feet	2423.61	2426.25'	2425.00'

As discussed, paralleling the Via Olivero Avenue right of way is a bermed landscape area and a perimeter block wall. It is our intent to utilize the berming for the required flood protection. In general, the berm exceeds the top of the water surface by six inches. In addition to the existing landscape berm, the existing perimeter wall provides additional protection to the building. It is our opinion, the building is adequately flood protected.

Within a pocket of this report are also the DRAINAGE PLAN and GRADING PLAN where the design finish floor elevations are depicted.

4. Interior Alleys

(See *Calculation Sheet 4-6*, Appendix D).

The interior alleyways onsite meet with CCRFCD and City of Las Vegas minimum requirements. Each of the interior alleyway cross-sections is drawn and flow capacity analysis performed. In no case is twice the depth of flow greater than the finish floor elevations or the product of the flow depth and velocity ($V \times D$) exceeding six.

5. Wall Openings:

A block wall openings will be constructed at the northeast corners of the development. The opening will convey basins ON-4 and ON-5. A summary of the sizing calculations and procedures indicated on *Calculation Sheets 7* for the openings are as follows:

A wall opening of 16' x 4' is required to discharge onsite sub-basins ON4 and ON5 one hundred year event to Via Olivero Avenue.

A 50% clogging factor has been applied to the opening. The block wall at the locations of the openings (See DRAINAGE PLAN, included within a pocket of this report) is required to be solid grouted to at least one cell above the adjacent finish ground.

V. CONCLUSION

1. COMPLIANCE with DRAINAGE LAWS, MASTER PLANS and REQUIREMENTS

Based on the data and analysis presented in this study, we conclude the development of the Planet Hyundai will not have an unreasonable impact on the surrounding area. The proposed development does not impact any existing or proposed Clark County Regional Flood Control District Master Plan Facilities and does not fall within a FEMA defined Special Flood Hazard Area. The street system and drainage facilities proposed are capable of conveying the flow rates at depths and velocities that meet acceptable design standards. The finish floor elevations of the proposed building are set at least or protected to twice the depth of flow in the gutter flow line up to a maximum of 18 inches above the water surface of 100-year floods at the adjacent street and drainage facilities.

2. OVERALL FACILITY EFFECTIVENESS

The project as designed will effectively control storm water runoff for the 100-year and 10-year floods as analyzed within this study. There should be no adverse effects on upstream or downstream properties due to the proposed development. The development attempts to preserve the historical drainage pattern of the site and vicinity. The base for this study is the DRAINAGE PLAN, within a pocket of this report. Changes made invalidating plan assumptions or conclusions reached will require a subsequent analysis and agency review and processing.

VI. REFERENCES

1. Technical Manuals and Software References

1. *Hydrologic Criteria and Drainage Design Manual*, Prepared by WRC Engineers, Inc., Updated by Montgomery Watson, for Clark County Regional Flood Control District, August 1999.
2. *Flood Control Master Plan Update*, James M. Montgomery Consulting Engineers, Inc., for Clark County Regional Flood Control District, August 1991.
3. *Soil Survey of Las Vegas Valley Area*, Nevada, Part of Clark County, United States Department of Agriculture Soil Conservation Service, July 1985.
4. *Flood Insurance Rate Map*, Federal Emergency Management Agency, Clark County, Nevada and Incorporated Areas, Effective Date: August 16, 1995.
5. *HEC-1 Flood Hydrograph Package*, User's Manual, U.S. Army Corps of Engineers, September 1991.
6. *FLOWMASTER* Version 1.0, Pipe and Ditch Sizing Software, HAESTAD Methods Inc.

2. Technical Hydrology Study References

1. *Update to the Technical Drainage Study for Gaudin's Las Vegas Jaguar-Porsche, Pentacore*, Dec 1998
2. *Technical Drainage Study for the Sahara/Belecastro Business Center*, Chiatovich Engineering, May 1997.

VIII. APPENDIX B

1. TABLE 1 SCS CURVE NUMBERS
2. TABLE 2 PRECIPITATION CALCULATION
3. TABLE 3a TIME OF CONCENTRATION UnUrbanized
4. TABLE 3b TIME OF CONCENTRATION Urbanized
5. TABLE 4 NOT USED
6. TABLE 5 PEAK FLOW SUMMARY
7. TABLE 6 STREET CAPACITY

TABLE 1
SCS CURVE NUMBERS

COVER DESCRIPTION		HYDROLOGIC SOIL GROUP			
COVER TYPE AND HYDROLOGIC CONDITION	% IMPERVIOUS	A	B	C	D
OPEN SPACE (lawns, parks, golf courses): Poor condition (grass cover < 50%) Fair condition (grass cover 50% to 75%) Good condition (grass cover > 75%)		68 49 39	79 69 61	86 79 74	89 84 80
IMPERVIOUS AREAS : Paved parking lots, roofs, driveways, etc. Streets and Roads : Paved; curbs and storm sewers Paved; open ditches Gravel Dirt		98 98 83 76 72	98 98 89 85 82	98 98 92 89 87	98 98 93 91 89
WESTERN DESERT URBAN AREAS : Natural desert landscaping Artificial desert landscaping		63 96	77 96	85 96	88 96
URBAN DISTRICTS : Commercial and Business Industrial	85 72	89 81	92 88	94 91	95 93
RESIDENTIAL DISTRICTS : 1/8 acre or less 1/4 acre 1/3 acre 1/2 acre 1 acre 2 acre	65 38 30 25 20 12	77 61 57 54 51 46	85 75 72 70 68 65	90 83 81 80 79 77	92 87 86 85 84 82
NEWLY GRADED AREAS (no vegetation)		77	86	91	94
DESERT SHRUB: Poor condition (ground cover < 30%) Fair condition (ground cover 30% to 70%) Good condition (ground cover > 70%)		63 55 49	77 72 68	85 81 79	88 86 84

TABLE 2
PRECIPITATION CALCULATION

Since the project site falls within the McCarran International Airport Rainfall Area, the magnitudes of 10-year and 100-year precipitation values may be determined from Figures 503 and 506 of the CCRFCD Manual:

$$\mathbf{10\text{-}year\ (6\text{-}hour) = 1.58''}$$

$$\mathbf{100\text{-}year\ (6\text{-}hour) = 2.77''}$$

$$\mathbf{RATIO\ of\ 10\text{-}Year\ to\ 100\text{-}Year\ Rainfall = 1.58''/2.77'' = 0.57}$$

TABLE 5
PEAK FLOW SUMMARY

BASINS	10-YEAR (CFS)	100-YEAR (CFS)
EXISTING		
OF1	0	0
EON1	5	13
EON2	3	6
EXISTING CP1	3	6
DEVELOPED		
ON1	2	5
CPA	3	5
ON2	2	3
ON3	2	5
CP1	4	8
ON4	3	5
ON5	2	3

* See Off-Site and On-Site Drainage Maps for basin locations.

TABLE 6
STREET CAPACITY

STREET (100-YEAR STORM)

LOCATION	Q ₁₀₀ (cfs)	SLOPE (%)	WIDTH (ft)	V ₁₀₀ (Ft/s)	D ₁₀₀ (ft)	D x V
SAHARA	271	2.5	150	7.43	0.94	6.98
Via Olivero	478	1.05	60	8.75	1.32	11.55

HALF STREET (10-YEAR STORM)

LOCATION	Q ₁₀₀ (cfs)	SLOPE (%)	WIDTH (ft)	V ₁₀₀ (Ft/s)	D ₁₀₀ (ft)	D x V
SAHARA	N/A	2.5	150			
Via Olivero	42	1.9	60	3.44	.61	2.1

X. APPENDIX D

- 1. CALCULATION SHEET 1 Sahara 100 yr Event**
- 2. CALCULATION SHEET 2 Via Olivero Ave 100 yr Event**
- 3. CALCULATION SHEET 3 Via Olivero Ave 10 yr Event**
- 4. CALCULATION SHEET 4 Basin ON-1 100 yr Event**
- 5. CALCULATION SHEET 5 Basin ON-2 100 yr Event**
- 6. CALCULATION SHEET 6 Basin ON-4 100 yr Event**
- 7. CALCULATION SHEET 7 Block Wall Opening SIZING FOR ON4 & ON5**

Worksheet for Calc Sheet 1, Sahara 100 yr

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.02500 ft/ft
Discharge 271.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
-0+75	1.20
-0+66	1.10
-0+66	1.08
-0+66	0.60
-0+61	0.50
-0+60	0.48
-0+60	0.00
-0+59	0.13
-0+59	0.17
-0+01	1.33
0+00	1.75
0+00	1.75
0+12	1.50
0+12	1.48
0+13	1.09
0+59	0.17
0+59	0.13
0+60	0.00
0+60	0.48
0+61	0.50
0+66	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
---------------	----------------	-----------------------

Worksheet for Calc Sheet 1, Sahara 100 yr

Input Data

Start Station	Ending Station	Roughness Coefficient
(-0+75, 1.20)	(0+66, 0.60)	0.017

Options

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

Results

Normal Depth	0.94	ft
Elevation Range	0.00 to 1.75	
Flow Area	36.47	ft ²
Wetted Perimeter	92.44	ft
Hydraulic Radius	0.39	ft
Top Width	90.91	ft
Normal Depth	0.94	ft
Critical Depth	1.21	ft
Critical Slope	0.00530	ft/ft
Velocity	7.43	ft/s
Velocity Head	0.86	ft
Specific Energy	1.80	ft
Froude Number	2.07	
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	0.94	ft
Critical Depth	1.21	ft

Worksheet for Calc Sheet 1, Sahara 100 yr

GVF Output Data

Channel Slope	0.02500	ft/ft
Critical Slope	0.00530	ft/ft

Project Description

Manning Formula

Normal Depth

Channel Slope

0.02500 ft/ft

Discharge

111.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
-0+75	1.20
-0+66	1.10
-0+66	1.08
-0+66	0.60
-0+61	0.50
-0+60	0.48
-0+60	0.00
-0+59	0.13
-0+59	0.17
-0+01	1.33
0+00	1.75
0+00	1.75
0+12	1.50
0+12	1.48
0+13	1.09
0+59	0.17
0+59	0.13
0+60	0.00
0+60	0.48
0+61	0.50
0+66	0.60

Start Station	Ending Station	Roughness Coefficient
1	2	0.015
2	3	0.015
3	4	0.015
4	5	0.015
5	6	0.015
6	7	0.015
7	8	0.015
8	9	0.015
9	10	0.015
10	11	0.015
11	12	0.015
12	13	0.015
13	14	0.015
14	15	0.015
15	16	0.015
16	17	0.015
17	18	0.015
18	19	0.015
19	20	0.015
20	21	0.015
21	22	0.015
22	23	0.015
23	24	0.015
24	25	0.015
25	26	0.015
26	27	0.015
27	28	0.015
28	29	0.015
29	30	0.015
30	31	0.015
31	32	0.015
32	33	0.015
33	34	0.015
34	35	0.015
35	36	0.015
36	37	0.015
37	38	0.015
38	39	0.015
39	40	0.015
40	41	0.015
41	42	0.015
42	43	0.015
43	44	0.015
44	45	0.015
45	46	0.015
46	47	0.015
47	48	0.015
48	49	0.015
49	50	0.015
50	51	0.015
51	52	0.015
52	53	0.015
53	54	0.015
54	55	0.015
55	56	0.015
56	57	0.015
57	58	0.015
58	59	0.015
59	60	0.015
60	61	0.015
61	62	0.015
62	63	0.015
63	64	0.015
64	65	0.015
65	66	0.015
66	67	0.015
67	68	0.015
68	69	0.015
69	70	0.015
70	71	0.015
71	72	0.015
72	73	0.015
73	74	0.015
74	75	0.015
75	76	0.015
76	77	0.015
77	78	0.015
78	79	0.015
79	80	0.015
80	81	0.015
81	82	0.015
82	83	0.015
83	84	0.015
84	85	0.015
85	86	0.015
86	87	0.015
87	88	0.015
88	89	0.015
89	90	0.015
90	91	0.015
91	92	0.015
92	93	0.015
93	94	0.015
94	95	0.015
95	96	0.015
96	97	0.015
97	98	0.015
98	99	0.015
99	100	0.015

Worksheet for Calc Sheet 1A, Sahara 100 yr W/ Inlets

Input Data

Start Station	Ending Station	Roughness Coefficient
(-0+75, 1.20)	(0+66, 0.60)	0.017

Options

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

Results

Normal Depth	0.72	ft
Elevation Range	0.00 to 1.75	
Flow Area	19.13	ft ²
Wetted Perimeter	70.35	ft
Hydraulic Radius	0.27	ft
Top Width	69.23	ft
Normal Depth	0.72	ft
Critical Depth	0.89	ft
Critical Slope	0.00598	ft/ft
Velocity	5.80	ft/s
Velocity Head	0.52	ft
Specific Energy	1.25	ft
Froude Number	1.95	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

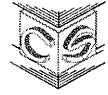
GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.72	ft
Critical Depth	0.89	ft

Worksheet for Calc Sheet 1A, Sahara 100 yr W/ Inlets

GVF Output Data

Channel Slope	0.02500	ft/ft
Critical Slope	0.00598	ft/ft



Land Planners

Civil Engineers

Development Entitlements

**ADDENDUM NO. 1
TO THE
TECHNICAL HYDROLOGY STUDY
FOR
FALCONI'S ACURA, WEST SAHARA**

**City of
LAS VEGAS**

**October 3, 2001
File No. 288-00**

Prepared for:

**FALCONI'S ACURA of Las Vegas
Perry Logan
5550 W Sahara Ave
Las Vegas, NV 89146**

Prepared by:

***CornerStone Engineering*
I N C O R P O R A T E D
101 Convention Center Dr Suite 880
Las Vegas, Nevada 89109**

DRAINAGE STUDY INFORMATION FORM

Name of Development: Falconi's Acura West Sahara Date: Oct 3, 2001

Location of Development: a) Descriptive (Cross Streets) Sahara Rainbow

b) Sect. 3 Twn. 21S Rng. 60E

Name of Owner: Falconi's Acura Of Las Vegas Assessors Parcel No: 163-03-806-003,004

Telephone No: 702-367-6400 Facsimile No: 702-367-6632

Address: 5550 W Sahara Ave

Las Vegas, NV 89146

Contact Person Name: Brian Ridinger Telephone No: (702) 731-4711

Firm: CornerStone Engineering Inc

Address: 2285-C Renaissance Dr Las Vegas, NV 89119

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: 8.84AC Being Developed/Disturbed: Under 6.50 AC
- Is a portion or all of the subject property located in a designated 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.)? Commercial
- Approximate upstream land area which drains to the subject site? N/A
- Has the site drainage been evaluated in the past? ☐ Yes ☒ NO If yes, please identify documentation:

- If known, please briefly identify the proposed discharge point(s) of runoff from the site:
To Sahara and Via Olivero

- Briefly describe your proposed schedule for the subject project: As Soon as Possible

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.

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

Engineer's Seal

Local Entity File No.

Revision

Date

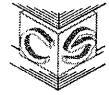
REFERENCE:

STANDARD FORM 1

CornerStone Engineering

I N C O R P O R A T E D

"Solutions ...by Design"



Land Planners

Civil Engineers

Development Entitlements

October 3, 2001

Albert Sung
City of Las Vegas Flood Control
731 S Fourth St
Las Vegas, NV 89101

SUBJECT: Addendum No 1 for Falconi's Acura, West Sahara

Dear Albert:

We are in receipt of Technical Hydrology Review Comments, dated July 3, 2001 for the referenced project.

The intent of this addendum is to respond to your concerns and if necessary supplement the original Technical Hydrology Study. We believe the responses we have provided will adequately address your review comments. If you have any questions or comments, please contact us at your earliest opportunity.

Sincerely,
CornerStone Engineering
I N C O R P O R A T E D

Brian Ridinger, P.E.

Comments are presented in **BOLD** type with the response following:

Comment 2. 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 acceptance of the drainage study.

RESPONSE: Understood, Please accept the study in concept and condition the approval requiring concurrence from CCRFCD

Comment 2. Sites with a grade difference 2 feet above or below existing are required to have approval from City of Las Vega Current Planning. Provide Current Planning approval with the next submittal. The engineer is directed to contact Mr. Matt Pinjuv of the City of Las Vegas at 229-6793.

RESPONSE: Approval notice is included with this addendum.

Comment 3. It appears flows from Sahara Avenue may enter the driveway entrances and cause a backwater into the onsite sidewalk underdrains. This must be addressed and revisions provided appropriately.

RESPONSE: While it is true, the 100 year flow depth will encroach in the site at the driveway entrances, the onsite sidewalk underdrains will not be adversely affected.

The westerly driveway, at the middle of the site, the lowest flow line elevation of the underdrain is 2416.02 feet. The flow line in Sahara Avenue is 2414.99 feet with a flow depth of 0.94 feet, resulting in a water surface elevation of 2415.93 feet. The flowline elevation of this underdrain is above the water surface elevation in Sahara Avenue.

The easterly driveway, at the southeast corner of the site, the lowest flow line elevation of the underdrain is 2410.54 feet. The flow line in Sahara Avenue is 2409.71 feet with a flow depth of 0.94 feet, resulting in a water surface elevation of 2410.65 feet. The flowline elevation of this underdrain is at the water surface elevation in Sahara Avenue. In our opinion, the underdrain will function more than adequately.

We would like to point out, the underdrain has been installed to allow a sidewalk access to the proposed development. If this sidewalk access had not been desired, a curb channel would have been installed. We do not believe the reviewer would have made this comment if the design had a proposed curb channel. The sidewalk drain is no more than a curb channel with a metal plate over the top.

In our opinion, the underdrains will function as required with no adverse affects to the site during the 100 year event and will remain as designed.

Comment 4. The engineer must address any flows entering the northwest corner of the site from Via Olivero and from the adjacent property to the west through the existing chain link fence. This must be addressed.

RESPONSE: While there may be some landscaping installed, it is our intent to leave the small area at the northwest corner of the site in like grading conditions as is current. A block perimeter wall is proposed to close the proposed development and the adjacent development has a curb channel along its east boundary conveying drainage to Via Olivero.. No water from Via Olivero or the adjacent development will enter the proposed Acura Dealership. Additionally, field observations do not show evidence that drainage from the adjacent development or Via Olivero has traversed the proposed Acura Development. In our opinion, the small area at the northwest corner of the development does not have any kind of inundation issue.

Comment 5. The cross section of Via Olivero shows a landscape berm to protect the proposed onsite building. However the flow velocity is erosive (8.75 ft/s) according to the calculations submitted. Provide erosion protection for the berm such as riprap (sizing calculation is needed) or put a flood wall at the back of the sidewalk.

RESPONSE: As discussed in the technical study, Section III.1, flows within Via Olivero were referenced from the *City of Las Vegas, Neighborhood Storm Drainage Plan for the Charleston/Sahara/Rainbow/Durango Area*. See Figure 4 of the Technical Study. The magnitudes of these flows are considered conservative, and were selected for the consideration of the Finish Floor elevation of the building.

With respect to the landscaping protection, we would like to reference flows from another approved City study, the *Oakey Detention Basin Design Planning Study*, prepared by Boyle Engineering Corporation in December of 1991. In the appendix of this Addendum, excerpts from the referenced study specifically, Exhibit B-3, show the flows and drainage structures at the intersection of Via Olivero and Montessouri. The right of way for Montessouri has been vacated with the exception of a drainage easement for the box culvert. We have indicated the location of the proposed site on the referenced Exhibit. Review of the Exhibit shows flows upstream in Via Olivero in the magnitude of two hundred ninety (290) cfs. Additionally, there are existing storm grate and curb opening inlets at the northwest corner of the proposed development that collect eighty (80) cfs each. The referenced exhibit shows one hundred thirty (130) cfs is conveyed within Via Olivero adjacent to the proposed development.

We have included in the appendix of this addendum, Calculation Sheet 2A. This data shows the revised flow characteristics with the flow in Via Olivero of one hundred thirty

(130) cfs. The revised flow depth is 0.82 feet and the revised velocity is 5.22 feet per second, barely considered erosive.

We proposed to install a six inch concrete curb at the back of the existing sidewalk. The six inch curb will protect the existing landscape berm and provide approximately four inches of freeboard. We have discussed this alternative and the provided freeboard with City Flood Control Staff. It is determined, this alternative and its conditions are acceptable resulting from the sidewalk and landscaping being existing along Via Olivero.

Comment 6. It appears on the Standard Form 4 for the existing conditions, that the lengths and slopes for basins EON1 should be for basin EON2, and vise-versa. This must be addressed and revisions provided appropriately.

RESPONSE: The reviewer is correct and we appreciate their bring this to our attention. We will revise the table as well as the HEC analysis and will included the updated information within this addendum.

A summary of the changes are as follows:

Basin EON1 Q_{100} is revised from 13 to 12 cfs

Basin EON2 Q_{100} is revised from 6 to 7 cfs

A negligible net change as these two basins enter West Sahara.

Comment 7. The location of the normal depth calculations must be indicated on the Developed Condition Drainage Plan. Also, there appears to be three north arrows and bars scales, with different scales labeled on the Developed Condition Drainage Plan. The Drainage plan must be revised, and the engineer must recheck the lengths on the Standard Form 4 and provide revisions as necessary.

RESPONSE: The plan has been revised. No change is necessary to Form 4.

Comment 8. The depth of flow on the exterior streets must be labeled on the Developed Condition Drainage Plan.

RESPONSE: The flow depths have been added to the plan.

Comment 9. The following comments must be address on the grading plans:

- a. The onsite and offsite sidewalk underdrains must be labeled, with the flowline elevations indicated on the plans.**

RESPONSE: The off-site sidewalk drains have been labeled and the flow line elevations shown. The on-site sidewalk drains have been labeled, however, the submitted plans show the top back of curb grades that control the elevation of the drains. Flow line elevations will not be shown for the on-site sidewalk drains.

- b. Cross-section indicates labeled “?” on sheet G2 must be removed.**

RESPONSE: Done

- c. A cross-sectional detail of the east side of the site with and without the valley gutter must be provided.**

RESPONSE: Done

- d. Cross-sectional details B1 and B2 are labeled as “East PL Cross Section”, Yet they are delineated on the west property line. Revise as necessary.**

RESPONSE: Done

- e. Cross-section detail D is labeled “West PL Cross Section”, yet it’s location is not shown on the grading plan.**

RESPONSE: Done

- f. Cross-sectional detail E is shown to be located at the west block wall opening on the north property line, yet it does not seem to match the detail. Revise appropriately.**

RESPONSE: Cross section E is shown on sheet G2 is the appropriate locations. On Sheet G1, while the section may look like an E it is actually an F. We have move the section label so as to make more clear.

- g. The wall openings must be labeled on the grading plan**

RESPONSE: Done

- h. The onsite valley gutters must be labeled**

RESPONSE: Done

- i. Master Planned Facilities must be labeled**

RESPONSE: Done

j. On Sahara Avenue, the 6-inch curb at the back of sidewalk must be a stemwall to provide 6-inches of freeboard

RESPONSE: As discussed in COMMENT 5 above, flows within Via Olivero were referenced from the *City of Las Vegas, Neighborhood Storm Drainage Plan for the Charleston/Sahara/Rainbow/Durango Area*. See Figure 4 of the Technical Study. The magnitudes of these flows are considered conservative, and were selected for the consideration of the Finish Floor elevation of the building. The same is applicable for Sahara Avenue.

With respect to the landscaping protection, we would like to reference upstream storm drain facilities not incorporate within the original technical study and approved with the City study, *Oakey Detention Basin Design Planning Study*, prepared by Boyle Engineering Corporation in December of 1991. In the appendix of this Addendum, excerpts from the referenced study specifically, Exhibit B-2, show the drainage structures at the intersection of Sahara Ave and Montessouri. The right of way for Montessouri has been vacated with the exception of a drainage easement for the box culvert. Review of the Exhibit shows there are existing storm grate and curb opening inlets at the Southwest corner of the proposed development that collect eighty (80) cfs each.

We have included in the appendix of this addendum, Calculation Sheet 1A. This data shows the revised flow characteristics with the flow in Sahara of one hundred eleven (111) cfs. The original technical study showed two hundred seventy-one (271) cfs in Sahara Avenue. The existing inlets collectively reduce the Sahara flow by one hundred sixty (160) cfs for a total flow passing the proposed development of one hundred eleven (111) cfs. The revised flow depth is 0.72 feet and the revised velocity is 5.8 feet per second, barely considered erosive.

As proposed in the technical study a six inch concrete curb at the back of sidewalk will be installed. The six inch curb will protect the landscaping and provide approximately five inches of freeboard. We understand the City typically requests six inches of freeboard for the landscape areas, however, we feel in this instance, the freeboard provided is adequate to protect the landscaping and minimize the potential for maintenance issues within the storm drainage facilities.

Worksheet for Calc Sheet 2, Via Olivero 100 yr-Adum1

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.01050 ft/ft
Discharge 478.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
-0+30	0.60
-0+25	0.50
-0+25	0.48
-0+24	0.00
-0+23	0.13
-0+23	0.17
0+00	0.63
0+23	0.17
0+23	0.13
0+24	0.00
0+25	0.48
0+25	0.50
0+30	0.60
0+30	1.10

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+30, 0.60)	(-0+23, 0.13)	0.013
(-0+23, 0.13)	(0+23, 0.17)	0.017
(0+23, 0.17)	(0+30, 1.10)	0.013

Options

Current Roughness Weighted Method Improved Lotter's Method
Open Channel Weighting Method Improved Lotter's Method

Worksheet for Calc Sheet 2, Via Olivero 100 yr-Adum1

Options

Closed Channel Weighting Method Horton's Method

Results

Normal Depth		1.32	ft
Elevation Range	0.00 to 1.10		
Flow Area		54.64	ft ²
Wetted Perimeter		62.33	ft
Hydraulic Radius		0.88	ft
Top Width		60.00	ft
Normal Depth		1.32	ft
Critical Depth		1.66	ft
Critical Slope		0.00367	ft/ft
Velocity		8.75	ft/s
Velocity Head		1.19	ft
Specific Energy		2.51	ft
Froude Number		1.62	
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	1.32	ft
Critical Depth	1.66	ft
Channel Slope	0.01050	ft/ft
Critical Slope	0.00367	ft/ft

Worksheet for Calc Sheet 2A,ViaOlivero100yrAd1W/ Inlet

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.01050 ft/ft
Discharge 130.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
-0+30	0.60
-0+25	0.50
-0+25	0.48
-0+24	0.00
-0+23	0.13
-0+23	0.17
0+00	0.63
0+23	0.17
0+23	0.13
0+24	0.00
0+25	0.48
0+25	0.50
0+30	0.60
0+30	1.10

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+30, 0.60)	(-0+23, 0.13)	0.013
(-0+23, 0.13)	(0+23, 0.17)	0.017
(0+23, 0.17)	(0+30, 1.10)	0.013

Options

Current Roughness weighted Method Improved Lotter's Method
Open Channel Weighting Method Improved Lotter's Method

Worksheet for Calc Sheet 2A,ViaOlivero100yrAd1W/ Inlet

Options

Closed Channel Weighting Method Horton's Method

Results

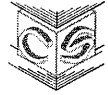
Normal Depth		0.82	ft
Elevation Range	0.00 to 1.10		
Flow Area		24.89	ft ²
Wetted Perimeter		61.34	ft
Hydraulic Radius		0.41	ft
Top Width		60.00	ft
Normal Depth		0.82	ft
Critical Depth		0.93	ft
Critical Slope		0.00478	ft/ft
Velocity		5.22	ft/s
Velocity Head		0.42	ft
Specific Energy		1.24	ft
Froude Number		1.43	
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	0.82	ft
Critical Depth	0.93	ft
Channel Slope	0.01050	ft/ft
Critical Slope	0.00478	ft/ft



Land Planners

Civil Engineers

Development Entitlements

**UPDATE NO.1
FOR THE
TECHNICAL DRAINAGE STUDY
FOR
FALCONI'S ACURA, WEST SAHARA**

**City of
Las Vegas**

**December 25, 2001
File No. 288-00**

Prepared for:

**Falconi's Acura of Las Vegas
Perry Logan
5550 W Sahara Ave
Las Vegas, NV 89146**

Prepared by:

***CornerStone Engineering*
I N C O R P O R A T E D
101 Convention Center Dr. Suite 880
Las Vegas, Nevada 89109**

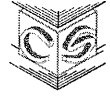
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CornerStone Engineering

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December 25, 2001

Mr. Greg McDermott
City of Las Vegas Flood Control Department
731 S Fourth St
Las Vegas, NV 89101

Subject: Technical Hydrology Update No 1 for Falconi's Acura, West Sahara

Dear Mr. McDermott:

Submitted for your approval are two (2) copies of Update No 1 to Falconi's Acura, West Sahara Study. Included with the update, within a pocket of this report, is an updated DRAINAGE PLAN and an updated GRADING PLAN for the referenced site.

The developer's intent is to incorporate the undeveloped approximately two and one quarter acres to the east within the approved development. The proposed project is located on Sahara Avenue adjacent to the approved Falconi's Acura auto dealership. The intent is to construct the approved auto dealership and the easterly portion that is the subject of this update in one current phase. A Legal description of the property is as follows: *a portion of the South half of the southeast quarter of Section 3, Township 21 South, Range 60 East, M.D.M., Clark County Nevada.* Assessor's Parcel Number 163-03-806-004 can further identify the subject property.

The scope of this study is to provide a hydrologic and hydraulic updated analysis for the approved Falconi's Acura development. The 10 and 100-year storm flows affecting the site are determined and recommendations for the drainage facilities necessary to convey these flows in accordance with the minimum standards as established by Clark County Regional Flood Control District (CCRFCD) and the City of Las Vegas are within.

If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,
CornerStone Engineering
I N C O R P O R A T E D

Brian Ridinger, P.E.

DRAINAGE STUDY INFORMATION FORMName of Development: Falconi's Acura West SaharaDate: Dec 25, 2001

Location of Development: a) Descriptive (Cross Streets)

SaharaRainbowb) Sect. 3Tw. 21SRng. 60EName of Owner: Falconi's Acura Of Las VegasAssessors Parcel No: 163-03-806-004Telephone No: 702-367-6400Facsimile No: 702-367-6632Address: 5550 W Sahara AveLas Vegas, NV 89146Contact Person Name: Brian RidingerTelephone No: (702) 731-4711Firm: CornerStone Engineering IncAddress: 101 Convention Center Dr Suite 880 Las Vegas, NV 89109

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

☐

Amended Grading Permit

1. Total Owned Land Area: At Site: 8.84AC Being Developed/Disturbed: 8.84 AC2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ YES* ☒ NO3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ YES* ☐ NO4. Proposed type of Development (Residential, Commercial, Etc.)? Commercial5. Approximate upstream land area which drains to the subject site? N/A6. Has the site drainage been evaluated in the past? ☐ Yes ☒ NO If yes, please identify documentation:7. If known, please briefly identify the proposed discharge point(s) of runoff from the site:
To Sahara Avenue8. Briefly describe your proposed schedule for the subject project: As Soon as Possible

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.

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

Engineer's Seal

Local Entity File No.

Revision

Date

REFERENCE:

STANDARD FORM 1

II. GENERAL LOCATION AND DEVELOPMENT DESCRIPTION

1. LOCATION OF PROPERTY

The site under investigation in this update is located adjacent to the east boundary of the approved Falconi's Acura Auto-dealership. The easterly addition stretches from Sahara Avenue northerly to Via Olivero Avenue and is bordered on the east by the existing Pontiac auto dealership.

A Legal description of the property is as follows: *a portion of the South half of the southeast quarter of Section 3, Township 21 South, Range 60 East, M.D.M., Clark County Nevada.* Assessor's Parcel Number 163-03-806-004 can further identify the subject property.

2. DESCRIPTION OF PROPERTY

The description of the property conforms with the existing analysis as discussed in the original report. For the purpose of this Update, we will only be discussing the items pertinent to the easterly addition. Excerpts from the original report and Addendum No 1 will be included for reference.

III. HYDROLOGIC ANALYSIS

1. OFF-SITE DRAINAGE DESCRIPTION

The offsite basins for this update are consistent with the original approved analysis and will not be discussed as a part of this update. Excerpts from the original study are included within the appendices.

2. ON-SITE DRAINAGE DESCRIPTION

(See Figures 3, Appendix A, *Existing Conditions*)

a) EXISTING

Within the original report, two principal existing undeveloped basins were modeled. While this was appropriate for the original proposed development, the inclusion of the easterly approximately two and one quarter acres results in three existing basins being modeled.

Existing basin EON1, the larger on-site northerly basin of the original study has been modified. A small basin along the easterly boundary of the updated project is removed

from basin EON1. Basin EON1, as discussed in the original study, conveys its runoff to the southeast corner of the proposed development and discharges into Sahara Avenue. The updated basin generates five (5) and twelve (12) cfs for the ten (10) and one hundred (100) year storm flows, respectively. The ten year event has remained the same as the original approved study, however, the one hundred event has decreased one (1) cfs.

Existing basin EON3 is the added basin along the easterly boundary. This basin conveys runoff to the south and discharges into the Pontiac auto-dealership to the east. The basin generates a negligible amount and one (1) cfs for the ten (10) and one hundred (100) year storm flows, respectively.

Existing basin EON2 remains unchanged from the original study.

b) PROPOSED

(See DRAINAGE PLAN, within a pocket of this report)

Table 5, Appendix B, *Peak Flow Summary*.

The proposed basins continue to convey drainage as discussed within the original study. However, one basin, Basin ON3, has been increased in size by a negligible amount to reflect the grading of the adjacent updated basins. In addition, two basins, Basin ON6 and ON7 have been added to model the added portion of the development.

Basin ON-3's flow generation remains unchanged and as discussed in the original report generates two (2) and five (5) cfs for the ten (10) and one hundred (100) year storm flows, respectively. The flows discharge through a commercial driveway into Sahara Avenue.

New basin ON6, a majority of the easterly addition, drains southeasterly to a proposed sidewalk drain in Sahara Avenue. The basin generates flows in the magnitude of three (3) and six (6) cfs for the ten (10) and one hundred (100) year storm flows, respectively.

Basin ON7 is a landscape area along the easterly property line, drains southerly and discharges in the Pontiac auto-dealership much the same as existing Basin EON3. The basin generates a negligible amount and one (1) cfs for the ten (10) and one hundred (100) year storm flows, respectively.

We have tabulated within Table 3 continued, Appendix B, Time of Concentration the developed basin characteristics and within Table 5, Appendix B, Peak Flow Summary the basin peak flows. Basin delineation is depicted on the DRAINAGE PLAN, within a pocket of this study. Basin characteristics were determined through field investigation, area technical manuals and area topography.

3. MASTER PLANNING INFORMATION

The regional facilities remain the same as discussed in the original study. We understand, as with the original report, we will need Regional Concurrence.

4. FLOODPLAIN INFORMATION

The floodplain information remains the same as discussed in the original report. The project is located within an area designated Flood Zone X. Excerpts from the original report are located within the appendices.

5. PREVIOUS DRAINAGE STUDIES

For the purposed of this Update, we will only reference the original study and the associated Addendum No 1.

1. *Technical Drainage Study for Falconi's Acura West Sahara, CornerStone Engineering June 2001.*
2. *Addendum No. 1 to the Technical Drainage Study for Falconi's Acura West Sahara, CornerStone Engineering June 2001.*

IV. PROPOSED DRAINAGE FACILITIES

1. GENERAL DESCRIPTION

The intent of this update is to include the easterly approximately two and one quarter acres within the Falconi's Acura Development. The intent is to construct the auto dealership and easterly addition in one current phase.

The Hydrology Criteria and Facility Calculations presented within the original report remain unchanged and will be followed within the easterly addition. The addition of the easterly area to the site does not affect the elevation of the finish floor or the flow conveyance within the adjacent streets, Sahara Avenue and Via Olivero.

The frontage along Sahara Avenue and Via Oliver will have a six inch curb installed along the back of sidewalk as recommended in the original study and justified in the Addendum No. 1.

The interior alleyways onsite of the added basins meet with CCRFCD and City of Las Vegas minimum requirements. A interior alleyway cross-sections is drawn and flow capacity analysis is performed. In no case is twice the depth of flow greater than the finish floor elevations or the product of the flow depth and velocity ($V \times D$) exceeding six.

The facilities discussed above are detailed on the DRAINAGE PLAN located within a pocket of this report. All onsite areas are conveyed to the public streets. By inspection, no on-site areas could possibly jeopardize or flood the proposed buildings.

V. CONCLUSION

1. COMPLIANCE with DRAINAGE LAWS, MASTER PLANS and REQUIREMENTS

Based on the data and analysis presented within the approved study and this Update, we conclude the Falconi's Acura Auto-dealership and added update area will not have an unreasonable impact on the surrounding area. The proposed development does not impact any existing or proposed Clark County Regional Flood Control District Master Plan Facilities and does not fall within a FEMA defined Special Flood Hazard Area.

2. OVERALL FACILITY EFFECTIVENESS

The project as well as the updated addition as designed will effectively control storm water runoff for the 100-year and 10-year floods as analyzed within this study. There should be no adverse effects on upstream or downstream properties due to the proposed development. The development attempts to preserve the historical drainage pattern of the site and vicinity. The base for this study is the DRAINAGE PLAN, within a pocket of this report. Changes made invalidating plan assumptions or conclusions reached will require a subsequent analysis and agency review and processing.

VI. REFERENCES

1. Technical Manuals and Software References

1. *Hydrologic Criteria and Drainage Design Manual*, Prepared by WRC Engineers, Inc., Updated by Montgomery Watson, for Clark County Regional Flood Control District, August 1999.
2. *Flood Control Master Plan Update*, James M. Montgomery Consulting Engineers, Inc., for Clark County Regional Flood Control District, August 1991.
3. *Soil Survey of Las Vegas Valley Area*, Nevada, Part of Clark County, United States Department of Agriculture Soil Conservation Service, July 1985.
4. *Flood Insurance Rate Map*, Federal Emergency Management Agency, Clark County, Nevada and Incorporated Areas, Effective Date: August 16, 1995.
5. *HEC-1 Flood Hydrograph Package*, User's Manual, U.S. Army Corps of Engineers, September 1991.
6. *FLOWMASTER* Version 1.0, Pipe and Ditch Sizing Software, HAESTAD Methods Inc.

2. Technical Hydrology Study References

1. *Technical Drainage Study for Falconi's Acura, West Sahara*, CornerStone Engineering, June 2001.
2. *Addendum No. 1 for the Technical Drainage Study for Falconi's Acura, West Sahara*, CornerStone Engineering, June 2001..

VIII. APPENDIX B

1. **TABLE 3U** **UPDATED TIME OF CONCENTRATION UnUrbanized**
2. **TABLE 3U** **UPDATED TIME OF CONCENTRATION Urbanized**
3. **TABLE 5U** **UPDATED PEAK FLOW SUMMARY**

TABLE 3U
TIME OF CONCENTRATION
Urbanized Basins – Existing and Proposed Conditions – UPDATE NO.1
(Modified Standard Form 4)

TABLE 5
UPDATED PEAK FLOW SUMMARY

BASINS	10-YEAR (CFS)	100-YEAR (CFS)
EXISTING		
OF1	0	0
EON1	5	12
EON2	3	6
EXISTING CP1	3	6
EON3	0	1
DEVELOPED		
ON1	2	5
CPA	3	5
ON2	2	3
ON3	2	5
CP1	4	8
ON4	3	5
ON5	2	3
ON6	3	6
ON7	0	1

* See Off-Site and On-Site Drainage Maps for basin locations.

IX. APPENDIX C

1. UPDATED Existing and Developed Conditions HEC-1 Analysis


```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 26DEC01 TIME 09:37:16
*
*****

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*****
*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*
*****

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X X XXXXXXXX XXXX X
X X X X X XX
X X X X X X
XXXXXXX XXXX XXXX X
X X X X XXXX X
X X X X XXXX X
X X XXXXXXXX XXXX XXX

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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

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

*** FREE ***

```

1 ID
2 ID
3 ID : HYDROLOGY STUDY FOR
4 ID : FALCONIS ACURA WEST SAHARA UPDATE:
5 ID : LOCATION
6 ID : SAHARA WEST OF RAINBOW
7 ID : PREPARED FOR
8 ID : FALCONIS ACURA OF LAS VEGAS
9 ID : Date, DEC 25, 2001
10 ID :
11 ID : Existing and Developed CONDITIONS:
12 ID : JOB NO. 288-00
13 ID : FILE NAME: 288hecUP1.IN
14 ID :
15 ID : PREPARED BY
16 ID : CornerStone Engineering Inc
17 ID : 101 CONVENTION CENTER DR
18 ID : SUITE 880
19 ID : LAS VEGAS, NV 89109
20 ID
21 ID

```

*DIAGRAM

```

22 IT 5 0 0 300
23 IO 5
24 IN 5
25 JR PREC 0.57 1

```

KK OFI
KM DEV OFFSITE BASIN FROM MITSUBISHI

```

26 BA 0.0001
27 PB 2.77
28 PC .000 .020 .057 .07 .087 .108 .124 .13 .13 .13
29 PC .13 .13 .13 .13 .14 .142 .148 .158 .172 .181
30 PC .19 .197 .199 .200 .201 .204 .214 .229 .241 .249
31 PC .251 .256 .27 .278 .281 .283 .295 .322 .352 .409
32 PC .499 .59 .71 .744 .781 .812 .819 .835 .851 .856
33 PC .86 .868 .876 .888 .91 .926 .937 .95 .97 .976
34 PC .982 .985 .987 .989 .99 .993 .993 .994 .995 .998
35 PC .998 .999 1.00
36 LS 0
37 UD 0.050
38
39

```

KK EON2
KM UN-DEV ONSITE BASIN EON2

```

40 BA 0.0045
41 LS 0
42 UD 0.100
43
44

```

KK CP1
KM COMBINE TWO BASINS
HC 2

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
48	KK EON1
49	KM UN-DEV ONSITE BASIN EON1
50	BA 0.0086
51	LS 0 88
52	UD 0.137
53	KK EON3
54	KM UN-DEV ONSITE BASIN EON3
55	BA 0.0004
56	LS 0 88
57	UD 0.100
58	KM *****
59	KM *
60	KM *END OF EXISTING BASINS CALCULATIONS *
61	KM *
62	KM *****
63	KK EOF1
64	KM DEV OFFSITE BASIN FROM MITSUBISHI
65	BA 0.0001
66	LS 0 98
67	UD 0.050
68	KK ON1
69	KM DEV BASIN SW CORNER
70	BA 0.0021
71	LS 0 95
72	UD 0.050
73	KK CPA
74	KM COMBINATION POINT A, COMBINE EOF1 AND ON1
75	HC 2
76	KK ON2
77	KM DEV BASIN SOUTHERN MIDDLE
78	BA 0.0014
79	LS 0 95
80	UD 0.062
81	KK ON3
82	KM DEV BASIN SE CORNER
83	BA 0.0022
84	LS 0 95
85	UD 0.054
86	KK CP1
87	KM COMBINATION POINT 1, COMBINE ON2 AND ON3
88	HC 2

HEC-1 INPUT

PAGE 3

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
89	KK ON4
90	KM DEV BASIN NW CORNER
91	BA 0.0029
92	LS 0 95
93	UD 0.118
94	KK ON5
95	KM DEV BASIN NE CORNER
96	BA 0.0014
97	LS 0 95
98	UD 0.051
99	KK ON6
100	KM DEV BASIN EAST 1/3 OF SITE
101	BA 0.0030
102	LS 0 98
103	UD 0.115
104	KK ON7
105	KM DEV BASIN EAST PROPERTY LINE
106	BA 0.0004
107	LS 0 88
108	UD 0.059
109	ZZ

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
26	OF1	.		
40	.	EON2	.	
45	CP1.....	.		
48	.	EON1	.	
53	.	EON3	.	
63	.	EOF1	.	
68	.	ON1	.	
73	.	CPA.....	.	
76	.	ON2	.	
81	.	ON3	.	
86	.	CP1.....	.	
89	.	ON4	.	
94	.	ON5	.	
99	.	ON6	.	
104	.	ON7	.	

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 26DEC01 TIME 09:37:16
*

*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*

: HYDROLOGY STUDY FOR
: FALCONIS ACURA WEST SAHARA UPDATE:
: LOCATION
: SAHARA WEST OF RAINBOW
: PREPARED FOR
: FALCONIS ACURA OF LAS VEGAS
: Date, DEC 25, 2001
:
: Existing and Developed CONDITIONS:
: JOB NO. 288-00
: FILE NAME: 288hecup1.IN
:
: PREPARED BY
: CornerStone Engineering Inc
: 101 CONVENTION CENTER DR
: SUITE 880
: LAS VEGAS, NV 89109
:-----

23 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
.57 1.00

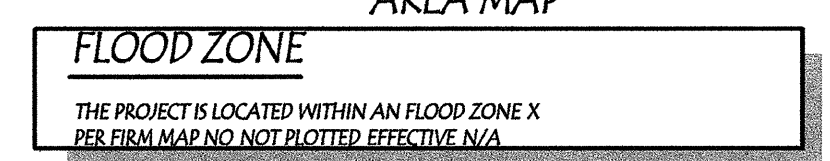
PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
				.57	1.00
HYDROGRAPH AT	OF1	.00	1	0.	0.
+				3.50	3.50
HYDROGRAPH AT	EON2	.00	1	3.	7.
+				3.50	3.50
2 COMBINED AT	CP1	.00	1	3.	7.
+				3.50	3.50
HYDROGRAPH AT	EON1	.01	1	5.	12.
+				3.58	3.58
HYDROGRAPH AT	EON3	.00	1	0.	1.
+				3.50	3.50
HYDROGRAPH AT	EOF1	.00	1	0.	0.
+				3.50	3.50
HYDROGRAPH AT	ON1	.00	1	2.	5.
+				3.50	3.50
2 COMBINED AT	CPA	.00	1	3.	5.
+				3.50	3.50
HYDROGRAPH AT	ON2	.00	1	2.	3.
+				3.50	3.50
HYDROGRAPH AT	ON3	.00	1	2.	5.
+				3.50	3.50
2 COMBINED AT	CP1	.00	1	4.	8.
+				3.50	3.50
HYDROGRAPH AT	ON4	.00	1	3.	5.
+				3.58	3.58
HYDROGRAPH AT	ON5	.00	1	2.	3.
+				3.50	3.50
HYDROGRAPH AT	ON6	.00	1	3.	6.
+				3.50	3.50
HYDROGRAPH AT	ON7	.00	1	0.	1.
+				3.50	3.50

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

[illegible]

NOTE:
The LanDesign Consultant
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CONTRACTOR
IS RESPONSIBLE TO VERIFY THESE QUANTITIES FOR THE PURPOSES OF BIDDING.
QUANTITIES SHOWN ARE AN OPINION AND ARE FOR BONDING PURPOSES
ONLY.

BASIS OF BEARING

NORTH 87° 51' 38" EAST - BEING THE SOUTH LINE OF THE
SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHEAST QUARTER (SE
1/4) OF SECTION 3, TOWNSHIP 21 SOUTH, RANGE 60 EAST,
M.D.M., CLARK COUNTY, NEVADA AS SHOWN BY FILE 113, PAGE
25 OF PARCEL MAPS IN THE OFFICE OF THE CLARK COUNTY
RECORDER.

ENGINEERS SEAL
FOR REVIEW ONLY

BRIAN D. RIDINGER
Exp. 12-31-13
CIVIL
No. 12309

SHEET 6
OF 7

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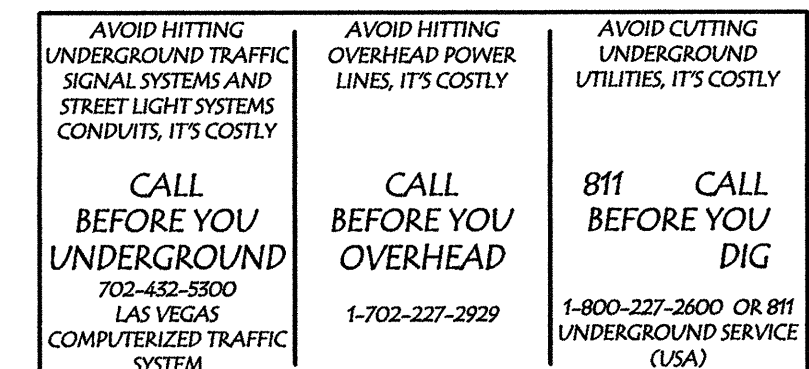
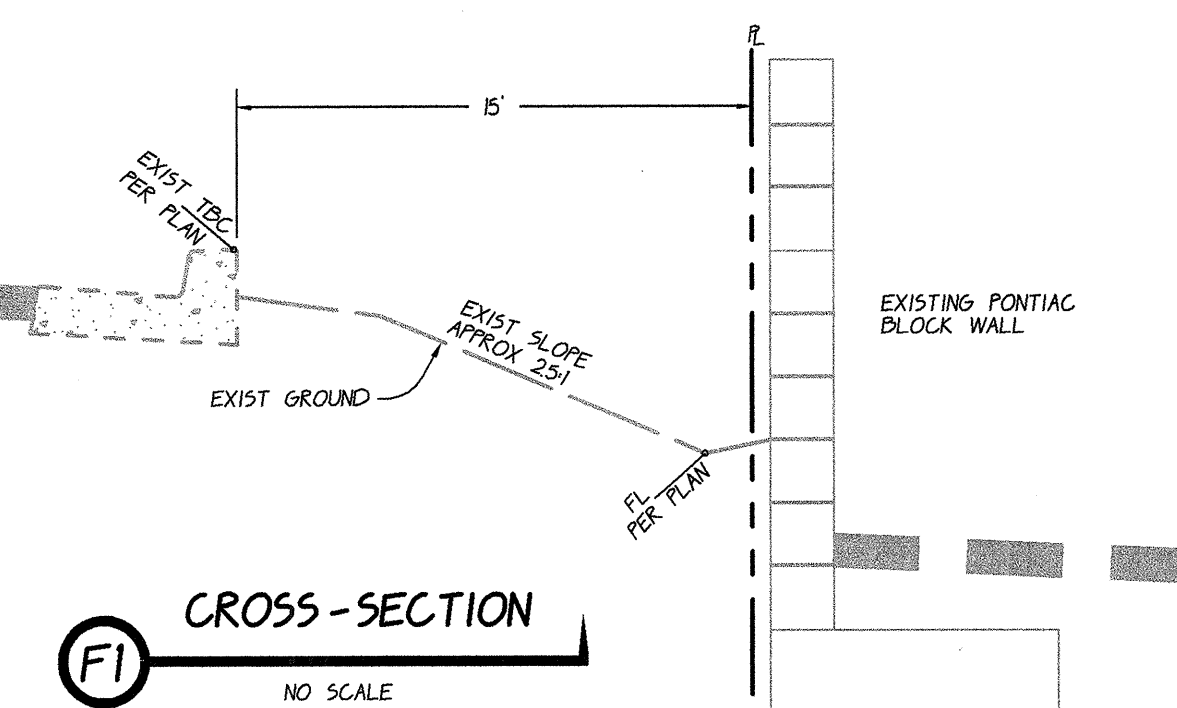
1154 Castle Point Ave
Henderson, NV 89074
TEL: 702-547-0047

JOB NUMBER: 229-00
DATE: MAY 17, 2012
FILENAME: 229-CD.DWG
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XREF FILES: 229-TOP.DWG
XREF FILES:

TDS
CLV

GRADING PLAN CERTIFICATION
I CERTIFY THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED
DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS

BY: _____ DATE: _____
BRIAN RIDINGER, PE 12309



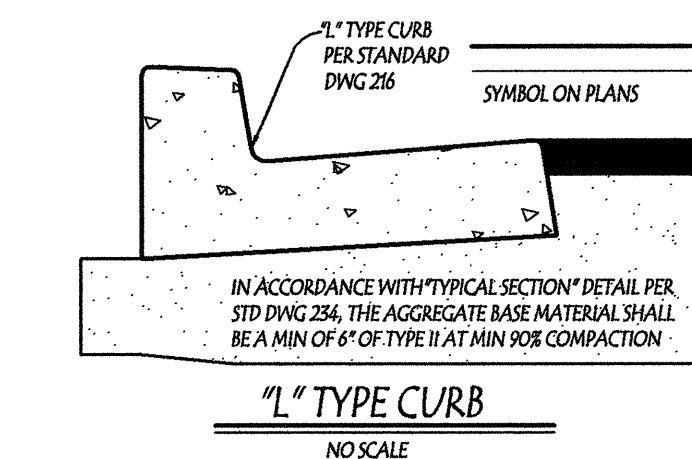
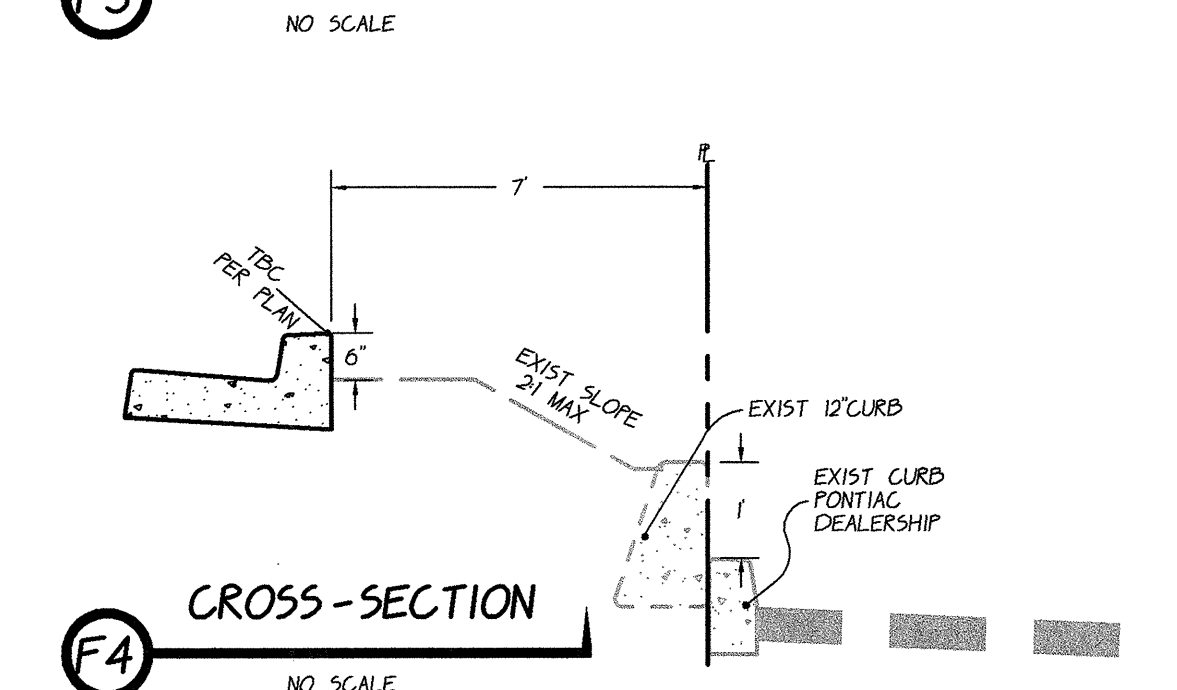
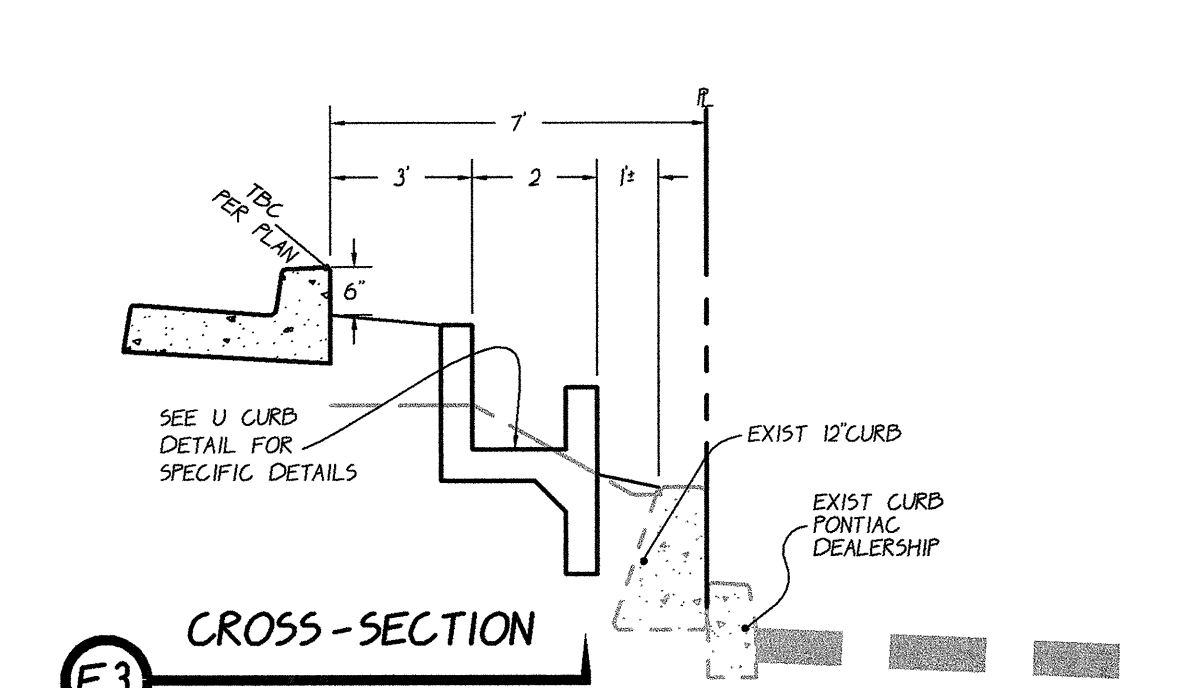
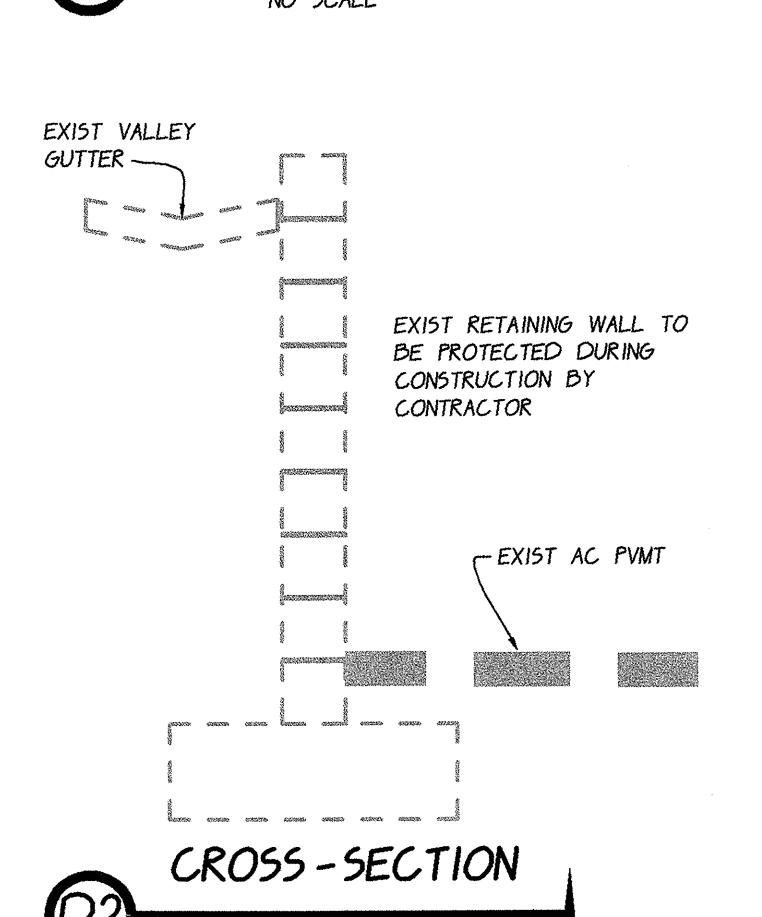
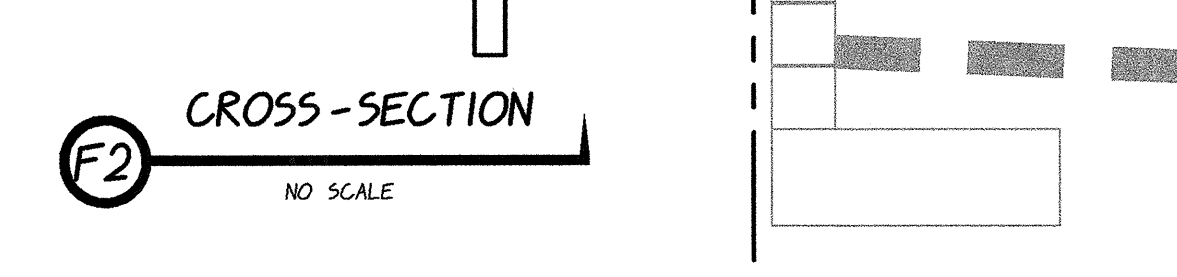
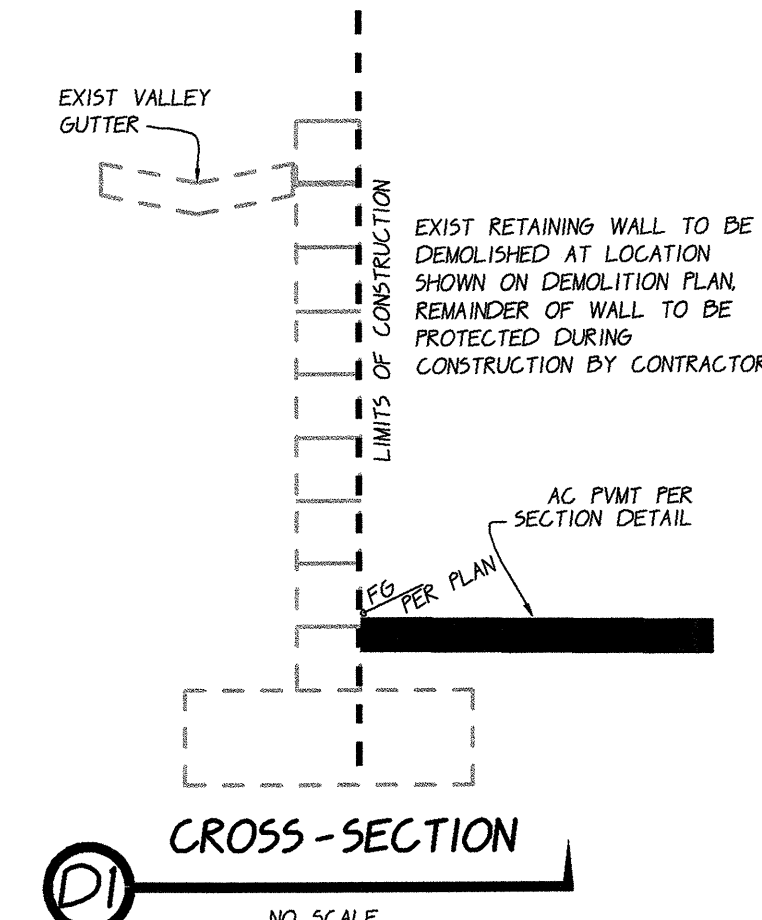
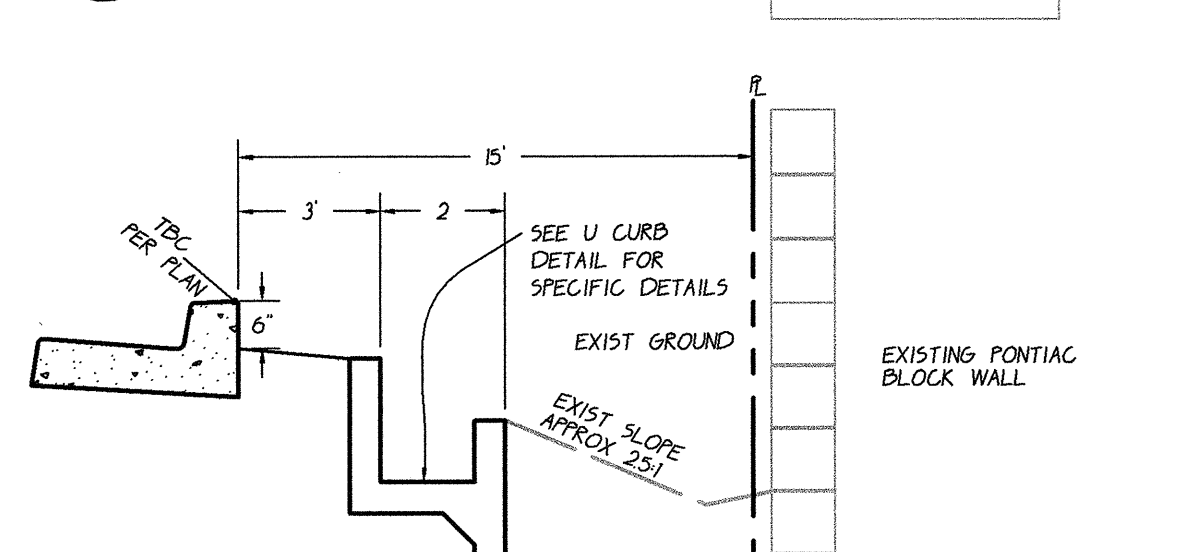
NOTE:
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ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS, SHOWN OR NOT SHOWN. THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM RECORD INFORMATION AND ARE ONLY INTENDED FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE TO FIELD VERIFY THE DEPTHS AND LOCATIONS OF ANY AND ALL RELEVANT UTILITIES PRIOR TO COMMENCING WITH CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE TO NOTIFY THE ENGINEER OF RECORD, IN WRITING, OF ANY CONFLICTS OR DISCREPANCIES, IMMEDIATELY.

WALL NOTE:
ALL RETAINING AND FENCE WALLS SHOWN ON THESE PLANS ARE
SHOWN FOR THE BENEFIT OF THE STRUCTURAL ENGINEER'S DESIGN.
THE STRUCTURAL DESIGN AND DETAILS ARE NOT A PART OF THESE
PLANS. ALL WALLS ARE REQUIRED TO BE REVIEWED SEPARATELY AND
PERMITTED SEPARATELY THROUGH THE BUILDING DEPARTMENT

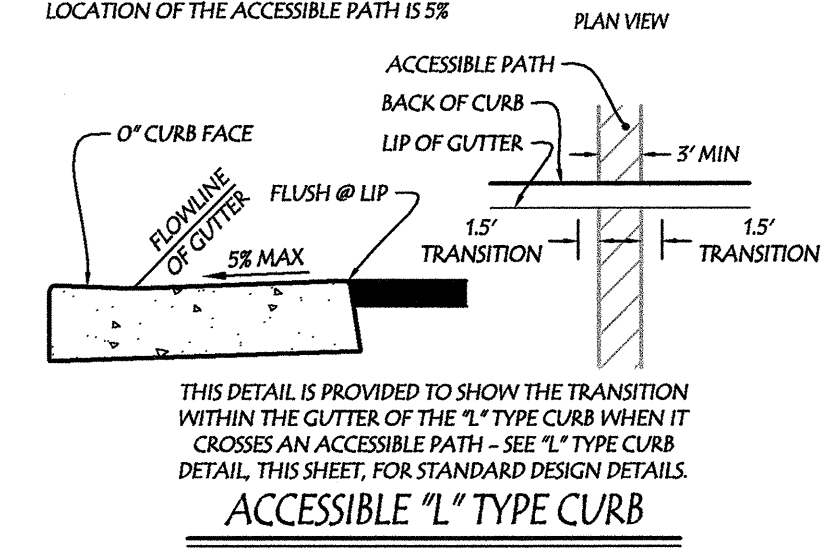
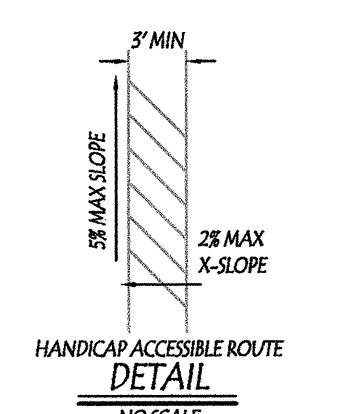
THE FOLLOWING MINIMUM PAVEMENT SECTIONS ARE A PRELIMINARY
RECOMMENDATION FROM:
GEOTEK, INC
*Geotechnical Evaluation for Planet Mazda, Located on Sahara Avenue, 640 Feet West of
Rainbow Boulevard, Las Vegas, Nevada*

THE CONTRACTOR IS RESPONSIBLE TO OBTAIN A FINAL PAVEMENT DESIGN FROM THE GEOTECHNICAL ENGINEER. THE PRELIMINARY SECTIONS PROVIDED ARE FOR THE CONVENIENCE OF THE CONTRACTOR. THE LAND DESIGN CONSULTANT BEARS NO RESPONSIBILITY FOR THE PAVEMENT SECTIONS DESIGN.

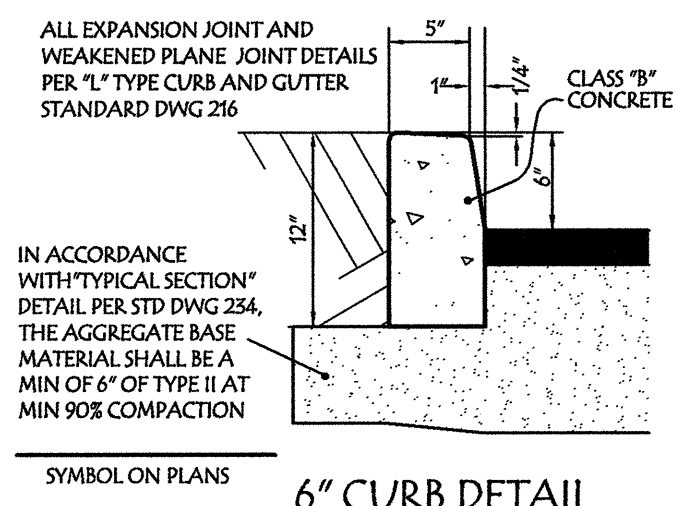
TRAFFIC AREA	ASPHALT	TYPE II	BASE
AUTOMOBILE PARKING	3"	4"	



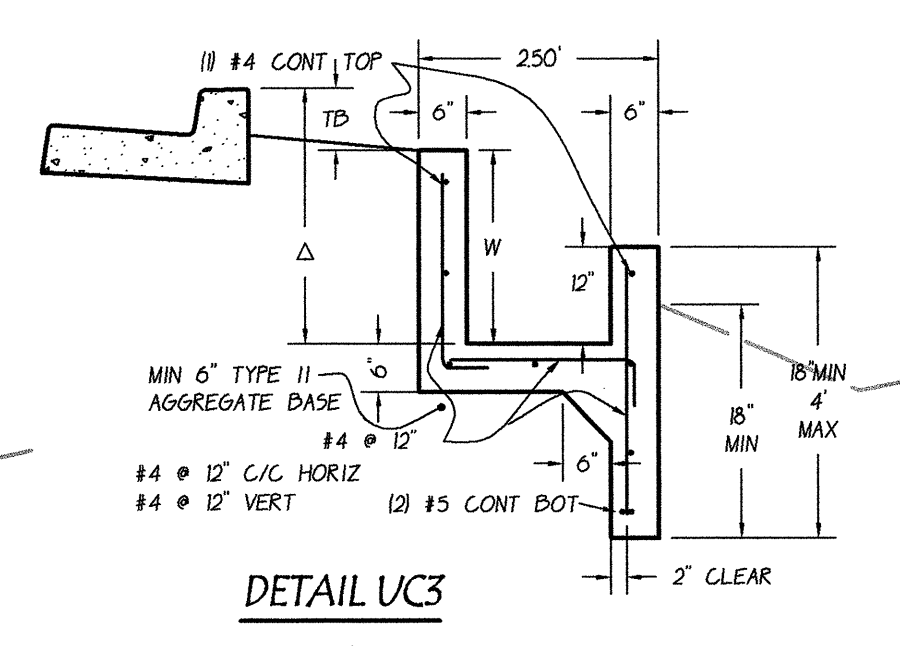
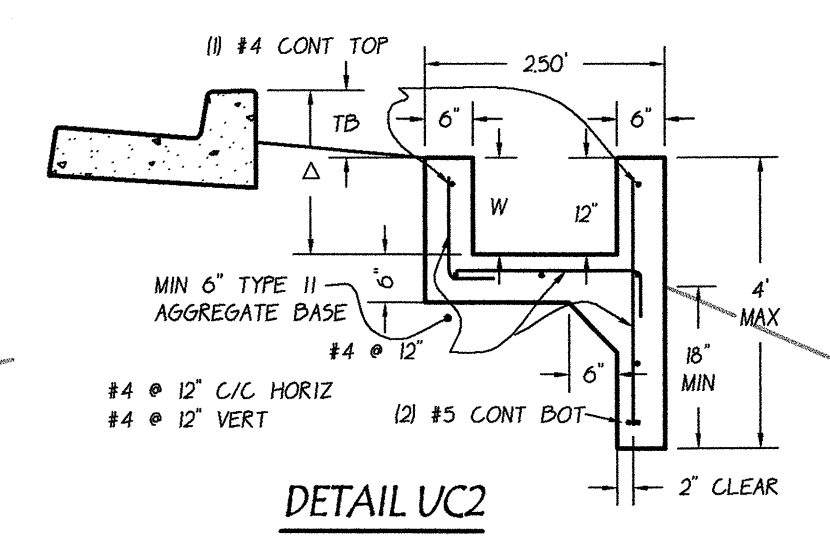
NOTE:
ALWAYS HOLD FLOWLINE GRADE WITHIN GUTTER.
TRANSITION GUTTER FROM STANDARD CROSS SLOPE
TO 5% MAXIMUM OUTSIDE OF ACCESSIBLE PATH.
TRANSITION LENGTH SHALL BE 15' MINIMUM. THE
MAXIMUM CROSS SLOPE OF THE GUTTER AT THE



NO SCALE



NO SCALE



U/CURB DETAIL SPECS

LOCATION	TC ELEV	A	W	TA	TB	SECTION
1	11.71	0.39"	12"	0.41"	N/A	UC1
2	12.08	1.08"	12"	N/A	0.95"	UC2
3	13.2	2.56"	24"	N/A	0.58"	UC3
4	12.77	2.40"	24"	N/A	0.40"	UC3
5	12.60	2.39"	24"	N/A	0.33"	UC3
6	12.15	2.02"	24"	0.65"	0.02"	UC3
7	10.41	0.35"	12"	0.65"	N/A	UC1

TRANSITION FROM
UC1 TO UC2

TRANSITION FROM
UC3 TO UC1

[illegible]

DETAILS

PLANET MAZDA
LAS VEGAS
WEST SAHARA AVE

SHEET 7
OF 7

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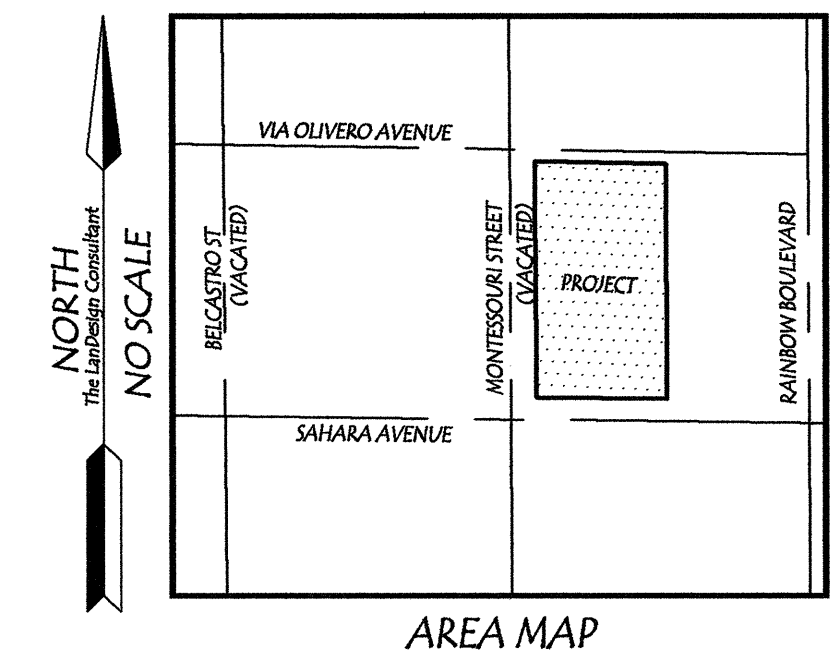
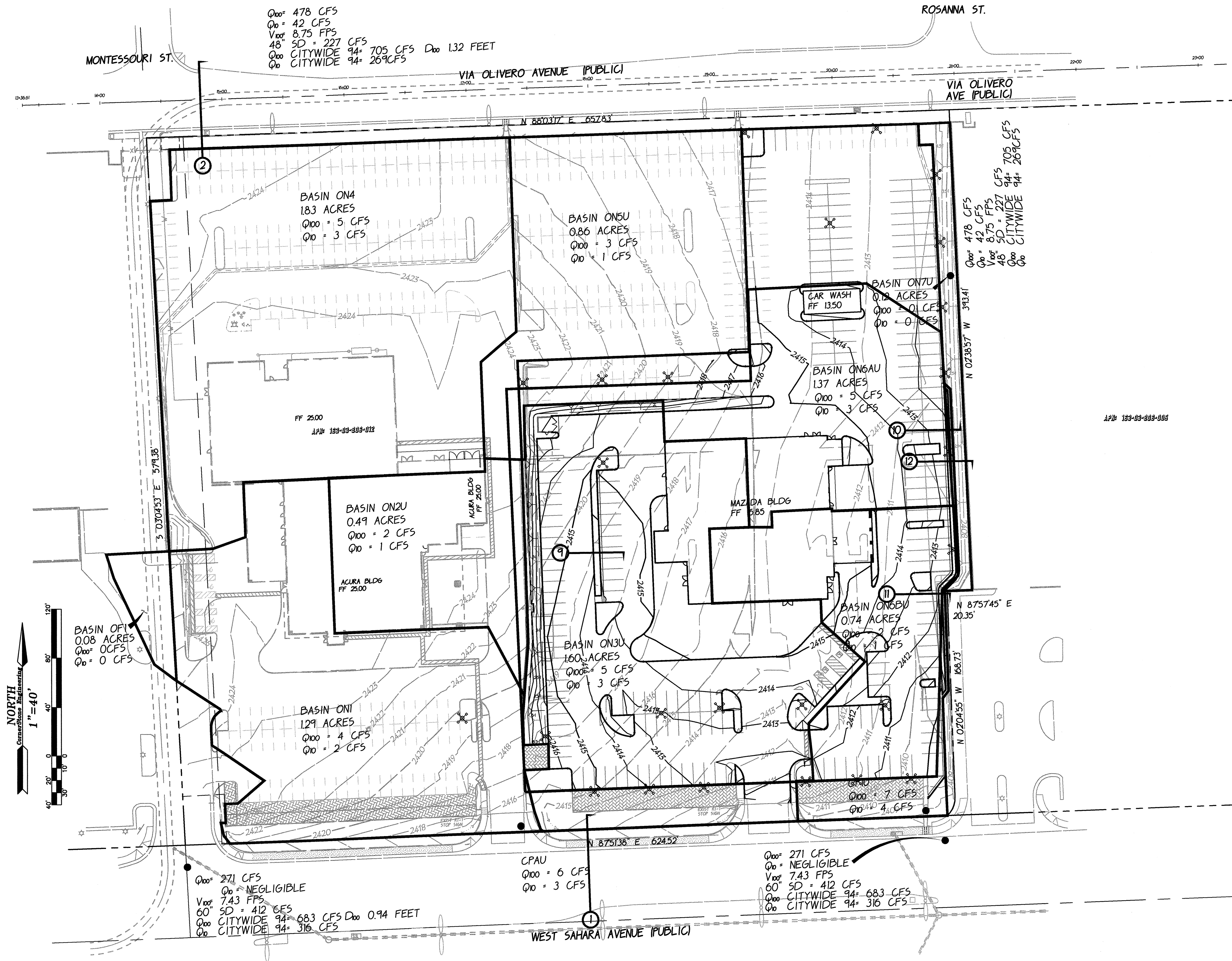
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Henderson, NV 89074
TEL: 702-547-0047

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JOB NUMBER: 229-00
DATE: MAY 17, 2012
FILENAME: 229-00
XREF FILES:
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CLV



NOTE:
The LanDesign Consultant
ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS, SHOWN OR NOT SHOWN. THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM RECORD INFORMATION AND ARE ONLY INTENDED FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE TO FIELD VERIFY THE DEPTHS AND LOCATIONS OF ANY AND ALL RELEVANT UTILITIES PRIOR TO COMMENCING WITH CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE TO NOTIFY THE ENGINEER OF RECORD, IN WRITING, OF ANY CONFLICTS OR DISCREPANCIES, IMMEDIATELY.

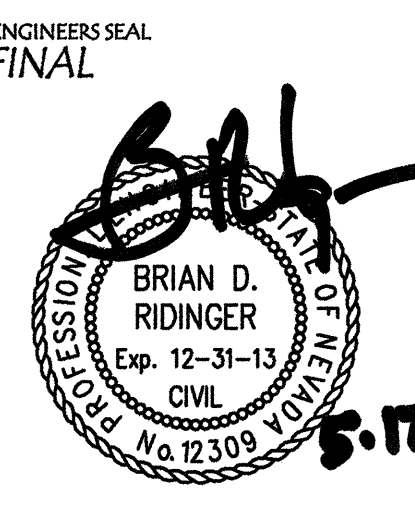
AVOID HITTING UNDERGROUND TRAFFIC SIGNAL SYSTEMS AND STREET LIGHT SYSTEMS CONDUITS, IT'S COSTLY	AVOID HITTING OVERHEAD POWER LINES, IT'S COSTLY	AVOID CUTTING UNDERGROUND UTILITIES, IT'S COSTLY
CALL BEFORE YOU UNDERGROUND 702-432-5900 LAS VEGAS COMPUTERIZED TRAFFIC SYSTEM	CALL BEFORE YOU OVERHEAD 1-702-227-2929	811 CALL BEFORE YOU DIG 1-800-227-2600 OR 811 UNDERGROUND SERVICE (USA)

REVISION	REVISION	REVISION	APPROVED
DATE	DESCRIPTION	DATE	BY
1			
2			
3			
4			
5			

DRAINAGE PLAN UPDATE NO 2

PLANET MAZDA
LAS VEGAS
WEST SAHARA AVE

SHEET 1
OF 1

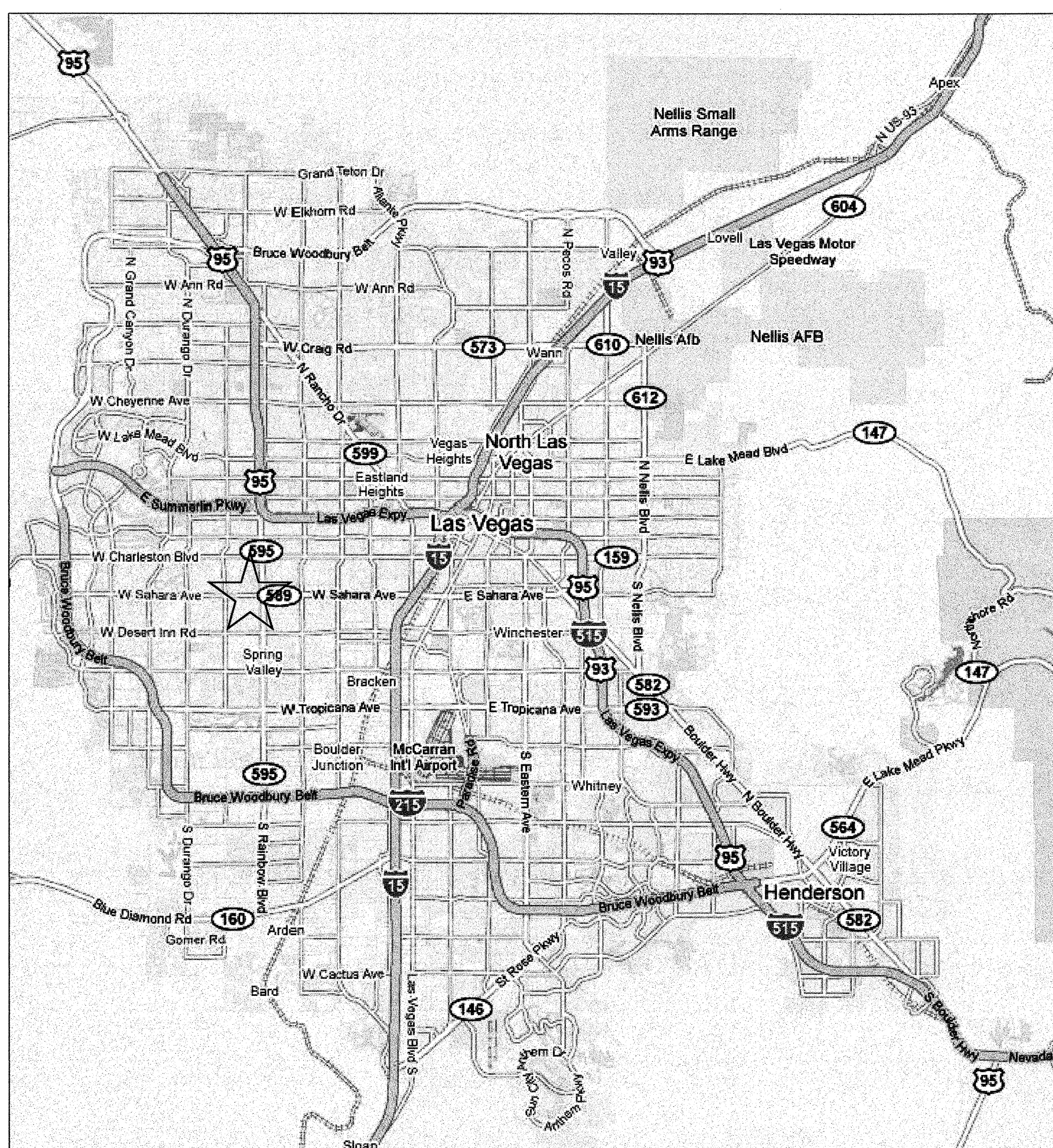


JOB NUMBER: 229.00
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FILENAME:
XREF FILES:
XREF FILES:
XREF FILES:

The
LanDesign
Consultant
insightful solutions for land development
1030 Wynnway Pkwy, #110
Henderson, NV 89074
TEL: 702-547-0047 FAX: 702-547-0049

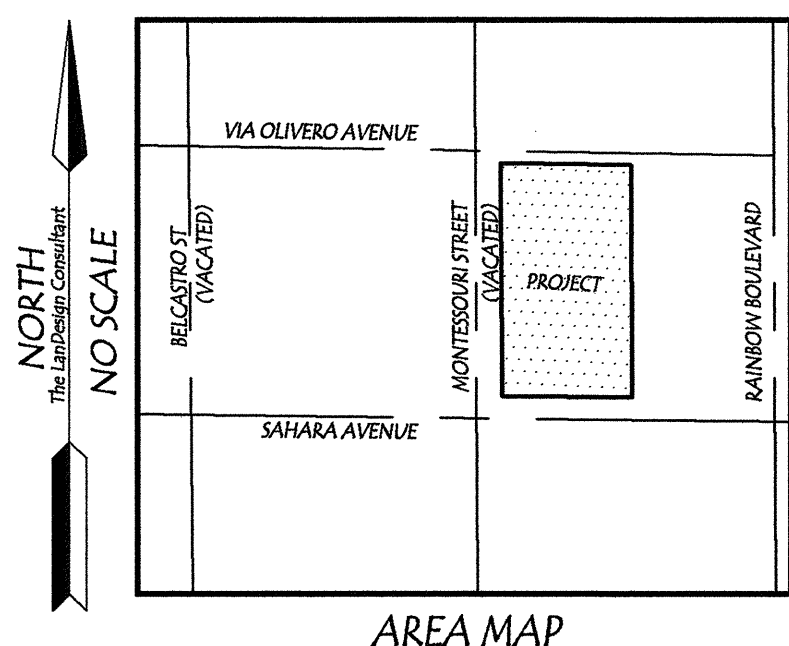
PLANET MAZDA LAS VEGAS WEST SAHARA AVE

CITY OF LAS VEGAS, NEVADA
APN NO 163-03-806-012 & 013



VICINITY MAP

NORTH
The LanDesign Consultant
NOT TO SCALE



AREA MAP

SHEET INDEX

SHEET 1 - COVER SHEET
SHEET 2 - UTILITY & GENERAL NOTES
SHEET 3 - DETAIL PLAN
SHEET 4 - MASTER UTILITY AND FIRE PLAN
SHEET 5 - UTILITY AND HORIZONTAL CONTROL
SHEET 6 - GRADING PLAN
SHEET 7 - DETAILS

BENCHMARK

CITY OF LAS VEGAS BENCHMARK NUMBER 01V035528 BEING A
RIVET AND PLATE IN THE TOP OF CURB AT THE NORTHEAST
CORNER OF SAHARA AND MONTESQUIEU
ELEV. = 757.765 METERS = 2486.48 FEET (NAVD 88)
CONVERSION:
1 METER = 3.28084 FEET

BASIS OF BEARING

NORTH 89° 51' 38" EAST - BEING THE SOUTH LINE OF THE
SOUTHEAST QUARTER, (SE 1/4) OF THE SOUTHEAST QUARTER, (SE
1/4) OF SECTION 3, TOWNSHIP 21 SOUTH, RANGE 60 EAST,
M.D.M. CLARK COUNTY, NEVADA AS SHOWN BY FILE 115, PAGE
25 OF PARCEL MAPS IN THE OFFICE OF THE CLARK COUNTY
RECORDS.

LEGAL DESCRIPTION

A PORTION OF THE SOUTH HALF (S 1/2) OF THE SOUTHEAST
QUARTER, (SE 1/4) OF SECTION 3, TOWNSHIP 21 SOUTH, RANGE 60
EAST, M.D.M. CLARK COUNTY, NEVADA

OWNER / DEVELOPER

CENTENNIAL - AZURE LLC
C/O MIKE BELLON
1400 S. Rainbow Blvd.
Las Vegas, NV 89144
PHONE: 702-243-7677
FAX: 702-243-7788

DEVIATION FROM STANDARDS

1) NONE

NOTE:

PRE-DEVELOPMENT MEETING WITH DEPARTMENT OF
DEVELOPMENT SERVICES, CIVIL ENGINEERING DIVISION,
OFF-SITE INSPECTOR REQUIRED. CONTACT CIVIL
ENGINEERING INSPECTOR AT 455-4610

NOTE:
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NOT SHOWN. THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN
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CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE
TO FIELD VERIFY THE DEPTHS AND LOCATIONS OF ANY AND ALL RELEVANT
UTILITIES PRIOR TO COMMENCING WITH CONSTRUCTION. THE
CONTRACTOR IS RESPONSIBLE TO NOTIFY THE ENGINEER OF RECORD, IN
WRITING, OF ANY CONFLICTS OR DISCREPANCIES, IMMEDIATELY.

AVOID HITTING UNDERGROUND TRAFFIC SIGNAL SYSTEMS AND STREET LIGHT SYSTEMS CONDUITS, IT'S COSTLY	AVOID HITTING OVERHEAD POWER LINES, IT'S COSTLY	AVOID CUTTING UNDERGROUND UTILITIES, IT'S COSTLY
CALL BEFORE YOU/ UNDERGROUND 702-432-5300 LAS VEGAS COMPUTERIZED TRAFFIC SYSTEM	CALL BEFORE YOU/ OVERHEAD 1-702-227-2929	811 CALL BEFORE YOU/ DIG 1-800-227-2600 OR 811 UNDERGROUND SERVICE (USA)

APPROVED CITY ENGINEER
BY: _____ DATE: _____
CHERI EDELMAN, PEPPER 14
APPROVAL OF THESE PLANS IS LIMITED TO THOSE IMPROVEMENTS
CONSTRUCTED IN THE DEDICATED RIGHT OF WAY AND/OR DEDICATED
EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE THE CONSTRUCTION
OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS
AND/OR SPECIFICATIONS, EXCEPT THOSE SPECIFICALLY LISTED UNDER
DEVIATIONS FROM STANDARD. 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

APPROVED DIRECTOR OF PLANNING AND DEVELOPMENT
BY: _____ DATE: _____
DOUG RANKIN, AICP PLANNING MANAGER
THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING AND
DEVELOPMENT DEPARTMENT

APPROVED CITY FIRE MARSHAL
BY: _____ DATE: _____

APPROVED FOR CONSTRUCTION
LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
PROJECT NO. _____ DATE: _____
SHEETS: 1-3

COVER SHEET

ENGINEER'S SEAL
FOR REVIEW ONLY

PLANET MAZDA
LAS VEGAS
WEST SAHARA AVE

SHEET 1
OF 7

The
LanDesign
Consultant

insightful solutions for land development
1154 Castle Point Ave
Henderson, NV 89074
TEL: 702-547-0047

JOB NUMBER: 229-00
DATE: MAY 17, 2012
FILENAME: 229-CD.DWG
XREF FILES: _____
XREF FILES: _____

TDS
CLV

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 CIVIL PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. 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 (1/2") ABOVE UP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.

9. CURB AND GUTTER FOUND TO BE NOT ACCEPTABLE 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 226. 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 TRANSITIONS TO BE AS SHOWN ON PLANS.

12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE SOILS ENGINEER APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.

13. EXACT LOCATION OF ALL SAWCUT LIDS, VALVE COVERS, ETC., DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER. LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.

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.E.S. STATUTE NO. 625.550.

15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.

WALL NOTES:
16. 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.

17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.

18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS IS 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 MDT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.

DATE 2/23/05

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.

2. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF THE TRAFFIC/ELECTRICAL FIELD OPERATIONS DIVISION AND THE CITY ENGINEER. ANY DEVIATION FROM THE PLAN LOCATION WILL REQUIRE COMPLIANCE WITH SECTION 625.10.03 (E) OF THE SPECIFICATIONS.

3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION.

4. ALL EMPTY CONDUIT SHALL HAVE PULL STRINGS INSTALLED PRIOR TO FINAL INSPECTION.

5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE OF EIGHTEEN INCHES (18") TO THE FACE OF STREET LIGHTING POLE ON ALL SIDES WHEN STREETLIGHT IS INSTALLED BEHIND SIDEWALK, AND SHALL AT NO TIME COMPLETELY ENCLOSE THE STREET LIGHTING POLE.

6. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE ELECTRICAL SERVICES SECTION 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 NEVADA POWER COMPANY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CURVCUT. SERVICE POINTS SHALL BE SHOWN ON THE 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 BEFORE STREETLIGHT BASES ARE INSTALLED AT NO EXPENSE TO THE CITY OF LAS VEGAS.

10. THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.

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 TO MAINTAIN OFF-SITE WORK, SO AS TO GENERATE THE DESIRED SURGRADE, 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 CAVING OF THE EXCAVATION.

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 IDENTIFIED:

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

CONSTRUCTION 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. ALL 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.

CITY OF LAS VEGAS TRAFFIC NOTES

1. ALL CONSTRUCTION SIGNING, BARRICADING AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC 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 ADVANCED 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 ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.

4. WHEN A DESIGNATED "SAFE ROUTE TO SCHOOL" IS ENCLOSED 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, TRAFFIC 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. STREET NAMES SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE 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 ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED. HEREINAFTER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.

9. STREET SIGNS AND STOP SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF STREET NAME SIGNS.

10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND FLAGGERS TO ENSURE THE SAFETY OF THE PUBLIC IN OR AROUND THE WORK AREA. THE CONTRACTOR SHALL HAVE A CERTIFIED ATSSA TRAFFIC CONTROL TECHNICIAN OR IMA WORK ZONE SAFETY SPECIALIST SET-UP, MAINTAIN AND/OR REMOVE ALL TRAFFIC CONTROL DEVICES IN THE CITY OF LAS VEGAS RIGHTS OF WAY.

11. WORK IN THE 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 NO. 229-3442) WHO WILL PROVIDE OFFICERS PROPERLY TRAINED IN THE USE OF METRO FEES FOR THE USE OF THESE OFFICERS SHALL BE SET UP BY METRO AND 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 DIRECTED BY THE CITY OF LAS VEGAS TRAFFIC ENGINEER.

15. CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEERING DIVISION (TRANSPORTATION SECTION) THROUGHOUT PROJECT'S OFFSITE INSPECTOR PRIOR TO INITIATING PAVING TO REEPLY DIRECTION FOR ANY PERMANENT OR TEMPORARY MODIFICATIONS TO THE APPROVED DRAWINGS REGARDING FINAL PAVEMENT TRANSITIONS, MARKING AND SIGNING THAT 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 SIGNAGE, 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 MAINTAINED.

LAS VEGAS FIRE & RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE CITY OF LAS VEGAS FIRE DEPARTMENT'S ORDINANCE #5667, "HYDRANT SPECIFICATIONS", AND "HYDRANT INSTALLATION SPECIFICATIONS".

2. AUTHORIZED HYDRANTS FOR THIS PROJECT ARE:
A. KENNEDY - GUARDIAN MODELS KBIA AND KBID
B. MUELLER - SUPER CENTURION 250 MODEL A-425
C. GLOW - MEDICAL MODEL 200 (288-7171) TWO (2) WORKING DAYS
D. U.S. PIPE - METELOW/M-05
E. TROY VALVE - PATRIOT MODEL PTB00N NEVADA HYDRANT

3. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW.

4. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT CENTER LINE OF STREET ADJACENT TO FIRE HYDRANTS AS REQUIRED BY ORDINANCE #5667.

5. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CALL THE CITY OF LAS VEGAS INSPECTION HOT-LINE AT 229-2071 TO REQUEST AN INSPECTION BY THE CITY OF LAS VEGAS FIRE DEPARTMENT.

6. PAINTING OF THE CURBS AND FIRE HYDRANTS AND ALL OTHER WORK NECESSARY AS REQUIRED BY ORDINANCE #5667 FOR THE PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, SHALL BE COMPLETED BEFORE APPROVAL BY THE CITY OF LAS VEGAS FIRE DEPARTMENT.

7. A PERMIT IS REQUIRED FROM THE CITY OF LAS VEGAS FIRE DEPARTMENT FOR THE ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK.

8. PRIVATE FIRE HYDRANTS SHALL BE PAINTED RED.

9. PRIOR TO THE FINAL OCCUPANCY, A FLOW TEST MUST BE WITNESSED BY THE CITY OF LAS VEGAS FIRE DEPARTMENT TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW.

10. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.I.W.W.A. APPROVED, AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE.

11. FIRE HYDRANT SPACING SHALL BE:
RESIDENTIAL - 500 FEET UNSPRINKLERED, 600 FEET SPRINKLERED.
COMMERCIAL - 300 FEET UNSPRINKLERED, 400 FEET SPRINKLERED.

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 1000' FOOT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR OR MORE TRAFFIC LANES AND HAVE TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FEET ON AN ALTERNATING BASIS.

13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE REQUIRED RADIUS OF A CUL-DE-SAC OR WITHIN TWENTY (20') FEET OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.

14. NO FIRE HYDRANT SHALL BE LOCATED WITHIN 6 FEET OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREET LIGHT OR ANY OTHER OBSTRUCTION.

15. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FEET, AS MEASURED BY AN APPROVED ROUTE.

16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTIONS (FDC) SHALL NOT EXCEED 100 FEET, AS MEASURED BY AN APPROVED ROUTE.

17. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FEET.

18. TWO 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.

19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPROVED LOADS OF THE FIRE APPARATUS.

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 THE GRADIENT CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%.

21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROAD SHALL BE NO LESS THAN 32 FEET OUTSIDE AND 28 FEET INSIDE TURNING RADIUS.

22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 15 FEET 6 INCHES.

23. FIRE DEPARTMENT ACCESS ROADS IN ALL RESIDENTIAL DEVELOPMENTS (EXCEPT FOR THE APARTMENT BUILDINGS) SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 8 FEET FLOW LINE TO FLOW LINE (THIS WIDTH MAY BE REDUCED TO 24 FEET, IF ALL BUILDINGS FRONTING THE STREET ARE SPRINKLERED) FOR MAIN RESIDENTIAL STREETS, WITH PARKING PERMITTED ON BOTH SIDES OF THE STREET. PRIVATE DRIVE AISLES, DRIVEWAYS, ETC. SHALL BE ALLOWED TO BE REDUCED TO A MINIMUM WIDTH OF 24 FEET WIDE FLOW LINE TO FLOW LINE WHEN SERVING NO MORE THAN 4 RESIDENCES, AND WHEN ON STREET PARKING IS DISALLOWED.

24. ALL FIRE APPARATUS ACCESS ROADS IN COMMERCIAL DEVELOPMENTS AND APARTMENT COMPLEXES SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 24 FEET (FLOW LINE TO FLOW LINE). PROVIDED NO PARKING IS ALLOWED ON EITHER SIDE, 32 FEET (FLOW LINE TO FLOW LINE), IF PARALLEL PARKING IS ALLOWED ON ONE SIDE ONLY, AND 40 FEET (FLOW LINE TO FLOW LINE), IF PARALLEL PARKING IS ALLOWED ON BOTH SIDES. THESE WIDTHS MAY BE REDUCED BY 4 FEET IF ALL BUILDINGS ARE SPRINKLERED.

25. A FIRE DEPARTMENT ACCESS ROAD SHALL EXTEND TO WITHIN 50 FEET OF A SINGLE EXTERIOR DOOR PROVIDING ACCESS TO THE INTERIOR OF THE BUILDING.

26. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FEET FROM A FIRE DEPARTMENT VEHICLE ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FEET IF IN THE BUILDING IS SPRINKLERED.

27. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROWS WITH DEAD ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FEET, AND FOR ALL COMMERCIAL, INDUSTRIAL, AND MULTI-FAMILY RESIDENTIAL DEVELOPMENTS.

28. ALL DEAD-END FIRE APPARATUS ACCESS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150' FEET IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND AREA HAVING A MINIMUM DIAMETER OF 81 FEET.

29. 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 ONE SIGN AT INTERSECTIONS. ALL 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 ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CURB IF CURB IS NOT PROVIDED, SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS.

30. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE CITY OF LAS VEGAS GUIDELINES FOR AUTOMATIC EMERGENCY VEHICLE ACCESS GATES. REVISED 2-4-04

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 (288-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION, FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. 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).

3. ALL WORK, EXCEPT AS MODIFIED BY THE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA SYSTEMS (UDACS).

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. A WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.

7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.

8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.19 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 288-3182 OR 288-8802. TWO (2) WORKING DAYS PRIOR TO METER PICKUP.

11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.13.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. 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 MANUFACTURERS LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

13. TELEPHONE "CALL BEFORE YOU DIG" AT 1-800-227-2600 or 811 FEB 2006

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 "G" 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 II 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 INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (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 NOT EXCEED THIS TOLERANCE SHALL 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.

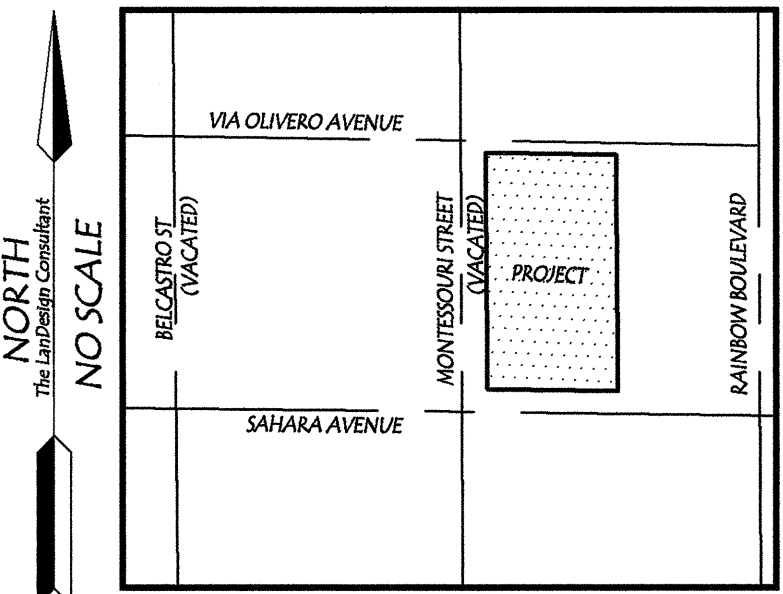
11. "USE OF THE TERM 'CERTIFY', 'CERTIFIED' OR 'CERTIFICATION' ON ANY PART OR PORTION OF THIS PLAN OR PLAN SET CONSTITUTES AN EXPRESSION OF PROFESSIONAL OPINION REGARDING THOSE FACTS OR FINDINGS WHICH ARE THE SUBJECT OF THE CERTIFICATION AS DEFINED IN NRS 625.402.

AVOID HITTING UNDERGROUND TRAFFIC SIGNAL SYSTEMS AND STREET LIGHT SYSTEMS CONDUITS, IT'S COSTLY	AVOID HITTING OVERHEAD POWER LINES, IT'S COSTLY	AVOID CUTTING UNDERGROUND UTILITIES, IT'S COSTLY
CALL BEFORE YOU UNDERGROUND 702-432-3500 LAS VEGAS COMPUTERIZED TRAFFIC SYSTEM	CALL BEFORE YOU OVERHEAD 1-702-227-2929	811 CALL BEFORE YOU DIG LAS VEGAS UNDERGROUND SERVICE (USA)

NOTE:

The LanDesign Consultant

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AREA MAP

PUBLIC WATER

11/2" COPPER WATER LATERAL	2 LF
11/2" BRASS WATER LATERAL	8 LF
11/2" SERVICE LATERAL	1 EA
11/2" METER	1 EA
11/2" RPPA	1 EA

PRIVATE WATER

4" PVC DOMESTIC WATER	568 LF
8" PVC FIRE WATER	812 LF
FIRE HYDRANT ASSY	5 EA
PIV	1 EA
FDC	4 EA
8" WATER VALVE	4 EA

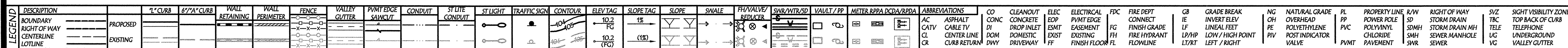
PRIVATE SEWER

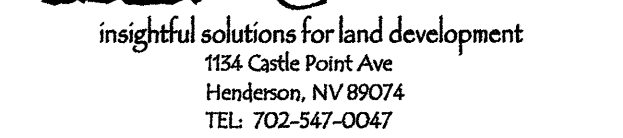
6" PVC SEWER	740 LF
SEWER CLEAN OUT	8 EA

PRIVE SITE QUANTITIES

6" CURB	---	---	---	---	2584 LF
1" L CURB AND GUTTER	---	---	---	---	341 LF
3" ASPHALT	---	---	---	---	9,223 SY
4" TYPE II AGGREGATE BASE	---	---	---	---	1025 CY
1 1/2" RPPA	---	---	---	---	0 LF
ITEM	---	---	---	---	0 EA
ITEM	---	---	---	---	0 EA
ITEM	---	---	---	---	0 EA
ITEM	---	---	---	---	0 EA

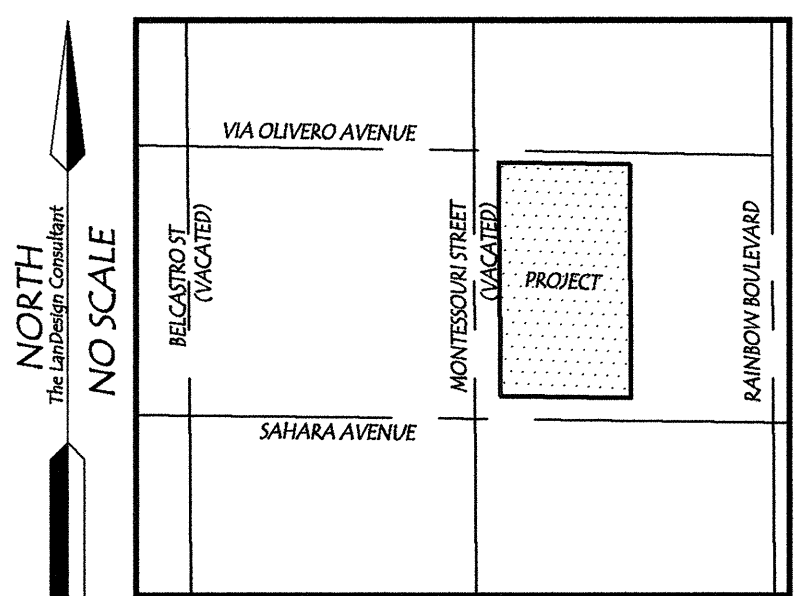
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FLOOD ZONE

THE PROJECT IS LOCATED WITHIN AN FLOOD ZONE X
PER FIRM MAP NO NOT PLOTTED EFFECTIVE N/A

GEOTECHNICAL REPORT

ALL GRADING OPERATIONS SHALL CONFORM WITH THE SOILS REPORT AS
PREPARED FOR THIS PROJECT BY: GEOTEK, INC
REPORT NO. : 10752-LV6 DATED: MAR 16, 2012

WALL NOTE:
ALL RETAINING AND FENCE WALLS SHOWN ON THESE PLANS ARE SHOWN FOR THE BENEFIT OF THE STRUCTURAL ENGINEER'S DESIGN. THE STRUCTURAL DESIGN AND DETAILS ARE NOT A PART OF THESE PLANS. ALL WALLS ARE REQUIRED TO BE REVIEWED SEPARATELY AND PERMITTED SEPARATELY THROUGH THE BUILDING DEPARTMENT

GRADING QUANTITIES

CUT: 5,963 CY FILL: 2,546 CY RESULT: EXPORT 3,417 CY

THIS QUANTITY IS ADJUSTED FOR:
PAVEMENT SECTION OF 3 " OF ASPHALT WITH 4 " OF BASE AND
BUILDING SECTION OF 12 "
CORRECTION FOR SHRINKAGE AND/OR SUBSIDENCE: IS NOT INCLUDED

CONTRACTOR
IS RESPONSIBLE TO VERIFY THESE QUANTITIES FOR THE PURPOSES OF BIDDING.
QUANTITIES SHOWN ARE AN OPINION AND ARE FOR BONDING PURPOSES
ONLY.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK NUMBER OLIV05SSE6 BEING A RIVET AND PLATE IN THE TOP OF CURB AT THE NORTHEAST CORNER OF SAHARA AND MONTESSOURI
 ELEV. = 737.765 METERS = 2420.48 FEET (NAVD 88)
 CONVERSION:
 1 METER * (3937/1200) = 1 US SURVEY FOOT

BASIS OF BEARING

NORTH 87° 51' 38" EAST - BEING THE SOUTH LINE OF THE
SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHEAST QUARTER (SE
1/4) OF SECTION 3, TOWNSHIP 21 SOUTH, RANGE 60 EAST,
M.D.M. CLARK COUNTY, NEVADA AS SHOWN BY FILE 113, PAGE
25 OF PARCEL MAPS IN THE OFFICE OF THE CLARK COUNTY
RECORDER.

GRADING PLAN

ENGINEERS SEAL
FOR REVIEW ONLY

PLANET MAZDA
LAS VEGAS
WEST SAHARA AVE

SHEET 6
OF 7

The
Land Design
Consultant

insightful solutions for land development

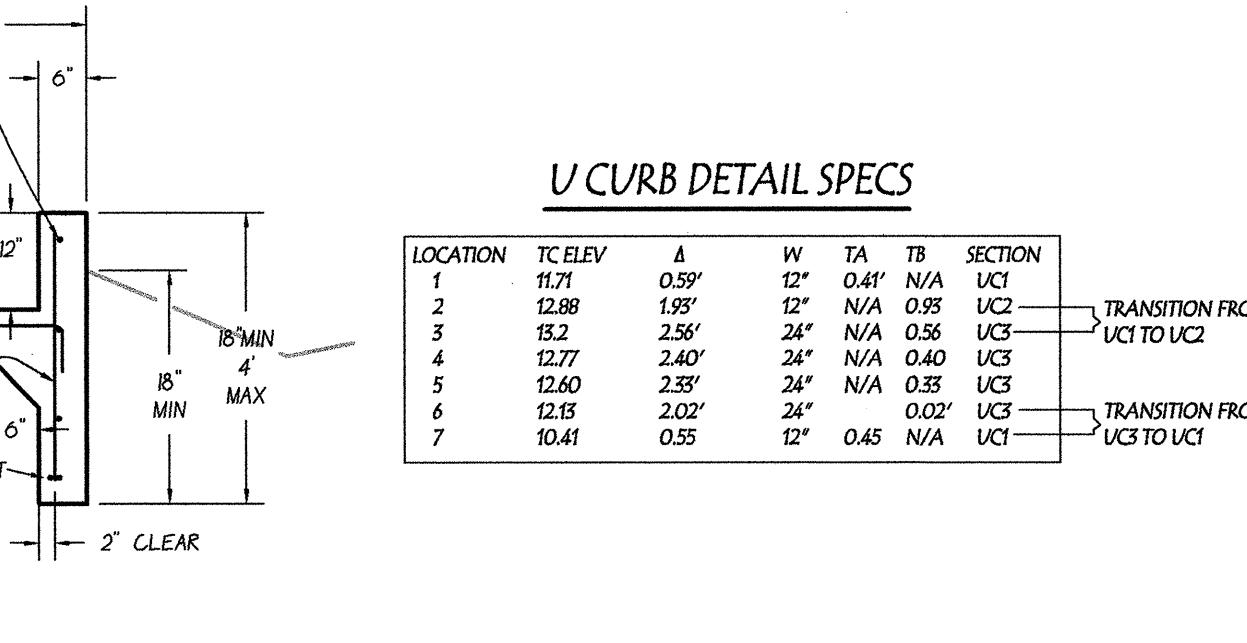
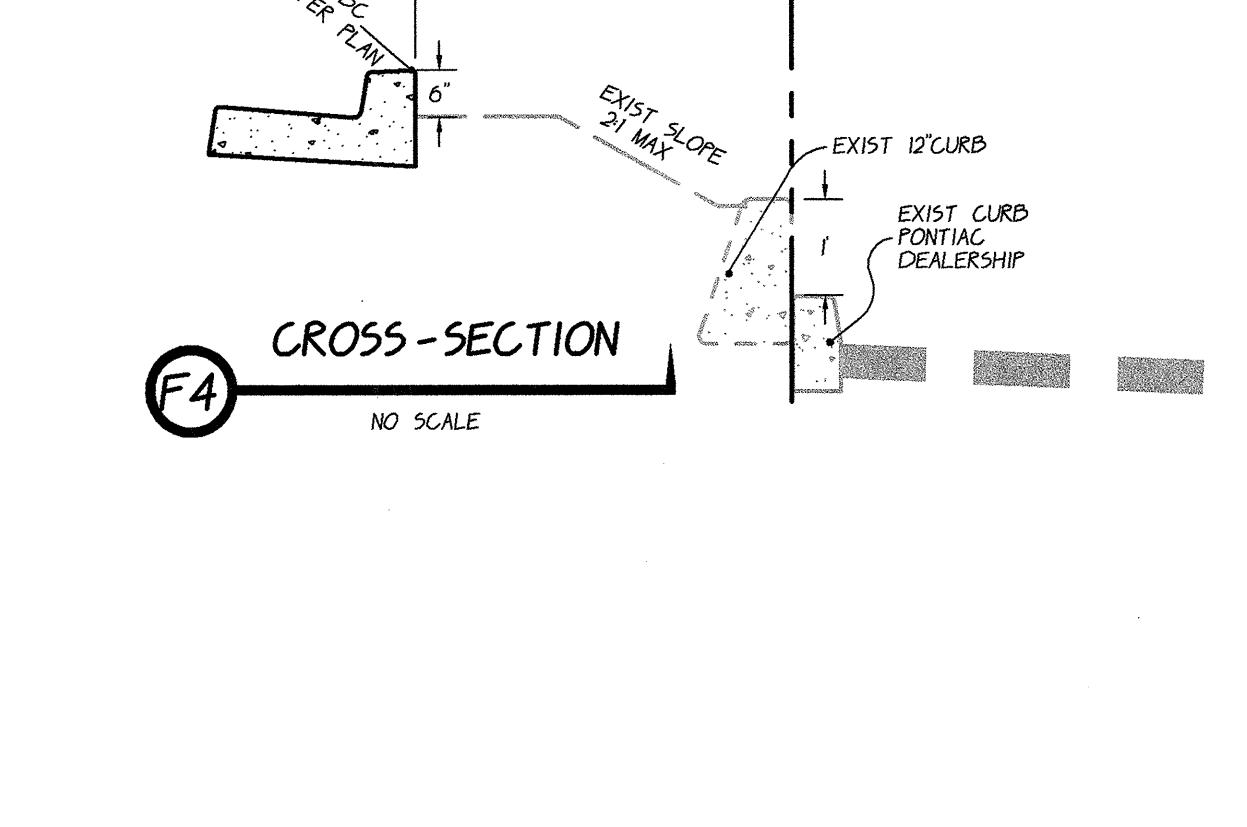
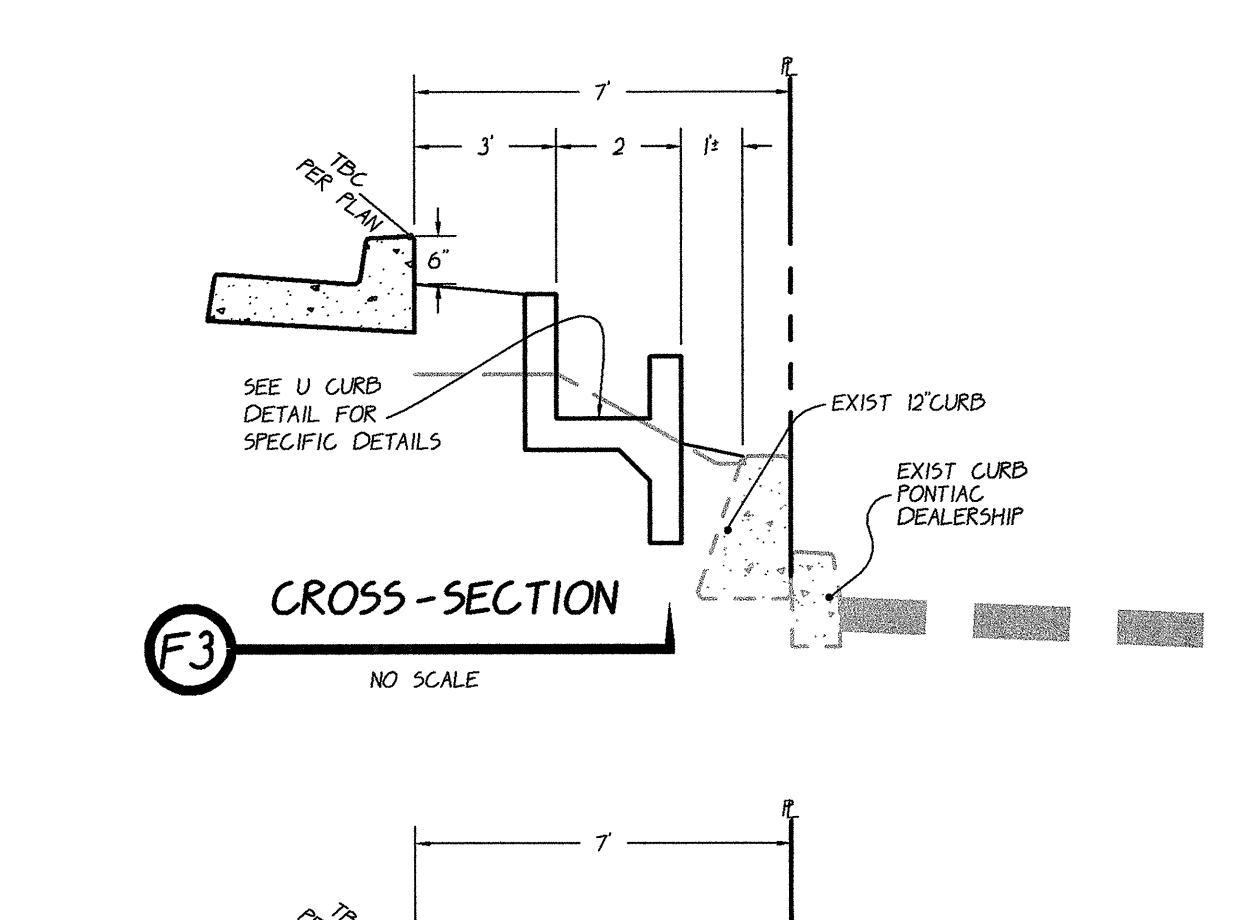
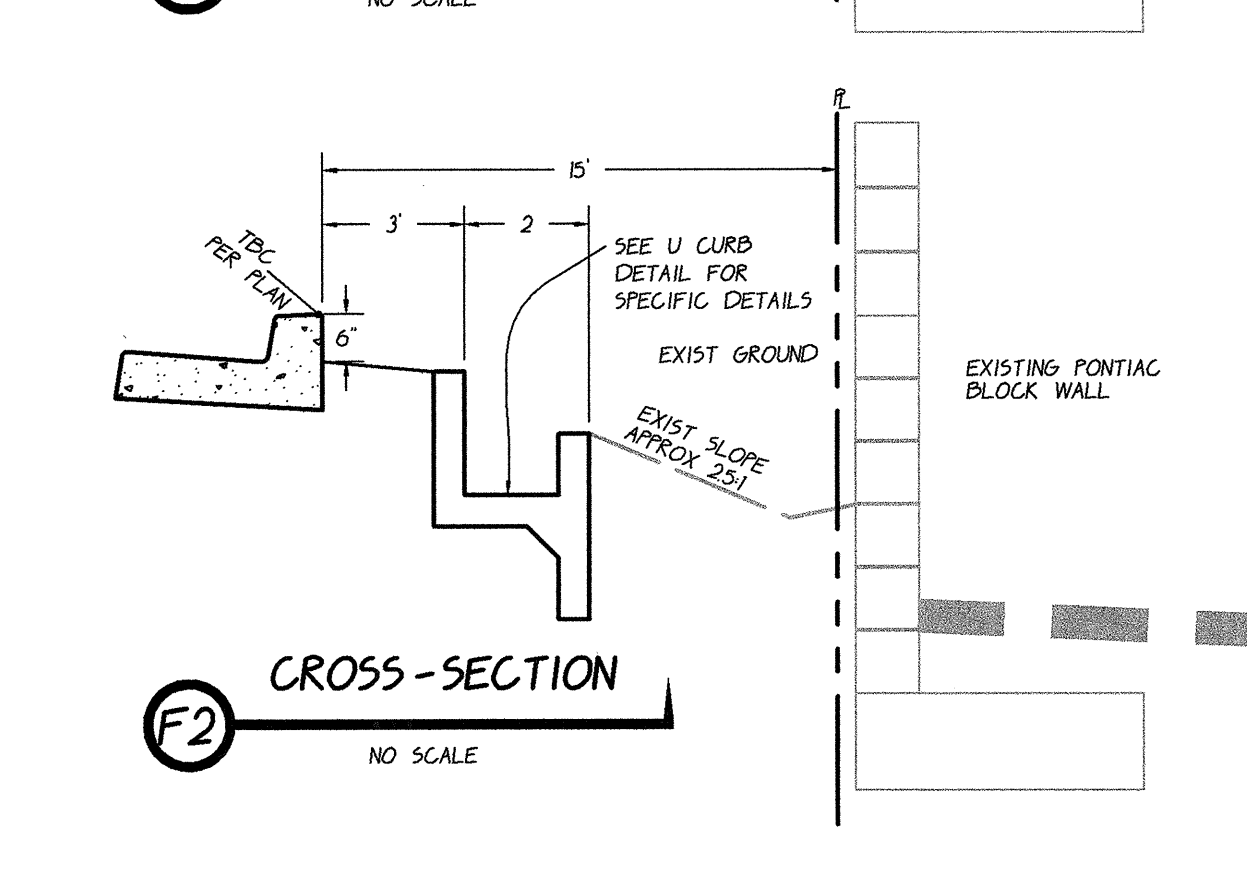
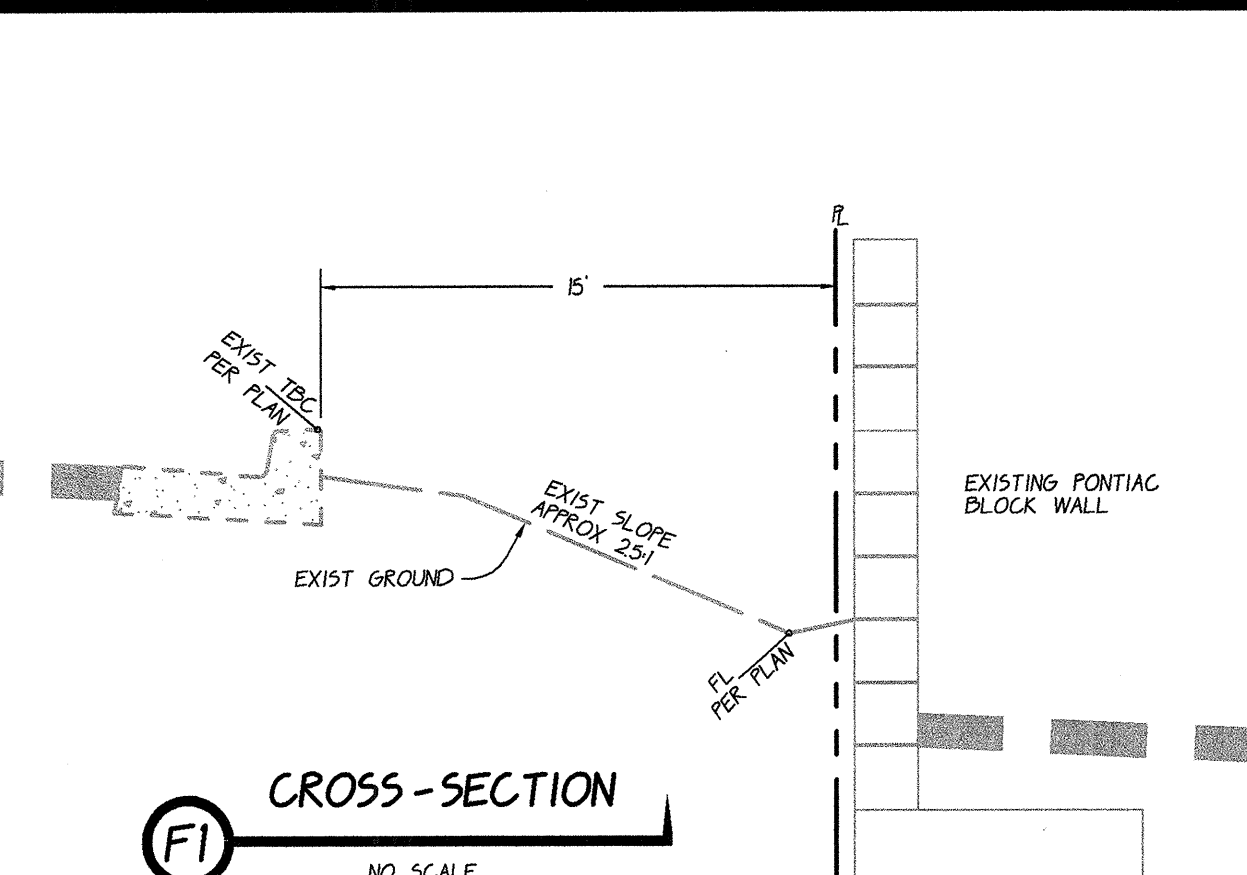
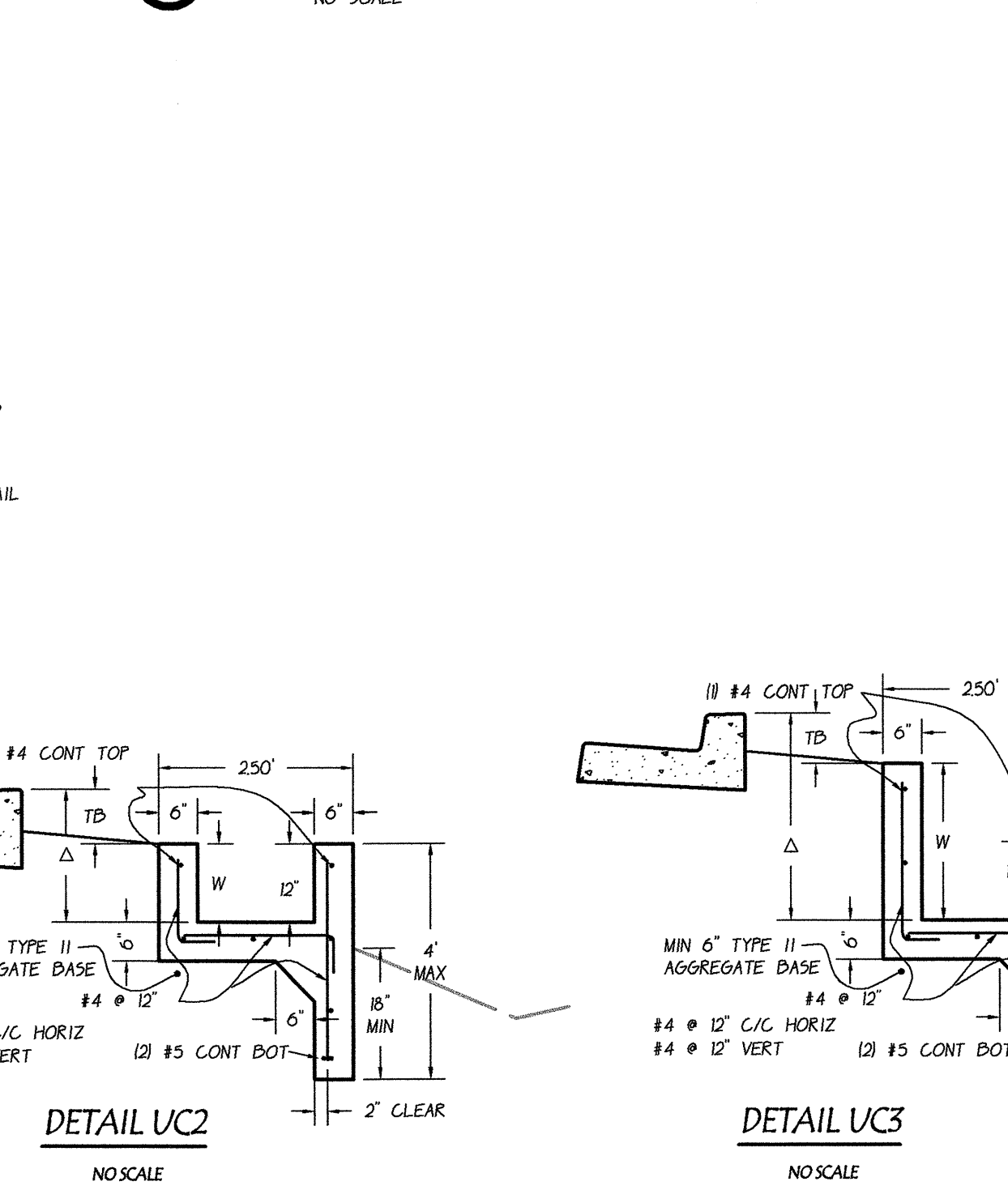
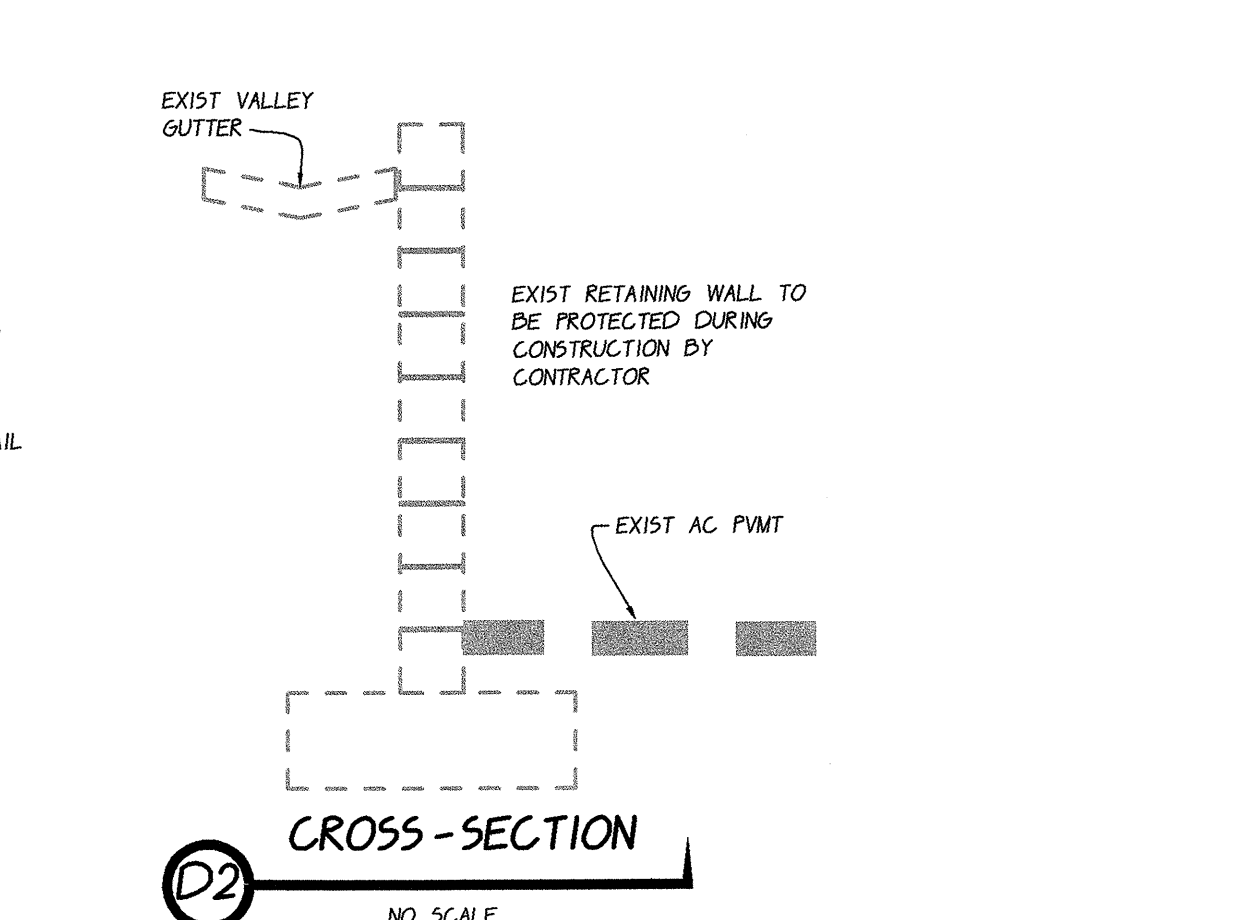
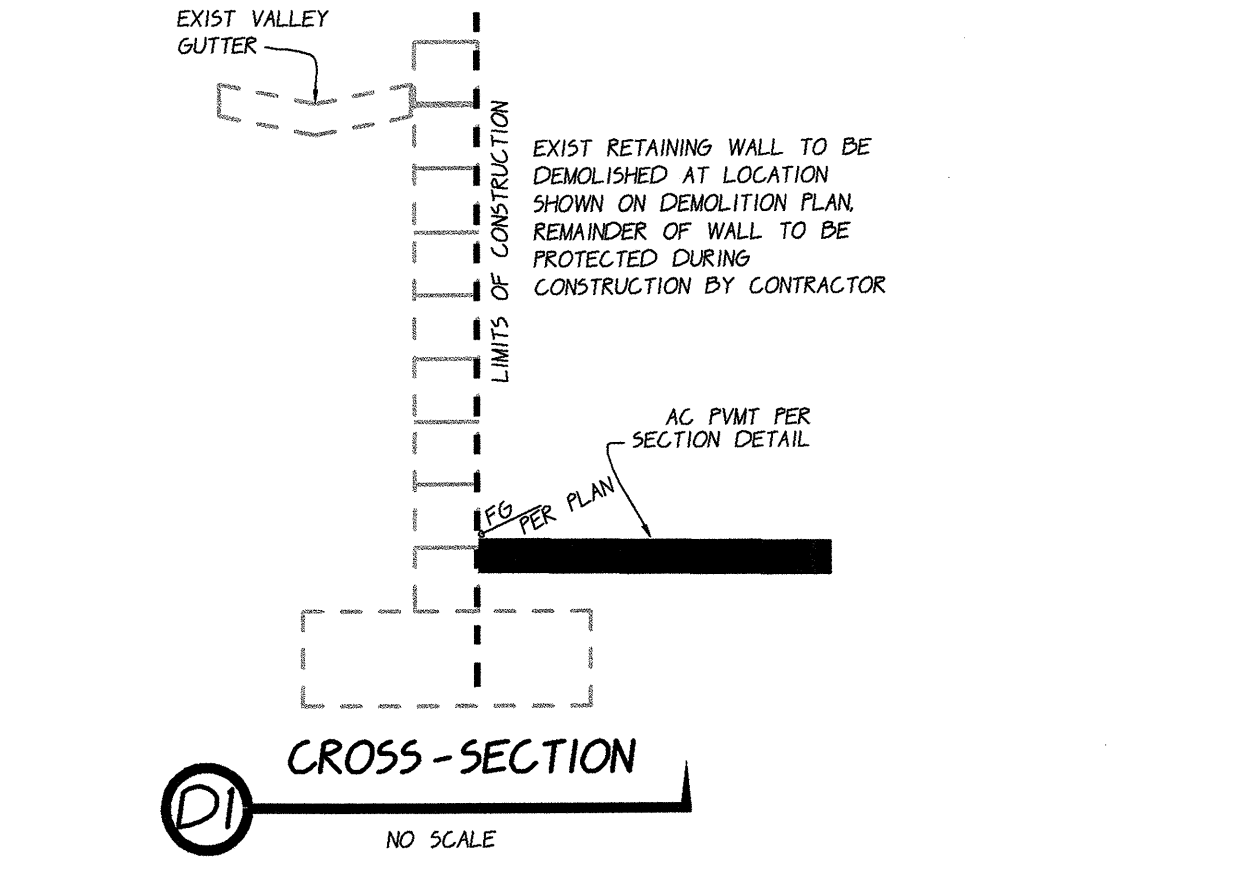
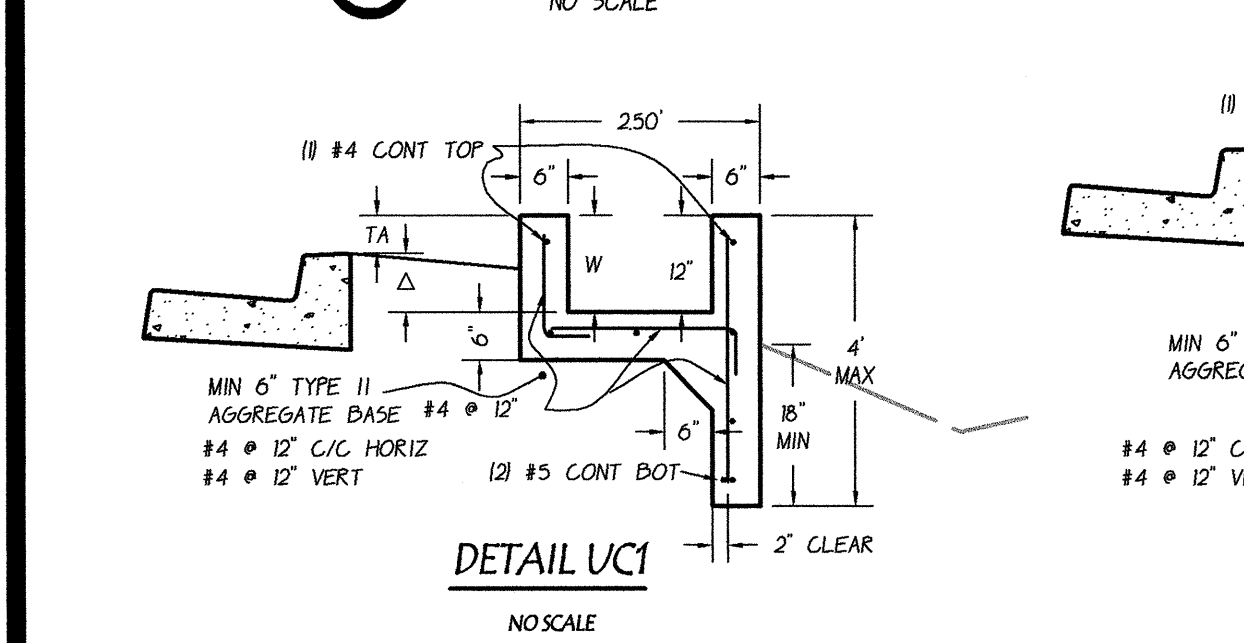
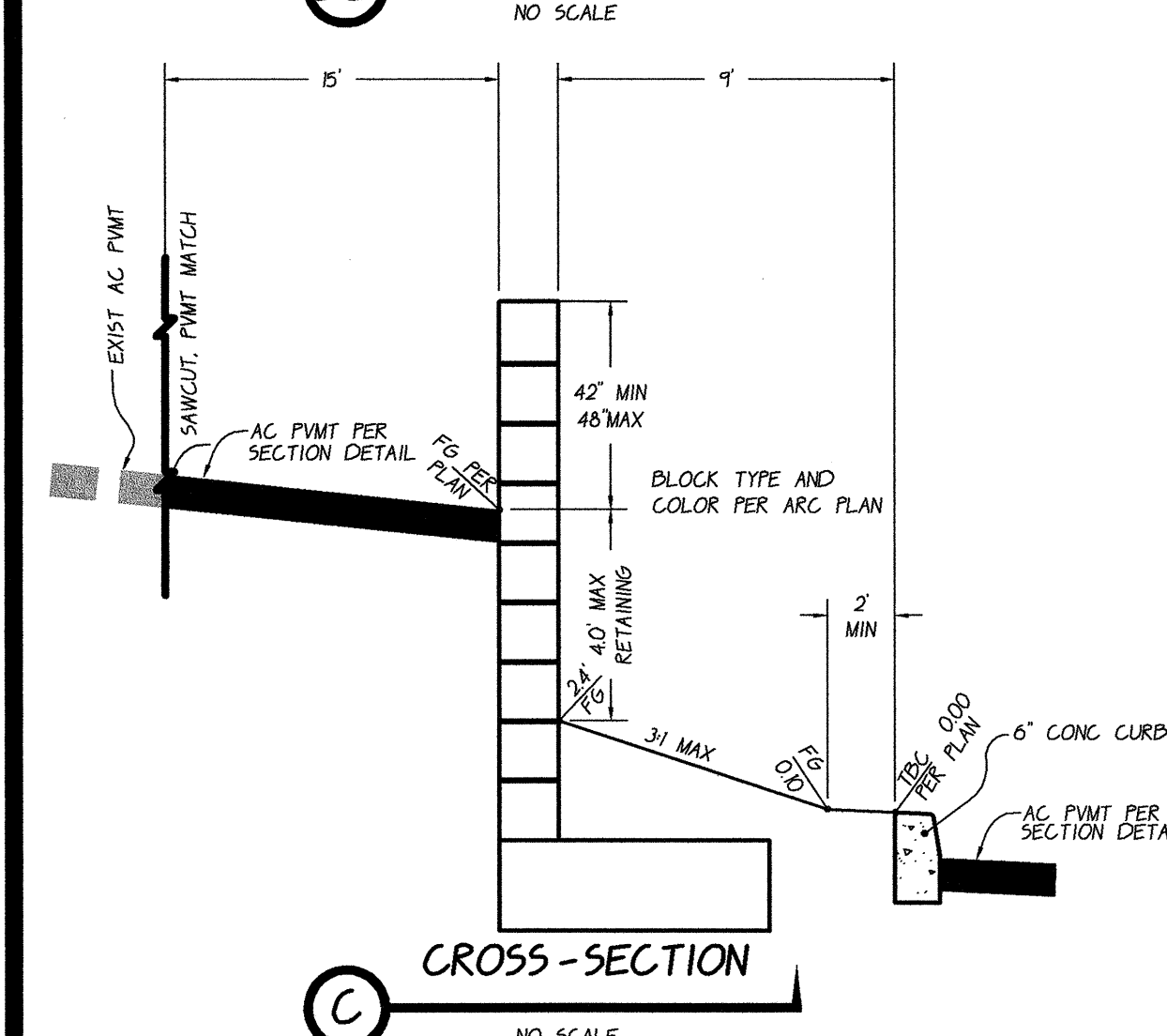
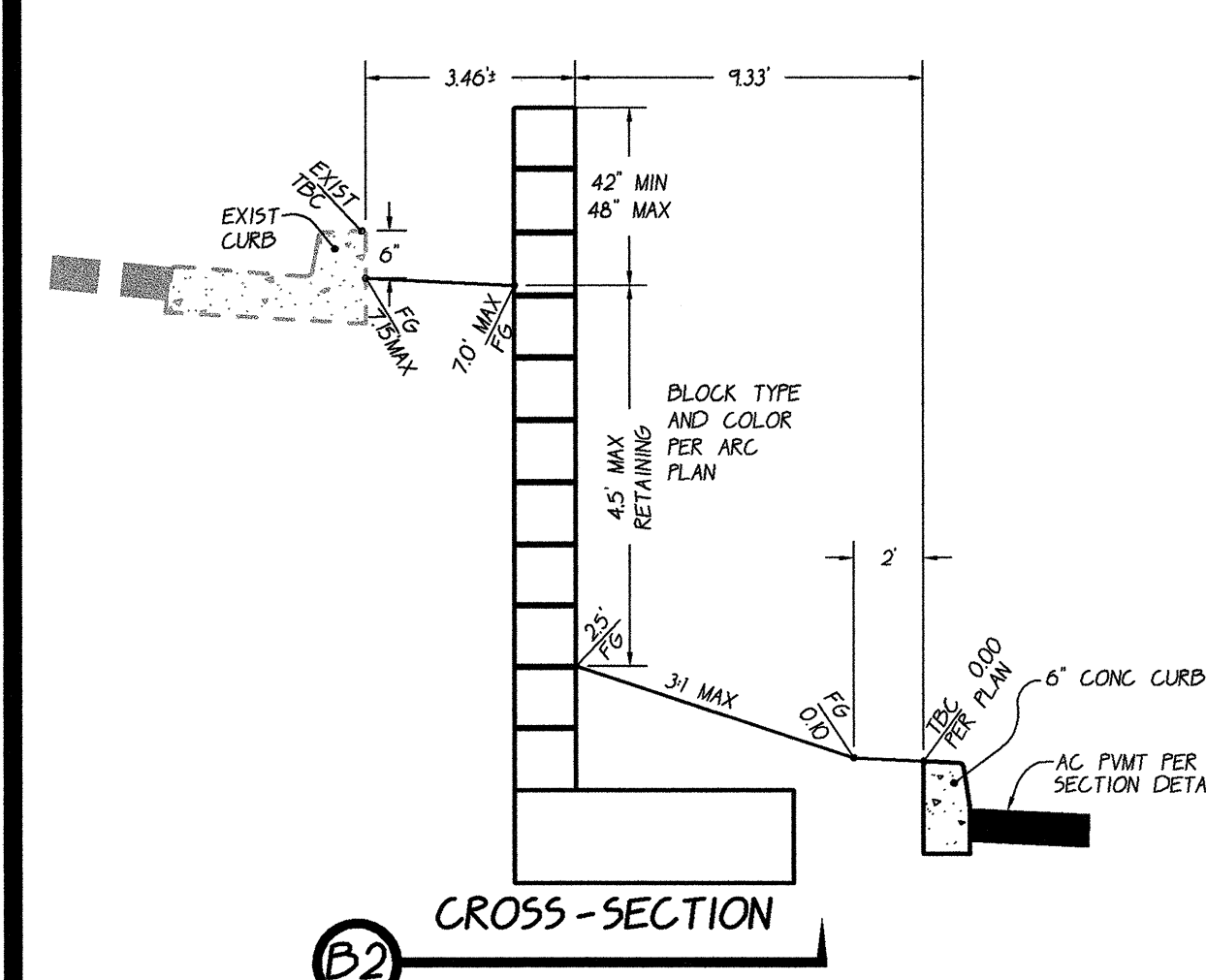
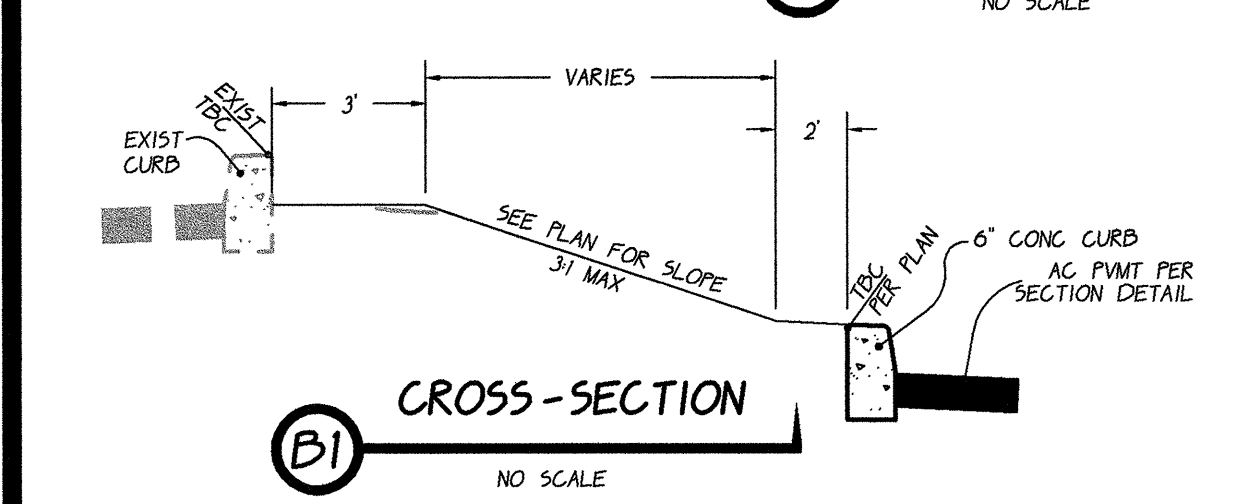
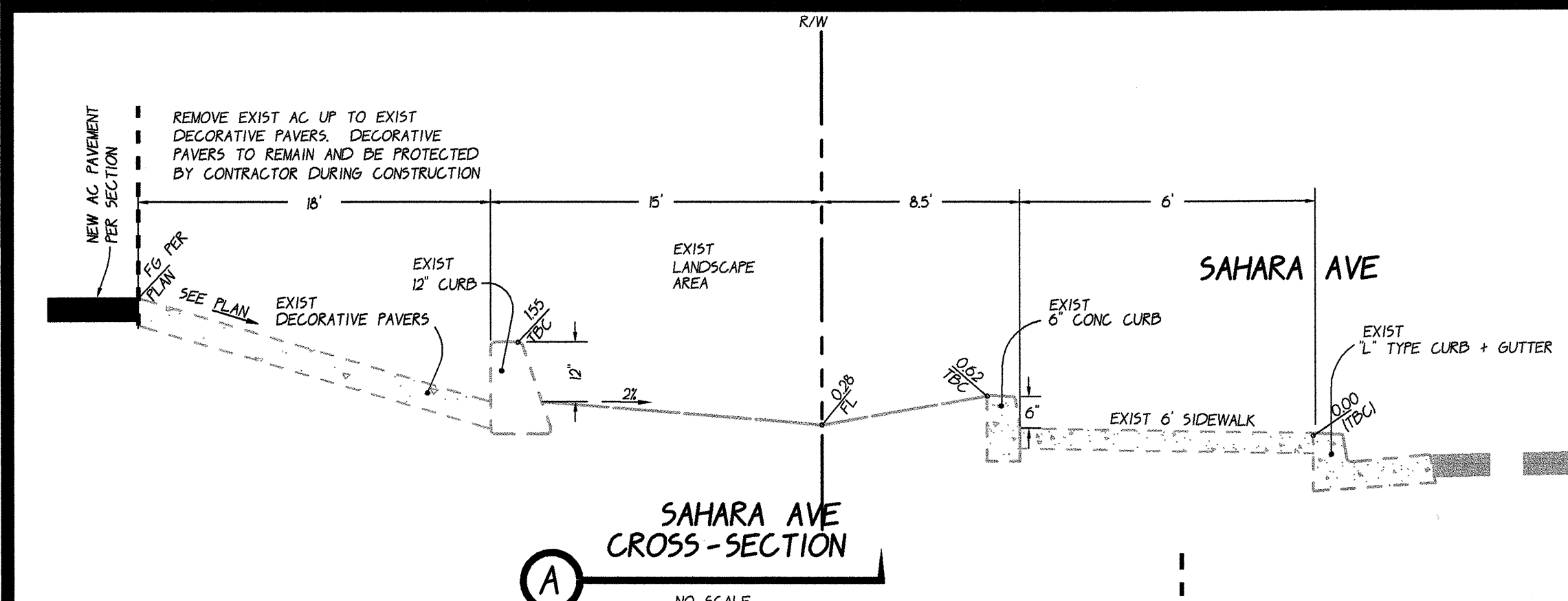
1554 Cable Point Ave.
Henderson, NV 89074
TEL: 702-547-0047

JOB NUMBER: 229-00
DATE: MAY 17, 2012
FILENAME: 229-CD.DWG
XREF FILES: 229-MST.DWG
XREF FILES: 229-TOP.DWG
XREF FILES:

TDS
CLV

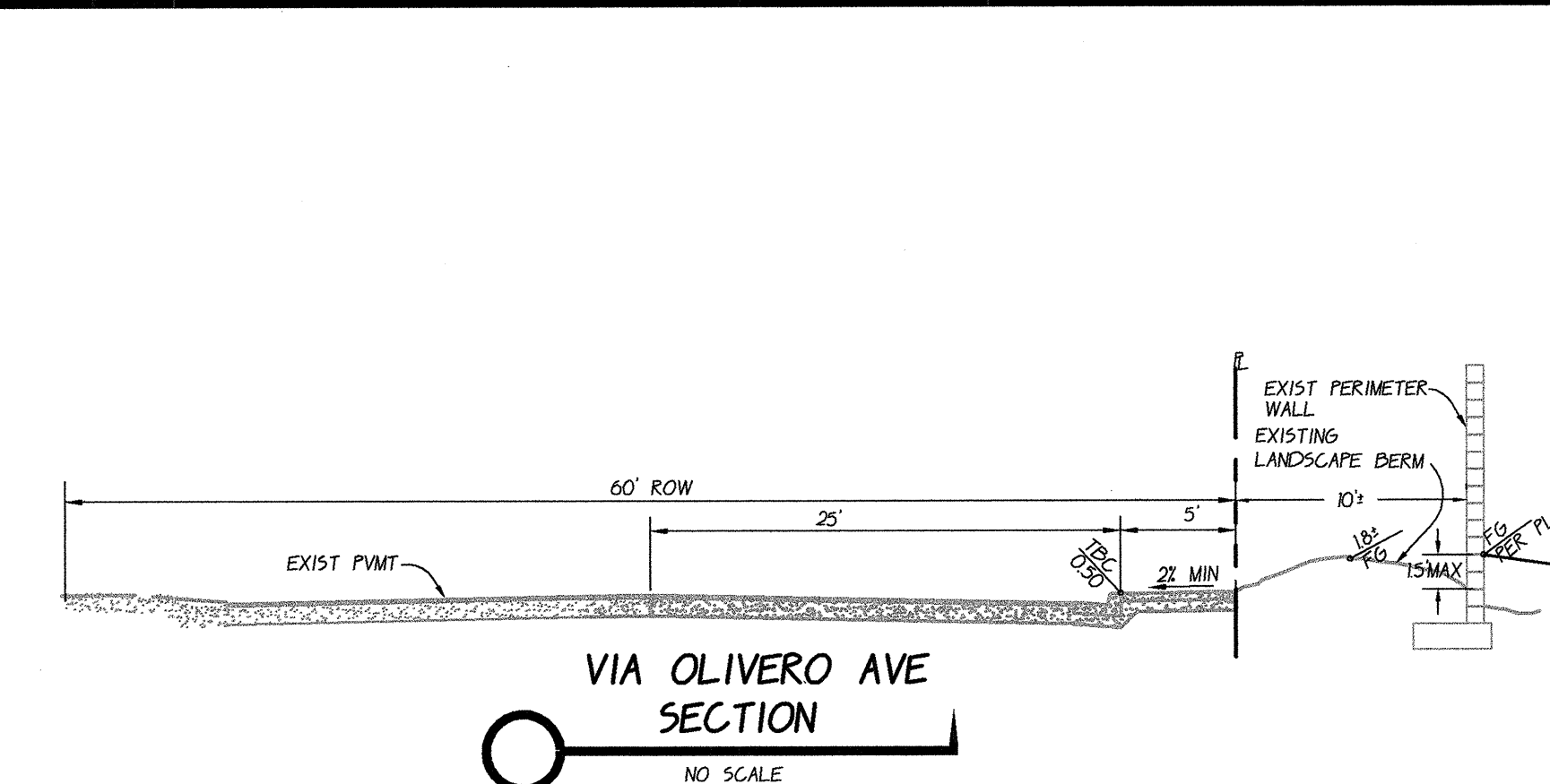
GRADING PLAN CERTIFICATION
I CERTIFY THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED
DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS

BY: _____ DATE: _____
BRIAN RIDINGER, PE 12309



U CURB DETAIL SPECS

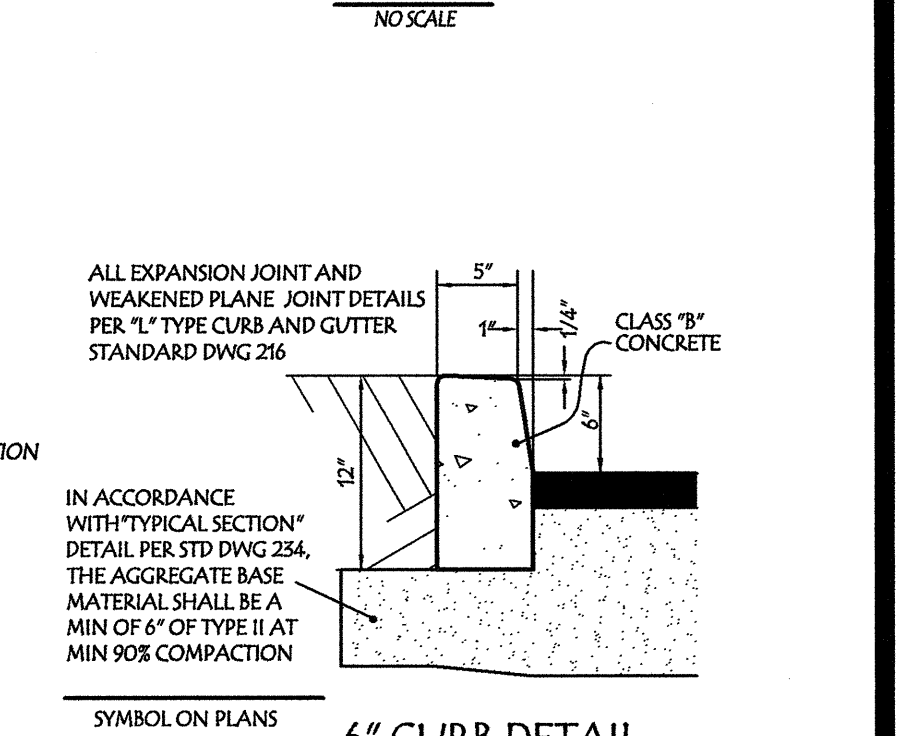
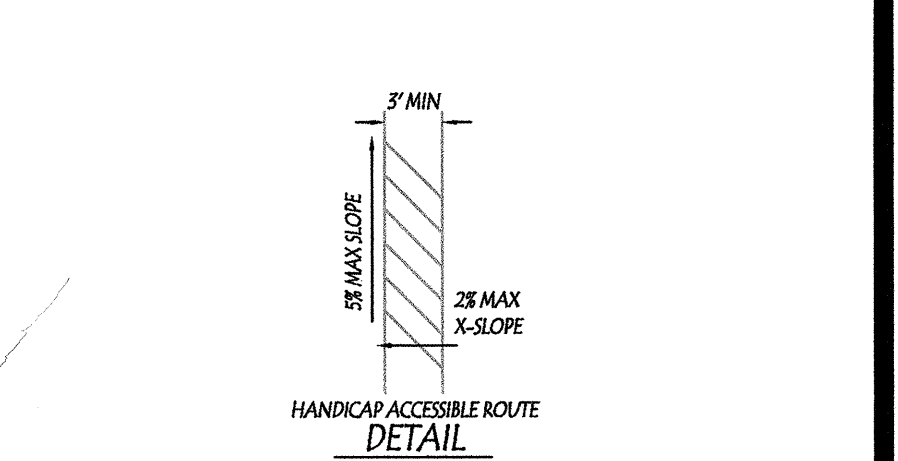
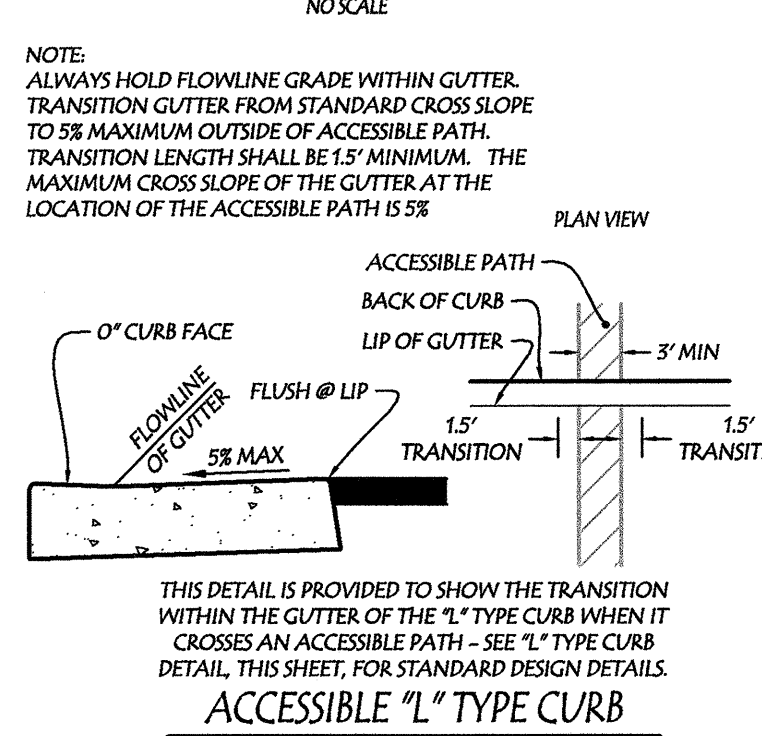
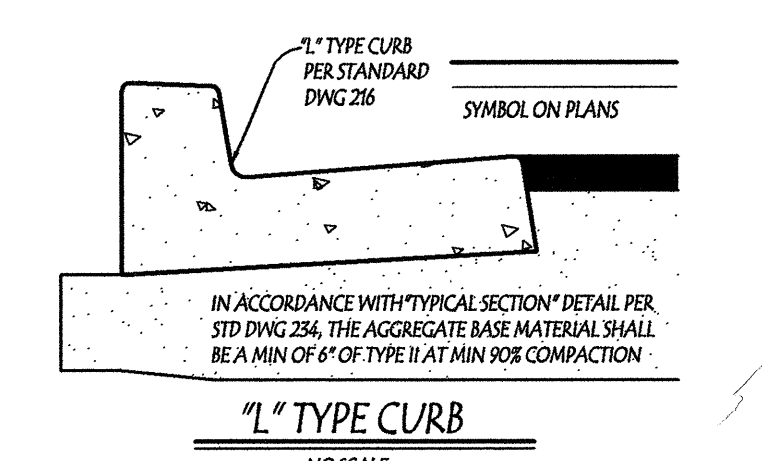
LOCATION	TC ELEV	A	W	TA	TB	SECTION
1	11.71	0.59'	12"	0.41'	N/A	UC1
2	12.88	1.95'	12"	0.05'	UC2	
3	13.2	2.56'	24"	N/A	0.56'	UC3
4	12.77	2.40'	24"	N/A	0.40'	UC3
5	12.40	2.35'	24"	N/A	0.35'	UC3
6	12.15	2.02'	24"	0.02'	UC3	
7	10.41	0.55'	12"	0.45'	N/A	UC1



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SITE PAVEMENT SECTION
THE FOLLOWING MINIMUM PAVEMENT SECTIONS ARE A PRELIMINARY RECOMMENDATION FROM:
GOTER, INC.
Geotechnical Evaluation for Planet Mazda, Located on Sahara Avenue, 640 Feet West of Rainbow Boulevard, Las Vegas, Nevada
DATE: MAY 16, 2012 PROJECT NO: 10752-LV6
THE CONTRACTOR IS RESPONSIBLE TO OBTAIN A FINAL PAVEMENT DESIGN FROM THE GEOTECHNICAL ENGINEER. THE PRELIMINARY SECTIONS PROVIDED ARE FOR THE CONVENIENCE OF THE CONTRACTOR. THE LAND DESIGN CONSULTANT BEARS NO RESPONSIBILITY FOR THE PAVEMENT SECTIONS DESIGN.
TRAFFIC AREA ASPHALT TYPE II BASE 4"
AUTOMOBILE PARKING 3"



DETAILS

ENGINEERS SEAL FOR REVIEW ONLY

PLANET MAZDA
LAS VEGAS
WEST SAHARA AVE

SHEET 7 OF 7

The LanDesign Consultant
insightful solutions for land development

1134 Castle Point Ave
Henderson, NV 89074
TEL: 702-547-0047

CLV

LEGEND	DESCRIPTION	1\"/>
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