

DS #: 5246

APN: 138.36.400-002 & 138.36.400.003

PROJECT: Tiffany Place Two

SUBMITAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: February 26, 2020
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: Tiffany Place Two	COPIES TO: Las Vegas Civil Engineering
Cross Streets:	SWC of Cory Place & Upland Street	Cory LLC
File Number:	F:\Depot\DSMemos\DS5246A.doc	Bart Anderson, P.E., DevCo
Parcel Number:	138-36-406-002 & 138-36-406-003	
Zoning Action:	GPA-77257; ZON-77258 & SDR-77259	
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	2/11/2020	2/26/2020	See Comments Below	\$400.00	3741049: \$400
			TOTAL FEES (LDDRS):	\$400.00	----

REMARKS:

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

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

Note that the Clark County Regional Flood Control District (District) has begun efforts to update the Hydrologic Criteria and Drainage Design Manual (HCDDM) and is requesting participation from the engineering community. The District is collecting comments and suggestions on errors, clarifications, or changes needed to the current Manual and/or content and usability enhancements to be incorporated into the updated Manual. Additional information on procedures and deadline to provide feedback and comments are available online at (<http://www.ccrfed.org/hcddmupdate.html>).

1. Sites with a grade difference of 2 feet 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 sheet with a letter justifying the grade difference to the *City Planning Department* (229-6301). The engineer must provide Planning approval with the next submittal.
2. The grading plan shows two parcels in the proposed development. The two buildings straddle over the two parcels which is not acceptable. Address in the next submittal whether a reversionary map is in the process to combine the two parcels into one.
3. The subject project encroaches into the adjacent existing *Tiffany Apartments* to the west. Obtain a notarized letter of permission from the owner of the adjacent apartment or address if there is another map to consolidate the parcels into one. This must be resolved in the next submittal.

4. **Figure 7 (Existing Offsite Basin Map):** Onsite basin "SITE" does not match the nomenclature in the adjacent table "EXON1". Also, other basins "EXOFF1", "EXOFF2" and combination point "COM1" are all not legible on the map. Provide a better quality map in the next submittal.
5. **Figure 9 (Future Offsite Basin Map):** The same comment above applies.
6. At the northeast corner of the project site, a block wall opening is proposed to discharge developed basin "FUTON2". Address in the next submittal whether an emergency overflow path is provided under a worst case scenario that the opening is totally clogged.
7. Provide a separate subchapter to address the BMP requirements. Address how the proposed features comply with the Manual.

In an effort to increase administrative efficiency, for all original and re-submittal packages including updates and the addenda, the City of Las Vegas Public Works Department requires both a hardcopy and a digital copy (PDF) on CD for the drainage study.

A letter sealed and signed by a Nevada registered civil engineer must be included in every submittal certifying documents on the electronic CD matches 100% of the hardcopy submittal. The new submittal requirement is effective on May 1, 2019. If there are any questions regarding these new requirements, please contact Albert Sung in the City Flood Control Section at (702) 229-6541.



Sample Letter to
certify CD.pdf

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: T20S/R60E/36
AREA L-36

Las Vegas Civil Engineering

Technical Drainage Study for Tiffany Place Two

Las Vegas, Nevada

Prepared for:

Cory LLC
6003 McLeod Dr
Las Vegas, NV 89120

Prepared by:

Las Vegas Civil Engineering
2251 N. Rampart Blvd. No. 418
Las Vegas, Nevada 89128
Tel: (702) 515-6741
Fax: (702) 515-6771

February 2020

Project No. 2010403

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Tiffany Place Two Date: 02/07/2020

Location of Development: a) Descriptive (Cross Streets) North/South: Upland Blvd
East/West: Cory Pl

b) Section: 36 Township: T20S Range: R60E

c) APN : 138-36-406-002 and -003

Name of Owner: Cory LLC

Telephone No.: NA Fax No.: NA E-Mail Address: NA

Address: 6003 McLeod Dr, LV, NV, 89120

Contact Person-Name: Joey Deblanco P.E. Telephone No.: 702-515-6741

* E-Mail Address: joey@LVCE.net Fax No.: NA

Firm: Las Vegas Civil Engineering

Address: 2251 North Rampart Blvd No. 418, Las Vegas, NV 89128

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: 2.00+/- Acres Being Developed/Disturbed: 2.00+/- Acres

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

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

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

5. Approximate upstream land area which drains to the subject site: none

6. 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: _____
Site will discharge into Upland Blvd.

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



Engineer's Seal

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

*New Required Field

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

Local Entity File No.	Revision	Date

REFERENCE:

STANDARD FORM 1

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Tiffany Place Two	Map ID:	
Firm Name: Las Vegas Civil Engineering	Engineer: Joey Deblanco	
Address: 2251 N Rampart Blvd No 418		
City: Las Vegas	State: NV	Zip: 89128
Phone Number: 702-515-6714	Fax Number: N/A	
Property Owner: Cory LLC		
Address: 6003 McLeod Dr		
City: Las Vegas	State: NV	Zip: 89120
Reviewed By:	Date Received:	Date Accepted for Review:

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

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

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

I. GENERAL REQUIREMENTS

YES NO

- ☒ ☐ Design Manual **Standard Form 1** with the engineer's seal and signature.
- ☒ ☐ Design Manual **Standard Form 4**.
- ☒ ☐ 2 copies of the 24" x 36" Drainage Plan.
- N/A** ☐ A notarized letter from the adjacent property owner (s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

YES NO

- ☒ ☐ A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated
- ☒ ☐ A copy of the current CCRFCDD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

YES NO

- | | | |
|-------------------------------------|--------------------------|--|
| ☒ | ☐ | Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs. |
| ☒ | ☐ | On-site drainage basin maps for existing interim and future conditions showing the existing topography, basin boundaries, concentration points, and on-site and off-site flows in cfs. |
| ☒ | ☐ | Vicinity Map with local and major cross streets identified and a north arrow. |

III. DRAINAGE PLAN

YES NO

- | | | |
|-------------------------------------|--------------------------|--|
| ☒ | ☐ | Sheet size 24"x36" sealed by a registered engineer in the State of Nevada. |
| ☒ | ☐ | Minimum scale: 1"=60'. |
| ☒ | ☐ | Project name. |
| ☒ | ☐ | Vicinity Map with local and major cross streets |
| ☒ | ☐ | Revision box. |
| ☒ | ☐ | North arrow and bar scale. |
| ☒ | ☐ | Engineer's /consultant's address and phone number. |
| ☒ | ☐ | Elevation datum and benchmark. |
| ☒ | ☐ | Legend for symbols and abbreviations. |
| ☒ | ☐ | Cut/fill scarps, where applicable. |
| ☒ | ☐ | Street names, grades, widths. |
| ☒ | ☐ | Proposed future and existing spot grades for top of curbs and street crown at lot lines, grade breaks, and along curb returns on both sides of the street. |
| ☒ | ☐ | Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate. |
| ☒ | ☐ | Minimum finish floor elevations with top-of-curb elevations at upstream end of lot. |
| ☒ | ☐ | Proposed typical street sections. |

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

YES NO

- | | | |
|-------------------------------------|--------------------------|---|
| N/A | ☐ | Streets with off-set crowns. |
| ☒ | ☐ | Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes. |
| ☒ | ☐ | Property lines. |
| ☒ | ☐ | Right-of-way lines and widths, existing and proposed. |
| ☒ | ☐ | Existing improvements and their elevations. |
| ☒ | ☐ | Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm Peak flows at basin concentration points. |
| ☒ | ☐ | Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets. |
| ☒ | ☐ | Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows. |
| ☒ | ☐ | Location and cross-section of street capacity calculations. |
| ☒ | ☐ | Cross-sectional detail for channels, including cutoff wall locations. |
| ☒ | ☐ | Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalks, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, materials, 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 shows appropriate lining and reinforcement. |
| ☒ | ☐ | Location and detail of existing, proposed, and future block wall openings. Minimum size is 16"X48". Wrought iron gate is required for flows > 10 cfs. |
| N/A | ☐ | Location and detail of floodwalls illustrating depth of flow, proposed grouting height, etc. |
| ☒ | ☐ | Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit. |
| ☒ | ☐ | Building and/or lot numbers. |
| N/A | ☐ | Alignment of all existing, proposed, or future Regional Facilities. Adjacent to the site. |
| N/A | ☐ | Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information. |

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

YES NO

- N/A ☐ For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
- N/A ☐ Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from Q_{100} flows.
- ☒ ☐ Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
- ☒ ☐ Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

YES NO

- ☒ ☐ Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
- ☒ ☐ Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
- ☒ ☐ Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
- ☒ ☐ Use of correct precipitation values in and around the McCarran Airport rainfall area.
- ☒ ☐ A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
- ☒ ☐ A summary table of stormwater flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where applicable.
- ☒ ☐ Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
- ☒ ☐ On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.
- ☒ ☐ Calculation for impervious area for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

YES NO

N/A ☐ Flow split calculations and supporting documentation or reference for the method of flow split calculations used.

☒ ☐ Normal depth street flow calculations and cross-section diagrams for all interior and perimeter streets. Provide “dxv” products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. $Q_{100} d \times v \leq 8$. $Q_{10} d \times v \leq 6$ and 12 foot dry lane for rights-of-way ≥ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.

☒ ☐ A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.

☒ ☐ Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)

N/A ☐ Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.

☒ ☐ Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirements 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.

A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones.

N/A ☐

- Field survey data.
- Input and output information.
- Plotted cross-sections based on survey with proper encroachments.
- A map showing the location of the cross-sections.
- Analysis of both sub and super-critical flow segments.
- A summary table and a discussion of the results in the text of the report.

☒ ☐ Provide a 50 percent clogging factor in the capacity calculation for drop inlets.

N/A ☐ Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public right-of-way, including headwater pool inundation.

☒ ☐ The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed

☒ ☐ Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2



CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

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

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

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

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

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

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

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

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

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

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

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

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

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APPENDICES

Figures
Hydrologic Parameters
Existing HEC-1 Model
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Hydraulic Calculations
Excerpts from the TDS for Tiffany Apartments
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I. INTRODUCTION

A. Study Overview and Purpose

This study is intended to serve as the technical hydrology study for the proposed development. The site comprises of approximately 2.00 acres of residential development. This study is a stand-alone document that presents the findings of a hydrologic analysis of the site and contributing watershed area.

This report will identify any natural washes as well as any existing/proposed drainage facilities that contribute stormwater runoff to the site during a 100- and 10-year, 6-hour storm event. This study has been conducted in accordance with the criteria set forth by the Clark County Regional Flood Control District's (CCRFCDD) *Hydrologic Criteria and Drainage Design Manual* (Reference #1).

B. Location

The project area is within the southwest quarter (SW 1/4) of Section 36, Township 20 South, Range 60 East, Clark County, Nevada. The site is located at the southwest corner of the intersection of Cory Place and Upland Boulevard (APN 138-36-406-002 and -003). See Figures 1 and 1A, *Vicinity Map* and *APN Map*.

C. Existing Site Description

The site is undeveloped. The site consists of approximately 2.00 acres in poor hydrologic condition. The general area slopes to the east at approximately one to two percent. The properties adjacent to the site are developed residential and commercial sites. See Figure 2, *Site Description Map*.

D. FEMA Flood Plain Information

A review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Community-Panel Number 32003C2165D, effective date November 16, 2011 (Reference #5), indicates the site is located within a FEMA Zone 'X'. A Zone 'X' is described by FEMA as areas outside of the 0.2% annual chance floodplain. A map depicting the FEMA flood zones in the vicinity of the site is included in the appendix of this study. (Figure 3- FIRM Map)

E. CCRFCDD Master Plan Information

As shown on Figure F-29 from the 2018 Las Vegas Valley Flood Control Master Plan Update (see Figures 4 and 5 in the Appendix), prepared ATKINS. (Reference #4), the subject site is not adjacent to a proposed Master Plan Flood Control Facility. Figure W-5 has also been provided, (see Figure 6 in the appendix) and the site is part of basin CH09-C.

F. Previous Drainage Studies

The project was analyzed using the basins from the Drainage Study for Tiffany Apartments (DS3855). The basin boundaries were used to delineate offsite basins. Reference material has been deemed acceptable and has been included in the appendix.

II. METHODOLOGY

A. Compliance with Regulations

This study complies with the standards set forth within Reference #1, and City of Las Vegas drainage requirements.

B. Hydrologic Criteria

1. Rainfall Criteria

The project site is located within the McCarran Airport Rainfall Area. The depth-duration-frequency values for the 6-hour, 10-year and 100-year storm events were obtained from Table 503 and 505 and Figure 513 of Reference #1. Since the site encompasses less than 8-square miles a Storm Distribution Number three (SDN #3) was used in the HEC-1 model. The precipitation values are outlined in Table 1.

2. Runoff Computations

The U. S. Army Corps of Engineers HEC-1 flood hydrograph package was used to determine the peak runoff generated during the 100- and 10-year, 6-hour storm event. The HEC-1 computer model simulates the surface runoff response of a given watershed to rainfall. The HEC-1 program represents the watershed as an interconnected system of hydraulic components. Each component represents an aspect of the rainfall runoff process within a portion of the watershed. The smaller portion is referred to as a sub-basin. The computed hydrographs from each sub-basin are then combined at appropriate locations to obtain the final discharge hydrograph. The HEC-1 parameter calculations are located in the appendix of this study.

The SCS curve number method was used to determine the infiltration rates for the drainage basins. The soil groups for the project site were determined using the SCS Soil Survey of the Las Vegas Valley Area, Nevada, Part of Clark County. Curve numbers for the undeveloped onsite and offsite were determined using Table 602 (4 of 4) for areas assumed to be desert shrub. Curve numbers for the developed onsite and offsite were determined using Table 602 (1 of 4) and Table 602A for opens spaces, pavement, commercial, residential lots, and apartments. Soil information has been included in the appendix.

Basin areas for the offsite and onsite drainage basins were determined using a scaled plan.

Lag Time T_L is defined as the time measured from the centroid of effective rainfall to the peak of the outflow hydrograph. It is a measure of the watershed's response time, and is a coherent property to basin length, slope, roughness characteristics, and land use. The lag-times for this study were estimated by calculating the drainage basins' time of concentration, T_C . The time of concentration consists of two components; the initial overland flow time, t_i , and the gutter or channel flow time, t_c . The equation for the time of concentration is $T_C = t_i + t_c$. The equation for lag time is $T_L = 0.6T_C$.

Precipitation in the Las Vegas Valley is characterized typically by long-duration, low-intensity winter storms and by short-duration, high-intensity summer storms. The winter storms, in general, do not produce major flooding events. The summer storms however can and do produce major flash flooding hazards in the Las Vegas Valley Area.

**TABLE 1
DRAINAGE BASIN PARAMETERS**

BASIN	AREA (acres)	CN	POINT PRECIP. (10 yr/100 yr)	DARF (10 yr/100 yr)	LAG (hr)
EXON1	2.00	88.0	1.58/2.77	0.57/1.00	0.100
EXOFF1	12.7	91.7	1.58/2.77	0.57/1.00	0.107
EXOFF2	4.57	93.1	1.58/2.77	0.57/1.00	0.131
FUTON1	0.13	93.0	1.58/2.77	0.57/1.00	0.050
FUTON2	1.87	93.0	1.58/2.77	0.57/1.00	0.050
FUTOF1	12.7	91.7	1.58/2.77	0.57/1.00	0.107
FUTOF2	4.57	93.3	1.58/2.77	0.57/1.00	0.131

III. DRAINAGE BASIN DESCRIPTIONS

A. Existing Offsite Drainage Description

The existing offsite basins impacting the site come from the northwest. Offsite basins flows were based on existing contours and the approved Technical Drainage Study for Tiffany Apartments. EXOFF1 channelizes flow in the gutter flowline, conveying flow south on Upland Boulevard. EXOFF2 channelizes flow in the gutter flowline, conveying flow east on Cory Place and into Upland Boulevard. Offsite flows and basins impacting the site are shown on the basin map included in the appendix (Figure 7).

B. Existing Onsite Drainage Description

The existing site was analyzed to quantify the amount of runoff generated in the existing conditions. The onsite basins have been delineated based on the sites existing topography. Onsite basin EXON1 is discharged east of the site into Upland Boulevard (EXOFF1). COM1 is the summation of all offsite and onsite flows in Upland Boulevard. The delineation of the existing onsite basins is shown on Figure 8 included in the appendix. Table 2 shows a summary of the runoff amounts determined in the existing condition:

**TABLE 2
10-YEAR / 100-YEAR, 6-HOUR STORM EVENT
EXISTING RUNOFF AMOUNTS**

BASIN NAME/ CONCENTRATION POINT	AREA (acres)	10-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)
EXON1	2.00	2	5
EXOFF1	12.7	15	32
EXOFF2	4.57	6	12
COM1	--	22	48

C. Future Offsite Drainage Description

The future basin delineation is the same as the existing condition. Offsite flows and basins impacting the site are shown on the basin map included in the appendix (Figure 9).

D. Future Onsite Drainage Description

The future onsite basins analyze the proposed development. Basin FUTON1 conveys flow west onto the adjacent property. Basin FUTON1 does not add significant flow to the adjacent property. FUTON2 conveys flow east into Upland Boulevard. COM1 is the summation of all offsite flows and FUTON2 in Upland Boulevard. The delineation of the future onsite basins is shown on Figure 10 included in the appendix. Table 3 shows a summary of the runoff amounts determined in the future condition:

TABLE 3
10-YEAR / 100-YEAR, 6-HOUR STORM EVENT
FUTURE RUNOFF AMOUNTS

BASIN NAME/ CONCENTRATION POINT	AREA (acres)	10-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)
FUTON1	0.13	<1	<1
FUTON2	1.87	3	6
FUTOF1	12.7	15	32
FUTOF2	4.57	6	12
COM1	--	23	50

E. Facility Design Calculations

Street flow calculations for the 10-year and 100-year, 6-hour storm events are summarized in the following tables:

TABLE 4
STREET FLOW CALCULATIONS

STREET	Q₁₀/Q₁₀₀ (cfs)	D₁₀/D₁₀₀ (ft)	V₁₀/V₁₀₀ (ft/s)	V x D
Cory Pl (Section 1) FUTOF2	6/12	0.33/0.40	2.90/3.38	0.96/1.35
Upland Blvd (Section 2) COM1	23/50	0.51/0.63	3.28/3.80	1.67/2.39

TABLE 5
SECTION FLOW CALCULATIONS

STREET	Q₁₀/Q₁₀₀ (cfs)	D₁₀/D₁₀₀ (ft)	V₁₀/V₁₀₀ (ft/s)	V x D
Section a (FUTON2 45%)	2/3	0.23/0.27	1.53/1.69	0.35/.46
Section b (FUTON2 10%)	1/1	0.18/0.18	2.39/2.39	0.43/0.43
Section c (FUTON2 45%)	2/3	0.22/0.25	2.75/3.04	0.61/0.76

The street calculations show that the *CCRFCD Hydrologic Criteria & Drainage Design Manual* velocity/depth products criteria are met in the future conditions. The velocity/depth products are below 6 and 8 for the 10- and 100-year storms, respectively. All finished floor elevations have been raised a minimum of twice the depth of flow up to 18 inches above the water surface elevation in the street along the frontage.

Upland Boulevard has a dry lane 16ft including the center turn lane. The 12 ft dry lane requirements for the 10-year condition are not met for Upland Boulevard excluding the center turn lane. The site does not significantly increase flows in Upland Boulevard.

Onsite BMPs have been included for this proposed development. Landscape swales have been provided for the control of surface water quality and the velocities are mitigated by erosion protection for the 100-year condition for onsite basins (see calculations in the appendix). The flowrate was calculated as shown on the worksheets included in the appendix. The total mitigated impervious area within this project is more than 75%. The proposed design satisfies BMP requirements.

IV. CONCLUSIONS

The following recommendations are provided to facilitate safety, both public and private, for the proposed residential development.

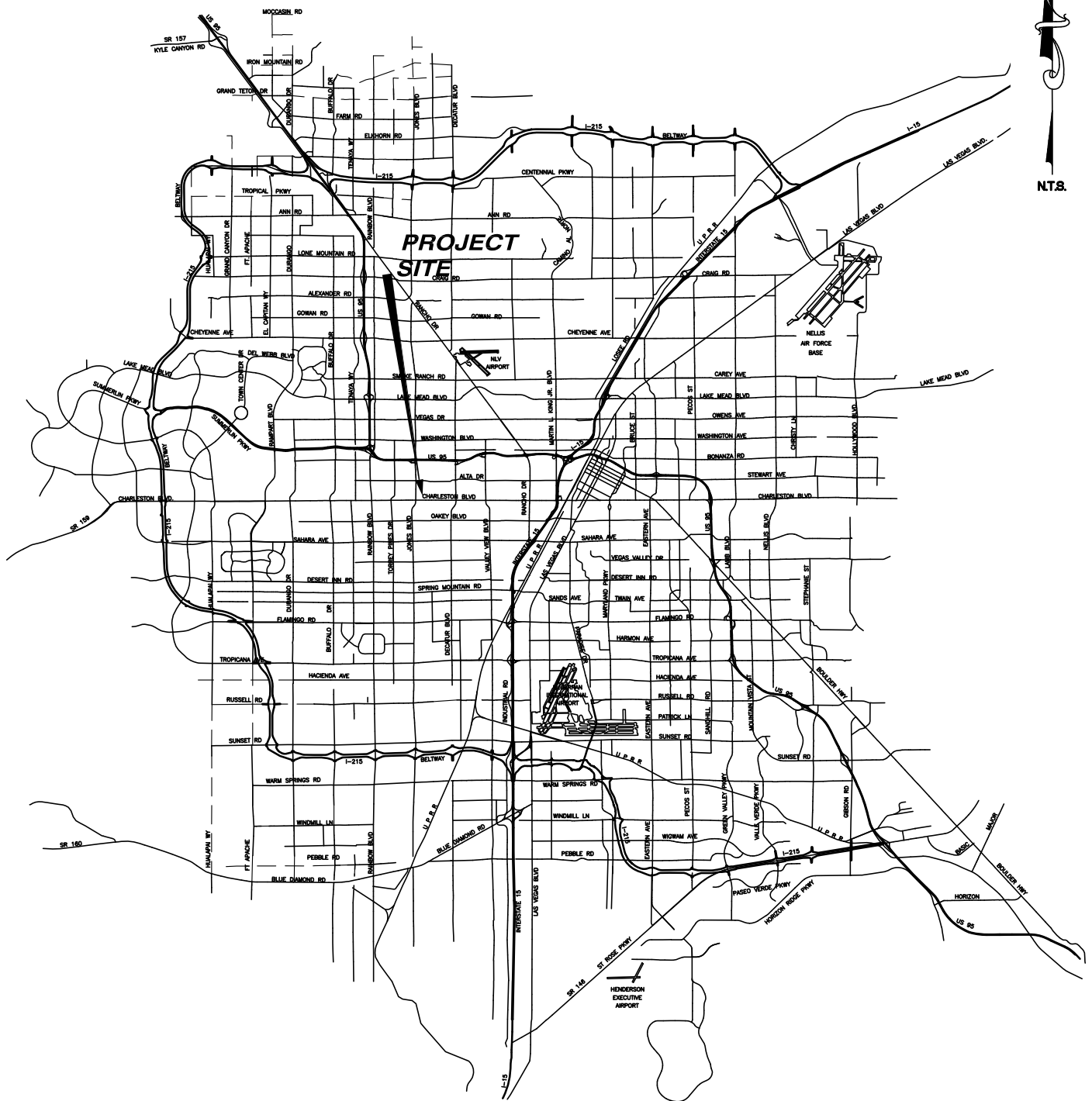
1. Construct all street improvements for the conveyance of stormwater.
2. Nuisance water shall be captured onsite so adjacent properties are not affected during construction.

V. REFERENCES

1. *CCRFCD Hydrologic Criteria and Drainage Design Manual*, WRC Engineering, 1999.
2. *Contours*, Clark County.
3. *Soil Survey of Las Vegas Valley Area, Nevada, Part of Clark County*, Soil Conservation Service, 1985.
4. *2018 CCRFCD Flood Control Master Plan*, Atkins, et al., 2018.
5. *Flood Insurance Rate Map, Community Panel Number 32003C2165D, Clark County, Nevada*, Federal Emergency Management Agency, effective November 16, 2011.
6. *HEC-1 Flood Hydrograph Package Version 4.0*, U.S. Army Corps of Engineers Hydrologic Engineering Center, 1990.
7. *FlowMaster Connect Edition Update 2*, Haestad Methods, Inc., 2018.
8. *Drainage Study Tiffany Apartments*, E & M Civil Engineering Consultants, 2004.

APPENDIX

Figures



Las Vegas Civil Engineering
 2251 N. Rampart Blvd. No. 418
 LAS VEGAS, NV 89128
 (702) 515-6741

FIGURE 1

VICINITY MAP

NOTES

This map is for assessment use only and does NOT represent a survey.

No liability is assumed for the accuracy of the data delineated herein. Information on roads and other non-assessed parcels may be obtained from the Road Document Listing in the Assessor's Office.

This map is compiled from official records, including surveys and deeds, but only contains the information required for assessment. See the recorded documents for more detailed legal information.

USE THIS SCALE(FEET) WHEN MAP REDUCED FROM 11X17 ORIGINAL

0 100 200 400 600 800

ASSESSOR'S PARCELS - CLARK COUNTY, NV.

Briana Johnson - Assessor

MAP LEGEND

—	PARCEL BOUNDARY	□	CONDOMINIUM UNIT	007	ROAD PARCEL NUMBER
- - -	SUB BOUNDARY	□	AIR SPACE PCL	001	PARCEL NUMBER
- · - · -	PM/LD BOUNDARY	□	RIGHT OF WAY PCL	1.00	ACREAGE
- · - · -	ROAD EASEMENT	□	SUB-SURFACE PCL	202	PARCEL SUB/SEQ NUMBER
- · - · -	MATCH / LEADER LINE			5	BLOCK NUMBER
- · - · -	HISTORIC LOT LINE			5	LOT NUMBER
- · - · -	HISTORIC SUB BOUNDARY			GL5	GOV. LOT NUMBER
- · - · -	HISTORIC PM/LD BOUNDARY				
- · - · -	SECTION LINE				

T20S R60E

126	125	124	12
137	138	139	14
164	163	162	16
175	176	177	17

Scale: 1" = 200'

SEC. 36

6	5	4	3	2	1
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

S 2 SW 4

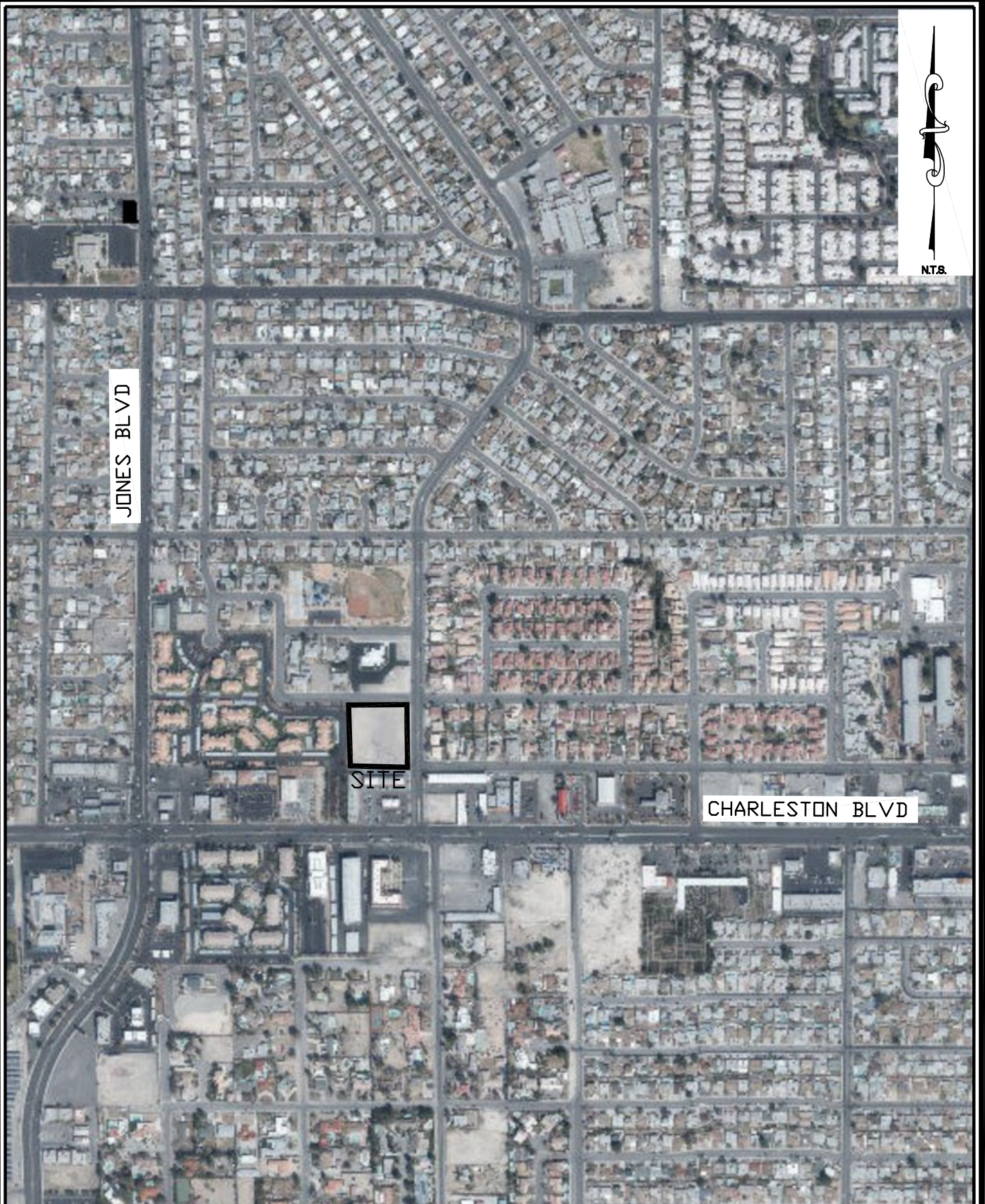
8	4	8	4
5	1	5	1
6	2	6	2
7	3	7	3
8	4	8	4
5	1	5	1

138-36-4





FIGURE 1A



N.T.S.

Las Vegas Civil Engineering
2251 N. Rampart Blvd. No. 418
LAS VEGAS, NV 89128
(702) 515-6741

FIGURE 2

SITE DESCRIPTION MAP

* PANEL NOT PRINTED - ALL ZONE X

** PANEL NOT PRINTED - ALL FLOOD HAZARDS CONTAINED IN CHANNEL FROM TROPICANA DETENTION BASIN;
REST OF PANEL ALL ZONE X

† PANEL NOT PRINTED - OUTSIDE COUNTY BOUNDARY

003C2135F

CITY OF
LAS VEGAS

003C2145F

*32003C2165D

32003C216

32003C2170F

2186

3200

SITE
Tropicana Wash

2551F

2552F

2556F

2557F

2003C2535F

2553F

**3200

2554F

2561F

2562F

2566F



MAP INDEX

FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY,
NEVADA
AND INCORPORATED AREAS
(SEE LISTING OF COMMUNITIES TABLE)

MAP INDEX

PANELS PRINTED: 225, 250, 275, 300, 325,
350, 367, 369, 370, 375, 378, 379, 386, 387, 388, 391,
625, 650, 655, 660, 665, 670, 680, 690, 695, 700, 750,
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1753, 1754, 1758, 1765, 1766, 1767, 1768, 1769, 1786,
1788, 1790, 1800, 1825, 1900, 1925, 1950, 2000, 2025,
2050, 2125, 2135, 2145, 2150, 2155, 2160, 2170, 2176,
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3775, 3850, 3875, 3900, 3925, 3950, 3985, 3995, 4005,
4015, 4060, 4070, 4080, 4090



MAP NUMBER
32003CINDOC

MAP REVISED
NOVEMBER 16, 2011

Federal Emergency Management Agency

Las **V**egas **C**ivil **E**ngineering
2251 N. Rampart Blvd. No. 418
LAS VEGAS, NV 89128
(702) 515-6741

FIGURE 3

FIRM

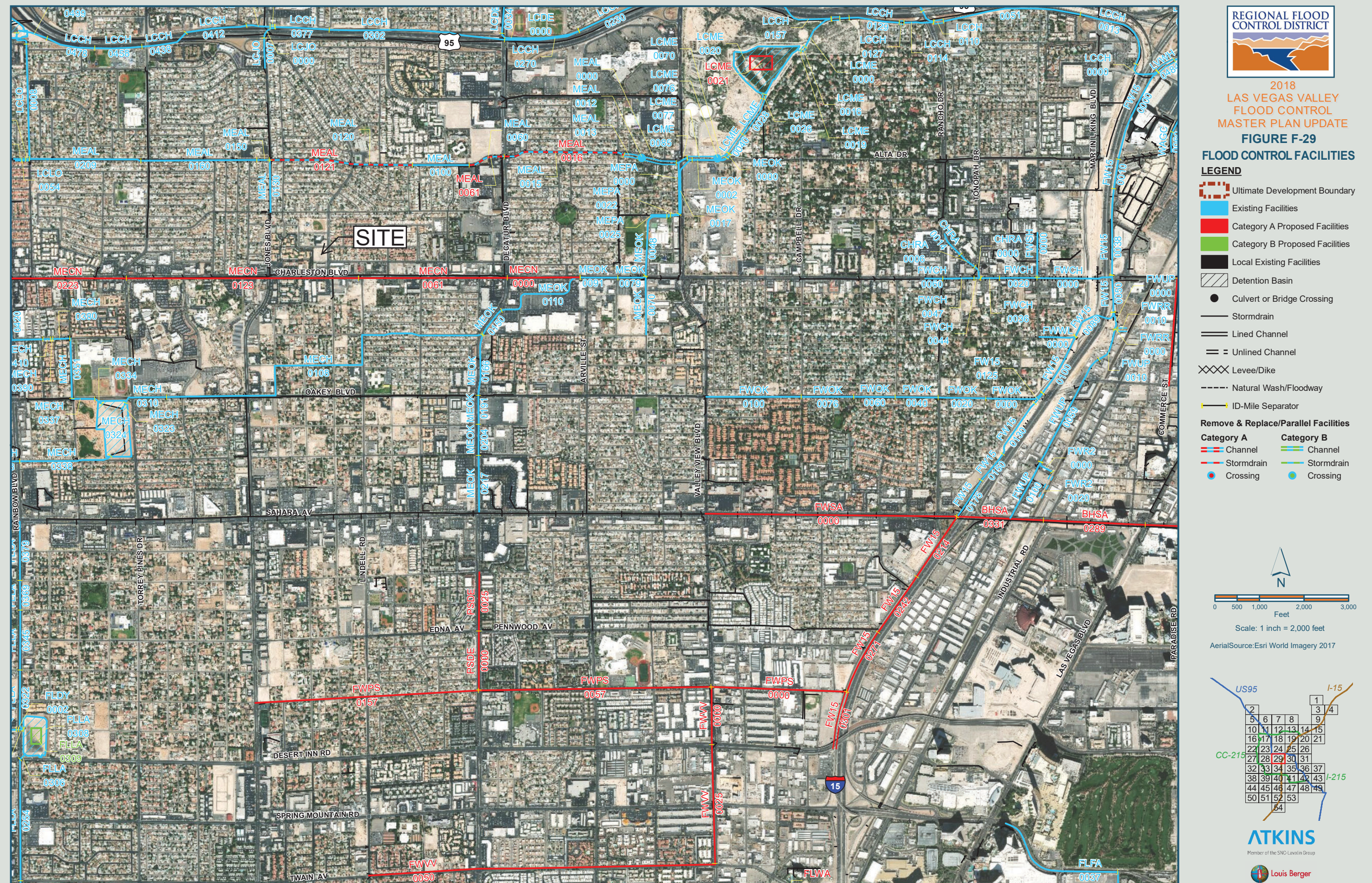
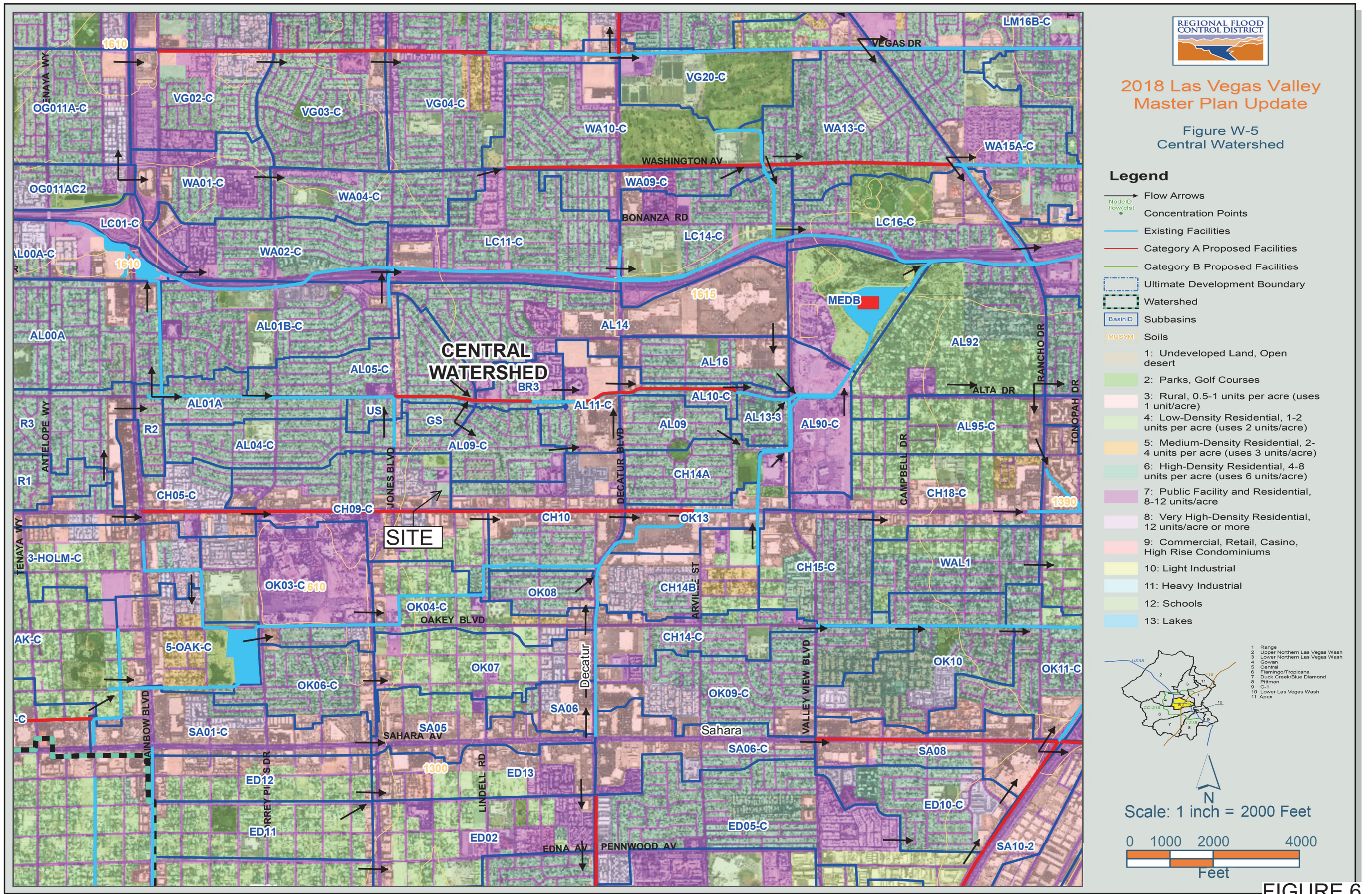


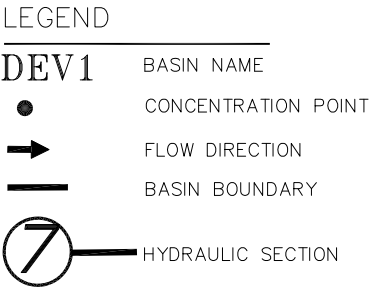
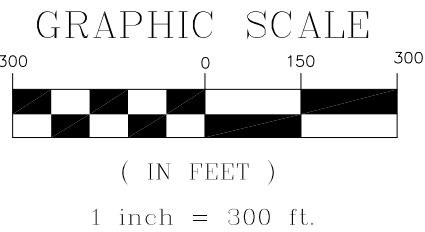
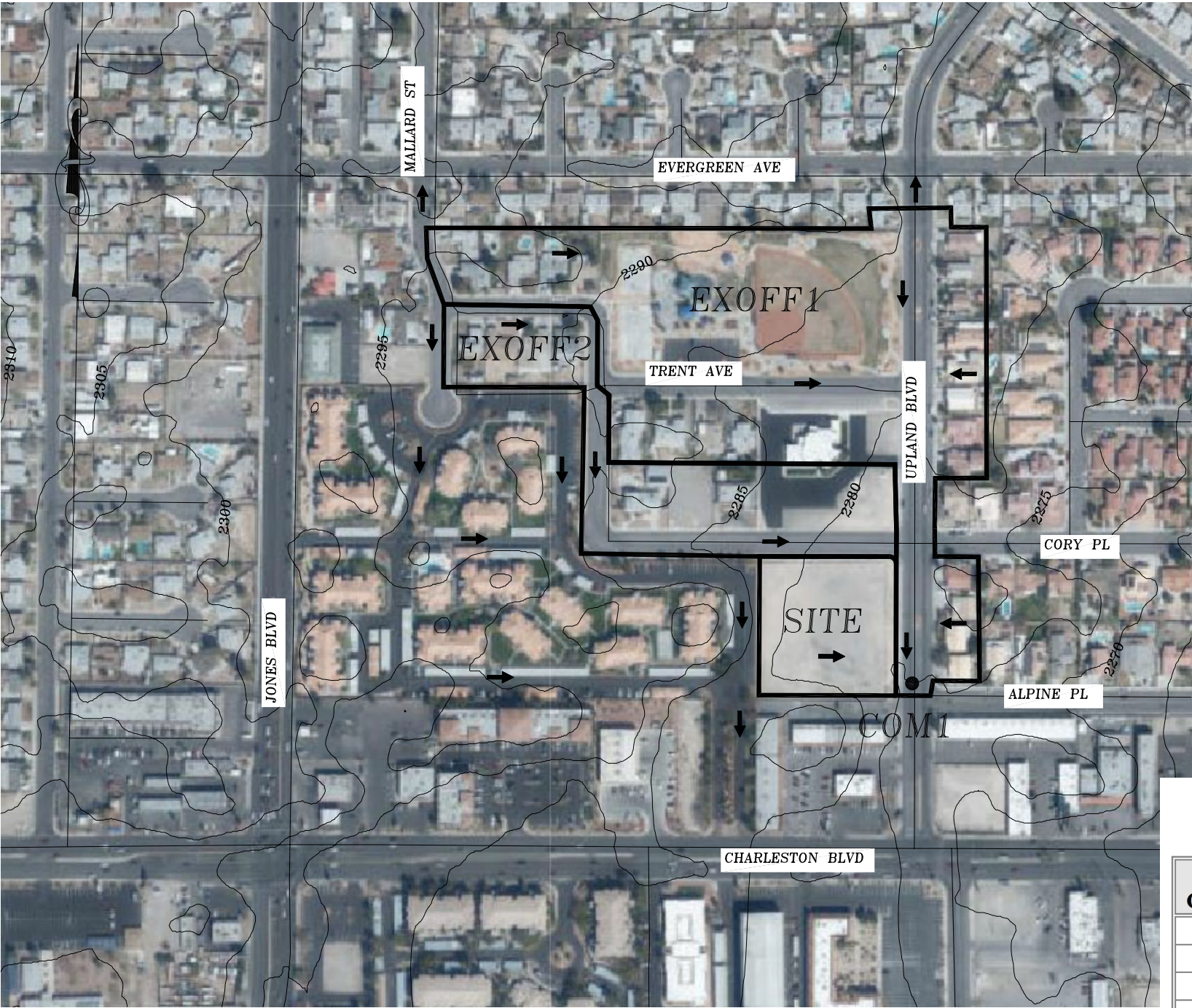
FIGURE 4

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
BHSA		BOULDER HIGHWAY SAHARA AVENUE						
0175	P	14' X 14' RCB	6000	3952	CSA13	SW3	7.93	0.67
0289	P	14' X 12' RCB	2300	3669	CSA11	SW3	7.55	0.87
0331	P	14' X 11' RCB	2000	3346	CSA10-1	SW3	7.15	1.00
CHRA		WEST CHARLESTON DRAINS - RANCHO						
0000	E	6' X 5' RCB	310	302	CAL95	SW3	0.62	1.92
0006	E	5' X 5' RCB	420	302	CAL95	SW3	0.62	1.00
0014	E	5' X 4' RCB	600	302	CAL95	SW3	0.62	1.50
FLBN		FLAMINGO - BOULDER HIGHWAY NORTH						
0312	P	7' X 4' RCB	2160	621	CCH52	SW3	0.62	4.20
0342	P	7' X 4' RCB	2425	621	CCH52	SW3	0.62	4.20
FLDY		FLAMINGO WASH - DARBY STORM DRAIN						
0000	E	84" RCP	100	611	CLF24	FLAM3A	0.76	0.25
0002	E	10' X 3' RCB	50	611	CLF24	FLAM3A	0.76	0.25
0004	E	60" RCP	680	611	CLF24	FLAM3A	0.76	2.80
FLFA		FLAMINGO - FASHION						
0000	E	12' X 5' RCB	2050	720	CFW17N	FLAM3A	0.72	0.28
0037	E	8' X 5' RCB	3080	492	FW14	FLAM3A	0.44	0.45
FLLA		FLAMINGO WASH - LATERAL (FLAMINGO RAINBOW)						
0254	E	90" RCP	2730	572	CLF27	FLAM3B	0.51	0.40
0304	P0	MODIFY SPILLWAY, RAISE HEIGHT BY 1' (REPLACES FLA0305)		1556	CLF25	FLAM3A	1.03	
0305	E	1,556 CFS PMF SPILLWAY (REPLACE W/ FLA0304)		1556	CLF25	FLAM3A	1.03	
0306	E	30" RCP WITH 18" ORIFICE OUTLET	203	30	DIDB	FLAM3A	1.03	0.43
0308	E	62 AC-FT DESERT INN DETENTION BASIN		813	CLF25	FLAM3A	1.03	
0309	P0	UPGRADE TO 70 AC-FT DESERT INN DETENTION BASIN		813	CLF25	FLAM3A	1.03	
0322	E	81" RCP	1370	245	LF25	FLAM3A	0.27	0.50
0345	E	81" RCP	1340	245	LF25	FLAM3A	0.27	0.50
0369	E	72" RCP	670					0.50
0379	E	66" RCP	1320					0.50
FW15		FREEWAY CHANNEL FROM DESERT INN TO EXPRESSWAY						
0000	E	3: 12' X 10' RCB	2170	3685	CAL93	Boulder4	8.93	0.17
0010	E	3: 12' X 10' RCB	677	3506	CAL96	Boulder4	8.70	0.17
0038	E	3: 12' X 10' RCB	1945	3399	CCCH22	Boulder4	8.52	0.17
0050	E	3: 12' X 10' RCB	870	2613	CCH50	SW4	8.48	0.17
0089	E	2: 18' X 10' RCB	1200	2485	CDWAL2	SW4	8.28	0.20
0100	E	2: 18' X 10' RCB	1510	2324	CDK11C	SW3	7.83	0.60
0125	E	2: 10' X 8' RCB	267	1450	DDCSA08	SW3	6.67	0.80
0130	E	20' X 8' RCB	1176	1450	DDCSA08	SW3	6.67	0.57
0150	E	2: 10' X 8' RCB	760	1450	DDCSA08	SW3	6.67	0.80
0175	E	2: 10' X 8' RCB	985	1450	DDCSA08	SW3	6.67	0.75
0214	P	2: 12' X 10' RCB	1610	4269	CE010-C	SW3	6.25	0.73
0242	P	2: 12' X 9' RCB	1500	4130	CC0PS08	SW3	6.03	0.93
0271	P	2: 12' X 10' RCB	1520	3842	CC0PS08	SW3	5.49	0.59
0301	P	CONC CHNL 12'W 4'D 2:1 SS	1300	353	CC03FD-C	SW3	0.42	0.42
FWCH		WEST CHARLESTON DRAIN						
0000	E	10' X 7' RCB	1710	1044	CCH22	SW3	1.38	0.74
0020	E	10' X 7' RCB	840	824	CCCH18-C	SW3	1.15	0.40
0036	E	9' X 7' RCB	425	824	CCCH18-C	SW3	1.15	0.40
0044	E	9' X 7' RCB	145	561	CCH18-C	SW3	0.53	0.40
0047	E	7' X 5' RCB	710	561	CCH18-C	SW3	0.53	2.05
0060	E	5' X 4' RCB	400	561	CCH18-C	SW3	0.53	0.40
FWOK		OAKEY DRAIN						
0000	E	10' X 8' RCB	1350	960	1COK11C	SW3	1.16	0.62
0020	E	10' X 8' RCB	1025	960	1COK11C	SW3	1.16	0.60
0040	E	8' X 8' RCB	960	749	COK10	SW3	0.85	1.00
0060	E	5' X 5' RCB	970	749	COK10	SW3	0.85	1.50
0076	E	5' X 6' RCB	1175	749	COK10	SW3	0.85	1.04
0100	E	5' X 5' RCB	2020	465	COK09-C	SW3	0.55	2.16
FWPS		PALMYRA / SIRIUS DRAIN						
0000	P	12' X 12' RCB	3000	3544	CPS08	SW3	5.07	1.50
0057	P	10' X 10' RCB	5220	2101	CPS06	SW3	2.78	1.28
0157	P	2: 66" RCP	5100	547	CPS03	SW3	0.59	1.15

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
FWR2		FREEWAY CHANNEL - RAILROAD CHANNEL						
0000	E	5' X 4' RCB	377					1.60
0020	E	EARTH CHNL 10'W 4'D 2:1 SS	650					0.50
FWRR		FREEWAY CHANNEL BYPASS FACILITY RR BRANCH						
0000	E	48" RCP	70					1.22
0010	E	CONC CHNL 5'W 5'D 0:1 SS	220					1.22
FWSA		FREEWAY CHANNEL - SAHARA						
0000	P	7' X 5' RCB	5700	496	CSA08	SW3	0.42	1.49
FWSH		SHADOW LANE DRAIN						
0000	E	7' X 4' RCB	950	247	CH22-C	SW3	0.23	0.20
FWUP		FREEWAY CHANNEL BYPASS FACILITY						
0000	E	10' X 9' RCB	350	181	CH50	SW3	0.20	0.37
0010	E	10' X 8' RCB	804	181	CH50	SW3	0.20	0.37
0059	E	10' X 6' RCB	2680	181	CH50	SW3	0.20	0.40
0100	E	8' X 4' RCB	1440	181	CH50	SW3	0.20	0.47
FWVV		VALLEY VIEW DRAIN						
0000	P	12' X 11' RCB	1320	1549	CCE3FA	SW3	2.69	0.30
0025	P	10' X 10' RCB	2665	1059	CR4C1	SW3	1.74	0.30
0050	P	8' X 6' RCB	7785	750	DFW05	SW3	1.34	1.50
FWWL		FREEWAY CHANNEL-WALDMAN AVENUE						
0000	E	6' X 6' RCB	820	431	CWAL2	SW3	0.45	0.20
LCCH		LAS VEGAS CREEK CHANNEL						
0000	E	2: 12' X 7' RCB	730	3212	CAL93C	MEADOWS4	9.90	1.28
0013	E	2: 12' X 6' RCB	2035	3050	CLC20-C	MEADOWS4	9.60	0.82
0051	E	2: 14' X 7' RCB	3113	3050	CLC20-C	MEADOWS4	9.60	0.60
0110	E	TRANSITION STRUCTURE	220	3001	CCLC16-C	MEADOWS4	9.50	
0114	E	2: 14' X 7' RCB	670	2386	CRMEDET	MEADOWS4	8.19	0.80
0127	E	TRANSITION STRUCTURE	110	2386	CRMEDET	MEADOWS4	8.19	
0129	E	2: 14' X 7' RCB	1130	2386	CRMEDET	MEADOWS4	8.19	0.50
0150	E	2: 13' X 7' RCB	200	2386	CRMEDET	MEADOWS4	8.19	0.95
0154	E	TRANSITION STRUCTURE	190	2386	CRMEDET	MEADOWS4	8.19	
0157	E	2: 12' X 6' RCB	1650	1700	CCLC14-C	SW3	2.93	1.06
0230	E	12' X 6' RCB	2140	1450	CLC14-C	SW3	2.53	1.74
0270	E	12' X 6' RCB	1705	814	CCWA02-C	SW3	1.84	0.54
0302	E	8' X 6' RCB	3940	814	CCWA02-C	SW3	1.84	2.49
0377	E	10' X 7' RCB	1226	814	CCWA02-C	SW3	1.84	0.74
0400	E	TRANSITION STRUCTURE	110	458	CWA02-C	SW3	1.47	0.49
0402	E	8' X 6' RCB @ JONES	535	458	CWA02-C	SW3	1.47	0.49
0412	E	60" RCP	1370	458	CWA02-C	SW3	1.47	1.08
0438	E	60" RCP	1090	171	CLC01-C	SW3	1.20	1.60
0458	E	60" RCP	1060	171	CLC01-C	SW3	1.20	1.60
0478	E	60" RCP	1110	171	CLC01-C	SW3	1.20	0.55
0499	E	42" RCP OUTLET	660	87	RAINBWB	SW3	1.11	1.88
0513	E	102 AC-FT RAINBOW DETENTION BASIN		1027	RAINBWIN	SW3	1.11	
LCDE		LAS VEGAS CREEK - DECATUR						
0000	E	6' X 5' RCB	1800	430	LC11-C	SW3	0.38	1.26
0034	E	72" RCP	700	430	LC11-C	SW3	0.38	0.50
LCJO		LAS VEGAS CREEK - JONES						
0000	E	6' X 6' RCB	380	381	AL01B-C	SW3	0.37	0.50
0007	E	6' X 5' RCB	675	381	AL01B-C	SW3	0.37	0.62
LCLO		LAS VEGAS CREEK - LORENZI						
0000	E	7' X 6' RCB	445	285	DAL00A	SW3	0.41	3.37
0008	E	7' X 6' RCB	2983	285	DAL00A	SW3	0.41	0.40
0054	E	7' X 5' RCB	169	285	DAL00A	SW3	0.41	1.00
LCME		LAS VEGAS CREEK - MEADOWS						
0000	E	14' X 8' RCB	895	1484	MEADOWDB	SW3SC	5.67	0.72
0016	E	MEADOWDB	140	1484	MEADOWDB	SW3SC	5.67	0.21
0017	E	3,300 CFS SPILLWAY (REPLACE W/ LCME0016)		3300	MEADOWDB	SW3SC	5.67	
0018	P	MODIFY SPILLWAY, RAISE HEIGHT BY 1' (REPLACES LCME0017)		3300	MEADOWDB	SW3SC	5.67	
0019	E	1: 11' X 5' RCB AND 1: 11.5' X 5' RCB	110	1484	MEADOWDB	SW3SC	5.67	0.81
0020	E	213 AC-FT MEADOWS DETENTION BASIN		4909	MEADOWIN	SW3SC	7.55	
0021	P	UPGRADE TO 249 AC-FT MEADOWS DETENTION BASIN		4909	MEADOWIN	SW3SC	7.55	

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LCME		LAS VEGAS CREEK - MEADOWS						
0026	E	ENERGY DISSIPATOR	110	4909	MEADOWIN	SW3SC	5.67	2.94
0028	E	CONC CHNL 45'W 8.5'D 0:1 SS	922	4909	MEADOWIN	SW3SC	5.67	0.40
0040	E	CONC CHNL 40'W 9.5'D 0:1 SS	525	4819	CAL90-C	SW3SC	5.44	0.40
0070	E	CONC CHNL 18-30'W 7-9.5'D 0:1 SS	255	1956	CAL16	SW3	2.33	2.06
0076	E	FREE SPAN BRIDGE 18'W 8'D @ ALTA	100	1956	CAL16	SW3	2.33	1.89
0077	E	CONC CHNL 18'W 8'D 1:1 SS	618	1956	CAL16	SW3	2.33	1.89
0085	E	10' X 6' RCBC @ VALLEY VIEW	275	1712	1CAL16	SW3	2.09	1.89
LCRA		LAS VEGAS CREEK - RANCHO						
0000	E	12' X 8' RCB	380	931	CLC16-C	SW3	1.71	0.60
0004	E	12' X 6' RCB	2367	931	CLC16-C	SW3	1.71	0.77
LVWH		WASHINGTON AVENUE CHANNEL						
0447	E	3: 14.33' X 10' RCB	1955	5193	CCAL93	SW5	22.05	0.15
0484	E	CONFLUENCE STRUCTURE	455	5193	CCAL93	SW5	22.05	0.15
MEAL		MEADOWS ALTA						
0000	E	CONC CHNL 8'W 11'D 1:1 SS	700	1277	CAL13-3	SW3	1.48	1.58
0012	E	12' X 6' RCBC @ RED SKY	160	1227	CAL10-C	SW3	1.42	3.03
0013	E	CONC CHNL 8'W 11'D 1:1 SS	320	1227	CAL10-C	SW3	1.42	3.03
0015	E	72" RCP	2500	592"	CAL11-C ¹	SW3	1.38	1.94
0016	P	ADD: 84" RCP	2500	592"	CAL11-C ¹	SW4	1.38	1.94
0060	E	60" RCP	905	419"	CBR3 ¹	SW3	1.08	1.00
0061	P	ADD: 78" RCP	905	419"	CBR3 ¹	SW3	1.08	1.00
0100	E	72" RCP	1280	837	CBR3	SW3	1.08	1.40
0120	E	60" RCP	3500	385"	CAL05-C ¹	SW3	1.01	1.00
0121	P	ADD: 78" RCP	3500	385"	CAL05-C ¹	SW3	1.01	1.00
0130	E	8' X 4' RCB	1150	198	AL04-C	SW3	0.18	0.40
0150	E	60" RCP	285	518	CCUS	SW3	0.74	1.40
0160	E	36" RCP	2600	341	CUS	SW3	0.56	1.25
0209	E	48" RCP	2500	150	DCR2	SW3	0.41	1.70
0256	E	38" X 60" HERCP	81	150	DCR2	SW3	0.41	1.42
0258	E	48" RCP	275	150	DCR2	SW3	0.41	4.31
MECH		EXTENSION OF MEADOWS / CHARLESTON						
0108	E	30" RCP	8550	32	0AKEYDB	SW3	1.88	1.43
0310	E	24" RCP	1000	32	0AKEYDB	SW3	1.88	1.43
0323	E	15" RCP OUTLET	200	32	0AKEYDB	SW3	1.88	
0324	E	201 AC-FT 0AKEY DETENTION BASIN		1891	0AKEYIN	SW3	1.88	
0334	E	11" X 6' RCB	200	622	C5-OAK-C	SW3	0.56	0.50
0337	E	9' X 6' RCB	520	622	C5-OAK-C	SW3	0.56	0.50
0338	E	10' X 8' RCB	2060	1302	C3A-OAKC	SW3	1.32	1.62
0351	E	90" RCP	1350	622	C5-OAK-C	SW3	0.56	0.50
0378	E	10' X 8' RCB	745	1302	C3A-OAKC	SW3	1.32	2.00
0380	E	66" RCP	385	372	3-HOLM-C	SW3	0.33	2.00
0390	E	63" X 53" RCP	50	372	3-HOLM-C	SW3	0.33	2.00
0410	E	66" RCP	182	372	3-HOLM-C	SW3	0.33	2.00
0420	E	66" RCP	1410	372	3-HOLM-C	SW3	0.33	2.00
MECN		MEADOWS - CHARLESTON						
0000	P	8' X 8' RCB	1570	1150	CCH10	SW3	1.00	1.09
0061	P	8' X 7' RCB	3300	1150	CCH10	SW3	1.00	1.82
0123	P	8' X 6' RCB	5200	854	CCH09-C	SW3	0.72	1.64
0223	P	8' X 5' RCB	2700	438	CCH05-C	SW3	0.34	2.04
MEOK		0AKEY MEADOWS STORMDRAIN						
0000	E	CONC CHNL 19'W 9.5'D 0:1 SS	112	2871	COK13	SW3SC	2.94	0.55
0002	E	19' X 7' RCB	800	2871	COK13	SW3SC	2.94	0.98
0017	E	19' X 8' RCB	1550	2871	COK13	SW3SC	2.94	0.92
0048	E	18' X 9' RCB	1700	2871	COK13	SW3SC	2.94	0.50
0070	E	7' X 6' RCB	1320	244	CH14B	SW3	0.22	0.44
0079	E	18' X 8' RCB	630	2524	COK12	SW3SC	2.57	0.50
0091	E	18' X 8' RCB	850	2524	COK12	SW3SC	2.57	1.01
0110	E	12' X 8' RCB	2304	1568	CCOK08	SW3SC	1.58	1.04
0150	E	12' X 8' RCB	642	1568	CCOK08	SW3SC	1.58	0.45
0166	E	12' X 9' RCB	1350	1568	COK08	SW3	1.58	0.45
0191	E	12' X 7' RCB	660	995	COK07	SW3	0.93	0.71





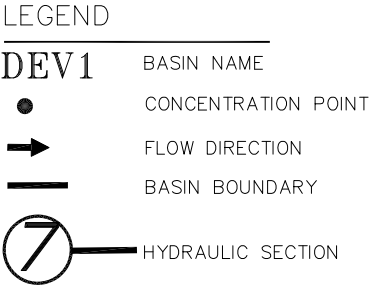
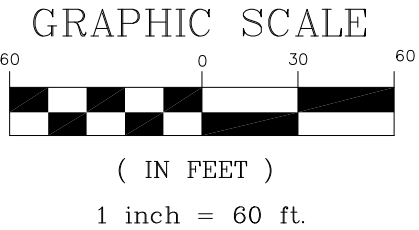
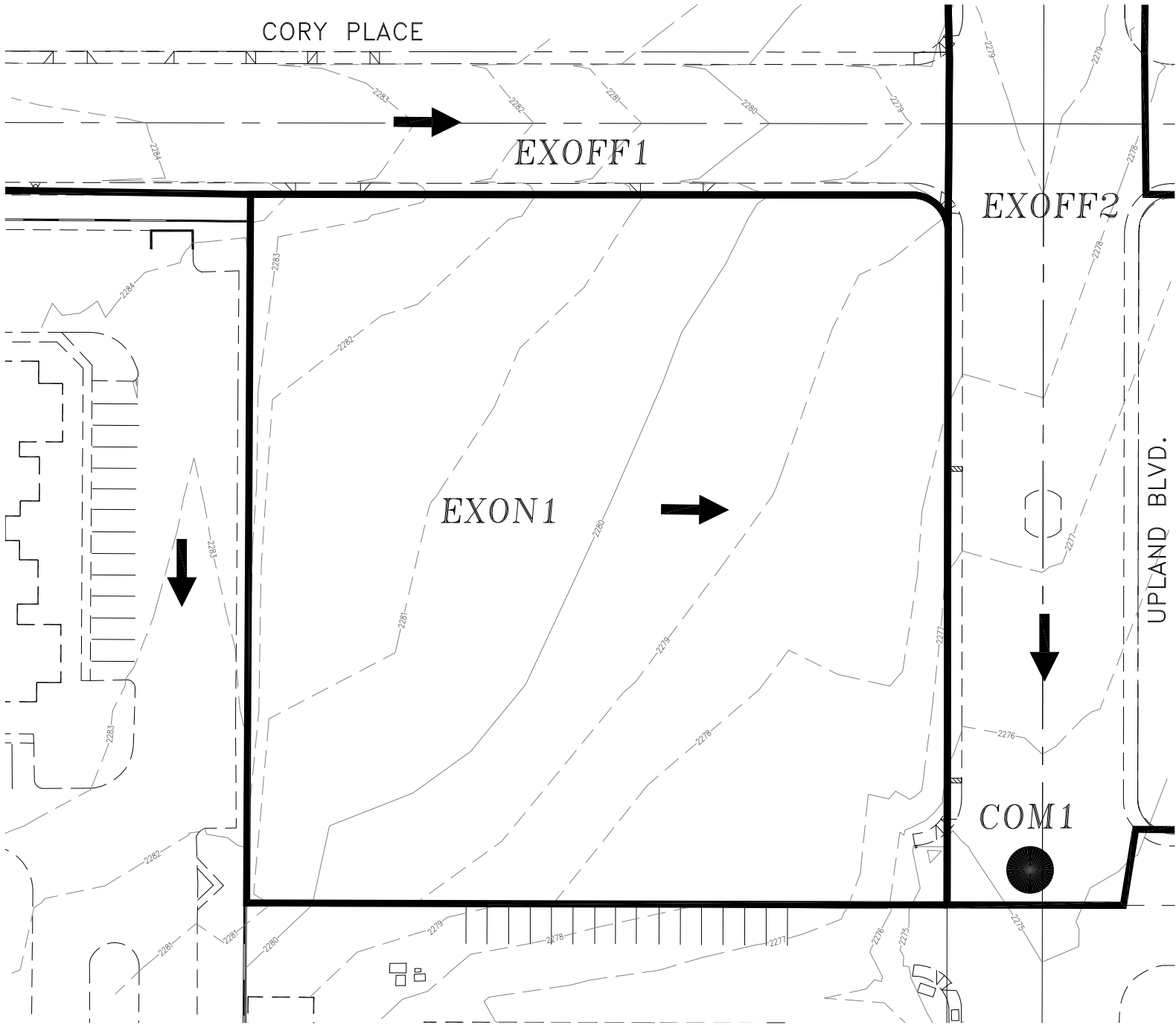
10-YEAR / 100-YEAR, 6-HOUR STORM EVENT
EXISTING RUNOFF AMOUNTS

BASIN NAME/ CONCENTRATION POINT	AREA (acres)	10-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)
EXON1	2.00	2	5
EXOFF1	12.7	15	32
EXOFF2	4.57	6	12
COM1	--	22	48

FIGURE 7

EXISTING OFFSITE
BASIN MAP

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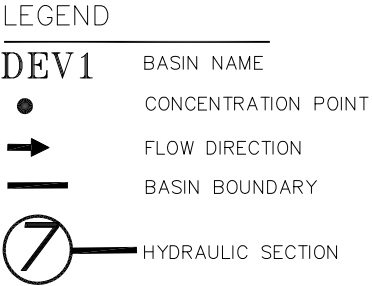
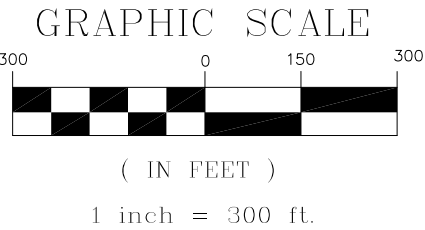
10-YEAR / 100-YEAR, 6-HOUR STORM EVENT
EXISTING RUNOFF AMOUNTS

BASIN NAME/ CONCENTRATION POINT	AREA (acres)	10-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)
EXON1	2.00	2	5
EXOFF1	12.7	15	32
EXOFF2	4.57	6	12
COM1	--	22	48

FIGURE 8

EXISTING ONSITE
BASIN MAP

Las Vegas Civil Engineering
2251 N. Rampart Blvd. No. 418
Las Vegas, Nevada 89128
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Fax: (702) 515-6771



10-YEAR / 100-YEAR, 6-HOUR STORM EVENT
FUTURE RUNOFF AMOUNTS

BASIN NAME/ CONCENTRATION POINT	AREA (acres)	10-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)
FUTON1	0.13	<1	<1
FUTON2	1.87	3	6
FUTOF1	12.7	15	32
FUTOF2	4.57	6	12
COM1	--	23	50

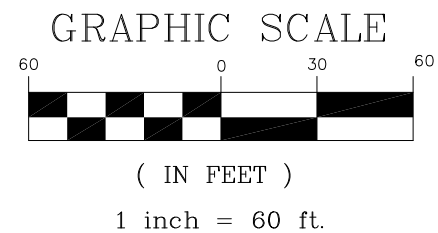
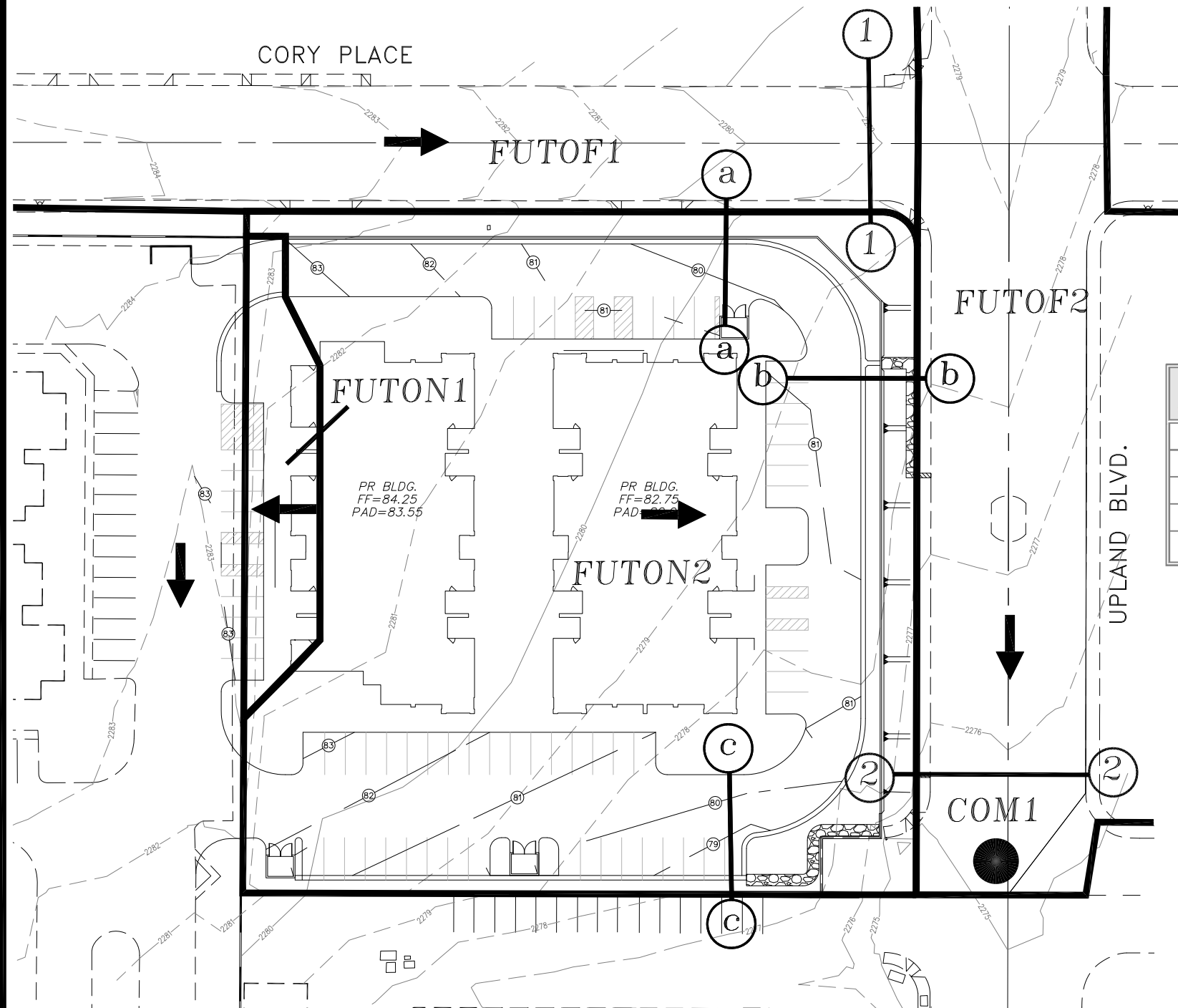
STREET FLOW CALCULATIONS

STREET	Q ₁₀ /Q ₁₀₀ (cfs)	D ₁₀ /D ₁₀₀ (ft)	V ₁₀ /V ₁₀₀ (ft/s)	V x D
Cory Pl (Section 1) FUTOF2	6/12	0.33/0.40	2.90/3.38	0.96/1.35
Upland Blvd (Section 2) COM1	23/50	0.51/0.63	3.28/3.80	1.67/2.39

FIGURE 9

FUTURE OFFSITE
BASIN MAP

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Las Vegas, Nevada 89128
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- LEGEND
- DEV1 BASIN NAME
- CONCENTRATION POINT
- ➔ FLOW DIRECTION
- BASIN BOUNDARY
- ⑦ HYDRAULIC SECTION

10-YEAR / 100-YEAR, 6-HOUR STORM EVENT
FUTURE RUNOFF AMOUNTS

BASIN NAME/ CONCENTRATION POINT	AREA (acres)	10-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)
FUTON1	0.13	<1	<1
FUTON2	1.87	3	6
FUTOF1	12.7	15	32
FUTOF2	4.57	6	12
COM1	--	23	50

STREET FLOW CALCULATIONS

STREET	Q ₁₀ /Q ₁₀₀ (cfs)	D ₁₀ /D ₁₀₀ (ft)	V ₁₀ /V ₁₀₀ (ft/s)	V x D
Cory Pl (Section 1) FUTOF2	6/12	0.33/0.40	2.90/3.38	0.96/1.35
Upland Blvd (Section 2) COM1	23/50	0.51/0.63	3.28/3.80	1.67/2.39

SECTION FLOW CALCULATIONS

STREET	Q ₁₀ /Q ₁₀₀ (cfs)	D ₁₀ /D ₁₀₀ (ft)	V ₁₀ /V ₁₀₀ (ft/s)	V x D
Section a (FUTON2 45%)	2/3	0.23/0.27	1.53/1.69	0.35/.46
Section b (FUTON2 10%)	1/1	0.18/0.18	2.39/2.39	0.43/0.43
Section c (FUTON2 45%)	2/3	0.22/0.25	2.75/3.04	0.61/0.76

FIGURE 10

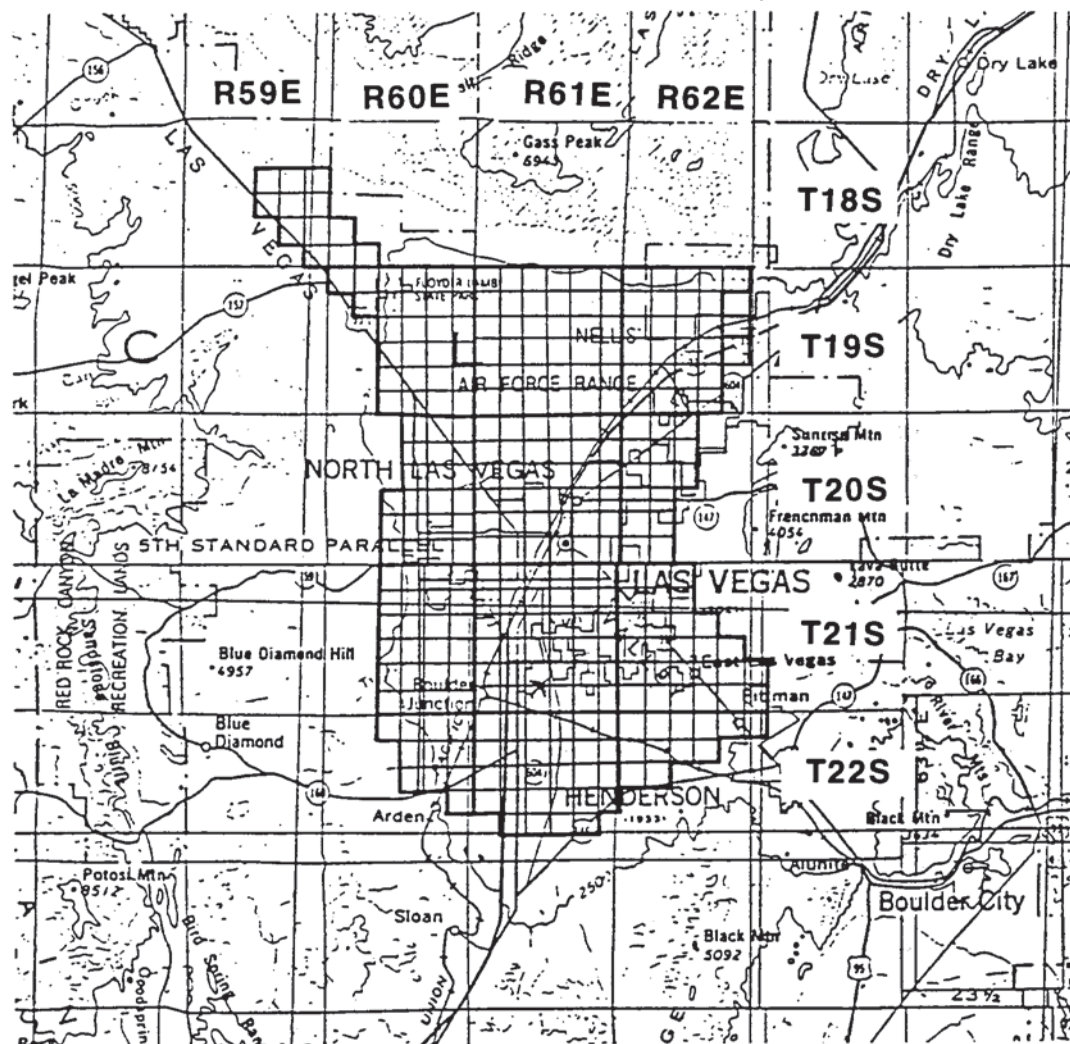
FUTURE ONSITE
BASIN MAP

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Hydrologic Parameters

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

McCARRAN AIRPORT RAINFALL AREA



TOWNSHIP	RANGE	SECTIONS	TOWNSHIP	RANGE	SECTIONS
18 South	59 East	13-15,22-26,36	20 South	62 East	4-9,16-20,29-32
18 South	60 East	30-32	21 South	60 East	1-4,9-16,21-28,33-36
19 South	60 East	1-6,8-16,21-28,33-36	21 South	61 East	ALL SECTIONS
19 South	61 East	ALL SECTIONS	21 South	62 East	4-9,15-23, 25-36
19 South	62 East	2-11,14-23,27-34	22 South	60 East	1-4,10-15,24
20 South	60 East	1-3,10-15,21-28,33-36	22 South	61 East	1-24,26-29
20 South	61 East	ALL SECTIONS	22 South	62 East	1-10,17-18

Notes:

1. Refer to Table 505 and Figure 516 Depth-Duration-Frequency values in the McCarran Airport Rainfall Area.
2. Refer to Table 506 and Figure 517 for Time-Intensity-Frequency values on the McCarran Airport Rainfall Area.

Revision	Date

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX-HOUR STORM DISTRIBUTIONS

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

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

Revision	Date

REFERENCE:

TABLE 503

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DEPTH-DURATION-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA (IN INCHES)

TIME	RECURRENCE INTERVAL					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5 min.	0.15	0.27	0.35	0.46	0.54	0.63
10 min.	0.25	0.44	0.57	0.74	0.89	1.02
15 min.	0.33	0.57	0.74	0.97	1.15	1.32
30 min.	0.44	0.78	1.01	1.31	1.55	1.79
1 hour	0.52	0.89	1.15	1.50	1.78	2.06
2 hour	0.59	1.01	1.30	1.70	2.01	2.30
3 hour	0.64	1.08	1.39	1.82	2.15	2.48
6 hour	0.72	1.22	1.58	2.05	2.41	2.77
24 hour (TR-55)	1.20	1.60	1.80	2.40	2.70	2.96

- NOTE: 1. Refer to Figure 513 for a description and drawing of the area included in the McCarran Airport Rainfall Area.
2. The 24 hour values presented above are for use with TR-55 only.
3. Table 501 adjustments not required.

Revision	Date

RUNOFF CURVE NUMBERS (URBAN AREAS¹)

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

See Table 602A

Developing urban areas

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

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

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

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

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

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

Revision	Date

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RUNOFF CURVE NUMBERS - RESIDENTIAL DISTRICTS

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

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

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

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

Revision	Date

REFERENCE:

TABLE 602A

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RUNOFF CURVE NUMBERS (SEMIARID RANGELANDS¹)

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition ²	A ³	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

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

²Poor: <30% ground cover (litter, grass, and brush overstory).

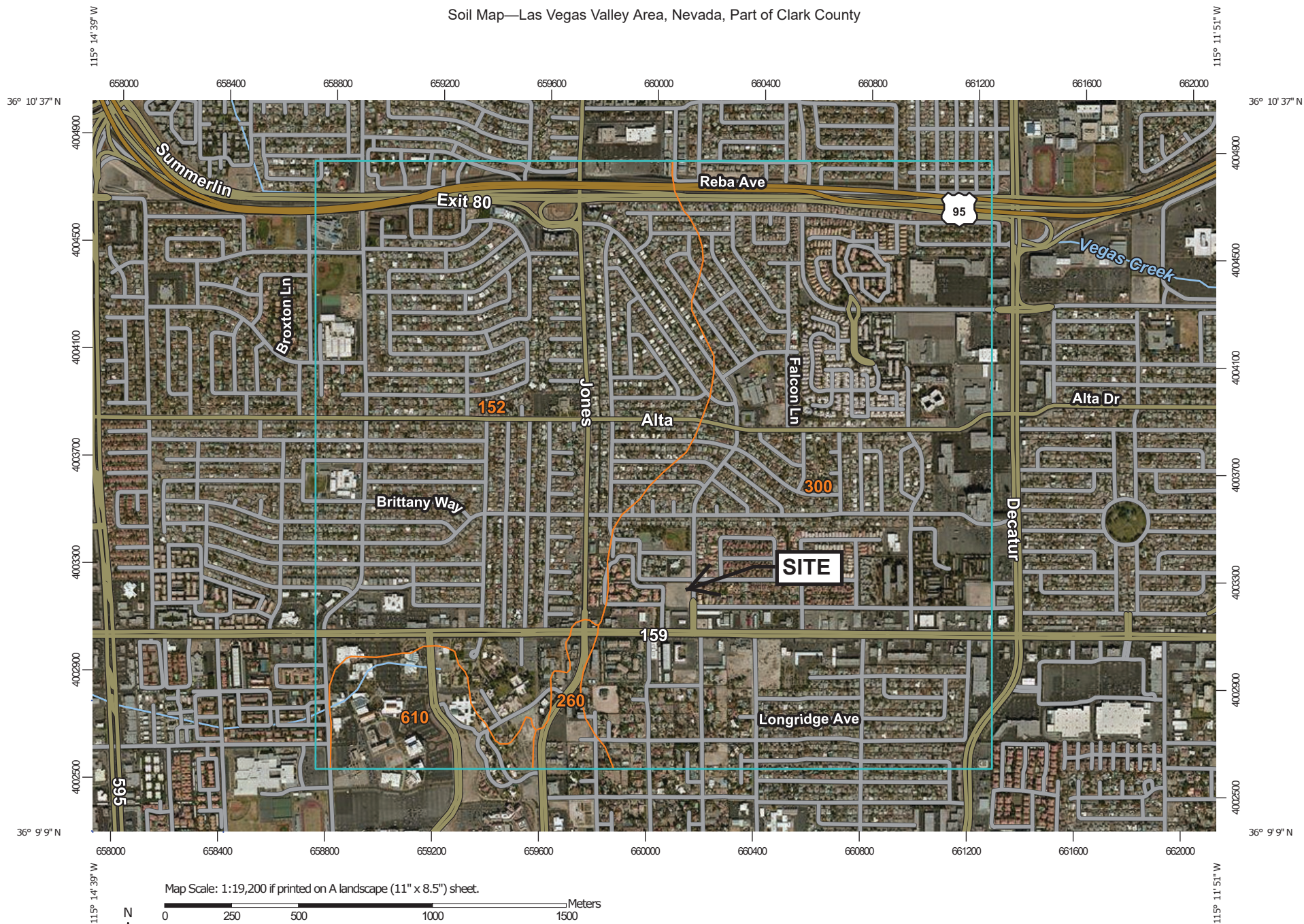
Fair: 30 to 70% ground cover.

Good: >70% ground cover.

³Curve numbers for group A have been developed only for desert shrub.

Revision	Date

Soil Map—Las Vegas Valley Area, Nevada, Part of Clark County



Map Scale: 1:19,200 if printed on A landscape (11" x 8.5") sheet.



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



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

2/3/2020
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Las Vegas Valley Area, Nevada, Part of Clark County

Survey Area Data: Version 14, Sep 16, 2019

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

Date(s) aerial images were photographed: May 7, 2011—Feb 25, 2014

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
152	Cave gravelly fine sandy loam, 0 to 4 percent slopes	622.5	43.8%
260	Jean gravelly loamy fine sand, 2 to 4 percent slopes	20.4	1.4%
300	Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes	715.1	50.3%
610	Pits, gravel	63.3	4.5%
Totals for Area of Interest		1,421.2	100.0%

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

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

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

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

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

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk "*" denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties—Las Vegas Valley Area, Nevada, Part of Clark County														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
152—Cave gravelly fine sandy loam, 0 to 4 percent slopes														
Cave	100	D	0-12	Gravelly fine sandy loam	SC-SM, SM	A-2, A-4	0- 0- 0	0- 3- 5	70-80-90	60-68-75	40-53-65	25-33-40	15-20-25	NP-3 -5
			12-36	Indurated	—	—	—	—	—	—	—	—	—	—
			36-60	Gravelly loamy sand, very gravelly sandy loam	GM, GP-GM, SM, SP-SM	A-1, A-2	0- 0- 0	0- 3- 5	35-55-75	30-45-60	20-28-35	10-20-30	0-8 -15	NP
260—Jean gravelly loamy fine sand, 2 to 4 percent slopes														
Jean	100	A	0-1	Gravelly loamy fine sand	SM	A-2	0- 0- 0	0- 0- 0	75-80-85	65-70-75	55-63-70	15-20-25	0-7 -14	NP
			1-18	Loamy fine sand	SM	A-2	0- 0- 0	0- 0- 0	90-95-100	75-88-100	65-78-90	25-30-35	0-7 -14	NP
			18-60	Stratified extremely gravelly sand to very gravelly loamy fine sand	GP, GW-GM	A-1	0- 3- 5	10-25-40	25-35-45	10-23-35	5-18-30	0- 5- 10	0-7 -14	NP

Engineering Properties--Las Vegas Valley Area, Nevada, Part of Clark County														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
300—Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes														
Las vegas	100	D	0-1	Gravelly fine sandy loam	SM	A-1, A-2	0- 0- 0	0- 0- 0	60-70-80	50-63-75	40-53-65	20-25-30	15-20-25	NP-3 -5
			1-7	Fine sandy loam	SM	A-4	0- 0- 0	0- 0- 0	80-90-100	75-85-95	65-73-80	40-45-50	0-7 -14	NP
			7-11	Gravelly sandy clay loam, gravelly loam	GC, SC	A-2, A-6	0- 0- 0	0- 0- 0	60-70-80	50-63-75	30-40-50	25-35-45	25-30-35	10-13-15
			11-15	Indurated	—	—	—	—	—	—	—	—	—	—

Data Source Information

Soil Survey Area: Las Vegas Valley Area, Nevada, Part of Clark County

Survey Area Data: Version 14, Sep 16, 2019



SOIL TYPE CALCULATED CURVE NUMBER

Soil Type #300-(Apartments)

Soil	Percent(%)	Soil Type	CN
Jean	100	D	93

$$CN=1*93=93.0$$

Soil Type #300-(Desert Shrub)

Soil	Percent(%)	Soil Type	CN
Jean	100	D	88

$$CN=1*88=88.0$$

Soil Type #300-(Open Space)

Soil	Percent(%)	Soil Type	CN
Jean	100	D	89

$$CN=1*89=89.0$$

Soil Type #300-(Paved Roads)

Soil	Percent(%)	Soil Type	CN
Jean	100	D	98

$$CN=1*98=98.0$$

Soil Type #300-(Residential-8K Lots)

Soil	Percent(%)	Soil Type	CN
Jean	100	D	90

$$CN=1*90=90.0$$

Soil Type #300-(Commercial)

Soil	Percent(%)	Soil Type	CN
Jean	100	D	95

$$CN=1*95=95.0$$

BASIN COMPOSITE CN VALUES

EXON1

EXISTING

Soil Type	Land Use	Percent of Basin	CN Value
300	Desert Shrub	100	88

CN(Composite) = 1*88

CN = 88.0

EXOFF1

EXISTING

Soil Type	Land Use	Percent of Basin	CN Value
300	Open Space	40	89
300	Paved Road	20	98
300	Residential 8kLots	30	90
300	Commercial	10	95

CN(Composite) = 0.4*89+0.2*98+0.3*90+0.1*95

CN = 91.7

EXOFF2

EXISTING

Soil Type	Land Use	Percent of Basin	CN Value
300	Desert Shrub	10	88
300	Paved Road	25	98
300	Residential 8kLots	40	90
300	Commercial	25	95

CN(Composite) = 0.1*88+0.25*98+0.4*90+0.25*95

CN = 93.1

FUTON1 and FUTON2

FUTURE

Soil Type	Land Use	Percent of Basin	CN Value
300	Apartments	100	93

CN(Composite) = 1*93

CN = 93.0

FUTOF1

FUTURE

Soil Type	Land Use	Percent of Basin	CN Value
300	Open Space	40	89
300	Paved Road	20	98
300	Residential 8kLots	30	90
300	Commercial	10	95

CN(Composite) = 0.4*89+0.2*98+0.3*90+0.1*95

CN = 91.7

FUTOF2

FUTURE

Soil Type	Land Use	Percent of Basin	CN Value
300	Paved Road	25	98
300	Residential 8kLots	50	90
300	Commercial	25	95

$CN(Composite) = 0.25*98 + 0.5*90 + 0.25*95$

CN = 93.3

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

Project No. : 2010403

DEVELOPMENT : Tiffany Place Two
Existing Conditions
CALCULATED BY : PDW

DATE: February 2020

*Las Vegas Civil
Engineering*

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc CHECK URBANIZED BASINS		FINAL Tc	Min Tc	Tlag	REMARKS
DESIG:	CN	K	AREA <i>(acres)</i>	AREA <i>(mi^2)</i>	LENGTH <i>(ft)</i>	SLOPE <i>(%)</i>	Ti <i>(min)</i>	LENGTH <i>(ft)</i>	SLOPE <i>(%)</i>	LAND COVER <i>k</i>	VELOCITY* <i>(fps)</i>	Tt <i>(min)</i>	Tc = Ti + Tt <i>(min)</i>	TOTAL LENGTH <i>(ft)</i>	Tc = <i>(L/180)+10 (min)</i>	<i>(min)</i>	<i>(min)</i>	Tlag= 0.6Tc/60 <i>(hrs)</i>	
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)		(10)	(11)		(12)	(13)	(14)			
Existing Onsite Basins																			
EXON1	88.0	0.7716	2.00	0.0031	20	10.00	1.23	410	1.67	EX	3.80	1.8	3.0	430.0	N/A	3.03	10.00	0.100	minimum Tc used
Existing Offsite Basins																			
EXOFF1	91.7	0.8204	12.70	0.0198	20	0.50	2.83	1445	1.00	DEV	3.06	7.9	10.7	1465.0	18.139	10.71	5.00	0.107	
EXOFF2	93.1	0.8389	4.57	0.0071	20	0.50	2.65	1920	1.00	DEV	3.06	10.5	13.1	1940.0	20.778	13.10	5.00	0.131	

$$T_i = 1.8 (1.1 - K) L^{1/2} / S^{1/3}$$

$$T_c = T_i + T_t$$

$$K = 0.0132 (CN) - 0.39 \quad T_{lag} = 0.6T_c$$

* The velocity in column 9 was computed using the equation $V = CS^{0.5}$

C is a coefficient and S is the travel slope, as outlined in section 602.1 of the CCRFCD Manual.

*As recommended in the CCRFCD Manual, C = 30.6 under developed conditions
and C = 29.4 under undeveloped conditions.

REFERENCE :

STANDARD FORM 4

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

Project No. : 2010403

DEVELOPMENT : Tiffany Place Two
Future Conditions
CALCULATED BY : PDW

DATE: February 2020

*Las Vegas Civil
Engineering*

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc CHECK URBANIZED BASINS		FINAL Tc	Min Tc	Tlag	REMARKS
DESIG:	CN	K	AREA (acres)	AREA (mi ²)	LENGTH (ft)	SLOPE (%)	Ti (min)	LENGTH (ft)	SLOPE (%)	LAND COVER k	VELOCITY* (fps)	Tt (min)	Tc = Ti + Tt (min)	TOTAL LENGTH (ft)	Tc = (L/180)*10 (min)	(min)	(min)	Tlag= 0.6Tc/60 (hrs)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Future Onsite Basins																			
FUTON1	93.0	0.8376	0.13	0.0002	10	2.00	1.19	25	2.00	DEV	4.33	0.1	1.3	35.0	10.194	1.28	5.00	0.050	minimum Tc used
FUTON2	93.0	0.8376	1.87	0.0029	25	1.00	2.36	340	1.53	DEV	3.79	1.5	3.9	365.0	12.028	3.86	5.00	0.050	minimum Tc used
Future Offsite Basins																			
FUTOF1	91.7	0.8204	12.70	0.0198	20	0.50	2.83	1445	1.00	DEV	3.06	7.9	10.7	1465.0	18.139	10.71	5.00	0.107	
FUTOF2	93.3	0.8416	4.57	0.0071	20	0.50	2.62	1920	1.00	DEV	3.06	10.5	13.1	1940.0	20.778	13.08	5.00	0.131	
Ti = 1.8 (1.1 - K) L^{1/2} / S^{1/3} Tc = Ti + Tt K = 0.0132 (CN) - 0.39 Tlag = 0.6Tc * The velocity in column 9 was computed using the equation V = CS^{0.5} C is a coefficient and S is the travel slope, as outlined in section 602.1 of the CCRFCD Manual. *As recommended in the CCRFCD Manual, C = 30.6 under developed conditions and C = 29.4 under undeveloped conditions.																			
REFERENCE :														STANDARD FORM 4					

Existing Hec-1 Model

```

1*****
*
*   FLOOD HYDROGRAPH PACKAGE   (HEC-1)
*       JUN   1998
*       VERSION 4.1
*
*   RUN DATE   05FEB20   TIME   09:30:53
*
*****

```

```

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

```

```

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

```

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

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

1 HEC-1 INPUT PAGE 1

```

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1          ID
2          ID          TECHNICAL DRAINAGE STUDY FOR TIFFANY PLACE TWO
3          ID          CLARK COUNTY, NEVADA
4          ID
5          ID          PREPARED FOR:
6          ID
7          ID          PREPARED BY:
8          ID          LAS VEGAS CIVIL ENGINEERING
9          ID          2251 NORTH RAMPART BLVD. NO. 418
10         ID          LAS VEGAS, NV 89128
11         ID
12         ID
13         ID          EXISTING 100- YEAR & 10-YEAR MODEL
14         ID          FILENAME:TIFF-EXA.DAT
15         ID          JOB#2010403
16         ID
17         ID
18         ID          *DIAGRAM
19         IT          5          0          0          300
20         IO          5
21         IN          5
22         JR          PREC          1.00          0.57
23         *
24         KK          EXOFF2
25         KM          EXISTING OFFSITE BASIN EXOFF2
26         BA          0.0071
27         PB          2.77
28         PC          .000          .020          .057          .070          .087          .108          .124          .130          .130          .130
29         PC          .130          .130          .130          .133          .140          .142          .148          .158          .172          .181
30         PC          .190          .197          .199          .200          .201          .204          .214          .229          .241          .249
31         PC          .251          .256          .270          .278          .281          .283          .295          .322          .352          .409
32         PC          .499          .590          .710          .744          .781          .812          .819          .835          .851          .856
33         PC          .860          .868          .876          .888          .910          .926          .937          .950          .970          .976
34         PC          .982          .985          .987          .989          .990          .993          .993          .994          .995          .998
35         LS          0          93.1
36         UD          0.131
37         *
38         KK          EXOFF1
39         KM          OFFSITE BASIN EXOFF1
40         BA          0.0198
41         LS          0          91.7
42         UD          0.107
43         *
44         KK          EXON1
45         KM          EXISTING ONSITE BASIN EXON1

```

44 BA 0.0031
45 LS 0 88.0
46 UD 0.100
*

1 HEC-1 INPUT PAGE 2

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

47 KK COM1
48 KM COMBINE EXOFF2, EXOFF1, AND EXON1
49 HC 3
*
50 ZZ

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

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

23 EXOFF2
.
37 . EXOFF1
.
42 . EXON1
.
47 COM1

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 05FEB20 TIME 09:30:53 *

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

TECHNICAL DRAINAGE STUDY FOR TIFFANY PLACE TWO
CLARK COUNTY, NEVADA

PREPARED FOR:

PREPARED BY:
LAS VEGAS CIVIL ENGINEERING
2251 NORTH RAMPART BLVD. NO. 418
LAS VEGAS, NV 89128

EXISTING 100- YEAR & 10-YEAR MODEL
FILENAME:TIFF-EXA.DAT
JOB#2010403

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

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

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS
DRAINAGE AREA SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION FEET
FLOW CUBIC FEET PER SECOND

STORAGE VOLUME ACRE-FEET
 SURFACE AREA ACRES
 TEMPERATURE DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
 NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF PRECIPITATION
 1.00 .57

1
 PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
				1.00	.57
HYDROGRAPH AT					
+	EXOFF2	.01	1	FLOW	12.
				TIME	6.
					3.58
HYDROGRAPH AT					
+	EXOFF1	.02	1	FLOW	32.
				TIME	15.
					3.50
HYDROGRAPH AT					
+	EXON1	.00	1	FLOW	5.
				TIME	2.
					3.50
3 COMBINED AT					
+	COM1	.03	1	FLOW	48.
				TIME	22.
					3.58

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

Future Hec-1 Model

```

1*****
*
*   FLOOD HYDROGRAPH PACKAGE   (HEC-1)
*       JUN   1998
*       VERSION 4.1
*
*   RUN DATE   05FEB20   TIME   09:31:04
*
*****

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

```

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

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

1 HEC-1 INPUT PAGE 1

```

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1          ID
2          ID          TECHNICAL DRAINAGE STUDY FOR TIFFANY PLACE TWO
3          ID          CLARK COUNTY, NEVADA
4          ID
5          ID          PREPARED FOR:
6          ID
7          ID          PREPARED BY:
8          ID          LAS VEGAS CIVIL ENGINEERING
9          ID          2251 NORTH RAMPART BLVD. NO. 418
10         ID          LAS VEGAS, NV 89128
11         ID
12         ID
13         ID          FUTURE 100- YEAR & 10-YEAR MODEL
14         ID          FILENAME:TIFF-FUTA.DAT
15         ID          JOB#2010403
16         ID
17         ID
18         ID          *DIAGRAM
19         IT          5          0          0          300
20         IO          5
21         IN          5
22         JR          PREC          1.00          0.57
23         *
24         KK          FUTOF2
25         KM          FUTURE OFFSITE BASIN FUTOF2
26         BA          0.0071
27         PB          2.77
28         PC          .000          .020          .057          .070          .087          .108          .124          .130          .130          .130
29         PC          .130          .130          .130          .133          .140          .142          .148          .158          .172          .181
30         PC          .190          .197          .199          .200          .201          .204          .214          .229          .241          .249
31         PC          .251          .256          .270          .278          .281          .283          .295          .322          .352          .409
32         PC          .499          .590          .710          .744          .781          .812          .819          .835          .851          .856
33         PC          .860          .868          .876          .888          .910          .926          .937          .950          .970          .976
34         PC          .982          .985          .987          .989          .990          .993          .993          .994          .995          .998
35         PC          .998          .999          1.00
36         LS          0          93.3
37         UD          0.131
38         *
39         KK          FUTOF1
40         KM          FUTURE OFFSITE BASIN FUTOF1
41         BA          0.0198
42         LS          0          91.7
43         UD          0.107
44         *
45         KK          FUTON2
46         KM          FUTURE ONSITE BASIN FUTON2

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44 BA 0.0029
45 LS 0 93.0
46 UD 0.050
*

1 HEC-1 INPUT PAGE 2

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

47 KK COM1
48 KM COMBINE FUTOF2, FUTOF1, AND FUTON2
49 HC 3
*

50 KK FUTON1
51 KM FUTURE ONSITE BASIN FUTON1
52 BA 0.0002
53 LS 0 93.0
54 UD 0.050
*
55 ZZ

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW
23 FUTOF2
.
.
37 . FUTOF1
.
.
42 . . FUTON2
.
.
47 COM1
.
.
50 . FUTON1

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 05FEB20 TIME 09:31:04 *

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

TECHNICAL DRAINAGE STUDY FOR TIFFANY PLACE TWO
CLARK COUNTY, NEVADA

PREPARED FOR:

PREPARED BY:
LAS VEGAS CIVIL ENGINEERING
2251 NORTH RAMPART BLVD. NO. 418
LAS VEGAS, NV 89128

FUTURE 100- YEAR & 10-YEAR MODEL
FILENAME:TIFF-FUTA.DAT
JOB#2010403

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

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

ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

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

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00 .57

1
PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
				1.00	.57
HYDROGRAPH AT					
+	FUTOF2	.01	1 FLOW	12.	6.
			TIME	3.58	3.58
HYDROGRAPH AT					
+	FUTOF1	.02	1 FLOW	32.	15.
			TIME	3.50	3.50
HYDROGRAPH AT					
+	FUTON2	.00	1 FLOW	6.	3.
			TIME	3.50	3.50
3 COMBINED AT					
+	COM1	.03	1 FLOW	50.	23.
			TIME	3.50	3.50
HYDROGRAPH AT					
+	FUTON1	.00	1 FLOW	0.	0.
			TIME	3.50	3.50

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

Hydraulic Calculations

Worksheet for Cory PI SECT 1 FUT 10yr

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Channel Slope	0.0184 ft/ft
Discharge	6.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.60
0+05.0	0.50
0+05.5	0.50
0+05.5	0.00
0+07.0	0.13
0+07.0	0.17
0+30.0	0.63
0+53.0	0.17
0+53.0	0.13
0+54.5	0.00
0+54.5	0.50
0+55.0	0.50
0+60.0	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.60)	(0+07.0, 0.13)	0.013
(0+07.0, 0.13)	(0+53.0, 0.13)	0.016
(0+53.0, 0.13)	(0+60.0, 0.60)	0.013

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

Results	
Normal Depth	0.33 ft
Elevation Range	0.00 to 0.63 ft
Flow Area	2.1 ft ²
Wetted Perimeter	19.73 ft
Hydraulic Radius	0.10 ft
Top Width	18.98 ft

Worksheet for Cory PI SECT 1 FUT 10yr

Results

Normal Depth	0.33 ft
Critical Depth	0.37 ft
Critical Slope	0.0073 ft/ft
Velocity	2.90 ft/s
Velocity Head	0.13 ft
Specific Energy	0.46 ft
Froude Number	1.546
Flow Type	Supercritical

GVF Input Data

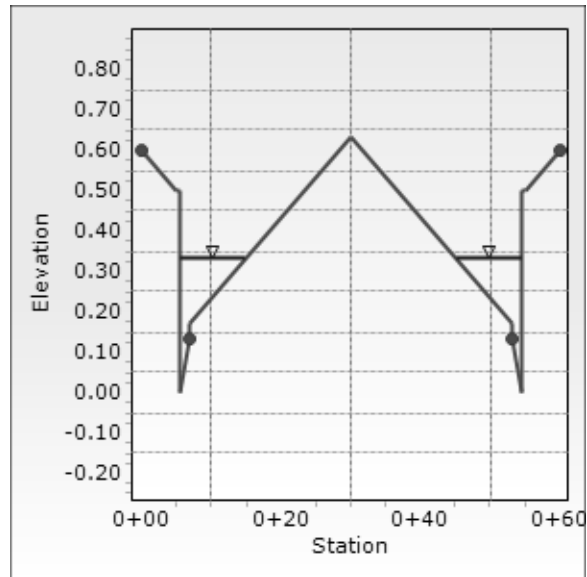
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.33 ft
Critical Depth	0.37 ft
Channel Slope	0.0184 ft/ft
Critical Slope	0.0073 ft/ft

Cross Section for Cory PI SECT 1 FUT 10yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0184 ft/ft
Normal Depth	0.33 ft
Discharge	6.00 cfs



Worksheet for Cory PI SECT 1 FUT 100yr

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Channel Slope	0.0184 ft/ft
Discharge	12.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.60
0+05.0	0.50
0+05.5	0.50
0+05.5	0.00
0+07.0	0.13
0+07.0	0.17
0+30.0	0.63
0+53.0	0.17
0+53.0	0.13
0+54.5	0.00
0+54.5	0.50
0+55.0	0.50
0+60.0	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.60)	(0+07.0, 0.13)	0.013
(0+07.0, 0.13)	(0+53.0, 0.13)	0.016
(0+53.0, 0.13)	(0+60.0, 0.60)	0.013

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

Results	
Normal Depth	0.40 ft
Elevation Range	0.00 to 0.63 ft
Flow Area	3.6 ft ²
Wetted Perimeter	26.51 ft
Hydraulic Radius	0.13 ft
Top Width	25.63 ft

Worksheet for Cory PI SECT 1 FUT 100yr

Results

Normal Depth	0.40 ft
Critical Depth	0.45 ft
Critical Slope	0.0067 ft/ft
Velocity	3.38 ft/s
Velocity Head	0.18 ft
Specific Energy	0.57 ft
Froude Number	1.599
Flow Type	Supercritical

GVF Input Data

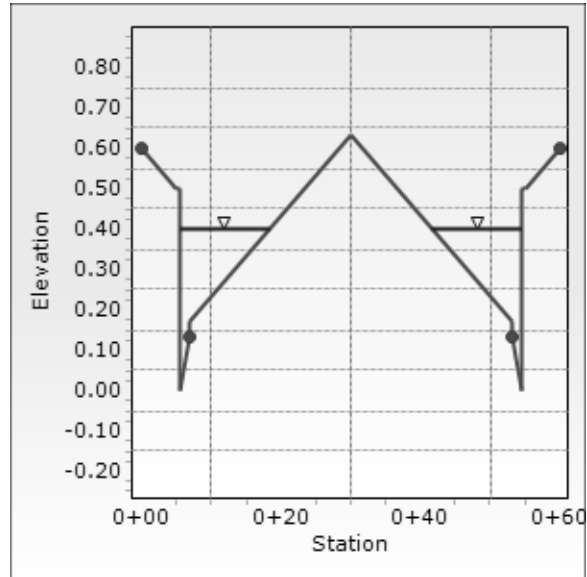
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.40 ft
Critical Depth	0.45 ft
Channel Slope	0.0184 ft/ft
Critical Slope	0.0067 ft/ft

Cross Section for Cory PI SECT 1 FUT 100yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0184 ft/ft
Normal Depth	0.40 ft
Discharge	12.00 cfs



Worksheet for Upland Blvd SECT 2 FUT 10yr

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Channel Slope	0.0119 ft/ft
Discharge	23.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.60
0+05.0	0.50
0+05.5	0.50
0+05.5	0.00
0+07.0	0.13
0+07.0	0.17
0+40.0	0.83
0+73.0	0.17
0+73.0	0.13
0+74.5	0.00
0+74.5	0.50
0+75.0	0.50
0+80.0	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.60)	(0+07.0, 0.13)	0.013
(0+07.0, 0.13)	(0+73.0, 0.13)	0.016
(0+73.0, 0.13)	(0+80.0, 0.60)	0.013

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

Results	
Normal Depth	0.51 ft
Elevation Range	0.00 to 0.83 ft
Flow Area	7.0 ft ²
Wetted Perimeter	39.49 ft
Hydraulic Radius	0.18 ft
Top Width	38.39 ft

Worksheet for Upland Blvd SECT 2 FUT 10yr

Results

Normal Depth	0.51 ft
Critical Depth	0.56 ft
Critical Slope	0.0064 ft/ft
Velocity	3.28 ft/s
Velocity Head	0.17 ft
Specific Energy	0.67 ft
Froude Number	1.353
Flow Type	Supercritical

GVF Input Data

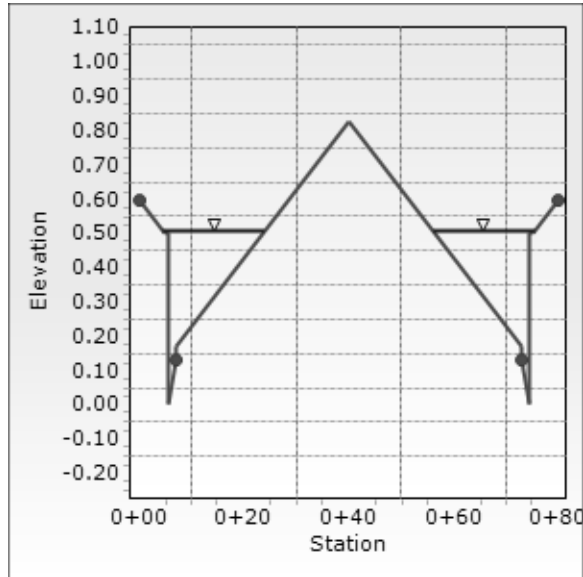
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.51 ft
Critical Depth	0.56 ft
Channel Slope	0.0119 ft/ft
Critical Slope	0.0064 ft/ft

Cross Section for Upland Blvd SECT 2 FUT 10yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0119 ft/ft
Normal Depth	0.51 ft
Discharge	23.00 cfs



Worksheet for Upland Blvd SECT 2 FUT 100yr

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Channel Slope	0.0119 ft/ft
Discharge	50.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.60
0+05.0	0.50
0+05.5	0.50
0+05.5	0.00
0+07.0	0.13
0+07.0	0.17
0+40.0	0.83
0+73.0	0.17
0+73.0	0.13
0+74.5	0.00
0+74.5	0.50
0+75.0	0.50
0+80.0	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.60)	(0+07.0, 0.13)	0.013
(0+07.0, 0.13)	(0+73.0, 0.13)	0.016
(0+73.0, 0.13)	(0+80.0, 0.60)	0.013

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

Results	
Normal Depth	0.63 ft
Elevation Range	0.00 to 0.83 ft
Flow Area	13.2 ft ²
Wetted Perimeter	61.07 ft
Hydraulic Radius	0.22 ft
Top Width	59.91 ft

Worksheet for Upland Blvd SECT 2 FUT 100yr

Results

Normal Depth	0.63 ft
Critical Depth	0.69 ft
Critical Slope	0.0055 ft/ft
Velocity	3.80 ft/s
Velocity Head	0.22 ft
Specific Energy	0.85 ft
Froude Number	1.430
Flow Type	Supercritical

GVF Input Data

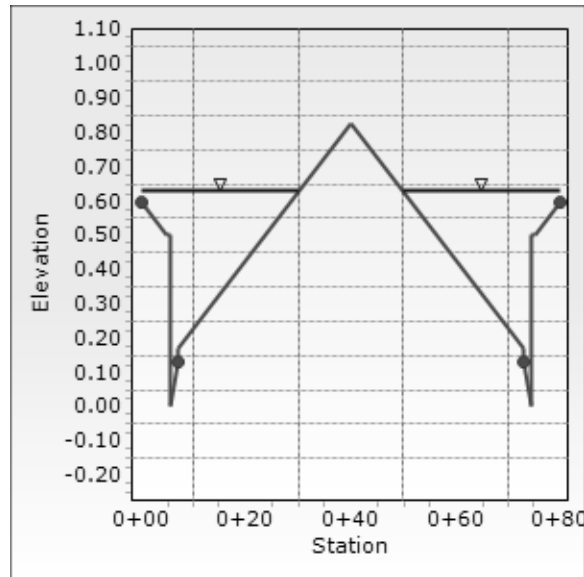
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Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.63 ft
Critical Depth	0.69 ft
Channel Slope	0.0119 ft/ft
Critical Slope	0.0055 ft/ft

Cross Section for Upland Blvd SECT 2 FUT 100yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0119 ft/ft
Normal Depth	0.63 ft
Discharge	50.00 cfs



Worksheet for Sect a 10yr

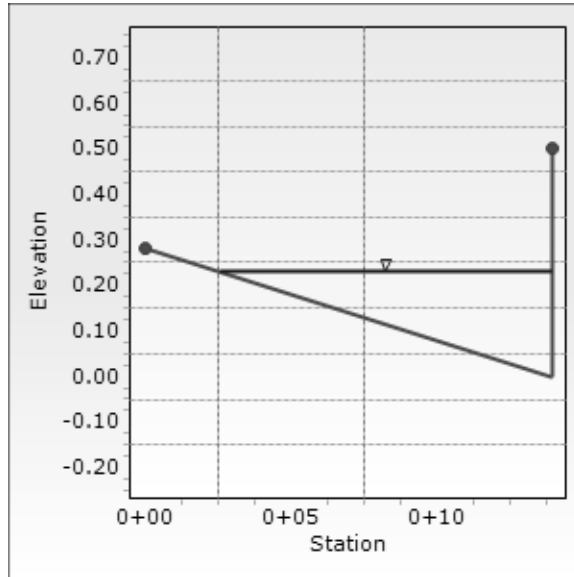
Project Description		
Friction Method	Manning Formula	
Solve For	Normal Depth	
Input Data		
Channel Slope	0.0050 ft/ft	
Discharge	2.00 cfs	
Section Definitions		
Station (ft)	Elevation (ft)	
0+00.0	0.28	
0+14.0	0.00	
0+14.0	0.50	
Roughness Segment Definitions		
Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.28)	(0+14.0, 0.50)	0.016
Options		
Current Roughness Weighted Method	Pavlovskii's Method	
Open Channel Weighting Method	Pavlovskii's Method	
Closed Channel Weighting Method	Pavlovskii's Method	
Results		
Normal Depth	0.23 ft	
Elevation Range	0.00 to 0.50 ft	
Flow Area	1.3 ft ²	
Wetted Perimeter	11.67 ft	
Hydraulic Radius	0.11 ft	
Top Width	11.44 ft	
Normal Depth	0.23 ft	
Critical Depth	0.21 ft	
Critical Slope	0.0081 ft/ft	
Velocity	1.53 ft/s	
Velocity Head	0.04 ft	
Specific Energy	0.27 ft	
Froude Number	0.797	
Flow Type	Subcritical	
GVF Input Data		
Downstream Depth	0.00 ft	
Length	0.00 ft	

Worksheet for Sect a 10yr

GVF Input Data	
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.23 ft
Critical Depth	0.21 ft
Channel Slope	0.0050 ft/ft
Critical Slope	0.0081 ft/ft

Cross Section for Sect a 10yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0050 ft/ft
Normal Depth	0.23 ft
Discharge	2.00 cfs



Worksheet for Sect a 100yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0050 ft/ft
Discharge	3.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.28
0+14.0	0.00
0+14.0	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.28)	(0+14.0, 0.50)	0.016

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

Results	
Normal Depth	0.27 ft
Elevation Range	0.00 to 0.50 ft
Flow Area	1.8 ft ²
Wetted Perimeter	13.58 ft
Hydraulic Radius	0.13 ft
Top Width	13.31 ft
Normal Depth	0.27 ft
Critical Depth	0.25 ft
Critical Slope	0.0077 ft/ft
Velocity	1.69 ft/s
Velocity Head	0.04 ft
Specific Energy	0.31 ft
Froude Number	0.818
Flow Type	Subcritical

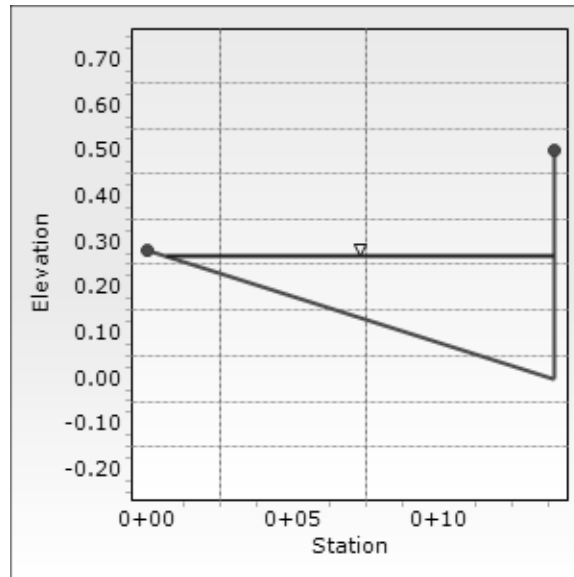
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft

Worksheet for Sect a 100yr

GVF Input Data	
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.27 ft
Critical Depth	0.25 ft
Channel Slope	0.0050 ft/ft
Critical Slope	0.0077 ft/ft

Cross Section for Sect a 100yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0050 ft/ft
Normal Depth	0.27 ft
Discharge	3.00 cfs



Worksheet for Sect b 10/100yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0178 ft/ft
Discharge	1.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.37
0+10.0	0.00
0+10.0	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.37)	(0+10.0, 0.50)	0.016

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

Results	
Normal Depth	0.18 ft
Elevation Range	0.00 to 0.50 ft
Flow Area	0.4 ft ²
Wetted Perimeter	4.93 ft
Hydraulic Radius	0.08 ft
Top Width	4.75 ft
Normal Depth	0.18 ft
Critical Depth	0.20 ft
Critical Slope	0.0084 ft/ft
Velocity	2.39 ft/s
Velocity Head	0.09 ft
Specific Energy	0.26 ft
Froude Number	1.422
Flow Type	Supercritical

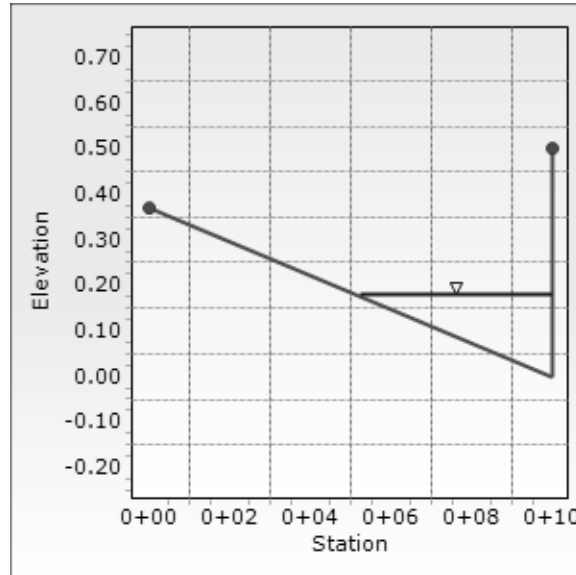
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft

Worksheet for Sect b 10/100yr

GVF Input Data	
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.18 ft
Critical Depth	0.20 ft
Channel Slope	0.0178 ft/ft
Critical Slope	0.0084 ft/ft

Cross Section for Sect b 10/100yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0178 ft/ft
Normal Depth	0.18 ft
Discharge	1.00 cfs



Worksheet for Sect c 10yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0178 ft/ft
Discharge	2.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.32
0+10.0	0.00
0+10.0	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.32)	(0+10.0, 0.50)	0.016

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

Results	
Normal Depth	0.22 ft
Elevation Range	0.00 to 0.50 ft
Flow Area	0.7 ft ²
Wetted Perimeter	6.96 ft
Hydraulic Radius	0.10 ft
Top Width	6.74 ft
Normal Depth	0.22 ft
Critical Depth	0.25 ft
Critical Slope	0.0078 ft/ft
Velocity	2.75 ft/s
Velocity Head	0.12 ft
Specific Energy	0.33 ft
Froude Number	1.477
Flow Type	Supercritical

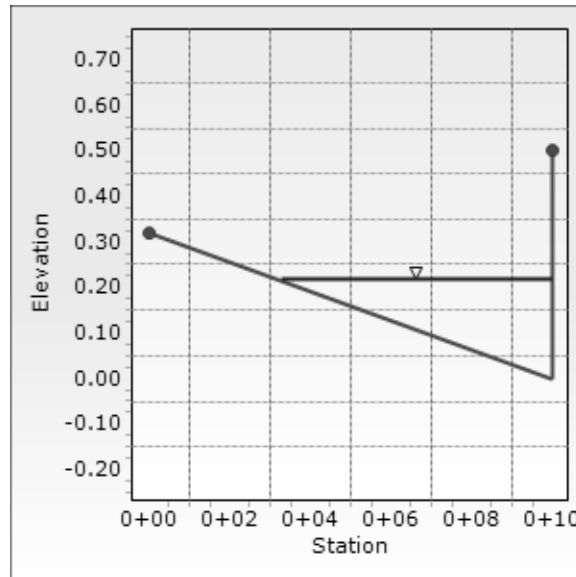
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft

Worksheet for Sect c 10yr

GVF Input Data	
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.22 ft
Critical Depth	0.25 ft
Channel Slope	0.0178 ft/ft
Critical Slope	0.0078 ft/ft

Cross Section for Sect c 10yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0178 ft/ft
Normal Depth	0.22 ft
Discharge	2.00 cfs



Worksheet for Sect c 100yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0178 ft/ft
Discharge	3.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.0	0.32
0+10.0	0.00
0+10.0	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.0, 0.32)	(0+10.0, 0.50)	0.016

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

Results	
Normal Depth	0.25 ft
Elevation Range	0.00 to 0.50 ft
Flow Area	1.0 ft ²
Wetted Perimeter	8.10 ft
Hydraulic Radius	0.12 ft
Top Width	7.85 ft
Normal Depth	0.25 ft
Critical Depth	0.30 ft
Critical Slope	0.0074 ft/ft
Velocity	3.04 ft/s
Velocity Head	0.14 ft
Specific Energy	0.40 ft
Froude Number	1.514
Flow Type	Supercritical

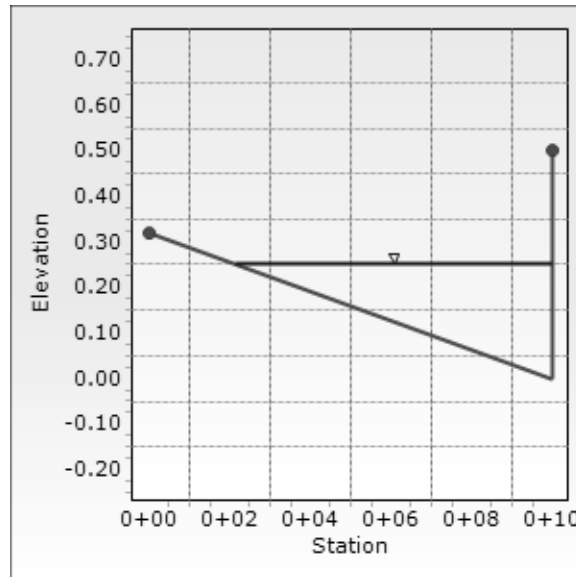
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft

Worksheet for Sect c 100yr

GVF Input Data	
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.25 ft
Critical Depth	0.30 ft
Channel Slope	0.0178 ft/ft
Critical Slope	0.0074 ft/ft

Cross Section for Sect c 100yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0178 ft/ft
Normal Depth	0.25 ft
Discharge	3.00 cfs



Worksheet for NW Swale

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.035
Channel Slope	0.0040 ft/ft
Left Side Slope	4.000 H:V
Right Side Slope	4.000 H:V
Discharge	3.00 cfs
Results	
Normal Depth	0.74 ft
Flow Area	2.2 ft ²
Wetted Perimeter	6.13 ft
Hydraulic Radius	0.36 ft
Top Width	5.94 ft
Critical Depth	0.51 ft
Critical Slope	0.0293 ft/ft
Velocity	1.36 ft/s
Velocity Head	0.03 ft
Specific Energy	0.77 ft
Froude Number	0.393
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	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.74 ft
Critical Depth	0.51 ft
Channel Slope	0.0040 ft/ft
Critical Slope	0.0293 ft/ft

Cross Section for NW Swale

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.035
Channel Slope	0.0040 ft/ft
Normal Depth	0.74 ft
Left Side Slope	4.000 H:V
Right Side Slope	4.000 H:V
Discharge	3.00 cfs



V: 1 
H: 1

Worksheet for SW Swale

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.035
Channel Slope	0.0050 ft/ft
Left Side Slope	4.000 H:V
Right Side Slope	4.000 H:V
Discharge	3.00 cfs
Results	
Normal Depth	0.71 ft
Flow Area	2.0 ft ²
Wetted Perimeter	5.87 ft
Hydraulic Radius	0.35 ft
Top Width	5.70 ft
Critical Depth	0.51 ft
Critical Slope	0.0293 ft/ft
Velocity	1.48 ft/s
Velocity Head	0.03 ft
Specific Energy	0.75 ft
Froude Number	0.437
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	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.71 ft
Critical Depth	0.51 ft
Channel Slope	0.0050 ft/ft
Critical Slope	0.0293 ft/ft

Cross Section for SW Swale

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.035
Channel Slope	0.0050 ft/ft
Normal Depth	0.71 ft
Left Side Slope	4.000 H:V
Right Side Slope	4.000 H:V
Discharge	3.00 cfs



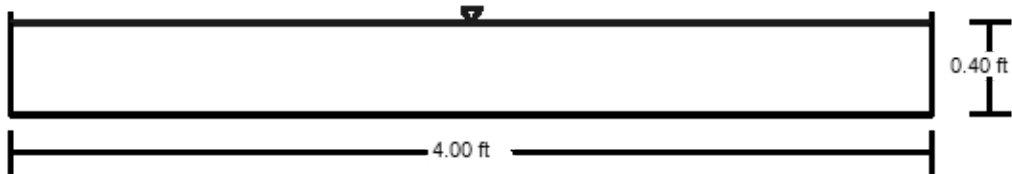
V: 1
H: 1

Worksheet for Block Wall Opening

Project Description	
Solve For	Headwater Elevation
Input Data	
Discharge	3.00 cfs
Crest Elevation	0.67 ft
Weir Coefficient	$3.00 \text{ ft}^{(1/2)}/\text{s}$
Crest Length	3.00 ft
Results	
Headwater Elevation	1.15 ft
Headwater Height Above Crest	0.48 ft
Flow Area	1.4 ft ²
Velocity	2.08 ft/s
Wetted Perimeter	3.96 ft
Top Width	3.00 ft

Cross Section for Block Wall Opening

Project Description	
Solve For	Headwater Elevation
Input Data	
Discharge	3.00 cfs
Headwater Elevation	1.06 ft
Crest Elevation	0.67 ft
Weir Coefficient	$3.00 \text{ ft}^{1/2}/\text{s}$
Crest Length	4.00 ft



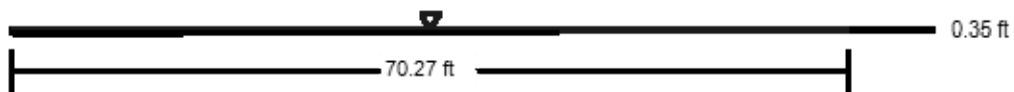
V: 1
H: 1

Worksheet for Dome Grate

Project Description		
Solve For	Spread	
Input Data		
Discharge	3.00 cfs	
Gutter Width	2.50 ft	
Gutter Cross Slope	0.0050 ft/ft	
Road Cross Slope	0.0050 ft/ft	
Grate Width	2.50 ft	
Grate Length	2.50 ft	
Local Depression	0.0 in	
Local Depression Width	30.0 in	
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0 %	
Results		
Spread	70.27 ft	
Depth	0.35 ft	
Gutter Depression	0.0 in	
Total Depression	0.0 in	
Open Grate Area	2.8 ft ²	
Active Grate Weir Length	5.00 ft	

Cross Section for Dome Grate

Project Description	
Solve For	Spread
Input Data	
Discharge	3.00 cfs
Spread	70.27 ft
Gutter Width	2.50 ft
Gutter Cross Slope	0.0050 ft/ft
Road Cross Slope	0.0050 ft/ft
Grate Width	2.50 ft
Grate Length	2.50 ft
Local Depression	0.0 in
Local Depression Width	30.0 in
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %



V: 1
H: 1

Conditions of Approval



**LAS VEGAS
CITY COUNCIL**

CAROLYN G. GOODMAN
Mayor

MICHELE FIORE
Mayor Pro Tem

STAVROS S. ANTHONY
CEDRIC CREAR
BRIAN KNUDSEN
VICTORIA SEAMAN
OLIVIA DIAZ

SCOTT D. ADAMS
City Manager

DEPARTMENT OF PLANNING
ROBERT SUMMERFIELD
DIRECTOR

**DEVELOPMENT
SERVICES CENTER**

333 N. RANCHO DRIVE
3RD FLOOR
LAS VEGAS, NV 89106
702.229.6301 | VOICE
702.474.7463 | FAX
711 | TTY



cityoflasvegas
lasvegasnevada.gov

November 21, 2019

Cory, LLC
6003 McLeod Drive
Las Vegas, Nevada 89120

**RE: GPA-77257 [PRJ-77098] - GENERAL PLAN AMENDMENT RELATED
TO ZON-77258 AND SDR-77259
CITY COUNCIL MEETING OF NOVEMBER 20, 2019**

Dear Applicant:

The City Council at a regular meeting held on November 20, 2019 voted to **APPROVE** your request for a General Plan Amendment FROM: L (LOW DENSITY RESIDENTIAL) TO: M (MEDIUM DENSITY RESIDENTIAL) on 2.00 acres at the southwest corner of Upland Boulevard and Cory Place (APNs 138-36-406-002 and 003), Ward 1 (Knudsen) [PRJ-77098].

The Notice of Final Action was filed with the Las Vegas City Clerk on November 21, 2019.

Sincerely,

Robert Summerfield, AICP
Director
Department of Planning

RTS:PL:clb

cc: International Asset Managers, Inc.
5800 West Charleston Boulevard
Las Vegas, Nevada 89146

Mr. Bob Gronauer
Kaempfer Crowell
1980 Festival Plaza Drive, Suite #650
Las Vegas, Nevada 89135



**LAS VEGAS
CITY COUNCIL**

CAROLYN G. GOODMAN
Mayor

MICHELE FIORE
Mayor Pro Tem

STAVROS S. ANTHONY
CEDRIC CREAR
BRIAN KNUDSEN
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OLIVIA DIAZ

SCOTT D. ADAMS
City Manager

DEPARTMENT OF PLANNING

ROBERT SUMMERFIELD
DIRECTOR

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cityoflasvegas
lasvegasnevada.gov

November 21, 2019

Cory, LLC
6003 McLeod Drive
Las Vegas, Nevada 89120

**RE: ZON-77258 [PRJ-77098] - REZONING RELATED TO GPA-77257 AND
SDR-77259
CITY COUNCIL MEETING OF NOVEMBER 20, 2019**

Dear Applicant:

The City Council at a regular meeting held on November 20, 2019 voted to **APPROVE** your request for a Rezoning FROM: R-1 (SINGLE FAMILY RESIDENTIAL) TO: R-3 (MEDIUM DENSITY RESIDENTIAL) on 2.00 acres at the southwest corner of Upland Boulevard and Cory Place (APNs 138-36-406-002 and 003), Ward 1 (Knudsen) [PRJ-77098].

The Notice of Final Action was filed with the Las Vegas City Clerk on November 21, 2019.

Sincerely,

Robert Summerfield, AICP ^{RE}
Director
Department of Planning

RTS:PL:clb

cc: International Asset Managers, Inc.
5800 West Charleston Boulevard
Las Vegas, Nevada 89146

Mr. Bob Gronauer
Kaempfer Crowell
1980 Festival Plaza Drive, Suite #650
Las Vegas, Nevada 89135



**LAS VEGAS
CITY COUNCIL**

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DEPARTMENT OF PLANNING
ROBERT SUMMERFIELD
DIRECTOR

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711 | TTY



cityoflasvegas
lasvegasnevada.gov

November 21, 2019

Cory, LLC
6003 McLeod Drive
Las Vegas, Nevada 89120

**RE: SDR-77259 [PRJ-77098] - SITE DEVELOPMENT PLAN REVIEW
RELATED TO GPA-77257 AND ZON-77258
CITY COUNCIL MEETING OF NOVEMBER 20, 2019**

Dear Applicant:

The City Council at a regular meeting held on November 20, 2019 voted to **APPROVE** your request for a Site Development Plan Review FOR A PROPOSED THREE-STORY, 34-UNIT MULTI-FAMILY RESIDENTIAL DEVELOPMENT on 2.00 acres at the southwest corner of Upland Boulevard and Cory Place (APNs 138-36-406-002 and 003), R-1 (Single Family Residential) Zone [PROPOSED: R-3 (Medium Density Residential)], Ward 1 (Knudsen) [PRJ-77098].

This approval is subject to the following conditions:

Planning

1. Approval of and conformance to the Conditions of Approval for General Plan Amendment (GPA-77257) and Rezoning (ZON-77258) shall be required, if approved.
2. This approval shall be void two years from the date of final approval, unless exercised pursuant to the provisions of LVMC Title 19.16. An Extension of Time may be filed for consideration by the City of Las Vegas.
3. All development shall be in conformance with the site plan and landscape plan, date stamped 09/09/19, and the building elevations, date stamped 08/15/19, except as amended by conditions herein.
4. An Exception from Title 19.06.040 is hereby approved, to allow a total of 26 trees in the landscape buffer areas where 45 are required.

5. An Exception from Title 19.08.110 is hereby approved, to allow a total of 15 parking area trees where 20 are required.
6. All necessary building permits shall be obtained and final inspections shall be completed in compliance with Title 19 and all codes as required by the Department of Building and Safety.
7. These Conditions of Approval shall be affixed to the cover sheet of any plan set submitted for building permit.
8. The applicant shall coordinate with the City Surveyor and other city staff to determine the most appropriate mapping action necessary to consolidate the existing lots. The mapping action shall be completed and recorded prior to the issuance of any building permits.
9. The minimum distance between buildings shall be 10 feet.
10. A technical landscape plan, signed and sealed by a Registered Architect, Landscape Architect, Residential Designer or Civil Engineer, must be submitted prior to or at the same time application is made for a building permit. A permanent underground sprinkler system is required, and shall be permanently maintained in a satisfactory manner; the landscape plan shall include irrigation specifications. Installed landscaping shall not impede visibility of any traffic control device.
11. A fully operational fire protection system, including fire apparatus roads, fire hydrants and water supply, shall be installed and shall be functioning prior to construction of any combustible structures.
12. Prior to the submittal of a building permit application, the applicant shall meet with Department of Planning staff to develop a comprehensive address plan for the subject site. A copy of the approved address plan shall be submitted with any future building permit applications related to the site.
13. All City Code requirements and design standards of all City Departments must be satisfied, except as modified herein.

Public Works

14. Correct all American's with Disabilities Act (ADA) deficiencies, if any, on the sidewalk along Upland Boulevard and Cory Place adjacent to this site in accordance with code requirements of Title 13.56.040 to the satisfaction of the City Engineer concurrent with development of this site. All existing paving damaged or removed by this development shall be restored at its original location and to its original width concurrent with development of this site.
15. Landscape and maintain all unimproved rights-of-way, if any, adjacent to this site. All landscaping and private improvements installed with this project shall be situated and maintained so as to not create sight visibility obstructions for vehicular traffic at all development access drives and abutting street intersections.
16. Submit a License Agreement for landscaping and private improvements in the Upland Boulevard and Cory Place public rights-of-way, if any, adjacent to this site prior to this issuance of permits for these improvements. The applicant must carry an insurance policy for the term of the License Agreement and add the City of Las Vegas as an additionally insured entity on this insurance policy. If requested by the City, the applicant shall remove property encroaching in the public right-of-way at the applicant's expense pursuant to the terms of the City's License Agreement. The installation and maintenance of all private improvements in the public right of way shall be the responsibility of the adjacent property owner(s) and shall be transferred with the sale of the property for the entire term of the License Agreement.
17. A Drainage Plan and Technical Drainage Study must be submitted to and approved by the Department of Public Works prior to the issuance of any building or grading permits or submittal of any construction drawings, whichever may occur first. Provide and improve all drainageways recommended in the approved drainage plan/study. The developer of this site shall be responsible to construct such neighborhood or local drainage facility improvements as are recommended by the City of Las Vegas Neighborhood Drainage Studies and approved Drainage Plan/Study concurrent with development of this site.

Cory, LLC
SDR-77259 [PRJ-77098] – Page Four
November 21, 2019

The Notice of Final Action was filed with the Las Vegas City Clerk on November 21, 2019.

Sincerely,

A handwritten signature in black ink that reads "Robert Summerfield". The signature is written in a cursive style with a large, stylized "R" and "S".

Robert Summerfield, AICP[®]
Director
Department of Planning

RTS:PL:clb

cc: International Asset Managers, Inc.
5800 West Charleston Boulevard
Las Vegas, Nevada 89146

Mr. Bob Gronauer
Kaempfer Crowell
1980 Festival Plaza Drive, Suite #650
Las Vegas, Nevada 89135

Excerpts from
the Drainage Study for Tiffany Apartments
(prepared by E & M Civil Engineering Consultants)

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: November 22, 2005
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: Tiffany Apartments	
Cross Streets:	NEC of Jones & Alpine (N. of Charleston)	
File Number:	F:\Depot\DSMemos\DS3855B.doc	
Parcel Number:	138-36-401-013	
Zoning Action:	SDR-5568 & ZON-5566	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES	NO X
COPIES TO:		E&M Civil Engineering
		Shander International, LLC.
		Bart Anderson, P.E., DevCo

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1 st Submittal	7/8/2005	7/22/2005	Not Approved	\$400.00	25324: \$400
2 nd Submittal	10/20/2005 & 11/14/2005	11/22/2005	See Comments Below	\$400.00	31926: \$400
			TOTAL FEES (LDDRS):	\$800.00	----

REMARKS:

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

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

1. Raise the finish floor elevation of the proposed building to F.F. = 2291.50.

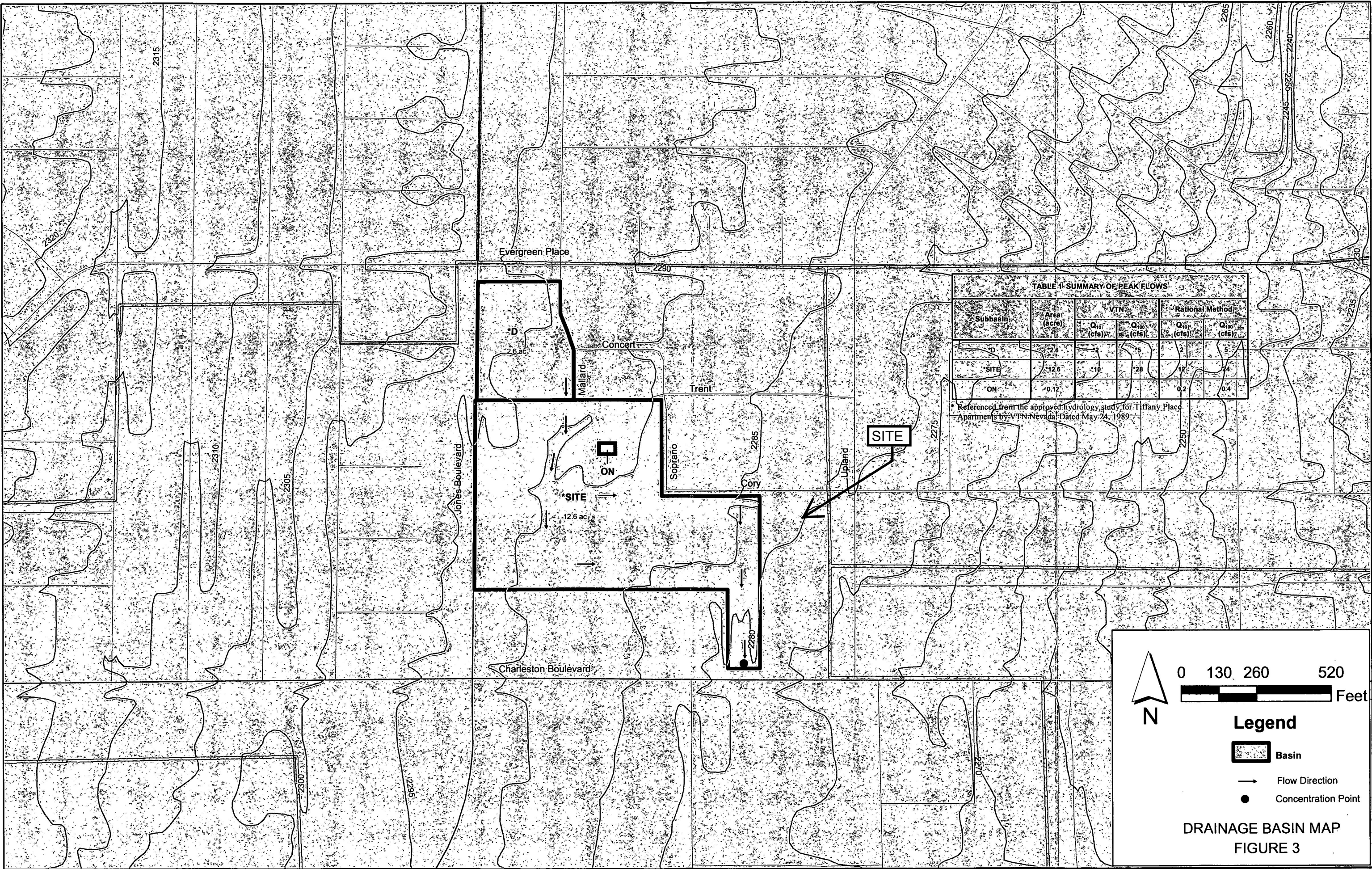
NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the City of Las Vegas Flood Control Section. Additionally, conditional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

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

END OF REMARKS

ays

T/R/S: T20S/R60E/36
AREA L-36



DRAINAGE BASIN MAP
FIGURE 3

Project Plans

[illegible]

OWNER/DEVELOPER

CORY LLC

6003 MCLEOD DR., LAS VEGAS, NV 89120-3454

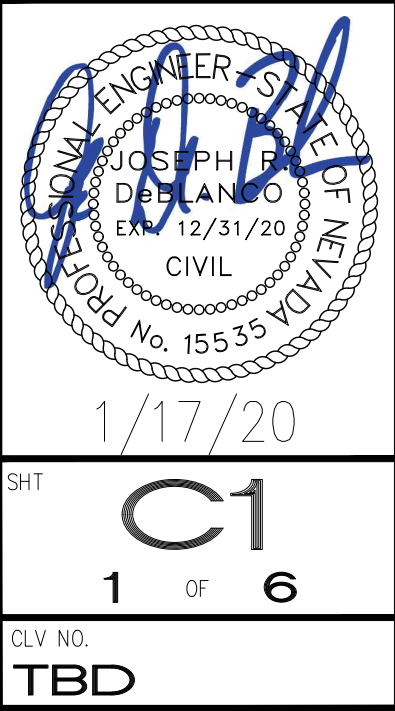
ENGINEERING FIRM

LAS VEGAS CIVIL ENGINEERING

2251 NORTH RAMPART BLVD. NO. 418, LAS VEGAS, NEVADA 89128
PH 702-515-6741 FX 702-915-6771

SHEET TITLE	COVER SHEET
PROJECT NAME	TIFFANY PLACE 2
PROJECT ADDRESS	APN'S 138-36-406-002 AND -003
MUNICIPALITY	CITY OF LAS VEGAS, NEVADA

DRAWN BY: JRD	DESIGNED BY: JRD	CHECKED BY: JRD	LYCE PROJ. NO. TIFFANY 2
HORIZONTAL SCALE N/A			
VERTICAL SCALE N/A			



LAS VEGAS CIVIL ENGINEERING
2251 NORTH RAMPART BLVD. NO. 418
LAS VEGAS, NV 89128
PHONE: 702-515-6741
JOEY DEBLANCO
JOEY@LVCE.NET

SECTION 36, TOWNSHIP 20 SOUTH, RANGE 60 EAST

PROJECT NO. 136909 FIRST APPROVED DATE: _____

COVER SHEET

SHEET TITLE

BY:

HORIZ

VERTI

1/17/20

SHT

C1

1 OF 6

CLV NO.
TBD

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION (USS), AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA" (USD), LATEST REVISION.
2. DESIGN PROFESSIONAL AND CONTRACTOR SHALL VERIFY CITY'S LATEST LED FIXTURE SPECIFICATIONS AND APPROVED FIXTURES PER CLV WEBSITE, UNDER BUILDING AND SAFETY FORMS, PRIOR TO ORDERING MATERIALS.
3. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS, ETC., LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF THE TRAFFIC AND CITY ENGINEER. ANY DEVIATION FROM THE PLAN LOCATION WILL REQUIRE COMPLIANCE WITH SECTION 623 OF THE USS.
4. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION IN ACCORDANCE WITH SECTION 623 G.03.01 OF THE USS.
5. ALL EMPTY CONDUIT SHALL HAVE AT LEAST ONE GREEN No. #8 AWG WIRE INSTALLED AS TRACER WIRE IN ACCORDANCE WITH SECTION 623 G.02.01 OF THE USS PRIOR TO BACKFILLING AND FINAL INSPECTION.
6. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN COMPLIANCE WITH USD NO. 320A WHEN POLE IS INSTALLED BEHIND SIDEWALK, AND SHALL AT NO TIME COMPLETELY ENCLOSE THE STREET LIGHTING POLE.
7. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TRAFFIC ENGINEERING DIVISION PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
8. SERVICE POINTS SHALL BE COORDINATED WITH NV ENERGY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICEPOINTS SHALL BE SHOWN ON THE PLANS.
9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREETLIGHTING 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 CONDUIT, WIRE, ETC. FROM SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON THE PLANS.

1. ALL CONSTRUCTION SIGNING, BARRICADING, AND STAFFIC Delineation SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.
2. THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.
3. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING CITY STREETS WHERE WARRANTED IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
4. WHEN A DESIGNATED "SUGGESTED ROUTE TO SCHOOL" IS ENCRoACHED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO BE ASSISTED IN THE SAFE CROSSING THROUGH THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A QUALIFIED "CROSSING GUARD". THE GUARD SHALL BE PRESENT FOR THE FULL DURATION OF TIME THAT CHILDREN ARE LIKELY TO BE PRESENT.
5. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW TRAFFIC SIGNS SHALL UTILIZE TYPE XI RETROREFLECTIVE SHEETING IN ACCORDANCE WITH CCAUSS 627 AND 716 AND SHALL HAVE AN ANTI-GRAFFITI PROTECTIVE OVERLAY FILM THAT IS A MATCHING COMPONENT TO, AND OF THE SAME MANUFACTURER AS THE RETROREFLECTIVE SHEETING TO WHICH IT IS APPLIED. STREET NAME 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 HERE UNDER, 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 INSURE THE SAFETY OF THE PUBLIC IN OR AROUND THE WORK AREA. THE CONTRACTOR SHALL HAVE A CERTIFIED ATSSA TRAFFIC CONTROL TECHNICIAN OR IMSA WORK ZONE SAFETY SPECIALIST SET UP, MAINTAIN AND/OR REMOVE ALL TRAFFIC CONTROL DEVICES IN THE CITY OF LAS VEGAS RIGHT OF WAY.
11. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE EXPEDITED TO COMPLETION SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA (RTC). IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP OR HAS AN ADVERSE EFFECT ON BUS SERVICE ON THAT STREET TO ARRANGE FOR TEMPORARY RELOCATION OF STOP.
13. GUARDS SHALL BE OBTAINED BY CONTACTING THE METROPOLITAN POLICE DEPARTMENT SPECIAL EVENTS UNIT (PHONE # 828-3442) WHO WILL PROVIDE OFFICERS PROPERLY TRAINED IN TRAFFIC CONTROL. FEES FOR THE USE OF THESE OFFICERS SHALL BE SET 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.

REVISÉ JUNE 4, 2018

1. IN THE EVENT THAT ANY UNFORESEEN CONDITIONS NOT COVERED BY THESE NOTES ARE ENCOUNTERED DURING GRADING OPERATIONS, THE OWNER/ENGINEER SHALL BE IMMEDIATELY NOTIFIED FOR DIRECTION.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM ALL NECESSARY CUTS AND FILLS WITHIN THE LIMITS OF THIS PROJECT AND THE RELATED OFF-SITE WORK, SO AS TO GENERATE THE DESIRED SUBGRADE, FINISH GRADES AND SLOPES SHOWN.
3. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ALL EXCAVATION. ADEQUATE SHORING SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR TO PREVENT UNDERMINING OF ANY ADJACENT FEATURES OR FACILITIES AND/OR 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 INDICATED: HORIZONTAL VERTICAL COMPACTION A. PAVEMENT AREA SUBGRADE 0.1' + 0.0' TO -0.1' SEE SOILS REPORT B. ENGINEERED FILL 0.5' + 0.1' TO -0.1' SEE SOILS REPORT COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.
7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
8. THE USE OF POTABLE WATER WITHOUT A SPECIAL PERMIT FOR BUILDING OR CONSTRUCTION PURPOSES INCLUDING CONSOLIDATION OF BACKFILL OR DUST CONTROL IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.
9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT-OF-WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. 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.

3. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "C" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE 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 FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

REVISÉ 04/15/10

1. LAS VEGAS CIVIL ENGINEERING SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES ON THE PLANS OR CONDITIONS IN THE FIELD.
2. ALL WORK TO BE PERFORMED OUTSIDE OF THE PROJECT BOUNDARY AND ON PRIVATE PROPERTY SHALL NOT BE PERFORMED UNTIL WRITTEN PERMISSION AND EASEMENT HAVE BEEN OBTAINED FROM THE OFFSITE OWNER AND GIVEN TO CITY OF LAS VEGAS.
3. SCARPS ARE NOT SHOWN ON PLAN FOR CLARITY PURPOSES FOR AREAS THAT ARE FLATTER THAN 2:1 SLOPE, OR LESS THAN 1' ELEVATION DIFFERENCE.
4. ALL SLOPE AREAS SHALL HAVE A MINIMUM ONE FOOT SHOULDER NEXT TO WALL PRIOR TO STARTING SLOPE.
5. PAD SECTION SHOWN ON PLANS IS FOR REFERENCE ONLY. FOR ACTUAL SECTION, REFER TO GEOTECHNICAL REPORT FOR SOILS ENGINEERS' RECOMMENDATION.
6. ALL SIDEWALK AND PARKING AREA INSTALLATIONS SHALL CONFORM TO ADA REQUIREMENTS.
7. RETAINING WALL ELEVATIONS ARE SHOWN FOR CONVENIENCE ONLY. CONTRACTOR MUST VERIFY EXACT TOP OF FOOTINGS, STEP FOOTINGS, AND TOP OF RETAINING WALLS TO MATCH FIELD CONDITIONS, PRIOR TO COMMENCEMENT OF WORK.
8. LAS VEGAS CIVIL ENGINEERING ACCEPTS NO LIABILITY FOR UTILITY LOCATIONS SHOWN OR NOT SHOWN ON THESE PLANS. THE UTILITY LOCATIONS WERE DETERMINED FROM SURFACE EVIDENCE AND INFORMATION PROVIDED BY THE UTILITY PROVIDER. ALL ARE HEREBY NOTIFIED TO CONFIRM ALL INFORMATION, SHOWN OR NOT SHOWN ON THESE PLANS, PRIOR TO COMMENCING CONSTRUCTION.

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

- NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. 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). THE LATEST EDITION OF UDACS SHALL SUPERSEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS.
9. ALL WATER FACILITIES AND APPURTENANCES SHALL BE DISINFECTED, PRESSURE TESTED, AND HAVE AN ACCEPTABLE PASSING HEALTH WATER SAMPLE OBTAINED, PRIOR TO OPERATION AND USE.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO 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 MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVWD) MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE. ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.
15. NO LEAD COMPLIANCE NOTE: TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER WORKS BRASS PRODUCTS PROPOSED TO BE RELOCATED, OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

PROJECT NO. XXXXXX
FIRST APPROVED DATE: _____

AC	ASPHALTIC CONCRETE	CONC	CONCRETE
ACP	ASBESTOS CEMENT PIPE	MIN	MINIMUM
ADJ	ADJUST	NO	NUMBER
BC	BEGINNING OF CURB OR BACK OF CURB	OC	ON CENTER
BCR	BEGINNING OF CURB RETURN OR BACK OF CURVE RADIUS	OD	OUTSIDE DIAMETER
BDRY	BOUNDARY	P	POWERLINE
BEG	BEGIN	PC	POINT OF CURVATURE
BM	BENCHMARK	PCC	POINT OF COMPOUND CURVE
BSW	BACK OF SIDEWALK	PG	PAD GRADE
BVC	BEGINNING OF VERTICAL CURVE	PHP	PLASTIC HIGH PRESSURE
C & G	CURB AND GUTTER	PI	POINT OF INTERSECTION
CF	CURB FACE	PL	PROPERTY LINE
CIP	CAST IRON PIPE	PP	POWER POLE
CL	CENTERLINE	PRC	POINT OF REVERSED CURVE
OMP	CORRUGATED METAL PIPE	PR/PROP	PROPOSED
CONC	CONCRETE	PT	POINT OF TANGENT
CONST	CONSTRUCT	PVC	POLY VINYL CHLORIDE PIPE
DC	DEPRESSED CURB	PVT	POINT OF VERTICAL INTERSECTION
DI	DROP INLET	PVM	PAVEMENT
DIA	DIAMETER	Q	RATE OF FLOW
DIP	DUCTILE IRON PIPE	RCP	REINFORCED CONCRETE PIPE
DMH	DROP MANHOLE	RT	RIGHT
EC	END OF CURVE	R/W	RIGHT-OF-WAY
ECR	END OF CURB RETURN	S	SANITARY SEWER
EL	ELEVATION	SD	STORM DRAIN
EP	ELECTRICAL PAD	SHP	STEEL HIGH PRESSURE
EX	EXISTING	SHT	SHEET
FC	FACE OF CURB	SP MH	SPECIAL MANHOLE
FF	FINISHED FLOOR	STA	STATION
FG	FINISH GRADE	STD	STANDARD
FH	FIRE HYDRANT	STL	STEEL
FL	FLOW LINE	SVZ	SIGHT VISIBILITY ZONE
G	GAS	SW	SIDEWALK
GB	GRADE BREAK	T	TANGENT DISTANCE OR TELEPHONE
HGT	HIGH OR HEIGHT	TC	TOP OF CURB
HOR	HORIZONTAL	TMH	TOP OF MANHOLE
HP	HIGH POINT	TP	TELEPHONE PAD
ID	INSIDE DIAMETER	TSV	TRAFFIC STREET LIGHT VAULT
INV	INVERT	TSW	TOP OF SIDEWALK
LAT	LATERAL	VC	VERTICAL CURVE
LF	LINEAL FEET	VCP	VITRIFIED CLAY PIPE
LT	LEFT	VERT	VERTICAL
MAX	MAXIMUM	VG	VALLEY GUTTER
		WMB	WATER METER BOX

<u>PUBLIC</u>		<u>PRIVATE</u>	
3" ASPHALT PAVEMENT.....	697 SY	6" CONCRETE PAVEMENT.....	58200 SF
TYPE II.....	100 CY	"L" TYPE CURB.....	503 LF
"L" TYPE CURB.....	351 LF	"A" TYPE CURB.....	2733 LF
COMMERCIAL DRIVEWAY.....	1373 SF	4" SIDEWALK.....	4494 SF
VALLEY GUTTER.....	392 SF	6" PVC SEWER.....	76 LF
4" SIDEWALK.....	2685 SF	2" PVC WATER.....	66 LF
SIDEWALK DRAIN.....	3 EA	6" PVC WATER.....	62 LF
SIDEWALK RAMP.....	5 EA	STREET SIGN.....	4 EA
1-1/2" PVC WATER.....	6 LF	6" RPPA.....	1 EA
1-1/2" METER SERVICE.....	1 EA	1-1/2" RPPA.....	1 EA
6" PVC WATER.....	6 LF		
6" RPPA.....	1 EA		
FIRE HYDRANT ASSEMBLY.....	1 EA		
STREET LIGHT.....	3 EA		
1-1/4" STREETLIGHT CONDUIT.....	275 LF		
4" FAST CONDUIT.....	282 LF		
STREET SIGN.....	4 EA		
PAVEMENT STRIPING.....	180 LF		
CROSSWALK FILM.....	280 SF		
24" STORM DRAIN.....	51 LF		
20' TYPE C DROP INLET (MOD).....	1 EA		

[illegible]

OWNER/DEVELOPER

CORY LLC
6003 MCLEOD DR., LAS VEGAS, NV 89120-3454

ENGINEERING FIRM

LAS VEGAS CIVIL ENGINEERING
22551 NORTH RAMPAFT BLVD. NO. 418, LAS VEGAS, NEVADA 89128
P. 702-515-6741 F. 702-515-6771

SHEET TITLE	NOTE SHEET
PROJECT NAME	TIFFANY PLACE 2
PROJECT ADDRESS	APN'S 138-36-406-002 AND -003
MUNICIPALITY	CITY OF LAS VEGAS, NEVADA

DRAWN BY: JRD	DESIGNED BY: JRD	CHECKED BY: JRD	LVC# PROJ. NO. TIFFANY 2
HORIZONTAL SCALE N/A			
VERTICAL SCALE N/A			



1/17/20
SHT
C2
2 OF 6
CLV NO.
TBD

AVOID HITTING UNDERGROUND TRAFFIC SIGNAL
SYSTEMS AND STREET LIGHT SYSTEM CONDUITS IT'S
COSTLY

UNDERGROUND

100 before you

100 20 UnderGround

1-702-432-5300

FREeway AND ARTERIAL
SYSTEM OF TRANSPORTATION

AVOID CUTTING UNDERGROUND
UTILITY LINES. IT'S COSTLY.

Call
before you
Dig

1-800-227-2600

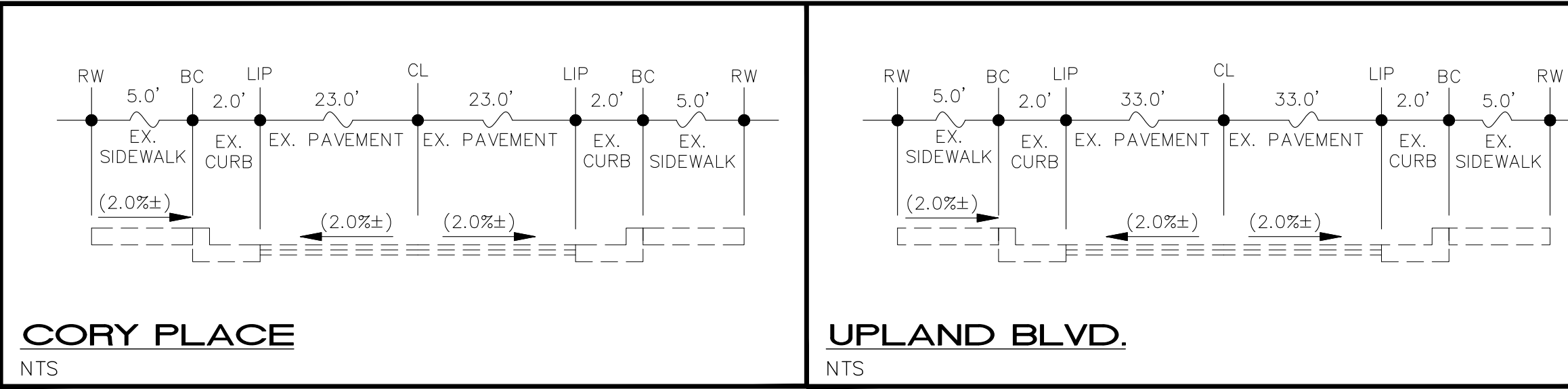
UNDERGROUND SERVICE (USA)

AVOID OVERHEAD POWER LINE CONTACT.

Call
before you
Overhead

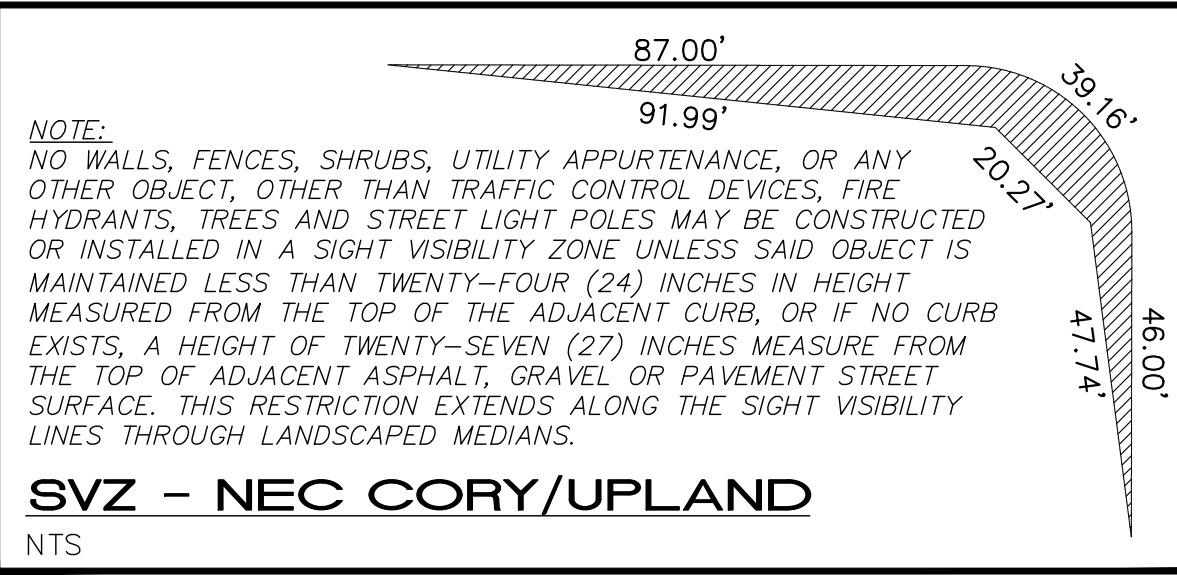
1-702-227-2929

NEVADA POWER ENVIRONMENT
SAFETY SERVICES DEPARTMENT

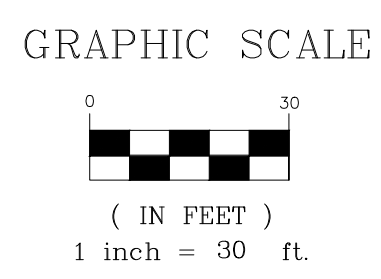
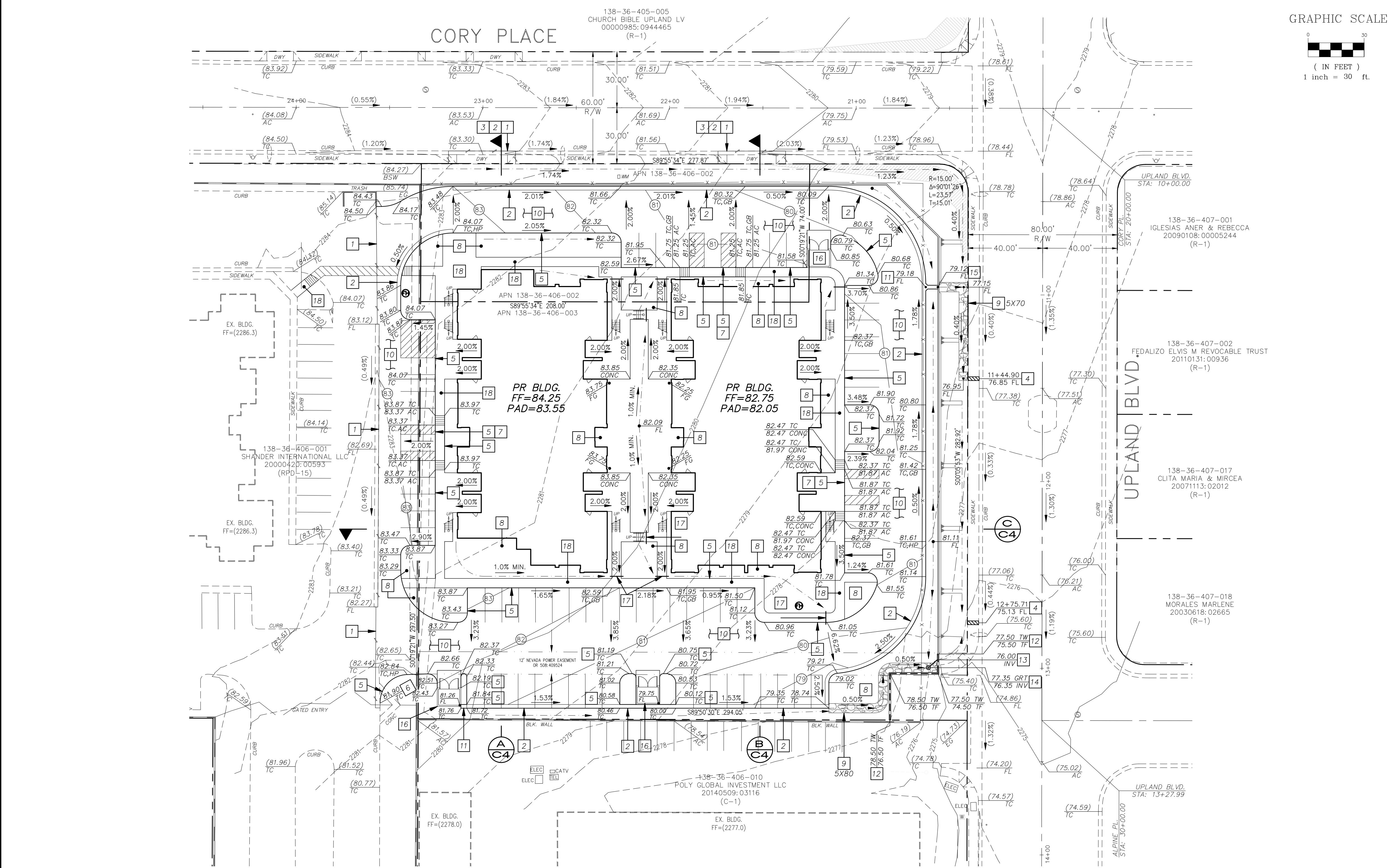


CORY PLACE
NTS

UPLAND BLVD.
NTS



SVZ - NEC CORY/UPLAND
NTS



- ### GRADING NOTES
- SAW CUT TO A NEAT LINE, REMOVE DEBRIS AND PREPARE FOR IMPROVEMENTS.
 - CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD 216.
 - CONSTRUCT SIDEWALK PER CCAUSD 234.
 - CONSTRUCT SIDEWALK DRAIN PER CCAUSD 236.
 - CONSTRUCT "A" TYPE CURB PER CCAUSD 219.
 - TIE INTO EXISTING.
 - 0-INCH CURB FACE.
 - LANDSCAPE BY OTHERS.
 - CONSTRUCT BMP SWALE, d50=3-INCH, t=6-INCH PER DETAIL 1 SHEET C4. SEE TAG FOR LXW.
 - CONSTRUCT 3.5-INCH AC OVER 6-INCH TYPE II BASE COMPACTED TO 95% DENSITY PER THE PROJECT SOILS STUDY.
 - CONSTRUCT CONCRETE FLUME PER DETAIL 2 SHEET C4.
 - CONSTRUCT 3-FOOT MAX. RETAINING WALL BY OTHERS.
 - INSTALL 5LF OF 8-INCH PERFORATED PVC STORM DRAIN @ 7.0% DISCHARGE 6-INCHES ABOVE FINISH GRADE. SEE DETAIL 3 SHEET C4.
 - CONSTRUCT LANDSCAPE CATCH BASIN PER DETAIL 3 SHEET C4.
 - CONSTRUCT BLOCK WALL OPENING PER DETAIL 4 SHEET C4.
 - TRASH ENCLOSURE - SEE ARCH PLANS. DISCHARGE FLOW AT REAR WHERE NOTED BY FLOW LINE ELEVATION; OTHERWISE DISCHARGE FLOW AT FRONT.
 - DRAINAGE BYPASS (TYPICAL) - SEE LANDSCAPE PLANS.
 - INSTALL 4" SLAB ON GRADE.

AVOID HITTING UNDERGROUND TRAFFIC SIGNALS, SIGNALS AND STREET LIGHT SYSTEM (CONDUCT PVT SURVEY)

Call before you Dig

1-702-432-5300

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.

Call before you Dig

1-800-227-2600
NEVADA POWER ENVIRONMENT
UNDERGROUND SERVICE (USA)

AVOID OVERHEAD POWER LINE CONTACT.

Call before you Overhead

1-702-227-2929
NEVADA POWER ENVIRONMENT
SAFETY SERVICES DEPARTMENT

FLOOD ZONE

THIS SITE IS IN THE 100 YEAR FLOOD PLAIN AND HAS BEEN DESIGNATED AS ZONE X ON F.I.R.M. PANEL NO. 32003C2165 DATED NOVEMBER 16, 2011 BY F.E.M.A.. A ZONE X IS AN AREA DETERMINED OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLANE.

SOILS STUDY

GRADING TO CONFORM TO SOILS REPORT NO. G-19-184 BY NOVA GEOTECHNICAL DATED 9/24/20.

BENCHMARK

CITY OF LAS VEGAS BENCH MARK NO. K367

USC&GS BRASS CAP TOP CURB N. SIDE OF CHARLESTON BLVD. 300 +/- E. OF UPLAND BLVD. TOWNSHIP, RANGE, SECTION T20S R60E S36

ELEVATION 691.388 (METERS)// 2268.33 (FEET) NAVD88

BASIS OF BEARING

S89°45'28"E, BEING THE CENTERLINE OF CHARLESTON BLVD AS SHOWN IN FILE 57, PAGE 31 OF SURVEYS, CLARK COUNTY, NEVADA OFFICIAL RECORDS.

DRAINAGE CERTIFICATION

I CERTIFY THIS GRADING PLAN CONFORMS WITH THE APPROVED DRAINAGE STUDY FOR THIS PROJECT ON FILE AT THE CITY OF LAS VEGAS: XXX-XXX.

G. J. BL

DATE _____

OWNER/DEVELOPER	CORY LLC	6003 MCLEOD DR. LAS VEGAS, NV 89120-3454
ENGINEERING FIRM	LAS VEGAS CIVIL ENGINEERING	2251 NORTH RAMPART BLVD. NO. 418 LAS VEGAS, NEVADA 89128 P: 702-515-6741 F: 702-515-6771
SHEET TITLE	GRADING PLAN	
PROJECT NAME	TIFFANY PLACE 2	
PROJECT ADDRESS	APN'S 138-36-406-002 AND -003	
MUNICIPALITY	CITY OF LAS VEGAS, NEVADA	
DRAWN BY:	JRD	
DESIGNED BY:	JRD	
CHECKED BY:	JRD	
HORIZONTAL SCALE	1"=30'	
VERTICAL SCALE	N/A	
LIVE PROJ. NO.	TIFFANY 2	
DATE	1/17/20	
SHT	C3	3 OF 6
CLV NO.	TBD	

OWNER/DEVELOPER	CORY LLC 6003 MCLEOD DR., LAS VEGAS, NV 89120-3454
ENGINEERING FIRM	LAS VEGAS CIVIL ENGINEERING 22551 NORTH RAMPART BLVD. NO. 418, LAS VEGAS, NEVADA 89128 P: 702-515-6741 F: 702-515-6771



- NTS

CLV NO.
TBD