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TECHNICAL DRAINAGE STUDY
FOR
LIVING GRACE FOURSQUARE CHURCH

APRIL 2021
Project No: 200279

Prepared by:

ACG Design
4310 Cameron St, Suite 12-A
Las Vegas, NV 89103

Prepared for:

Church International Foursquare Gospel
2400 N. Michael Way
Las Vegas, NV 89108

4/9/2021

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

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

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

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

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

II. GRADING PLAN INFORMATION		
Yes	No	
n/a		Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains.
X		All existing and "to be constructed" walls with cross-sections showing wall type, (e.g. block wall, retaining wall, flood wall, etc.), with limits clearly defined, adjacent ground elevations. Wall heights must meet current ordinances and in no case exceed 14 feet above the adjacent property.
X		Street slopes for both interior and perimeter streets. Note: The minimum slope for a roadway is 0.4 percent, a minimum 18-inch storm drain must be provided where minimum slopes cannot be met.
X		Back of lot elevations and lot drainage pattern for all lots including common lots.
n/a		Sites with a grade difference two feet above or below existing ground are required to have approval from City of Las Vegas Current Planning. Current Planning approval is required prior to final approval of the drainage study.
X		On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners. (The project must pass flows through the site every 600 feet where the project is blocking flow paths.)
n/a		This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included.
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	
n/a		Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
n/a		Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
n/a		The limits of the flood zones and the base flood elevations (BFE) must be shown on all grading plans for all developments within a Special Flood Hazard Zone A, AO, AE, etc.
X		Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections.
X		Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

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

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

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

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: LIVING GRACE FOURSQUARE CHURCH Date: 04/07/21

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

East/West: Smoke Ranch

b) Section: 13 Township: 20 S Range: 60E

c) APN : 138-13-403-001

Name of Owner: Church International Foursquare Gospel

Telephone No.: Fax No.: N A E-Mail Address:

Address: 2400 N. Michael Way Las Vegas NV 89108

Contact Person-Name: Hailey Shinton **Telephone No.:** 702-931-2992

* **E-Mail Address:** hshinton@acg.design **Fax No.:** N.A

Firm: ACG DESIGN

Address: 4310 CAMERON STREET. SUITE 12-A. LAS VEGAS 89103

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	X	Building Permit		

1. Total Owned Land Area: At Site: 2.50 ACRES Being Developed/Disturbed: 2.5 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.): Commerical
5. Approximate upstream land area which drains to the subject site: 0 ACRES
6. Has the site drainage been evaluated in the past? ☐ **YES** X **NO** If yes, please identify documentation:
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Smoke Ranch Road (neglible) and Michael Way
8. Briefly describe your proposed schedule for the subject project: ASAP

4/9/2021
Engineer's Seal

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

***New Required Field**

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

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Living Grace Foursquare Church	Map ID: 138-13-403-001
Firm Name: ACG DESIGN	Engineer: RANDOLPH SKORPINSKI
Address: 4310 CAMERON STREET, SUITE 12-A	
City: LAS VEGAS State: NV Zip: 89131	
Phone Number: 702-569-9157	Fax Number: N/A
Property Owner: **Church International Foursquare**	
Address: **2400 N. Michael Way Las Vegas, NV 89108**	
City: State: Zip:	

Reviewed By:	Date Received:	Date Accepted for Review:

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

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

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

I. GENERAL REQUIREMENT

Yes	No	
X		Design Manual **Standard Form 1** with the engineer's seal and signature.
X		Design Manual **Standard Form 4**.
X		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	
X		A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
X		A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

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

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes / N/A	No	
_____	_____	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.
X	_____	Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
X	_____	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
X	_____	Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

Yes	No	
X	_____	Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
X	_____	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.
X	_____	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.
X	_____	Use of correct precipitation values in and around the McCarran Airport rainfall area.
X	_____	A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
X	_____	A summary table of stormwater flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where applicable.
X	_____	Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
X	_____	On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.
X	_____	Calculation for impervious area for parking lots and LIDs (if required).

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

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

REFERENCE:	**STANDARD FORM 2**

LAS VEGAS CITY COUNCIL

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Mayor

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Mayor Pro Tem

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cityoflasvegas
lasvegasnevada.gov

September 9, 2020

First Thai-Loatian Presbyterian Church
2744 Childress Drive
Las Vegas, Nevada 89134

RE: 20-0071-SUP1 AND 20-0071-SDR1
PLANNING COMMISSION MEETING OF SEPTEMBER 8, 2020

Dear Applicant:

The Planning Commission at a regular meeting held on *September 8, 2020* voted to recommend ***APPROVAL*** of the following Land Use Entitlement project requests on 2.50 acres at 2400 North Michael Way (APN 138-13-403-001), R-E (Residence Estates) Zone, Ward 5 (Crear).

20-0071-SUP1 - FOR A CHURCH/HOUSE OF WORSHIP USE.

20-0071-SDR1 - FOR A 16,870 SQUARE-FOOT CHURCH/HOUSE OF WORSHIP.

This approval is subject to the following conditions:

20-0071-SUP1 CONDITIONS

Planning

1. Conformance to all Minimum Requirements under LVMC Title 19.12 for a Church/House of Worship use.

2. Approval of and conformance to the Conditions of Approval for Site Development Plan Review (20-0071-SDR1) shall be required, if approved.

3. 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.

4. 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.

5. These Conditions of Approval shall be affixed to the cover sheet of any plan set submitted for building permit, as well as submitted as part of any business license application.

6. Prior to or at the time of submittal for any building permit, the applicant shall provide written verification by the FAA and/or the Clark County Department of Aviation of the following:
   - Applicant is required to file a valid FAA Form 7460-1, "Notice of Proposed Construction or Alteration" with the FAA, in accordance with 14 CFR Part 77, or submit to the Clark County Director of Aviation a "Property Owner's Shielding Determination Statement" and request written concurrence from the Clark County Department of Aviation;
   - No Building Permit or other construction permit shall be issued for any structure greater than 35 feet above the surface of land that, based upon the FAA's 7460 airspace determination (the outcome of filing the FAA Form 7460-1) would (a) constitute a hazard to air navigation, (b) would result in an increase to minimum flight altitudes during any phase of flight (unless approved by the Department of Aviation), or (c) would otherwise be determined to pose a significant adverse impact on airport or aircraft operations.
   - Applicant is advised that FAA's airspace determinations are dependent on petitions by any interested party and the height that will not present a hazard as determined by the FAA may change based on these comments.

7. All City Code requirements and design standards of all City departments must be satisfied, except as modified herein.

20-0071-SDR1 CONDITIONS

Planning

1. Approval of and conformance to the Conditions of Approval for Special Use Permit (20-0071-SUP1) 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 on 08/24/20, and the building elevations date stamped on 09/02/20, except as amended by conditions herein.

4. An Exception from 19.06.0400 is hereby approved to allow 24-inch box trees to be planted at 35 feet on center where 20 feet is required along right-of-way lines.

5. 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.

6. These Conditions of Approval shall be affixed to the cover sheet of any plan set submitted for building permit.

7. 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, which 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.

8. 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.

9. Prior to or at the time of submittal for any building permit, the applicant shall provide written verification by the FAA and/or the Clark County Department of Aviation of the following:
   - Applicant is required to file a valid FAA Form 7460-1, "Notice of Proposed Construction or Alteration" with the FAA, in accordance with 14 CFR Part 77, or submit to the Clark County Director of Aviation a "Property Owner's Shielding Determination Statement" and request written concurrence from the Clark County Department of Aviation;
   - No Building Permit or other construction permit shall be issued for any structure greater than 35 feet above the surface of land that, based upon the FAA's 7460 airspace determination (the outcome of filing the FAA Form an increase to minimum flight altitudes during any phase of flight (unless approved by the Department of Aviation), or (c) would otherwise be determined to pose a significant adverse impact on airport or aircraft operations.7460-1) would (a) constitute a hazard to air navigation, (b) would result in
   - Applicant is advised that FAA's airspace determinations are dependent on petitions by any interested party and the height that will not present a hazard as determined by the FAA may change based on these comments.
   - Applicant is advised that the FAA's airspace determinations include expiration dates and that the separate airspace determinations will be needed for construction cranes or other temporary equipment.

10. All City Code requirements and design standards of all City Departments must be satisfied, except as modified herein.

Public Works

11. Prior to the issuance of any permits, dedicate an additional 10-feet of right-of-way for a total half street width of 40-feet on Michael Way and the right turn lane/bus turnout on Smoke Ranch Road as shown on the site plan. Additionally, grant a Bus Shelter Pad Easement on Smoke Ranch Road adjacent to this site prior to the issuance of permits unless the Regional Transportation Commission (RTC) acknowledges in writing that this easement is not required.

12. Construct all incomplete half-street improvements on Michael Way meeting current City Standards 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.

13. The sidewalk along Smoke Ranch Road adjacent to this site shall meet Public Right-of-Way Accessibility Guidelines (PROWAG) in accordance with code requirements of Title 13.56.040 to the satisfaction of the City Engineer concurrent with development of this site.

14. This site shall connect to the public sewer line in Michael Way.

15. Submit a License Agreement for landscaping and private improvements in the 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.

16. 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.

This item will be considered by the City Council on ***October 21, 2020***. This meeting will be held at 9:00 A.M. at the Council Chambers of City Hall, 495 South Main Street, Las Vegas, Nevada. ***The Council requires that you or your representative be present at this meeting.*** If you or your representative chooses not to attend, the City Council may act in your absence without your input.

Sincerely,

Eric McCammond
Senior Management Analyst
Case Planning Division

EM:nl

cc:

Pastor Richard Box
Living Grace Fourquare Church
3013 North Rancho Drive, Ste. 128
Las Vegas, Nevada 89130

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I. INTRODUCTION

Church International Foursquare Gospel is proposing commercial development at the northwest corner of Smoke Ranch Road and Michael Way within City of Las Vegas. The purpose of this report is to present a detailed hydrologic and hydraulic analysis for the existing and developed onsite and offsite conditions and determine adequate protection for the project from offsite and onsite flows. The following tasks were performed in the preparation of this report:

- Identify previous drainage studies for the project site and surrounding areas.
- Identify the FEMA floodplain designation for the project site.
- Identify existing and proposed regional drainage facilities adjacent to the site.
- Estimate runoff generated for the peak 10-year, and 100-year return period storms for existing and proposed conditions.
- Recommend drainage facilities to protect the site from storm runoff.

II. LOCATION AND DESCRIPTION

The project site is located in Section 13, Township 20 South, Range 60 East, M.D.M., within Las Vegas, Nevada. The Assessor's Parcel Number is 138-13-403-001. The site is bordered on the North and West by existing residential development, the East by Michael Way, and the South by Smoke Ranch Road. Please refer to **Figures 1 and 2** for the vicinity and location of the project site. The existing site is comprised of undeveloped land. The project site generally slopes east. The existing site consists of approximately 2.5 acres zoned Residence Estates District (R-E).

III. FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD HAZARD ANALYSIS

The Special Flood Hazard Areas (SFHA) for Clark County, Nevada and incorporated areas are outlined in the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps. The project site lies within FIRM Community Panel 32003C2155F. Per the FIRM panel, the site lies in unshaded Zone X, areas determined to be outside 0.2% annual chance floodplain. Refer to **Figure 3** for FIRM Panel.

IV. CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT (CCRFCD) FACILITIES

Figure 4A and 4B are reproduced from Figure F-24 of the 2018 Clark County Regional Flood Control District (CCRFCD) Master Plan Update (Reference 3). This figure depicts the project site in relation to existing and proposed CCRFCD Facilities. As shown on the figure, the site is adjacent to existing and proposed CCRFCD Facilities. A 54" RCP currently existing within Smoke Ranch Road that is designed to contain 1,483 cfs. Future improvements propose to replace the existing 54" RCP with a 10' x 8' RCB, which is also designed to contain 1,483 cfs.

V. REVIEWED/REFERENCED DRAINAGE STUDIES

While numerous drainage studies were reviewed for the area, they are over twenty years old and not utilized as reference material for the subject drainage study.

FIGURE 1

VICINITY MAP

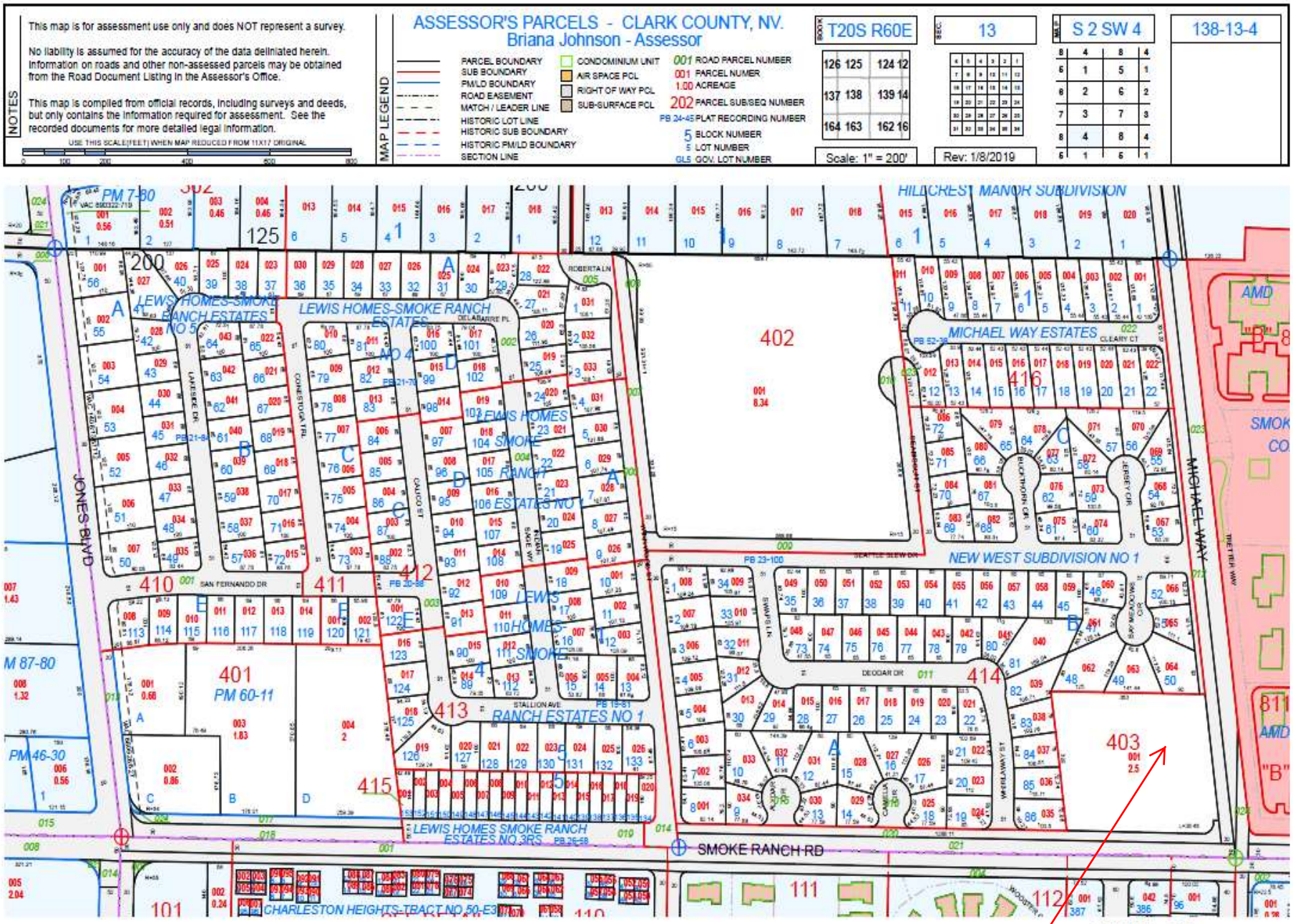

NOTES
This map is for assessment use only and does NOT represent a survey.
No liability is assumed for the accuracy of the data delineated herein. Information on roads and other non-assessed parcels may be obtained from the Road Document Listing in the Assessor's Office.
This map is compiled from official 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
MAP LEGEND
ASSESSOR'S PARCELS - CLARK COUNTY, NV.
Briana Johnson - Assessor
PARCEL BOUNDARY
SUB BOUNDARY
PM/LD BOUNDARY
ROAD EASEMENT
MATCH / LEADER LINE
HISTORIC LOT LINE
HISTORIC SUB BOUNDARY
HISTORIC PM/LD BOUNDARY
SECTION LINE
CONDOMINIUM UNIT
AIR SPACE PCL
RIGHT OF WAY PCL
SUB-SURFACE PCL
001 ROAD PARCEL NUMBER
001 PARCEL NUMER
1.00 ACREAGE
202 PARCEL SUB/SEQ NUMBER
PB 24-45 PLAT RECORDING NUMBER
5 BLOCK NUMBER
5 LOT NUMBER
GLS GOV. LOT NUMBER
BOOK T20S R60E
SEC. 13
MAP S 2 SW 4
138-13-4
Scale: 1" = 200'
Rev: 1/8/2019
HILLCREST MANOR SUBDIVISION
MICHAEL WAY ESTATES
NEW WEST SUBDIVISION NO 1
LEWIS HOMES-SMOKE RANCH ESTATES NO 5
LEWIS HOMES-SMOKE RANCH ESTATES NO 4
LEWIS HOMES SMOKE RANCH ESTATES NO 1
LEWIS HOMES SMOKE RANCH ESTATES NO 3RS
CHARLESTON HEIGHTS-TRACT NO 50-E
JONES BLVD
MICHAEL WAY
SMOKE RANCH RD
SAN FERNANDO DR
ROBERTA LN
DEODAR DR
STALLION AVE
SKY MEADOWS DR
PM 7-80
PM 87-80
PM 60-11
PM 46-30
PROJECT SITE
TAX DIST 200

FIGURE 2

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC–3, #9202
1315 East–West Highway
Silver Spring, MD 20910–3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713–3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the Clark County GIS Management Office (GISMO).

This map reflects more detailed and up–to–date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de–annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

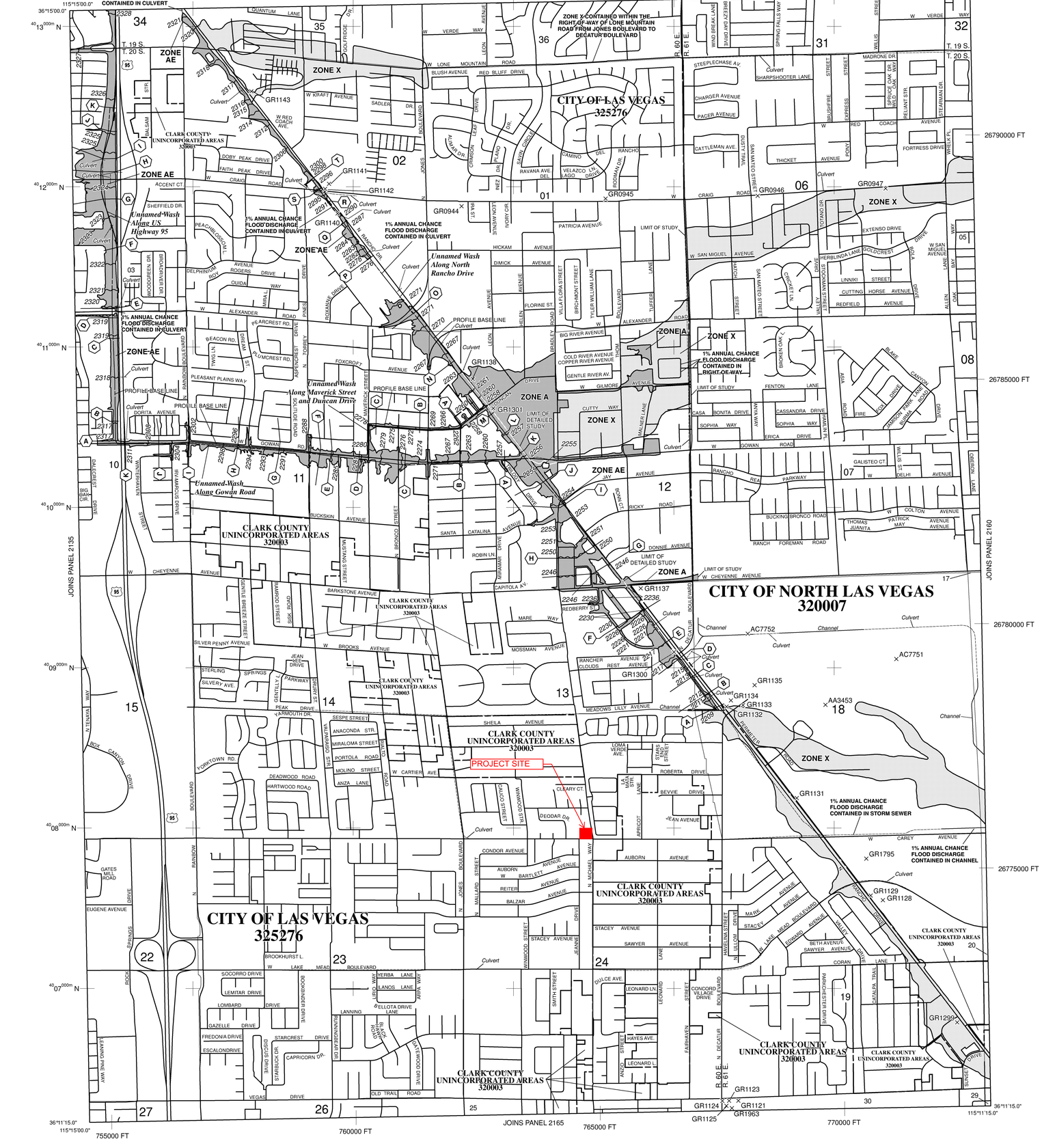
For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

The Digital Flood Insurance Rate Map (DFIRM) was produced through a unique partnership between Clark County and the Federal Emergency Management Agency (FEMA). Clark County has developed a long-term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the Clark County commitment to share and maintain floodplain layers within their Geographic Information System Management Office (GISMO).

This DFIRM reflects several innovative features. These include:
+ Southern Nevada GIS–Cooperation among local government agencies throughout Clark County. The foundation of cooperation is the GIS Interlocal Agreements formed between fourteen regional participants. In part, the agreements specify that the Clark County GIS Management Office (GISMO) will be responsible for maintaining a GIS data warehouse and associated Southern Nevada GIS metadata.

+ The GISMO's responsibilities go beyond maintaining the GIS data warehouse. GISMO also maintains the Street Centerline Database used by 911 dispatch services. This centerline database serves as the basemap for this DFIRM.

DIGITAL DATA AVAILABILITY: http://www.co.clark.nv.us/ceit/gismo/gismo.htm



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A Cross section line

23 — 23 Transect line

97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

4275000mN 1000-meter Universal Transverse Mercator grid ticks, zone 11

6000000 FT 5000-foot grid ticks: Nevada State Plane coordinate system, east zone (FIPSZONE 2701), Transverse Mercator

DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 16, 1995
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
September 27, 2002

November 16, 2011 –to reflect updated topographic information, to change floodway, to add Base Flood Elevations, to update corporate limits, to change Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to delete Special Flood Hazard Areas, to change zone designations, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1–800–638–6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2155F

FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2155 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY	320003	2155	F
LAS VEGAS, CITY OF	325276	2155	F
NORTH LAS VEGAS, CITY OF	320007	2155	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

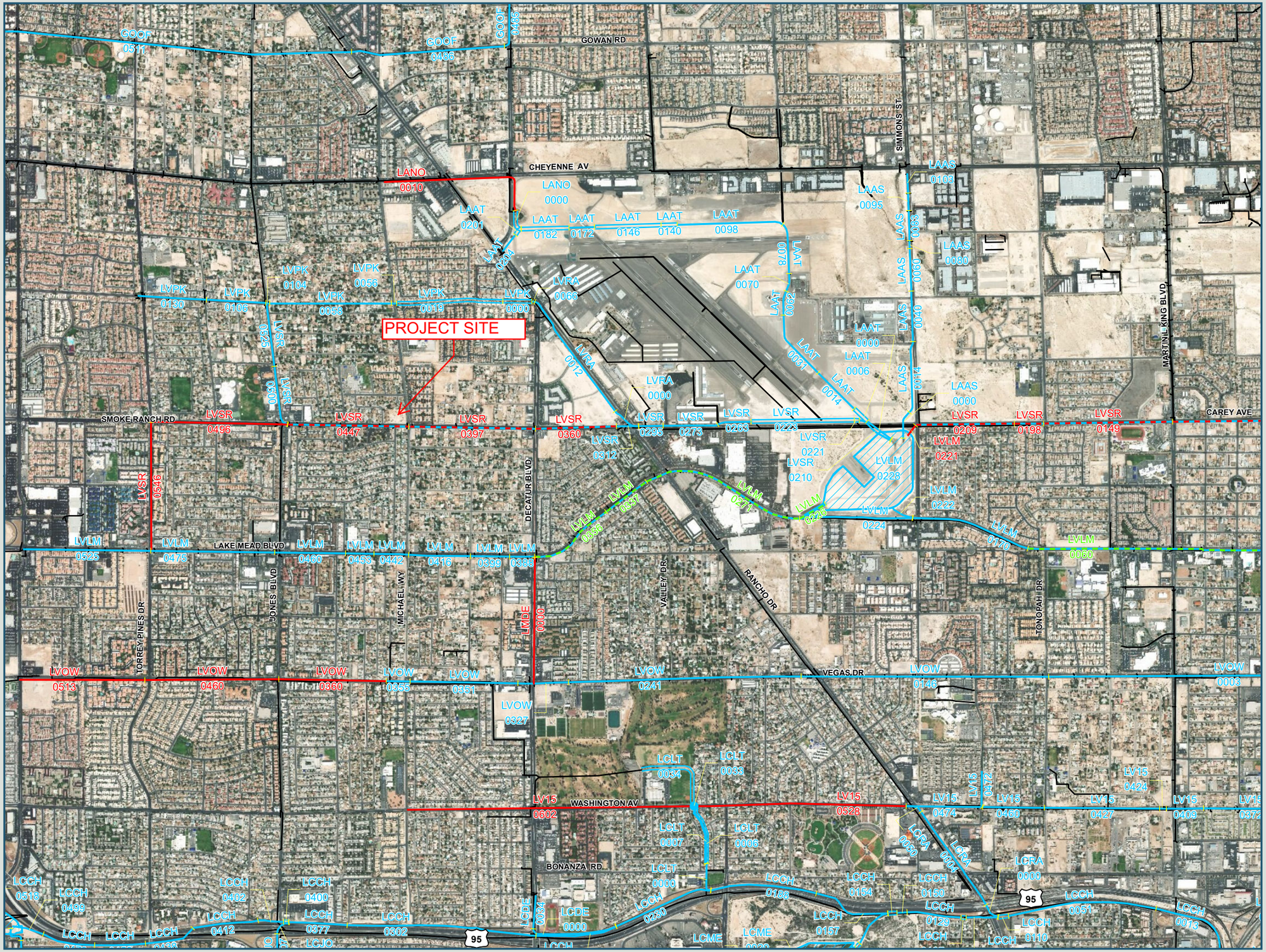
MAP NUMBER
32003C2155F

MAP REVISED
NOVEMBER 16, 2011

Federal Emergency Management Agency

REGIONAL FLOOD CONTROL DISTRICT

CLARK COUNTY NEVADA



REGIONAL FLOOD CONTROL DISTRICT

2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-24
FLOOD CONTROL FACILITIES

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Detention Basin
- Culvert or Bridge Crossing
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

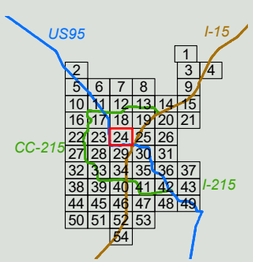
Category A	Category B
Channel	Channel
Stormdrain	Stormdrain
Crossing	Crossing

N

0 500 1,000 2,000 3,000
Feet

Scale: 1 inch = 2,000 feet

AerialSource:Esri World Imagery 2017



ATKINS
Member of the SNC-Lavalin Group

Louis Berger

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
GOOF		**GOWAN OUTFALL FACILITIES**						
0485	E	90" RCP	1080	630	DGOW2A	GOW3B	1.37	0.47
0486	E	8' X 5' RCB	3200	630	DGOW2A	GOW3B	1.37	0.60
0511	E	8' X 5' RCB	8390	740	CPT6B-C	GOW3B	1.08	0.50
LAAS		**NORTH LAS VEGAS AIR TERMINAL - SIMMONS**						
0000	E	14' X 6' RCB	580	728	CR2-CA	NW3	2.57	0.50
0014	E	9' X 6' RCB	1489	728	CR2-CA	NW3	2.57	1.44
0040	E	8' X 6' RCB	1111	728	CR2-CA	NW3	2.57	1.74
0060	E	10' X 6' RCB	864	728	CR2-CA	NW3	2.57	0.60
0080	E	66" RCP	157	294	R-C	NW3	0.27	0.50
0083	E	60" RCP	627	294	R-C	NW3	0.27	1.42
0095	E	54" RCP	373	294	R-C	NW3	0.27	1.44
0103	E	48" RCP	400	294	R-C	NW3	0.27	1.75
LAAT		**NORTH LAS VEGAS AIR TERMINAL**						
0000	E	3: 8' X 5' RCBC	650	1364	CB3-1	NW3	4.17	0.50
0006	E	CONC CHNL 20'W 8'D 1.5:1 SS	380	1364	CB3-1	NW3	4.17	0.50
0014	E	10' X 6' RCB	934	1364	CB3-1	NW3	4.17	1.84
0031	E	10' X 6' RCB	1618	1105	CB3-2	NW3	3.87	1.05
0062	E	12' X 8' RCB	511	1105	CB3-2	NW3	3.87	0.50
0070	E	12' X 6' RCB	376	1105	CB3-2	NW3	3.87	0.56
0078	E	10' X 6' RCB	1055	1105	CB3-2	NW3	3.87	0.58
0098	E	10' X 4' RCB	2207	696	CCA1-C	NW3	2.98	0.60
0140	E	CONC CHNL 6'W 4'D 1.5:1 SS	338	696	CCA1-C	NW3	2.98	0.64
0146	E	CONC CHNL 6'W 3'D 1.5:1 SS	1388	696	CCA1-C	NW3	2.98	0.68
0172	E	76" X 48" HERCP	536	494	CA1-C	NW3	2.77	0.75
0182	E	CONC CHNL 6'W 3'D 1.5:1 SS	997	494	CA1-C	NW3	2.77	0.83
0201	E	CONC CHNL 6'W 3'D 1.5:1 SS	184	494	CA1-C	NW3	2.77	0.37
0204	E	48" RCP	425	494	CA1-C	NW3	2.77	0.37
LANO		**NORTH LAS VEGAS AIR TERMINAL NORTH**						
0000	E	CONC CHNL 0'W 3'D 1.5:1 SS	470	494	CA1-C	NW3	2.77	0.30
0010	P	6' X 4' RCB	3375	211	DA1-C	NW3	2.46	1.13
LCCH		**LAS VEGAS CREEK CHANNEL**						
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
0188	E	2: 12' X 6' RCB	2225	1700	CCLC14-C	SW3	2.93	1.36
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	RAINBWDB	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

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LCLO		**LAS VEGAS CREEK - LORENZI**						
0008	E	7' X 6' RCB	2983	285	DAL00A	SW3	0.41	0.40
LCLT		**LAS VEGAS CREEK - LATERAL**						
0000	E	6' X 6' RCB	620	250	WA10D	SW3	0.40	0.50
0006	E	CONC CHNL 10'W 4'D 0:1 SS	1230	125^	WA10D^	SW3	0.40	0.62
0007	E	23" x 14" HERCP	1230	125^	WA10D^	SW3	0.40	0.62
0033	E	10' X 4' RCBC @ WASHINGTON	96	372	WA10-C	SW3	0.40	0.50
0034	E	GRASS CHNL 12'W 5'D 1:1 SS	1750	372	WA10-C	SW3	0.40	0.20
LCME		**LAS VEGAS CREEK - MEADOWS**						
0000	E	14' X 8' RCB	895	1484	MEADOWDB	SW3SC	5.67	0.72
0016	E	STILLING BASIN	140	1484	MEADOWDB	SW3SC	5.67	0.21
0017	E	3,300 CFS SPILLWAY (REPLACE W/ LCME0018)		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	
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
0050	E	8' X 6' RCB	355	694	WA13D	SW3	1.39	0.50
LMDE		**LAKE MEAD BOULEVARD - DECATUR BRANCH**						
0000	P	10' X 5' RCB	2640	673	DCVG04-C	NW3	1.25	0.90
LV15		**FREEWAY CHANNEL**						
0372	E	9' X 6' RCB	1970	1152	CWA20-C	NW3	4.52	0.66
0409	E	7' X 6' RCB	815	841	CVG07	NW3	4.09	0.91
0424	E	10' X 5' RCB	130	841	CVG07	NW3	4.09	0.40
0427	E	8' X 6' RCB	2411	841	CVG07	NW3	4.09	0.60
0460	E	6' X 5' RCB	1242	253	CCWA13-C	NW3	3.31	1.50
0472	E	60" RCP	713	410	WA15A-C	NW3	0.43	0.30
0474	E	5' X 5' RCB	1625	253	CCWA13-C	NW3	3.31	1.00
0528	P	8' X 8' RCB	4420	959	CWA13-C	SW3	1.39	1.19
0602	P	2: 66" RCP	5980	551	CWA09-C	SW3	0.63	1.59
LVLM		**LAS VEGAS WASH - LAKE MEAD**						
0059	E	72" RCP (REPLACE W/ LVLM0060)	5952	1159	CLM20-C	NW3SC	1.36	0.66
0060	P0	12' X 7' RCB (REPLACES LVLM0059)	5952	1159	CLM20-C	NW3SC	1.36	0.66
0170	E	78" RCP	2421	454	CLM16A-C	NW5	12.15	1.17
0221	P	48" RCP OUTLET	270	195	DR2	NW4	11.77	
0222	E	48" RCP OUTLET	500	368	DCAREY	NW4	11.77	
0224	E	36" RCP	2429					0.53
0225	E	90" RCP (REPLACE W/ LVLM0226)	641	2077	CLM10-C	NW3	3.01	1.35
0226	P0	2: 10' X 9' RCB (REPLACES LVLM0225)	641	2077	CLM10-C	NW3	3.01	0.50
0227	E	10,000 CFS PMF SPILLWAY		10000	CARYLMDB	NW4	11.77	
0228	E	607 AC-FT CAREY-LAKE MEAD DETENTION BASIN		5499	CARYLMIN	NW4	11.78	
0270	E	90" RCP (REPLACE W/ LVLM0271)	3473	2077	CLM10-C	NW3	3.01	1.35
0271	P0	12' X 8' RCB (REPLACES LVLM0270)	3473	2077	CLM10-C	NW3	3.01	1.35
0336	E	84" RCP (REPLACE W/ LVLM0337)	1050	1769	CLM06-C	NW3	2.60	1.16
0337	P0	12' X 8' RCB (REPLACES LVLM0336)	1050	1769	CLM06-C	NW3	2.60	1.16
0355	E	90" RCP (REPLACE W/ LVLM0356)	1840	1769	CLM06-C	NW3	2.60	0.40
0356	P0	12' X 11' RCB (REPLACES LVLM0355)	1840	1769	CLM06-C	NW3	2.60	0.40
0388	E	84" RCP	520	913	CLM05-C	NW3	1.00	1.40
0399	E	78" RCP	803	913	CLM05-C	NW3	1.00	1.07
0416	E	72" RCP	1320	913	CLM05-C	NW3	1.00	1.00
0442	E	60" RCP	725	591	CLM03-C	NW3	0.63	1.28
0453	E	54" RCP	589	591	CLM03-C	NW3	0.63	2.37
0460	E	54" RCP	1464	591	CLM03-C	NW3	0.63	2.05
0475	E	48" RCP	2632	242	LM02-C	NW3	0.29	1.24
0525	E	48" RCP	2600	565	CLM01-C	NW3	0.64	1.24
LVOW		**OWENS AVENUE SYSTEM**						
0003	E	96" RCP	7500	1219	CLM16B-C	NW3	2.43	0.70
0146	E	84" RCP	4800	570	DCVG20-C	NW3	2.04	0.90
0241	E	72" RCP	4832	416	CVG20-C	NW3	1.56	1.65
0327	E	7' X 5' RCB	360	416	CVG20-C	NW3	1.56	1.26
0351	E	72" RCP	2250	837	CVG04-C	NW3	1.25	1.44

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LVOW		**OWENS AVENUE SYSTEM**						
0355	E	8' X 5' RCB	491	837	CVG04-C	NW3	1.25	0.40
0360	P	8' X 6' RCB	2300	837	CVG04-C	NW3	1.25	1.48
0460	P	7' X 6' RCB	2700	615	CVG03-C	NW3	0.95	1.48
0513	P	6' X 5' RCB	2615	463	CVG02-C	NW3	0.68	1.68
LVPK		**PEAK DRIVE SYSTEM**						
0000	E	CONC CHNL 15'W 6'D 0:1 SS	606	1081	CPD04B-C	NW3	1.59	1.22
0019	E	CONC CHNL 20'W 5.5'D 0:1 SS	2190	1081	CPD04B-C	NW3	1.59	0.57
0056	E	10' X 5' RCB	103	723	CCY04A-C	NW3	1.12	0.40
0058	E	9' X 6' RCB	2542	723	CCY04A-C	NW3	1.12	0.95
0104	E	10' X 6' RCB	76	723	CCY04A-C	NW3	1.12	1.26
0106	E	7' X 5' RCB	1235	723	CCY04A-C	NW3	1.12	0.61
0130	E	7' X 5' RCB	1435	383	CPD01-C	NW3	0.67	0.61
LVRA		**LAS VEGAS WASH - RANCHO**						
0000	E	12' X 8' RCB	612	1438	CCPD04BC	NW3	3.77	1.56
0012	E	12' X 8' RCB	2838	1438	CCPD04BC	NW3	3.77	0.78
0066	E	14' X 5' RCB	65	1438	CCPD04BC	NW3	3.77	1.22
LVSR		**LAS VEGAS WASH - SMOKE RANCH**						
0070	E	66" RCP (REPLACE W/ LVSR0071)	4118	1086	CS1-C	NW3SC	1.42	0.73
0071	P	10' X 8' RCB (REPLACES LVSR0070)	4118	1086	CS1-C	NW3SC	1.42	0.73
0148	E	54" RCP (REPLACE W/ LVSR0149)	2587	823	CS	NW3SC	0.95	0.58
0149	P	11' X 6' RCB (REPLACES LVSR0148)	2587	823	CS	NW3SC	0.95	0.58
0197	E	30" RCP (REPLACE W/ LVSR0198)	581	368	CR2-C	NW3SC	0.38	0.86
0198	P	8' X 4' RCB (REPLACES LVSR0197)	581	368	CR2-C	NW3SC	0.38	0.86
0208	E	54" RCP (REPLACE W/ LVSR0209)	2060	368	CR2-C	NW3SC	0.38	1.41
0209	P	7' X 4' RCB (REPLACES LVSR0208)	2060	368	CR2-C	NW3SC	0.38	1.41
0210	E	14' X 8' RCB	800	3092	CB1-C	NW3	6.34	1.73
0221	E	TRANSITION STRUCTURE	100	3092	CB1-C	NW3	6.34	7.08
0223	E	CONC CHNL 14'W 8'D 1.5:1 SS	2150	3092	CB1-C	NW3	6.34	0.96
0263	E	14' X 8' RCB	707	3092	CB1-C	NW3	6.34	0.63
0273	E	11' X 11' RCB	1140	3092	CB1-C	NW3	6.34	0.92
0295	E	11' X 11' RCB	510	2868	CCSR05B	NW3	6.06	2.85
0312	E	8' X 8' RCB	460	1652	CSR05B	NW3	2.30	1.63
0359	E	66" RCP (REPLACE W/ LVSR0360)	1690	1652	CSR05B	NW3	2.30	0.67
0360	P	10' X 10' RCB (REPLACES LVSR0359)	1690	1652	CSR05B	NW3	2.30	0.75
0396	E	60" RCP (REPLACE W/ LVSR0397)	2640	1483	CSR05D	NW3	1.94	1.14
0397	P	10' X 9' RCB (REPLACES LVSR0396)	2640	1483	CSR05D	NW3	1.94	0.87
0446	E	54" RCP (REPLACE W/ LVSR0447)	2530	1483	CSR05D	NW3	1.94	1.14
0447	P	10' X 8' RCB (REPLACES LVSR0446)	2530	1483	CSR05D	NW3	1.94	1.25
0496	P	10' X 7' RCB	2855	1245	CSR02E	NW3	1.64	1.27
0500	E	60" RCP	1290					1.97
0525	E	54" RCP	1340					0.30
0546	P	8' X 9' RCB	2640	781	CSR00A	NW3	1.01	0.57

*The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.
**As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.
^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e. HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).

REGIONAL FLOOD CONTROL DISTRICT

2018 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F-24

LEGEND

ID (Facility Identifier) AABB
Parent Stream Name
Stream Name
Mile 0000
Distance Above Confluence with Parent Stream (Miles)
Miles in Hundredths

Existing Facility.....E
Proposed or Modified Facility.....P
Contingency Level
Category A.....P
Category B.....P0

Bottom Width..... W
Depth..... D
Side Slope, H:V..... SS

Construction Features

Cast in Place Concrete Pipe	CIPCP	Reinforced Concrete Arch Culvert	RCAC
Corrugated Metal Arch Pipe Culvert	CMAP	Reinforced Concrete Box	RCB
Corrugated Metal Pipe Culvert	CMPC	Reinforced Concrete Box Culvert	RCBC
High Density Polyethylene	HDPE	Reinforced Concrete Pipe	RCP
Horizontal Elliptical Reinforced Concrete Pipe	HERCP	Reinforced Concrete Pipe Culvert	RCPC
Reinforced Concrete Arch Pipe	RCAP	Storm Sewer Pipe	SSP

ATKINS
Member of the SNC-Lavalin Group
Louis Berger

VI. HYDROLOGY

The methodology presented in this study is in compliance with the CCRFCD Hydrologic Criteria and Drainage Design Manual (Reference 3, hereinafter referred to as the Manual).

The existing and developed drainage basins were determined from aerial photography, field investigations and boundary and topographical survey. The watersheds were modeled using the SCS Unit Hydrograph method within the U.S. Army Corps of Engineers HEC-1 Flood Hydrograph Package.

Precipitation - The project site is located within the McCarran Rainfall Area as identified in the Manual, Figure 513. The 6-hour depths used for the HEC-1 analysis are 1.58 inches for the 10-year storm event and 2.77 inches for the 100-year storm event, per Rainfall Depth-Duration-Frequency Table 505. Reference material has been provided in Appendix C.

Curve Numbers (CN) – The project site is within Hydrologic Soils Group D.

For the Existing condition, the CN value of 88 for the subject site was determined per Table 602, 1 of 4 of the Manual. For the Developed condition, the CN value of 95 for the subject site was utilized using Table 602, 1 of 4 of the Manual.

Drainage Areas and Flow Patterns - The subbasins and flow patterns used for the hydrologic modeling were determined from digital grading and design files for site.

Onsite & Offsite Basin Analysis – Two conditions were utilized to estimate onsite and offsite flows impacting the proposed site. The conditions are Existing and Developed, which are further explained. No further development is anticipated within the area after this project is completed.

Lag Time - The lag time (TLAG) is described as the time between the center of mass of rainfall and the time of peak discharge from a basin. Lag Time can be related to time of concentration (Tc) by the following relationship: TLAG = 0.6 (Tc). The time of concentration (Tc) is defined as the time required for runoff to flow from the most hydraulically distant area of the basin to the outlet of the basin or a design point. The procedure for calculating (Tc) is outlined in Section 602 of the Manual. Lag Time calculations for the drainage subbasins have been included in Appendix A on Standard Form 4.

VII. EXISTING CONDITION

For the Existing condition, the hydrologic analysis consists of 1 onsite basin and two offsite basins. The site generates a total of 6 cfs under Existing Conditions for the 100-year storm event. **Figure 5** depicts the basins and drainage patterns used in the Existing Conditions hydrologic analysis. An Existing Condition HEC-1 model has been included in Appendix A. **Table 1** summarizes the HEC-1 results for Existing Conditions.

The first offsite basin, SMOKE RANCH, represents the flow within Smoke Ranch Road, adjacent to the subject site. The existing flow within Smoke Ranch Road was determined per the City of Las Vegas Northwest Neighborhood Study, Figure E-16. The flow prior to the intersection of Michael Way is 263 cfs and 866 cfs for the 10-year and 100-years storm respectively. The existing facility within Smoke Ranch Road captures 231 cfs within the existing storm drain system, therefore the surface flow within Smoke Ranch Road is 32-cfs and 635-cfs for the 10-year and 100-year storm flows.

The second offsite basin, MICHAEL, represents the flow within Michael Way, adjacent to the subject site. The existing flow within Michael Way prior to the intersection of Smoke Ranch Road was determined per the City of Las Vegas Northwest Neighborhood Study, Figure E-16. Only half street improvements within the existing condition, there is no curb, gutter or sidewalk on the west side of Michael Way. The flow prior to the intersection of Michael Way is 36 cfs and 83 cfs for the 10-year and 100-years storm respectively.

Onsite basin, EX1, represents the subject site, existing flow is conveyed west to east towards Michael Way. The calculated flows are 3-cfs and 6-cfs for the 10-year and 100-year storm events, respectively.

Table 1: Summary of Existing Conditions

BASIN	AREA (AC)	Q_{10} (cfs)	Q_{100} (cfs)
SMOKE RANCH	n/a	263	866
MICHAEL	n/a	36	83
EX1	2.50	3	6

Existing Condition Street Flow Summary:

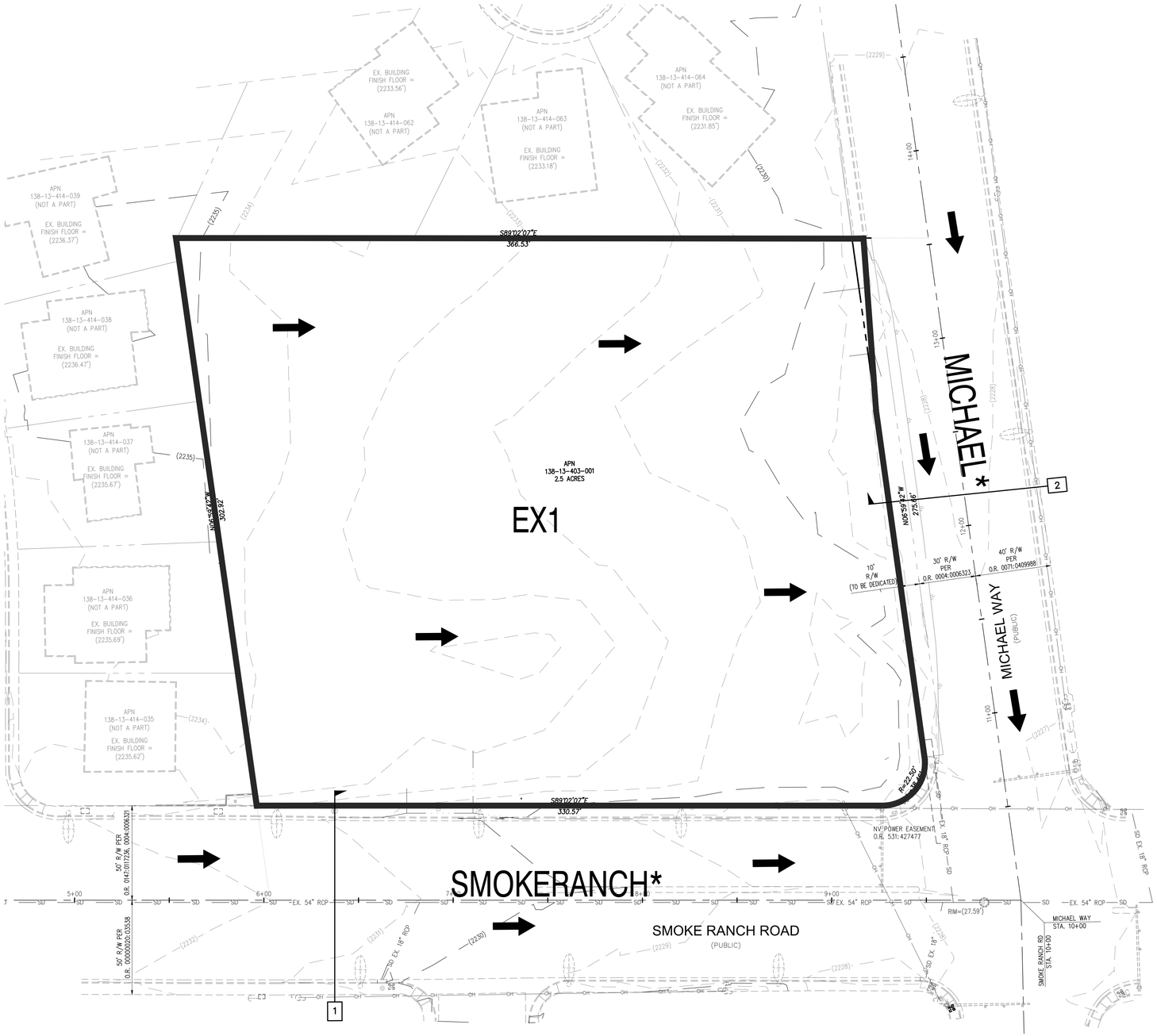
Cross-section characteristics for the Existing Condition are presented below. **Figure 5** shows the locations of the cross sections corresponding to the calculations included in **Table 2**. Refer to Appendix B for street flow hydraulic calculations.

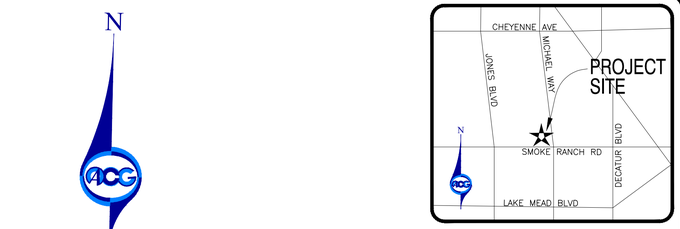
Table 2: Existing Cross-Section Characteristics: 10-year and 100-year

Description	Slope, %	Q_{100}, cfs	D_{100}, ft	V_{100}, fps	$D*V_{100}$	Q_{10}, cfs	D_{10}, ft	V_{10}, fps	$D*V_{10}$
1A/1B – Smoke Ranch	1.00	635	1.49	8.03	11.96	32	0.58	3.53	2.04
2A/2B – Michael Way	0.30	83	0.85	2.51	2.13	36	0.65	1.94	1.26

Cross Section 1 represents the surface flow within Smoke Ranch Road, which is 32-cfs and 635-cfs for the 10-year and 100-year storm flows respectively. For $\mathbf{Q_{100}}$, the flow depth, D, is 1.49 feet, the flow velocity, V, is 8.03 feet per second using a slope of 1.00%. The product of D*V is11.96. The calculated D*V is greater than 8 in the existing condition for the 100-year flow. As indicated in Cross Section 1A, dry lane criteria is met for the 10-year flow with approximately 27' of dry lane on the north half of Smoke Ranch Road. See Appendix B for Cross Section calculations.

Cross Section 2 represents the surface flow within Michael Way, which is 36-cfs and 83-cfs for the 10-year and 100-year storm flows respectively. For $\mathbf{Q_{100}}$, the flow depth, D, is 0.85 feet, the flow velocity, V, is 2.51 feet per second using a slope of 0.30%. The product of D*V is 2.13. As indicated in Cross Section 2A, dry lane criteria is met for the 10-year flow. There is approximately 6' of dry lane on the west half of Michael Way but the overall dry lane for the roadway is 15'. See Appendix B for Cross Section calculations.





VICINITY MAP
NTS

N

GRAPHIC SCALE
30 0 15 30 60
(IN FEET)
1" = 30'

LEGEND

- BASIN BOUNDARY
- OFF1 — BASIN NAME
- FLOW DIRECTION
- (2555) — EXISTING CONTOURS
- CP1 — COMBINATION POINT
- 1 — FLOWMASTER SECTION

SUMMARY OF FLOWS EXISTING CONDITIONS			
BASIN NAME	AREA (AC)	Q_{10} (CFS)	Q_{100} (CFS)
SMOKERANCH*	N/A	263	866
MICHAEL*	N/A	36	83
EX1	2.50	3	6

*REFERENCED FROM THE NORTHWEST NEIGHBORHOOD STUDY, FIGURE E-16

FLOW CHARACTERISTICS – EXISTING CONDITION (10 YEAR)						
SECTION NUMBER	FLOW	SLOPE (%)	Q_{10} (cfs)	DEPTH (ft)	VELOCITY (ft/s)	D*V
1A	SMOKE RANCH	1.00	32	0.58	3.53	2.04
2A	MICHAEL	0.30	36	0.65	1.94	1.26

FLOW CHARACTERISTICS – EXISTING CONDITION (100 YEAR)						
SECTION NUMBER	FLOW	SLOPE (%)	Q_{100} (cfs)	DEPTH (ft)	VELOCITY (ft/s)	D*V
1B	SMOKE RANCH	1.00	635	1.49	8.03	11.96
2B	MICHAEL	0.30	83	0.85	2.51	2.13

REV.	DESCRIPTION	APRVD. BY	DATE
APPROVAL			

LIVING GRACE FOURSQUARE CHURCH

EXISTING CONDITIONS BASIN MAP
APN: 138-13-403-001
2400 N MICHAEL WAY
LAS VEGAS, NEVADA 89108

ACG DESIGN
4310 CAMERON ST. SUITE 12-A
LAS VEGAS, NEVADA 89103
OFFICE: 702.448.8737
WEBSITE: WWW.ACG.DESIGN

ENGINEER'S SEAL

DATE:	04/02/21
PROJ. NO:	200279
DRAWN BY:	ARB
CHECKED BY:	RAS
SCALE:	AS NOTED
JURISDICTION:	LAS VEGAS

DRAWING NUMBER:
FIG5

AGENCY NUMBER:

VIII. DEVELOPED CONDITION

For the Developed Condition, the hydrologic analysis consists of 3 onsite basins and two offsite basins. The site generates a total of 9 cfs under Developed Conditions for the 100-year storm event. **Figure 6** depicts the basins and drainage patterns used in the Developed Conditions hydrologic analysis. A Developed Condition HEC-1 model has been included in Appendix A. **Table 1** summarizes the HEC-1 results for Developed Conditions.

The first offsite basin, SMOKE RANCH, represents the flow within Smoke Ranch Road, adjacent to the subject site. The existing flow within Smoke Ranch Road was determined per the City of Las Vegas Northwest Neighborhood Study, Figure E-16. The flow prior to the intersection of Michael Way is 263 cfs and 866 cfs for the 10-year and 100-years storm respectively. The existing facility within Smoke Ranch Road captures 231 cfs within the existing storm drain system, therefore the surface flow within Smoke Ranch Road is 32-cfs and 635-cfs for the 10-year and 100-year storm flows.

The second offsite basin, MICHAEL, represents the flow within Michael Way, adjacent to the subject site. The existing flow within Michael Way prior to the intersection of Smoke Ranch Road was determined per the City of Las Vegas Northwest Neighborhood Study, Figure E-16. The flow prior to the intersection of Michael Way is 36 cfs and 83 cfs for the 10-year and 100-years storm respectively.

Onsite basin, ON1, represents the northerly portion of the subject site, this flow is conveyed east towards Michael Way. The calculated flows are 1-cfs and 2-cfs for the 10-year and 100-year storm events, respectively. Onsite basin, ON2, represents the easterly portion of the subject site, this flow is conveyed east towards Michael Way. The calculated flows are 2-cfs and 4-cfs for the 10-year and 100-year storm events, respectively. Onsite basin, ON3, represents the westerly portion of the subject site, this flow is conveyed south towards Smoke Ranch Road. The calculated flows are 2-cfs and 3-cfs for the 10-year and 100-year storm events, respectively.

BMP Measures have been proposed as required per the Manual. The total site area is 2.5 acres, the total parking area is 1.65 acres. Based on the requirements, approximately 1.23 acres would need to provide BPM implementation. The treated area for Basin ON2 is 0.64 and the treated area for Basin ON3 is 0.64, for a combined total of 1.25 acres therefore meeting the required BPM implementation.

Table 3: Summary of Developed Conditions

BASIN	AREA (AC)	Q_{10} (cfs)	Q_{100} (cfs)
SMOKE RANCH	n/a	263	866
MICHAEL	n/a	36	83
ON1	0.64	1	2
ON2	1.05	2	4
ON3	0.81	1	3

Developed Condition Street Flow Summary:

Cross-section characteristics for the Developed Condition are presented below. **Figure 6** shows the locations of the cross sections corresponding to the calculations included in **Table 2**. Refer to Appendix B for street flow hydraulic calculations.

Table 4: Developed Cross-Section Characteristics: 10-year and 100-year

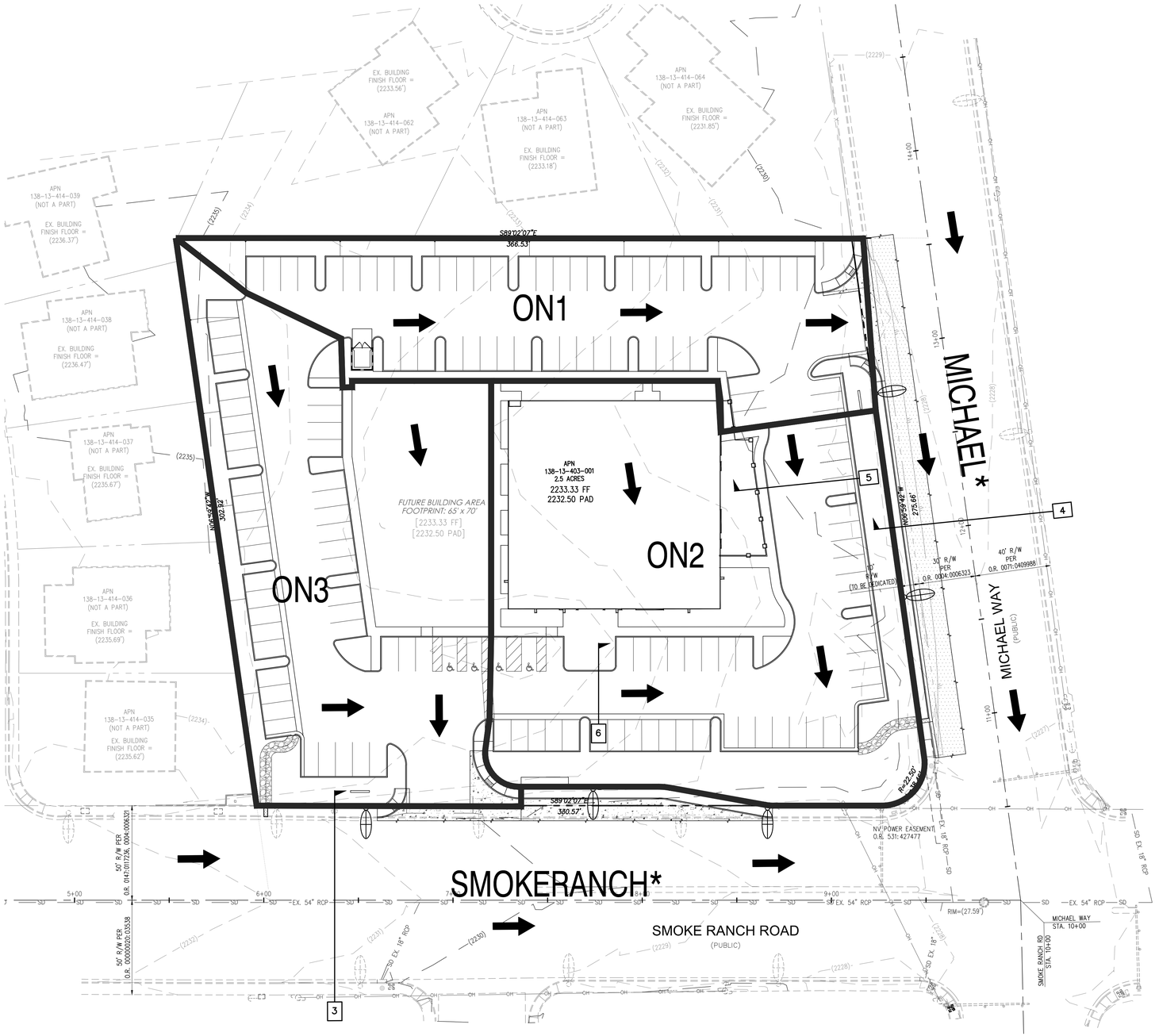
Description	Slope, %	Q_{100}, cfs	D_{100}, ft	V_{100}, fps	$D*V_{100}$	Q_{10}, cfs	D_{10}, ft	V_{10}, fps	$D*V_{10}$
3A/3B – Smoke Ranch	1.00	638	1.49	8.05	11.99	33	0.59	3.55	2.09
4A/4B – Michael Way	0.30	83	0.83	2.73	2.27	36	0.65	2.14	1.39
5 – Onsite Calc ON2	0.50	4	0.43	2.27	0.98	-	-	-	-
6 – Onsite Calc ON2	1.00	4	0.33	3.21	1.06	-	-	-	-

Cross Section 3 represents the surface flow within Smoke Ranch Road, which is 34-cfs and 638-cfs for the 10-year and 100-year storm flows respectively. This flow combines the existing flow plus the onsite flow from Basin ON3. For **Q_{100}**, the flow depth, D, is 1.49 feet, the flow velocity, V, is 8.05 feet per second using a slope of 1.00%. The product of D*V is11.99. The increase in onsite flow (ON3) to Smoke Ranch Road is negligible compared to the existing condition. The calculated D*V is greater than 8 in the developed condition for the 100-year flow. As indicated in Cross Section 3A, dry lane criteria is met for the 10-year flow with approximately 27’ of dry lane on the north half of Smoke Ranch Road. See Appendix B for Cross Section calculations.

Cross Section 4 represents the surface flow within Michael Way. The calculated flows for the project site in the existing condition were 3-cfs and 6-cfs for the 10-year and 100-year flows respectively, which conveyed into Michael Way. The developed flows from ON1 and ON2 which convey to Michael Way is the same at 3-cfs and 6-cfs. Therefore, the overall flow within Michael Way remains the same in the Developed Condition. The proposed development includes full offsite improvements for the west half of Michael Way. For **Q_{100}**, the flow depth, D, is 0.83 feet, the flow velocity, V, is 2.73 feet per second using a slope of 0.30%. The product of D*V is 2.27. As indicated in Cross Section 4A, dry lane criteria is met for the 10-year flow. There is approximately 6’ of dry lane on the west half of Michael Way but the overall dry lane for the roadway is 15’. The proposed full offsite improvements on the west half of Michael Way does not significantly change the depth of flow or dry lane requirements compared to the Existing Condition. See Appendix B for Cross Section calculations.

Cross Section 5 represents the surface flow adjacent to the proposed building, within Basin ON2, which is 4-cfs for the 100-year storm. For **Q_{100}**, the flow depth, D, is 0.43 feet, the flow velocity, V, is 2.27 feet per second using a slope of 0.50%. The product of D*V is 0.98. See Appendix B for Cross Section calculations.

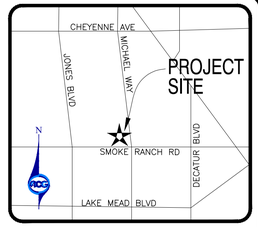
Cross Section 6 represents the surface flow adjacent to the proposed building, within Basin ON2, which is 4-cfs for the 100-year storm. For **Q_{100}**, the flow depth, D, is 0.33 feet, the flow velocity, V, is 3.21 feet per second using a slope of 1.00%. The product of D*V is 1.06. See Appendix B for Cross Section calculations.



GRAPHIC SCALE

30 0 15 30 60

(IN FEET)
1" = 30'



VICINITY MAP
NTS

LEGEND

- BASIN BOUNDARY
- OFF1 — BASIN NAME
- FLOW DIRECTION
- (2555) — EXISTING CONTOURS
- CP1 — COMBINATION POINT
- 1 — FLOWMASTER SECTION

SUMMARY OF FLOWS EXISTING CONDITIONS			
BASIN NAME	AREA (AC)	Q100 (CFS)	Q10 (CFS)
SMOKERANCH*	N/A	263	866
MICHAEL*	N/A	36	83
ON1	0.64	1	2
ON2	1.05	2	4
ON3	0.81	1	3

*REFERENCED FROM THE NORTHWEST NEIGHBORHOOD STUDY, FIGURE E-16

FLOW CHARACTERISTICS – EXISTING CONDITION (10 YEAR)						
SECTION NUMBER	FLOW	SLOPE (%)	Q10 (cfs)	DEPTH (ft)	VELOCITY (ft/s)	D*V
3A	SMOKE RANCH	1.00	33	0.59	3.55	2.09
4A	MICHAEL	0.30	36	0.65	2.14	1.39

FLOW CHARACTERISTICS – EXISTING CONDITION (100 YEAR)						
SECTION NUMBER	FLOW	SLOPE (%)	Q100 (cfs)	DEPTH (ft)	VELOCITY (ft/s)	D*V
3B	SMOKE RANCH	1.00	638	1.49	8.05	11.99
4B	MICHAEL	0.30	83	0.83	2.73	2.27
5	ONSITE CALC – ON2	0.50	4	0.43	2.27	0.98
6	ONSITE CALC – ON2	1.00	4	0.33	3.21	1.06

REVISIONS			
REV.	DESCRIPTION	APRVD. BY	DATE

APPROVAL

LIVING GRACE FOURSQUARE CHURCH

DEVELOPED CONDITIONS BASIN MAP
APN: 138-13-403-001
2400 N MICHAEL WAY
LAS VEGAS, NEVADA 89108

ACG DESIGN
4310 CAMERON ST, SUITE 12-A
LAS VEGAS, NEVADA 89103
OFFICE: 702.448.8737
WEBSITE: WWW.ACG.DESIGN

ENGINEER'S SEAL

DATE:	04/02/21
PROJ. NO:	200279
DRAWN BY:	ARB
CHECKED BY:	RAS
SCALE:	AS NOTED
JURISDICTION:	LAS VEGAS

DRAWING NUMBER:
FIG6

AGENCY NUMBER:

IX. FINISHED FLOOR ELEVATION

The site has been designed as commercial development, the Finish Floor elevations of the proposed building has been set a minimum of 6" above the highest adjacent flowline.

The proposed Finish Floor Elevations also meet the requirement of the Manual criteria for non-special flood hazard areas in which the minimum finished floor elevation shall be at least twice the depth of flow above the gutter line (measured at the high side of the building).

X. CONCLUSIONS AND RECOMMENDATIONS

1. Methodology used in this report complies with Clark County Regional Flood Control District (CCRFCD) and Clark County criteria.

2. This project site is not located within a FEMA designated SFHA.

3. The proposed development will not have a negative impact on downstream or adjacent properties or facilities.

4. The proposed development does not alter the existing flow patterns.

5. The proposed finished floor elevations have been placed at elevations greater than 18 inches above the highest centerline or top of curb elevation of the addressed street at the center of the building.

XI. REFERENCES

1. Clark County Regional Flood Control District – The 2013 Las Vegas Valley Flood Control Master Plan Update, 2013.

2. Post, Buckley, Schuh & Jernigan Inc., Louis Berger Group, Clark County Regional Flood Control District – The 2008 Las Vegas Valley Flood Control Master Plan Update, 2008.

3. Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual, updated August 12, 1999.

4. U.S. Army Corps of Engineers, HEC-1 Flood Hydrograph Package, June 1998.

5. Soil Survey of Las Vegas Valley Area, Nevada. U.S. Department of Agriculture, Soil Conservation Service, July 1985.

Appendices

Appendix A:

- Standard Form 4 – Existing & Developed Condition
- HEC-1 Calculation – Existing Condition
- HEC-1 Calculation – Developed Condition
- Northwest Neighborhood Study – Figure E-16

Appendix B:

- Section 1A - Smoke Ranch (Existing - 10-Year)
- Section 1B - Smoke Ranch (Existing - 100-Year)
- Section 2A - Michael Way (Existing - 10-Year)
- Section 2B - Michael Way (Existing - 100-Year)
- Section 3A - Smoke Ranch (Developed - 10-Year)
- Section 3B - Smoke Ranch (Developed - 100-Year)
- Section 4A - Michael Way (Developed - 10-Year)
- Section 4B - Michael Way (Developed - 100-Year)
- Section 5 - Onsite Calc (Developed, ON2 - 100-Year)
- Section 6 - Onsite Calc (Developed, ON2 - 100-Year)

Appendix C:

- Figure 513 – McCarran Airport Rainfall Area
- Table 505 – Depth-Duration-Frequency Values for McCarran Airport Rainfall Area
- Table 602, 1 of 4 – Runoff Curve Numbers (Urban Areas)
- Soil Survey Map –Living Grace

Appendix D:

- Proposed Improvement Plan Package

APPENDIX A

TIME OF CONCENTRATION

LIVING GRACE

EXISTING AND DEVELOPED CONDITIONS

ACG Design — **Date:04/07/21** **Calculated by: SDS**

Project No: 200279 — **Date:04/07/21** **Checked by: RAS**

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag	REMARKS
DESIG:	DEV./EX. (D or E)	CN	K	AREA Ac	AREA Mi^2	INITIAL LENGTH Feet	SLOPE %	Ti Min	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY FPS	V2 VELOCITY FPS	Tt Min	Min	Min	Tlag= 0.6Tc/60 Hours	RAINFALL Inches
EX1	E	88.0	0.7716	2.50	0.0039	65	1.20	4.5	365	2.00	2.1	-	2.9	7.4	N/A	**0.074**	1.58/2.77
ON1	D	95.0	0.8640	0.64	0.0010	55	2.00	2.5	285	1.20	2.2	3.0	2.1	4.6	11.9	**0.050**	1.58/2.77
ON2	D	95.0	0.8640	1.05	0.0016	45	3.00	2.0	200	1.00	2.0	2.9	1.7	3.6	11.4	**0.050**	1.58/2.77
ON3	D	95.0	0.8640	0.81	0.0013	25	2.00	1.7	300	0.50	1.4	2.4	3.5	5.2	11.8	**0.052**	1.58/2.77

Tc = Ti + Tt Tlag = 0.6 Tc

Ti = 1.8 (1.1 - K) L^1/2 / S^1/3

K = 0.0132 (CN) - 0.39

Tc Check = L/180+10

For the travel time (Tt) calculations,
V1 applies to the first 500 feet of travel distance;
V2 applies to the remaining travel distance.

Existing V1 = 14.8*(S/100)^1/2 Developed V1 = 20.2*(S/100)^1/2

Existing V2 = 29.4*(S/100)^1/2 Developed V2 = 30.6*(S/100)^1/2

STANDARD FORM 4

Existing

```
1*****************************************                 ****************************************
*                                       *                 *                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                 *    U.S. ARMY CORPS OF ENGINEERS      *
*           JUN  1998                   *                 *  HYDROLOGIC ENGINEERING CENTER       *
*         VERSION 4.1                   *                 *       609 SECOND STREET              *
*                                       *                 *    DAVIS, CALIFORNIA 95616           *
*  RUN DATE  05APR21  TIME  08:00:08    *                 *         (916) 756-1104               *
*                                       *                 *                                      *
*****************************************                 ****************************************
```

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

          *DIAGRAM
    1     ID  ******************************************************************
    2     ID  * ..........................................................
    3     ID  * :
    4     ID  * :          LIVING GRACE
    5     ID  * :          DRAINAGE STUDY
    6     ID  * :          EXISTING CONDITIONS
    7     ID  * :..........................................................
    8     ID  * :          RETURN PERIOD_ _ _ _100-YEAR & 10-YEAR
    9     ID  * :          DISTRIBUTION_ _ _ _ 6-HOUR SDN3
   10     ID  * :          PROJECT NO_ _ _ _ _ 200279
   11     ID  * :          FILENAME_ _ _ _ _ _ EXISTING.H1
   12     ID  * :          DATE MODELED_ _ _ _ 040221
   13     ID  * :          MODELED BY_ _ _ _ _ SDS
   14     ID  * :..........................................................
   15     ID  * :
   16     ID  * :..........................................................
   17     ID  ******************************************************************
   18     ID
   19     ID
   20     ID
   21     IT     5     0     0    300
   22     IO     5
   23     IN     5     0     0
   24     JR   PREC    .57     1
          *

   25     KK  EX1
```

```
        26        KM   SUBBASIN EX1
        27        KM          AREA    2.50 AC
        28        PB   2.77
        29        PC   .000   .020   .057   .070   .087   .108   .124   .130   .130   .130
        30        PC   .130   .130   .130   .133   .140   .142   .148   .158   .172   .181
        31        PC   .190   .197   .199   .200   .201   .204   .214   .229   .241   .249
        32        PC   .251   .256   .270   .278   .281   .283   .295   .322   .352   .409
        33        PC   .499   .590   .710   .744   .781   .812   .819   .835   .851   .856
        34        PC   .860   .868   .876   .888   .910   .926   .937   .950   .970   .976
        35        PC   .982   .985   .987   .989   .990   .993   .993   .994   .995   .998
        36        PC   .998   .999   1.00
        37        BA   .0039
        38        LS     0    88.0
        39        UD   .074
                *
        40        ZZ
1
           SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE     (V) ROUTING         (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR       (<---) RETURN OF DIVERTED OR PUMPED FLOW

   25      EX1

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                ****************************************
*                              *                *                              *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                *    U.S. ARMY CORPS OF ENGINEERS     *
*            JUN   1998            *                *    HYDROLOGIC ENGINEERING CENTER    *
*          VERSION 4.1             *                *         609 SECOND STREET           *
*                              *                *      DAVIS, CALIFORNIA 95616       *
*  RUN DATE   05APR21  TIME  08:00:08  *                *          (916) 756-1104           *
*                              *                *                              *
****************************************                ****************************************
```

```
                ******************************************************************
                * .............................................................. *
                * :                                                            : *
                * :            LIVING GRACE                                    : *
                * :            DRAINAGE STUDY                                  : *
                * :            EXISTING CONDITIONS                             : *
                * :............................................................: *
                * :            RETURN PERIOD_ _ _ _100-YEAR & 10-YEAR          : *
                * :            DISTRIBUTION_ _ _ _ 6-HOUR SDN3                 : *
                * :            PROJECT NO_ _ _ _ _ 200279                      : *
                * :            FILENAME_ _ _ _ _ _ EXISTING.H1                 : *
                * :            DATE MODELED_ _ _ _ 040221                      : *
                * :            MODELED BY_ _ _ _ _ SDS                         : *
                * :............................................................: *
                * :                                                            : *
                * .............................................................. *
                ******************************************************************
```

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

   IT        HYDROGRAPH TIME DATA
               NMIN          5  MINUTES IN COMPUTATION INTERVAL
               IDATE     1   0  STARTING DATE
               ITIME      0000  STARTING TIME
```

Existing

NQ 300 NUMBER OF HYDROGRAPH ORDINATES
NDDATE 2 0 ENDING DATE
NDTIME 0055 ENDING TIME
ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

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

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
.57 1.00
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

				RATIOS APPLIED TO PRECIPITATION		
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2
					.57	1.00
HYDROGRAPH AT						
+	EX1	.00	1	FLOW	3.	6.
				TIME	3.50	3.50

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

Developed

```
1*****************************************                 ****************************************
*                                       *                 *                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                 *    U.S. ARMY CORPS OF ENGINEERS      *
*           JUN  1998                   *                 *  HYDROLOGIC ENGINEERING CENTER       *
*         VERSION 4.1                   *                 *       609 SECOND STREET              *
*                                       *                 *    DAVIS, CALIFORNIA 95616           *
*  RUN DATE  06APR21  TIME  16:28:56    *                 *         (916) 756-1104               *
*                                       *                 *                                      *
*****************************************                 ****************************************
```

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

          *DIAGRAM
    1     ID  ********************************************************************
    2     ID  * ..................................................................
    3     ID  * :
    4     ID  * :          LIVING GRACE
    5     ID  * :           DRAINAGE STUDY
    6     ID  * :           EXISTING CONDITIONS
    7     ID  * :.................................................................
    8     ID  * :           RETURN PERIOD_ _ _ _100-YEAR & 10-YEAR
    9     ID  * :           DISTRIBUTION_ _ _ _ 6-HOUR SDN3
   10     ID  * :           PROJECT NO_ _ _ _ _ 200279
   11     ID  * :           FILENAME_ _ _ _ _ _ DEVELOPED.H1
   12     ID  * :           DATE MODELED_ _ _ _ 040221
   13     ID  * :           MODELED BY_ _ _ _ _ SDS
   14     ID  * :.................................................................
   15     ID  * :
   16     ID  * :.................................................................
   17     ID  ********************************************************************
   18     ID
   19     ID
   20     ID
   21     IT     5      0      0    300
   22     IO     5
   23     IN     5      0      0
   24     JR   PREC    .57      1
          *

   25     KK   ON1
```

```
         26        KM   SUBBASIN ON1
         27        KM         AREA    0.64 AC
         28        PB   2.77
         29        PC   .000   .020   .057   .070   .087   .108   .124   .130   .130   .130
         30        PC   .130   .130   .130   .133   .140   .142   .148   .158   .172   .181
         31        PC   .190   .197   .199   .200   .201   .204   .214   .229   .241   .249
         32        PC   .251   .256   .270   .278   .281   .283   .295   .322   .352   .409
         33        PC   .499   .590   .710   .744   .781   .812   .819   .835   .851   .856
         34        PC   .860   .868   .876   .888   .910   .926   .937   .950   .970   .976
         35        PC   .982   .985   .987   .989   .990   .993   .993   .994   .995   .998
         36        PC   .998   .999   1.00
         37        BA   .0010
         38        LS     0    95.0
         39        UD   .050
                   *

         40        KK   ON2
         41        KM   SUBBASIN ON2
         42        KM         AREA   1.05 AC
         43        PB   2.77
         44        BA   .0016
         45        LS     0    95.0
         46        UD   .050
                   *
1                                  HEC-1 INPUT                                PAGE  2

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


         47        KK   ON3
         48        KM   SUBBASIN ON3
         49        KM         AREA    0.81 AC
         50        PB   2.77
         51        BA   .0013
         52        LS     0    95.0
         53        UD   .052
                   *
         54        ZZ
1
            SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING         (---->) DIVERSION OR PUMP FLOW

   NO.     (.) CONNECTOR       (<---) RETURN OF DIVERTED OR PUMPED FLOW

   25      ON1
             .
             .
   40          .      ON2
             .          .
             .          .
   47          .          .      ON3

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS      *
*            JUN   1998                *                    *  HYDROLOGIC ENGINEERING CENTER       *
*          VERSION 4.1                 *                    *        609 SECOND STREET             *
*                                      *                    *     DAVIS, CALIFORNIA 95616          *
*  RUN DATE   06APR21  TIME  16:28:56  *                    *            (916) 756-1104            *
*                                      *                    *                                      *
****************************************                    ****************************************


                  ************************************************************
                  * .....
```

```
                * :
                * :          LIVING GRACE
                * :           DRAINAGE STUDY
                * :           EXISTING CONDITIONS
                * :.....................................................................
                * :           RETURN PERIOD_ _ _ _100-YEAR & 10-YEAR
                * :           DISTRIBUTION_ _ _ _ 6-HOUR SDN3
                * :           PROJECT NO_ _ _ _ _ 200279
                * :           FILENAME_ _ _ _ _ _ DEVELOPED.H1
                * :           DATE MODELED_ _ _ _ 040221
                * :           MODELED BY_ _ _ _ _ SDS
                * :.....................................................................
                * :
                * :.....................................................................
                **********************************************************************


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

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

            COMPUTATION INTERVAL     .08 HOURS
              TOTAL TIME BASE   24.92 HOURS

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

    JP       MULTI-PLAN OPTION
               NPLAN         1  NUMBER OF PLANS

    JR       MULTI-RATIO OPTION
             RATIOS OF PRECIPITATION
             .57     1.00
1

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


                                          RATIOS APPLIED TO PRECIPITATION
 OPERATION      STATION    AREA   PLAN          RATIO 1  RATIO 2
                                    .57     1.00

 HYDROGRAPH AT
+             ON1        .00     1   FLOW          1.      2.
                                 TIME         3.50     3.50

 HYDROGRAPH AT
+             ON2        .00     1   FLOW          2.      4.
                                 TIME         3.50     3.50
```

Developed

HYDROGRAPH AT
+ ON3 .00 1 FLOW 1. 3.
TIME 3.50 3.50

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

CITY OF LAS VEGAS
NEVADA

NORTHWEST NEIGHBORHOOD STUDY

LEGEND

SUB-BASIN BOUNDARY

FLOW ARROW

250 10-YEAR STREET FLOW
500 100-YEAR STREET FLOW
300 10-YEAR FACILITY FLOW
800 100-YEAR FACILITY FLOW

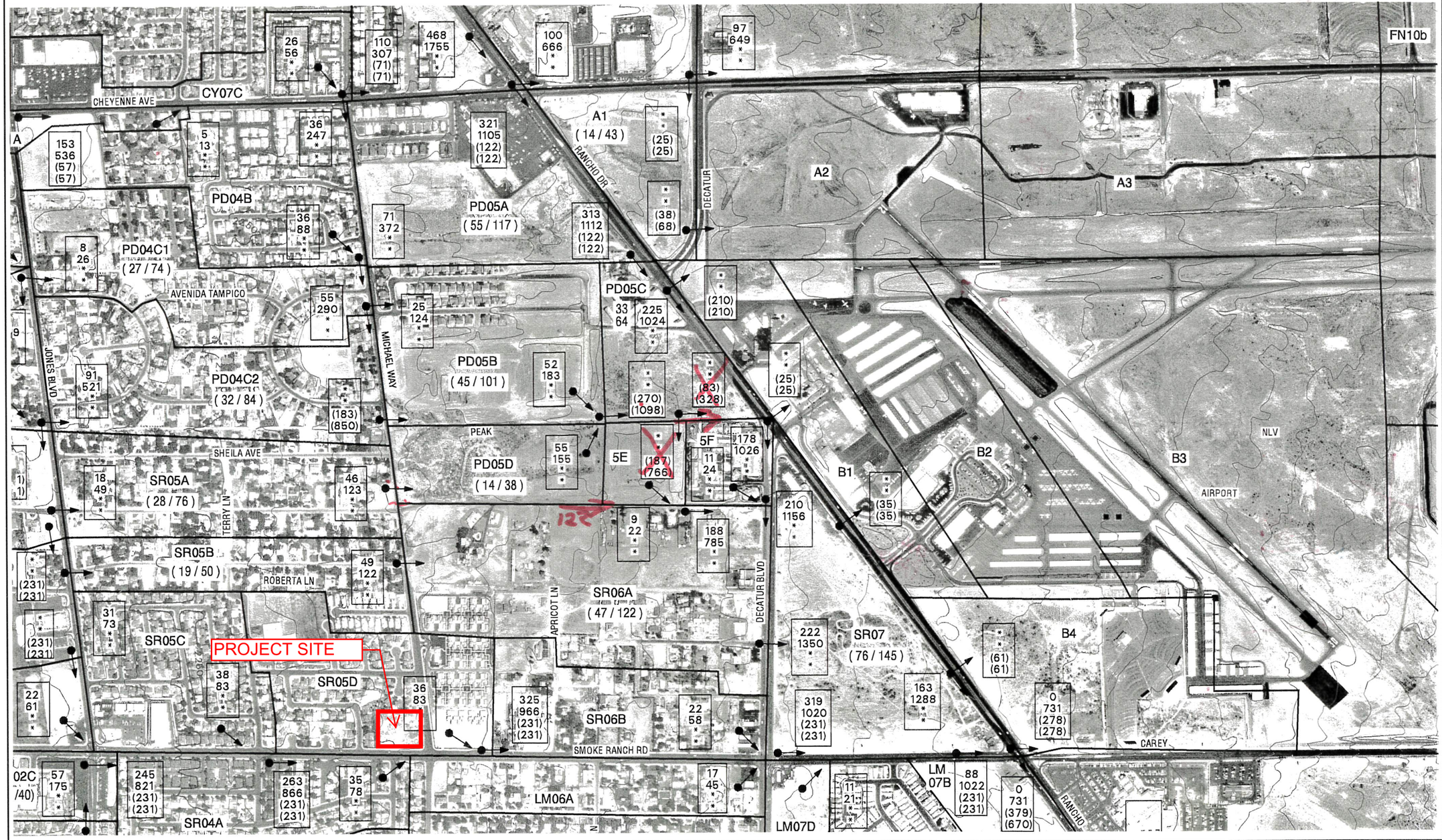
(FLOWS IN CFS)

BWJS Basin-ID

(13 / 59) Contributing flow (10-Year / 100-Year) from the basin (cfs)

PHOTO DATE: APRIL 1996

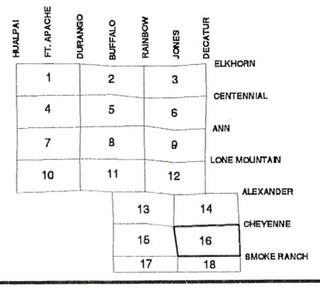
FIGURE E-16



EXISTING DRAINAGE CONDITIONS

PBS&J
POST, BUCKLEY, SCHUH & JERNIGAN, INC.

ENGINEERING PLANNING SURVEYING GIS
901, N. Green Valley Pkwy, Ste 100, Henderson NV 89014
Phone: (702) 263-7275 Fax: (702) 263-7200



NOTE:
Existing conditions are based on future CN values with only existinig local and CCRFCD facilities in place

N
W E
S

800 600 400 200 0 400 800
(IN FEET)

SCALE: 1 INCH = 800 FEET

APPENDIX B

Section 1A - Smoke Ranch (Existing - 10-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010
Discharge	32.00

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	31.33
0+05.00	31.19
0+05.50	31.19
0+05.50	30.33
0+07.00	30.41
0+50.00	31.46
0+93.00	30.28
0+94.50	30.20
0+94.50	30.70
0+95.00	30.70
1+00.00	30.88

Roughness Segment Definitions

Start Station & Elevation	End Station & Elevation	Roughness Coefficient
(0+00.00, 31.33)	(0+05.00, 31.19)	0.013
(0+05.00, 31.19)	(0+05.50, 31.19)	0.013
(0+05.50, 31.19)	(0+05.50, 30.33)	0.013
(0+05.50, 30.33)	(0+07.00, 30.41)	0.013
(0+07.00, 30.41)	(0+50.00, 31.46)	0.016
(0+50.00, 31.46)	(0+93.00, 30.28)	0.016
(0+93.00, 30.28)	(0+94.50, 30.20)	0.013
(0+94.50, 30.20)	(0+94.50, 30.70)	0.013
(0+94.50, 30.70)	(0+95.00, 30.70)	0.013
(0+95.00, 30.70)	(1+00.00, 30.88)	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	0.58
Elevation Range	30.20 to 31.46 ft
Flow Area	9.1
Wetted Perimeter	40.48
Hydraulic Radius	0.22
Top Width	39.51

Section 1A - Smoke Ranch (Existing - 10-Year)

Results	
Normal Depth	0.58
Critical Depth	0.64
Critical Slope	0.006
Velocity	3.53
Velocity Head	0.19
Specific Energy	0.78
Froude Number	1.299
Flow Type	Supercritical

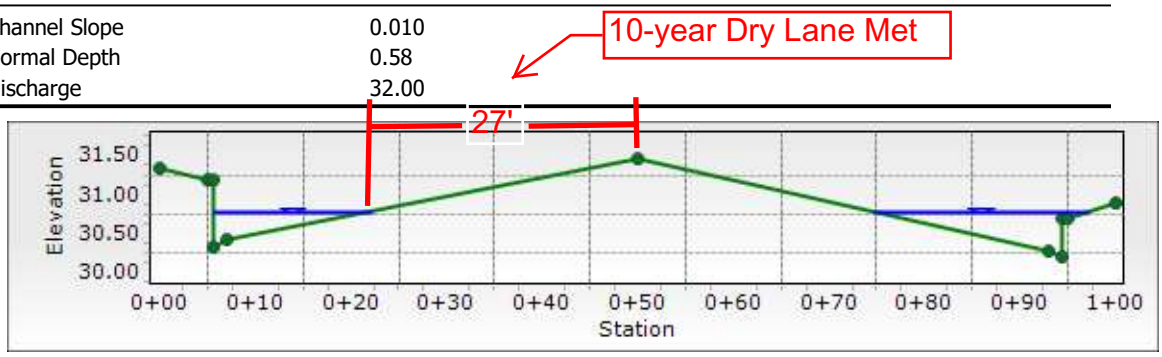
GVF Input Data	
Downstream Depth	0.00
Length	0.00
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00
Profile Description	N/A
Profile Headloss	0.00
Downstream Velocity	Infinity
Upstream Velocity	Infinity
Normal Depth	0.58
Critical Depth	0.64
Channel Slope	0.010
Critical Slope	0.006

Cross Section for Section 1A - Smoke Ranch (Existing - 10-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010
Normal Depth	0.58
Discharge	32.00



Section 1B - Smoke Ranch (Existing - 100-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010
Discharge	635.00

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	31.33
0+05.00	31.19
0+05.50	31.19
0+05.50	30.33
0+07.00	30.41
0+50.00	31.46
0+93.00	30.28
0+94.50	30.20
0+94.50	30.70
0+95.00	30.70
1+00.00	30.88

Roughness Segment Definitions

Start Station & Elevation	End Station & Elevation	Roughness Coefficient
(0+00.00, 31.33)	(0+05.00, 31.19)	0.013
(0+05.00, 31.19)	(0+05.50, 31.19)	0.013
(0+05.50, 31.19)	(0+05.50, 30.33)	0.013
(0+05.50, 30.33)	(0+07.00, 30.41)	0.013
(0+07.00, 30.41)	(0+50.00, 31.46)	0.016
(0+50.00, 31.46)	(0+93.00, 30.28)	0.016
(0+93.00, 30.28)	(0+94.50, 30.20)	0.013
(0+94.50, 30.20)	(0+94.50, 30.70)	0.013
(0+94.50, 30.70)	(0+95.00, 30.70)	0.013
(0+95.00, 30.70)	(1+00.00, 30.88)	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	1.49
Elevation Range	30.20 to 31.46 ft
Flow Area	79.1
Wetted Perimeter	102.56
Hydraulic Radius	0.77
Top Width	100.00

Section 1B - Smoke Ranch (Existing - 100-Year)

Results	
Normal Depth	1.49
Critical Depth	1.78
Critical Slope	0.004
Velocity	8.03
Velocity Head	1.00
Specific Energy	2.49
Froude Number	1.593
Flow Type	Supercritical

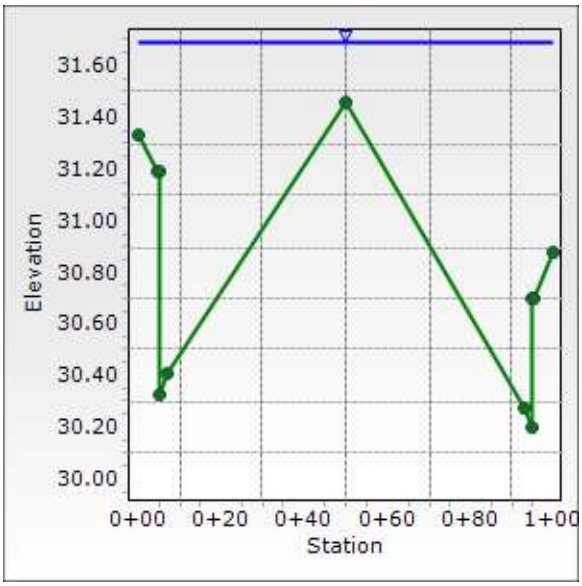
GVF Input Data	
Downstream Depth	0.00
Length	0.00
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00
Profile Description	N/A
Profile Headloss	0.00
Downstream Velocity	Infinity
Upstream Velocity	Infinity
Normal Depth	1.49
Critical Depth	1.78
Channel Slope	0.010
Critical Slope	0.004

Cross Section for Section 1B - Smoke Ranch (Existing - 100-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010
Normal Depth	1.49
Discharge	635.00



Section 2A - Michael Way (Existing - 10-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.003
Discharge	36.00

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	28.20
0+15.00	27.53
0+40.00	28.38
0+73.00	27.66
0+74.50	27.58
0+74.50	28.08
0+75.00	28.08
0+80.00	28.18

Roughness Segment Definitions

Start Station & Elevation	End Station & Elevation	Roughness Coefficient
(0+00.00, 28.20)	(0+15.00, 27.53)	0.025
(0+15.00, 27.53)	(0+40.00, 28.38)	0.016
(0+40.00, 28.38)	(0+73.00, 27.66)	0.016
(0+73.00, 27.66)	(0+74.50, 27.58)	0.013
(0+74.50, 27.58)	(0+74.50, 28.08)	0.013
(0+74.50, 28.08)	(0+75.00, 28.08)	0.013
(0+75.00, 28.08)	(0+80.00, 28.18)	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	0.65
Elevation Range	27.53 to 28.38 ft
Flow Area	18.6
Wetted Perimeter	65.47
Hydraulic Radius	0.28
Top Width	64.93
Normal Depth	0.65
Critical Depth	0.55
Critical Slope	0.008
Velocity	1.94
Velocity Head	0.06
Specific Energy	0.71

Section 2A - Michael Way (Existing - 10-Year)

Results	
Froude Number	0.640
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00
Length	0.00
Number Of Steps	0

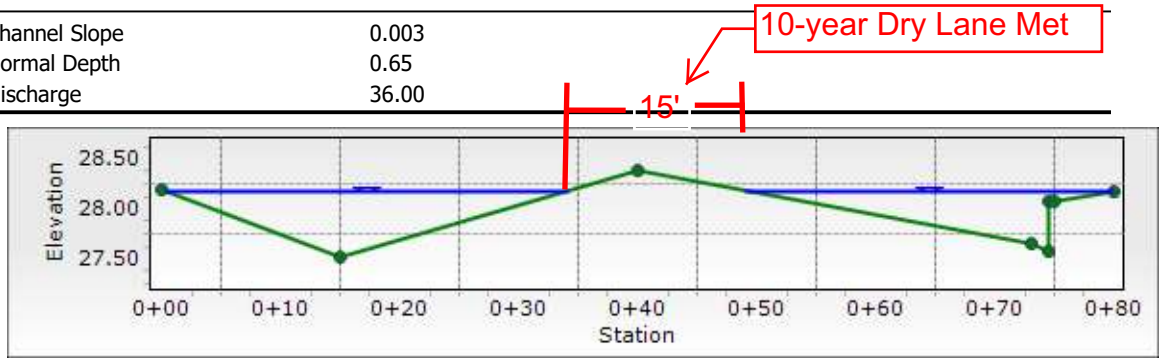
GVF Output Data	
Upstream Depth	0.00
Profile Description	N/A
Profile Headloss	0.00
Downstream Velocity	0.00
Upstream Velocity	0.00
Normal Depth	0.65
Critical Depth	0.55
Channel Slope	0.003
Critical Slope	0.008

Messages	
Messages	Water Surface Elevation exceeds lowest end station by 0.00434549728514ft. Flow is divided.

Cross Section for Section 2A - Michael Way (Existing - 10-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.003
Normal Depth	0.65
Discharge	36.00



Section 2B - Michael Way (Existing - 100-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.003
Discharge	83.00

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	28.20
0+15.00	27.53
0+40.00	28.38
0+73.00	27.66
0+74.50	27.58
0+74.50	28.08
0+75.00	28.08
0+80.00	28.18

Roughness Segment Definitions

Start Station & Elevation	End Station & Elevation	Roughness Coefficient
(0+00.00, 28.20)	(0+15.00, 27.53)	0.025
(0+15.00, 27.53)	(0+40.00, 28.38)	0.016
(0+40.00, 28.38)	(0+73.00, 27.66)	0.016
(0+73.00, 27.66)	(0+74.50, 27.58)	0.013
(0+74.50, 27.58)	(0+74.50, 28.08)	0.013
(0+74.50, 28.08)	(0+75.00, 28.08)	0.013
(0+75.00, 28.08)	(0+80.00, 28.18)	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	0.85
Elevation Range	27.53 to 28.38 ft
Flow Area	33.0
Wetted Perimeter	80.93
Hydraulic Radius	0.41
Top Width	80.00
Normal Depth	0.85
Critical Depth	0.75
Critical Slope	0.007
Velocity	2.51
Velocity Head	0.10
Specific Energy	0.95

Section 2B - Michael Way (Existing - 100-Year)

Results	
Froude Number	0.690
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00
Length	0.00
Number Of Steps	0

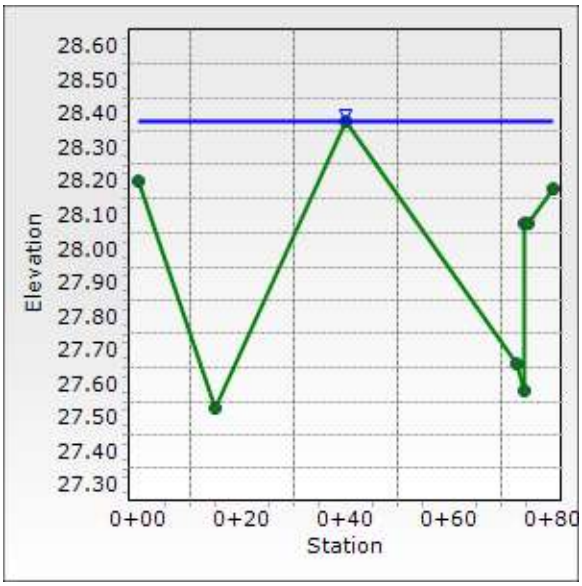
GVF Output Data	
Upstream Depth	0.00
Profile Description	N/A
Profile Headloss	0.00
Downstream Velocity	0.00
Upstream Velocity	0.00
Normal Depth	0.85
Critical Depth	0.75
Channel Slope	0.003
Critical Slope	0.007

Messages	
Messages	Water Surface Elevation exceeds lowest end station by 0.203023372739494ft.

Cross Section for Section 2B - Michael Way (Existing - 100-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.003
Normal Depth	0.85
Discharge	83.00



Section 3A - Smoke Ranch (Developed - 10-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010
Discharge	33.00

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	31.33
0+05.00	31.19
0+05.50	31.19
0+05.50	30.33
0+07.00	30.41
0+50.00	31.46
0+93.00	30.28
0+94.50	30.20
0+94.50	30.70
0+95.00	30.70
1+00.00	30.88

Roughness Segment Definitions

Start Station & Elevation	End Station & Elevation	Roughness Coefficient
(0+00.00, 31.33)	(0+05.00, 31.19)	0.013
(0+05.00, 31.19)	(0+05.50, 31.19)	0.013
(0+05.50, 31.19)	(0+05.50, 30.33)	0.013
(0+05.50, 30.33)	(0+07.00, 30.41)	0.013
(0+07.00, 30.41)	(0+50.00, 31.46)	0.016
(0+50.00, 31.46)	(0+93.00, 30.28)	0.016
(0+93.00, 30.28)	(0+94.50, 30.20)	0.013
(0+94.50, 30.20)	(0+94.50, 30.70)	0.013
(0+94.50, 30.70)	(0+95.00, 30.70)	0.013
(0+95.00, 30.70)	(1+00.00, 30.88)	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	0.59
Elevation Range	30.20 to 31.46 ft
Flow Area	9.3
Wetted Perimeter	41.07
Hydraulic Radius	0.23
Top Width	40.09

Section 3A - Smoke Ranch (Developed - 10-Year)

Results	
Normal Depth	0.59
Critical Depth	0.64
Critical Slope	0.006
Velocity	3.55
Velocity Head	0.20
Specific Energy	0.79
Froude Number	1.301
Flow Type	Supercritical

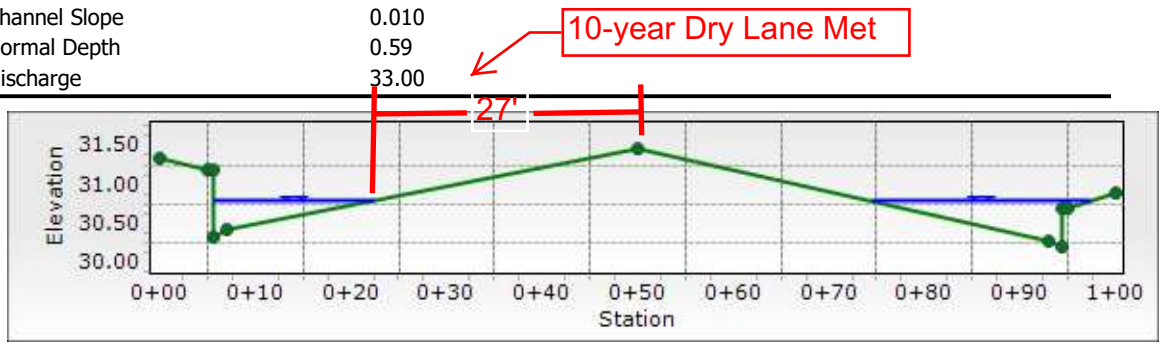
GVF Input Data	
Downstream Depth	0.00
Length	0.00
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00
Profile Description	N/A
Profile Headloss	0.00
Downstream Velocity	Infinity
Upstream Velocity	Infinity
Normal Depth	0.59
Critical Depth	0.64
Channel Slope	0.010
Critical Slope	0.006

Cross Section for Section 3A - Smoke Ranch (Developed - 10-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010
Normal Depth	0.59
Discharge	33.00



Section 3B - Smoke Ranch (Developed - 100-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010
Discharge	638.00

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	31.33
0+05.00	31.19
0+05.50	31.19
0+05.50	30.33
0+07.00	30.41
0+50.00	31.46
0+93.00	30.28
0+94.50	30.20
0+94.50	30.70
0+95.00	30.70
1+00.00	30.88

Roughness Segment Definitions

Start Station & Elevation	End Station & Elevation	Roughness Coefficient
(0+00.00, 31.33)	(0+05.00, 31.19)	0.013
(0+05.00, 31.19)	(0+05.50, 31.19)	0.013
(0+05.50, 31.19)	(0+05.50, 30.33)	0.013
(0+05.50, 30.33)	(0+07.00, 30.41)	0.013
(0+07.00, 30.41)	(0+50.00, 31.46)	0.016
(0+50.00, 31.46)	(0+93.00, 30.28)	0.016
(0+93.00, 30.28)	(0+94.50, 30.20)	0.013
(0+94.50, 30.20)	(0+94.50, 30.70)	0.013
(0+94.50, 30.70)	(0+95.00, 30.70)	0.013
(0+95.00, 30.70)	(1+00.00, 30.88)	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	1.49
Elevation Range	30.20 to 31.46 ft
Flow Area	79.3
Wetted Perimeter	102.57
Hydraulic Radius	0.77
Top Width	100.00

Section 3B - Smoke Ranch (Developed - 100-Year)

Results	
Normal Depth	1.49
Critical Depth	1.78
Critical Slope	0.004
Velocity	8.05
Velocity Head	1.01
Specific Energy	2.50
Froude Number	1.593
Flow Type	Supercritical

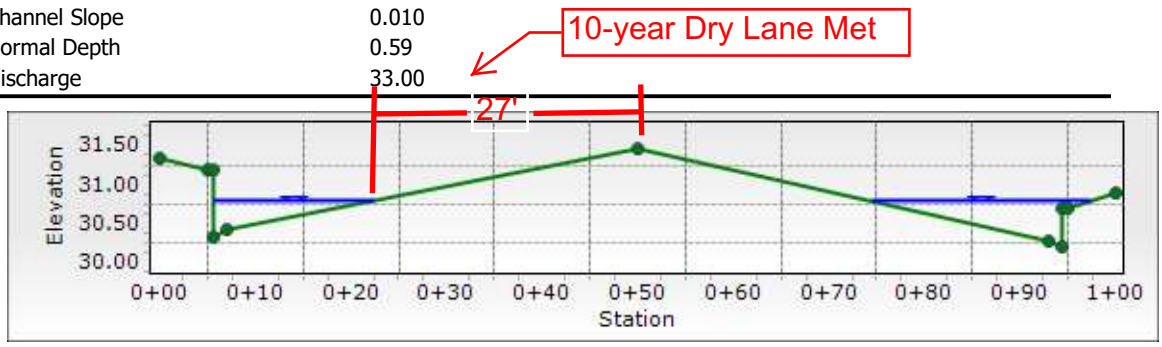
GVF Input Data	
Downstream Depth	0.00
Length	0.00
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00
Profile Description	N/A
Profile Headloss	0.00
Downstream Velocity	Infinity
Upstream Velocity	Infinity
Normal Depth	1.49
Critical Depth	1.78
Channel Slope	0.010
Critical Slope	0.004

Cross Section for Section 3A - Smoke Ranch (Developed - 10-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010
Normal Depth	0.59
Discharge	33.00



Section 4A - Michael Way (Developed - 10-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.003
Discharge	36.00

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	28.16
0+05.00	28.06
0+05.50	28.06
0+05.50	27.56
0+07.00	27.64
0+40.00	28.38
0+73.00	27.66
0+74.50	27.58
0+74.50	28.08
0+75.00	28.08
0+80.00	28.18

Roughness Segment Definitions

Start Station & Elevation	End Station & Elevation	Roughness Coefficient
(0+00.00, 28.16)	(0+05.00, 28.06)	0.013
(0+05.00, 28.06)	(0+05.50, 28.06)	0.013
(0+05.50, 28.06)	(0+05.50, 27.56)	0.013
(0+05.50, 27.56)	(0+07.00, 27.64)	0.013
(0+07.00, 27.64)	(0+40.00, 28.38)	0.016
(0+40.00, 28.38)	(0+73.00, 27.66)	0.016
(0+73.00, 27.66)	(0+74.50, 27.58)	0.013
(0+74.50, 27.58)	(0+74.50, 28.08)	0.013
(0+74.50, 28.08)	(0+75.00, 28.08)	0.013
(0+75.00, 28.08)	(0+80.00, 28.18)	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	0.65
Elevation Range	27.56 to 28.38 ft
Flow Area	16.8
Wetted Perimeter	65.43
Hydraulic Radius	0.26
Top Width	64.34

Section 4A - Michael Way (Developed - 10-Year)

Results	
Normal Depth	0.65
Critical Depth	0.59
Critical Slope	0.006
Velocity	2.14
Velocity Head	0.07
Specific Energy	0.72
Froude Number	0.739
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00
Length	0.00
Number Of Steps	0

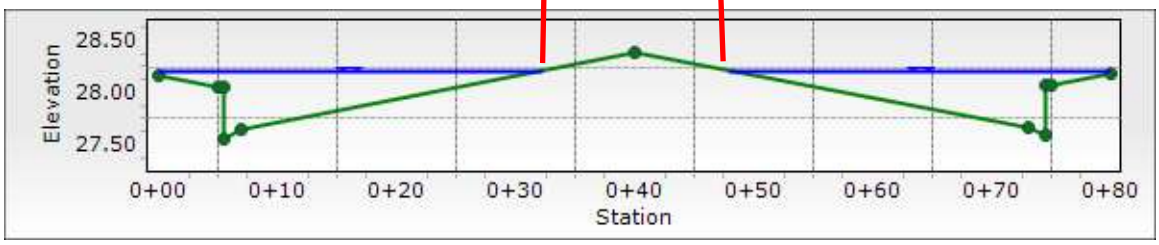
GVF Output Data	
Upstream Depth	0.00
Profile Description	N/A
Profile Headloss	0.00
Downstream Velocity	0.00
Upstream Velocity	0.00
Normal Depth	0.65
Critical Depth	0.59
Channel Slope	0.003
Critical Slope	0.006

Messages	
Messages	Water Surface Elevation exceeds lowest end station by 0.046796849123826ft. Flow is divided.

Cross Section for Section 4A - Michael Way (Developed - 10-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.003
Normal Depth	0.65
Discharge	36.00



Section 4B - Michael Way (Developed - 100-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.003
Discharge	83.00

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	28.16
0+05.00	28.06
0+05.50	28.06
0+05.50	27.56
0+07.00	27.64
0+40.00	28.38
0+73.00	27.66
0+74.50	27.58
0+74.50	28.08
0+75.00	28.08
0+80.00	28.18

Roughness Segment Definitions

Start Station & Elevation	End Station & Elevation	Roughness Coefficient
(0+00.00, 28.16)	(0+05.00, 28.06)	0.013
(0+05.00, 28.06)	(0+05.50, 28.06)	0.013
(0+05.50, 28.06)	(0+05.50, 27.56)	0.013
(0+05.50, 27.56)	(0+07.00, 27.64)	0.013
(0+07.00, 27.64)	(0+40.00, 28.38)	0.016
(0+40.00, 28.38)	(0+73.00, 27.66)	0.016
(0+73.00, 27.66)	(0+74.50, 27.58)	0.013
(0+74.50, 27.58)	(0+74.50, 28.08)	0.013
(0+74.50, 28.08)	(0+75.00, 28.08)	0.013
(0+75.00, 28.08)	(0+80.00, 28.18)	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	0.83
Elevation Range	27.56 to 28.38 ft
Flow Area	30.4
Wetted Perimeter	81.47
Hydraulic Radius	0.37
Top Width	80.00

Section 4B - Michael Way (Developed - 100-Year)

Results	
Normal Depth	0.83
Critical Depth	0.77
Critical Slope	0.005
Velocity	2.73
Velocity Head	0.12
Specific Energy	0.95
Froude Number	0.780
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00
Length	0.00
Number Of Steps	0

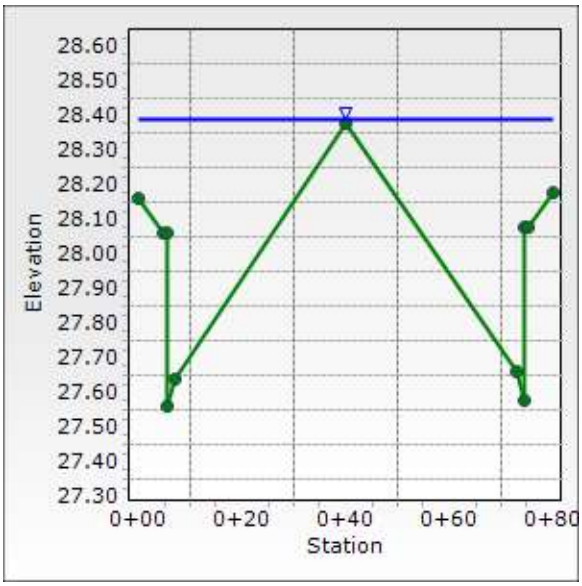
GVF Output Data	
Upstream Depth	0.00
Profile Description	N/A
Profile Headloss	0.00
Downstream Velocity	0.00
Upstream Velocity	0.00
Normal Depth	0.83
Critical Depth	0.77
Channel Slope	0.003
Critical Slope	0.005

Messages	
Messages	Water Surface Elevation exceeds lowest end station by 0.234058666165659ft.

Cross Section for Section 4B - Michael Way (Developed - 100-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.003
Normal Depth	0.83
Discharge	83.00



Section 5 - Onsite Calc (Developed, ON2 - 100-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005
Discharge	4.00

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	32.38
0+00.50	32.38
0+00.50	31.88
0+29.00	30.39

Roughness Segment Definitions

Start Station & Elevation	End Station & Elevation	Roughness Coefficient
(0+00.00, 32.38)	(0+00.50, 32.38)	0.013
(0+00.50, 32.38)	(0+00.50, 31.88)	0.013
(0+00.50, 31.88)	(0+29.00, 30.39)	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	0.43
Elevation Range	30.39 to 32.38 ft
Flow Area	1.8
Wetted Perimeter	8.65
Hydraulic Radius	0.20
Top Width	8.21
Normal Depth	0.43
Critical Depth	0.40
Critical Slope	0.007
Velocity	2.27
Velocity Head	0.08
Specific Energy	0.51
Froude Number	0.865
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00
Length	0.00
Number Of Steps	0

Section 5 - Onsite Calc (Developed, ON2 - 100-Year)

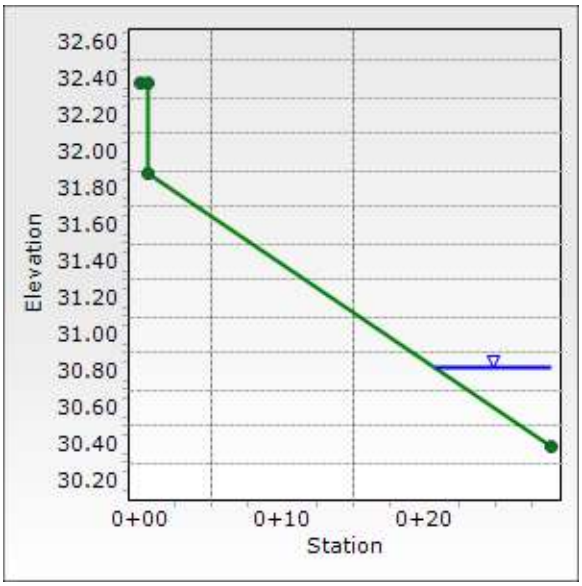
GVF Output Data	
Upstream Depth	0.00
Profile Description	N/A
Profile Headloss	0.00
Downstream Velocity	0.00
Upstream Velocity	0.00
Normal Depth	0.43
Critical Depth	0.40
Channel Slope	0.005
Critical Slope	0.007

Messages	
Messages	Water Surface Elevation exceeds lowest end station by 0.428980061720392ft.

Cross Section for Section 5 - Onsite Calc (Developed, ON2 - 100-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005
Normal Depth	0.43
Discharge	4.00



Section 6 - Onsite Calc (Developed, ON2 - 100-Year)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010
Discharge	4.00

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	32.35
0+00.50	32.35
0+00.50	31.85
0+23.00	30.50
0+24.50	30.40
0+26.00	30.50

Roughness Segment Definitions

Start Station & Elevation	End Station & Elevation	Roughness Coefficient
(0+00.00, 32.35)	(0+00.50, 32.35)	0.013
(0+00.50, 32.35)	(0+00.50, 31.85)	0.013
(0+00.50, 31.85)	(0+23.00, 30.50)	0.016
(0+23.00, 30.50)	(0+24.50, 30.40)	0.013
(0+24.50, 30.40)	(0+26.00, 30.50)	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
Elevation Range	30.40 to 32.35 ft
Flow Area	1.2
Wetted Perimeter	6.99
Hydraulic Radius	0.18
Top Width	6.75
Normal Depth	0.33
Critical Depth	0.37
Critical Slope	0.006
Velocity	3.21
Velocity Head	0.16
Specific Energy	0.48
Froude Number	1.315
Flow Type	Supercritical

Section 6 - Onsite Calc (Developed, ON2 - 100-Year)

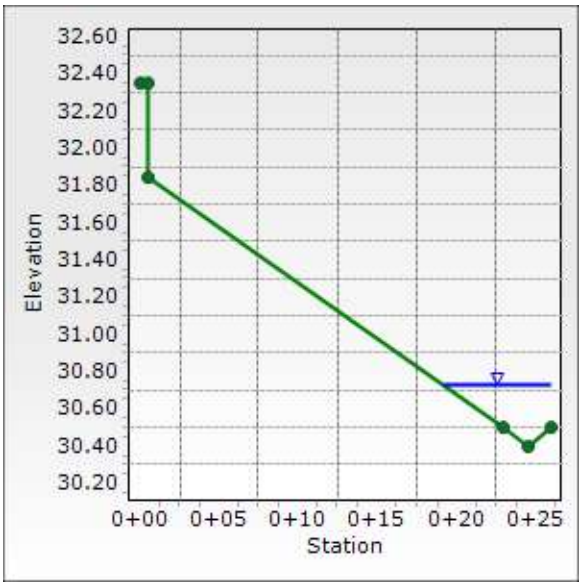
GVF Input Data	
Downstream Depth	0.00
Length	0.00
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00
Profile Description	N/A
Profile Headloss	0.00
Downstream Velocity	Infinity
Upstream Velocity	Infinity
Normal Depth	0.33
Critical Depth	0.37
Channel Slope	0.010
Critical Slope	0.006

Cross Section for Section 6 - Onsite Calc (Developed, ON2 - 100-Year)

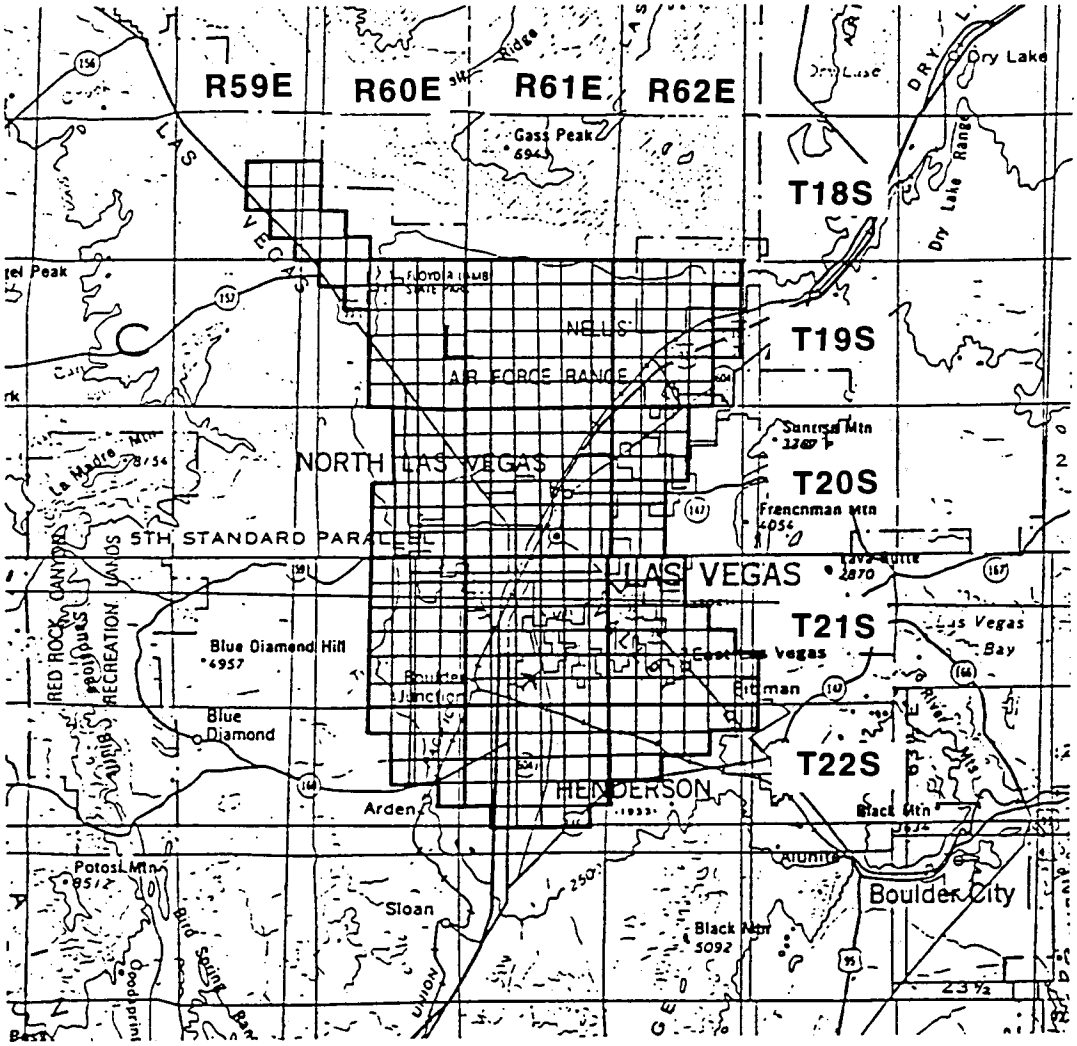
Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010
Normal Depth	0.33
Discharge	4.00



APPENDIX C

McCARRAN AIRPORT RAINFALL AREA


R59E
R60E
R61E
R62E
T18S
T19S
T20S
T21S
T22S
NELLIS
AIR FORCE RANGE
NORTH LAS VEGAS
LAS VEGAS
HENDERSON
Boulder City
Blue Diamond
Blue Diamond Hill
Arden
Sloan
Potosi Mtn
Gass Peak
Sunrise Mtn
Frenchman Mtn
Black Mtn
Dry Lake
Las Vegas Bay
Boulder Junction
Eastern Las Vegas
Eitman
Alunite
Dry Lake Range
Las Vegas Range
Sheep Range
Spring Mtns
Red Rock Canyon
Las Vegas Wash
Colorado River
Lake Mead
Lake Mohave
Lake Mojave
Lake Las Vegas
Lake Mead National Recreation Area
Floyd Lamb State Park
Las Vegas Motor Speedway
Las Vegas Boulevard
Las Vegas Blvd
Las Vegas Wash
Las Vegas Valley
Las Vegas Bay
Las Vegas Range

DEPTH-DURATION-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA

(IN INCHES)

	RECURRENCE INTERVAL					
TIME	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 AREAS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
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 $I_a = 0.2S$.

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

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

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

Living Grace

April 2, 2021

Preface

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

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

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

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

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

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

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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

Custom Soil Resource Report
Soil Map

Map Scale: 1:749 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 35 70 140 210

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

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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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 16, Aug 26, 2020

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

Date(s) aerial images were photographed: Apr 3, 2019—May 14, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

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
300	Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes	2.3	100.0%
Totals for Area of Interest		**2.3**	**100.0%**

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Las Vegas Valley Area, Nevada, Part of Clark County

300—Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hrbp
Elevation: 1,800 to 2,600 feet
Mean annual precipitation: 4 to 6 inches
Mean annual air temperature: 63 to 68 degrees F
Frost-free period: 220 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Las Vegas

Setting

Landform: Basin-floor remnants
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from limestone

Typical profile

H1 - 0 to 1 inches: gravelly fine sandy loam
H2 - 1 to 7 inches: fine sandy loam
H3 - 7 to 11 inches: gravelly sandy clay loam
H4 - 11 to 15 inches: indurated

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 3 to 14 inches to petrocalcic
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0
Available water capacity: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Other vegetative classification: LIMY 3-5" P.Z. (030XB019NV_3)
Hydric soil rating: No

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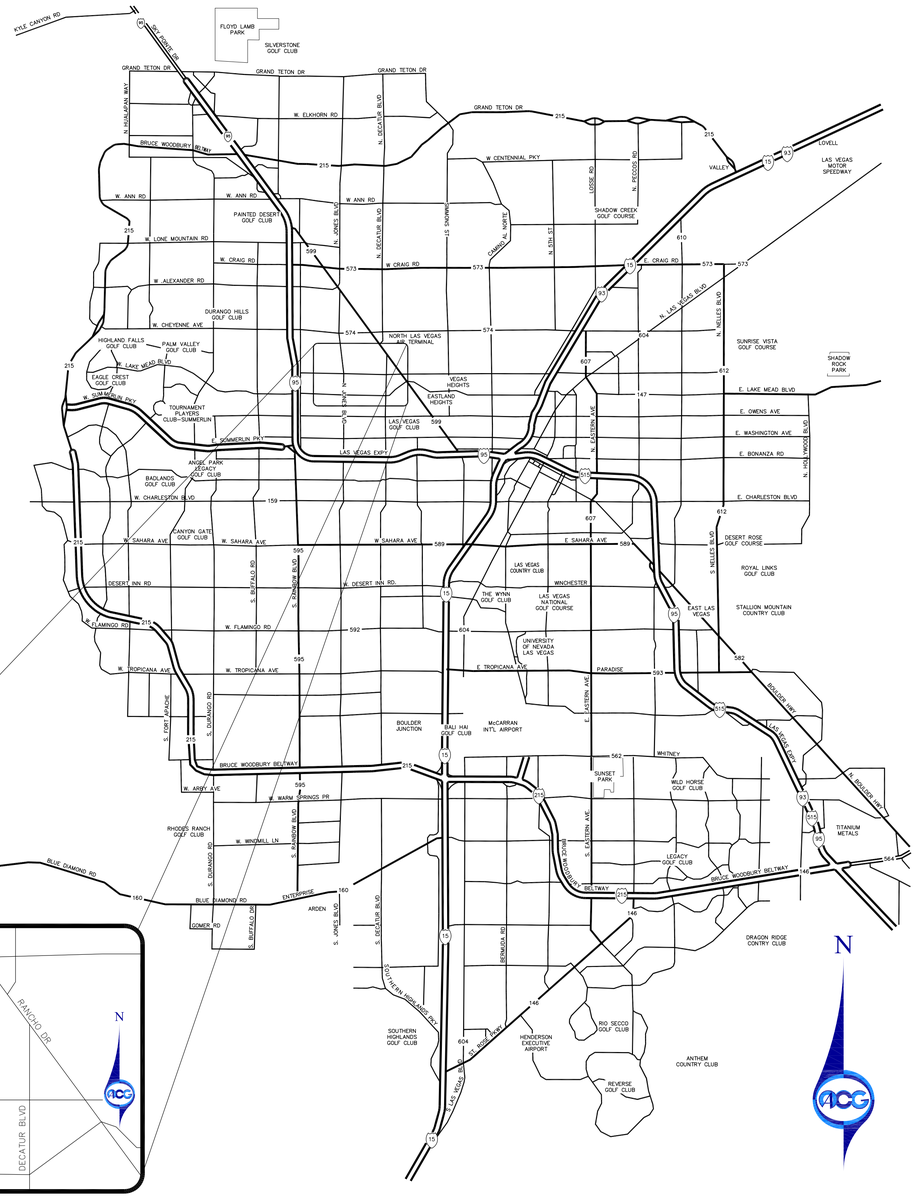
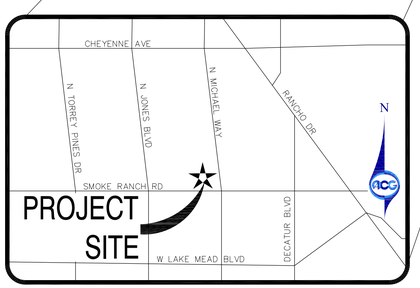
APPENDIX D

LIVING GRACE
CIVIL IMPROVEMENT PLANS

2400 N MICHAEL WAY
LAS VEGAS, NEVADA 89108
ACRES: 2.5
APN 128-13-403-001

ON-SITE DISTURBED ACREAGE: 2.5 AC
OFF-SITE DISTURBED ACREAGE: 0.15 AC





VICINITY MAP
NTS

SHEET INDEX	
DRAWING NO.	DESCRIPTION
C1	COVER SHEET
C2	GENERAL NOTES SHEET 1
C3	GENERAL NOTES SHEET 2
C4	LEGEND & ABBREVIATIONS
C5	HORIZONTAL CONTROL & TRAFFIC CONTROL PLAN
C6	GRADING PLAN
C7	UTILITY PLAN
C8	CROSS SECTIONS
C9	DETAILS

APPROVALS

LAS VEGAS FIRE & RESCUE — DATE

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES

PROJECT NO._____ FIRST APPROVED DATE:_____
LVVWD APPROVED FIRE FLOW: TOTAL 1,500 GPM/ONSITE 1,500 GPM
SHEETS C1 – C4, & C8

NEVADA POWER D.B.A. NV ENERGY — DATE

NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NEVADA POWER COMPANY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

CENTRAL TELEPHONE COMPANY, D.B.A. CENTURYLINK — DATE

THE AFFIXED CENTRAL TELEPHONE COMPANY, D.B.A. CENTURYLINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

COX COMMUNICATIONS LAS VEGAS, INC. — DATE

SOUTHWEST GAS CORPORATION — DATE

ENGINEER'S SEAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEVADA.

LICENSE #14985

4/9/2021
DATE

ENGINEERING FIRM

ACG DESIGN
NATHAN JONES
4310 CAMERON ST. STE. 12–A
LAS VEGAS, NV 89103
PHONE: (702) 278–2715

OWNER/DEVELOPER

CHURCH INTERNATIONAL FOURSQUARE GOSPEL
2400 N MICHAEL WAY
LAS VEGAS, NV 89108

CAUTION TO CONTRACTOR

THE CONTRACTOR SHALL BE RESPONSIBLE TO INVESTIGATE AND VERIFY THE ACTUAL LOCATION AND DEPTH OF ALL EXISTING UNDERGROUND FACILITIES AT LEAST 48 HOURS IN ADVANCE OF THE PERFORMANCE OF ANY WORK.

NOTE

THESE PLANS SHALL NOT, IN PART OR IN WHOLE, BE USED FOR CONSTRUCTION UNTIL APPROVED AND SIGNED BY THE GOVERNING AGENCY.

ENGINEER TO BE NOTIFIED OF ANY DISCREPANCIES IMMEDIATELY.

BASIS OF BEARINGS

NORTH 89°02'07" WEST
BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 13, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, SHOWN AS THE CENTERLINE OF SMOKE RANCH ROAD IN BOOK 23 OF PLATS, PAGE 100, CLARK COUNTY, NEVADA OFFICIAL RECORDS.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5LV0013S6

RIVET & PLATE IN TOP OF CURB AT NW CORNER OF MICHAEL WAY & CLEARY CT

ELEVATION = 679.84 METERS = 2,230.44 U.S. SURVEY FEET (NAVD 88')

SURVEY MONUMENTATION NOTE

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

FLOOD ZONE INFORMATION

AS SHOWN BY FLOOD INSURANCE RATE MAP NO. 32003C2155F, DATED NOVEMBER 16, 2011, LOCATED IN UNSHADED ZONE X, AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

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

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

FAST
Call before you UnderGround
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

REVISIONS / APPROVAL

REV.	DESCRIPTION	APRVD. BY	DATE

LIVING GRACE FOURSQUARE CHURCH

COVER SHEET

APN: 138-13-403-001
2400 N MICHAEL WAY
LAS VEGAS, NEVADA 89108

ACG DESIGN
4310 CAMERON ST. SUITE 12-A
LAS VEGAS, NEVADA 89103
OFFICE: 702.448.8737
WEBSITE: WWW.ACG.DESIGN

ENGINEER'S SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA
RANDOLPH A. SKORPINSKI
EXP: 06-30-22
CIVIL
No. 14985
4/9/2021

DATE:	3/19/2021
PROJ. NO:	200279
DRAWN BY:	ARB
CHECKED BY:	RAS
SCALE:	AS NOTED
JURISDICTION:	LAS VEGAS

DRAWING NUMBER:
C1
SHEET 1 OF 9
AGENCY NUMBER:

J:\PROJECTS_CURRENT\COMMERCIAL CLIENTS\CHURCHES CONTRACTING\200279-LIVING GRACE\ENGINEERING\CIVIL DRAWINGS\IMPROVEMENT PLANS\200279-C1_C4-CV.DWG 3/19/2021 8:41 AM

CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".

2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE'S WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.

3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.

4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.

5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.

6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.

7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300'IN EXTRUDED-TYPE CURB.

8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.

9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.

10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.

11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.

12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE (COMPANY , _ REPORT #, DATE) APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.

13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.

14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.

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

WALL NOTES:

16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.

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

18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.

19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.

20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC, THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.

21. AFTER HAUNCHING AND PRIOR TO BACKFILL OPERATIONS WHICH WOULD COVER SANITARY SEWER AND STORM DRAIN FACILITIES, CONTRACTOR IS REQUIRED TO SCHEDULE CLV OPEN-TRENCH UTILITY SURVEY INSPECTION FOR DETERMINATION OF FINAL LOCATION COORDINATES. FACILITIES TO BE LOCATED BY CLV SHALL INCLUDE AT A MINIMUM THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLE, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AND THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS.

22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST ADDITION.

23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

NOTICE TO CONTRACTOR

1. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR SHALL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONALS HARMLESS FROM ALL LIABILITY, REAL OR ALLEGED IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL.

2. CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND SHALL REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.

3. THE EXISTENCE AND APPROXIMATE LOCATION OF ANY UNDERGROUND FACILITIES SHOWN HEREON WERE OBTAINED FROM A SEARCH OF AVAILABLE RECORDS. THERE MAY, HOWEVER BE EXISTING UTILITIES NOT SHOWN ON THE PLANS. THE CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT THE UTILITIES OR STRUCTURES SHOWN HEREON AND ANY OTHER NOT OF RECORD OR NOT SHOWN ON THESE PLANS.

4. 14 GAUGE SOLID COPPER WIRE FOR LINE LOCATION SHALL BE REQUIRED OVER ALL SERVICE LATERALS NOT INSTALLED PERPENDICULAR TO THE MAIN IN ACCORDANCE WITH UDACS PLATE No. 27.

5. SEE PLAN AND PROFILE AND MASTER UTILITY SHEETS FOR COMPLETE WATER AND SEWER DESIGN.

6. CONTRACTOR SHALL BE RESPONSIBLE FOR DUST AND EROSION CONTROL DURING CONSTRUCTION.

7. SEE LANDSCAPE PLANS FOR LANDSCAPING. (SEE ARCH PACKAGE– COMPLETED BY OTHERS)

CITY OF LAS VEGAS GRADING NOTES

1. IN THE EVENT THAT ANY UNFORESEEN CONDITIONS NOT COVERED BY THESE NOTES ARE ENCOUNTERED DURING GRADING OPERATIONS, THE OWNER/ENGINEER SHALL BE IMMEDIATELY NOTIFIED FOR DIRECTION.

2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM ALL NECESSARY CUTS AND FILLS WITHIN THE LIMITS OF THIS PROJECT AND THE RELATED OFF-SITE WORK, SO AS TO GENERATE THE DESIRED SUBGRADE, FINISH GRADES AND SLOPES SHOWN.

3. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ALL EXCAVATION. ADEQUATE SHORING SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR TO PREVENT UNDERMINING OF ANY ADJACENT FEATURES OR FACILITIES AND/OR 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.

CITY OF LAS VEGAS TRAFFIC NOTES

1. ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.

2. THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.

3. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING CITY STREETS WHERE WARRANTED IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.

4. WHEN A DESIGNATED "SAFE ROUTE TO SCHOOL" IS ENCROACHED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO BE ASSISTED IN THE SAFE CROSSING THROUGH THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A QUALIFIED "CROSSING GUARD". THE GUARD SHALL BE PRESENT FOR THE FULL DURATION OF TIME THAT CHILDREN ARE LIKELY TO BE PRESENT.

5. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW TRAFFIC SIGNS SHALL BE FABRICATED WITH DIAMOND GRADE VIP CLASS 6 REFLECTIVE SHEETING OR APPROVED EQUAL. ALL NEW TRAFFIC SIGNS, EXCEPT STREETNAME AND SCHOOL SPEED LIMIT SIGNS, SHALL HAVE 3M SERIES 1160 OR APPROVED EQUIVALENT ANTI-GRAFFITI PROTECTIVE OVERLAY FILM; SCHOOL ZONE SIGNS SHALL HAVE 3M SERIES 1150 ANTI-GRAFFITI PROTECTIVE OVERLAY FILM. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON 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 STOPS 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 CITIZENS AREA TRANSIT (C.A.T.) IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP OR HAS AN ADVERSE EFFECT ON BUS SERVICE ON THAT STREET TO ARRANGE FOR TEMPORARY RELOCATION OF STOP.

13. GUARDS SHALL BE OBTAINED BY CONTACTING THE METROPOLITAN POLICE DEPARTMENT SPECIAL EVENTS UNIT (PHONE # 828-3442) WHO WILL PROVIDE OFFICERS PROPERLY TRAINED IN TRAFFIC CONTROL. 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 OTHERWISE DIRECTED BY THE CITY OF LAS VEGAS TRAFFIC ENGINEER.

15. THE CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEERING DIVISION (TRANSPORTATION SECTION) THROUGH THE PROJECT'S OFFSITE INSPECTOR PRIOR TO INITIATING PAVING TO RECEIVE DIRECTION FOR ANY PERMANENT OR TEMPORARY MODIFICATIONS TO THE APPROVED DRAWINGS REGARDING FINAL PAVEMENT TRANSITIONS, MARKINGS AND SIGNING THAT ARE REQUIRED TO MATCH ADJACENT ROADWAY SEGMENTS. THE CONTRACTOR SHALL PROVIDE A DRAWING FOR APPROVAL BY THE TRAFFIC ENGINEERING DIVISION DEPICTING ANY ADJUSTMENTS TO THE FINAL PAVEMENT MARKINGS AND SIGNAGE, WHICH MAY INCLUDE OMITTING, ADDING OR MODIFYING PAVEMENT MARKINGS AND TRAFFIC CONTROL SIGNS SUCH THAT ADEQUATE TRANSITIONS AND LANE TERMINATIONS BETWEEN ADJACENT ROADWAY SEGMENTS ARE CONSTRUCTED.

CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS'CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.

2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.

3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.

4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.\

5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.

6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" 'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.

7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.

8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A"CONTRACTORS.

9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS 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.

CITY OF LAS VEGAS STREETLIGHT NOTES

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. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS, ETC., LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF TRAFFIC ENGINEERING AND THE CITY ENGINEER. ANY DEVIATION FROM THE PLAN LOCATION WILL REQUIRE COMPLIANCE WITH SECTION 623 OF THE USS.

3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION IN ACCORDANCE WITH SECTION 623 G.03.01 OF THE USS..

4. ALL EMPTY CONDUIT SHALL HAVE AT LEAST ONE GREEN #8 AWG WIRE INSTALLED AS TRACER WIRE IN ACCORDANCE WITH SECTION 623 G.02.01 OF THE USS PRIOR TO BACKFILLING AND FINAL INSPECTION.

5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN ACCORDANCE WITH THE USD NO. 320A WHEN POLE IS INSTALLED BEHIND SIDEWALK, AND SHALL AT NO TIME COMPLETELY ENCLOSE THE STREET LIGHTING POLE.

6. 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.

7. SERVICE POINT SHALL BE COORDINATED WITH NV ENERGY COMPANY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE CIVIL PLANS.

8. 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.

9. THE CONTRACTOR SHALL FURNISH COMPLETE CONDUIT, WIRE, ETC., FROM SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES

PROJECT NO._____ FIRST APPROVED DATE:_____

LVVWD APPROVED FIRE FLOW: TOTAL 1,500 GPM/ONSITE 1,500 GPM

REVISIONS			APPROVAL	
REV.	DESCRIPTION	APRVD. BY	DATE	

LIVING GRACE FOURSQUARE CHURCH

GENERAL NOTES SHEET 1

APN: 138-13-403-001
2400 N MICHAEL WAY
LAS VEGAS, NEVADA 89108

ACG DESIGN
4310 CAMERON ST, SUITE 12-A
LAS VEGAS, NEVADA 89103
OFFICE: 702.448.8737
WEBSITE: WWW.ACG.DESIGN

ENGINEER'S SEAL

4/9/2021

DATE:	3/19/2021
PROJ. NO:	200279
DRAWN BY:	ARB
CHECKED BY:	RAS
SCALE:	AS NOTED
JURISDICTION:	LAS VEGAS

DRAWING NUMBER:
C2
SHEET 2 OF 9

AGENCY NUMBER:

Z:\PROJECTS_CURRENT\COMMERCIAL CLIENTS\SHOWCASE CONTRACTING\200279-LIVING GRACE\ENGINEERING\CIVIL DRAWINGS\IMPROVEMENT PLANS\200279-G1_G4-CI.DWG 3/19/2021 8:41 AM

LAS VEGAS FIRE & RESCUE PREVENTION GENERAL NOTES FOR HYDRANTS AND ACCESS

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE #6631 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICTS –APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON–SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. IFC § 105.6.15
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. IFC § 3310, § 3312
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. IFC § 507.5.7.3
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. IFC § 106.3
7. ALL ON–SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. IFC § 507.2.1, NFPA 24
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. IFC § 507
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. IFC § 507.5.7.1
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. IFC § 507
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: IFC § C102
    - RESIDENTIAL –500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
    - COMMERCIAL –300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. IFC § C102.8
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL–DE–SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL–DE–SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. IFC § C102.10
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE–TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. IFC § C102.4
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. IFC § C102.7
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD–END STREET SHALL NOT EXCEED 200 FT. IFC § C102.6
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD–INS ARE INSTALLED ON A SINGLE SYSTEM. FOR SYSTEMS REQUIRED TO HAVE TWO (2) SOURCES OF WATER SUPPLY, SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD–INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION. FOR SYSTEMS PERMITTED TO HAVE ONE SOURCE OF WATER SUPPLY, SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 3 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD–INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION. IFC § C104
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL–WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. IFC § 503.2.3
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12%. ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. IFC § 503.2.7, § 503.2.8
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. IFC § 503.2.4
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13FT 6 INS. IFC § 503.2.1
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 33 FT WITH PARKING ON BOTH SIDES MEASURED TO FACE OF CURB. NOT LESS THAN 28 FT WIDE WITH PARKING RESTRICTED TO ONE SIDE MEASURED TO FACE OF CURB. NOT LESS THAN 24 FT WIDE WITH NO PARKING ON EITHER SIDE MEASURED TO FACE OF CURB. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. IFC § 503.2.1.1
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. IFC § 503.1.1
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 200 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD–ENDS OR A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. CLV REGULATION AND MOU
26. ALL DEAD–END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. CLV REGULATION
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. IFC § 503.3
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. IFC § 503.6
29. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS, OR HAVING FOUR OR MORE TRAVEL LANES AND A TRAFFIC COUNT OF MORE THAN 30,000 VEHICLES PER DAY, ALL HYDRANTS BEING UTILIZED TO DELIVER FIRE FLOW TO THE PROPOSED LOCATION SHALL BE LOCATED ON THE SAME SIDE OF THE STREET AS THE PROPOSED DEVELOPMENT. CLV REGULATION

LAS VEGAS VALLEY WATER DISTRICT STANDARD NOTES: LVVWD PROJECT #_____

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258–7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. 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 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 APPROVED PRODUCTS LIST FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS BY SUBMITTING SHOP DRAWINGS.
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.

DEVIATIONS:

- NONE

SOUTHWEST GAS CORPORATION GENERAL NOTES

1. IN THE EVENT OF NATURAL GAS EMERGENCIES CALL 911 AND 1–877–860–6020.
2. MINIMUM HORIZONTAL AND VERTICAL CLEARANCE BETWEEN NATURAL GAS FACILITIES AND ANY UNDERGROUND UTILITIES AND/OR STRUCTURES, INCLUDING BUT NOT LIMITED TO WATER, SEWER, STORM DRAIN, COMMUNICATIONS, AND ELECTRIC SHALL BE AT LEAST 12–INCHES OR GREATER AS DICTATED BY LOCAL CODES AND STANDARDS.
    (A) ANY DEVIATION FROM SPECIFIED MINIMUM CLEARANCES MUST BE APPROVED BY ALL AFFECTED UTILITIES AND/OR MUNICIPALITIES.
3. FOR VALVE ADJUSTMENT CONTACT (702) 528–7881 14 DAYS PRIOR TO CONSTRUCTION.
4. IN THE EVENT OF A NATURAL GAS CONFLICT WITH PROPOSED UTILITIES AND STRUCTURES CONTACT (702)365–2099.

CAUTION: HIGH PRESSURE GAS!!!
CALL SOUTHWEST GAS AT (702) 278–8451 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES 48 HOURS PRIOR TO CONSTRUCTION.

REVISED 3/04/2020

SOUTHWEST GAS CORPORATION DATE:

LAS VEGAS FIRE & RESCUE DATE:

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES

PROJECT NO._____ FIRST APPROVED DATE:_____
LVVWD APPROVED FIRE FLOW: TOTAL 1,500 GPM/ONSITE 1,500 GPM

FAST Call before you UnderGround 1-702-432-5300 — NEVADA 811 SYSTEM OF TRANSMISSION

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

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

REVISIONS

REV.	DESCRIPTION	APRVD. BY	DATE

APPROVAL

LIVING GRACE FOURSQUARE CHURCH

GENERAL NOTES SHEET 2

APN: 138-13-403-001
2400 N MICHAEL WAY
LAS VEGAS, NEVADA 89108

ACG DESIGN
4310 CAMERON ST. SUITE 12-A
LAS VEGAS, NEVADA 89103
OFFICE: 702.448.8737
WEBSITE: WWW.ACG.DESIGN

ENGINEER'S SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA
RANDOLPH A. SKORPINSKI
EXP: 06-30-22
CIVIL
No. 14985
4/9/2021

DATE:	3/19/2021
PROJ. NO:	200279
DRAWN BY:	ARB
CHECKED BY:	RAS
SCALE:	AS NOTED
JURISDICTION:	LAS VEGAS

DRAWING NUMBER: C3
SHEET 3 OF 9
AGENCY NUMBER:

Z:\PROJECTS_CURRENT\COMMERCIAL CLIENTS\SHOWCASE CONTRACTING\200279-LIVING GRACE\ENGINEERING\DWG DRAWINGS\IMPROVEMENT PLANS\200279-01_C4-GVDWG 3/19/2021 8:41 AM

ABBREVIATIONS

ABAN	ABANDON
AB	AGGREGATE BASE
ABS	ABSOLUTE
AC	ASPHALTIC CONCRETE
ACKV	AUTOMATIC CHECK VALVE
ADA	AMERICAN DISABILITY ACT
ADDL	ADDITIONAL
ADDM	ADDENDUM
ADJ	ADJUSTABLE
AGG	AGGREGATE
AL	ALUMINUM
AMT	AMOUNT
&	AND
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APN	ASSESSOR PARCEL NUMBER
APPROX	APPROXIMATE
APPVD	APPROVED
ASPH	ASPHALT
ASSN	ASSOCIATION
ASSY	ASSEMBLY
ASTM	AMERICAN SOCIETY OF TESTING MATERIALS
AVE	AVENUE
AWWA	AMERICAN WATER WORKS ASSOCIATION
BC	BOLT CIRCLE/BACK OF CURB
BCR	BACK OF CURB RADIUS BEGINNING OF CURVE RETURN
BDRY LINE	BOUNDARY LINE
BETW, B/W	BETWEEN
BK	BOOK/BACK
BLDG	BUILDING
BLK	BLOCK
BLM	BUREAU OF LAND MANAGEMENT
BLVD	BOULEVARD
BM	BENCHMARK
BO	BLOW OFF ASSEMBLY
BC, BOC	BACK OF CURB
BOT	BOTTOM
BW, BOW	BACK OF WALK
BPV	BACK PRESSURE VALVE
BRG	BEARING
BS	BACK SIGHT
BVC	BEGINNING OF VERTICAL CURVE
BSW	BACK OF SIDEWALK
C	CONDUIT
C&G	CURB & GUTTER
CAP	CAPACITY
CATV	CABLE TELEVISION
CAV	COMBINATION AIR VALVE
CC	CLARK COUNTY
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT
CI	CAST IRON
CIP	CAST IRON PIPE/CAST IN PLACE
CIR	CIRCLE
CIRCUM	CIRCUMFERENCE
CL OR ℄	CENTERLINE
CO	COUNTY/COMPANY/CONTRACT
COL	COLUMN
CONC	CONCRETE
CONST	CONSTRUCTION
COR	CORNER
CONC	CONCRETE
CONN	CONNECTION
CONT	CONTINUE OR CONTINUOUS
CTR	CENTER
CU	CUBIC
CY	CUBIC YARD
D OR △	DELTA ANGLE
D/W	DRIVEWAY
DBO	DESIGNED BY OTHERS
DCSWCS	DESIGN AND CONSTRUCTION STANDARDS FOR WASTE WATER COLLECTION SYSTEMS
DEMO	DEMOLITION
DEPT	DEPARTMENT
DET	DETAIL
DEV	DEVELOPMENT
DI	DROP INLET OR DUCTILE IRON
DIA OR Ø	DIAMETER
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DIR	DIRECTION
DIST	DISTANCE
DMH	DROP MANHOLE
DOM	DOMESTIC
DR	DRIVE
DWG	DRAWING
DWY	DRIVEWAY
E	EAST
EC	EXISTING CONCRETE
ECR	END OF CURVE RETURN
EOC	END OF CURVE
EOP	EDGE OF PAVEMENT
EOS	EDGE OF SHOULDER
ESMT	EASEMENT
EVC	END OF VERTICAL CURVE
EX	EXISTING
FC	FACE OF CURB
FF	FINISHED FLOOR
FG	FINISHED GRADE
FH	FIRE HYDRANT
FL OR ℄	FLOW LINE
FN	FENCE
FOW	FACE OF WALL
FSTNR	FASTENER
FT	FOOT OR FEET
FUT	FUTURE
GB	GRADE BREAK
GM	GAS METER
GPM	GALLONS PER MINUTE
GRD	GRADE
GRT	GRATE
GUT	GUTTER
GV	GATE VALVE
HERCP	HORIZONTAL/ELLIPTICAL REINFORCED CONCRETE PIPE
HP	HIGH POINT
IN	INCH
INSTR	INSTRUMENT
INT	INTERIOR
INV	INVERT
IRR	IRRIGATION
LEN OR L	LENGTH OF CURVATURE
LF	LINEAR FOOT
LT	LEFT/LIGHT
LVVWD	LAS VEGAS VALLEY WATER DISTRICT
M	METER
MAX	MAXIMUM
N	NORTH
NAP	NOT-A-PART
NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
NE	NORTHEAST
NG	NATURAL GROUND
NO. #	NUMBER
NPC	NEVADA POWER COMPANY
NTS	NOT TO SCALE
NW	NORTHWEST
MH	MANHOLE
MIN	MINIMUM
OHP	OVER HEAD POWER
OHTEL	OVER HEAD TELEPHONE
P	POLE/PRESSURE/PIPE/POWER
P/L / ℄	PROPERTY LINE
PERP	PERPENDICULAR
PG	PRESSURE GAGE
PKWY	PARKWAY
PRIV	PRIVATE
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE PIPE
QTY	QUANTITY
R	RADIUS
(R)	RADIAL
R.D.O.	ROOF DRAIN OUTLET PIPE LOCATION
RPDA	REDUCED PRESSURE DETECTOR ASSEMBLY
RPPA	REDUCED PRESSURE PRINCIPLE ASSEMBLY
RR	RAILROAD
ROW	RIGHT OF WAY
S/C	SAW CUT
SCCP	STEEL CYLINDER CONCRETE PIPE
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SW, SDWK	SIDEWALK
SE	SOUTHEAST
SEC	SECTION/SECOND(ARY)
SHT	SHEET
SIG	SIGNAL
SF, SQ FT	SQUARE FOOT (FEET)
SY, SQ YD	SQUARE YARD
SNBORS	SOUTHERN NEVADA BUILDING OFFICIALS REGIONAL STANDARD
SS	SANITARY SEWER
ST	STREET
STA	STATION
STD	STANDARD
SL, STLT	STREET LIGHT
SUR	SURVEY
SVZ	SITE VISIBILITY ZONE
T	TELEPHONE/TANGENT
TAN	TANGENT
TC	TOP OF CURB
TF	TOP OF FOOTING
TFW	TOP OF FLOOD WALL
TMH	TOP OF MANHOLE
TR.DR.	TRENCH DRAIN
TRW	TOP OF RETAINING WALL
TOT	TOTAL
TW	TOP OF WALL
TS	TRAFFIC SIGNAL
TRANS	TRANSITION/TRANSMISSION
(TYP)	TYPICAL
UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
USD	UNIFORM STANDARD DRAWINGS
VC	VERTICAL CURVE
VERT	VERTICAL
VG	VALLEY GUTTER
W/	WITH
WM	WATER METER
W	WATER
WV	WATER VALVE
YD	YARD

NOTE:
THIS IS A STANDARD ABBREVIATION SHEET. SOME ABBREVIATIONS MAY APPEAR ON THIS SHEET BUT NOT USED IN THE PLANS. ALL ABBREVIATIONS USED ON THE PLANS MUST APPEAR ON THIS SHEET.

UTILITY

	PROPOSED	EXISTING
WATER PIPELINE	W	W
BLOWOFF		
COMBINATION AIR VALVE	A	A
REDUCER		
WATER VALVE		
FIRE HYDRANT ASSEMBLY		
WATER METER	WM	WM
SANITARY SEWER MANHOLE		
STREET LIGHT (GENERIC SYMBOL NOT RELATED TO WATTAGE)		
ELECTRICAL BOX	ELEC	ELEC
ELECTRICAL PANEL BOX	ELEC PANEL	ELEC PANEL
CABLE TV	CTV	CTV
GAS LINE	G	G
SANITARY SEWER	SS	SS
UNDERGROUND POWER	UGP	UGP
UNDERGROUND TELEPHONE	UGTEL	UGTEL
VALVE (INITIALS INDICATE OWNERSHIP AND/ OR TYPE)		
UTILITY BOX (INITIALS INDICATE OWNER AND / OR TYPE)		
UTILITY STUB-OUT		
TRAFFIC CONTROL SIGN		
100 W LUMINAIRE		
150 W LUMINAIRE		
200 W LUMINARE		
250 W LUMINAIRE		
400 W LUMINAIRE		
750 W LUMINAIRE		
TRAFFIC SIGNAL POLE		
GATE VALVE		
DOUBLE CHECK DETECTOR ASSEMBLY (DCDA)	DCDA	DCDA
REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)	RPDA	RPDA
ROOF DRAIN OUTLET PIPE LOCATION		

GEOMETRIC

	PROPOSED	EXISTING
EDGE OF PAVEMENT		
FENCE	X X X	X X X
CURB, GUTTER AND SIDEWALK		
CENTER LINE	℄ ℄	℄ ℄
BLOCK WALL/RETAINING WALL		
SCREEN WALL		
STREET NAME SIGN		
DRIVEWAY	BACK OF SIDEWALK RIGHT-OF-WAY LINE BACK OF CURB	
WHEELCHAIR RAMP		

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

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

FAST
Call before you UnderGround
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES

PROJECT NO._____ FIRST APPROVED DATE:_____
LVVWD APPROVED FIRE FLOW: TOTAL 1,500 GPM/ONSITE 1,500 GPM

SITE PLAN

	PROPOSED	EXISTING
STEPS (NOTE TYPE AND NO. OF RISERS)		
EXISTING BUILDING & FOUNDATION		

MISCELLANEOUS

REFERENCE BUBBLE	DET / SHT — DETAIL OR SECTION REFERENCE NUMBER (DETAIL) OR LETTER (SECTION) DRAWING NUMBER OF SHEET WHERE DETAIL OR SECTION RESIDES C XX-XX — ALL SHEETS THAT REFERENCE TO THE DETAIL OR SECTION
IDENTIFICATION HEXAGON	XX
SAW CUT LINE-ASPHALT CONC. OR PCC CONC.	

DRAINAGE / GRADING

	PROPOSED	EXISTING
STORM DRAIN MANHOLE (SIZE AS NOTED PER PLAN)		
CONTOURS	2640 2640	2640 2640
STORM DRAIN (SIZE AS NOTED PER PLAN)	SD	SD
DIRECTION OF FLOW		
FLOW LINE OF DITCH OR CHANNEL		
DROP INLET	GRATE	GRATE
ELEVATIONS	0.00	(0.00)
CUT OR FILL SLOPES	TOP OF SLOPE TOE OF SLOPE	
VALLEY GUTTER		

SPECIAL SURVEY LEGEND & ABBREVIATIONS

W	WATER PULLBOX/ METER/SHUT OFF
E	ELECTRIC PULLBOX/ METER/TRANSFORMER
T	TELEPHONE PULLBOX/HANDHOLE
FO	FIBER OPTIC PULLBOX/HANDHOLE
SL	STREETLIGHT PULLBOX/HANDHOLE
TS	TRAFFIC SIGNAL PULLBOX/HANDHOLE
ICV	IRRIGATION CONTROL VALVE
SS	SANITARY SEWER
CTV	CATV PULLBOX/HANDHOLE
AL	AREA LIGHT PULLBOX/HANDHOLE
RB	RED BOX DVD RENTAL KIOSK

	FIRE HYDRANT
WV	WATER VALVE
GAS	GAS METER
SS	SEWER MANHOLE
GV	GAS VALVE
SSCO	SEWER CLEANOUT
	AREA LIGHT
	STREET LIGHT
	SIGN
IM	INTERCEPTOR MANHOLE
	TILE WALKWAY
	DESERT LANDSCAPE AREA
B	8" CONCRETE BOLLARD
1230	TRAFFIC SIGNAL POLE
	AREA LIGHT
SD	STORM MANHOLE
	SHRUB
	FLOWERS/PLANT
	TREE
	PALM TREE
	BUILDING COLUMN
TC	TRASH CAN

SURVEY

SURVEY MONUMENT	
PROPERTY LINE	℄
RIGHT-OF-WAY LINE	
PATENT RESERVATION OR EASEMENT LINE	
SECTION LINE	
CONCRETE MONUMENT	
CONCRETE MONUMENT SURVEY LINE	INTERSECTING CENTERLINE

REV.	DESCRIPTION	APRVD. BY	DATE
	REVISIONS	APPROVAL	

LIVING GRACE FOURSQUARE CHURCH

LEGEND & ABBREVIATIONS

APN: 138-13-403-001
2400 N MICHAEL WAY
LAS VEGAS, NEVADA 89108

ACG DESIGN
4310 CAMERON ST. SUITE 12-A
LAS VEGAS, NEVADA 89103
OFFICE: 702.448.8737
WEBSITE: WWW.ACG.DESIGN

ENGINEER'S SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA
RANDOLPH A. SKORPINSKI
EXP: 06-30-22
CIVIL
No. 14985
4/9/2021

DATE:	3/19/2021
PROJ. NO:	200279
DRAWN BY:	ARB
CHECKED BY:	RAS
SCALE:	AS NOTED
JURISDICTION:	LAS VEGAS

DRAWING NUMBER:
C4
SHEET 4 OF 9

AGENCY NUMBER:

Z:\PROJECTS_CURRENT\COMMERCIAL CLIENTS\SHOWCASE CONTRACTING\200279-LIVING GRACE\ENGINEERING\CIVIL DRAWINGS\IMPROVEMENT PLANS\200279-CL C4-CLVDWG 3/19/2021 8:41 AM

LEGEND

- PROPOSED AC PAVEMENT
- PROPOSED CONCRETE
- LIMITS OF PAVEMENT RESTORATION PER USD NO. 500.5
- PROPOSED NO PARKING AREA AND ADA ACCESSIBLE ROUTE

HANDICAP ACCESSIBILITY NOTE

CONTRACTOR TO COMPLY WITH ALL ADA REQUIREMENTS. IF CONTRACTOR FINDS DISCREPANCIES WITH ANY INFORMATION INDICATED ON THESE PLANS, ACG DESIGN, LLC IS TO BE NOTIFIED BY CONTRACTOR IMMEDIATELY.

ROOF DRAIN OUTLET NOTE

REFER TO ARCHITECTURAL/PLUMBING PLANS (BY OTHERS) FOR THE TREATMENT OF ROOF DRAIN OUTLETS.

STORMWATER MANAGEMENT NOTES:

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 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 BMP'S 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 BMP'S 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.
6. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL RESPOND TO STORMWATER INSPECTION CORRECTIVE ACTIONS IN THE MANNER PRESCRIBED BY CLARK COUNTY, INCLUDING BUT NOT LIMITED TO PROVIDING PHOTOS AND DESCRIPTIONS OF THE CORRECTIONS COMPLETED BY THE CONTRACTOR OR HIS AGENT.

BASIS OF BEARINGS

NORTH 89°02'07" WEST
BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 13, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, SHOWN AS THE CENTERLINE OF SMOKE RANCH ROAD IN BOOK 23 OF PLATS, PAGE 100, CLARK COUNTY, NEVADA OFFICIAL RECORDS.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5LV001356
RIVET & PLATE IN TOP OF CURB AT NW CORNER OF MICHAEL WAY & CLEARY CT
ELEVATION (METERS): 679.84
ELEVATION (FEET): 2,230.44 U.S. SURVEY FEET (NAVD 88)

LEGAL DESCRIPTION

THE SOUTH 350 FEET OF THE EAST 393 FEET OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 13, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA.

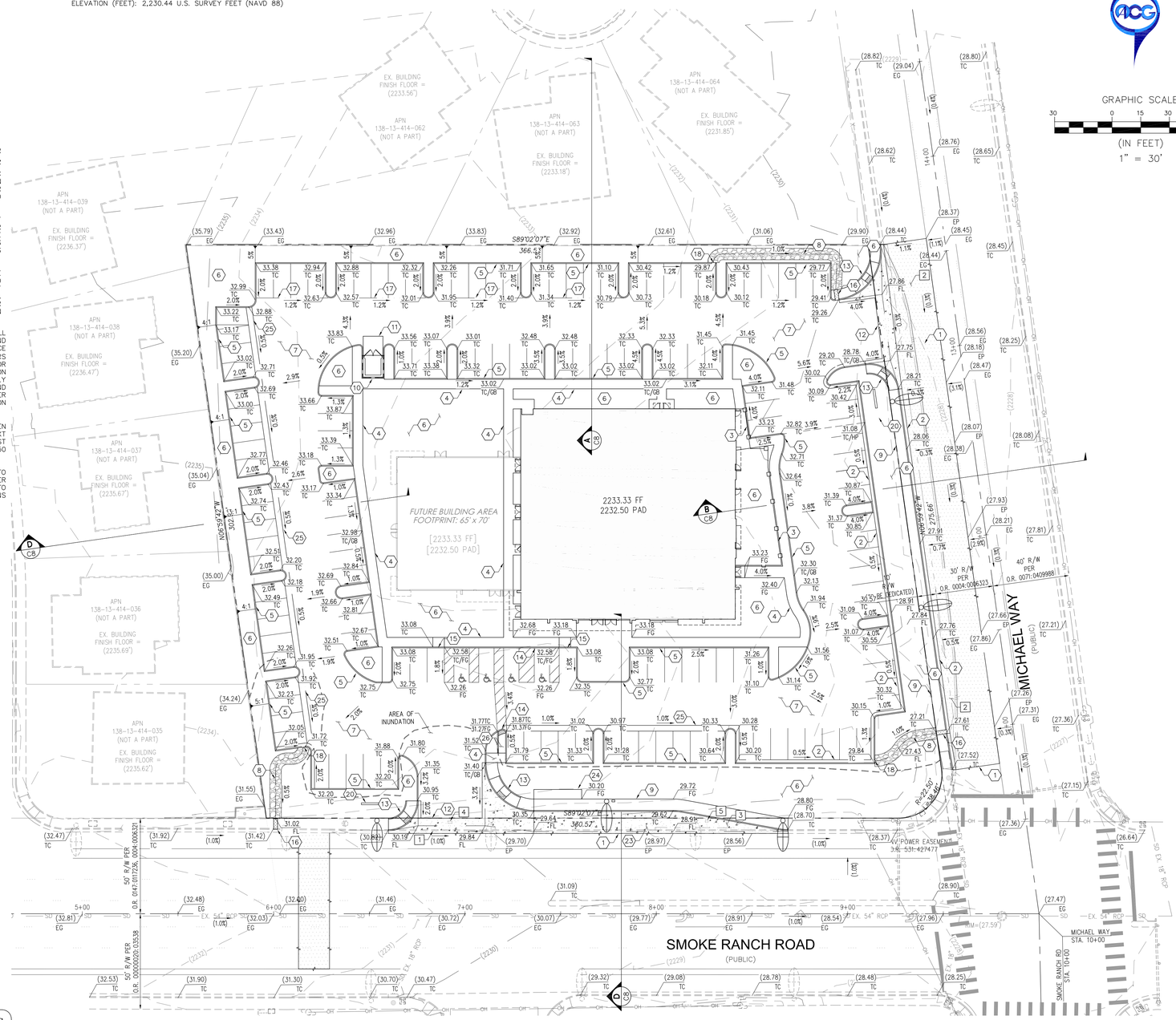
EXCEPTING THEREFROM THOSE PORTIONS AS CONVEYED FOR ROADWAY PURPOSES BY DEEDS RECORDED MARCH 26, 1954 IN BOOK 4 AS DOCUMENT NOS. 6321 AND 6322, AND RECORDED JULY 28, 1971 IN BOOK 147 AS DOCUMENT NO. 117236, OF OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

FLOOD ZONE INFORMATION

AS SHOWN BY FLOOD INSURANCE RATE MAP NO. 32003C2170F, DATED NOVEMBER 16, 2011, LOCATED IN UNSHADED ZONE X, AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

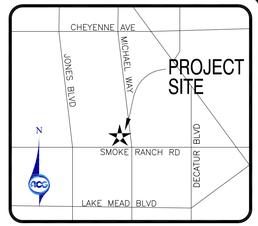
LANDSCAPE NOTE

REMOVE ALL EXISTING LANDSCAPE FEATURES SUCH AS TREES, SHRUBS, GRASS, DECORATIVE ROCK, TREE WELLS, ETC IN CONFLICT WITH PROPOSED IMPROVEMENTS. REFER TO ARCHITECTURAL LANDSCAPE PLAN.



N

GRAPHIC SCALE
30 0 15 30 60
(IN FEET)
1" = 30'



VICINITY MAP
NTS

REMOVAL NOTES

1. REMOVE EXISTING "L"-TYPE C&G.
2. REMOVE EXISTING AC PAVEMENT.
3. REMOVE EXISTING CONCRETE SIDEWALK.
4. RELOCATE EXISTING TRAFFIC SIGNAL VAULT AND CONDUIT. COORDINATE WITH APPROPRIATE AGENCY.
5. RELOCATE EXISTING STREET LIGHT VAULT AND CONDUIT. COORDINATE WITH APPROPRIATE AGENCY.

CONSTRUCTION NOTES

1. SAWCUT & MATCH EXISTING PAVEMENT.
2. CONSTRUCT "L" CURB AND GUTTER PER CCAUSD NO. 216.
3. INSTALL 6' HIGH WROUGHT IRON FENCE PER ARCHITECTURAL PLANS.
4. CONSTRUCT ON-SITE CONCRETE SIDEWALK PER DETAIL 6, SHEET C9.
5. CONSTRUCT MODIFIED "A" TYPE CURB PER DETAIL 1, SHEET C9.
6. LANDSCAPE AREA (DESIGNED BY OTHERS)
7. CONSTRUCT 3" ON-SITE PAVEMENT OVER 4" TYPE II AGGREGATE BASE (95% COMPACTION). 6" MINIMUM SCARIFICATION AND COMPACTION. REFER TO DETAIL 2, SHEET C9.
8. FLOWLINE OF PROPOSED SWALE PER BMP DESIGN CRITERIA. D_{BMP}=3 INCHES MIN., THICKNESS = 9 INCHES, 4:1 MAXIMUM SIDE SLOPES, 40' LONG X 6' WIDE MINIMUM. REFER TO LIMITS SHOWN ON PLAN AND DETAIL 9, SHEET C8.
9. CONSTRUCT OFF-SITE CONCRETE SIDEWALK PER CCAUSD NO. 234.
10. CONSTRUCT TRASH ENCLOSURE PER ARCHITECTURAL PLANS.
11. CONSTRUCT CONCRETE APRON FOR TRASH ENCLOSURE (6" CONCRETE SLAB WITH 6X6/1.4X1.4 W.W.F.) OVER 8" TYPE II AGGREGATE BASE. REFER TO DETAIL 4, SHEET C8.
12. CONSTRUCT 8" CONCRETE CROSS GUTTER AND SPANDRELS PER CCAUSD NO. 228 FOR COMMERCIAL DRIVEWAY PER CCAUSD NO. 222A & 225.
13. CONSTRUCT CONCRETE SIDEWALK RAMP WITH DETECTABLE TACTILE WARNINGS PER CCAUSD NO. 235. (CASE I, A=8', B=8' UNLESS OTHERWISE NOTED). 2% MAX. SLOPE IN LANDING AREA.
14. CONSTRUCT ZERO-INCH CURB FACE PER DETAIL 7, SHEET C8.
15. CONSTRUCT 0-INCH TO 6-INCH CURB FACE TRANSITION.
16. CONSTRUCT SIDEWALK DRAIN PER CCAUSD NO. 236.
17. CONSTRUCT FLOWLINE IN AC PAVEMENT. PROVIDE POSITIVE DRAINAGE AS INDICATED PER GRADES ON PLAN. (1% MINIMUM SLOPE).
18. PROVIDE 2' CURB OPENING TO ALLOW RUN-OFF TO SPILL OUT OF CURB. REFER TO DETAIL 10, SHEET C8.
20. MONUMENT SIGN (BY SEPARATE PERMIT).
21. INSTALL AREA LIGHT PER ELECTRICAL SITE PLAN (BY OTHERS).
22. LIMITS OF TRENCH BACKFILL AND PAVEMENT RESTORATION PER CCAUSD NO. 500.4 & 500.5 & 503..
23. CONSTRUCT CONCRETE BUS TURNOUT LANE PER CCAUSD NO. 234.4. REFER TO TYPICAL BUS TURN OUT DETAIL PER CCAUSD NO. 234.1.
24. CONSTRUCT CONCRETE BUS STOP PASSENGER LOADING W/SHELTER PAD PER CCAUSD NO. 234.2. & 234.5.
25. CONSTRUCT 3' VALLEY GUTTER PER DETAIL 5, SHEET C9.
26. CONSTRUCT CONCRETE SIDEWALK RAMP. ENSURE 5% MAXIMUM LONGITUDINAL SLOPE AND 2% MAXIMUM CROSS SLOPE.

NOTE

THESE PLANS SHALL NOT, IN PART OR IN WHOLE, BE USED FOR CONSTRUCTION UNTIL APPROVED AND SIGNED BY THE GOVERNING AGENCY.

ENGINEER TO BE NOTIFIED OF ANY DISCREPANCIES IMMEDIATELY.

FAST — Call before you UnderGround — 1-702-432-5300 — FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

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

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS.

RANDOLPH SKORPINSKI, P.E. (NV #14985) — DATE

REV.	DESCRIPTION	APRVD. BY	DATE

APPROVAL

REVISIONS

LIVING GRACE FOURSQUARE CHURCH

GRADING PLAN
APN: 138-13-403-001
2400 N MICHAEL WAY
LAS VEGAS, NEVADA 89108

ACG DESIGN
4310 CAMERON ST, SUITE 12-A
LAS VEGAS, NEVADA 89103
OFFICE: 702.448.8737
WEBSITE: WWW.ACG.DESIGN

ENGINEER'S SEAL
PROFESSIONAL ENGINEER — STATE OF NEVADA — RANDOLPH A. SKORPINSKI — EXP: 06-30-22 — CIVIL — No. 14985
4/9/2021

DATE:	4/8/2021
PROJ. NO:	200279
DRAWN BY:	ARB
CHECKED BY:	RAS
SCALE:	AS NOTED
JURISDICTION:	LAS VEGAS

DRAWING NUMBER: C6
SHEET 6 OF 9

AGENCY NUMBER:

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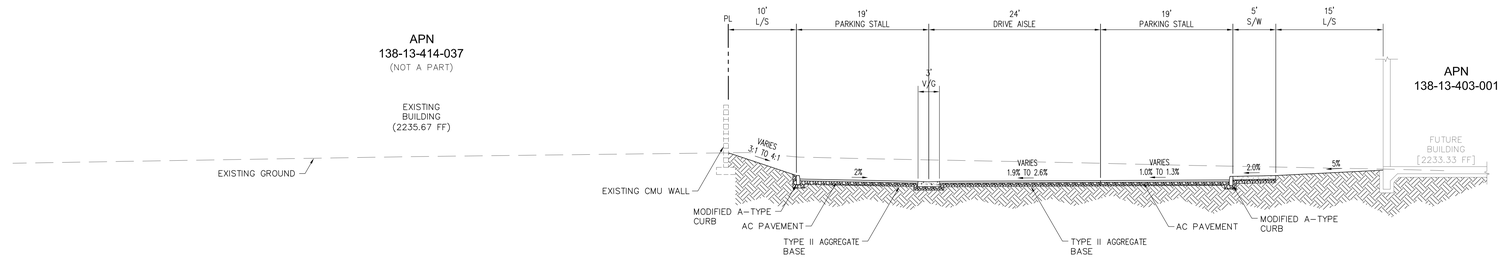
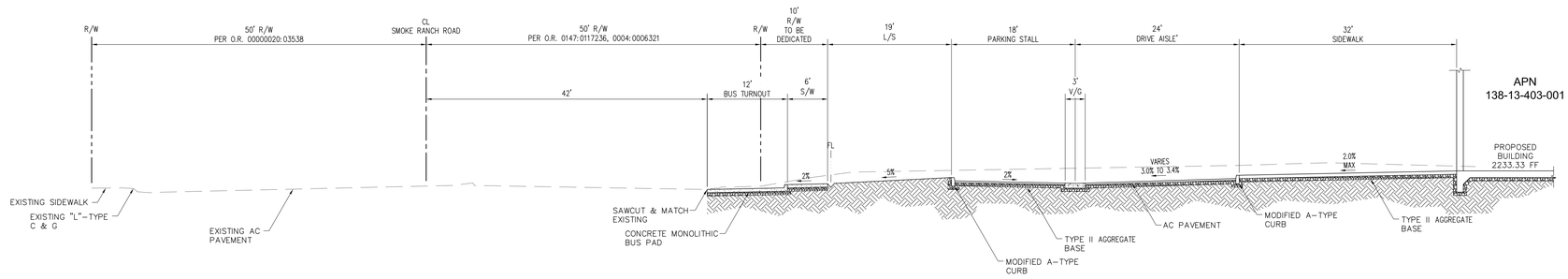


CROSS SECTION D
NTS



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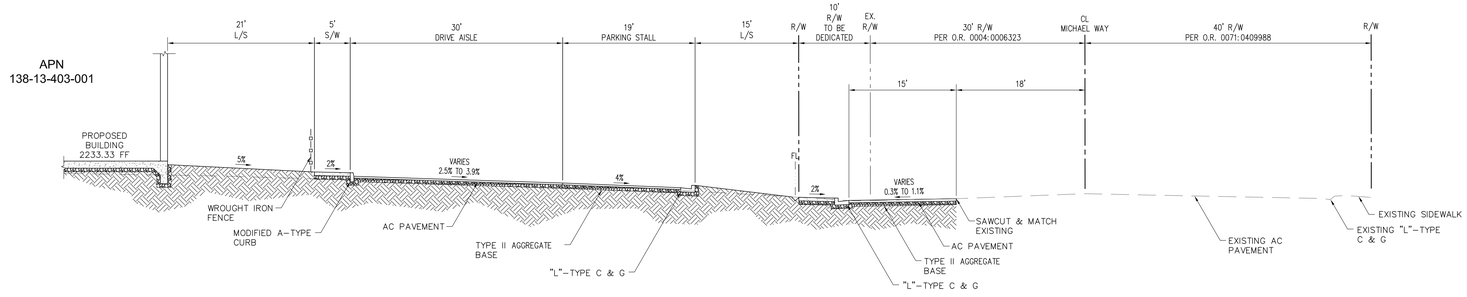

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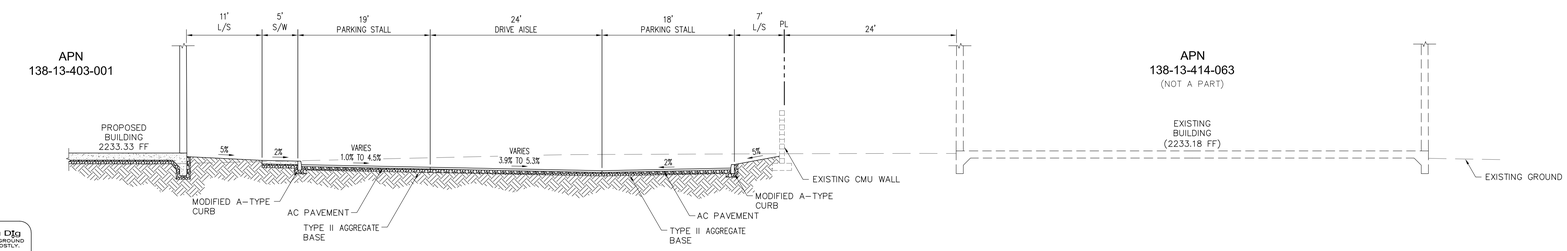

CROSS SECTION A
NTS

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

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Z:\PROJECTS\CURRENT\COMMERCIAL CLIENTS\SHOWCASE CONTRACTING\200279-LIVING GRACE\ENGINEERING\CIVIL DRAWINGS\IMPROVEMENT PLANS\200279-C8_09-XS-01.DWG 4/9/2021 8:59 AM

REVISIONS

REV.	DESCRIPTION	APRVD. BY	DATE

APPROVAL

LIVING GRACE FOURSQUARE CHURCH

CROSS SECTIONS
APN: 138-13-403-001
2400 N MICHAEL WAY
LAS VEGAS, NEVADA 89108

ACG DESIGN
4310 CAMERON ST. SUITE 12-A
LAS VEGAS, NEVADA 89103
OFFICE: 702.448.8737
WEBSITE: WWW.ACG.DESIGN

ENGINEER'S SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA
RANDOLPH A. SKORPINSKI
EXP: 06-30-22
CIVIL
No. 14985
4/9/2021

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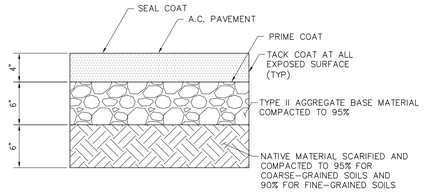
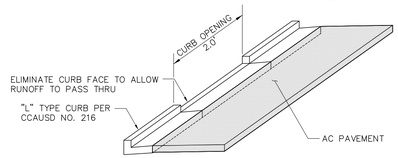
CHECKED BY:	RAS
SCALE:	AS NOTED
JURISDICTION:	LAS VEGAS

DRAWING NUMBER:
C8
SHEET 8 OF 9
AGENCY NUMBER:



NOTE:
ALL AGGREGATE BASES SHALL BE COMPACTED PER GEOTECHNICAL REPORT PW#
PRELIMINARY PAVEMENT SECTIONS SHALL BE VERIFIED WITH THE FINAL PAVEMENT SECTION RECOMMENDATION REPORT PRIOR TO CONSTRUCTION. IF FINAL PAVEMENT SECTIONS ARE DIFFERENT, A REVISION TO THE IMPROVEMENT PLANS WILL BE REQUIRED.

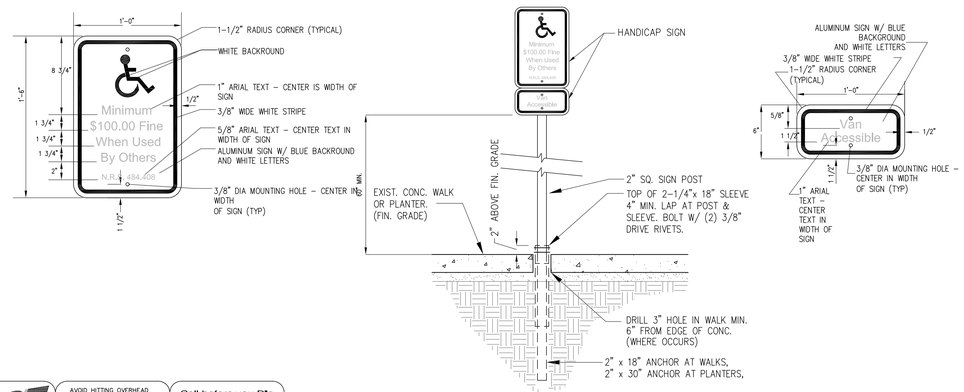
OFF-SITE AC PAVEMENT SECTION — 11
NTS



2' CURB OPENING — 10
NTS

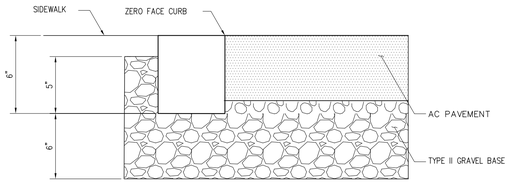
TRIBUTARY AREA > 0.5 AC, SWALE SLOPE ≤1%, SIDE SLOPES 4:1 MAXIMUM, MINIMUM LENGTH 40 FT, MAXIMUM DEPTH 9" FOR 2 YEAR FLOW
ROCK LINED, D50=6", THICKNESS = 12"

BMP SWALE DETAIL — 9
NTS

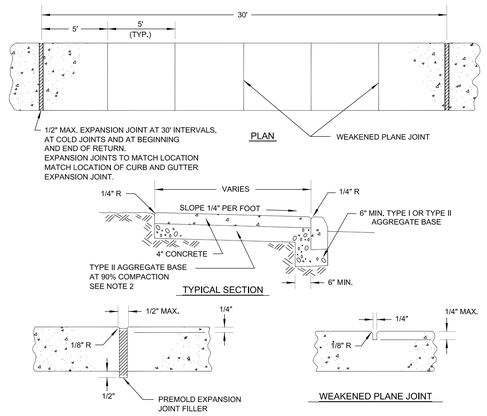


ALL COMPONENTS TO BE GALVANIZED SQUARE POST. ATTACH ANCHOR TO SLEEVE PRIOR TO DRIVING INTO GROUND.

HANDICAP ACCESSIBILITY SIGN — 8
N.T.S

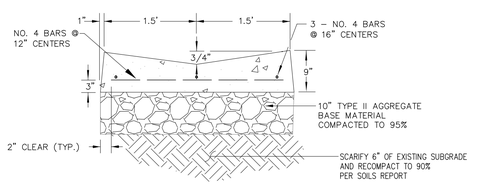


ZERO FACE CURB — 7
NTS



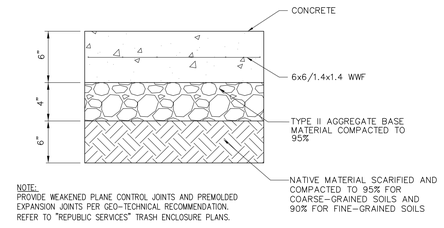
NOTES:
1. ON ALL CURB RETURNS A 1/2" MAX. EXPANSION JOINT SHALL BE CONSTRUCTED BETWEEN THE BACK OF CURB AND THE SIDEWALK FOR THE ENTIRE LENGTH OF THE RETURN.
2. THE TYPE II AGGREGATE BASE THICKNESS IS SHOWN ON THE TYPICAL SECTION DRAWINGS PER USD NO. 202 -207.
3. LONGITUDINAL WEAKENED PLANE JOINT REQUIRED AT MIDPOINT OF SIDEWALK 10' OR WIDER.
4. CONTRACTOR HAS THE OPTION TO SAWCUT OR TOOL WEAKENED PLANE JOINT.

ON-SITE SIDEWALK CONSTRUCTION DETAIL — 6
NTS



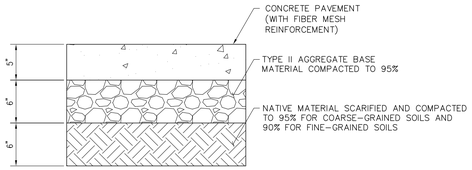
NOTES:
1. FINISHED ASPHALT CONCRETE SURFACE TO BE FLUSH WITH VALLEY GUTTER LIP.

3' VALLEY GUTTER — 5
NTS



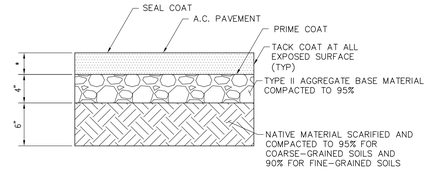
NOTE:
PROVIDE WEAKENED PLANE CONTROL JOINTS AND PREMOLDED EXPANSION JOINTS PER GEO-TECHNICAL RECOMMENDATION.
REFER TO "REPUBLIC SERVICES" TRASH ENCLOSURE PLANS.

CONCRETE SECTION FOR TRASH ENCLOSURE APRON — 4
NTS



NOTE:
PROVIDE WEAKENED PLANE CONTROL JOINTS AND PREMOLDED EXPANSION JOINTS PER GEO-TECHNICAL REPORT, SECTION 5.7.1
REFER TO GEOTECHNICAL REPORT BEFORE PLACEMENT OF PCC PAVEMENT

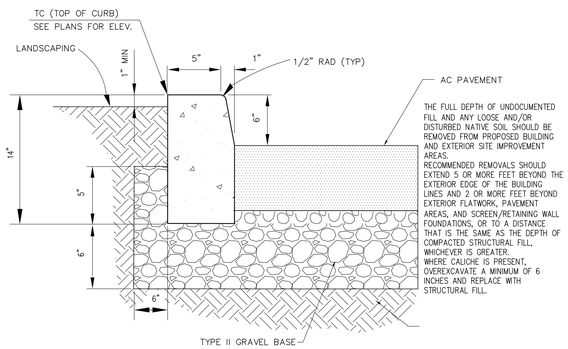
ON-SITE CONCRETE SECTION — 3
NTS



* 2" AC FOR AUTO PARKING
3" AC FOR MAIN CORRIDOR AND TRUCK ACCESS

REFER TO GEOTECHNICAL REPORT

ON-SITE AC PAVEMENT SECTION — 2
NTS



THE FULL DEPTH OF UNDOCUMENTED FILL AND ANY LOOSE AND/OR DISTURBED NATIVE SOIL SHOULD BE REMOVED FROM PROPOSED BUILDING AND EXTERIOR SITE IMPROVEMENT AREAS.
RECOMMENDED REMOVALS SHOULD EXTEND 5 OR MORE FEET BEYOND THE EXTERIOR EDGE OF THE BUILDING LINES AND 2 OR MORE FEET BEYOND EXTERIOR FLATWORK, PAVEMENT AREAS, AND SCREEN/RETAINING WALL FOUNDATIONS, OR TO A DISTANCE THAT IS THE SAME AS THE DEPTH OF COMPACTED STRUCTURAL FILL, WHICHEVER IS GREATER.
WHERE CALICHE IS PRESENT, OVEREXCAVATE A MINIMUM OF 6 INCHES AND REPLACE WITH STRUCTURAL FILL.

MODIFIED "A" CURB — 1
NTS

FAST
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FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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Call 811
OR
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REVISIONS

REV.	DESCRIPTION	APRVD. BY	DATE

APPROVAL

LIVING GRACE FOURSQUARE CHURCH

DETAILS

APN: 138-13-403-001
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ENGINEER'S SEAL
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DRAWING NUMBER:
C9
SHEET 9 OF 9

AGENCY NUMBER:

Z:\PROJECTS_CURRENT\COMMERCIAL CLIENTS\CHURCHES CONTRACTING\200279-LIVING GRACE\ENGINEERING\CIVIL DRAWINGS\IMPROVEMENT PLANS\200279-C8_C9-XS-DT.DWG 3/25/2021 12:47 PM