

DS #: 4747

APN: 139-21-314-001

PROJECT: WEST PREP ACADEMY ELEM. SCHOOL ADDITION

SUBMITTAL: 1ST

SCANNED BY/DATE: _____

CHECKED BY/DATE: _____



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		August 26, 2015
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:	
	West Prep Academy Elementary School Addition	
Cross Streets:	SEC of Lake Mead Blvd. & Pink Rose St.	
File Number:	F:\Depot\DSMemos\DS4747A.doc	
Parcel Number:	139-21-314-001	
Zoning Action:	PMP-60740	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES	NO X
		COPIES TO: GCW Engineers Surveyors Clark County School District Bart Anderson, P.E., DevCo CCRFCFCD CNLV

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	8/12/2015	8/26/2015	See Comments Below	\$400.00	409950: \$400
TOTAL FEES (LDDRS):				\$400.00	----

REMARKS:

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

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

1. Provide a copy of the zoning/planning conditions associated with this site (**PMP-60740**) with the next submittal to verify compliance with conditions. *Flood Control* will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the *City Council*). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.
2. Sites with a grade difference of 2 feet above or below existing are required to have approval from the *City Planning and Development Department*. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to the *City Planning Department* (229-6301). The engineer must provide Planning approval with the next submittal.
3. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCFCD) master planned facility. Therefore, CCRFCFCD concurrence is required prior to final approval of the drainage study.
4. The site is also adjacent to the jurisdiction of the *City of North Las Vegas*. The engineer must coordinate with *City of North Las Vegas Public Works Department* and incorporate any concerns for boundary conditions along the northern border. *City of North Las Vegas Public Works Department* concurrence is required prior to final acceptance of the subject study.

5. Provide an *Existing Drainage Conditions Map* in the next submittal.
6. The current school site consists of two parcels. Is there a parcel map to combine the two into one single lot? If yes, provide a note in the proposed parcel map for inter-lot drainage right. Provide a copy of the parcel map in the next submittal for verification. If no, a public drainage easement (privately maintained) must be delineated and granted in the parcel to the north to perpetuate drainage from the south parcel.
7. **Sheet C10:** During a worst case scenario that the trench grates are clogged, the resulting drainage will be on surface in the corridor between the new and the existing school buildings. The water surface appears will be inundating the adjacent buildings. Please address this in the next submittal.
8. Label an existing storm drain in *Lake Mead Boulevard* with *City of Las Vegas* recorded drawing number on *Sheet C8* and *Sheet C9*.

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

END OF REMARKS

ays

T/R/S: T20S/R61E/21

AREA M-21

 *** FAX TX REPORT ***

TRANSMISSION OK

JOB NO. 2379
 DESTINATION ADDRESS 7028042299
 PSWD/SUBADDRESS
 DESTINATION ID
 ST. TIME 08/26 14:46
 USAGE T 01' 01
 PGS. 2
 RESULT OK

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM

DATE:

August 26, 2015

TO:

Land Development Services
 Department of Building & Safety

FROM:

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

SUBJECT:

Drainage Study for:

West Prep Academy Elementary School Addition

COPIES TO:

GCW Engineers Surveyors

Cross Streets:

SEC of Lake Mead Blvd. & Pink Rose St.

Clark County School District

File Number:

F:\Depot\DSMemos\DS4747A.doc

Bart Anderson, P.E., DevCo

Parcel Number:

139-21-314-001

CCRFCD

Zoning Action:

PMP-60740

CNLV

FEMA Flood Zone

YES

NO

X

Proposed Storm Drain

YES

NO

X

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
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DS 4747
8/12/15
400 —
M-21
CCRFCD

**TECHNICAL DRAINAGE STUDY
FOR
WEST PREP ACADEMY ELEMENTARY SCHOOL
ADDITION**

858-004

AUGUST 2015

GCV
ENGINEERS & SURVEYORS

Prepared For:

**Domingo Cambeiro Corporation
3555 Pecos-McLeod Avenue
Las Vegas, Nevada 89121
Phone: (702) 732-0084
Fax: (702) 732-9602**

**TECHNICAL DRAINAGE STUDY
FOR
WEST PREP ACADEMY ELEMENTARY SCHOOL
ADDITION**

858-004

AUGUST 2015



Prepared For:

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HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: West Prep Academy Elementary School Addition Date: August 2015

Location of Development a) Descriptive (Cross Streets) North/South: Tonopah Drive
East/West: Lake Mead Boulevard

b) Section: 21 Township: 20 S Range: 61 E

c) APN: 139-21-314-001, 139-21-301-009

Name of Owner: Clark County School District

Telephone No.: (702) 799-3120 Fax No.: (702) 799-1858 E-Mail Address: sdrews@interact.ccsd.net

Address: 2050 Sapphire Stone Ave City of Las Vegas, Nevada 89106

Contact Person-Name: James A. Monroe Jr., PE Telephone No.: (702) 804-2133

* E-Mail Address: jmonroe@gcwallace.com Fax No.: (702) 804-2299

Firm: G. C. WALLACE COMPANIES

Address: 1555 S. Rainbow Blvd; Las Vegas, NV 89146

Type of Land Development/Land Disturbance

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

1. Total Owned Land Area: At Site: +/- 24.1 acres Being Developed/Disturbed: +/- 7.4 acres

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

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

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

5. Approximate upstream land area which drains to the subject site: N/A

6. Has the site drainage been evaluated in the past? ☒ Yes ☐ No If yes, please identify documentation: Technical Drainage Study for Las Longford at Lake Mead, Stanley Consultants. Update to the Technical Drainage Study for Las Longford at Lake Mead, GC Wallace. Technical Drainage Study for Lake Mead Tonopah Middle School CCSD #0842, Summit Engineering.

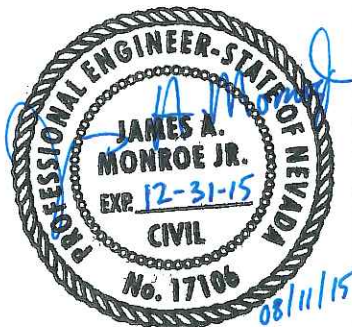
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Northwest corner of the site in Lake Mead Boulevard, and an existing Drainage easement east of the school site that drains into Stella Lake Street.

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

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.



Engineer's Seal

Local Entity File No.

Revision

Date

REFERENCE:

STANDARD FORM 1



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.
	N/A	Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street. Note: Proposed top of curb elevations must be provided for both sides of roadways even if only half street construction is required.
X		Label existing topography at a minimum 5 foot elevation interval including adjacent developments, finished floor elevations of existing buildings and top of existing curbs extending 100 feet* around the perimeter of the site. (*Measured from the centerline of the adjacent roadway.)

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

II. GRADING PLAN INFORMATION		
Yes	No	
	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.
X		Sites with a grade difference two feet above or below existing ground are required to have approval from City of Las Vegas Current Planning. Current Planning approval is required prior to final approval of the drainage study.
X		On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners. (The project must pass flows through the site every 600 feet where the project is blocking flow paths.)
	N/A	This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included.
X		Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW.

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

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

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

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

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name:	West Prep Academy Elementary School Addition	Map ID:
Firm Name:	G. C. Wallace, Inc.	Engineer: James A. Monroe Jr.
Address:	1555 S. Rainbow Blvd	
City:	Las Vegas	State: Nevada Zip: 89146
Phone Number:	804-2000	Fax Number: 804-2297

Property Owner: Clark County School District		
Address: 2050 Sapphire Stone Ave		
City: Las Vegas	State: NV	Zip: 89106
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	
☒	☐	Design Manual Standard Form 1 with the engineer's seal and signature.
☒	☐	Design Manual Standard Form 4 .
☒	☐	2 copies of the 24" x 36" Drainage Plan.
☐	☒	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

Reference:	STANDARD FORM 2
------------	------------------------

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS

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

III. DRAINAGE PLAN

Yes	No	
☒	☐	Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada.
☒	☐	Minimum scale: 1" = 60'.
☒	☐	Project name.
☒	☐	Vicinity Map with local and major cross streets.
☒	☐	Revision box.
☒	☐	North arrow and bar scale.
☒	☐	Engineer's/consultant's address and phone number.
☒	☐	Elevation datum and benchmark.
☒	☐	Legend for symbols and abbreviations.
☒	☐	Cut/fill scarps, where applicable.
☒	☐	Street names, grades, widths.
☒	☐	Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
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.
	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.
	N/A	Location and detail of existing, proposed, and future block wall openings. Minimum size is 16"x48". Wrought iron gate is required for flows > 10 cfs.
	N/A	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
☒	☐	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood Walls with 8-inch concrete masonry unit.
☒	☐	Building and/or lot numbers.
☒	☐	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
☒	☐	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.
	☒	N/A For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
☒	☐	Appropriately elevated "humps" 6 inches above the 100-year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
☒	☐	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.

IV. HYDROLOGIC ANALYSIS

Yes	No	
☒	☐	Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
☒	☐	Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
☒	☐	Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
☒	☐	Use of correct precipitation values in and around the McCarran Airport Rainfall Area.
☒	☐	A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
☒	☐	A summary table of storm water flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where acceptable.
☒	☐	Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
☒	☐	On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

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

REFERENCE:

STANDARD FORM 2

**TECHNICAL DRAINAGE STUDY
FOR
WEST PREP ACADEMY ELEMENTARY SCHOOL
ADDITION**

858-004

AUGUST 2015

Prepared For:

**Domingo Cambeiro Corporation
3555 Pecos-McLeod Avenue
Las Vegas, Nevada 89121
Phone: (702) 732-0084
Fax: (702) 732-9602**

Prepared By:

**G. C. Wallace, Inc.
1555 South Rainbow Boulevard
Las Vegas, Nevada 89146
Phone: (702) 804-2000
Fax: (702) 804-2299**

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I. INTRODUCTION

Clark County School District is proposing to construct an addition within a 4.9+/- acre lot located north of Sapphire Stone Avenue, south of Lake Mead Boulevard, east of Pink Rose Street and west of Las Vegas Enterprise Park. The proposed elementary school addition improvements will remove the existing parking lot, modify the walk aisle along the northern perimeter of the existing school building, add a new building, park improvements, and a new parking lot.

G.C. Wallace, Inc. (GCW) has reviewed previously approved technical drainage studies, for the project site and adjacent developments. Hydrologic and hydraulic information from the previous studies have been referenced for the purposes of this report. The referenced studies include the following:

1. *Technical Drainage Study for Longford at Lake Mead* (Reference 1) DS# 4366, hereinafter referred to as the Longford Study.
2. *Update to the Technical Drainage Study for Longford at Lake Mead* (Reference 2), DS# 3921, hereinafter referred to as the Longford Update Study.
3. *Technical Drainage Study for Lake Mead Tonopah Middle School* (Reference 3), DS# 1801, hereinafter referred to as the School Site Study.
4. *The Central Neighborhood Flood Control Master Plan, March 2005* (Reference 4), hereinafter referred to as the Central Neighborhood Study.

The site was previously analyzed in the Longford Study. The Longford Study was approved by City of Las Vegas (CLV) on March 30, 2004. Existing drainage conditions for the Site have been referenced from the Longford Study. Pertinent referenced materials from the Longford Study have been included in Appendix C.

The Longford Update Study was approved by City of Las Vegas (CLV) on March 15, 2006, with concurrence from the Clark County Regional Flood Control District (CCRFCD) February 23, 2006. Pertinent referenced materials from the Longford Update Study have been included in Appendix C.

The School Site Study was approved by CLV on November 19, 1997. The School Site Study analyzed the existing School site south of the project site. Referenced plans from the School Site were used to determine the roof drain locations for the existing school

building and offsite area tributary to a proposed walk aisle and bus loading drive aisle. Pertinent referenced materials from the School Site Study have been included in Appendix C.

The Central Neighborhood Study establishes flows within Lake Mead Boulevard adjacent to the project site. Pertinent referenced materials from the Central Neighborhood Study have been included in Appendix C.

The purpose of this report is to accompany the grading plans, to provide detailed hydrologic and hydraulic analyses for the site, and to determine adequate protection from offsite and onsite flows. The following tasks were performed in the preparation of this report:

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

II. LOCATION AND DESCRIPTION

The site is located in Sections 21, Township 20 South, Range 61 East, M.D.M., in Clark County, Nevada. The site is bordered by the Tonopah Middle School to the South, Pink Rose Street to the west, Lake Mead Boulevard to the north and Las Vegas Enterprise Park to the east. Please refer to Figures 1 and 2 for the vicinity and location of the site.

The proposed school addition will be constructed within approximately 4.9+/- acres of undeveloped desert and approximately 2.0+/- acres of developed school property. The proposed school addition improvements will remove the existing parking lot, modify the walk aisle along the northern perimeter of the existing school building, add a new building, park improvements, and a new parking lot. Proposed drainage patterns for the site will generally follow existing conditions. Drainage improvements will include a concrete-lined swale along the eastern boundary of the site.

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

Based on the Flood Insurance Rate Map (FIRM) Community Panel 32003C 2160F, dated November 16, 2011, the project site is located within a Flood Zone "X". Areas designated as Zone "X" are described as being outside the 500-year floodplain and not located in a FEMA-designated Special Flood Hazard Area (SFHA). Figure 3 shows the site denoted on a portion of the aforementioned FIRM panel.

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

Figure 4 is reproduced from Figure F-26 of the *2013 Las Vegas Valley Clark County Regional Flood Control Master Plan Update* (Reference 6, hereinafter referred to as the 2013 MPU). This figure depicts the project site in relation to existing and proposed CCRFCD facilities. As shown on the figure, the project site is located adjacent to existing LVLM 0059, a 72-inch RCP. LVLM 0060 is proposed as a category B facility that will replace the 72-inch RCP with a 12-foot x 6-foot RCB.

V. HYDROLOGY

The methodology presented in this study is in compliance with the *CCRFCD Hydrologic Criteria and Drainage Design Manual* (Reference 2, hereinafter referred to as the Manual).

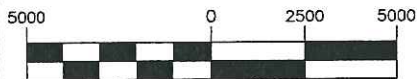
Model Description - The watersheds were modelled using the SCS Unit Hydrograph method within the U.S. Army Corps of Engineers *HEC-1 Flood Hydrograph Package* (Reference 3). Since the drainage area for the project is less than 8 square miles, an SDN 3 design storm was selected for use in the HEC-1 computer model.

Precipitation – The site lies within the McCarran Airport Rainfall Area. According to the Manual (Table 503, 505 and Figure 513) the 6 hour 100-year and 10-year precipitation values are 2.77 inches and 1.58 inches, respectively. Pertinent reference material from the Manual has been included in Appendix A.

Curve Numbers (CN) – A copy of the curve number calculation from the Longford Study has been included in Appendix C. The referenced calculation shows the project area consists of Hydrologic Soil Type B. Curve numbers for proposed conditions were determined from Table 602 of the Manual and the soil map descriptions. This project uses a curve number of 92 for commercial, and 98 for paved area. A curve number table is provided in Appendix A.

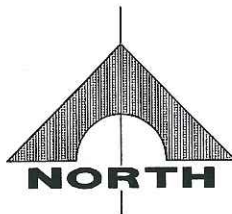


GRAPHIC SCALE



(IN FEET)

1 inch = 5000 ft.

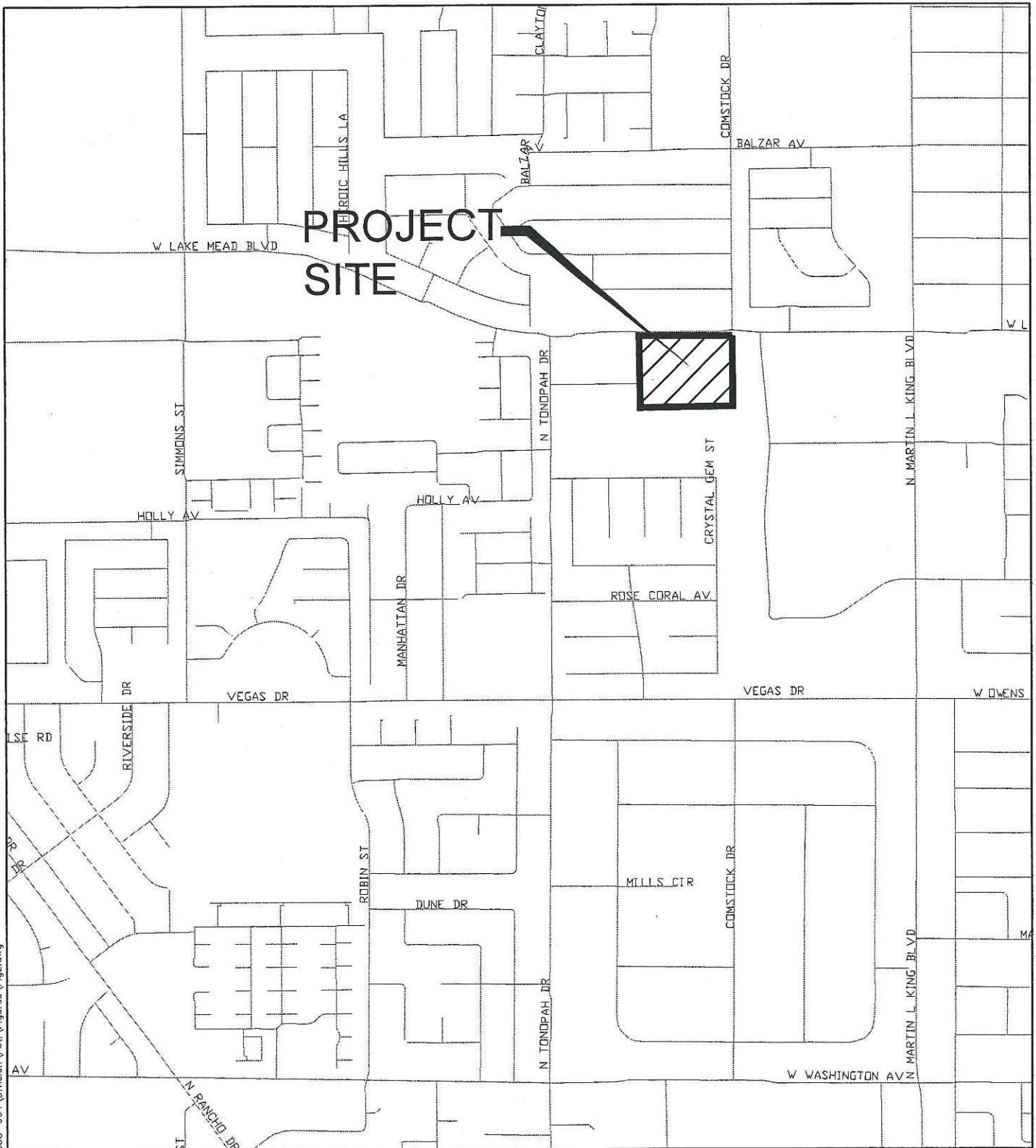


CLARK COUNTY SCHOOL DISTRICT
WEST PREP ACADEMY
ELEM. SCHOOL ADDITION

FIGURE 1
VICINITY MAP



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CLARK COUNTY SCHOOL DISTRICT
WEST PREP ACADEMY
ELEM. SCHOOL ADDITION

FIGURE 2

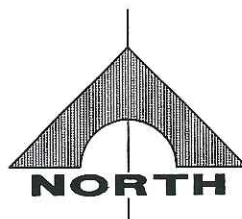
LOCATION MAP

GRAPHIC SCALE



(IN FEET)

1 inch = 1000 ft

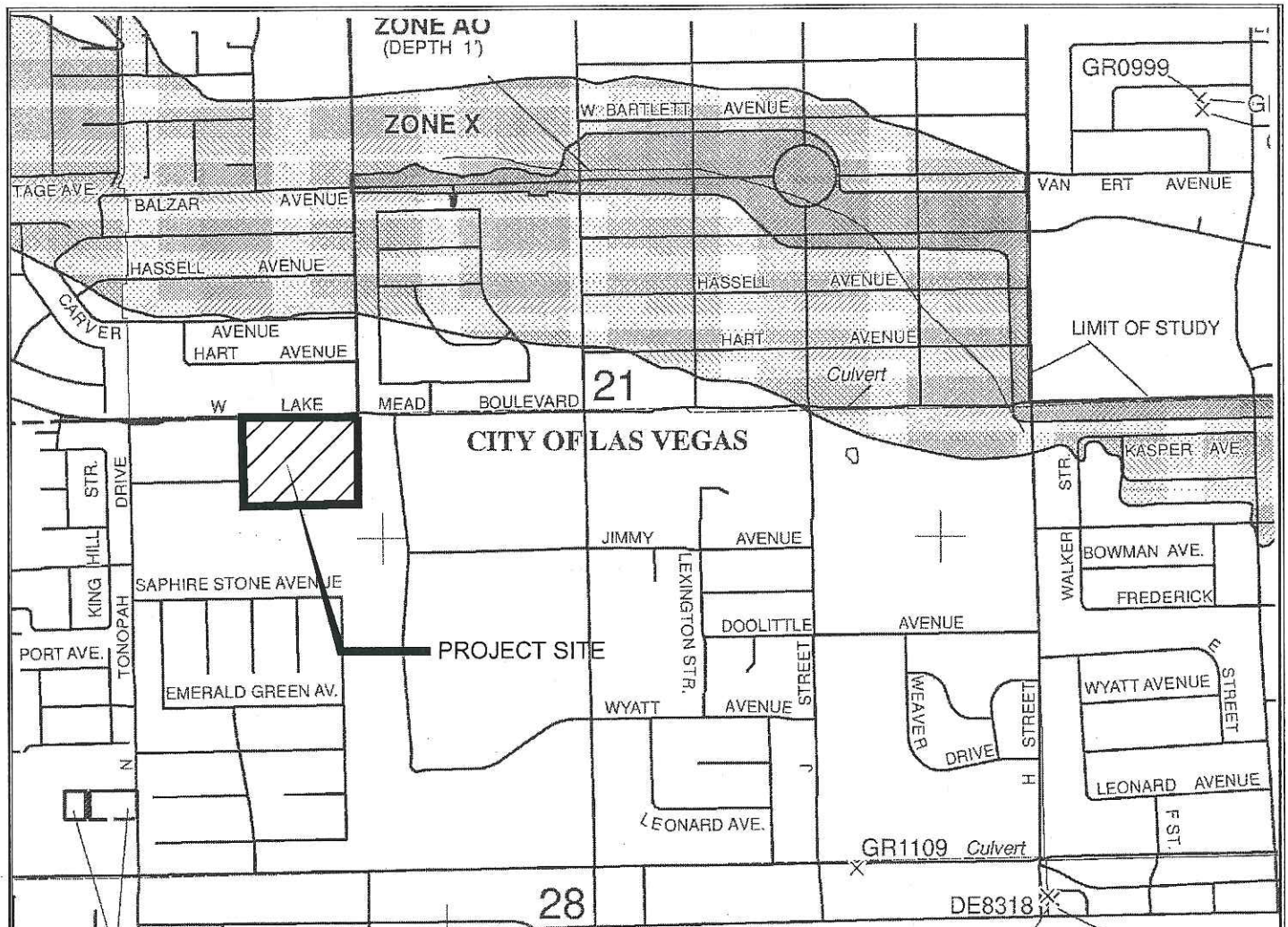


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CLARK COUNTY
INCORPORATED AREAS

780000 FT

JOINS PANEL 2170

GR1112 GR1111

785

PANEL 2160F

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY,
NEVADA
AND INCORPORATED AREAS

PANEL 2160 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY	322003	2160	F
LAS VEGAS, CITY OF	320078	2160	F
NORTH LAS VEGAS, CITY OF	320007	2160	F

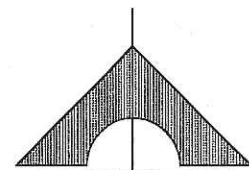
Notes to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
32003C2160F

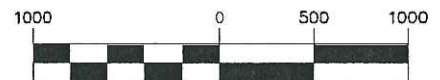
MAP REVISED
NOVEMBER 16, 2011

Federal Emergency Management Agency



NORTH

GRAPHIC SCALE



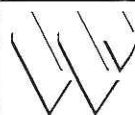
(IN FEET)

1 inch = 1000 ft.

CLARK COUNTY SCHOOL DISTRICT
WEST PREP ACADEMY
ELEM. SCHOOL ADDITION

FIGURE 3

F.I.R.M.

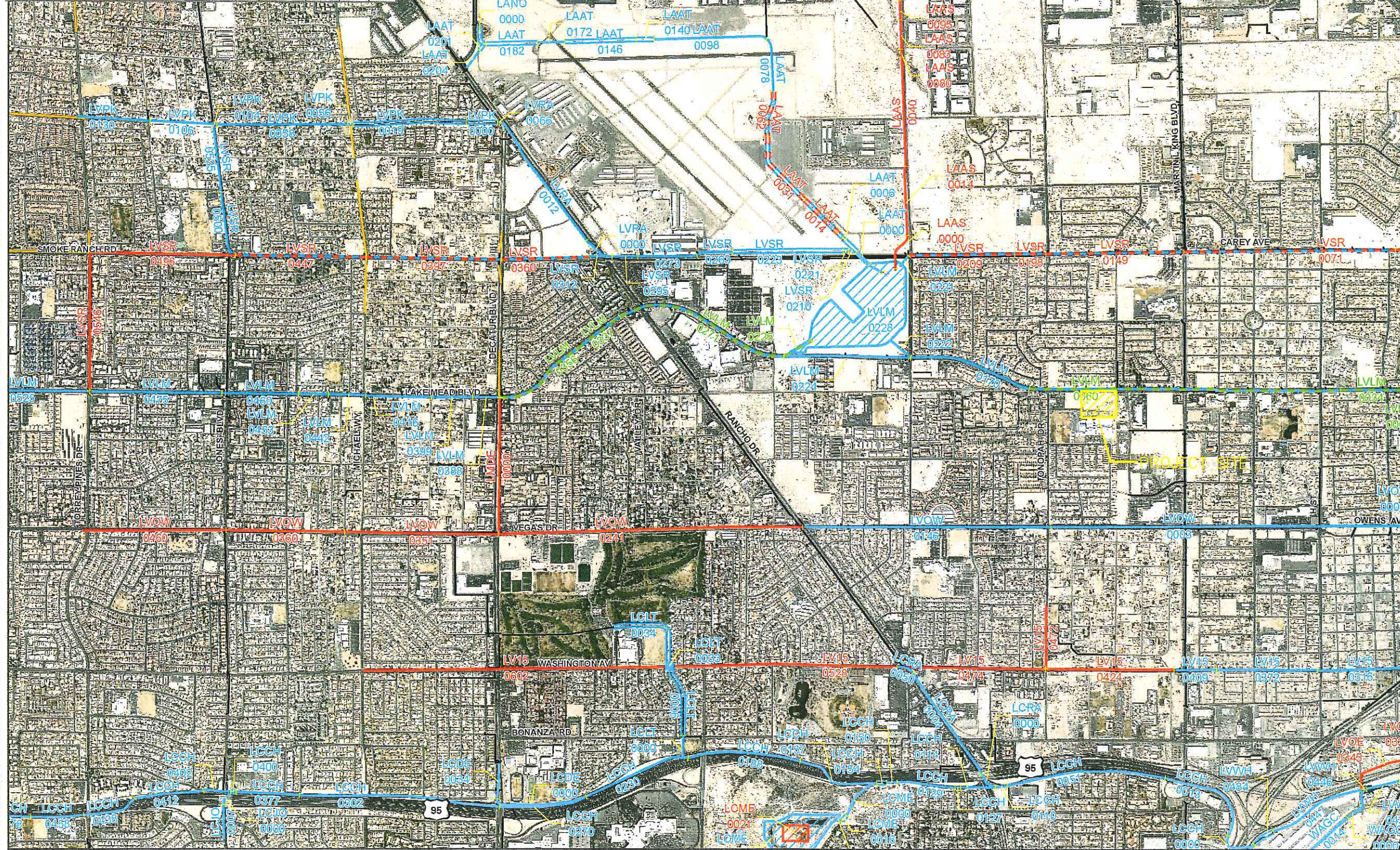


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ID / River Mile	Status	Facility Description	Length (ft)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LVLE 0000	P1	LAKE MEAD DRAIN TO LAS VEGAS WASH	2500	1030	CLV1B-2	WEST3	1.20	0.40
0047	P1	12" X 6" RCB	2400	845	CLV1B-1	WEST3	0.89	0.50
LVLM 0000	E	LAS VEGAS WASH - LAKE MEAD						
0001	E	43" X 68" HERCP (Replace w/ LVLM0001)	847	994	CLM20-C	NW3SC	1.36	4.60
0016	P0	12" X 5" RCB (Replaces LVLM0000)	847	994	CLM20-C	NW3SC	1.36	4.60
0017	E	54" RCP (Replace w/ LVLM0017)	965	994	CLM20-C	NW3SC	1.36	4.38
0033	E	12" X 5" RCB (Replaces LVLM0016)	965	994	CLM20-C	NW3SC	1.36	4.38
0034	E	60" RCP (Replace w/ LVLM0034)	1186	994	CLM20-C	NW3SC	1.36	1.62
0059	P0	12" X 5" RCB (Replaces LVLM0033)	1186	994	CLM20-C	NW3SC	1.36	1.62
0060	E	72" RCP (Replace w/ LVLM0059)	5952	994	CLM20-C	NW3SC	1.36	0.66
0060	P0	12" X 6" RCB (Replaces LVLM0059)	5952	994	CLM20-C	NW3SC	1.36	0.66

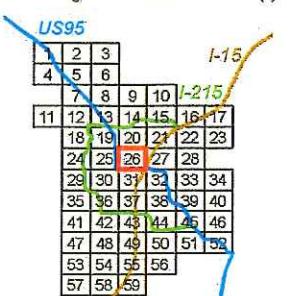
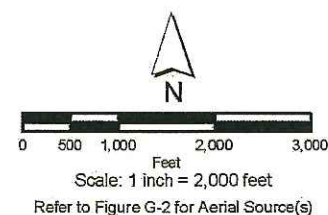


2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE
FIGURE F-26
FLOOD CONTROL FACILITIES

LEGEND

- Ultimate Development Boundary
 - Existing Facilities
 - Category A Proposed Facilities
 - Category B Proposed Facilities
 - Local Existing Facilities
 - Local Proposed Facilities
 - Detention Basin
 - 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 |

FIGURE 4



Drainage Areas and Flow Patterns – The subbasins and flow patterns used for the hydrologic modelling were determined from the digital topography for the site, roof drainage patterns, and a visit to the site.

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 (T_c) by the following relationship: $TLAG = 0.6 (T_c)$. The time of concentration (T_c) 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 (T_c) is outlined in Section 602 of the Manual. Lag time calculations for the drainage subbasins are included in Appendix A on Standard Form 4.

VI. EXISTING CONDITIONS

Existing conditions drainage patterns were addressed in the Longford Study. Pertinent referenced material from the Longford Update Study has been included in Appendix C.

VII. PROPOSED CONDITIONS

Under proposed conditions, the project site is developed and the offsite subbasins are assumed developed. Proposed conditions drainage patterns are depicted on Figure 5. Similar to existing conditions, under proposed conditions the site has two discharge points 1) Northeast to Lake Mead Boulevard and 2) Southeast to an existing drive aisle that discharges flows to an existing drainage easement located east of the school site.

Offsite flow conveyed in Lake Mead Boulevard west of the project site has been referenced from the Central Neighborhood Study. The Central Neighborhood Study shows 808 cfs conveyed within Lake Mead Boulevard as surface flow and 380 cfs in a 72-inch Storm drain east of the Lake Mead Boulevard and Tonopah Drive Intersection. The total surface flow in Lake Mead Boulevard (808 cfs) is combined with HEC-1 Concentration Point 4 (39 cfs) for a maximum flow rate of 847 cfs as surface flow in Lake Mead Boulevard adjacent to the site during the 100-year storm event. Please see cross section locations and the cross section summary on Figure 5. Cross Section 4 shows a maximum flow depth of 1.76-feet in Lake Mead Boulevard adjacent to the site. The proposed building finished floor elevation will be more than 2 feet above the flow depth in Lake Mead Boulevard. Therefore, the proposed building will be more than twice the depth of flow or six inches above the high side top of curb elevation in Lake Mead Boulevard.

Flow rates shown in the referenced studies conveyed in Winter Snow Avenue and Pink Rose Street in the Longford Study were based on a conservative assumption, which is based on assuming 50 percent of the Central Neighborhood Study Subbasin LM17A. The hydrologic analysis presented in this study is based on delineating the subbasin in this area to match a high point that was confirmed in Tonopah Drive located approximately 200 feet south of Winter Snow Avenue during a recent site visit. The maximum flow in Pink Rose Street adjacent to the project site is 19 cfs shown at Concentration Point 2. Cross Section 1 shows a maximum flow depth of 0.55 feet in Pink Rose Street adjacent to the site. The proposed building finished floor elevation will be more than 2 feet above the flow depth in Pink Rose Street. Therefore, the proposed building will be more than twice the depth of flow or six inches above the high side top of curb elevation in Pink Rose Street.

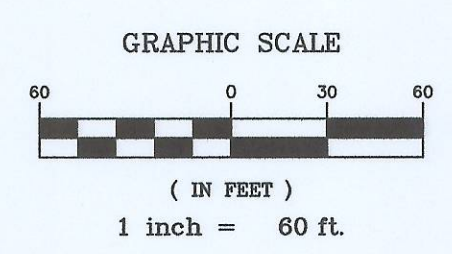
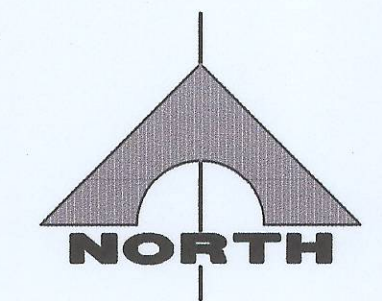
8 cfs generated onsite will be conveyed east to a proposed concrete-lined swale located along the eastern boundary of the site. The concrete-lined swale will discharge flows at the northeast corner of the site. Cross Section 2 shows a maximum flow depth of 0.75-feet in the

concrete-lined swale. The proposed building finished floor elevation will be more than 6 feet above the flow depth in the concrete-lined swale. Therefore, the proposed building will be more than twice the depth of flow above the flow line elevation in the concrete-lined swale.

7 cfs generated onsite will be discharged south in the proposed bus loading area drive aisle. Flow conveyed in the drive aisle will be conveyed south to an existing drainage easement that conveys and discharges flow east to Stella Lake Street. Flows discharged to the existing drainage easement will be consistent with existing conditions.

A proposed 12-inch wide trench drain with a minimum 0.5 percent longitudinal slope will collect flow between the existing and proposed school buildings. The proposed trench drain will collect runoff from between the existing school building and the proposed school building and convey 0.5 cfs (ON1A) west into a proposed 8-inch PVC pipe that daylights to Pink Rose Street. The flowline elevation at the high side of the trench drain is 2067.55-feet. The maximum flow depth in the trench drain is 0.34-feet. Therefore the finished floor elevation of 2069.00 feet will be higher than twice the depth of flow above the flowline elevation ($2067.55 \text{ feet} + 2 \times 0.34 \text{ feet}$). Manufacture's specifications for the proposed trench drain have been included in Appendix B. Drainage basins have been depicted on Figure 5. The results of the proposed conditions HEC-1 model are summarized in Table 1. A copy of the HEC-1 model output is included in the Appendix A.

TABLE 1 SUMMARY OF PROPOSED CONDITIONS HEC-1 MODEL			
SB OR CP	AREA (AC)	100 YR (CFS)	10 YR (CFS)
CP1	-	7	3
CP2	-	19	9
CP3	-	31	15
CP4	-	39	18
OFF1	2.11	5	3
OFF2	0.7	2	1
OFF3	3.66	9	4
OFF4	1.33	4	2
OFF5	1.33	3	2
ON1	1.20	3	1
ON2	1.89	5	2
ON3	3.04	8	4
ON4	2.70	7	3



LEGEND

- CP1 COMBINATION POINT
- SUBBASIN BOUNDARY
- - - PRORATED SUBBASIN BOUNDARY
- ON1 BASIN DESIGNATION
- ON4A PRORATED BASIN DESIGNATION
- FLOW DIRECTION

SUMMARY OF PROPOSED CONDITIONS HEC-1 MODEL				
SB OR CP	AREA (AC)	100 YR (CFS)	10 YR (CFS)	
CP1	-	7	3	
CP2	-	19	9	
CP3	-	31	15	
CP4	-	39	18	
OFF1	2.11	5	3	
OFF2	0.70	2	1	
OFF3	3.66	9	4	
OFF4	1.33	4	2	
OFF5	1.33	3	2	
ON1	1.20	3	1	
ON2	1.89	5	2	
ON3	3.04	8	4	
ON4	2.70	7	3	

SUMMARY OF HYDRAULIC CROSS SECTIONS PROPOSED CONDITIONS						
Cross Section	Slope [%]	Q ₁₀₀ [cfs]	Depth [ft]	Velocity [ft/s]	D*V	Flow Breakdown
1	0.50	19	0.55	2.17	1.19	CP2 [19]
2	0.50	8	0.75	1.89	1.42	ON3 [8]
3	0.50	847	1.76	7.17	12.62	808* + CP4 [39]
4	0.81	7	0.41	2.15	0.88	ON4 [7]
5	0.50	3	0.30	1.24	0.37	ON1 [3]

*Referenced street flow at Lake Mead Blvd and Tonopah Dr. from the 2005 Central Neighborhood Study

PROPOSED CONDITION PRORATED FLOW SUMMARY			
Proposed Onsites			
Subbasin*	Q ₁₀₀ (cfs)	Area (acres)	cfs/acre
ON1	3	1.2	2.50
Proposed Onsite Prorated Basins			
Subbasin*	Q ₁₀₀ (cfs)	Area (acres)	cfs/acre
ON1A	0.5	0.1	2.50
ON1B	2.5	1.1	2.50
TOTAL	3	2.8	NA

PROJECT NO.
858-004

DESIGN:
DRAWN:
CHECK:
PLOT DATE: 08-11-15
PLOT TIME: 11:52:33

PROJECT NO.
858-004

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PLOT TIME: 11:52:33

PROJECT NO.
858-004

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PLOT DATE: 08-11-15
PLOT TIME: 11:52:33

CLARK COUNTY SCHOOL DISTRICT

WEST PREP ACADEMY ELEM. SCHOOL ADDITION

PROPOSED CONDITIONS BASIN MAP

FIG 5

1 OF 5 SHTS

VIII. CONCLUSIONS AND RECOMMENDATIONS

1. Methodology used in this report is in compliance with the Clark County Regional Flood Control District (CCRFCD) criteria.
2. The proposed project lies within a Flood Zone "X". Therefore, the project development is not currently located in a FEMA-designated Special Flood Hazard Area (SFHA).
3. The proposed drainage patterns are generally consistent with the approved prior drainage studies performed for the project site and surrounding projects.
4. The proposed drainage patterns in the report are generally consistent with existing drainage patterns
5. Runoff generated from, or conveyed by the project will not adversely impact any downstream properties or facilities.

IX. REFERENCES

1. Stanley Consultants, *Technical Drainage Study for Longford at Lake Mead*. December 2003.
2. G. C. Wallace, *Update Technical Drainage Study for Longford at Lake Mead*. November 2004.
3. G. C. Wallace, *Update Technical Drainage Study for Longford at Lake Mead*. November 2004.
4. Summit Engineering Corporation, *Technical Drainage Study for Lake Mead Tonopah Middle School CCSD #0842*. March 1996.
5. City of Las Vegas. Central Neighborhood Flood Control Master Plan. March 2005.
6. Clark County Regional Flood Control District, *2013 Las Vegas Valley Flood Control Master Plan Update*. 2013.
7. Clark County Regional Flood Control District, *Hydrologic Criteria and Drainage Design Manual*. August 1999.
8. U.S. Army Corps of Engineers, *HEC-1 Flood Hydrograph Package*. June 1998.

West Prep Academy Elementary School Addition
APPENDIX LAYOUT

Appendix A. Hydrologic Calculations and Information

1. Figure 513 From the CCRFCD Manual
2. Table 503 from the CCRFCD Manual
3. Table 505 from the CCRFCD Manual
4. Table 602 (1 of 4) From the CCRFCD Manual
5. Curve Number Table
6. Standard Form 4
7. Proposed Conditions HEC-1 Model

Appendix B. Hydraulic Calculations and Information

1. Normal Depth Calculations
2. Trench Drain Specifications
3. Specific Energy Calculation

Appendix C. Referenced Material

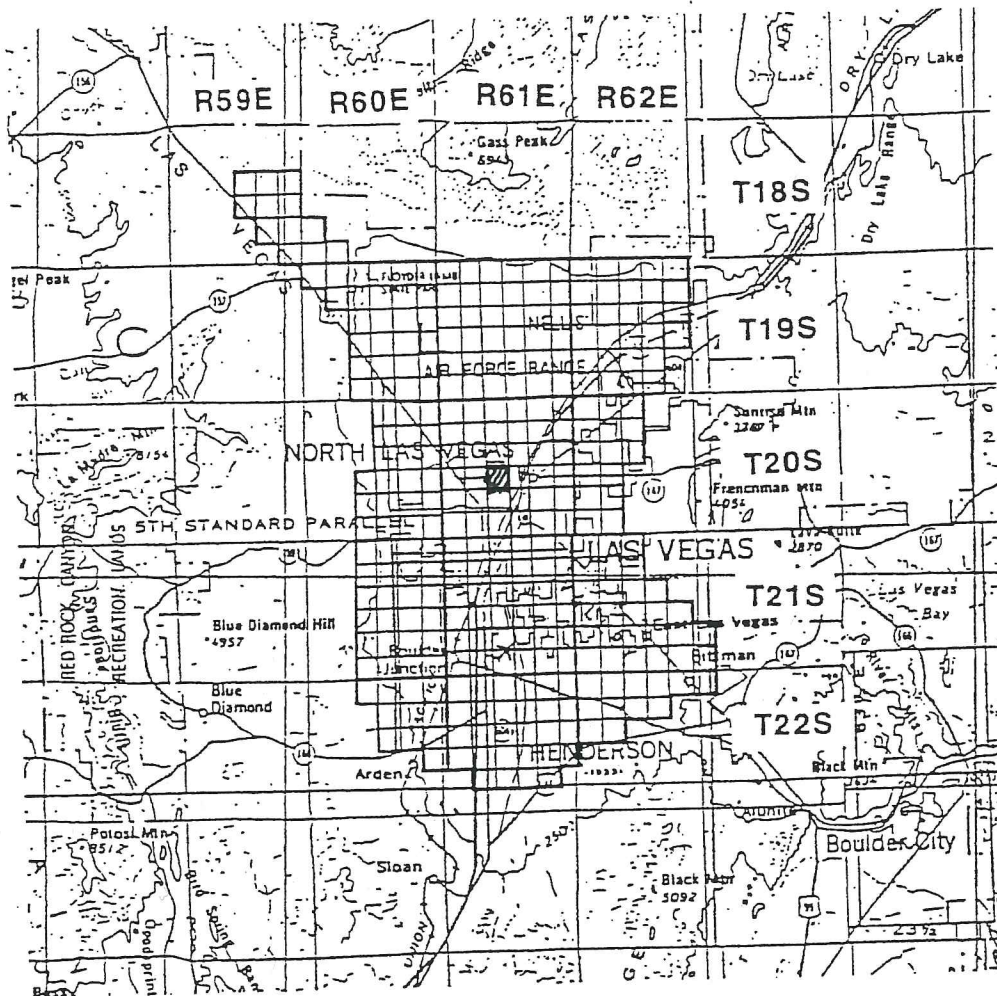
1. Addendum #1 to the Technical Drainage Study for Longford at Lake Mead
 - a. CLV Approval Letter
 - b. Excerpt From Text: Response to Comment 2.
 - c. Curve Number Calculations
 - d. Standard Form 4
 - e. Existing Conditions HEC-1 Model
 - f. Exhibit 8 – Existing Conditions Basin Map
2. Response to Comments on the Update to the Technical Drainage study for Longford at Lake Mead
 - a. CLV Approval Letter
 - b. CCRFCD Concurrence Letter
 - c. Figure 5R – Drainage Conditions Map
3. Technical Drainage Study Addendum 2 Addition for Lake Mead Tonopah Middle School
 - a. CLV Approval Letter
 - b. Figure 4 – Developed Basins
 - c. Improvement Plan Sheets 1 and 7
4. Central Neighborhood Flood Control Master Plan
 - a. Figure E-1 - Existing Drainage Conditions
 - b. Figure F-1 – Future Drainage Conditions

APPENDIX A

Hydrologic Calculations and Information

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

McCARRAN AIRPORT RAINFALL AREA



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

Notes:

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

Revision	Date

WRC
ENGINEERING

REFERENCE:
USACE, Los Angeles District, 1988

FIGURE 513

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX-HOUR STORM DISTRIBUTIONS

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

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

Revision	Date

REFERENCE:

TABLE 503

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

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

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

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

Revision	Date

WRC
ENGINEERING

REFERENCE:

USACE, Los Angeles District, 1988

TABLE 505

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RUNOFF CURVE NUMBERS (URBAN AREAS¹)

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

See Table 602A

Developing urban areas

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

- 1 Average runoff condition, and $I_p = 0.25$.
- 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

WEST PREP ACADEMY ELEMENTARY SCHOOL ADDITION					
	CURVE NUMBER TABLE				
Basin	Soil	Percent	CN	Landuse	PREC
OFF1	236	100.0%	92.0	School/Commercial	2.77
OFF2	236	100.0%	92.0	School/Commercial	2.77
OFF3	236	100.0%	92.0	School/Commercial	2.77
OFF4	236	100.0%	98.0	Paved Streets	2.77
OFF5	236	100.0%	92.0	School/Commercial	2.77
ON1	236	100.0%	92.0	School/Commercial	2.77
ON2	236	100.0%	92.0	School/Commercial	2.77
ON3	236	100.0%	92.0	School/Commercial	2.77
ON4	236	100.0%	92.0	School/Commercial	2.77

HYDROLOGIC CRITERIA AND DESIGN MANUAL

TIME OF CONCENTRATION

WEST PREP ACADEMY ELEMENTARY SCHOOL ADDITION PROPOSED CONDITIONS

G. C. WALLACE COMPANIES
Engineers/Planners/Surveyors

Project No: 858-004
Date: 8-Jul-08
Calculated by: dbc

		SUB-BASIN DATA				INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK		Tc	Tlag	REMARKS	
		CN		AREA	AREA	INITIAL	SLOPE	Ti	TRAVEL	SLOPE	V1	V2	Tt	TOTAL	Tc =				
DESIG:		DEV/EX. (D or E)	(16)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9a)	(9b)	(10)	(11)	(12)	(13)	(14)	(15)	PRECIP [100YR/10YR]
	OFF1	D	92.0	0.8244	2.11	0.0033	50	1.0	3.5	425	1.0%	0.2	0.3	35.1	475	12.6	38.6	0.126	2.77/1.58
	OFF2	D	92.0	0.8244	0.70	0.0011	50	1.0	3.5	340	0.6%	0.2	0.2	36.2	390	12.2	39.7	0.122	2.77/1.58
	OFF3	D	92.0	0.8244	3.66	0.0057	50	1.3	3.2	790	0.3%	0.1	0.2	97.8	840	14.7	101.1	0.147	2.77/1.58
	OFF4	D	98.0	0.9036	1.33	0.0021	30	2.0	1.5	1175	0.7%	0.2	0.3	93.3	1205	16.7	94.8	0.167	2.77/1.58
	OFF5	D	92.0	0.8244	1.33	0.0021	50	1.0	3.5	340	1.0%	0.2	0.3	28.1	390	12.2	31.6	0.122	2.77/1.58
	ON1	D	92.0	0.8244	1.20	0.0019	15	1.5	1.7	650	0.6%	0.2	0.2	63.8	665	13.7	65.5	0.137	2.77/1.58
	ON2	D	92.0	0.8244	1.89	0.0030	50	1.0	3.5	660	1.1%	0.2	0.3	47.8	710	13.9	51.3	0.139	2.77/1.58
	ON3	D	92.0	0.8244	3.04	0.0048	125	4.2	3.4	590	1.4%	0.2	0.4	38.5	715	14.0	41.9	0.140	2.77/1.58
	ON4	D	92.0	0.8244	2.70	0.0042	75	4.2	2.7	915	1.2%	0.2	0.3	59.1	990	15.5	61.8	0.155	2.77/1.58

*Basin referenced from the Longford Study

**Initial Length and Slope referenced from the School Site Study

Tc = Tt + Tt Tlag = 0.6 Tc

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

K = 0.0132 (CN) - 0.39

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}

V2 = 29.4*(S/100)^{1/2}

Developed:

V1 = 20.2*(S/100)^{1/2}

V2 = 30.6*(S/100)^{1/2}

REFERENCE:

STANDARD FORM 4


```

1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 05AUG15 TIME 16:25:46 *
*****

```

```

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

```

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X X XXXXXX XXXX X
X X X X X XX
X X X X X
XXXXXX XXXX X XXXX X
X X X X X
X X X X X
X X XXXXXX XXXX XXX

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSK- 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

*** FREE ***

```

1 ID *****
2 ID *
3 ID * :
4 ID * : CLARK COUNTY SCHOOL DISTRICT :
5 ID * : WEST PREP ACADEMY ELEM. SCHOOL ADDITION :
6 ID * : PROPOSED CONDITIONS :
7 ID * :
8 ID * : RETURN PERIOD 100 & 10 -YEAR :
9 ID * : DISTRIBUTION 6-HOUR SDN3 :
10 ID * : PROJECT NO 858-004 :
11 ID * : FILENAME 858-004_PRO.H1 :
12 ID * : DATE MODELED 07/17/15 :
13 ID * : MODELED BY DBC :
14 ID * :
15 ID * :
16 ID * :
17 ID *****
18 ID
19 ID JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
20 ID
21 ID AREA DARF
22 ID SQ.MI.
23 ID
24 ID 0.0 - 0.5 1.00
25 ID 0.5 - 1.0 0.98
26 ID 1.0 - 2.0 0.95
27 ID 2.0 - 4.0 0.92
28 ID 4.0 - 6.0 0.91
29 ID 6.0 - 8.0 0.89
30 ID
31 ID IT 5 0 0 300
32 ID IO 5 0 0
33 ID IN 5 0 0
34 ID JR PREC 1 0.57
35 ID
36 ID
37 ID PB 2.77
38 ID BA 0.0033
39 ID PC 0.000 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
40 ID PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
41 ID PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
42 ID PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
43 ID PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
44 ID PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
45 ID PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
46 ID PC 0.998 0.999 1.000
47 ID LS 0 92.0
48 ID UD .126

```

1

HEC-1 INPUT

PAGE 2

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

```

49 KK OFF2
50 KM
51 PB 2.77

```


52	BA	0.0011	
53	LS	0	92.0
54	UD	.122	
	*		
55	KK	CP1	
56	KM	COMBINES OFF1 AND OFF2 WEST OF LAKE MEAD BLVD AND PINK ROSE ST	
57	HC	2	
	*		
58	KK	OFF3	
59	KM		
60	PB	2.77	
61	BA	0.0057	
62	LS	0	92.0
63	UD	.147	
	*		
64	KK	ON1	
65	KM		
66	PB	2.77	
67	BA	0.0019	
68	LS	0	92.0
69	UD	.137	
	*		
70	KK	OFF4	
71	KM		
72	PB	2.77	
73	BA	0.0021	
74	LS	0	98.0
75	UD	.167	
	*		
76	KK	OFF5	
77	KM		
78	PB	2.77	
79	BA	0.0021	
80	LS	0	92.0
81	UD	.122	
	*		
82	KK	CP2	
83	KM	COMBINES OFF2, ON1, OFF4, and OFF5 AT PINK ROSE ST AND LAKE MEAD BLVD	
84	HC	4	
	*		

HEC-1 INPUT

PAGE 3

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
85	KK ON2
86	KM
87	PB 2.77
88	BA 0.0030
89	LS 0 92.0
90	UD .139
	*
91	KK CP3
92	KM COMBINES CP1, CP2, AND ON2
93	HC 3
	*
94	KK ON3
95	KM
96	PB 2.77
97	BA 0.0048
98	LS 0 92.0
99	UD .140
	*
100	KK CP4
101	KM COMBINES CP3 AND ON3 IN LAKE MEAD BOULEVARD
102	HC 2
	*
103	KK ON4
104	KM CONVEYED THROUGH DRAINAGE EASEMENT EAST OF SCHOOL SITE
105	PB 2.77
106	BA 0.0042
107	LS 0 92.0
108	UD .155
	*
	*
109	ZZ

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
LINE		
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
35	OFF1	
	.	
49	OFF2	
	.	
	.	


```

55      CP1.....
      .
58      .      OFF3
      .
64      .      .      ON1
      .
70      .      .      .      OFF4
      .
76      .      .      .      .      OFF5
      .
82      .      CP2.....
      .
85      .      .      ON2
      .
91      .      CP3.....
      .
94      .      .      ON3
      .
100     .      CP4.....
      .
103     .      .      ON4

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*      JUN 1998                  *
*      VERSION 4.1              *
* RUN DATE 05AUG15 TIME 16:25:46 *
*****

```

```

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

```

```

*****
* : CLARK COUNTY SCHOOL DISTRICT :
* : WEST PREP ACADEMY ELEM. SCHOOL ADDITION :
* : PROPOSED CONDITIONS :
* : RETURN PERIOD 100 & 10 -YEAR :
* : DISTRIBUTION 6-HOUR SDN3 :
* : PROJECT NO 858-004 :
* : FILENAME 858-004_PRO.H1 :
* : DATE MODELED 07/17/15 :
* : MODELED BY DBC :
* :
* :
*****

```

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

AREA	DARF
SQ.MI.	
0.0 - 0.5	1.00
0.5 - 1.0	0.98
1.0 - 2.0	0.95
2.0 - 4.0	0.92
4.0 - 6.0	0.91
6.0 - 8.0	0.89

```

32 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
STORAGE VOLUME
SURFACE AREA
TEMPERATURE

CUBIC FEET PER SECOND
ACRE-FEET
ACRES
DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00 .57

1

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION	
					RATIO 1 1.00	RATIO 2 .57
HYDROGRAPH AT +	OFF1	.00	1	FLOW TIME	5. 3.58	3. 3.58
HYDROGRAPH AT +	OFF2	.00	1	FLOW TIME	2. 3.58	1. 3.58
2 COMBINED AT +	CP1	.00	1	FLOW TIME	7. 3.58	3. 3.58
HYDROGRAPH AT +	OFF3	.01	1	FLOW TIME	9. 3.58	4. 3.58
HYDROGRAPH AT +	ON1	.00	1	FLOW TIME	3. 3.58	1. 3.58
HYDROGRAPH AT +	OFF4	.00	1	FLOW TIME	4. 3.58	2. 3.58
HYDROGRAPH AT +	OFF5	.00	1	FLOW TIME	3. 3.58	2. 3.58
4 COMBINED AT +	CP2	.01	1	FLOW TIME	19. 3.58	9. 3.58
HYDROGRAPH AT +	ON2	.00	1	FLOW TIME	5. 3.58	2. 3.58
3 COMBINED AT +	CP3	.02	1	FLOW TIME	31. 3.58	15. 3.58
HYDROGRAPH AT +	ON3	.00	1	FLOW TIME	8. 3.58	4. 3.58
2 COMBINED AT +	CP4	.02	1	FLOW TIME	39. 3.58	18. 3.58
HYDROGRAPH AT +	ON4	.00	1	FLOW TIME	7. 3.58	3. 3.58

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

APPENDIX B

Hydraulic Calculations and Information

Worksheet for Cross Section 1 PINK ROSE STREET

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 19.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.61
0+00.00	0.61
0+06.00	0.50
0+06.00	0.00
0+07.00	0.13
0+07.00	0.17
0+26.00	0.54
0+44.00	0.17
0+44.00	0.13
0+46.00	0.00
0+46.00	0.50
0+51.00	0.61
0+51.00	1.61

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.61)	(0+51.00, 1.61)	0.016

Options

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

Worksheet for Cross Section 1 PINK ROSE STREET

Results

Normal Depth	0.55	ft
Elevation Range	0.00 to 1.61 ft	
Flow Area	8.75	ft ²
Wetted Perimeter	45.99	ft
Hydraulic Radius	0.19	ft
Top Width	44.89	ft
Normal Depth	0.55	ft
Critical Depth	0.53	ft
Critical Slope	0.00674	ft/ft
Velocity	2.17	ft/s
Velocity Head	0.07	ft
Specific Energy	0.62	ft
Froude Number	0.87	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.55	ft
Critical Depth	0.53	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00674	ft/ft

Cross Section for Cross Section 1 PINK ROSE STREET

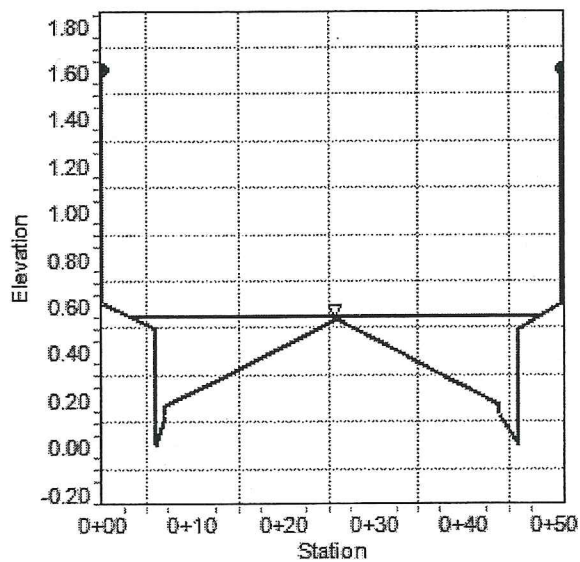
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.55	ft
Discharge	19.00	ft ³ /s

Cross Section Image



Worksheet for Cross Section 2 EASEMENT

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 8.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.98
0+48.00	0.50
0+50.00	0.00
0+50.00	1.00
0+51.00	1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.98)	(0+48.00, 0.50)	0.016
(0+48.00, 0.50)	(0+51.00, 1.00)	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 0.75 ft
Elevation Range 0.00 to 1.00 ft
Flow Area 4.24 ft²
Wetted Perimeter 28.24 ft
Hydraulic Radius 0.15 ft
Top Width 27.42 ft
Normal Depth 0.75 ft

Worksheet for Cross Section 2 EASEMENT

Results

Critical Depth	0.73	ft
Critical Slope	0.00714	ft/ft
Velocity	1.89	ft/s
Velocity Head	0.06	ft
Specific Energy	0.81	ft
Froude Number	0.85	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.75	ft
Critical Depth	0.73	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00714	ft/ft

Cross Section for Cross Section 2 EASEMENT

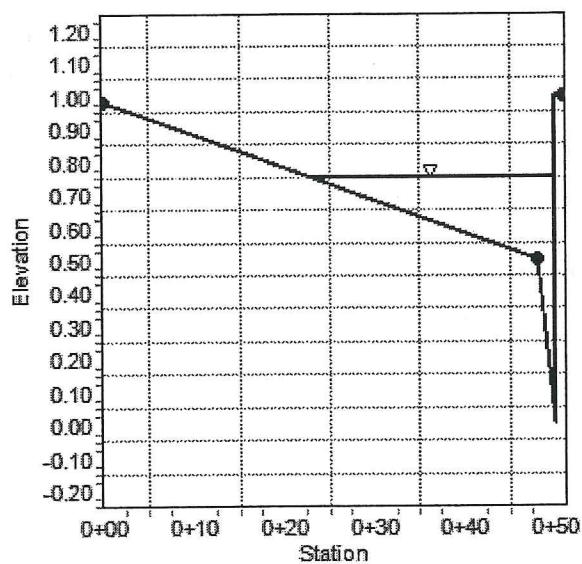
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.75	ft
Discharge	8.00	ft ³ /s

Cross Section Image



Worksheet for Cross Section 3 LAKE MEAD BOULEVARD

Options

Open Channel Weighting Method Pavlovskii's Method

Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth		1.76	ft
Elevation Range	0.00 to 3.00 ft		
Flow Area		118.08	ft ²
Wetted Perimeter		103.43	ft
Hydraulic Radius		1.14	ft
Top Width		100.00	ft
Normal Depth		1.76	ft
Critical Depth		1.88	ft
Critical Slope		0.00358	ft/ft
Velocity		7.17	ft/s
Velocity Head		0.80	ft
Specific Energy		2.56	ft
Froude Number		1.16	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.76	ft
Critical Depth	1.88	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00358	ft/ft

Project Description

Manning Formula

Normal Depth

847.00 ft³/s

Worksheet for Cross Section 4 DRIVEWAY

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00810 ft/ft
Discharge 7.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.90
0+00.50	0.90
0+00.63	0.40
0+23.50	0.17
0+23.50	0.13
0+25.00	0.00
0+25.00	0.50
0+25.50	0.50
0+30.50	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.90)	(0+30.50, 0.60)	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 0.41 ft
Elevation Range 0.00 to 0.90 ft
Flow Area 3.25 ft²
Wetted Perimeter 24.83 ft

Worksheet for Cross Section 4 DRIVEWAY

Results

Hydraulic Radius	0.13	ft
Top Width	24.37	ft
Normal Depth	0.41	ft
Critical Depth	0.41	ft
Critical Slope	0.00742	ft/ft
Velocity	2.15	ft/s
Velocity Head	0.07	ft
Specific Energy	0.48	ft
Froude Number	1.04	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.41	ft
Critical Depth	0.41	ft
Channel Slope	0.00810	ft/ft
Critical Slope	0.00742	ft/ft

Cross Section for Cross Section 4 DRIVEWAY

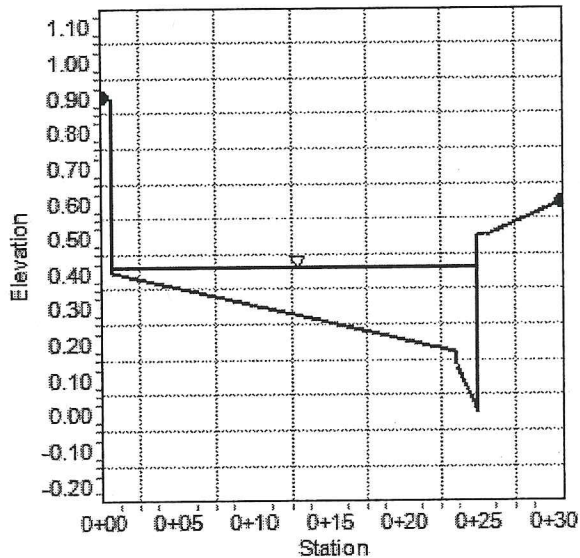
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope	0.00810	ft/ft
Normal Depth	0.41	ft
Discharge	7.00	ft ³ /s

Cross Section Image



Worksheet for Cross Section 5 DRIVEWAY

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 3.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.71
0+05.00	0.61
0+05.50	0.61
0+05.50	0.11
0+07.00	0.24
0+07.00	0.28
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.50
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.71)	(0+40.00, 0.60)	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 0.30 ft

Worksheet for Cross Section 5 DRIVEWAY

Results

Elevation Range	0.00 to 0.71 ft	
Flow Area	2.42	ft ²
Wetted Perimeter	29.58	ft
Hydraulic Radius	0.08	ft
Top Width	29.00	ft
Normal Depth	0.30	ft
Critical Depth	0.28	ft
Critical Slope	0.00931	ft/ft
Velocity	1.24	ft/s
Velocity Head	0.02	ft
Specific Energy	0.32	ft
Froude Number	0.76	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.30	ft
Critical Depth	0.28	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00931	ft/ft

Cross Section for Cross Section 5 DRIVEWAY

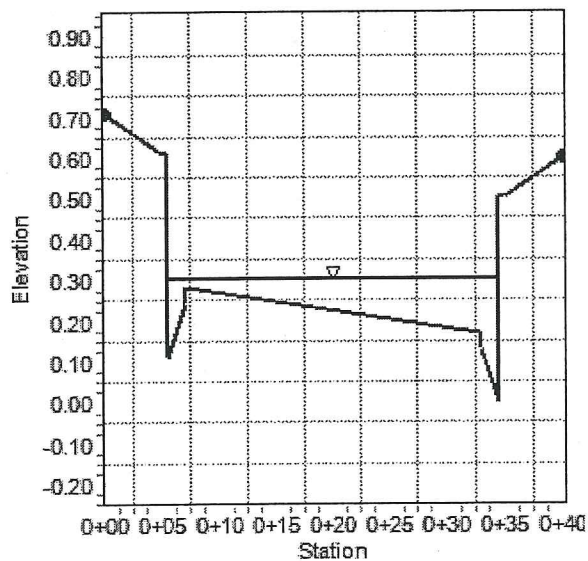
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.30 ft
Discharge 3.00 ft³/s

Cross Section Image



Worksheet for 12 INCH TRENCH DRAIN

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 0.50 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	70.00
0+00.00	69.00
0+09.50	68.87
0+09.50	68.02
0+09.70	67.56
0+09.90	67.55
0+10.08	67.55
0+10.26	67.56
0+10.48	68.02
0+10.48	68.87
0+20.00	69.00
0+20.00	70.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 70.00)	(0+20.00, 70.00)	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 0.34 ft

Worksheet for 12 INCH TRENCH DRAIN

Results

Elevation Range	67.55 to 70.00 ft	
Flow Area	0.24	ft ²
Wetted Perimeter	1.28	ft
Hydraulic Radius	0.18	ft
Top Width	0.86	ft
Normal Depth	0.34	ft
Critical Depth	0.27	ft
Critical Slope	0.00977	ft/ft
Velocity	2.13	ft/s
Velocity Head	0.07	ft
Specific Energy	0.41	ft
Froude Number	0.72	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.34	ft
Critical Depth	0.27	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00977	ft/ft

Cross Section for 12 INCH TRENCH DRAIN

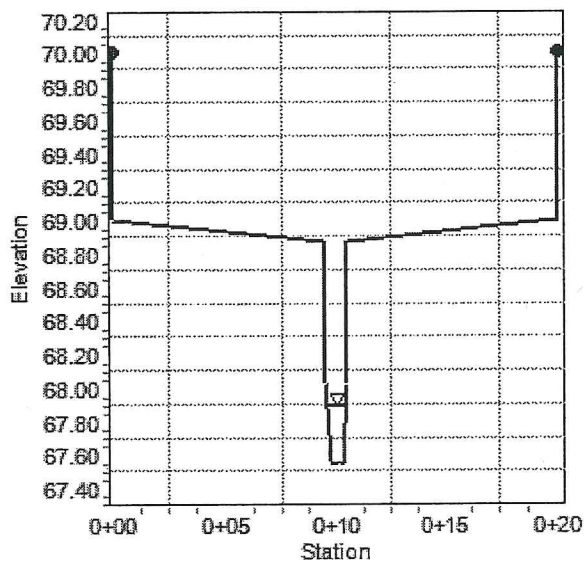
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.34 ft
Discharge 0.50 ft³/s

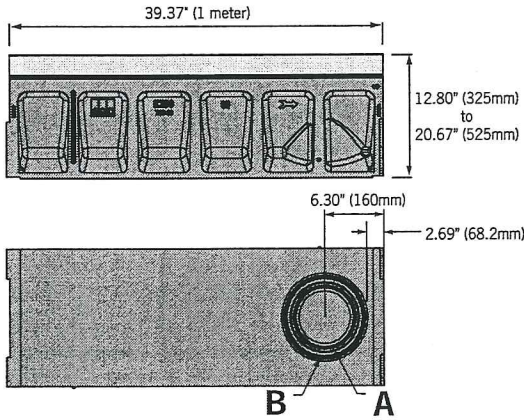
Cross Section Image



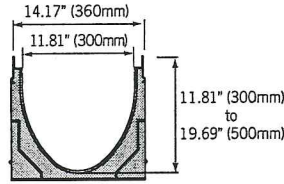
ACO DRAIN

KlassikDrain - KS300 Stainless steel edge rail channel system

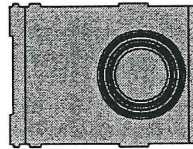
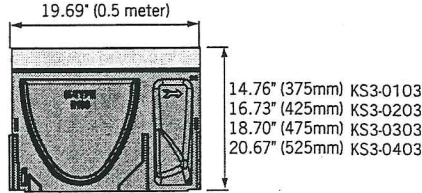
One meter channel



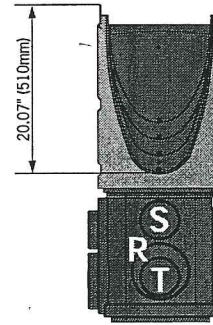
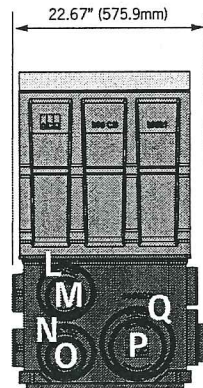
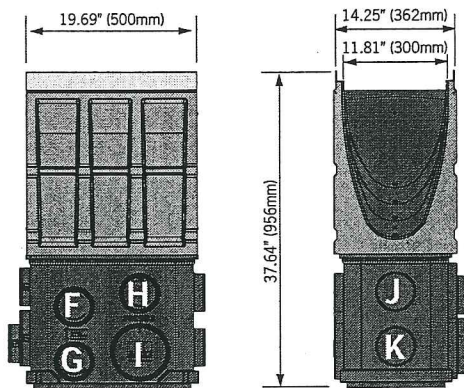
Knock-outs included on every 5th channel



Half meter channel



Type 903S In-line catch basin



Total capacity = 15.59 gallons

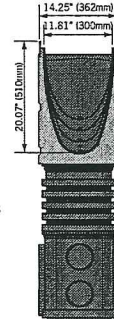
Outlet flow rates

Outlet	Product	Outlet size (Sch. 40)	Invert Depth	GPM	CFS
A	Bottom outlet - KS3-00	6" round	11.81"	421	0.94
A	Bottom outlet - KS3-040	6" round	19.69"	544	1.21
B	Bottom outlet - KS3-00	8" round	11.81"	748	1.67
B	Bottom outlet - KS3-040	8" round	19.69"	966	2.15
C	End outlet - KS3-00	6" round	11.81"	364	0.81
C	End outlet - KS3-40	6" round	19.69"	500	1.11
D	End outlet - KS3-10	8" round	13.78"	681	1.52
D	End outlet - KS3-40	8" round	19.69"	863	1.92
E	End outlet - KS3-20	10" round	15.75"	1116	2.49
E	End outlet - KS3-40	10" round	19.69"	1304	2.91
F	Type KS3-903S	4" round	29.80"	287	0.64
G	Type KS3-903S	4" round	36.29"	319	0.71
H	Type KS3-903S	4" round	28.22"	279	0.62
I	Type KS3-903S	6" round	36.29"	707	1.57
J	Type KS3-903S	4" round	28.37"	280	0.62
K	Type KS3-903S	4" round	34.87"	312	0.70
L	Type KS3-903S	6" round	29.15"	626	1.40
M	Type KS3-903S	4" round	28.59"	281	0.63
N	Type KS3-903S	6" round	36.28"	707	1.57
O	Type KS3-903S	4" round	35.72"	316	0.70
P	Type KS3-903S	6" round	35.72"	701	1.56
Q	Type KS3-903S	8" round	36.28"	1237	2.76
R	Type KS3-903S	6" round	34.78"	690	1.54
S	Type KS3-903S	4" round	27.65"	276	0.61
T	Type KS3-903S	4" round	34.36"	310	0.69

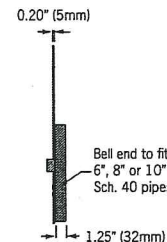
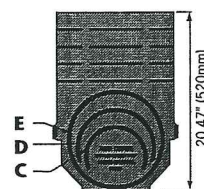
Note: These are the pipe flow rates at the specified outlet, NOT channel flow rates. *Catch basin flow rates are without trash bucket - using trash bucket reduces flow.

Type 904G In-line catch basin

- Notes:
1. Riser can be cut down in 1" (25mm) increments.
 2. Maximum capacity including riser 27.82 gallons.
 3. Add 12" (300mm) to all heights if using riser.
 4. Outlet flow rates will be higher due to increased depth - contact ACO Sales Office for more details.



End Cap



ACO DRAIN

KlassikDrain - KS300 Stainless steel edge rail channel system



Description	Part No.	Invert Inches ²	mm ²	Weight Lbs.	Description	Part No.	Invert Inches ²	mm ²	Weight Lbs.
K3-00 Neutral channel - 39.37" (1m) ²	76441	11.81	300	132.6	K3-28 Sloped channel - 39.37" (1m)	76428	17.32	440	165.1
K3-1 Sloped channel - 39.37" (1m)	76401	12.01	305	132.6	K3-29 Sloped channel - 39.37" (1m)	76429	17.52	445	166.3
K3-2 Sloped channel - 39.37" (1m)	76402	12.20	310	133.8	K3-30 Sloped channel - 39.37" (1m) ²	76430	17.72	450	167.5
K3-3 Sloped channel - 39.37" (1m)	76403	12.40	315	135.0	K3-030 Neutral channel - 39.37" (1m) ²	76447	17.72	450	167.5
K3-4 Sloped channel - 39.37" (1m)	76404	12.60	320	136.2	K3-0303 Neutral channel - 19.69" (0.5m) ²	76448	17.72	450	89.5
K3-5 Sloped channel - 39.37" (1m) ²	76405	12.80	325	137.4	K3-31 Sloped channel - 39.37" (1m)	76431	17.91	455	168.7
K3-6 Sloped channel - 39.37" (1m)	76406	12.99	330	138.6	K3-32 Sloped channel - 39.37" (1m)	76432	18.11	460	169.9
K3-7 Sloped channel - 39.37" (1m)	76407	13.19	335	139.8	K3-33 Sloped channel - 39.37" (1m)	76433	18.31	465	171.1
K3-8 Sloped channel - 39.37" (1m)	76408	13.39	340	141.0	K3-34 Sloped channel - 39.37" (1m)	76434	18.50	470	172.3
K3-9 Sloped channel - 39.37" (1m)	76409	13.58	345	142.2	K3-35 Sloped channel - 39.37" (1m) ²	76435	18.70	475	173.5
K3-10 Sloped channel - 39.37" (1m) ²	76410	13.78	350	143.4	K3-36 Sloped channel - 39.37" (1m)	76436	18.90	480	174.7
K3-010 Neutral channel - 39.37" (1m) ²	76443	13.78	350	143.4	K3-37 Sloped channel - 39.37" (1m)	76437	19.09	485	175.9
K3-0103 Neutral channel - 19.69" (0.5m) ²	76444	13.78	350	75.3	K3-38 Sloped channel - 39.37" (1m)	76438	19.29	490	177.1
K3-11 Sloped channel - 39.37" (1m)	76411	13.98	355	144.6	K3-39 Sloped channel - 39.37" (1m)	76439	19.49	495	178.3
K3-12 Sloped channel - 39.37" (1m)	76412	14.17	360	145.8	K3-40 Sloped channel - 39.37" (1m) ²	76440	19.69	500	179.5
K3-13 Sloped channel - 39.37" (1m)	76413	14.37	365	147.0	K3-040 Neutral channel - 39.37" (1m) ²	76449	19.69	500	179.5
K3-14 Sloped channel - 39.37" (1m)	76414	14.57	370	148.2	K3-0403 Neutral channel - 19.69" (0.5m) ²	76450	19.69	500	97.7
K3-15 Sloped channel - 39.37" (1m) ²	76415	14.76	375	149.4	K3-903G In-line catch basin - 19.69" (0.5m) ²	94615	37.40	950	88.0
K3-16 Sloped channel - 39.37" (1m)	76416	14.96	380	150.6	K3-904G In-line catch basin - 19.69" (0.5) ²	94636	37.40	950	98.0
K3-17 Sloped channel - 39.37" (1m)	76417	15.16	385	151.8	K3-Series 600 Optional plastic riser	99902	-	-	10.0
K3-18 Sloped channel - 39.37" (1m)	76418	15.35	390	153.0	Foul air trap - fits both 900 & 600 series basins	90854	-	-	1.2
K3-19 Sloped channel - 39.37" (1m)	76419	15.55	395	154.2	Universal end cap	96826	15.71	399	2.5
K3-20 Sloped channel - 39.37" (1m) ²	76420	15.75	400	155.4	K3-Installation device	97479	-	-	4.9
K3-020 Neutral channel - 39.37" (1m) ²	76445	15.75	400	155.4	Grate removal tool	01318	-	-	0.3
K3-0203 Neutral channel - 19.69" (0.5m) ²	76446	15.75	400	82.3	K3-QuickLok locking bar	10458	-	-	0.7
K3-21 Sloped channel - 39.37" (1m)	76421	15.94	405	156.7					
K3-22 Sloped channel - 39.37" (1m)	76422	16.14	410	157.9					
K3-23 Sloped channel - 39.37" (1m)	76423	16.34	415	159.1					
K3-24 Sloped channel - 39.37" (1m)	76424	16.54	420	160.3					
K3-25 Sloped channel - 39.37" (1m) ²	76425	16.73	425	161.5					
K3-26 Sloped channel - 39.37" (1m)	76426	16.93	430	162.7					
K3-27 Sloped channel - 39.37" (1m)	76427	17.13	435	163.9					

Notes:

- This channel offers a bottom knockout feature; 6" & 8" round
- Inverts shown are for the male end; for female invert depth subtract 5mm (≈0.2") from the male invert (except for neutral channels, where it will be same as male invert).
To calculate the overall channel depth add 20mm (≈0.8") to invert depth.
- This catch basin kit includes a polymer concrete top, removable Quicklok locking bar, trash bucket and plastic base. Select an appropriate grate.
- This catch basin kit includes a polymer concrete top, removable Quicklok locking bar, deep trash bucket, plastic riser and plastic base. Select an appropriate grate.

Specifications

General

The surface drainage system shall be ACO Drain KS300 complete with gratings secured with 'QuickLok' locking as manufactured by ACO Polymer Products, Inc. or approved equal.

Materials

The trench system bodies shall be manufactured from polyester polymer concrete with the minimum properties as follows:

Compressive strength: 14,000 psi
Flexural strength: 4,000 psi

Water absorption 0.07%
Frost proof YES
Salt proof YES
Dilute acid and alkali resistant YES

The nominal clear opening shall be 12" (300mm) with overall width of 14.17" (360mm). Pre-cast units shall be manufactured with either an invert slope of 0.5% or with neutral invert and have a wall thickness of at least 0.50" (13mm). Each unit will feature a partial radius in the trench bottom and a male to female interconnecting end profile. Units shall have horizontal cast in anchoring keys on the outside wall to ensure maximum mechanical bond to the surrounding bedding material and pavement surface. The stainless steel edge rail will be integrally

cast in by the manufacturer to ensure maximum homogeneity between polymer concrete body and edge rail. Each edge rail shall be at least 3/32" (2.5mm) thick.

Grates

Grates shall be specified. See separate ACO Spec Info grate sheets for details. After removal of grates and 'QuickLok' bar there shall be uninterrupted access to the trench to aid maintenance.

Installation

The trench drain system shall be installed in accordance with the manufacturer's installation instructions and recommendations.

ACO Polymer Products, Inc.

Northeast Sales Office

P.O. Box 245
Chardon, OH 44024
Tel: (440) 285-7000
Toll free: (800) 543-4764
Fax: (440) 285-7005

West Sales Office

P.O. Box 12067
Casa Grande, AZ 85130
Tel: (520) 421-9988
Toll Free: (888) 490-9552
Fax: (520) 421-9899

Southeast Sales Office

4211 Pleasant Road
Fort Mill, SC 29708
Toll free: (800) 543-4764
Fax: (803) 802-1063

Follow us on



Electronic Contact:

info@ACODrain.us
www.ACODrain.us



© June 10, 2014 ACO Polymer Products, Inc. This information is believed to be accurate but it is not guaranteed to be so. We cannot assume liability for results that buyer obtains with our product since conditions of use are beyond the control of the company. It is the customer's responsibility to evaluate suitability and safety of product for his own use. ACO Polymer Products Inc. reserves the right to change the product and specifications without notice.

June 14/3

www.ACODrain.us

Location	FL elevation (ft)	Specific Energy (ft)	Minimum FF/TW (ft)	FF (ft)	Remarks
Winter Snow and Pink Rose	66.05	0.62	66.67	69	Flow Makes the turn at the knuckle

APPENDIX C

Referenced Material and Supporting Documents

JUNE 2011

ADDENDUM #1 TO THE MECHANICAL DRAINAGE STUDY for LONGFORD AT LAKE MEAD

June 2011

Prepared for:

Longford at Lakemead, LLC
3077 E. Warm Springs Road
Las Vegas, NV 89119



Stanley Consultants INC.

A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

CITY OF LAS VEGAS				DATE:	
INTER-OFFICE MEMORANDUM				March 30, 2004	
TO: Land Development Services Department of Public Works				FROM: Albert J. Jankowiak, P.E.  Flood Control Civil Engineer Department of Public Works	
SUBJECT: Technical Drainage Study for: Longford at Lake Mead				COPIES TO: Stanley Consultants, Inc.	
Cross Streets: Tonopah Drive & Lake Mead Blvd.				Murtagh Family Living Trust	
File Number: F:\Depot\DSMEMOS\DS3466C.doc				Bart Anderson, P.E., DevCo	
Parcel Number: 139-21-301-011 & -012				CCRFCD	
Zoning Action:					
FEMA Flood Zone		YES	NO	X	
Proposed Storm Drain		YES	NO	X	
HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID G.R. No.
1 st Submittal	12/11/2003	12/22/2003	See Comments Below	\$400.00	115984: \$400
2 nd Submittal, Supplement	1/15/2004, 2/12/2004	1/29/2004, 2/13/2004	See Comments Below	\$400.00	117717: \$400
3 rd Submittal	3/22/2004	3/30/2004	CCRFCD Concurrence	N/C	N/C
TOTAL FEES (LDDRS):				\$800.00	-----

REMARKS:

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

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

1. The engineer must provide a table on the grading plans that shows a quantity estimate of all on-site and off-site flood control improvements such as solid grouted stem wall, drainage easements, protection berm, riprap, etc. All drainage improvements must be bonded and inspected.
2. This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.

NOTE: All land surface area disturbances over 1 acre require a stormwater discharge permit issued by the Nevada Division of Environmental Protection (NDEP). A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. A storm water discharge permit application and associated information may be downloaded from the web site:

<http://www.state.nv.us/ndep/bwpc/storm01.htm>

Projects that disturb more than one acre of land must submit to NDEP a "Notice of Intent" for inclusion under Stormwater Permit No. NVR100000 along with the appropriate filling fee.

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

END OF REMARKS

B&H/ajj

T/R/S: T21S/R61E/21

AREA M-21

Post-it® Fax Note 7671		Date 3/30/4	# of pages 2
To Dennis Brown	From Al Janowski		
Co./Dept. Longford @ Luke	Co. CLV Flood		
Phone #	Phone # 229-2191		
Fax # 369-9793	Fax #		

January 14, 2004

Mr. Albert J. Jankowiak, P.E.
City of Las Vegas Department of Public Works – Engineering Planning
Flood Control Section
731 South Fourth Street
Las Vegas, Nevada 89101

RE: Addendum #1 to the Technical Drainage Study for Longford at Lake Mead

Dear Mr. Jankowiak:

We are hereby submitting for your review two copies of Addendum #1 to the Technical Drainage Study for Longford at Lake Mead. The following responses are provided for comments dated December 23, 2003.

Comment #1

A review of the grading plan shows an elevation difference of approximately 4-feet of fill adjacent to developed properties. Sites with a grade difference of 2-feet above or below existing are required to have approval from the City Planning and Development Department. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to Linda Hartman-Maynard [Tel: 229-6899] at the CLV Current Planning Division. The engineer must provide a Current Planning approval with the next submittal.

Response

Grading plans, detail sheets, and a justification letter have been submitted to the City Planning and Development Department for review and approval. A copy of the justification letter and transmittal are included in the appendix of this addendum.

Comment #2

Provide an offsite drainage map showing the basin boundaries and the runoff amounts from the adjacent properties to the west and south. Determine the flow rate in both Winter Snow Avenue and Pink Rose Street and provide hydraulic calculations for the streets. Include the information on Exhibit 8 – *Existing Conditions Basin Map* and Exhibit 9 – *Developed Conditions Basin Map*. Also, include the flow rate, depth of flow, and velocity of Lake Mead Boulevard on the basin maps.

Response

It is the intent of this study to use offsite drainage information from the *City of Las Vegas City Wide Hydrology Study*. A Copy of the basin map is included with this addendum. The project site is a portion of basin LM17A from the *CLV City Wide Hydrology Study*. LM17A is the area between Tonopah and Martin Luther King and between Lake Mead and Doolittle. In order to provide a conservative, yet accurate assumption, 50 percent (50 %) of the flow generated by basin LM17A has been used for the street flow calculations for Winter Snow Avenue and Pink Rose Street. Please note that the use of 50 percent (50 %) is due to the development of the Enterprise Business Park which makes up the east half (E ½) of basin LM17A. The HEC-1 analysis from the CLV City Wide Hydrology Study indicates that the flow generated by basin LM17A is 21 cfs/64 cfs (10 Year/100 Year). A copy of the page from the CLV City Wide Hydrology Study HEC-1 analysis is included in the appendix of this addendum. The flow used in the street flow calculations for Winter Snow Avenue and Pink Rose Street is 11 cfs/32 cfs (10 Year/100 Year). Street flow calculations for Winter Snow Avenue and Pink Rose Street are included in the appendix of this addendum. Careful review of both studies indicates that basin LM17A is a portion of basin LM14-C from the *CCRFGD Master Plan Update 2002*.

Comment #3

A review of the grading plan indicates that runoff generated by the adjacent properties is discharged through the site. Development of the site must not adversely impact the adjacent properties. Provide for the offsite flow by either accepting the flow through the site or by redirecting the flow offsite to an acceptable discharge point. If the flow is redirected offsite, obtain a notarized letter from the adjacent property owner allowing the offsite grading. If the flow is conveyed through the project site, provide a Public Drainage Easement to be Privately Maintained through the site. On the detail sheet, provide or revise the impacted cross-sections accordingly.

Response

A site visit on December 30, 2003 has provided evidence that the adjacent properties to the south and west do not impact the proposed site. Digital photos were taken and are included in the appendix of this addendum to provide documentation of the evidence that the adjacent properties do not discharge to the proposed site. The adjacent properties discharge flows into Tonopah Drive, Lake Mead Boulevard, Winter Snow Avenue, Pink Rose Street, and through a public drainage easement located along the east property line of the existing middle school site to the south. The photos have been labeled with a description and location with respect to the Longford at Lake Mead site. In addition, a retaining wall is necessary along the south property line near the southeast corner of the site. This will impact a small area of the existing middle school site to the south. The developer is currently attempting to obtain permission to grade from the school district for the minor offsite grading required to minimize the amount of retaining wall needed. The addition of this retaining wall and grading do not impact the existing drainage conditions as shown in the pictures included. The developer requests that notarized permission to grade be listed as a condition of approval for the study. It is understood that no permits will be issued until notarized permission to grade is received.

Comment #4

Job No. 16948.01.00
09-Dec-03

Stanley Consultants INC.

5820 S. Eastern Ave. Suite 200
Las Vegas, Nevada 89119
702.369.9396

6-Hour Design Storm Distribution

[illegible]

EXISTING CONDITIONS

EON1	2.06	0.0032
------	------	--------

EQN2	185	00076
------	-----	-------

LONG DEVELOPED CONDITIONS

MILLION OF 1977 DOLLARS

0.0019	1.20	0.0019
--------	------	--------

DON2	0.44	0.0007
------	------	--------

DON3 0.42 0.0007

DON4	0.84	0.0013
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1 69 0 0026

CONC	1.00	0.0020
CONC	1.15	0.0040

Donor	1.13	0.0018
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CON7	1.19	0.0019
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Longford at Lake Mead
Calculated by: EJT

Job No. 16948.01.00
09-Dec-03



Stanley Consultants INC.

5820 S. Eastern Ave. Suite 200
Las Vegas, Nevada 89119
702.369.9396

Similar to STANDARD FORM 4 from the Clark County Regional Flood Control District's Hydrologic Criteria and
Drainage Design Manual

For SMALL BASINS < 1 sq. mi.

Sub-Basin Data			Initial/Overland Time (Ti)			Travel Time (Tt)					Tc Check (Urbanized Basins)		Final Tc	TLAG	Remarks
Designation (1)	K (Default by CN) (2)	Area (Acres) (3)	Length (feet) (4)	Slope (%) (5)	Ti (Min) (6)	Length (feet) (7)	Slope (%) (8)	V1 (FPS) (Manning) (9)	V2 (FPS) (Manning) (10)	Tt (Min) (10)	Total Length (feet) (11)	Tc= (L/180)+10 (Min) (12)	Tc = Tt + Tt (13)		
EXISTING CONDITIONS															
EON1	0.63	2.06	100	1.50	7.45	415	0.80	1.32	2.63	5.23	515	12.9	12.7	0.127	Tc>=10 for Non Urban Tc>=5 for Urban
EON2	0.63	4.85	100	1.00	8.52	725	0.90	1.40	2.79	7.28	825	14.6	14.6	0.146	
DEVELOPED CONDITIONS															
DON1	0.82	1.20	100	1.00	4.96	300	0.50	1.43	2.16	3.50	400	12.2	8.5	0.085	
DON2	0.82	0.44	100	1.00	4.96	300	0.50	1.43	2.16	3.50	400	12.2	8.5	0.085	
DON3	0.82	0.42	100	1.00	4.96	200	1.00	2.02	3.06	1.65	300	11.7	6.6	0.066	
DON4	0.82	0.84	100	1.00	4.96	170	1.00	2.02	3.06	1.40	270	11.5	6.4	0.064	
DON5	0.82	1.69	100	1.00	4.96	360	0.50	1.43	2.16	4.20	460	12.6	9.2	0.092	
DON6	0.82	1.13	100	1.00	4.96	330	0.50	1.43	2.16	3.85	430	12.4	8.8	0.088	
DON7	0.82	1.19	100	1.00	4.96	820	0.50	1.43	2.16	8.30	920	15.1	13.3	0.133	

K = 0.0132*Cn-0.39 $Ti = 1.8 * (1.1 - K) * L^{1/2} / (S^{1/3})$

Generalized Manning's Equations

Existing Conditions

$V1 = 14.8 * (S/100)^{0.5}$

$V2 = 29.4 * (S/100)^{0.5}$

Developed Conditions

$V1 = 20.2 * (S/100)^{0.5}$

$V2 = 30.6 * (S/100)^{0.5}$

* V1 is used for the first 500 feet of length in column (7). V2 is used for the remainder.

$Tt = L / (60 * V)$


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* FLOOD HYDROGRAPH PACKAGE (HEC-1)
ENGINEERS
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* JUN 1998
*
* CENTER
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* VERSION 4.1
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* STREET
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* 95616
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* RUN DATE 09DEC03 TIME 07:41:52
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*
* U.S. ARMY CORPS OF
*
* HYDROLOGIC ENGINEERING
*
* 609 SECOND
*
* DAVIS, CALIFORNIA
*
* (916) 756-1104
*

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

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

LINE	ID	1	2	3	4	5	6	7	8	9	10	
1	ID	Stanley Consultant's, Inc.										
2	ID	Q:\16948\06-Studies\04-Studies\01-Drainage\01-1st Submittal\01-Documents\										
3	ID	Longford at Lake Mead - Existing Conditions										
4	ID	10 & 100 Year										
5	ID	6 Hour Storm										
6	ID	Unit Hydrograph: SCS										
7	ID	12/08/2003										
8	ID	Eric J. Tune, E.I.										
9	IT	5	0	0	300							
10	IN	5										
11	IO	5										
	*DIAGRAM											
12	JR	PREC	0.570	1.000								
	*											
13	KK	EON1	BASIN									
14	KM	RUNOFF CALCULATION FOR EXISTING ON-SITE BASIN 1										
15	BA	0.0032										
16	PB	2.77										
17	PC	0.00	2.00	5.70	7.00	8.70	10.80	12.40	13.00	13.00	13.00	
18	PC	13.00	13.00	13.00	13.30	14.00	14.20	14.80	15.80	17.20	18.10	
19	PC	19.00	19.70	19.90	20.00	20.10	20.40	21.40	22.90	24.10	24.90	
20	PC	25.10	25.60	27.00	27.80	28.10	28.30	29.50	32.20	35.20	40.90	
21	PC	49.90	59.00	71.00	74.40	78.10	81.20	81.90	83.50	85.10	85.60	
22	PC	86.00	86.80	87.60	88.80	91.00	92.60	93.70	95.00	97.00	97.60	
23	PC	98.20	98.50	98.70	98.90	99.00	99.30	99.30	99.40	99.50	99.80	
24	PC	99.80	99.90	100.00								
25	LS	0	77									
26	UD	0.127										
	*											
27	KK	EON2	BASIN									
28	KM	RUNOFF CALCULATION FOR EXISTING ON-SITE BASIN 2										
29	BA	0.0076										
30	LS	0	77									
31	UD	0.146										
	*											
32	ZZ											

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT

LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW

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

13 EON1

27 EON2

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1*****
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*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
ENGINEERS *
* JUN 1998
*
* CENTER *
* VERSION 4.1
*
* STREET *
*
* 95616
* RUN DATE 09DEC03 TIME 07:41:52
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* U.S. ARMY CORPS OF
* HYDROLOGIC ENGINEERING
*
* 609 SECOND
*
* DAVIS, CALIFORNIA
*
* (916) 756-1104
*

```

Stanley Consultant's, Inc.
 Q:\16948\06-Studies\04-Studies\01-Drainage\01-1st Submittal\01-Documents\
 Longford at Lake Mead - Existing Conditions
 10 & 100 Year
 6 Hour Storm
 Unit Hydrograph: SCS
 12/08/2003
 Eric J. Tuna, E.I.

```

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

```

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IT      HYDROGRAPH TIME DATA
        NMN          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
        NDDATE       0055 ENDING TIME
        ICENT        19  CENTURY MARK

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        COMPUTATION INTERVAL .06 HOURS
        TOTAL TIME BASE     24.92 HOURS

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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

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JP      MULTI-PLAN OPTION
        NPLAN        1  NUMBER OF PLANS

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JR      MULTI-RATIO OPTION
        RATIOS OF PRECIPITATION
        .57          1.00

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1

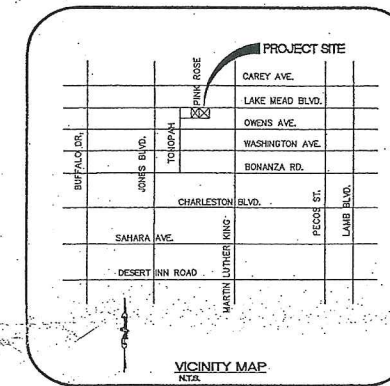
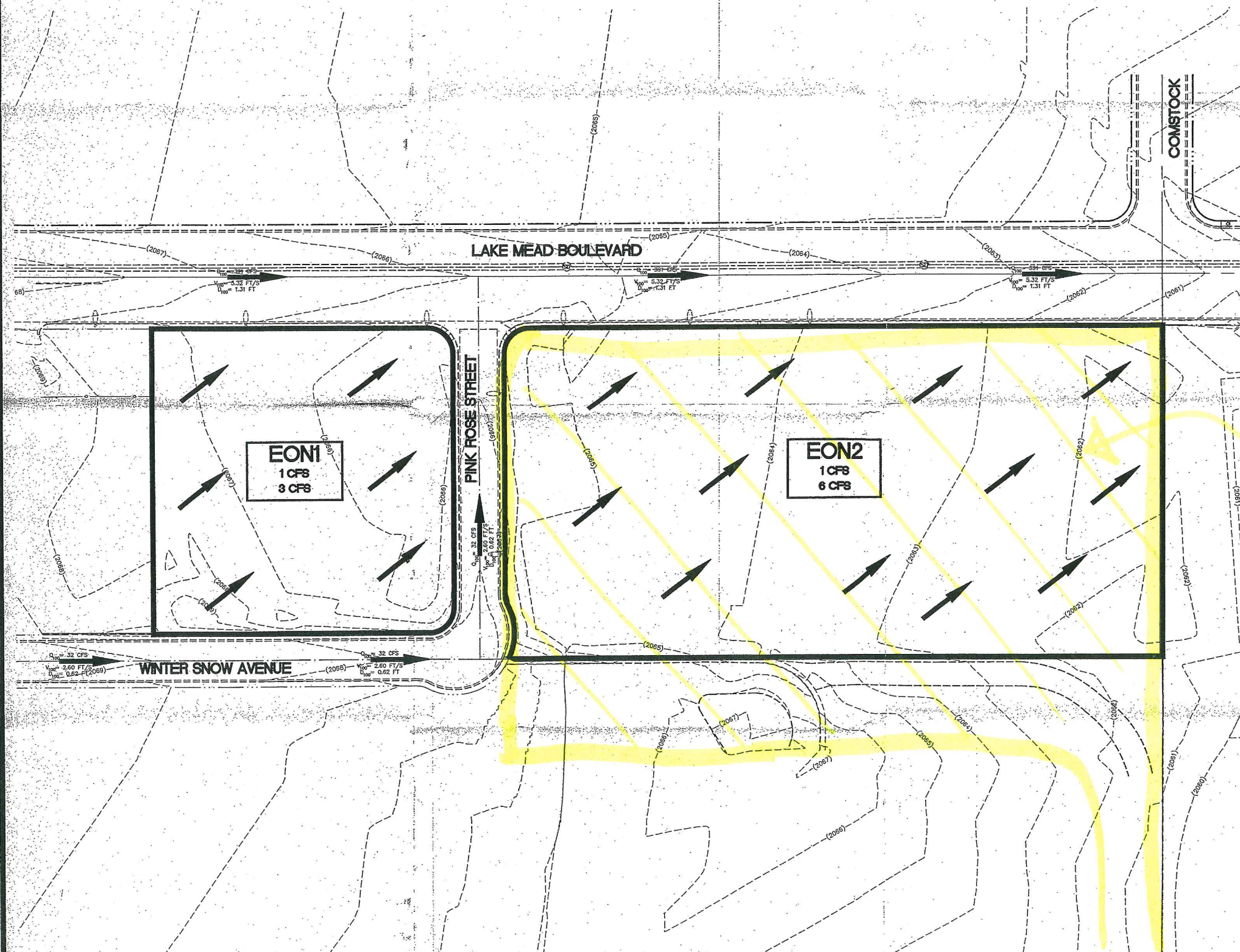
PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
				.57	1.00
HYDROGRAPH AT					
+	EON1	.00	1	FLOW	1.
				TIME	3.58
HYDROGRAPH AT					
+	EON2	.01	1	FLOW	1.
				TIME	3.58

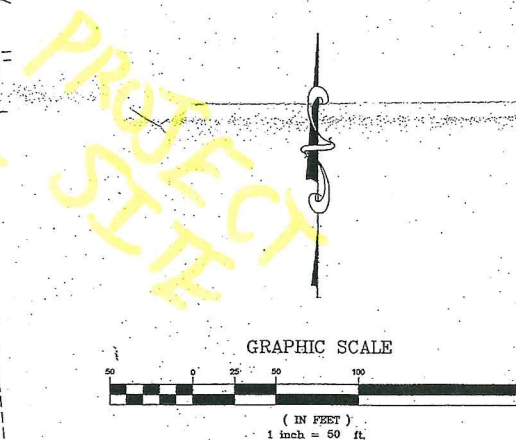
*** NORMAL END OF HEC-1 ***

LONGFORD AT LAKE MEAD

EXISTING CONDITIONS BASIN MAP EXHIBIT 8



DEVELOPED CONDITIONS BASIN SUMMARY			
BASIN	AREA	Q ₁₀	Q ₁₀₀
EON1	2.06 AC	1 CFS	3 CFS
EON2	4.85 AC	1 CFS	6 CFS



LEGAL DESCRIPTION

THIS PROJECT LIES WITHIN THE NORTH HALF (N 1/2) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 21, TOWNSHIP 20 SOUTH, RANGE 61-EAST, M.D.M., CLARK COUNTY, NEVADA.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK NUMBER 8, BEING A RIVET AND 2" ROUND ALUMINUM DISK IN THE TOP OF CURB ON THE NORTH SIDE OF LAKE MEAD BOULEVARD AT THE INTERSECTION OF LAKE MEAD BOULEVARD AND TONOPAH STREET.

NAVD '88 ELV = 630.470 M (2068.47 FT).

BASIS OF BEARING

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 89°55'08" EAST, BEING THE NORTH LINE OF THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 21, TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.M., AND BEING THE CENTERLINE OF LAKE MEAD BOULEVARD, AS SHOWN BY THAT CERTAIN PARCEL MAP RECORDED IN FILE 87, PAGE 65, OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY NEVADA.

FLOOD ZONE INFORMATION

FEMA FIRM MAP No. 32003C2160 E
DATED: SEPTEMBER 27, 2002

FLOOD ZONE DESIGNATION: ZONE X

DESCRIPTION OF ZONE X FLOOD ZONE:
THOSE AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOOD PLAIN.

5020 S. Eastern Avenue, Suite 200
Las Vegas, Nevada 89119
(702) 368-3986 Fax (702) 368-9793
www.stanleyconsultants.com



Stanley Consultants Inc.
NEVADA

LONGFORD AT LAKE MEAD, LLC
LONGFORD AT LAKE MEAD
EXISTING CONDITIONS BASIN MAP
CITY OF LAS VEGAS

SCI PROJECT #
16948.01.00

SHEET 1 OF 1

SCALE (H): 1" = 50'
SCALE (V): N/A
DRAWN BY: EJT
CHECKED BY: DBR
DATE: 01-08-04

**RESPONSE TO COMMENTS
ON THE UPDATE TO THE
TECHNICAL DRAINAGE STUDY
FOR
LONGFORD AT LAKE MEAD**

758.004

December 2005

Prepared for:

**Longford Properties
3077 E. Warm Springs Road
Las Vegas, Nevada 89120
Phone: (702) 454-5300
Fax: (702) 454-1376**

CITY OF LAS VEGAS				DATE:	
INTER-OFFICE MEMORANDUM				RECEIVED March 15, 2006 MAR 20 2006	
TO: Land Development Services Department of Public Works				FROM: G.C. WALLACE Albert Sung, P.E. Flood Control Project Engineer Department of Public Works	
SUBJECT: Update to the Technical Drainage Study for: Longford at Lake Mead - Update				COPIES TO: G.C. Wallace	
Cross Streets:		Tonopah Drive & Lake Mead Blvd.		Longford Properties	
File Number:		F:\Depot\DSMEMOS\DS3921C.doc		Bart Anderson, P.E., DevCo	
Parcel Number:		139-21-314-002		CCRFC	
Zoning Action:		ZON-3335			
FEMA Flood Zone		YES	NO	X	
Proposed Storm Drain		YES	NO	X	
HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Trn. No.
1 st Submittal	12/11/2003	12/22/2003	Not Approved	\$400.00	115984: \$400
2 nd Submittal, Supplement	1/15/2004, 2/12/2004	1/29/2004, 2/13/2004	Conditional Approval	\$400.00	117717: \$400
3 rd Submittal	3/22/2004	3/30/2004	CCRFC Concurrence	N/C	N/C
4 th Submittal Update	11/9/2005	11/23/2005	Not Approved	\$400.00	33130: \$400
5 th Submittal	1/4/2006	1/18/2006	Conditional Approval	\$400.00	36193: \$400
CCRFC	3/3/2006	3/15/2006	Concurrence	N/C	N/C
TOTAL FEES (LDDRS):				\$1,600.00	----

REMARKS:

4th & 5th Submittals: Update and addendum

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

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

The following comments are repeated until they are complete:

1. The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.
2. A drainage study update will be required for each subsequent pad development.
3. Raise the finish floor elevation of the "Family Dollar" building to FF=2069.50.
4. Sheet C5: In the proposed public drainage easement, replace the U-channel (which drains the parking area to the south of "Family Dollar" building) with valley gutter.
5. Revise the wall opening detail to provide vertical bars versus horizontal.
6. The City of Las Vegas typically allows a 10' minimum width for public drainage easements. However, Greg McDermott, Flood Control Project Manager, has approved the proposed 8' drainage

easement for the Longford development considering the minimal 8-cfs and the location of the building.

7. *All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map.*

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

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

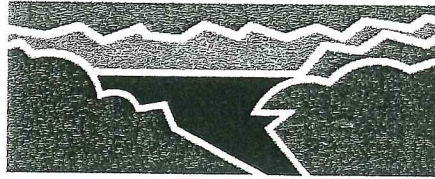
END OF REMARKS

B&H/ajj/cld

T/R/S: T21S/R61E/21

AREA M-21

REGIONAL FLOOD CONTROL DISTRICT



February 23, 2006

Gale Wm. Fraser, II, P.E.
General Manager/Chief
Engineer

BOARD OF DIRECTORS

Larry Brown
Chairman
City of Las Vegas

Chip Maxfield
Vice-Chairman
Clark County

Robert L. Eliason
City of North Las Vegas

Mayor Oscar Goodman
City of Las Vegas

Andy Hafen
City of Henderson

Mayor Bill Nicholes
City of Mesquite

Roger Tobler
City of Boulder City

Bruce L. Woodbury
Clark County

Mr. Randy Fultz, P.E.
City of Las Vegas Public Works
731 S. Fourth St
Las Vegas, NV 89101

DISTRICT CONCURRENCE: LONGFORD AT LAKE MEAD UPDATE (DS3921) (RFCD NO. 06-6681)

Dear Mr. Fultz:

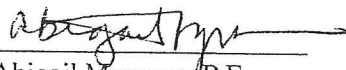
Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated November 7, 2005 and Addendum No. 1 dated December 12, 2005, for the above-mentioned project as submitted by G. C. Wallace, Inc. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Las Vegas Public Works dated January 19, 2006.

District concurs with acceptance of this Technical Drainage Study by City of Las Vegas Public Works.

District's review of this project was limited to issues of Regional Flood Control Significance as defined in *Uniform Regulations for the Control of Drainage*.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, information submitted by G. C. Wallace, Inc., may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

GALE WM. FRASER, II, P.E.
General Manager/Chief Engineer

BY: 
Abigail Mayrena, P.E.
Associate Engineer


Andrew R. Trelease, P.E., CFM
Principal Civil Engineer

AM:ART:css

c: Grant Y. Tokumi, P.E., G. C. Wallace, Inc.

File: 21-61-21.GCW

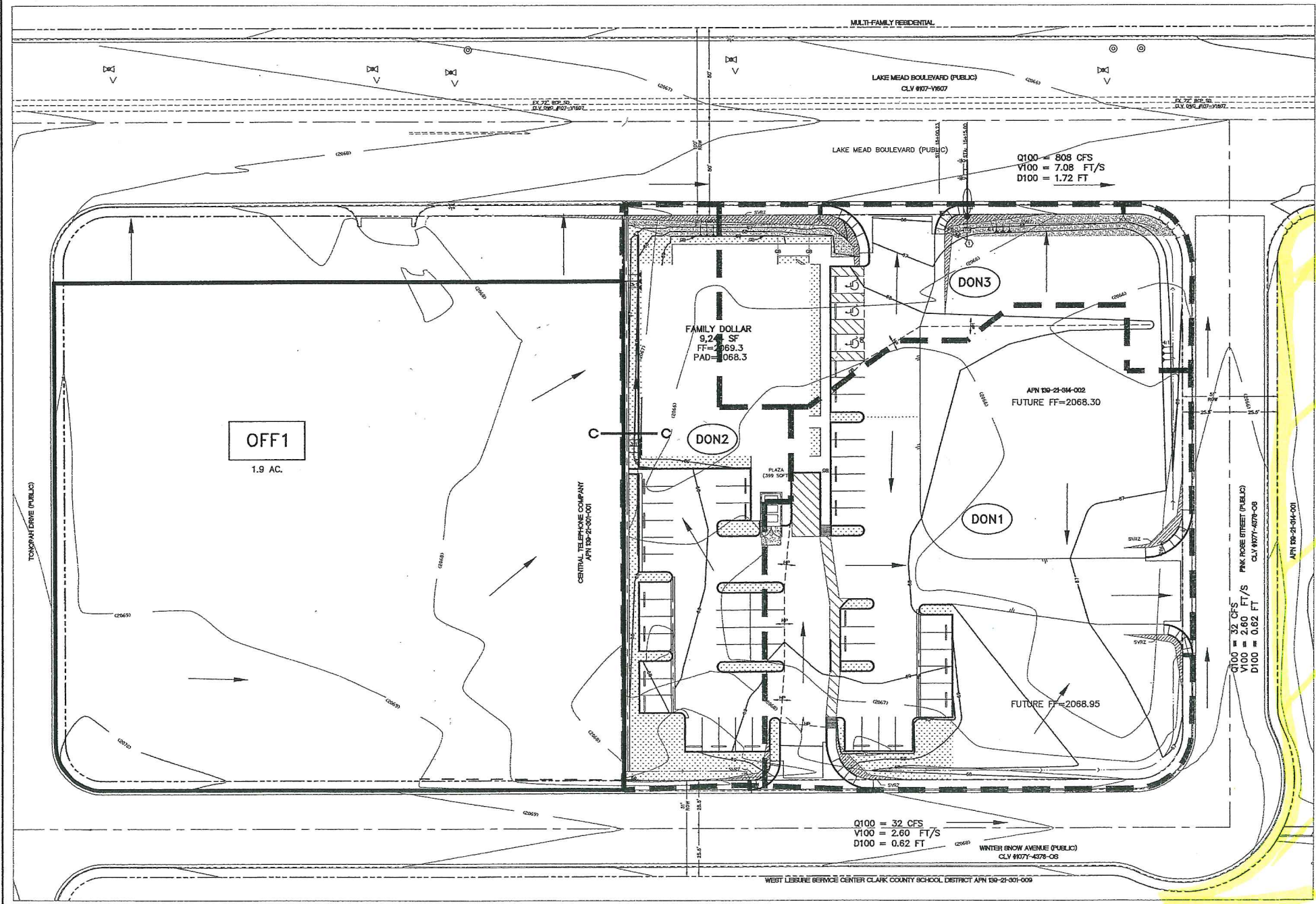
DEVELOPED CONDITIONS BASIN SUMMARY				
BASIN	AREA (ac)	100-YEAR (cfs)	10-YEAR (cfs)	
DON1	1.2	3	2	
DON2	0.44	1	1	
DON3	0.42	1	1	

SUMMARY STREET FLOW CHARACTERISTICS					
STREET	SLOPE (%)	Q100 (cfs)	VELOCITY (FPS)	DEPTH (FT)	V x D
PINK ROSE	0.5	32	2.60	0.62	1.61
WINTER SNOW	0.5	32	2.60	0.62	1.61

NOTE: BOTH TABLES ARE REFERENCED FROM THE LONGFORD AT LAKE MEAD STUDY DONE BY STANLEY CONSULTANTS.

HEC-1 SUMMARY OFFSITE STORM RUNOFF				
SUBBASIN	AREA (ac)	100-YEAR (cfs)	10-YEAR (cfs)	
OFF1	1.9	7	4	

SUMMARY STREET FLOW CHARACTERISTICS				
LOCATION	FLOW (cfs)	DEPTH (FT)	VELOCITY (FPS)	D x V
C-C	8	0.84	3.27	2.75
Lake Mead	808	1.72	7.08	12.18



LEGEND

- DON1 STANLEY CONSULTANTS DRAINAGE SUBBASIN
- STANLEY CONSULTANTS SUBBASIN BOUNDARY
- OFF1 OFFSITE DRAINAGE SUBBASIN
- OFFSITE SUBBASIN BOUNDARY
- C — C CROSS SECTION
- FLOW DIRECTION

LONGFORD SHOPPES AT LAKE MEAD
LONGFORD AT LAKE MEAD, LLC
DRAINAGE CONDITIONS MAP

SHEET
FIG 5R
SHT OF SHTS

G. C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD., LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2239
G:\725-004\DWG\Map5R.DWG

DESIGN: _____
DRAWN: _____
CHECK: _____
ISSUE DATE: _____
PLOT DATE: 12-02-05
PLOT TIME: 11:40:52

DATE: _____
APP: _____
DATE: _____
REV: _____
DATE: _____
DESCRIPTION: _____

PROJECT
SITE

1801
M21
FILE

RECEIVED

JUN 27 1996

**CLV PUBLIC WORKS
FLOOD CONTROL**

**TECHNICAL DRAINAGE STUDY
ADDENDUM 2 ADDITION
FOR
LAKE MEAD TONOPAH MIDDLE SCHOOL
CCSD #0842**

A.P.N. 139-21-301-002

June 26, 1996

Prepared for:

**CLARK COUNTY SCHOOL DISTRICT
CONSTRUCTION MANAGEMENT DEPARTMENT
4828 South Pearl Street
Las Vegas, NV 89121**

Prepared by:

**SUMMIT ENGINEERING CORPORATION
3684 S. Highland Drive
Las Vegas, Nevada 89103
(702) 252-3236
Job #71082**

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		November 19, 1997
TO: Diane Phomninh, P. E. Land Development Services Department of Public Works		FROM: Dennis W. Stransky, P.E. Project Manager, Flood Control Department of Public Works
SUBJECT: Drainage Study for: LAKE MEAD TONOPAH Middle School		COPIES TO: Summit Engineering Corp. John McNellis, P.E. Clark County School District
FILE NO. F:\Depot\DS2\DS1801D.doc		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1st Submittal	03/18/96	03/28/96	Not Acceptable	N/C
2nd Submittal	04/12/96	04/29/96	Not Acceptable	N/C
3rd Submittal	06/19/96	06/25/96	Accepted	N/C
4 th submittal	11/06/97	11/19/97	See below comments	
TOTAL FEES:				N/C

REMARKS:

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

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

1. This submittal is for the re-grading of the 24 foot drainage easement at the southeast corner of the site. This revision is in conjunction with the changes to the curb, gutter and sidewalk at the corner of Sapphire stone Avenue and Crystal Stone Street in Unit 3 of the Diamond Point subdivision.
2. The drainage study review fees have been waived at the request of the City Manager.

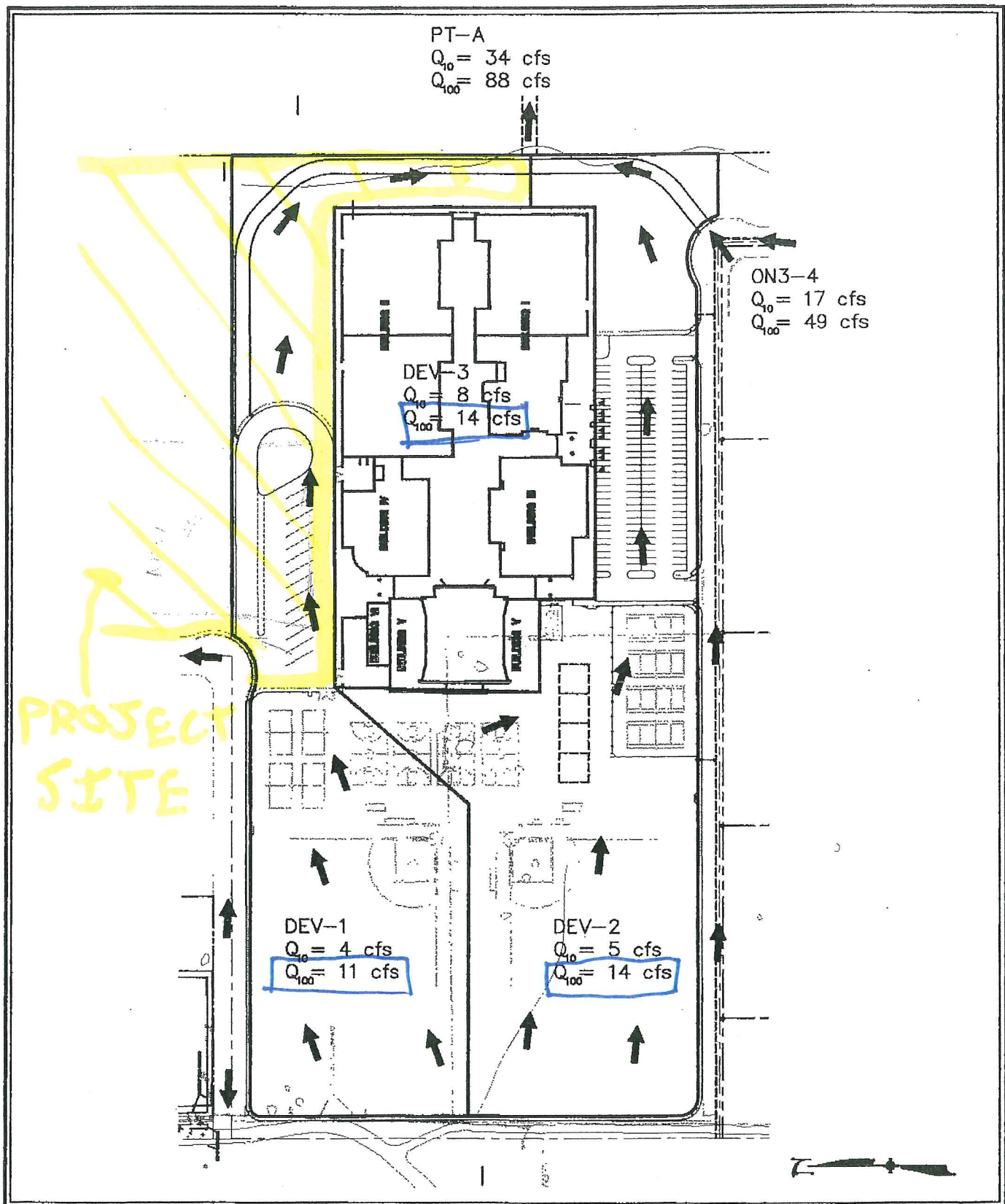
NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the City of Las Vegas Flood Control Section. Additionally, conditional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

PLANS SENT TO LAND DEVELOPMENT yes *SSW* (initial)

END OF REMARKS

dws

T/R/S 20S/61E/21
AREA M-21



DEVELOPED BASINS
 FIGURE 4

DATE 3/7/96
 JOB NO. 71082
 SCALE 1" = 180'

SUMMIT™ ENGINEERING CORPORATION
 CONSULTING ENGINEERS AND SURVEYORS
 3684 SOUTH HIGHLAND, LAS VEGAS, NEVADA
 (702) 252-3236

OWNER

CLARK COUNTY SCHOOL DISTRICT
4828 PEARL STREET
LAS VEGAS, NV 89121
(702)799-7604

ARCHITECT

WELLES-PUGSLEY ARCHITECTS
2480 E. TOMPKINS AVENUE, SUITE 222
LAS VEGAS, NEVADA 89121

CHARLES I. WEST MIDDLE SCHOOL

FORMERLY KNOWN AS

LAKE MEAD TONOPAH MIDDLE SCHOOL

STANDARD SPECIFICATIONS/STANDARD DETAILS

THE FOLLOWING LISTED DOCUMENTS CONTAIN THE STANDARD SPECIFICATIONS AND STANDARD DETAILS TO BE USED IN THE CONSTRUCTION OF THIS PROJECT. THE CONTRACTOR SHALL MAINTAIN A SET OF THE LISTED DOCUMENTS AT THE PROJECT SITE AT ALL TIMES.

- SPECIFICATIONS (STANDARD SPECIFICATIONS)
"UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA" (LATEST EDITION).
- STANDARD DRAWINGS (STD. DWGS.)
"UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA" (LATEST EDITION).
- WATER SYSTEM STANDARDS (U.D.A.C.S.)
"UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS" (LATEST EDITION).
- SEWER SYSTEM STANDARDS (D.C.S.)
"DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS" (LATEST EDITION).

PROJECT BENCHMARK

CITY OF LAS VEGAS BM21V01 21C4; A RIVET & PLATE IN TOP OF CURB AT THE NORTHEAST CORNER OF LAKE MEAD & MARTIN LUTHER KING BOULEVARD.
ELEVATION = 625.6597 METERS (NAVD 83) 2052.69 FEET

BASIS OF BEARINGS

NORTH 89°55'08" EAST, BEING THE NORTH LINE OF THE W 1/2 SW 1/4 OF SEC. 21, T. 20 S., R. 61 E., M.D.M., AS PER FILE #2 OF PARCEL MAPS, PAGE 74, CLARK COUNTY, NEVADA RECORDS' CUMULATIVE MAP INDEX.

CITY OF LAS VEGAS STREET LIGHT NOTES

- ALL STREET LIGHTING INSTALLATIONS SHALL CONFORM TO THE LATEST ISSUE OF THE STANDARD DETAILS AND SPECIFICATIONS OF THE CITY OF LAS VEGAS, AND SHALL ALSO CONFORM TO THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, 1995, UNLESS OTHERWISE NOTED.
- SEE UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION CITY OF LAS VEGAS DRAWING NO. 318.
- STREET LIGHT NOTE: ALL HANDCOVERS MUST BE INSTALLED, POLECAPS POURED, AND PULL BOX LIDS BOLTED DOWN PRIOR TO ENERGIZING CIRCUIT. ALL WIRES MUST HAVE THIN INSULATION.

CITY OF LAS VEGAS STREET NOTES

- A.C. PAVEMENT TO BE 1/2" ABOVE LIP OF GUTTER AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS.
- SUBGRADE FOR TYPE I UNDER CURB AND GUTTER AND UNDER A.C. (WHERE REQUIRED) TO BE CONTINUOUS.
- FOG SEAL TO BE APPLIED AFTER FINAL CORRECTIONS AND ADJUSTMENTS HAVE BEEN MADE.
- THE MAXIMUM GRADE BREAK OCCURRING IN THE CROSS SECTION SHALL BE 2% AND SHALL FALL BETWEEN DRIVING LANES OR BETWEEN A DRIVING LANE AND A PARKING LANE.
- IN PLACE NATIVE MATERIAL (NON-CEMENTED) MAY BE SUBSTITUTED FOR TYPE I AGGREGATE BASE PROVIDED THE FOLLOWING CONDITION IS MET: ALL OTHER REQUIREMENTS ARE THE SAME AS FOR TYPE I, AND APPROVED BY CONSTRUCTION SERVICES OFFICE.

CITY OF LAS VEGAS SEWER NOTES

- ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN & CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IN ALL CASES, THESE STANDARDS SHALL SUPERSEDE THE UNIFORM STANDARD SPECIFICATIONS. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATION BOOKS.
- 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 CONTROLLING AGENCY.
- CHISEL "S" OR "C" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
- POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OR TYPE B GRAVEL.
- ALL MANHOLES IN PAVED STREETS 8' R/W AND LARGER, SHALL HAVE CONCRETE COLLARS.
- TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO 12" DIAMETER SIZE. CONNECTIONS TO 15" OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES.
- A SEWER MAIN CROSSING OVER A WATER MAIN OR LESS THAN 18" UNDER A WATER MAIN MUST BE REINFORCED CONCRETE ENCASED FOR A DISTANCE NOT LESS THAN TEN FEET (10') TO EACH SIDE OF THE CENTERLINE OF THE WATER MAIN.
- ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CONTROLLING AGENCY MUST BE CLASS "A" CONTRACTORS.
- 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. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED AND REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY.

UTILITY NOTE

UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

Avoid cutting underground utility lines. It's costly.
Call before you dig
1-800-227-2600
UNDERGROUND SERVICE (USA)

CITY OF LAS VEGAS FIRE DEPARTMENT NOTES

- ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE CITY OF LAS VEGAS FIRE DEPARTMENT "HYDRANT SPECIFICATIONS", "HYDRANT INSTALLATIONS" AND ORDINANCE # 3944.
- AUTHORIZED HYDRANTS FOR THIS PROJECT ARE:
A. KENNEDY GUARDIAN
B. MUELLER A-423 CENTURIAN
C. CLOW MODEL 2546 MEDALLION
- ON ANY NEW HOME OR BUILDING INSTALLATION, ACCESSIBLE FIRE HYDRANTS SHALL BE INSTALLED BEFORE COMPLETION OF CONSTRUCTION COMMENCES AND SAID FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER WITH AN ADEQUATE WATER SUPPLY.
- CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT CENTERLINE OF STREET ADJACENT TO FIRE HYDRANT AS REQUIRED IN ORDINANCE # 3944 TO IDENTIFY FIRE HYDRANT LOCATIONS.
- CALL THE LAS VEGAS BUILDING DEPARTMENT AT 223-2071 FOR UNDERGROUND INSPECTION, PRESSURE AND FLUSH VERIFICATION OF ALL FIRE HYDRANTS AND FIRE LINES BEFORE COVERING.
- PAINTING OF THE CURBS AND HYDRANTS AND ANY WORK NECESSARY FOR PROTECTION OF HYDRANTS FROM PHYSICAL DAMAGE PER ORDINANCE # 3944 SHALL BE COMPLETED BEFORE APPROVAL BY THE CITY OF LAS VEGAS FIRE DEPARTMENT.
- A PERMIT IS REQUIRED FROM THE FIRE DEPARTMENT FOR ON-SITE WATER LINE AND FIRE HYDRANT. THE PERMIT AND CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER PRIOR TO ANY WORK BEGINNING.
- PRIVATE FIRE HYDRANTS SHALL BE PAINTED RED.
- A FLOW TEST MUST BE WITNESSED BY THE FIRE DEPARTMENT PRIOR TO OCCUPANCY FOR VERIFICATION OF REQUIRED ON-SITE WATER SUPPLY.
- ALL ON SITE FIRE MAIN MATERIALS MUST BE U.L. LISTED AND A.W.W.A. APPROVED.
- FIRE HYDRANT SPACINGS:
RESIDENTIAL - 500 FEET UNSPRINKLERED, 1,000 FEET SPRINKLERED
COMMERCIAL, INCLUDING MULTI-FAMILY - 500 FEET UNSPRINKLERED, 600 FEET SPRINKLERED.
- WHERE NEW WATER MAINS ARE EXTENDED ALONG STREETS, WHERE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF STRUCTURES, FIRE HYDRANTS SHALL BE SPACED AT MAXIMUM 1,000 FEET SPACING TO PROVIDE FOR TRANSPORTATION HAZARDS.
- NO FIRE HYDRANT SHALL BE LOCATED WITHIN THE REQUIRED RADIUS OF A CUL-DE-SAC OR WITHIN 20 FEET OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
- NO FIRE HYDRANT SHALL BE LOCATED WITHIN 6 FEET OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREET LIGHT OR ANY OTHER OBSTRUCTION.
- TWO SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE ARE 4 OR MORE FIRE HYDRANTS INSTALLED ON A SINGLE SYSTEM.
- NOT MORE THAN 2 HYDRANTS CAN BE OUT OF SERVICE DUE TO A SINGLE MAIN BREAK.
- FIRE APPARATUS ROADS SHALL HAVE AN UNOBSTRUCTED WIDTH OF NOT LESS THAN 20 FEET PROVIDED NO PARKING IS ALLOWED, NOT LESS THAN 28 FEET IF PARALLEL PARKING IS ALLOWED ON ONE SIDE, AND NOT LESS THAN 36 FEET IF PARALLEL PARKING IS ALLOWED ON BOTH SIDES. VERTICAL CLEARANCE SHALL BE NOT LESS THAN 13 FEET 6 INCHES.
- THE TURNING RADIUS FOR ANY FIRE APPARATUS ACCESS ROAD AND/OR FIRE LANE, PUBLIC OR PRIVATE SHALL BE NOT LESS THAN 45 FEET OUTSIDE RADIUS AND 22 FEET INSIDE RADIUS.
- A FIRE APPARATUS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FEET FROM A FIRE DEPARTMENT VEHICLE ACCESS. (SEE EXCEPTIONS IN USC #4, SECTION 902.2)
- ALL DEAD END FIRE APPARATUS ACCESS ROADS AND/OR FIRE LANES PUBLIC OR PRIVATE IN EXCESS OF 150 FEET IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURNAROUND AREA. SEE ORDINANCE #3944.
- 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 FEET ALONG ALL DESIGNATED FIRE LANES. SIGNS TO BE PROVIDED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FEET OR LESS THAN 6 FEET FROM ROADWAY LEVEL. THE CURBS ALONG OR ON THE PAVEMENT OF CEMENT IF CURB IS NOT PRESENT, SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS.
- ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECOVER SYSTEM. SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE CITY OF LAS VEGAS GUIDELINES FOR AUTOMATIC EMERGENCY VEHICLE ACCESS GATES.

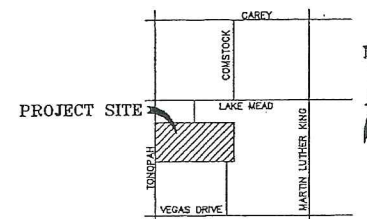
CITY OF LAS VEGAS TRAFFIC NOTES:

- 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 COUNTY STREETS IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
- ALL CONSTRUCTION SIGNING, BARRICAADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "NEVADA TRAFFIC CONTROL HANDBOOK - 1985" AND TO THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES - 1978". (REVISION NO. 4, MARCH, 1986).
- 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 LINE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.
- THE DEVELOPER SHALL BE RESPONSIBLE TO PROVIDE AND INSTALL ALL PERMANENT SIGNS SHOWN ON THE PLANS. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CITY OF LAS VEGAS STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF LAS VEGAS STANDARDS.
- IF A PROPOSED STREET LIGHT STANDARD IS FIELD LOCATED TO WITHIN FIVE (5) FEET OF ANY SIGN SHOWN HEREON TO BE MOUNTED ON A SIGN POST, THEN CHANGE MOUNTING TO ONE ON THE STREET LIGHT STANDARD.
- ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE APPROVED AND PLACED IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO ANY PORTION OF THE ROAD BEING IMPROVED HEREUNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR ON THESE PLANS.
- LVACTS INTERCONNECT CABLE POLICY IS IN EFFECT. INTERCONNECT CABLE MUST BE MAINTAINED AT ALL TIMES. DEVELOPER/CONTRACTOR SHALL PROVIDE TEMPORARY OVERHEAD INTERCONNECT CABLE WHILE PERMANENT CABLE IS BEING RELOCATED. ANY DAMAGE TO THIS CABLE IS DEEMED AN EMERGENCY BY LVACTS. CITY OF LAS VEGAS, CLARK COUNTY, AND NDOT. TEMPORARY AERIAL INSTALLATION MUST BE ACCEPTABLE TO COUNTY TRAFFIC MANAGER AND LVACTS.

SHEET INDEX:

- CIVIL NOTE SHEET
- HORIZONTAL CONTROL PLAN - WEST HALF
- HORIZONTAL CONTROL PLAN - EAST HALF
- GRADING PLAN - WEST HALF
- GRADING PLAN - EAST HALF
- STORM DRAIN
- UTILITY PLAN
- SIGNING & STRIPING
- PLAYGROUND EQUIPMENT PLAN
- DETAIL SHEET
- DETAIL SHEET
- DETAIL SHEET
- DETAIL SHEET

2493



VICINITY MAP

CITY OF LAS VEGAS GENERAL NOTES:

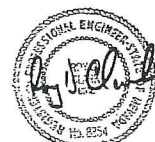
- ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST EDITION, THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA, NEVADA", LATEST EDITION, ANY 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 THE COVER SHEET AS "DEVIATIONS FROM STANDARDS". DEVIATIONS: NONE.
- 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 ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCES WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD OR UNDERGROUND POWER LINES AND/OR OTHER UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COSTS AND LIABILITY IN CONNECTION THEREWITH.
- 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 OR OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
- ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
- TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGN TO BE APPROVED BY THE QUALITY CONTROL DIVISION PRIOR TO USE ON THE PROJECT.
- PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT OF WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
- EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDE TYPE CURB.
- A.C. PAVEMENT TO BE 1/2" ABOVE LIP OF ALL GUTTER AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS.
- APPLY FOG SEAL ONLY AFTER ALL CORRECTIONS AND ADJUSTMENTS HAVE BEEN MADE.
- CURB & GUTTER WITH A GRADE OF LESS THAN FOUR TENTHS OF ONE PERCENT SHALL BE WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION. ANY CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY SHALL BE REMOVED AND REPLACED.
- 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.
- CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF TRANSITIONS TO BE AS SHOWN ON PLANS, OR AS DESIGNATED IN THE FIELD BY A CITY INSPECTOR.
- ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE SOILS ENGINEER AND APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
- THE EXACT LOCATION OF SAWCUT LINES MAY BE DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS INSPECTOR IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATION.
- 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. 625.550.
- UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC. SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APPROACHES, FLOWLINES, AND VALLEY GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY, AND THE CITY ENGINEER.
- WALL NOTES:
A. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN FOR THE PURPOSE OF GRADING RELATIONSHIPS.
B. THE STRUCTURAL AND ARCHITECTURAL DESIGN OF ALL WALLS (RETAINING OR NON-RETAINING) MUST BE APPROVED BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
- ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT ON CITY STREETS. STRUCTURAL SECTION SHOWN IS BASED ON AN "R" VALUE OF 72.

APPROVALS

J. Spando 6/26/96
CITY OF LAS VEGAS FIRE DEPARTMENT DATE
Tamara Jacoby 7/19/96
GEORGE JACOBY DATE
LAS VEGAS VALLEY WATER DISTRICT
Quanita Rodriguez 6-26-96
NEVADA POWER DATE
Shelly McDuffy 6/26/96
SOUTHWEST GAS DATE
Nick Smith 6-26-96
SPRINT/CENTRAL TELEPHONE NEVADA DATE
Terrell Parker 6-26-96
PRIME CABLE DATE

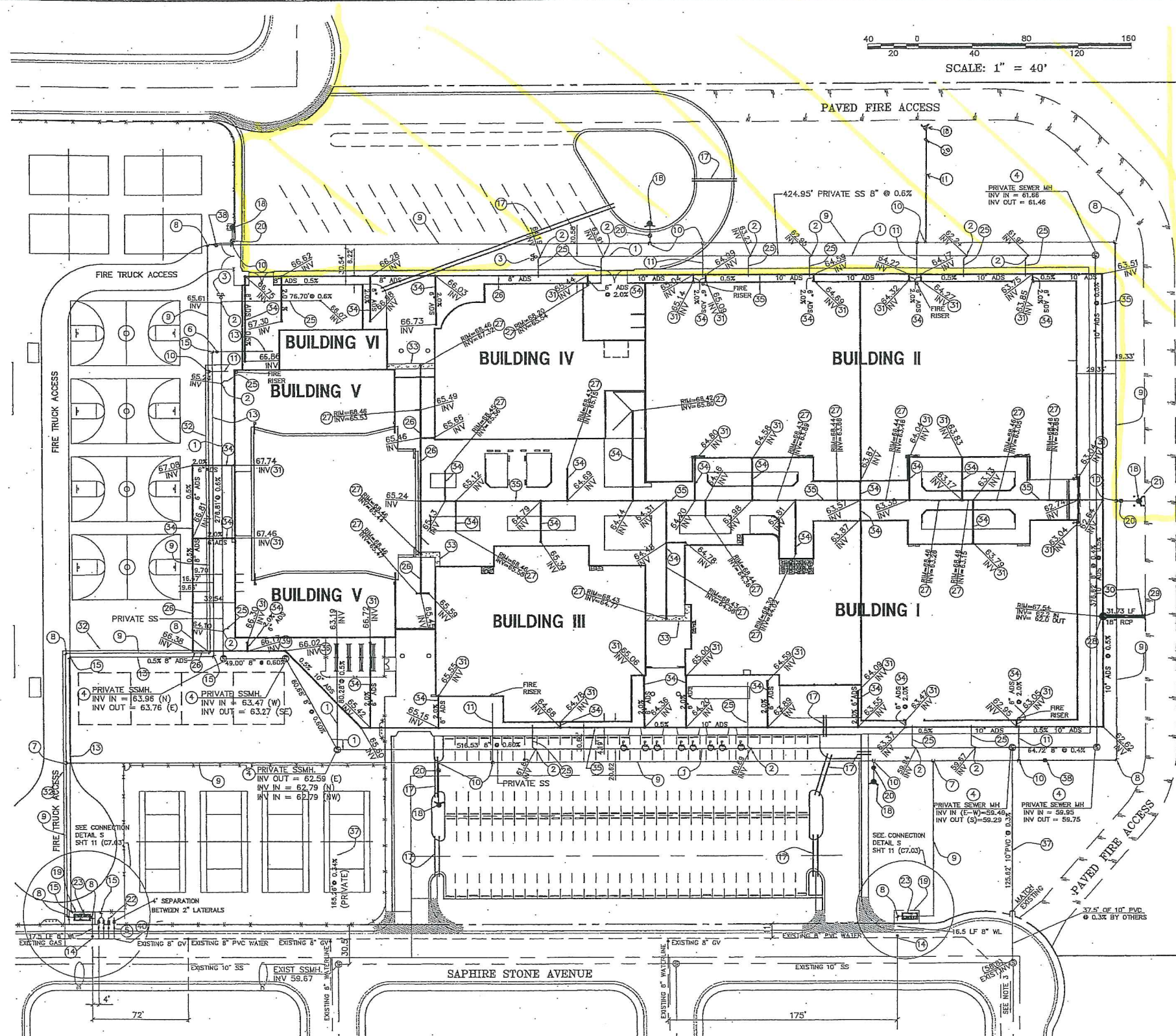
APPROVAL OF THESE PLANS BY THE CITY ENGINEER IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED RIGHTS-OF-WAY AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE THE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIFICALLY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

Dennis Anderson 8-15-96
DENNIS ANDERSON, P.E. DATE
CITY OF LAS VEGAS-CITY ENGINEER



SHEET	1	OF	13	SCALE	HORIZ. N/A	VERT. N/A	JOB NO. 71002	DATE	JUNE 26, 1996	DESIGNED BY: R.D.C.	DRAWN BY: R.D.C.	CHECKED BY: R.D.C.	SUMMIT ENGINEERING CORPORATION CONSULTING ENGINEERS AND SURVEYORS 3684 SOUTH HIGHLAND, LAS VEGAS, NEVADA 89103 PHONE (702) 252-3236 FAX (702) 252-3247
LAKE MEAD TONOPAH MIDDLE SCHOOL CCSD #0842 CIVIL NOTE SHEET													

PROJECT SITE



FIRE FLOW CALCULATION

FIRE FLOW REQUIREMENT IS 2,625 GALLONS PER MINUTE AT 20 PSI RESIDUAL

BASED ON:

SQUARE FOOTAGE	148,569 S.F. (6 BUILDINGS)
LARGEST AREA BETWEEN 4-HOUR AREA SEPARATION WALLS:	52,034 S.F.
BUILDING HEIGHT	ONE-STORY
TYPE OF CONSTRUCTION	II-N & II-1H
OCCUPANCY:	A-2.1, A-3, B-2, E-1
FULL AUTOMATIC FIRE SPRINKLER SYSTEM	YES

UTILITY NOTES:

- 1 - 8" PVC SANITARY SEWER LINE
- 2 - 6" PVC WYE, THE PLUMBING CONTRACTOR SHALL COORDINATE THE CONNECTION TO SANITARY SEWER WITH BUILDING SEWER LATERALS, SEE PLUMBING DRAWINGS
- 3 - 6" CLEANOUT W/ 2 45° BENDS
- 4 - INSTALL 48" SANITARY SEWER MANHOLE PER DCS STD DWG SD-1
- 5 - INSTALL 4-2" WATER METERS PER UDACS PLATE 1D
- 6 - INSTALL 4" GATE VALVE
- 7 - INSTALL 6" DUCTILE IRON TEE W/THRUST BLOCK
- 8 - INSTALL 8" DUCTILE IRON ELL (90°) W/THRUST BLOCK
- 9 - INSTALL 6" WATER MAIN AWWA C-900 CLASS 150 W/3.5' MIN BURIAL DEPTH
- 10 - INSTALL 6" X 6" DUCTILE IRON TEE W/THRUST BLOCK
- 11 - INSTALL 6" WATER MAIN FOR FIRE PROTECTION, AWWA C-900 CLASS 150
- 12 - INSTALL 4" SERVICE LINE FOR DOMESTIC SERVICE, AWWA C-900 CLASS 150
- 13 - INSTALL 6" X 6" M.J. TAPPING SLEEVE & VALVE
- 14 - INSTALL 4" DUCTILE IRON ELBOW W/THRUST BLOCK
- 15 - INSTALL 6" PVC CONDUIT FOR LANDSCAPING
- 16 - INSTALL FIRE HYDRANT PER UDACS PLATE NO 7
- 17 - LVVWD 10' X 20' EASEMENT
- 18 - INSTALL 6" GATE VALVE
- 19 - INSTALL BOLLARDS PER DETAIL 'Z' SHEET 13 (C7.05)
- 20 - INSTALL 4-2" RPPA'S PER UDACS PLATE 11A
- 21 - INSTALL 6" DOUBLE CHECK DETECTOR ASSEMBLY PER UDACS PLATE 20B
- 22 - INSTALL 6" PVC SANITARY SEWER LINE
- 23 - INSTALL 6" ADS DRAIN PIPE
- 24 - INSTALL 6" INLINE DRAIN PER DETAIL 'W' SHEET 12 (C7.04)
- 25 - INSTALL 48" STORM DRAIN MANHOLE
- 26 - INSTALL HEADWALL PER DETAIL 'Y' SHEET 13 (C7.05)
- 27 - INSTALL 18" RCP
- 28 - ON ALL ROOF DRAIN OUTLETS, EXTEND PIPE TO CAST IRON ROOF DRAINAGE PIPING, SEE PLUMBING DRAWINGS
- 29 - INSTALL 4" STEEL GAS LINE (BY SOUTHWEST GAS)
- 30 - INSTALL UTILITY TRENCH PER DETAIL 'X' SHEET 13 (C7.05)
- 31 - INSTALL 6" ADS DRAIN PIPE
- 32 - INSTALL 10" ADS DRAIN PIPE
- 33 - INSTALL 10"-45° ADS ELBOW
- 34 - INSTALL 10" PVC SANITARY SEWER LINE
- 35 - INSTALL 6" GATE VALVE
- 36 - INSTALL 6"x6"x10" REDUCING TEE
- 37 - INSTALL 4-2" CORPORATION STOPS AND SERVICE LATERALS PER UDACS PLATE 1D

QUANTITIES:

1789 LF	13 EA	2 EA	4 EA	4 EA	1 EA	2 EA	8 EA	2650 LF	11 EA	140 LF	620 LF	2 EA	5 EA	770 LF	6 EA	6 EA	4 EA	4 EA	2 EA	300 LF	540 LF	20 EA	1 EA	1 EA	40 LF	26 EA	580 LF	1040 LF	1950 LF	1 EA	126 LF	2 EA	1 EA
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UTILITY NOTE
UTILITY LOCATIONS SHOWN HEREIN ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THE EXACT LOCATION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION. THE CITY OF LAS VEGAS RESERVES THE RIGHT TO PREVENT THE PHYSICAL CONNECTION OF THIS PROJECT INTO THE DOWNSTEAM SEWER SYSTEM UNTIL ALL SEGMENTS HAVE BEEN COMPLETED AND ACCEPTED FOR MAINTENANCE.

SEWER CONNECTION NOTE:
A SEGMENT OF THE DOWNSTEAM SEWER SYSTEM THAT WILL SERVE THIS PROJECT HAS NOT BEEN COMPLETED AND/OR ACCEPTED FOR MAINTENANCE BY THE C.L.V. ANY WORK DONE ON THIS PROJECT PRIOR TO THE COMPLETION AND/OR ACCEPTANCE OF THE DOWNSTEAM SEWER SYSTEM(S) SHALL BE DONE AT THE DEVELOPER'S OWN RISK. THE CITY OF LAS VEGAS RESERVES THE RIGHT TO PREVENT THE PHYSICAL CONNECTION OF THIS PROJECT INTO THE DOWNSTEAM SEWER SYSTEM UNTIL ALL SEGMENTS HAVE BEEN COMPLETED AND ACCEPTED FOR MAINTENANCE.

- NOTES:**
1. THE UTILITY LOCATIONS INTO THE BUILDING ARE ASSUMED. IF THE FINAL LOCATIONS DIFFER SIGNIFICANTLY, THE CONTRACTOR SHALL CONTACT THE ENGINEER.
 2. ALL SANITARY SEWER NORTH OF THE NORTH RIGHT-OF-WAY LINE OF AMBERSTONE AVENUE IS PRIVATE.
 3. FOR LOCATION OF SEWER LINE EXTENSION TO A 12" COLLECTION SYSTEM SEE "SEWER VICINITY MAP" ON SHEET 13 (C7.05)
 4. FIRE RISER LOCATION SHOWN FOR REFERENCE ONLY

PROJECT BENCHMARK
CITY OF LAS VEGAS BENCHMARK 2104: A RIVET & PLATE IN TOP OF CURB AT THE NORTHEAST CORNER OF LAKE MEAD & MARTIN LUTHER KING BOULEVARD.
ELEVATION = 625.6597 METERS (NAVD 83) 2052.69 FEET

BASIS OF BEARINGS
NORTH 89°55'08" EAST, BEING THE NORTH LINE OF THE W 1/2 SW 1/4 OF SEC. 21, T. 20 S., R. 61 E., M.D.M., AS PER FILE B2 OF PARCEL MAPS, PAGE 74, CLARK COUNTY, NEVADA RECORDER'S CUMULATIVE MAP INDEX.

INSTALLATION OF DOUBLE CHECK DETECTOR ASSEMBLY - 8" (2 ea.)
THE DOUBLE CHECK DETECTOR ASSEMBLY SHALL BE INSTALLED IN ACCORDANCE WITH THE UDACS PLATE 20B.

ANY BLOCK WALL OR OTHER FENCE MATERIAL SHALL BE DESIGNED AND CONSTRUCTED AROUND THE OUTSIDE OF THE EASEMENT(S) SO AS TO ALLOW THE DISTRICT DIRECT ACCESS FROM THE ADJACENT RIGHT-OF-WAY.

APPROVED
James B. ...
LAS VEGAS VALLEY WATER DISTRICT
DATE: 7/19/96



SUMMIT™ ENGINEERING CORPORATION
CONSULTING ENGINEERS AND SURVEYORS
3845 SOUTH HIGHLAND AVE., SUITE 100
LAS VEGAS, NEVADA 89103
PHONE: (702) 232-3238 FAX: (702) 232-3247

DESIGNED BY: R.D.C.
DRAWN BY: C.S.S.
CHECKED BY: R.D.C.
JUNE 26, 1996
NEVADA

LAKE MEAD TONOPAH MIDDLE SCHOOL
CCSD #0842
UTILITY PLAN

REV.	DATE	DESCRIPTION	BY	APP'D

SHEET	SCALE	HORIZ. 1"=40'	VERT. 1"=4'	JOB NO. 71082	DATE 7/19/96
7					
13					

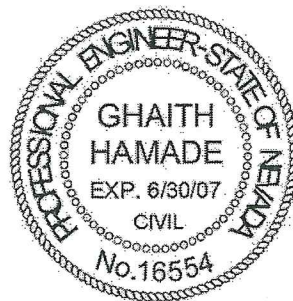
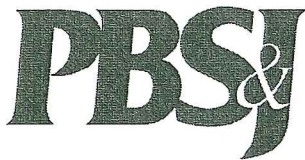
City of Las Vegas

**Central Neighborhood
Flood Control Master Plan**

Volume I – Report

March 2005

PBS&J Reference No. 511502





City of Las Vegas

CENTRAL NEIGHBORHOOD FLOOD CONTROL MASTER PLAN

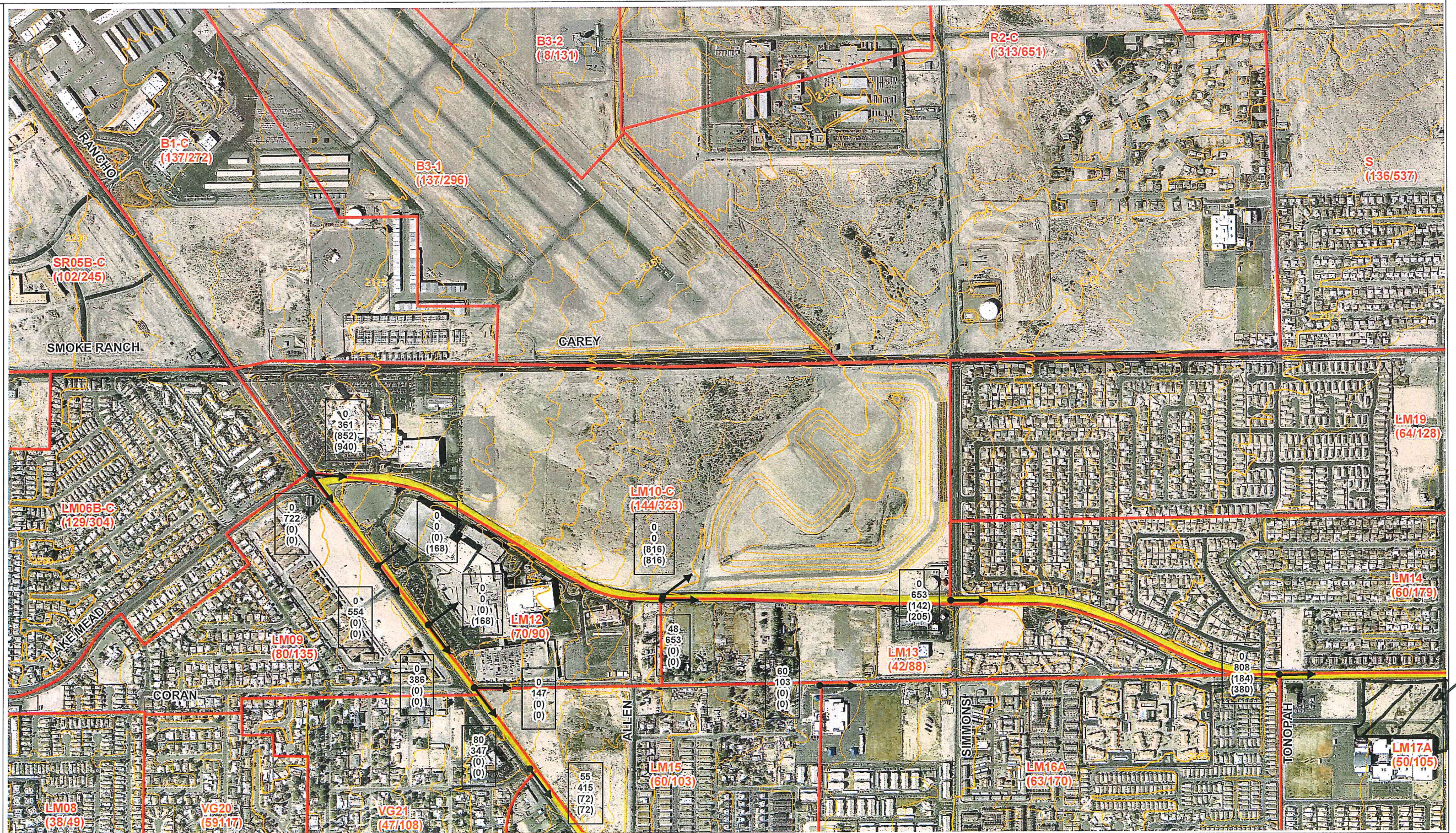
LEGEND

- Sub-basin Boundary
- LV12** Basin ID
- (10yr./100yr.) Contributing flow from the basin (cfs)
- 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)
- Study Area Limit

PHOTO DATE: SPRING 2004

FIGURE E-1



EXISTING DRAINAGE CONDITIONS

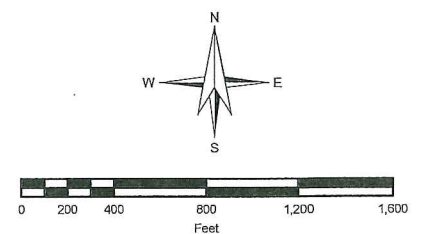


2270 Corporate Circle, Suite 100
Henderson, NV 89074
(702) 263-7275
Fax: (702) 263-7200

	Durango	Rainbow	Decatur	Tonopah	5th	Pecos	Nellis
Lake Mead				1	2		
Washington				3	4	5	6
Charleston	7	8	9	10	11	12	
Sahara	13	14	15	16	17		
Desert Inn		18	19				

NOTE:
Existing conditions are based on future
Curve Number values with only existing local and
CCRFCFCD facilities in place.

100-Year flows at locations where a 100-Year
subbasin concentration point does not exist in the
hydrology model were based on an area-weighted
ratio of the 100-Year flows from concentration points
upstream and downstream of the location. See
Volume I for a more detailed explanation.



SCALE: 1 inch = 800 feet

ATLAS PROJECT

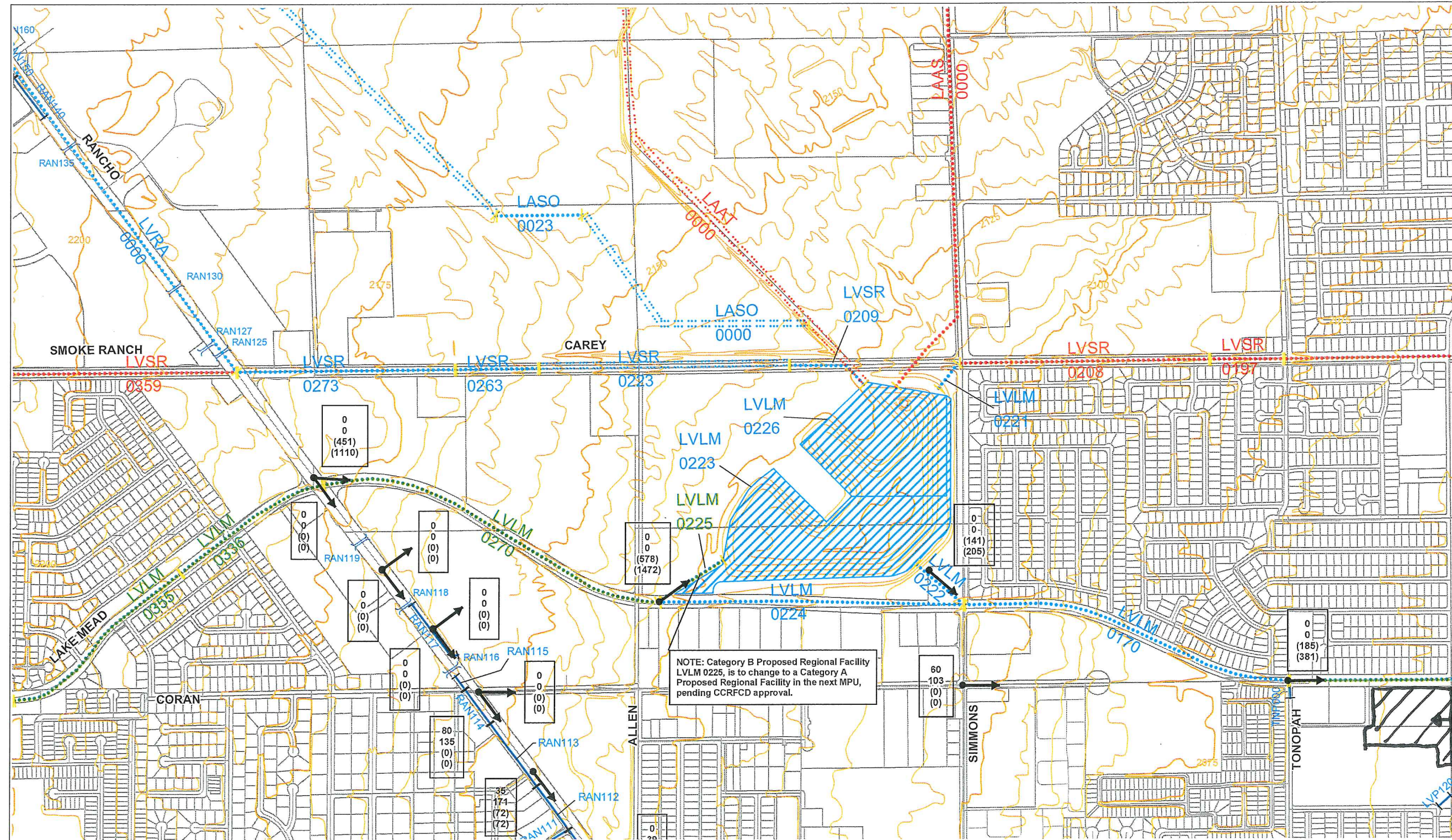


City of Las Vegas

CENTRAL NEIGHBORHOOD FLOOD CONTROL MASTER PLAN

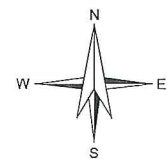
LEGEND

- Existing Regional Facility
- Category A Proposed Regional Facility (2002 MPU)
- Category B Proposed Regional Facility (2002 MPU)
- Category A Proposed Regional Facility (2004 CNFCMP)
- Existing Local Facility
- Proposed Local Facility
- Regional Culvert
- Regional Bridge
- Regional Pipeline
- Regional Channel
- Regional Levee
- Regional Detention Basin
- Local Storm Drain
- Local Culvert
- Proposed Local Storm Drain
- Regional ID-Mile Separator
- Local Facility Separator



PROJECT
SITE

FIGURE F-1



SCALE: 1 inch = 800 feet

Flow Arrow

250
500
(300)
(800)

10-Year Street Flow
100-Year Street Flow
10-Year Facility Flow
100-Year Facility Flow

(Flows in CFS)

NOTE:
Ultimate drainage conditions are based on future Curve Number values with all flood control facilities in place.

100-Year flows at locations where a 100-Year subbasin concentration point does not exist in the hydrology model were based on an area-weighted ratio of the 100-Year flows from concentration points upstream and downstream of the location. See Volume I for a more detailed explanation.

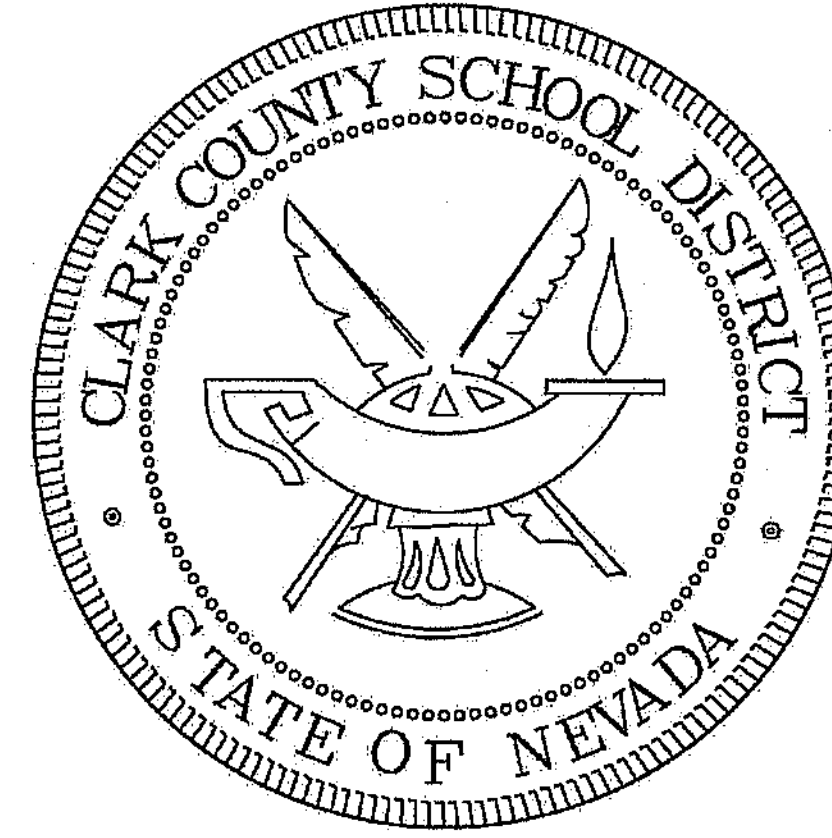
	Durango	Rainbow	Decatur	Tonopah	5th	Pecos	Nellis
Lake Mead				1	2		
Washington				3	4	5	6
Charleston	7	8	9	10	11	12	
Sahara	13	14	15	16	17		
Desert Inn			18	19			

FUTURE DRAINAGE CONDITIONS



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(702) 263-7275
Fax: (702) 263-7200

APN# 139-21-314-001 & 139-21-301-009
2050 SAPPHIRE STONE AVENUE



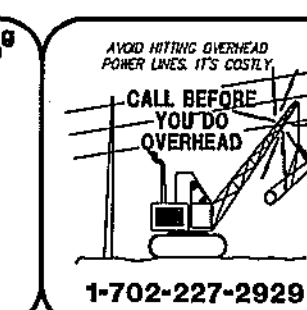
VICINITY MAP
NOT TO SCALE

CCSD
CLARK COUNTY
SCHOOL DISTRICT



DCC architects
Domingo Cambeiro Corp.

Pugsley.
Simpson.
Coulter.
ARCHITECTS



SOUTHWEST GAS CORP. DATE

DATE: 6/1/15

[illegible]

PROJECT NO: **858-004**

DESIGN:	RPL
DRAWN:	RPL
CHECK:	RC
LOT DATE:	08-11-15
LOT TIME:	11:14:48

J. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1355 S. RAINBOW BL. VD. LAS VEGAS NV 89146
T: 702.804.2000 • F: 702.804.2299 • GCWALLACE.COM



C
E
 Projects\800\858-
 Study Lopez

CLARK COUNTY SMOOOL DISTRICT
WEST PREP ACADEMY ELEM. SCHOOL ADDITION
COVER SHEET

DRAWING
C1
1 OF 14 SHTS

TDS 8/11/15

CITY OF LAS VEGAS SEWER NOTES

- 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.
- 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.
- CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLY 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, 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.
- 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 AT THE CONTRACTOR'S EXPENSE. THE CITY ENGINEER OR OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
- ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS. ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
- 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.
- PERMITS ARE REQUIRED FOR ALL WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
- EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
- AC PAVEMENT TO BE 1/2" ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS.
- CURB AND GUTTER FLOW TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER USD 216.
- SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER USD 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
- CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INSULATION TO NEW CONSTRUCTION. THE EXTENT OF TRANSITIONS TO BE AS SHOWN ON PLANS.
- ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE CITY ENGINEER. REPORT #, DATE) APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
- EXACT LOCATION OF ALL SAWCUT LINES MAY BE DETERMINED IN THE FIELD BY A CITY ENGINEER. IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
- 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. 625.360 AND CITY OF LAS VEGAS TITLE 18, APPENDIX D.
- UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOW LINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.
- 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.
- ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
- 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.
- 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.
- WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC. THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO THE 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.
- SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE OFFSITE INSPECTION AND TESTING PRIOR TO PROJECT ACCEPTANCE. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, AND THE CONNECTION OF SEWER SERVICE LATERALS TO THE SERVICE MAIN AND WHERE THE SEWER SERVICE LATERALS EXITS THE PUBLIC RIGHT-OF-WAY. THE LOCATION SHALL BE DESCRIBED BY STATE PLANE COORDINATES WHICH SHALL BE BASED ON THE "NEVADA COORDINATE SYSTEM OF 1983, EAST ZONE" AS DEFINED BY THE NEVADA REVISED STATUTES CHAPTER 327, AND TIED TO THE CITY OF LAS VEGAS VERTICAL CONTROL BENCHMARK NETWORK. COORDINATES MUST BE CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINITIES OF +/- 0.1 METER (+/- 0.3 FEET). A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).
- SANITARY SEWER SERVICE LATERALS REQUIRE THE INSTALLATION OF A MARKER BALL AT THE CONNECTION OF THE SEWER SERVICE LATERAL TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERAL EXITS THE PUBLIC RIGHT-OF-WAY. STORM DRAIN LATERALS REQUIRE THE INSTALLATION OF A MARKER BALL AT THE CONNECTION OF THE STORM DRAIN LATERAL TO THE STORM DRAIN MAIN AND WHERE THE STORM DRAIN LATERAL EXITS THE PUBLIC RIGHT-OF-WAY OR WHERE THE STORM DRAIN LATERAL CONNECTS TO A DROP INLET. THE MARKER BALL SHALL BE 3M 4" MARKER BALL 1400-TR APPROVED EQUAL.
- CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST EDITION.
- A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

REVISED 04/15/10

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

LVVWD PROJECT # 123381

- 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 00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
- 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.
- 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 SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
- A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
- ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
- ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
- ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
- ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.2.2 OF THE 2010 EDITION OF THE UDACS
- ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED, AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
- 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.
- 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.
- ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE LISTED ON THE LVVWD PRE-APPROVED MATERIALS AND MANUFACTURERS LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
- TELEPHONE "CALL BEFORE YOU DIG" AT 811 OR 1-800-227-2600
- 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 ON THE STREET SURFACE. ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ADJUTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.

ADDITIONAL WATER NOTES:

- INSTALL PIPELINE MARKER BALLS IN TRENCH ABOVE EACH HORIZONTAL ELBOW FITTING, PER UDACS PLATE #15.
- ADJUST ALL EXISTING WATER APPURTENANCES TO FINISHED GRADE PER UDACS SPECIFICATIONS. (VALVES SHALL BE ACCESSIBLE AT ALL TIMES).
- RELOCATE TEST STATIONS AND FIBER OPTIC PULL BOXES BEHIND BACK OF CURB WHERE REQUIRED.
- THE CONTRACTOR CANNOT GUARANTEE A WATERTIGHT SHUTDOWN WHERE CONNECTIONS OR REPAIRS TO EXISTING FACILITIES ARE REQUIRED. THE CONTRACTOR SHALL ENSURE THAT LABOR AND EQUIPMENT IS AVAILABLE TO REMOVE FUGITIVE WATER THAT MAY IMPEDE CONSTRUCTION AT ALL TIMES. COORDINATION WITH INSPECTION DIVISION MUST TAKE PLACE PRIOR TO ANY TRIAL SHUTDOWN.
- CONTRACTOR TO INSTALL TEMPORARY SERVICE TO ENSURE PROPER SHUTDOWN IN THE EVENT NO OTHER APPURTENANCES ARE AVAILABLE.
- THIS PROJECT PROVIDES FOR THE INSTALLATION OF OFF-SITE MAINS ONLY, AND DOES NOT PROVIDE OR IMPLY ANY WATER COMMITMENT. THE CONTRACTOR SHALL MAINTAIN TREES, SHRUBS OR DECORATIVE ROCKS, AND ANY BLOCK WALL OR OTHER FENCE MATERIAL, SHALL BE DESIGNED AND CONSTRUCTED AROUND THE EASEMENT(S) TO ALLOW THE DISTRICT DIRECT ACCESS TO THE VAULT(S), BACKFLOW ASSEMBLIES AND PIPING FROM THE ADJACENT RIGHT-OF-WAY.

DEVIATION FROM STANDARD

NONE

CITY OF LAS VEGAS GENERAL NOTES

- 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 REVISION 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".
- 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 CLY 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, 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.
- 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 AT THE CONTRACTOR'S EXPENSE. THE CITY ENGINEER OR OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
- ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS. ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
- 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.
- PERMITS ARE REQUIRED FOR ALL WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
- EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
- AC PAVEMENT TO BE 1/2" ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS.
- CURB AND GUTTER FLOW TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER USD 216.
- SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER USD 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
- CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INSULATION TO NEW CONSTRUCTION. THE EXTENT OF TRANSITIONS TO BE AS SHOWN ON PLANS.
- ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE CITY ENGINEER. REPORT #, DATE) APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
- EXACT LOCATION OF ALL SAWCUT LINES MAY BE DETERMINED IN THE FIELD BY A CITY ENGINEER. IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
- 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. 625.360 AND CITY OF LAS VEGAS TITLE 18, APPENDIX D.
- UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOW LINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.
- 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.
- ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
- 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.
- 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.
- WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC. THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO THE 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.
- SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE OFFSITE INSPECTION AND TESTING PRIOR TO PROJECT ACCEPTANCE. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, AND THE CONNECTION OF SEWER SERVICE LATERALS TO THE SERVICE MAIN AND WHERE THE SEWER SERVICE LATERALS EXITS THE PUBLIC RIGHT-OF-WAY. THE LOCATION SHALL BE DESCRIBED BY STATE PLANE COORDINATES WHICH SHALL BE BASED ON THE "NEVADA COORDINATE SYSTEM OF 1983, EAST ZONE" AS DEFINED BY THE NEVADA REVISED STATUTES CHAPTER 327, AND TIED TO THE CITY OF LAS VEGAS VERTICAL CONTROL BENCHMARK NETWORK. COORDINATES MUST BE CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINITIES OF +/- 0.1 METER (+/- 0.3 FEET). A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).
- SANITARY SEWER SERVICE LATERALS REQUIRE THE INSTALLATION OF A MARKER BALL AT THE CONNECTION OF THE SEWER SERVICE LATERAL TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERAL EXITS THE PUBLIC RIGHT-OF-WAY. STORM DRAIN LATERALS REQUIRE THE INSTALLATION OF A MARKER BALL AT THE CONNECTION OF THE STORM DRAIN LATERAL TO THE STORM DRAIN MAIN AND WHERE THE STORM DRAIN LATERAL EXITS THE PUBLIC RIGHT-OF-WAY OR WHERE THE STORM DRAIN LATERAL CONNECTS TO A DROP INLET. THE MARKER BALL SHALL BE 3M 4" MARKER BALL 1400-TR APPROVED EQUAL.
- CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST EDITION.
- A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

CITY OF LAS VEGAS TRAFFIC NOTES

- ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.
- THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.
- BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCED WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING CITY STREETS WHERE WARRANTED IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
- WHEN A DESIGNATED "SAFE ROUTE TO SCHOOL" IS ENCLOSED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO BE ASSISTED IN THE SAFE CROSSING THROUGH THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A QUALIFIED "CROSSING GUARD". THE GUARD SHALL BE PRESENT FOR THE FULL DURATION OF TIME THAT CHILDREN ARE LIKELY TO BE PRESENT.
- 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.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW SIGNS SHALL BE FABRICATED WITH DIAMOND GRADE VPI CLASS 6 REFLECTIVE SHEETING OR APPROVED EQUAL. ALL NEW TRAFFIC SIGNS, EXCEPT STREET NAME AND SCHOOL SPEED LIMIT SIGNS, SHALL HAVE 3M SERIES 1160 OR APPROVED EQUIVALENT ANTI-GRAFFITI PROTECTIVE OVERLAY FILM. STREET NAME 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.
- 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.
- ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ON TO 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.
- STREET SIGNS AND STOP SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF STREET NAME SIGNS.
- THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND SIGNING TO MAINTAIN 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.
- 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.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING CITIZENS AREA TRANSIT (CAT) IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP. THE CONTRACTOR SHALL REPORT ON BUS SERVICE ON THAT STREET TO ARRANGE FOR TEMPORARY RELOCATION OF STOP.
- 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.
- ANY WORK WITHIN 300' OF A SIGNALIZED INTERSECTION WILL BE NIGHT WORK, UNLESS DIRECTED BY THE CITY OF LAS VEGAS TRAFFIC ENGINEER.
- 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 DRAWING 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 DETAILING 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 STREETLIGHT NOTES

- ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND ANY ADOPTED SPECIAL AREA STANDARDS.
- NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF THE TRAFFIC ENGINEER AND THE CITY ENGINEER.
- ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION.
- ALL STREET LIGHTING CONDUITS STUB SHALL HAVE AT LEAST ONE GREEN #8 THW WIRE INSTALLED, AS TRACER WIRE. WHEN "EMPTY" CONDUIT IS COMPLETELY INSTALLED FROM PB TO PB, IT SHALL HAVE MINIMUM OF 2 #4 AND 1 #8 THW WIRE WITH THE ENDS TAPED OR "SAFE OFF" PRIOR TO FINAL INSPECTION.
- ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN ACCORDANCE WITH THE USD NO. 320A.
- AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TEF0 PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
- 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 PLANS.
- IT SHALL BE ASSUMED THAT IN THE ABSENCE OF AN EXISTING, WORKABLE CIRCUIT TO ATTACH TO, ALL INSTALLATIONS SHALL REQUIRE A NEW SERVICE FOR OPERATION OF THE CIRCUIT.
- WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREET LIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED, AT NO EXPENSE TO THE CITY OF LAS VEGAS, BEFORE STREETLIGHT BASES ARE INSTALLED.
- THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.
- THE DEVELOPER/OWNER WILL BE REQUIRED TO SUPPLY POWER TO ALL NEW PUBLIC STREET LIGHTS INSTALLED UNDER THIS DESIGN PRIOR TO BOND RELEASE OR PROJECT COMPLETION. THE DEVELOPER/OWNER WILL BE RESPONSIBLE FOR ALL ITEMS ASSOCIATED WITH THE INSTALLATION, CONSTRUCTION, ENERGIZING, MAINTENANCE AND OPERATIONAL COST OF SAID STREET LIGHTS PRIOR TO PROJECT COMPLETION. REFER TO THE PLAN FOR ANY NEW SERVICE REQUIREMENTS. THE TRANSFER OF OWNERSHIP FROM THE DEVELOPER/OWNER TO THE CITY OF LAS VEGAS FOR ALL NEW PUBLIC STREET LIGHTS AND/OR SERVICE/S INSTALLED UNDER THIS PLAN WILL BE IN CONJUNCTION WITH THIS PROJECT COMPLETION. COORDINATE ALL MAINTENANCE AND OPERATIONAL TRANSFERS WITH THE CITY OF LAS VEGAS TRAFFIC ENGINEERING DEPARTMENT (TEFO) AT (702) 228-6331.

LAS VEGAS FIRE AND RESCUE GENERAL NOTES

- ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE THE CITY OF LAS VEGAS FIRE DEPARTMENTS ORDINANCE #5667, "HYDRANT SPECIFICATIONS", AND "HYDRANT INSTALLATION SPECIFICATION".
- AUTHORIZED FIRE HYDRANTS ARE AS FOLLOWS:
 - KENNEDY - GUARDIAN MODELS K81A AND K81D
 - MUELLER - SUPER CENTURION 250 MODEL A-423
 - CLOW - MEDALLION MODEL F-2546LVD
 - U.S. PIPE - METROLFLOW/M-03
- 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 § 105.7.12]
- 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]
- 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]
- ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE MEDIANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE FLOW. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC § 106.3]
- ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.I.W.M.A. APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [IFC § 507.2.1, NFPA 24]
- PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY AS REQUIRED PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [IFC § 507]
- PRIVATE FIRE HYDRANTS SHALL BE PAINTED RED. [IFC § 507.5.7.1]
- PRIOR TO THE FINAL OCCUPANCY, A FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE. FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [IFC § 507]
- FIRE HYDRANTS SPACING SHALL BE: [IFC § C102]
 - RESIDENTIAL - 500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
 - COMMERCIAL - 300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
- WHERE NEW WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM 1,000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR FOUR 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 FEET ON AN ALTERNATING BASIS. [IFC § C102.8]
- 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.
- NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC § C102.12]
- 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]
- 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]
- THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [IFC § C102.7]
- TWO SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [IFC § C104]
- 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]
- 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]
- 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]
- VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13 FT 6 INS. [IFC § 503.2.1]
- FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FT FLOW LINE TO THE FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 23 FT WIDE, FLOW-LINE TO FLOW-LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD. NOT LESS THAN 24 FT WIDE, FLOW-LINE TO FLOW-LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. [IFC § 503.2.1.1]
- 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. THIS DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS SPRINKLERED. [IFC § 503.1.1]
- APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR EXCEEDING 62,000 SQUARE FEET IN AREA. [IFC § 503.1.2]
- ALL DEAD-END FIRE APPARATUS ACCESS ROADS AND/OR FIRE LINES, 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. [IFC § 503.2.5]
- 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]
- ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/ACCESS SYSTEM. SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE IFC § 503.6 AND IFC APPENDIX M.

LAS VEGAS FIRE DEPARTMENT DATE

REVISED JULY 1, 2014

FLOOD ZONE NOTE

NO PORTION OF THE SITE FALLS WITHIN A FEMA DESIGNATED SPECIAL FLOOD HAZARD AREA. A SITE LOCATION MAP (SEE DETAIL 3200302) DATED SEPTEMBER 27, 2003, REFLECTS A LOWR. THIS PANEL SHOWS THAT THE PROJECT IS LOCATED WITHIN A ZONE X AND NOT LOCATED WITHIN A FEMA DESIGNATED 100-YEAR ZONE A OR SPECIAL FLOOD HAZARD AREA.

CITY OF LAS VEGAS GRADING NOTES

- 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.
- 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.
- 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.
- 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.
- 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.
- 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:

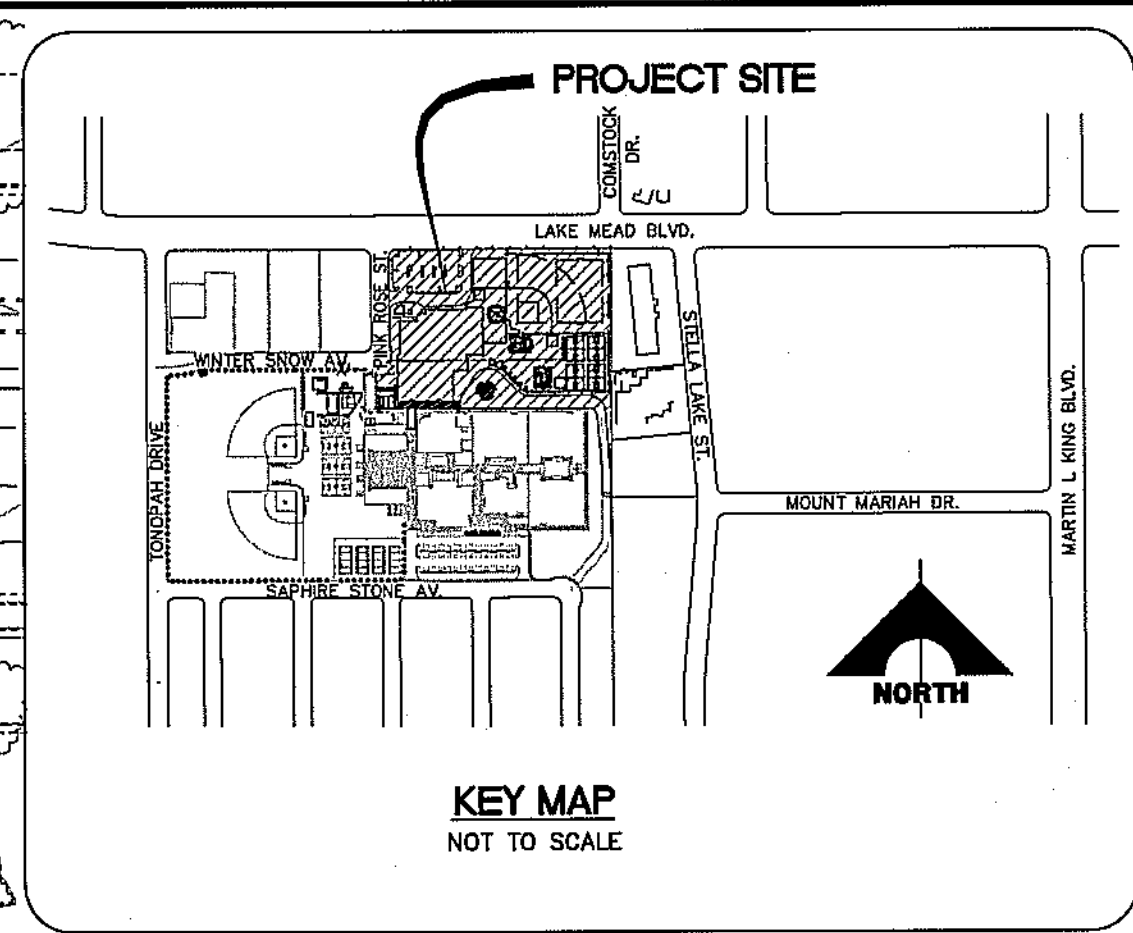
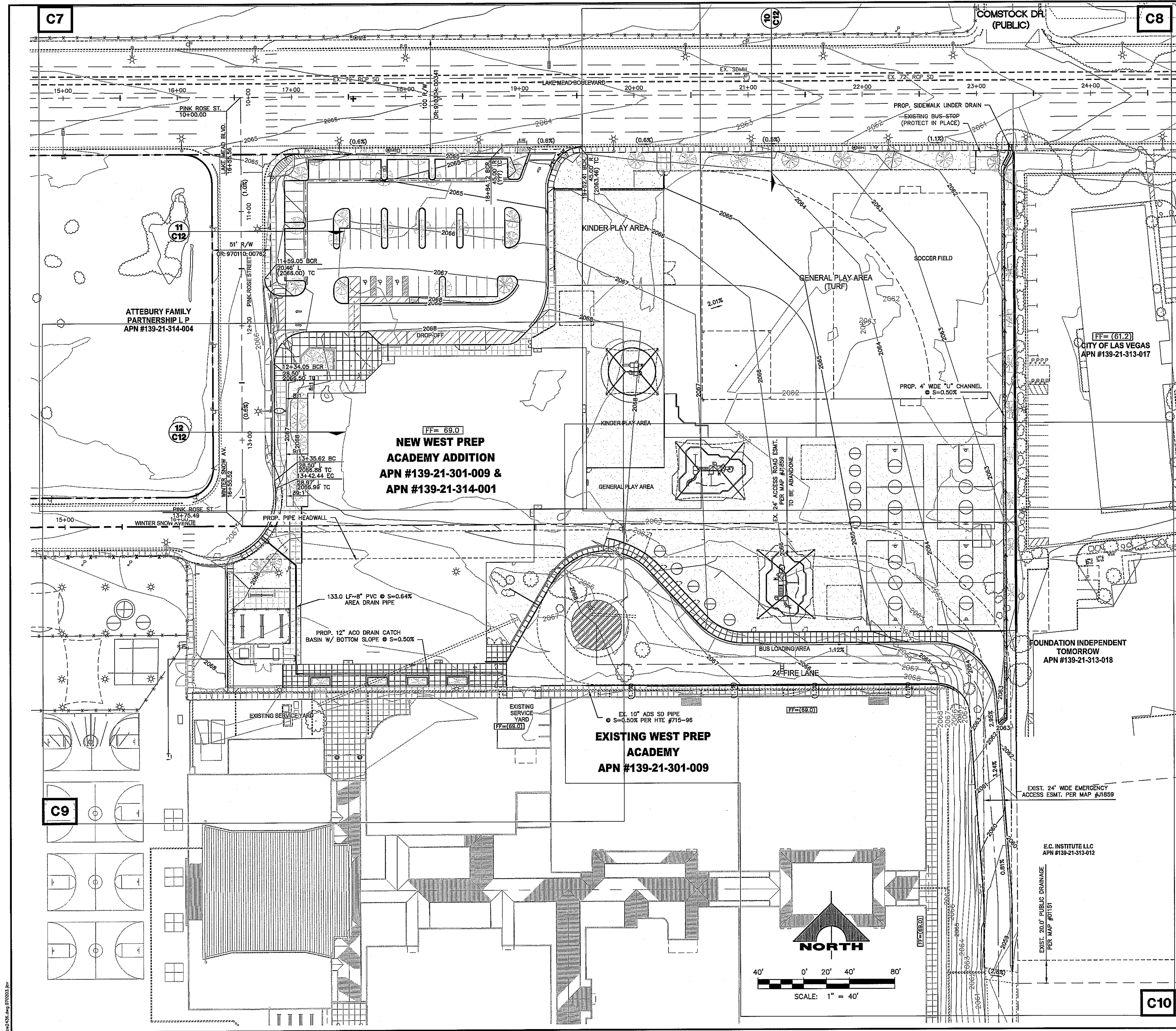
	HORIZONTAL	VERTICAL	COMPACTION
A. PAVEMENT AREA SUBGRADE	0.1"±	+0.0' TO -0.1'	SEE SOILS REPORT
B. ENGINEERED FILL	0.5"±	+0.1' TO -0.1'	SEE SOILS REPORT

 COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE. COMPACTION SHALL COMPLY WITH THE REQUIREMENTS OF THE ENGINEER.
- ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
- 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.
- THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT-OF-WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPLILLS 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.
- IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, SUCH ITEM SHALL BE PROVIDED, AS DIRECTED BY THE CITY ENGINEER, AT NO EXPENSE TO THE CITY OF LAS VEGAS. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.

REVISED 4/15/10

STORMWATER RUNOFF MANAGEMENT

- THE OWNER, SITE DEVELOPER, CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATE IN, THE PUBLIC RIGHTS OF WAYS OF THE CITY OF LAS VEGAS 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.
- 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 THE CITY OF LAS VEGAS AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL.
- 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 NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.
- AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY ACTUAL RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
- ACCUMULATED SEDIMENT IN BMPs SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED RAIN EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.



PROJECT NO.	858-004
DESIGN:	RPL
DRAWN:	RPL
CHECK:	RC
DATE:	08-11-15
REV:	DATE
DESCRIPTION:	

PROJECT NO. 858-004

DESIGN: RPL
DRAWN: RPL
CHECK: RC
DATE: 08-11-15
REV: DATE

DESCRIPTION:

DRAINAGE CERTIFICATION

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

ROY D. CLARK, PE NO. 8354 DATE

FLOOD ZONE DESCRIPTION

THIS SITE IS LOCATED IN ZONE "X", AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 3200302170 E. CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002. FLOOD DESIGNATION PROVIDED BY FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA).

BM #	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM No. SLV01 21W6	CITY OF LAS VEGAS VERTICAL CONTROL POINT "SLV01 21W6", BEING A RIVET & PLATE IN TOP OF CURB @ NW CORNER OF COMSTOCK & LAKE MEAD.	2061.68 (FEET)	628.401 (METERS)

BASIS OF BEARINGS

NORTH 89°55'08" EAST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 21, TOWNSHIP 20 SOUTH, RANGE 81 EAST, M.D.M. AS SHOWN IN BOOK 118, PAGE 68 OF PLATS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

NOTE

THIS SET OF DRAWING IS BASE UPON CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88). PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

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CLARK COUNTY PUBLIC OPERATIONS

1-702-227-2929

CLARK COUNTY SCHOOL DISTRICT

WEST PREP ACADEMY ELEM. SCHOOL ADDITION

OVERALL GRADING PLAN

DRAWING

C7

7 OF 14 SHTS

PROFESSIONAL SEAL

ROY D. CLARK, PE
NO. 8354
CLARK COUNTY, NEVADA

PROJECT NO. 858-004

DESIGN: RPL

DRAWN: RPL

CHECK: RC

DATE: 08-11-15

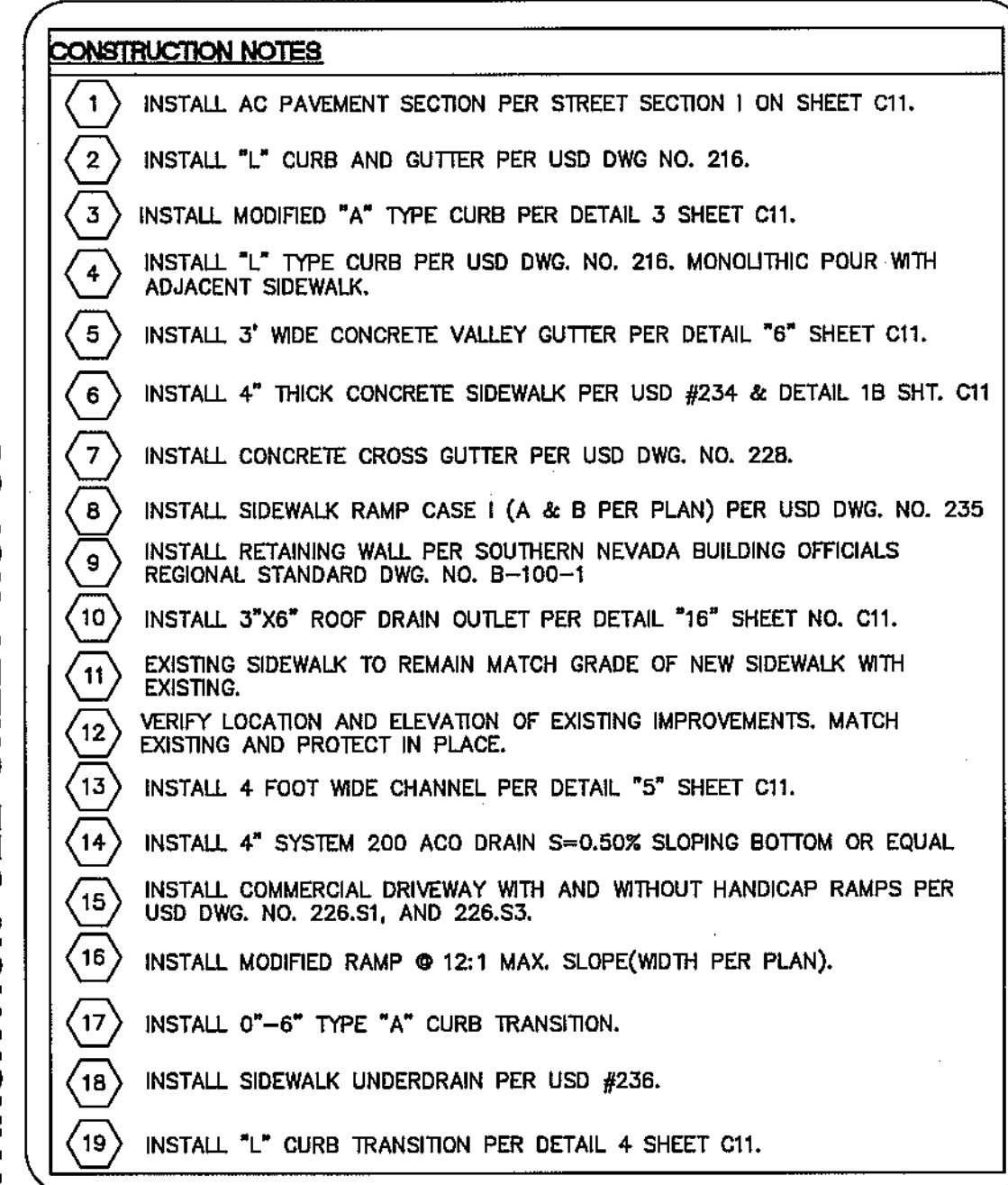
REV: DATE

DESCRIPTION:

CLARK COUNTY SCHOOL DISTRICT

WEST PREP ACADEMY ELEM. SCHOOL ADDITION

OVERALL GRADING PLAN



DRAINAGE CERTIFICATION	
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT. .	
ROY D. CLARK, PE NO. 8354 DATE	

FLOOD ZONE DESCRIPTION

THIS SITE IS LOCATED IN ZONE "X", AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 32003C2170 E. CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002. FLOOD DESIGNATION PROVIDED BY FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA).

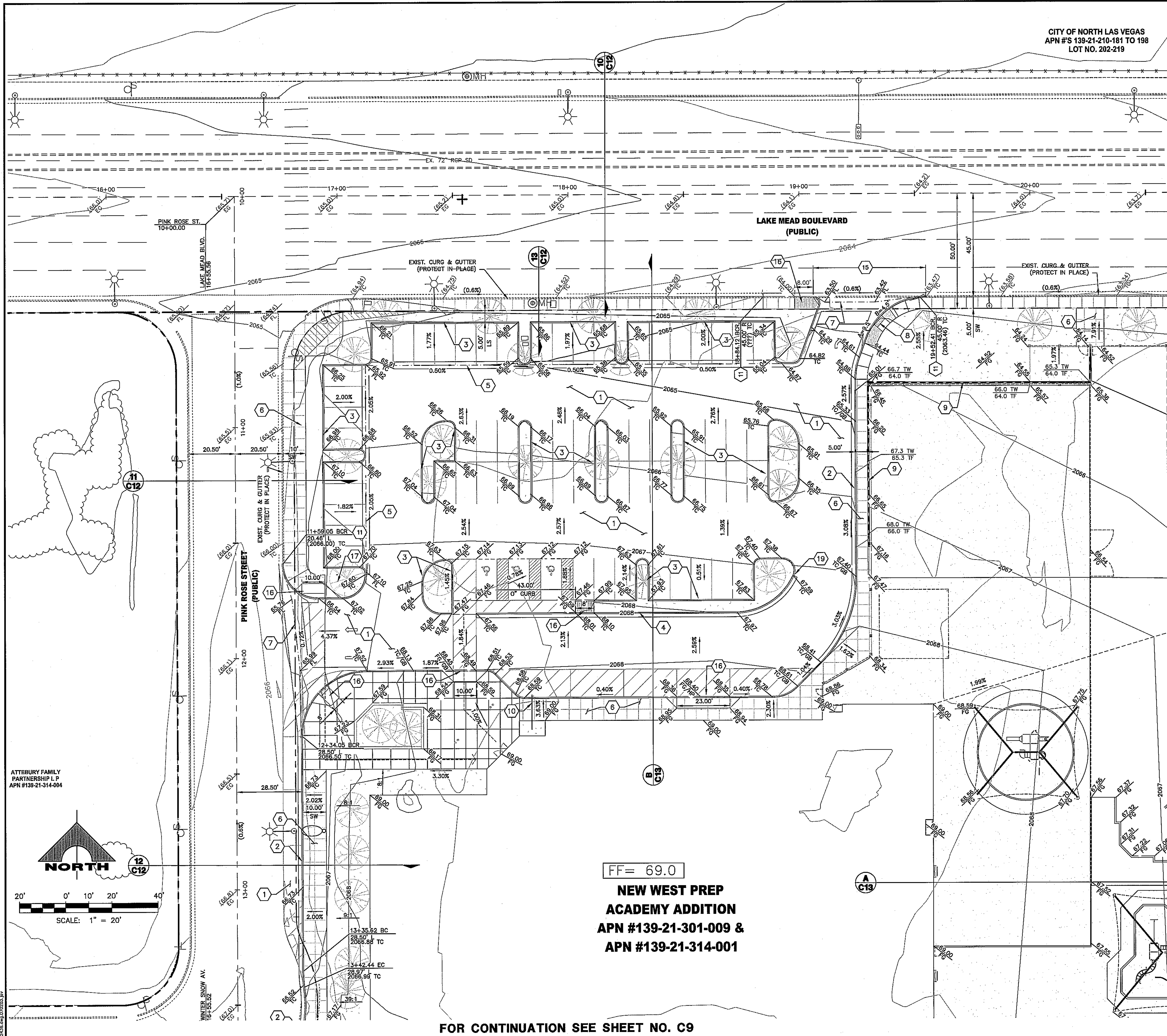
BENCHMARK			
BM #	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM NO. SLV01 21W6	CITY OF LAS VEGAS VERTICAL CONTROL POINT "SLV01 21W6", BEING A RIVET & PLATE IN TOP OF CURB @ NW CORNER OF COMSTOCK & LAKE MEAD.	2061.68 (FEET)	628.401 (METERS)

BASIS OF BEARINGS

NORTH 89°55'08" EAST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 21, TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.M. AS SHOWN IN BOOK 118, PAGE 68 OF PLATS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

NOTE

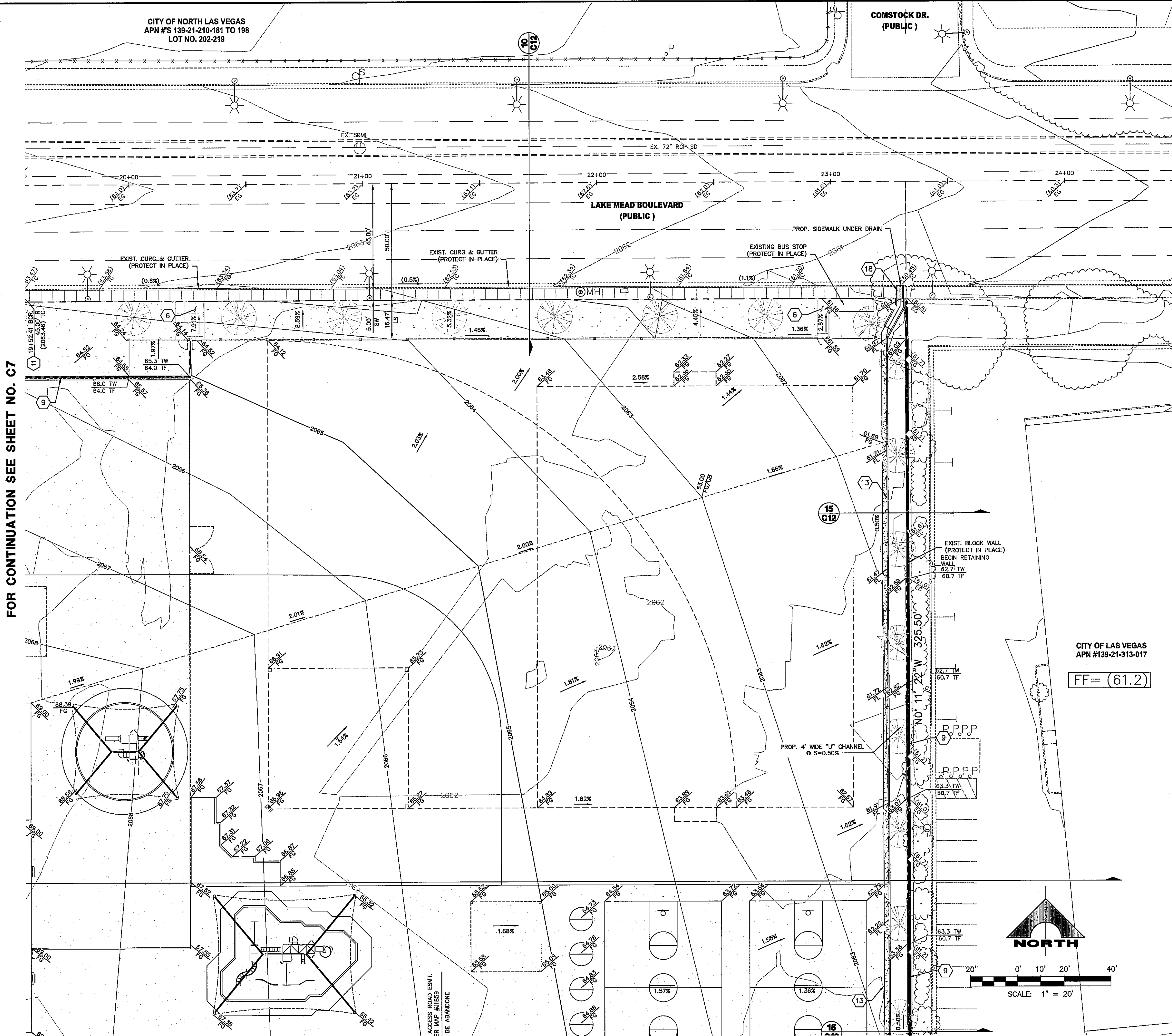
THIS SET OF DRAWING IS BASE UPON CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88). PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.



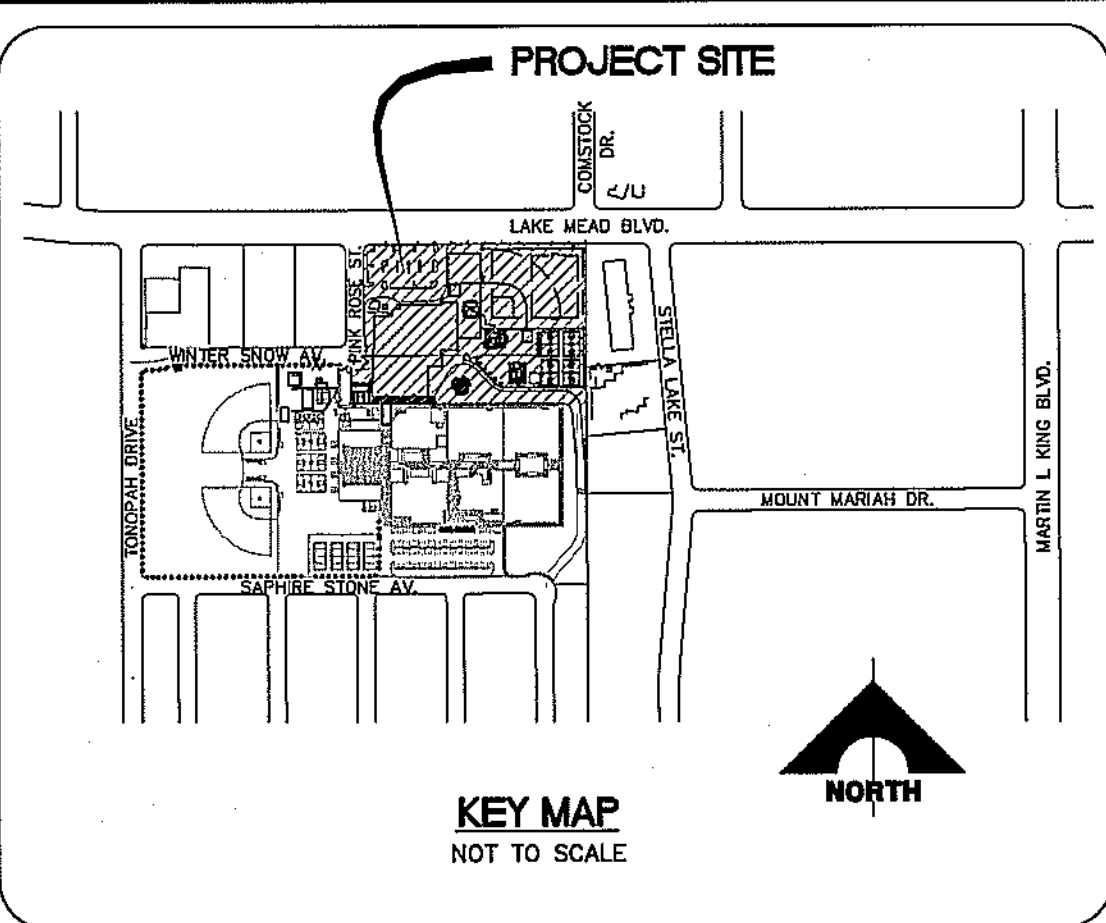
FOR CONTINUATION SEE SHEET NO. C9

ATTEBURY FAMILY
PARTNERSHIP L P
APN #139-21-314-004

FOR CONTINUATION SEE SHEET NO. C7



FOR CONTINUATION SEE SHEET NO. C10



- CONSTRUCTION NOTES**
1. INSTALL AC PAVEMENT SECTION PER STREET SECTION 1 ON SHEET C11.
 2. INSTALL "L" CURB AND GUTTER PER USD DWG NO. 216.
 3. INSTALL MODIFIED "A" TYPE CURB PER DETAIL 3 SHEET C11.
 4. INSTALL "L" TYPE CURB PER USD DWG. NO. 216. MONOLITHIC POUR WITH ADJACENT SIDEWALK.
 5. INSTALL 3" WIDE CONCRETE VALLEY GUTTER PER DETAIL "6" SHEET C11.
 6. INSTALL 4" THICK CONCRETE SIDEWALK PER USD #234 & DETAIL 1B SHT. C11
 7. INSTALL CONCRETE CROSS GUTTER PER USD DWG. NO. 228.
 8. INSTALL SIDEWALK RAMP CASE I (A & B PER PLAN) PER USD DWG. NO. 235
 9. INSTALL RETAINING WALL PER SOUTHERN NEVADA BUILDING OFFICIALS REGIONAL STANDARD DWG. NO. B-100-1
 10. INSTALL 3"x6" ROOF DRAIN OUTLET PER DETAIL "16" SHEET NO. C11.
 11. EXISTING SIDEWALK TO REMAIN MATCH GRADE OF NEW SIDEWALK WITH EXISTING.
 12. VERIFY LOCATION AND ELEVATION OF EXISTING IMPROVEMENTS. MATCH EXISTING AND PROTECT IN PLACE.
 13. INSTALL 4 FOOT WIDE CHANNEL PER DETAIL "5" SHEET C11.
 14. INSTALL 4" SYSTEM 200 AGO DRAIN S=0.50% SLOPING BOTTOM OR EQUAL.
 15. INSTALL COMMERCIAL DRIVEWAY WITH AND WITHOUT HANDICAP RAMPS PER USD DWG. NO. 226.51, AND 226.53.
 16. INSTALL MODIFIED RAMP @ 12:1 MAX. SLOPE(WIDTH PER PLAN).
 17. INSTALL 0"-6" TYPE "A" CURB TRANSITION.
 18. INSTALL SIDEWALK UNDERDRAIN PER USD #236.
 19. INSTALL "L" CURB TRANSITION PER DETAIL 4 SHEET C11.

DRAINAGE CERTIFICATION

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

ROY D. CLARK, PE NO. 8354 DATE

FLOOD ZONE DESCRIPTION

THIS SITE IS LOCATED IN ZONE "X". AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN. PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 32003C2170 E. CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002. FLOOD DESIGNATION PROVIDED BY FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA).

BENCHMARK			
BM #	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM No. 51V01 21W6	CITY OF LAS VEGAS VERTICAL CONTROL POINT "51V01 21W6", BEING A RIVET & PLATE IN TOP OF CURB @ NW CORNER OF COMSTOCK & LAKE MEAD.	2061.68 (FEET)	628.401 (METERS)

BASIS OF BEARINGS

NORTH 89°55'08" EAST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 21, TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.M. AS SHOWN IN BOOK 116, PAGE 68 OF PLATS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

NOTE

THIS SET OF DRAWING IS BASE UPON CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88). PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

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FREIGHTWAY AND AIRPORT SYSTEMS OF TRANSPORTATION

CLARK COUNTY SMOOD DISTRICT

WEST PREP ACADEMY ELEM. SCHOOL ADDITION

GRADING PLAN 2

DRAWING

9 OF 14 SHTS

PROJECT NO. 858-004

DESIGN: ###

DRAWN: ###

CHECK: ###

PLOT DATE: 08-11-15

PLOT TIME: 11:21:27

ENGINEER

ROY D. CLARK

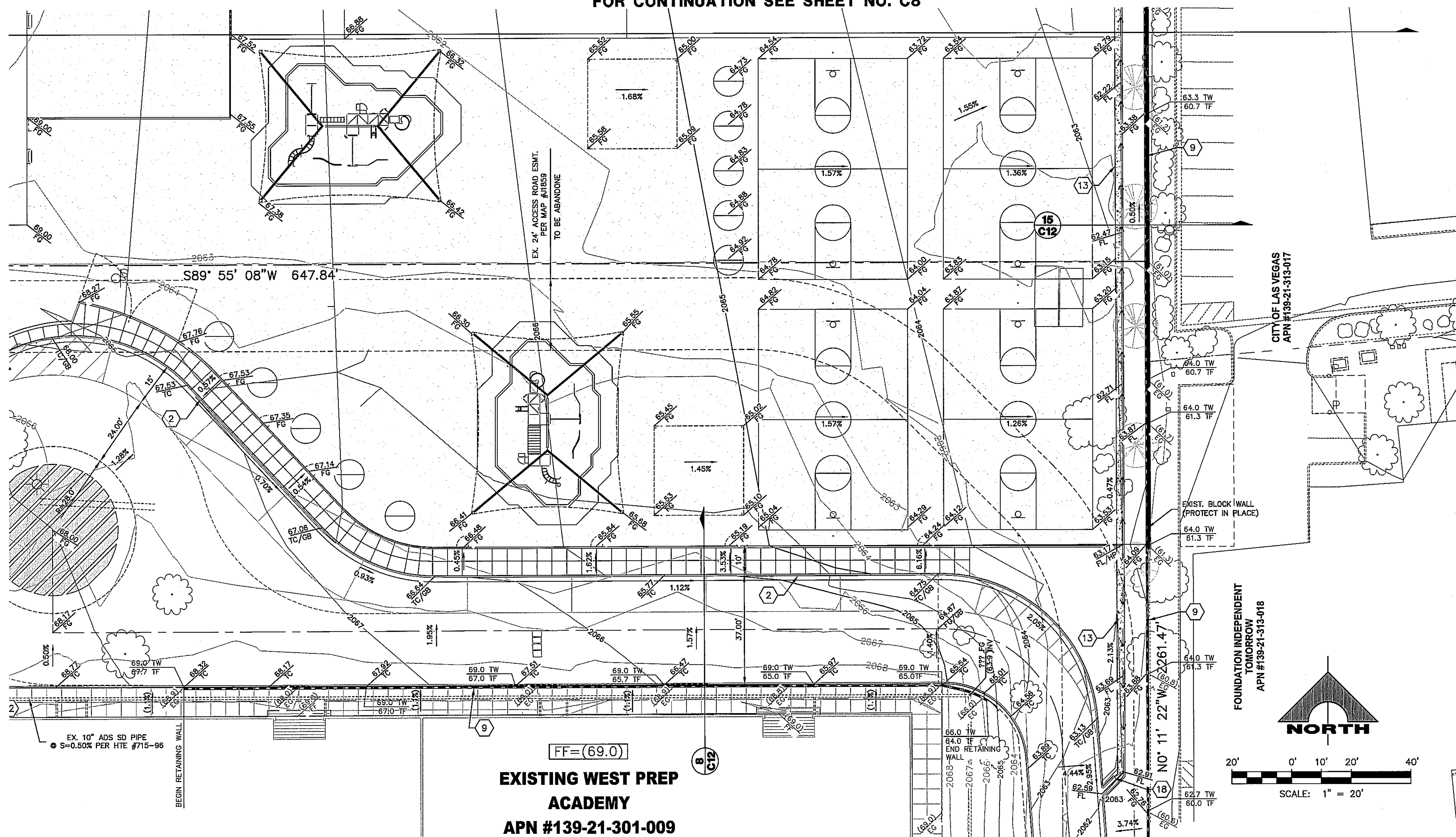
PE NO. 8354

DATE: 8/11/15

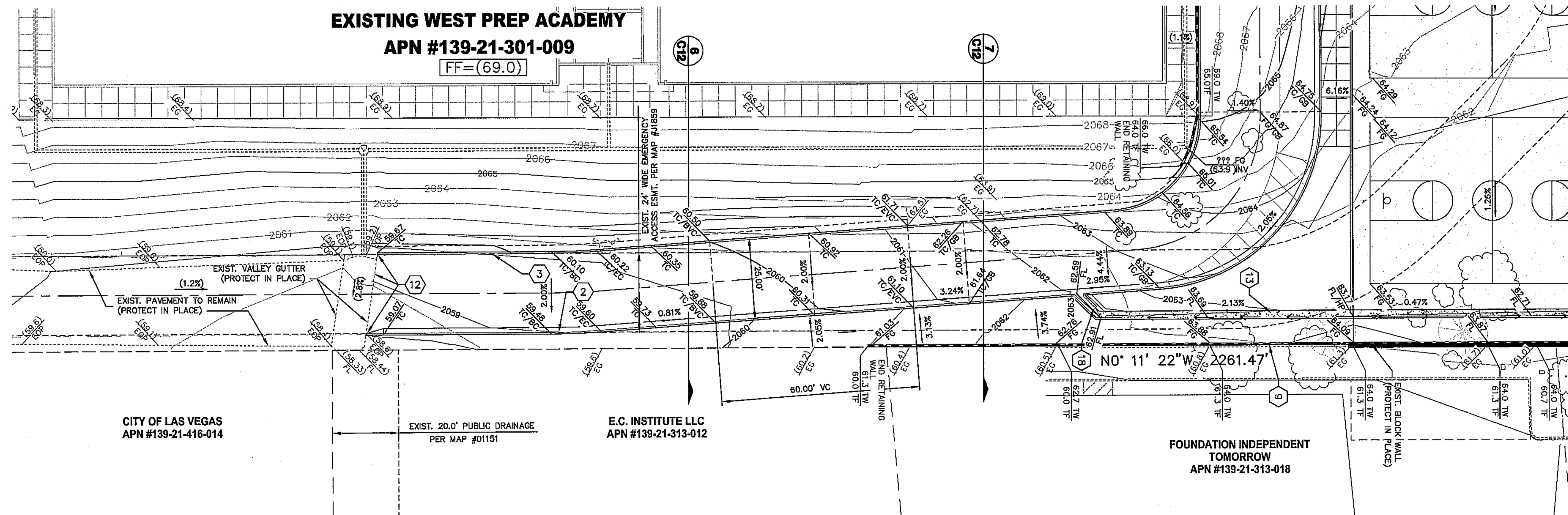
TDS 8/11/15

www.2438.dwn.070203.hv

FOR CONTINUATION SEE SHEET NO. C8



FOR CONTINUATION SEE SHEET BELOW

[illegible]

CONSTRUCTION NOTES

1. INSTALL ACO PAVEMENT SECTION PER STREET SECTION 1 ON SHEET C11.
2. INSTALL "L" CURB AND GUTTER PER USD DWG NO. 216.
3. INSTALL MODIFIED "A" TYPE CURB PER DETAIL 3 SHEET C11.
4. INSTALL "L" TYPE CURB PER USD DWG. NO. 216. MONOLITHIC POUR WITH ADJACENT SIDEWALK.
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DRAINAGE CERTIFICATION

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

ROY D. CLARK, PE NO. 8354

FLOOD ZONE DESCRIPTION

THIS SITE IS LOCATED IN ZONE "X", AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 32003C2170 E. CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002. FLOOD DESIGNATION PROVIDED BY FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA).

BENCHMARK

BM #	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM No. 5LV01 21W6	CITY OF LAS VEGAS VERTICAL CONTROL POINT "5LV01 21W6", BEING A RIVET & PLATE IN TOP OF CURB @ NW CORNER OF COMSTOCK & LAKE MEAD.	2061.68 (FEET)	628.401 (METERS)

BASIS OF BEARINGS

NORTH 89°55'08" EAST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 21, TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.M. AS SHOWN IN BOOK 118, PAGE 68 OF PLATS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

NOTE

THIS SET OF DRAWING IS BASE UPON CITY OF LAS VEGAS VERTICAL CONTROL 2008
ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM
OF 1988 (NAVD'88). PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE
SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

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POWER LINES. IT'S COSTLY.

**CALL BEFORE
YOU'DO
OVERHEAD**

1-702-227-2929

FAST

Call before you UnderGround

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**FREWAY AND ARTERIAL
SYSTEM OF TRANSPORTATION**

[illegible]



	FILE	DATE	DESCRIPTION	DAYS	TOTAL DTS	DAYS	SORT-TEST
30% PRI							

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DETAIL SHEET 1

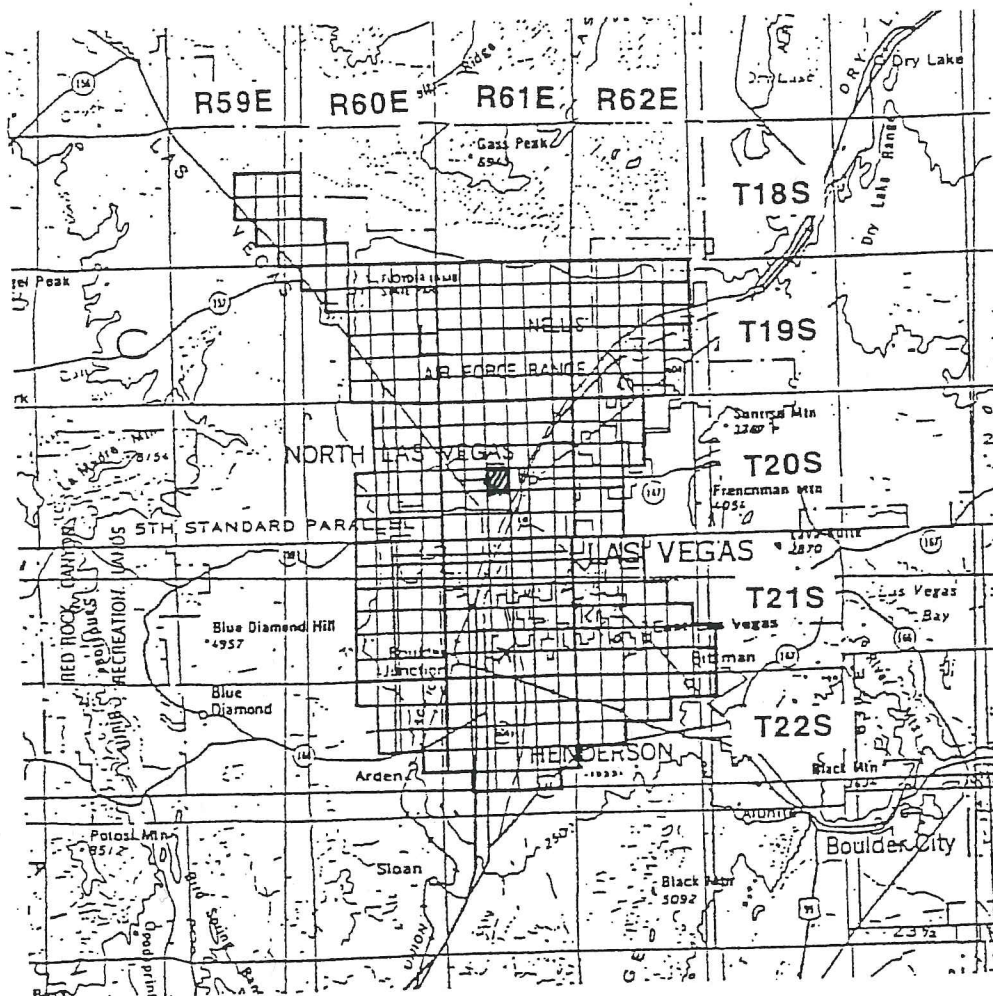
12 OF 14 SHTS.

APPENDIX A

Hydrologic Calculations and Information

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

McCARRAN AIRPORT RAINFALL AREA



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

Notes:

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

Revision	Date

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX-HOUR STORM DISTRIBUTIONS

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

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

Revision	Date

REFERENCE:

TABLE 503

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

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

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

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

Revision	Date

WRC
ENGINEERING

REFERENCE:

USACE, Los Angeles District, 1988

TABLE 505

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RUNOFF CURVE NUMBERS (URBAN AREAS¹)

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

See Table 602A

Developing urban areas

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

- 1 Average runoff condition, and $I_p = 0.25$.
- 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

WEST PREP ACADEMY ELEMENTARY SCHOOL ADDITION					
	CURVE NUMBER TABLE				
Basin	Soil	Percent	CN	Landuse	PREC
OFF1	236	100.0%	92.0	School/Commercial	2.77
OFF2	236	100.0%	92.0	School/Commercial	2.77
OFF3	236	100.0%	92.0	School/Commercial	2.77
OFF4	236	100.0%	98.0	Paved Streets	2.77
OFF5	236	100.0%	92.0	School/Commercial	2.77
ON1	236	100.0%	92.0	School/Commercial	2.77
ON2	236	100.0%	92.0	School/Commercial	2.77
ON3	236	100.0%	92.0	School/Commercial	2.77
ON4	236	100.0%	92.0	School/Commercial	2.77

HYDROLOGIC CRITERIA AND DESIGN MANUAL

TIME OF CONCENTRATION

WEST PREP ACADEMY ELEMENTARY SCHOOL ADDITION PROPOSED CONDITIONS

G. C. WALLACE COMPANIES
Engineers/Planners/Surveyors

Project No: 858-004
Date: 8-Jul-08
Calculated by: dbc

SUB-BASIN DATA										INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)				Tc CHECK			Tc	Tag	REMARKS
DESIG:	DEV/EX. (D or E)	CN	K	AREA Ac	AREA Sq Ml	INITIAL LENGTH Feet	TIME (Ti)		Ti Min	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY fps	V2 VELOCITY fps	Tt Min	TOTAL LENGTH Feet	Tc = (L/180)*10 Min	Tc Min	Tc (14)	Ttag Hours (15)	PRECIP [100YR/10YR]		
							SLOPE %	Feet														
(1)		(16)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9a)	(9b)	(10)	(11)	(12)	(13)	(14)					
OFF1	D	92.0	0.8244	2.11	0.0033	50	1.0	3.5		425	1.0%	0.2	0.3	35.1	475	12.6	38.6	0.126		2.77/1.58		
OFF2	D	92.0	0.8244	0.70	0.0011	50	1.0	3.5		340	0.6%	0.2	0.2	36.2	390	12.2	39.7	0.122		2.77/1.58		
OFF3	D	92.0	0.8244	3.66	0.0057	50	1.3	3.2		790	0.3%	0.1	0.2	97.8	840	14.7	101.1	0.147		2.77/1.58		
OFF4	D	98.0	0.9036	1.33	0.0021	30	2.0	1.5		1175	0.7%	0.2	0.3	93.3	1205	16.7	94.8	0.167		2.77/1.58		
OFF5	D	92.0	0.8244	1.33	0.0021	50	1.0	3.5		340	1.0%	0.2	0.3	28.1	390	12.2	31.6	0.122		2.77/1.58		
ON1	D	92.0	0.8244	1.20	0.0019	15	1.5	1.7		650	0.6%	0.2	0.2	63.8	665	13.7	65.5	0.137		2.77/1.58		
ON2	D	92.0	0.8244	1.89	0.0030	50	1.0	3.5		660	1.1%	0.2	0.3	47.8	710	13.9	51.3	0.139		2.77/1.58		
ON3	D	92.0	0.8244	3.04	0.0048	125	4.2	3.4		590	1.4%	0.2	0.4	38.5	715	14.0	41.9	0.140		2.77/1.58		
ON4	D	92.0	0.8244	2.70	0.0042	75	4.2	2.7		915	1.2%	0.2	0.3	59.1	990	15.5	61.8	0.155		2.77/1.58		

*Basin referenced from the Longford Study

**Initial Length and Slope referenced from the School Site Study

Tc = Tt + Tt Tlag = 0.6 Tc

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

K = 0.0132 (CN) - 0.39

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}

V2 = 29.4*(S/100)^{1/2}

Developed:

V1 = 20.2*(S/100)^{1/2}

V2 = 30.6*(S/100)^{1/2}

REFERENCE:

STANDARD FORM 4


```

1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 05AUG15 TIME 16:25:46 *
*****

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```

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

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X X XXXXXX XXXX X
X X X X X XX
X X X X X
XXXXXX XXXX X XXXX X
X X X X X
X X X X X
X X XXXXXX XXXX XXX

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSK- 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

*** FREE ***

```

1 ID *****
2 ID *
3 ID * :
4 ID * : CLARK COUNTY SCHOOL DISTRICT :
5 ID * : WEST PREP ACADEMY ELEM. SCHOOL ADDITION :
6 ID * : PROPOSED CONDITIONS :
7 ID * :
8 ID * : RETURN PERIOD 100 & 10 -YEAR :
9 ID * : DISTRIBUTION 6-HOUR SDN3 :
10 ID * : PROJECT NO 858-004 :
11 ID * : FILENAME 858-004_PRO.H1 :
12 ID * : DATE MODELED 07/17/15 :
13 ID * : MODELED BY DBC :
14 ID * :
15 ID * :
16 ID * :
17 ID *****
18 ID
19 ID JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
20 ID
21 ID AREA DARF
22 ID SQ.MI.
23 ID
24 ID 0.0 - 0.5 1.00
25 ID 0.5 - 1.0 0.98
26 ID 1.0 - 2.0 0.95
27 ID 2.0 - 4.0 0.92
28 ID 4.0 - 6.0 0.91
29 ID 6.0 - 8.0 0.89
30 ID
31 ID IT 5 0 0 300
32 ID IO 5 0 0
33 ID IN 5 0 0
34 ID JR PREC 1 0.57
35 ID
36 ID
37 ID PB 2.77
38 ID BA 0.0033
39 ID PC 0.000 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
40 ID PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
41 ID PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
42 ID PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
43 ID PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
44 ID PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
45 ID PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
46 ID PC 0.998 0.999 1.000
47 ID LS 0 92.0
48 ID UD .126

```

1

HEC-1 INPUT

PAGE 2

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

```

49 KK OFF2
50 KM
51 PB 2.77

```


52	BA	0.0011	
53	LS	0	92.0
54	UD	.122	
	*		
55	KK	CP1	
56	KM	COMBINES OFF1 AND OFF2 WEST OF LAKE MEAD BLVD AND PINK ROSE ST	
57	HC	2	
	*		
58	KK	OFF3	
59	KM		
60	PB	2.77	
61	BA	0.0057	
62	LS	0	92.0
63	UD	.147	
	*		
64	KK	ON1	
65	KM		
66	PB	2.77	
67	BA	0.0019	
68	LS	0	92.0
69	UD	.137	
	*		
70	KK	OFF4	
71	KM		
72	PB	2.77	
73	BA	0.0021	
74	LS	0	98.0
75	UD	.167	
	*		
76	KK	OFF5	
77	KM		
78	PB	2.77	
79	BA	0.0021	
80	LS	0	92.0
81	UD	.122	
	*		
82	KK	CP2	
83	KM	COMBINES OFF2, ON1, OFF4, and OFF5 AT PINK ROSE ST AND LAKE MEAD BLVD	
84	HC	4	
	*		

HEC-1 INPUT

PAGE 3

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
85	KK ON2
86	KM
87	PB 2.77
88	BA 0.0030
89	LS 0 92.0
90	UD .139
	*
91	KK CP3
92	KM COMBINES CP1, CP2, AND ON2
93	HC 3
	*
94	KK ON3
95	KM
96	PB 2.77
97	BA 0.0048
98	LS 0 92.0
99	UD .140
	*
100	KK CP4
101	KM COMBINES CP3 AND ON3 IN LAKE MEAD BOULEVARD
102	HC 2
	*
103	KK ON4
104	KM CONVEYED THROUGH DRAINAGE EASEMENT EAST OF SCHOOL SITE
105	PB 2.77
106	BA 0.0042
107	LS 0 92.0
108	UD .155
	*
	*
109	ZZ

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
LINE		
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
35	OFF1	
	.	
49	OFF2	
	.	
	.	


```

55      CP1.....
      .
58      .      OFF3
      .
64      .      .      ON1
      .
70      .      .      .      OFF4
      .
76      .      .      .      .      OFF5
      .
82      .      CP2.....
      .
85      .      .      ON2
      .
91      .      CP3.....
      .
94      .      .      ON3
      .
100     .      CP4.....
      .
103     .      .      ON4

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*      JUN 1998                  *
*      VERSION 4.1              *
* RUN DATE 05AUG15 TIME 16:25:46 *
*****

```

```

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

```

```

*****
* : CLARK COUNTY SCHOOL DISTRICT :
* : WEST PREP ACADEMY ELEM. SCHOOL ADDITION :
* : PROPOSED CONDITIONS :
* : RETURN PERIOD 100 & 10 -YEAR :
* : DISTRIBUTION 6-HOUR SDN3 :
* : PROJECT NO 858-004 :
* : FILENAME 858-004_PRO.H1 :
* : DATE MODELED 07/17/15 :
* : MODELED BY DBC :
* :
*****

```

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

AREA	DARF
SQ.MI.	
0.0 - 0.5	1.00
0.5 - 1.0	0.98
1.0 - 2.0	0.95
2.0 - 4.0	0.92
4.0 - 6.0	0.91
6.0 - 8.0	0.89

```

32 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
STORAGE VOLUME
SURFACE AREA
TEMPERATURE

CUBIC FEET PER SECOND
ACRE-FEET
ACRES
DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00 .57

1

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION	
					RATIO 1 1.00	RATIO 2 .57
HYDROGRAPH AT +	OFF1	.00	1	FLOW TIME	5. 3.58	3. 3.58
HYDROGRAPH AT +	OFF2	.00	1	FLOW TIME	2. 3.58	1. 3.58
2 COMBINED AT +	CP1	.00	1	FLOW TIME	7. 3.58	3. 3.58
HYDROGRAPH AT +	OFF3	.01	1	FLOW TIME	9. 3.58	4. 3.58
HYDROGRAPH AT +	ON1	.00	1	FLOW TIME	3. 3.58	1. 3.58
HYDROGRAPH AT +	OFF4	.00	1	FLOW TIME	4. 3.58	2. 3.58
HYDROGRAPH AT +	OFF5	.00	1	FLOW TIME	3. 3.58	2. 3.58
4 COMBINED AT +	CP2	.01	1	FLOW TIME	19. 3.58	9. 3.58
HYDROGRAPH AT +	ON2	.00	1	FLOW TIME	5. 3.58	2. 3.58
3 COMBINED AT +	CP3	.02	1	FLOW TIME	31. 3.58	15. 3.58
HYDROGRAPH AT +	ON3	.00	1	FLOW TIME	8. 3.58	4. 3.58
2 COMBINED AT +	CP4	.02	1	FLOW TIME	39. 3.58	18. 3.58
HYDROGRAPH AT +	ON4	.00	1	FLOW TIME	7. 3.58	3. 3.58

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

APPENDIX B

Hydraulic Calculations and Information

Worksheet for Cross Section 1 PINK ROSE STREET

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 19.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.61
0+00.00	0.61
0+06.00	0.50
0+06.00	0.00
0+07.00	0.13
0+07.00	0.17
0+26.00	0.54
0+44.00	0.17
0+44.00	0.13
0+46.00	0.00
0+46.00	0.50
0+51.00	0.61
0+51.00	1.61

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.61)	(0+51.00, 1.61)	0.016

Options

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

Worksheet for Cross Section 1 PINK ROSE STREET

Results

Normal Depth	0.55	ft
Elevation Range	0.00 to 1.61 ft	
Flow Area	8.75	ft ²
Wetted Perimeter	45.99	ft
Hydraulic Radius	0.19	ft
Top Width	44.89	ft
Normal Depth	0.55	ft
Critical Depth	0.53	ft
Critical Slope	0.00674	ft/ft
Velocity	2.17	ft/s
Velocity Head	0.07	ft
Specific Energy	0.62	ft
Froude Number	0.87	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.55	ft
Critical Depth	0.53	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00674	ft/ft

Cross Section for Cross Section 1 PINK ROSE STREET

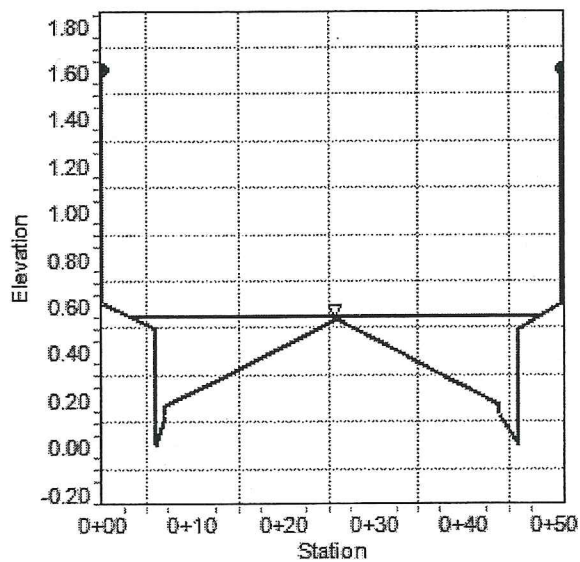
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.55 ft
Discharge 19.00 ft³/s

Cross Section Image



Worksheet for Cross Section 2 EASEMENT

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 8.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.98
0+48.00	0.50
0+50.00	0.00
0+50.00	1.00
0+51.00	1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.98)	(0+48.00, 0.50)	0.016
(0+48.00, 0.50)	(0+51.00, 1.00)	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 0.75 ft
Elevation Range 0.00 to 1.00 ft
Flow Area 4.24 ft²
Wetted Perimeter 28.24 ft
Hydraulic Radius 0.15 ft
Top Width 27.42 ft
Normal Depth 0.75 ft

Worksheet for Cross Section 2 EASEMENT

Results

Critical Depth	0.73	ft
Critical Slope	0.00714	ft/ft
Velocity	1.89	ft/s
Velocity Head	0.06	ft
Specific Energy	0.81	ft
Froude Number	0.85	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.75	ft
Critical Depth	0.73	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00714	ft/ft

Cross Section for Cross Section 2 EASEMENT

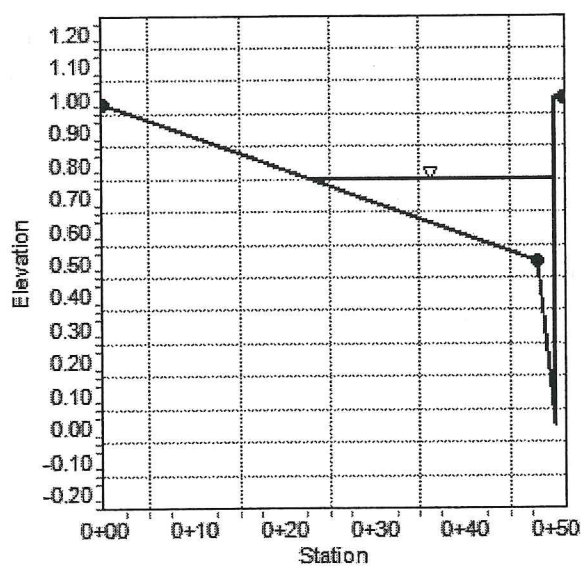
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.75 ft
Discharge 8.00 ft³/s

Cross Section Image



Worksheet for Cross Section 3 LAKE MEAD BOULEVARD

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 847.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
1+00.00	3.00
1+00.00	1.00
1+00.00	0.60
1+05.00	0.50
1+05.50	0.50
1+05.50	0.00
1+07.00	0.13
1+07.00	0.17
1+50.00	1.03
1+93.00	0.17
1+93.00	0.13
1+94.50	0.00
1+94.50	0.50
1+95.00	0.50
2+00.00	0.60
2+00.00	1.00
2+00.00	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(1+00.00, 3.00)	(2+00.00, 3.00)	0.016

Options

Current Roughness weighted Pavlovskii's Method
Method

Worksheet for Cross Section 3 LAKE MEAD BOULEVARD

Options

Open Channel Weighting Method Pavlovskii's Method

Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth		1.76	ft
Elevation Range	0.00 to 3.00 ft		
Flow Area		118.08	ft ²
Wetted Perimeter		103.43	ft
Hydraulic Radius		1.14	ft
Top Width		100.00	ft
Normal Depth		1.76	ft
Critical Depth		1.88	ft
Critical Slope		0.00358	ft/ft
Velocity		7.17	ft/s
Velocity Head		0.80	ft
Specific Energy		2.56	ft
Froude Number		1.16	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.76	ft
Critical Depth	1.88	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00358	ft/ft

Project Description

Manning Formula

Normal Depth

847.00 ft³/s

Worksheet for Cross Section 4 DRIVEWAY

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00810 ft/ft
Discharge 7.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.90
0+00.50	0.90
0+00.63	0.40
0+23.50	0.17
0+23.50	0.13
0+25.00	0.00
0+25.00	0.50
0+25.50	0.50
0+30.50	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.90)	(0+30.50, 0.60)	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 0.41 ft
Elevation Range 0.00 to 0.90 ft
Flow Area 3.25 ft²
Wetted Perimeter 24.83 ft

Worksheet for Cross Section 4 DRIVEWAY

Results

Hydraulic Radius	0.13	ft
Top Width	24.37	ft
Normal Depth	0.41	ft
Critical Depth	0.41	ft
Critical Slope	0.00742	ft/ft
Velocity	2.15	ft/s
Velocity Head	0.07	ft
Specific Energy	0.48	ft
Froude Number	1.04	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.41	ft
Critical Depth	0.41	ft
Channel Slope	0.00810	ft/ft
Critical Slope	0.00742	ft/ft

Cross Section for Cross Section 4 DRIVEWAY

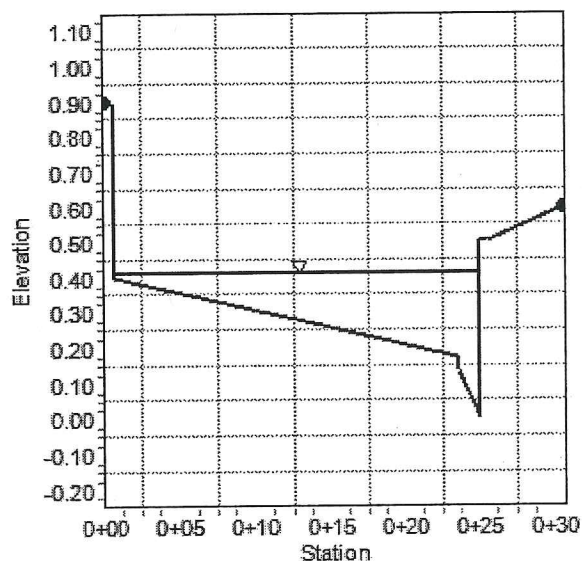
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope	0.00810	ft/ft
Normal Depth	0.41	ft
Discharge	7.00	ft ³ /s

Cross Section Image



Worksheet for Cross Section 5 DRIVEWAY

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 3.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.71
0+05.00	0.61
0+05.50	0.61
0+05.50	0.11
0+07.00	0.24
0+07.00	0.28
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.50
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.71)	(0+40.00, 0.60)	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 0.30 ft

Worksheet for Cross Section 5 DRIVEWAY

Results

Elevation Range	0.00 to 0.71 ft	
Flow Area	2.42	ft ²
Wetted Perimeter	29.58	ft
Hydraulic Radius	0.08	ft
Top Width	29.00	ft
Normal Depth	0.30	ft
Critical Depth	0.28	ft
Critical Slope	0.00931	ft/ft
Velocity	1.24	ft/s
Velocity Head	0.02	ft
Specific Energy	0.32	ft
Froude Number	0.76	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.30	ft
Critical Depth	0.28	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00931	ft/ft

Cross Section for Cross Section 5 DRIVEWAY

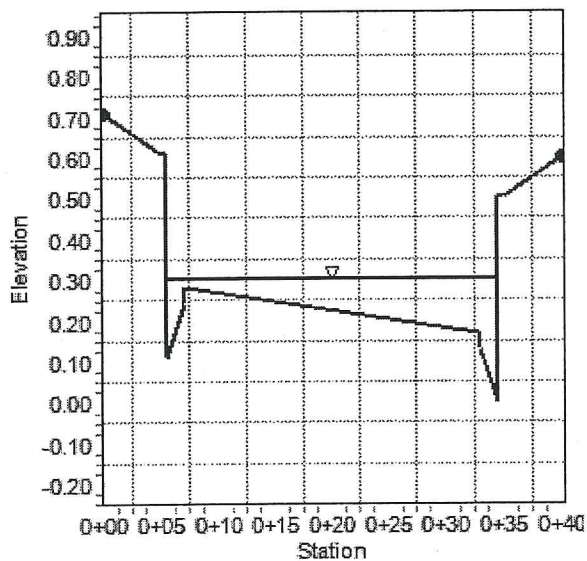
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.30 ft
Discharge 3.00 ft³/s

Cross Section Image



Worksheet for 12 INCH TRENCH DRAIN

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 0.50 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	70.00
0+00.00	69.00
0+09.50	68.87
0+09.50	68.02
0+09.70	67.56
0+09.90	67.55
0+10.08	67.55
0+10.26	67.56
0+10.48	68.02
0+10.48	68.87
0+20.00	69.00
0+20.00	70.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 70.00)	(0+20.00, 70.00)	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 0.34 ft

Worksheet for 12 INCH TRENCH DRAIN

Results

Elevation Range	67.55 to 70.00 ft	
Flow Area	0.24	ft ²
Wetted Perimeter	1.28	ft
Hydraulic Radius	0.18	ft
Top Width	0.86	ft
Normal Depth	0.34	ft
Critical Depth	0.27	ft
Critical Slope	0.00977	ft/ft
Velocity	2.13	ft/s
Velocity Head	0.07	ft
Specific Energy	0.41	ft
Froude Number	0.72	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

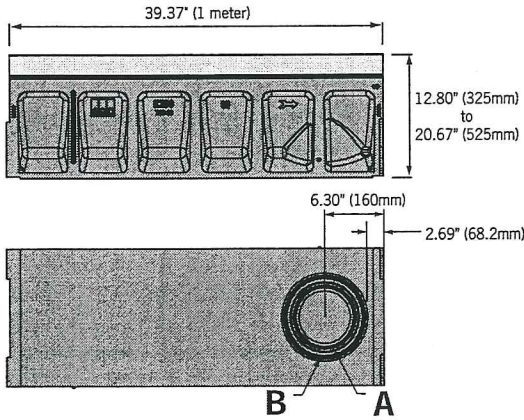
GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.34	ft
Critical Depth	0.27	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00977	ft/ft

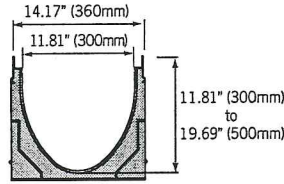
ACO DRAIN

KlassikDrain - KS300 Stainless steel edge rail channel system

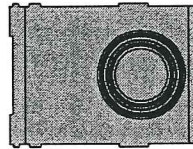
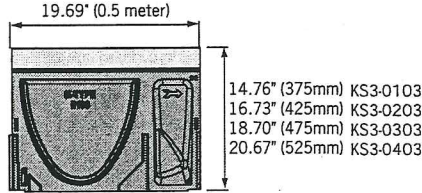
One meter channel



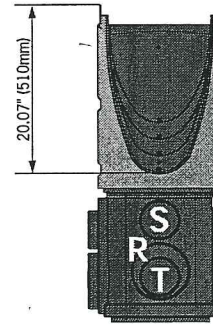
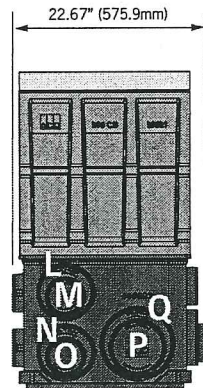
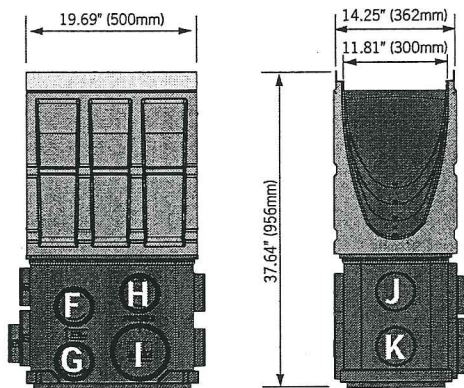
Knock-outs included on every 5th channel



Half meter channel



Type 903S In-line catch basin



Total capacity = 15.59 gallons

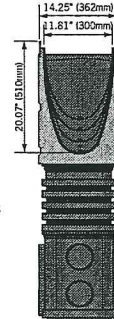
Outlet flow rates

Outlet	Product	Outlet size (Sch. 40)	Invert Depth	GPM	CFS
A	Bottom outlet - KS3-00	6" round	11.81"	421	0.94
A	Bottom outlet - KS3-040	6" round	19.69"	544	1.21
B	Bottom outlet - KS3-00	8" round	11.81"	748	1.67
B	Bottom outlet - KS3-040	8" round	19.69"	966	2.15
C	End outlet - KS3-00	6" round	11.81"	364	0.81
C	End outlet - KS3-40	6" round	19.69"	500	1.11
D	End outlet - KS3-10	8" round	13.78"	681	1.52
D	End outlet - KS3-40	8" round	19.69"	863	1.92
E	End outlet - KS3-20	10" round	15.75"	1116	2.49
E	End outlet - KS3-40	10" round	19.69"	1304	2.91
F	Type KS3-903S	4" round	29.80"	287	0.64
G	Type KS3-903S	4" round	36.29"	319	0.71
H	Type KS3-903S	4" round	28.22"	279	0.62
I	Type KS3-903S	6" round	36.29"	707	1.57
J	Type KS3-903S	4" round	28.37"	280	0.62
K	Type KS3-903S	4" round	34.87"	312	0.70
L	Type KS3-903S	6" round	29.15"	626	1.40
M	Type KS3-903S	4" round	28.59"	281	0.63
N	Type KS3-903S	6" round	36.28"	707	1.57
O	Type KS3-903S	4" round	35.72"	316	0.70
P	Type KS3-903S	6" round	35.72"	701	1.56
Q	Type KS3-903S	8" round	36.28"	1237	2.76
R	Type KS3-903S	6" round	34.78"	690	1.54
S	Type KS3-903S	4" round	27.65"	276	0.61
T	Type KS3-903S	4" round	34.36"	310	0.69

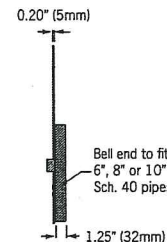
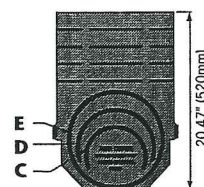
Note: These are the pipe flow rates at the specified outlet, NOT channel flow rates. *Catch basin flow rates are without trash bucket - using trash bucket reduces flow.

Type 904G In-line catch basin

- Notes:
1. Riser can be cut down in 1" (25mm) increments.
 2. Maximum capacity including riser 27.82 gallons.
 3. Add 12" (300mm) to all heights if using riser.
 4. Outlet flow rates will be higher due to increased depth - contact ACO Sales Office for more details.



End Cap



ACO DRAIN

KlassikDrain - KS300 Stainless steel edge rail channel system



Description	Part No.	Invert Inches ²	mm ²	Weight Lbs.	Description	Part No.	Invert Inches ²	mm ²	Weight Lbs.
K3-00 Neutral channel - 39.37" (1m) ²	76441	11.81	300	132.6	K3-28 Sloped channel - 39.37" (1m)	76428	17.32	440	165.1
K3-1 Sloped channel - 39.37" (1m)	76401	12.01	305	132.6	K3-29 Sloped channel - 39.37" (1m)	76429	17.52	445	166.3
K3-2 Sloped channel - 39.37" (1m)	76402	12.20	310	133.8	K3-30 Sloped channel - 39.37" (1m) ²	76430	17.72	450	167.5
K3-3 Sloped channel - 39.37" (1m)	76403	12.40	315	135.0	K3-030 Neutral channel - 39.37" (1m) ²	76447	17.72	450	167.5
K3-4 Sloped channel - 39.37" (1m)	76404	12.60	320	136.2	K3-0303 Neutral channel - 19.69" (0.5m) ²	76448	17.72	450	89.5
K3-5 Sloped channel - 39.37" (1m) ²	76405	12.80	325	137.4	K3-31 Sloped channel - 39.37" (1m)	76431	17.91	455	168.7
K3-6 Sloped channel - 39.37" (1m)	76406	12.99	330	138.6	K3-32 Sloped channel - 39.37" (1m)	76432	18.11	460	169.9
K3-7 Sloped channel - 39.37" (1m)	76407	13.19	335	139.8	K3-33 Sloped channel - 39.37" (1m)	76433	18.31	465	171.1
K3-8 Sloped channel - 39.37" (1m)	76408	13.39	340	141.0	K3-34 Sloped channel - 39.37" (1m)	76434	18.50	470	172.3
K3-9 Sloped channel - 39.37" (1m)	76409	13.58	345	142.2	K3-35 Sloped channel - 39.37" (1m) ²	76435	18.70	475	173.5
K3-10 Sloped channel - 39.37" (1m) ²	76410	13.78	350	143.4	K3-36 Sloped channel - 39.37" (1m)	76436	18.90	480	174.7
K3-010 Neutral channel - 39.37" (1m) ²	76443	13.78	350	143.4	K3-37 Sloped channel - 39.37" (1m)	76437	19.09	485	175.9
K3-0103 Neutral channel - 19.69" (0.5m) ²	76444	13.78	350	75.3	K3-38 Sloped channel - 39.37" (1m)	76438	19.29	490	177.1
K3-11 Sloped channel - 39.37" (1m)	76411	13.98	355	144.6	K3-39 Sloped channel - 39.37" (1m)	76439	19.49	495	178.3
K3-12 Sloped channel - 39.37" (1m)	76412	14.17	360	145.8	K3-40 Sloped channel - 39.37" (1m) ²	76440	19.69	500	179.5
K3-13 Sloped channel - 39.37" (1m)	76413	14.37	365	147.0	K3-040 Neutral channel - 39.37" (1m) ²	76449	19.69	500	179.5
K3-14 Sloped channel - 39.37" (1m)	76414	14.57	370	148.2	K3-0403 Neutral channel - 19.69" (0.5m) ²	76450	19.69	500	97.7
K3-15 Sloped channel - 39.37" (1m) ²	76415	14.76	375	149.4	K3-903G In-line catch basin - 19.69" (0.5m) ²	94615	37.40	950	88.0
K3-16 Sloped channel - 39.37" (1m)	76416	14.96	380	150.6	K3-904G In-line catch basin - 19.69" (0.5) ²	94636	37.40	950	98.0
K3-17 Sloped channel - 39.37" (1m)	76417	15.16	385	151.8	K3-Series 600 Optional plastic riser	99902	-	-	10.0
K3-18 Sloped channel - 39.37" (1m)	76418	15.35	390	153.0	Foul air trap - fits both 900 & 600 series basins	90854	-	-	1.2
K3-19 Sloped channel - 39.37" (1m)	76419	15.55	395	154.2	Universal end cap	96826	15.71	399	2.5
K3-20 Sloped channel - 39.37" (1m) ²	76420	15.75	400	155.4	K3-Installation device	97479	-	-	4.9
K3-020 Neutral channel - 39.37" (1m) ²	76445	15.75	400	155.4	Grate removal tool	01318	-	-	0.3
K3-0203 Neutral channel - 19.69" (0.5m) ²	76446	15.75	400	82.3	K3-QuickLok locking bar	10458	-	-	0.7
K3-21 Sloped channel - 39.37" (1m)	76421	15.94	405	156.7					
K3-22 Sloped channel - 39.37" (1m)	76422	16.14	410	157.9					
K3-23 Sloped channel - 39.37" (1m)	76423	16.34	415	159.1					
K3-24 Sloped channel - 39.37" (1m)	76424	16.54	420	160.3					
K3-25 Sloped channel - 39.37" (1m) ²	76425	16.73	425	161.5					
K3-26 Sloped channel - 39.37" (1m)	76426	16.93	430	162.7					
K3-27 Sloped channel - 39.37" (1m)	76427	17.13	435	163.9					

Notes:

- This channel offers a bottom knockout feature; 6" & 8" round
- Inverts shown are for the male end; for female invert depth subtract 5mm (≈0.2") from the male invert (except for neutral channels, where it will be same as male invert).
To calculate the overall channel depth add 20mm (≈0.8") to invert depth.
- This catch basin kit includes a polymer concrete top, removable Quicklok locking bar, trash bucket and plastic base. Select an appropriate grate.
- This catch basin kit includes a polymer concrete top, removable Quicklok locking bar, deep trash bucket, plastic riser and plastic base. Select an appropriate grate.

Specifications

General

The surface drainage system shall be ACO Drain KS300 complete with gratings secured with 'QuickLok' locking as manufactured by ACO Polymer Products, Inc. or approved equal.

Materials

The trench system bodies shall be manufactured from polyester polymer concrete with the minimum properties as follows:

Compressive strength: 14,000 psi
Flexural strength: 4,000 psi

Water absorption 0.07%
Frost proof YES
Salt proof YES
Dilute acid and alkali resistant YES

The nominal clear opening shall be 12" (300mm) with overall width of 14.17" (360mm). Pre-cast units shall be manufactured with either an invert slope of 0.5% or with neutral invert and have a wall thickness of at least 0.50" (13mm). Each unit will feature a partial radius in the trench bottom and a male to female interconnecting end profile. Units shall have horizontal cast in anchoring keys on the outside wall to ensure maximum mechanical bond to the surrounding bedding material and pavement surface. The stainless steel edge rail will be integrally

cast in by the manufacturer to ensure maximum homogeneity between polymer concrete body and edge rail. Each edge rail shall be at least 3/32" (2.5mm) thick.

Grates

Grates shall be specified. See separate ACO Spec Info grate sheets for details. After removal of grates and 'QuickLok' bar there shall be uninterrupted access to the trench to aid maintenance.

Installation

The trench drain system shall be installed in accordance with the manufacturer's installation instructions and recommendations.

ACO Polymer Products, Inc.

Northeast Sales Office

P.O. Box 245
Chardon, OH 44024
Tel: (440) 285-7000
Toll free: (800) 543-4764
Fax: (440) 285-7005

West Sales Office

P.O. Box 12067
Casa Grande, AZ 85130
Tel: (520) 421-9988
Toll Free: (888) 490-9552
Fax: (520) 421-9899

Southeast Sales Office

4211 Pleasant Road
Fort Mill, SC 29708
Toll free: (800) 543-4764
Fax: (803) 802-1063

Follow us on



Electronic Contact:

info@ACODrain.us
www.ACODrain.us



© June 10, 2014 ACO Polymer Products, Inc. This information is believed to be accurate but it is not guaranteed to be so. We cannot assume liability for results that buyer obtains with our product since conditions of use are beyond the control of the company. It is the customer's responsibility to evaluate suitability and safety of product for his own use. ACO Polymer Products Inc. reserves the right to change the product and specifications without notice.

June 14/3

www.ACODrain.us

Location	FL elevation (ft)	Specific Energy (ft)	Minimum FF/TW (ft)	FF (ft)	Remarks
Winter Snow and Pink Rose	66.05	0.62	66.67	69	Flow Makes the turn at the knuckle

APPENDIX C

Referenced Material and Supporting Documents

JUNE 2011

ADDENDUM #1 TO THE MECHANICAL DRAINAGE STUDY for LONGFORD AT LAKE MEAD

JUNE 2011

Prepared for:

Longford at Lakemead, LLC
3077 E. Warm Springs Road
Las Vegas, NV 89119



Stanley Consultants INC.

A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

CITY OF LAS VEGAS				DATE:	
INTER-OFFICE MEMORANDUM				March 30, 2004	
TO: Land Development Services Department of Public Works				FROM: Albert J. Jankowiak, P.E.  Flood Control Civil Engineer Department of Public Works	
SUBJECT: Technical Drainage Study for: Longford at Lake Mead				COPIES TO: Stanley Consultants, Inc.	
Cross Streets: Tonopah Drive & Lake Mead Blvd.				Murtagh Family Living Trust	
File Number: F:\Depot\DSMEMOS\DS3466C.doc				Bart Anderson, P.E., DevCo	
Parcel Number: 139-21-301-011 & -012				CCRFCD	
Zoning Action:					
FEMA Flood Zone		YES	NO	X	
Proposed Storm Drain		YES	NO	X	
HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS		REVIEW FEES
					FEES PAID G.R. No.
1 st Submittal	12/11/2003	12/22/2003	See Comments Below		\$400.00
2 nd Submittal, Supplement	1/15/2004, 2/12/2004	1/29/2004, 2/13/2004	See Comments Below		\$400.00
3 rd Submittal	3/22/2004	3/30/2004	CCRFCD Concurrence		N/C
TOTAL FEES (LDDRS):				\$800.00	-----

REMARKS:

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

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

1. The engineer must provide a table on the grading plans that shows a quantity estimate of all on-site and off-site flood control improvements such as solid grouted stem wall, drainage easements, protection berm, riprap, etc. All drainage improvements must be bonded and inspected.
2. This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.

NOTE: All land surface area disturbances over 1 acre require a stormwater discharge permit issued by the Nevada Division of Environmental Protection (NDEP). A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. A storm water discharge permit application and associated information may be downloaded from the web site:

<http://www.state.nv.us/ndep/bwpc/storm01.htm>

Projects that disturb more than one acre of land must submit to NDEP a "Notice of Intent" for inclusion under Stormwater Permit No. NVR100000 along with the appropriate filling fee.

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

END OF REMARKS

B&H/ajj

T/R/S: T21S/R61E/21

AREA M-21

Post-it® Fax Note 7671		Date 3/30/4	# of pages 2
To Dennis Brown	From Al Janowski		
Co./Dept. Longford @ Luke	Co. CLV Flood		
Phone #	Phone # 229-2191		
Fax # 369-9793	Fax #		

January 14, 2004

Mr. Albert J. Jankowiak, P.E.
City of Las Vegas Department of Public Works – Engineering Planning
Flood Control Section
731 South Fourth Street
Las Vegas, Nevada 89101

RE: Addendum #1 to the Technical Drainage Study for Longford at Lake Mead

Dear Mr. Jankowiak:

We are hereby submitting for your review two copies of Addendum #1 to the Technical Drainage Study for Longford at Lake Mead. The following responses are provided for comments dated December 23, 2003.

Comment #1

A review of the grading plan shows an elevation difference of approximately 4-feet of fill adjacent to developed properties. Sites with a grade difference of 2-feet above or below existing are required to have approval from the City Planning and Development Department. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to Linda Hartman-Maynard [Tel: 229-6899] at the CLV Current Planning Division. The engineer must provide a Current Planning approval with the next submittal.

Response

Grading plans, detail sheets, and a justification letter have been submitted to the City Planning and Development Department for review and approval. A copy of the justification letter and transmittal are included in the appendix of this addendum.

Comment #2

Provide an offsite drainage map showing the basin boundaries and the runoff amounts from the adjacent properties to the west and south. Determine the flow rate in both Winter Snow Avenue and Pink Rose Street and provide hydraulic calculations for the streets. Include the information on Exhibit 8 – *Existing Conditions Basin Map* and Exhibit 9 – *Developed Conditions Basin Map*. Also, include the flow rate, depth of flow, and velocity of Lake Mead Boulevard on the basin maps.

Response

It is the intent of this study to use offsite drainage information from the *City of Las Vegas City Wide Hydrology Study*. A Copy of the basin map is included with this addendum. The project site is a portion of basin LM17A from the *CLV City Wide Hydrology Study*. LM17A is the area between Tonopah and Martin Luther King and between Lake Mead and Doolittle. In order to provide a conservative, yet accurate assumption, 50 percent (50 %) of the flow generated by basin LM17A has been used for the street flow calculations for Winter Snow Avenue and Pink Rose Street. Please note that the use of 50 percent (50 %) is due to the development of the Enterprise Business Park which makes up the east half (E ½) of basin LM17A. The HEC-1 analysis from the CLV City Wide Hydrology Study indicates that the flow generated by basin LM17A is 21 cfs/64 cfs (10 Year/100 Year). A copy of the page from the CLV City Wide Hydrology Study HEC-1 analysis is included in the appendix of this addendum. The flow used in the street flow calculations for Winter Snow Avenue and Pink Rose Street is 11 cfs/32 cfs (10 Year/100 Year). Street flow calculations for Winter Snow Avenue and Pink Rose Street are included in the appendix of this addendum. Careful review of both studies indicates that basin LM17A is a portion of basin LM14-C from the *CCRFGD Master Plan Update 2002*.

Comment #3

A review of the grading plan indicates that runoff generated by the adjacent properties is discharged through the site. Development of the site must not adversely impact the adjacent properties. Provide for the offsite flow by either accepting the flow through the site or by redirecting the flow offsite to an acceptable discharge point. If the flow is redirected offsite, obtain a notarized letter from the adjacent property owner allowing the offsite grading. If the flow is conveyed through the project site, provide a Public Drainage Easement to be Privately Maintained through the site. On the detail sheet, provide or revise the impacted cross-sections accordingly.

Response

A site visit on December 30, 2003 has provided evidence that the adjacent properties to the south and west do not impact the proposed site. Digital photos were taken and are included in the appendix of this addendum to provide documentation of the evidence that the adjacent properties do not discharge to the proposed site. The adjacent properties discharge flows into Tonopah Drive, Lake Mead Boulevard, Winter Snow Avenue, Pink Rose Street, and through a public drainage easement located along the east property line of the existing middle school site to the south. The photos have been labeled with a description and location with respect to the Longford at Lake Mead site. In addition, a retaining wall is necessary along the south property line near the southeast corner of the site. This will impact a small area of the existing middle school site to the south. The developer is currently attempting to obtain permission to grade from the school district for the minor offsite grading required to minimize the amount of retaining wall needed. The addition of this retaining wall and grading do not impact the existing drainage conditions as shown in the pictures included. The developer requests that notarized permission to grade be listed as a condition of approval for the study. It is understood that no permits will be issued until notarized permission to grade is received.

Comment #4

Job No. 16948.01.00
09-Dec-03

Stanley Consultants INC.

5820 S. Eastern Ave. Suite 200
Las Vegas, Nevada 89119
702.369.9396

6-Hour Design Storm Distribution

5820 S. Eastern Ave. Suite 200 Las Vegas, Nevada 89119 702.369.9396									
SCS Curve Numbers									
Curve Numbers									
Soils									
Percent of Drainage Area in Each Hydrologic Soils Group (Sum Must=100%)									
Tbl. 502 Para-graph									
Cover Type and Hydrologic Condition									
Curve # for Hydrologic Soils Group									
Composite									
10-Year Adj. Pl. Rainfall (Inches) Tbl. 505 x1.0 (Default)	10-Year Adj. Pl. Rainfall (Inches) Tbl. 505 x 0.57 Same as Tbl. 505 or Fig. 503 x 1.24	Depth- Area Reduc- tion Factor	100-Year Rainfall (Inches) Fig. 506 x1.43	10-Year Rainfall (Inches) Fig. 503 x 1.24	SDN # Tbl. 503				
Drainage Basin Name	Drainage Area (Acres)		Drainage Area (Sq. Mi.)						
EXISTING CONDITIONS									
000N1	2.06	0.0032	2.77	1	1.58	1.58 SDN-3			
000N2	4.85	0.0076	2.77	1	1.58	1.58 SDN-3			
DEVELOPED CONDITIONS									
000N1	1.20	0.0019	2.77	1	1.58	1.58 SDN-3			
000N2	0.44	0.0007	2.77	1	1.58	1.58 SDN-3			
000N3	0.42	0.0007	2.77	1	1.58	1.58 SDN-3			
000N4	0.84	0.0013	2.77	1	1.58	1.58 SDN-3			
000N5	1.69	0.0026	2.77	1	1.58	1.58 SDN-3			
000N6	1.13	0.0018	2.77	1	1.58	1.58 SDN-3			
000N7	1.19	0.0019	2.77	1	1.58	1.58 SDN-3			

EXISTING CONDITIONS

EON1	2.06	0.0032
------	------	--------

EQN2	185	00076
------	-----	-------

LONG DEVELOPED CONDITIONS

MILLION OF 1977 DOLLARS

0.0019	1.20	0.0019
--------	------	--------

DON2	0.44	0.0007
------	------	--------

DON3 0.42 0.0007

DON4	0.84	0.0013
------	------	--------

169 00026

CONC	1.00	0.0020
CONC	1.15	0.0040

Donor	1.13	0.0018
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CON7	1.19	0.0019
------	------	--------

Longford at Lake Mead
Calculated by: EJT

Job No. 16948.01.00
09-Dec-03



Stanley Consultants INC.

5820 S. Eastern Ave. Suite 200
Las Vegas, Nevada 89119
702.369.9396

Similar to STANDARD FORM 4 from the Clark County Regional Flood Control District's Hydrologic Criteria and
Drainage Design Manual

For SMALL BASINS < 1 sq. mi.

Sub-Basin Data			Initial/Overland Time (Ti)			Travel Time (Tt)					Tc Check (Urbanized Basins)		Final Tc	TLAG	Remarks
Designation (1)	K (Default by CN) (2)	Area (Acres) (3)	Length (feet) (4)	Slope (%) (5)	Ti (Min) (6)	Length (feet) (7)	Slope (%) (8)	V1 (FPS) (Manning) (9)	V2 (FPS) (Manning) (10)	Tt (Min) (10)	Total Length (feet) (11)	Tc= (L/180)+10 (Min) (12)	Tc = +Tt (Min) (13)		
EXISTING CONDITIONS															
EON1	0.63	2.06	100	1.50	7.45	415	0.80	1.32	2.63	5.23	515	12.9	12.7	0.127	Tc>=10 for Non Urban Tc>=5 for Urban
EON2	0.63	4.85	100	1.00	8.52	725	0.90	1.40	2.79	7.28	825	14.6	14.6	0.146	
DEVELOPED CONDITIONS															
DON1	0.82	1.20	100	1.00	4.96	300	0.50	1.43	2.16	3.50	400	12.2	8.5	0.085	
DON2	0.82	0.44	100	1.00	4.96	300	0.50	1.43	2.16	3.50	400	12.2	8.5	0.085	
DON3	0.82	0.42	100	1.00	4.96	200	1.00	2.02	3.06	1.65	300	11.7	6.6	0.066	
DON4	0.82	0.84	100	1.00	4.96	170	1.00	2.02	3.06	1.40	270	11.5	6.4	0.064	
DON5	0.82	1.69	100	1.00	4.96	360	0.50	1.43	2.16	4.20	460	12.6	9.2	0.092	
DON6	0.82	1.13	100	1.00	4.96	330	0.50	1.43	2.16	3.85	430	12.4	8.8	0.088	
DON7	0.82	1.19	100	1.00	4.96	820	0.50	1.43	2.16	8.30	920	15.1	13.3	0.133	

$$K = 0.0132^{*}Cn^{-0.39} \quad Tt = 1.8^{*}(1.1-K)^{*}L^{*}(1/2)/(S^{*}(1/3))$$

Generalized Manning's Equations

Existing Conditions

$$V1 = 14.8^{*}(S/100)^{0.5}$$

$$V2 = 29.4^{*}(S/100)^{0.5}$$

Developed Conditions

$$V1 = 20.2^{*}(S/100)^{0.5}$$

$$V2 = 30.6^{*}(S/100)^{0.5}$$

$$Tt = L/(60^{*}V)$$

* V1 is used for the first 500 feet of length in column (7). V2 is used for the remainder.


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* FLOOD HYDROGRAPH PACKAGE (HEC-1)
ENGINEERS
*
* JUN 1998
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* CENTER
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* VERSION 4.1
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* STREET
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* 95616
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* RUN DATE 09DEC03 TIME 07:41:52
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*
* U.S. ARMY CORPS OF
*
* HYDROLOGIC ENGINEERING
*
* 609 SECOND
*
* DAVIS, CALIFORNIA
*
* (916) 756-1104
*
*

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT

STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77

VERSION NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY, DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

LINE	ID	1	2	3	4	5	6	7	8	9	10	
1	ID	Stanley Consultant's, Inc.										
2	ID	Q:\16948\06-Studies\04-Studies\01-Drainage\01-1st Submittal\01-Documents\										
3	ID	Longford at Lake Mead - Existing Conditions										
4	ID	10 & 100 Year										
5	ID	6 Hour Storm										
6	ID	Unit Hydrograph: SCS										
7	ID	12/08/2003										
8	ID	Eric J. Tune, E.I.										
9	IT	5	0	0	300							
10	IN	5										
11	IO	5										
	*DIAGRAM											
12	JR	PREC	0.570	1.000								
	*											
13	KK	EON1	BASIN									
14	KM	RUNOFF CALCULATION FOR EXISTING ON-SITE BASIN 1										
15	BA	0.0032										
16	PB	2.77										
17	PC	0.00	2.00	5.70	7.00	8.70	10.80	12.40	13.00	13.00	13.00	
18	PC	13.00	13.00	13.00	13.30	14.00	14.20	14.80	15.80	17.20	18.10	
19	PC	19.00	19.70	19.90	20.00	20.10	20.40	21.40	22.90	24.10	24.90	
20	PC	25.10	25.60	27.00	27.80	28.10	28.30	29.50	32.20	35.20	40.90	
21	PC	49.90	59.00	71.00	74.40	78.10	81.20	81.90	83.50	85.10	85.60	
22	PC	86.00	86.80	87.60	88.80	91.00	92.60	93.70	95.00	97.00	97.60	
23	PC	98.20	98.50	98.70	98.90	99.00	99.30	99.30	99.40	99.50	99.80	
24	PC	99.80	99.90	100.00								
25	LS	0	77									
26	UD	0.127										
	*											
27	KK	EON2	BASIN									
28	KM	RUNOFF CALCULATION FOR EXISTING ON-SITE BASIN 2										
29	BA	0.0076										
30	LS	0	77									
31	UD	0.146										
	*											
32	ZZ											

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT

LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW

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

13 EON1

.

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27 EON2

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(***) RUNOFF ALSO COMPUTED AT THIS LOCATION


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1*****
*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
ENGINEERS *
* JUN 1998
*
* CENTER *
* VERSION 4.1
*
* STREET *
*
* 95616
* RUN DATE 09DEC03 TIME 07:41:52
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* U.S. ARMY CORPS OF
* HYDROLOGIC ENGINEERING
*
* 609 SECOND
*
* DAVIS, CALIFORNIA
*
* (916) 756-1104
*

```

Stanley Consultant's, Inc.
 Q:\16948\06-Studies\04-Studies\01-Drainage\01-1st Submittal\01-Documents\
 Longford at Lake Mead - Existing Conditions
 10 & 100 Year
 6 Hour Storm
 Unit Hydrograph: SCS
 12/08/2003
 Eric J. Tuna, E.I.

```

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

```

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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
        NDDTIME      0055 ENDING TIME
        ICENT      19 CENTURY MARK

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        COMPUTATION INTERVAL .06 HOURS
        TOTAL TIME BASE 24.92 HOURS

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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

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JP      MULTI-PLAN OPTION
        NPLAN      1 NUMBER OF PLANS

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JR      MULTI-RATIO OPTION
        RATIOS OF PRECIPITATION
        .57 1.00

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1

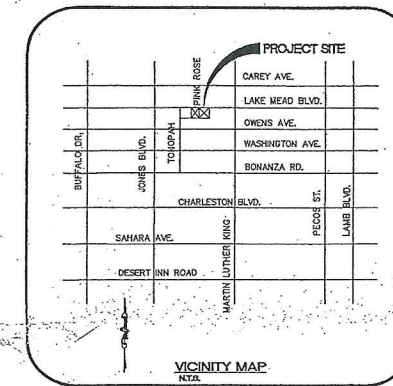
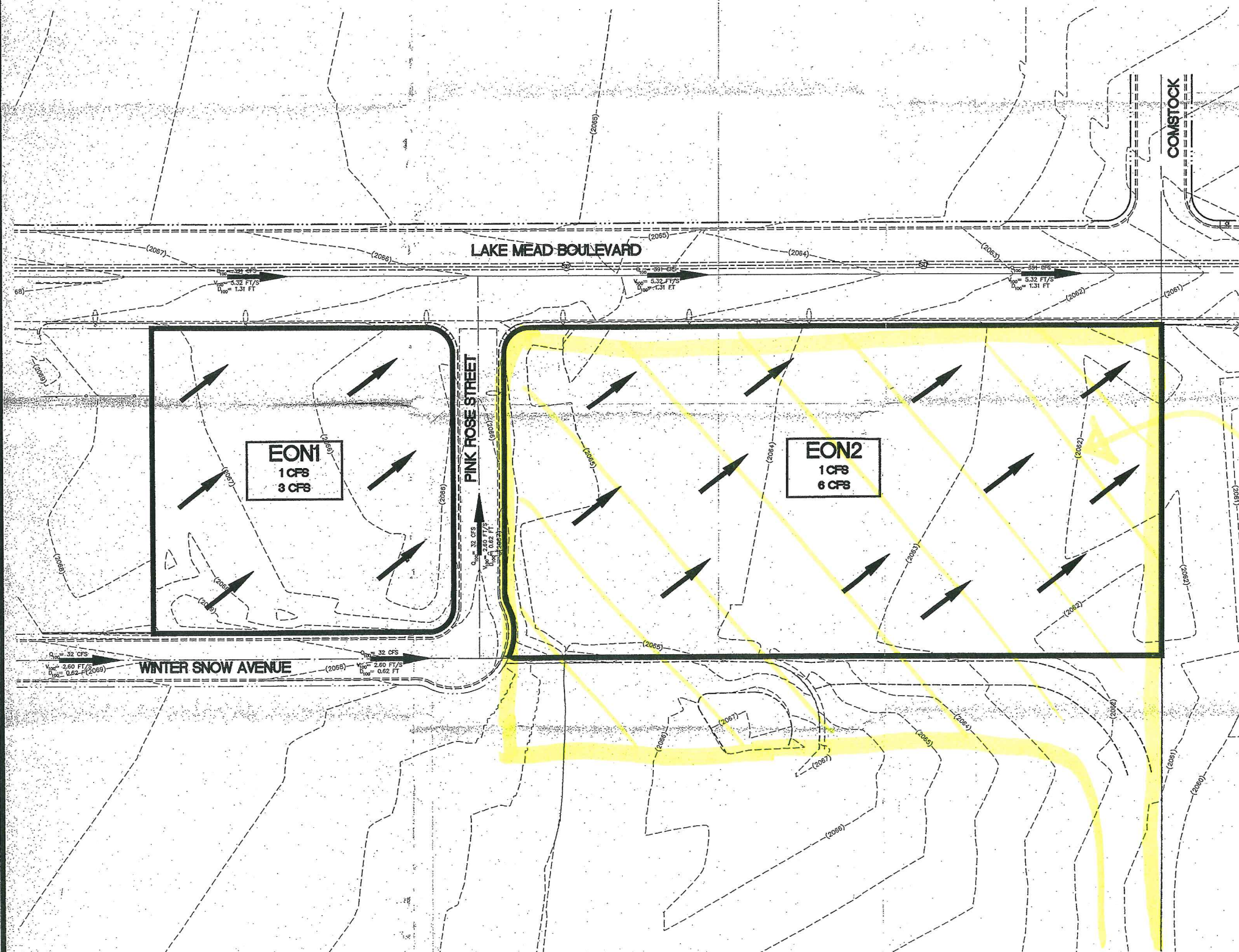
PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
				.57	1.00
HYDROGRAPH AT					
+	EON1	.00	1	FLOW	1.
				TIME	3.58
					3.58
HYDROGRAPH AT					
+	EON2	.01	1	FLOW	1.
				TIME	3.58
					3.58

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

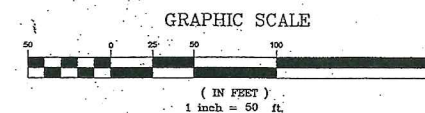
LONGFORD AT LAKE MEAD

EXISTING CONDITIONS BASIN MAP EXHIBIT 8



DEVELOPED CONDITIONS BASIN SUMMARY			
BASIN	AREA	Q_{10}	Q_{100}
EON1	2.06 AC	1 CFS	3 CFS
EON2	4.85 AC	1 CFS	6 CFS

PROJECT SITE



LEGAL DESCRIPTION

THIS PROJECT LIES WITHIN THE NORTH HALF (N 1/2) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 21, TOWNSHIP 20 SOUTH, RANGE 61-EAST, M.D.M., CLARK COUNTY, NEVADA.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK NUMBER 8, BEING A RIVET AND 2" ROUND ALUMINUM DISK IN THE TOP OF CURB ON THE NORTH SIDE OF LAKE MEAD BOULEVARD AT THE INTERSECTION OF LAKE MEAD BOULEVARD AND TONOPAH STREET.

NAVD '88 ELV = 630.470' M (2068.47 FT).

BASIS OF BEARING

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 89°55'08" EAST, BEING THE NORTH LINE OF THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 21, TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.M., AND BEING THE CENTERLINE OF LAKE MEAD BOULEVARD, AS SHOWN BY THAT CERTAIN PARCEL MAP RECORDED IN FILE 87, PAGE 65, OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY NEVADA.

FLOOD ZONE INFORMATION

FEMA FIRM MAP No. 32003C2160 E
DATED: SEPTEMBER 27, 2002

FLOOD ZONE DESIGNATION: ZONE X

DESCRIPTION OF ZONE X FLOOD ZONE:
THOSE AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOOD PLAIN.

5020 S. Eastern Avenue, Suite 200
Las Vegas, Nevada 89119
(702) 368-3986 Fax (702) 368-9793
www.stanleyconsultants.com



Stanley Consultants Inc.
NEVADA

LONGFORD AT LAKE MEAD, LLC
LONGFORD AT LAKE MEAD
EXISTING CONDITIONS BASIN MAP

CITY OF LAS VEGAS

SCI PROJECT #
16948.01.00

SHEET 1 OF 1

SCALE (H): 1" = 50'

SCALE (V): N/A

DRAWN BY: EJT

CHECKED BY: DBR

DATE: 01-08-04

**RESPONSE TO COMMENTS
ON THE UPDATE TO THE
TECHNICAL DRAINAGE STUDY
FOR
LONGFORD AT LAKE MEAD**

758.004

December 2005

Prepared for:

**Longford Properties
3077 E. Warm Springs Road
Las Vegas, Nevada 89120
Phone: (702) 454-5300
Fax: (702) 454-1376**

CITY OF LAS VEGAS				DATE:		RECEIVED	
INTER-OFFICE MEMORANDUM				March 15, 2006		MAR 20 2006	
TO: Land Development Services Department of Public Works				FROM: G.C. WALLACE Albert Sung, P.E. Flood Control Project Engineer Department of Public Works			
SUBJECT: Update to the Technical Drainage Study for: Longford at Lake Mead - Update				COPIES TO: G.C. Wallace			
Cross Streets:		Tonopah Drive & Lake Mead Blvd.		Longford Properties			
File Number:		F:\Depot\DSMEMOS\DS3921C.doc		Bart Anderson, P.E., DevCo			
Parcel Number:		139-21-314-002		CCRFC			
Zoning Action:		ZON-3335					
FEMA Flood Zone		YES	NO	X			
Proposed Storm Drain		YES	NO	X			
HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS		REVIEW FEES	FEES PAID Trn. No.	
1 st Submittal	12/11/2003	12/22/2003	Not Approved		\$400.00	115984: \$400	
2 nd Submittal, Supplement	1/15/2004, 2/12/2004	1/29/2004, 2/13/2004	Conditional Approval		\$400.00	117717: \$400	
3 rd Submittal	3/22/2004	3/30/2004	CCRFC Concurrence		N/C	N/C	
4 th Submittal Update	11/9/2005	11/23/2005	Not Approved		\$400.00	33130: \$400	
5 th Submittal	1/4/2006	1/18/2006	Conditional Approval		\$400.00	36193: \$400	
CCRFC	3/3/2006	3/15/2006	Concurrence		N/C	N/C	
TOTAL FEES (LDDRS):				\$1,600.00	----		

REMARKS:

4th & 5th Submittals: Update and addendum

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

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

The following comments are repeated until they are complete:

1. The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.
2. A drainage study update will be required for each subsequent pad development.
3. Raise the finish floor elevation of the "Family Dollar" building to FF=2069.50.
4. Sheet C5: In the proposed public drainage easement, replace the U-channel (which drains the parking area to the south of "Family Dollar" building) with valley gutter.
5. Revise the wall opening detail to provide vertical bars versus horizontal.
6. The City of Las Vegas typically allows a 10' minimum width for public drainage easements. However, Greg McDermott, Flood Control Project Manager, has approved the proposed 8' drainage

easement for the Longford development considering the minimal 8-cfs and the location of the building.

7. *All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map.*

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

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

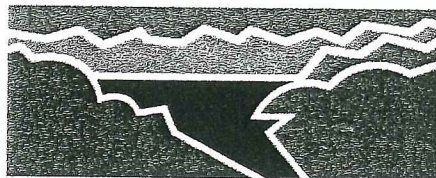
END OF REMARKS

B&H/ajj/cld

T/R/S: T21S/R61E/21

AREA M-21

REGIONAL FLOOD CONTROL DISTRICT



February 23, 2006

Gale Wm. Fraser, II, P.E.
General Manager/Chief
Engineer

BOARD OF DIRECTORS

Larry Brown
Chairman
City of Las Vegas

Chip Maxfield
Vice-Chairman
Clark County

Robert L. Eliason
City of North Las Vegas

Mayor Oscar Goodman
City of Las Vegas

Andy Hafen
City of Henderson

Mayor Bill Nicholes
City of Mesquite

Roger Tobler
City of Boulder City

Bruce L. Woodbury
Clark County

Mr. Randy Fultz, P.E.
City of Las Vegas Public Works
731 S. Fourth St
Las Vegas, NV 89101

DISTRICT CONCURRENCE: LONGFORD AT LAKE MEAD UPDATE (DS3921) (RFCD NO. 06-6681)

Dear Mr. Fultz:

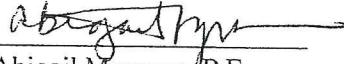
Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated November 7, 2005 and Addendum No. 1 dated December 12, 2005, for the above-mentioned project as submitted by G. C. Wallace, Inc. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Las Vegas Public Works dated January 19, 2006.

District concurs with acceptance of this Technical Drainage Study by City of Las Vegas Public Works.

District's review of this project was limited to issues of Regional Flood Control Significance as defined in *Uniform Regulations for the Control of Drainage*.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, information submitted by G. C. Wallace, Inc., may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

GALE WM. FRASER, II, P.E.
General Manager/Chief Engineer

BY: 
Abigail Mayrena, P.E.
Associate Engineer


Andrew R. Trelease, P.E., CFM
Principal Civil Engineer

AM:ART:css

c: Grant Y. Tokumi, P.E., G. C. Wallace, Inc.

File: 21-61-21.GCW

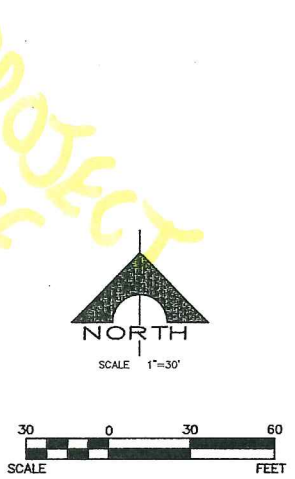
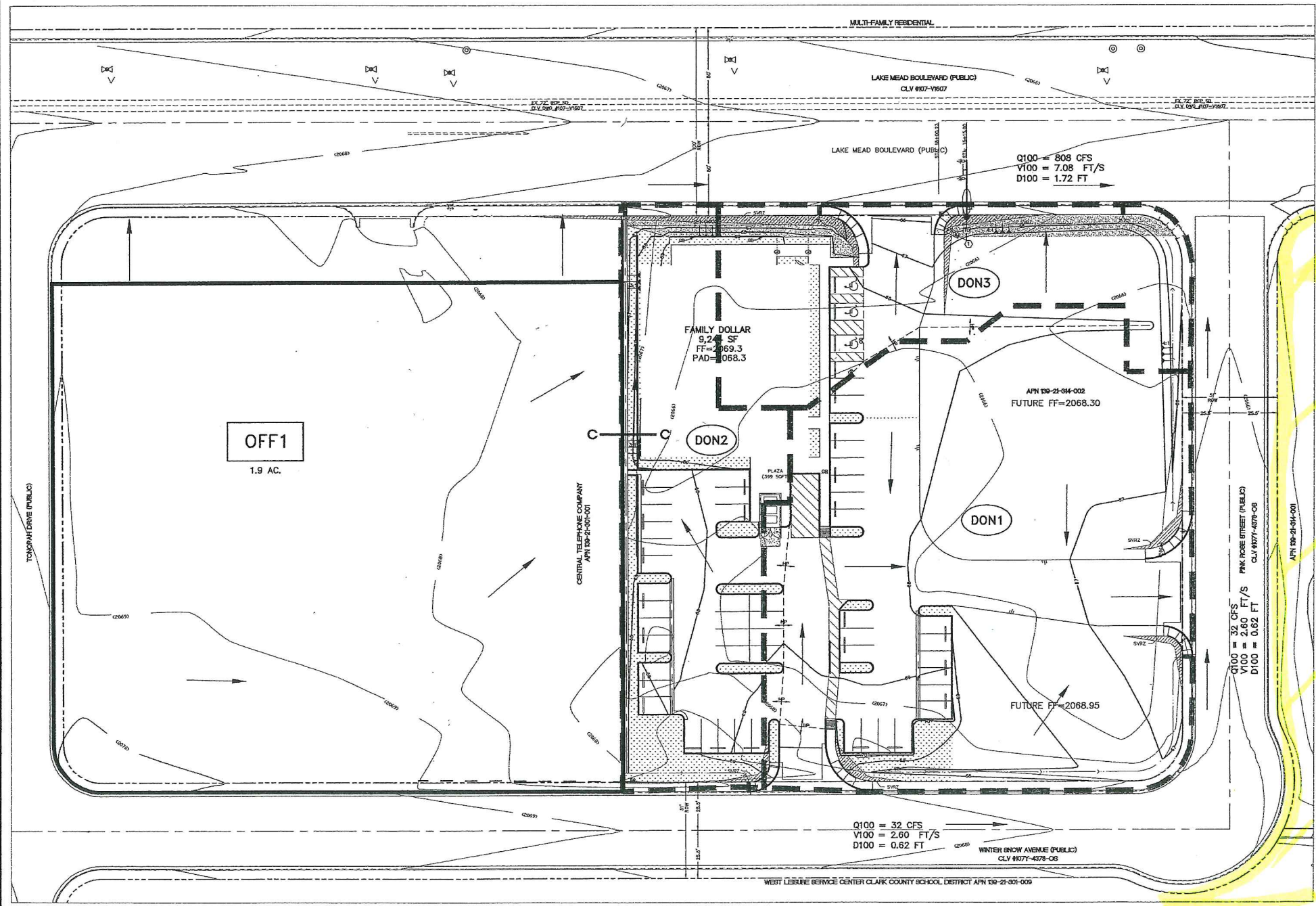
DEVELOPED CONDITIONS BASIN SUMMARY				
BASIN	AREA (ac)	100-YEAR (cfs)	10-YEAR (cfs)	
DON1	1.2	3	2	
DON2	0.44	1	1	
DON3	0.42	1	1	

SUMMARY STREET FLOW CHARACTERISTICS					
STREET	SLOPE (%)	Q100 (cfs)	VELOCITY (FPS)	DEPTH (FT)	V x D
PINK ROSE	0.5	32	2.60	0.62	1.61
WINTER SNOW	0.5	32	2.60	0.62	1.61

NOTE: BOTH TABLES ARE REFERENCED FROM THE LONGFORD AT LAKE MEAD STUDY DONE BY STANLEY CONSULTANTS.

HEC-1 SUMMARY OFFSITE STORM RUNOFF				
SUBBASIN	AREA (ac)	100-YEAR (cfs)	10-YEAR (cfs)	
OFF1	1.9	7	4	

SUMMARY STREET FLOW CHARACTERISTICS				
LOCATION	FLOW (cfs)	DEPTH (FT)	VELOCITY (FPS)	D x V
C-C	8	0.84	3.27	2.75
Lake Mead	808	1.72	7.08	12.18



LEGEND

- DON1 STANLEY CONSULTANTS DRAINAGE SUBBASIN
- STANLEY CONSULTANTS SUBBASIN BOUNDARY
- OFF1 OFFSITE DRAINAGE SUBBASIN
- OFFSITE SUBBASIN BOUNDARY
- C — C CROSS SECTION
- FLOW DIRECTION

LONGFORD SHOPPES AT LAKE MEAD
LONGFORD AT LAKE MEAD, LLC
DRAINAGE CONDITIONS MAP

SHEET
FIG 5R
SHT OF SHTS

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD., LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2239
G:\725-004\DWG\Map5R.dwg

DESIGN: _____
DRAWN: _____
CHECK: _____
ISSUE DATE: _____
PLOT DATE: 12-02-05
PLOT TIME: 11:40:52

REVISIONS
REV. DATE DESCRIPTION

DATE: _____
APP. DATE: _____
APP. DATE: _____
APP. DATE: _____

1801
M21
FILE

RECEIVED

JUN 27 1996

**CLV PUBLIC WORKS
FLOOD CONTROL**

**TECHNICAL DRAINAGE STUDY
ADDENDUM 2 ADDITION
FOR
LAKE MEAD TONOPAH MIDDLE SCHOOL
CCSD #0842**

A.P.N. 139-21-301-002

June 26, 1996

Prepared for:

**CLARK COUNTY SCHOOL DISTRICT
CONSTRUCTION MANAGEMENT DEPARTMENT
4828 South Pearl Street
Las Vegas, NV 89121**

Prepared by:

**SUMMIT ENGINEERING CORPORATION
3684 S. Highland Drive
Las Vegas, Nevada 89103
(702) 252-3236
Job #71082**

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		November 19, 1997
TO: Diane Phomninh, P. E. Land Development Services Department of Public Works		FROM: Dennis W. Stransky, P.E. Project Manager, Flood Control Department of Public Works
SUBJECT: Drainage Study for: LAKE MEAD TONOPAH Middle School		COPIES TO: Summit Engineering Corp. John McNellis, P.E. Clark County School District
FILE NO. F:\Depot\DS2\DS1801D.doc		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1st Submittal	03/18/96	03/28/96	Not Acceptable	N/C
2nd Submittal	04/12/96	04/29/96	Not Acceptable	N/C
3rd Submittal	06/19/96	06/25/96	Accepted	N/C
4 th submittal	11/06/97	11/19/97	See below comments	
TOTAL FEES:				N/C

REMARKS:

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

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

1. This submittal is for the re-grading of the 24 foot drainage easement at the southeast corner of the site. This revision is in conjunction with the changes to the curb, gutter and sidewalk at the corner of Sapphire stone Avenue and Crystal Stone Street in Unit 3 of the Diamond Point subdivision.
2. The drainage study review fees have been waived at the request of the City Manager.

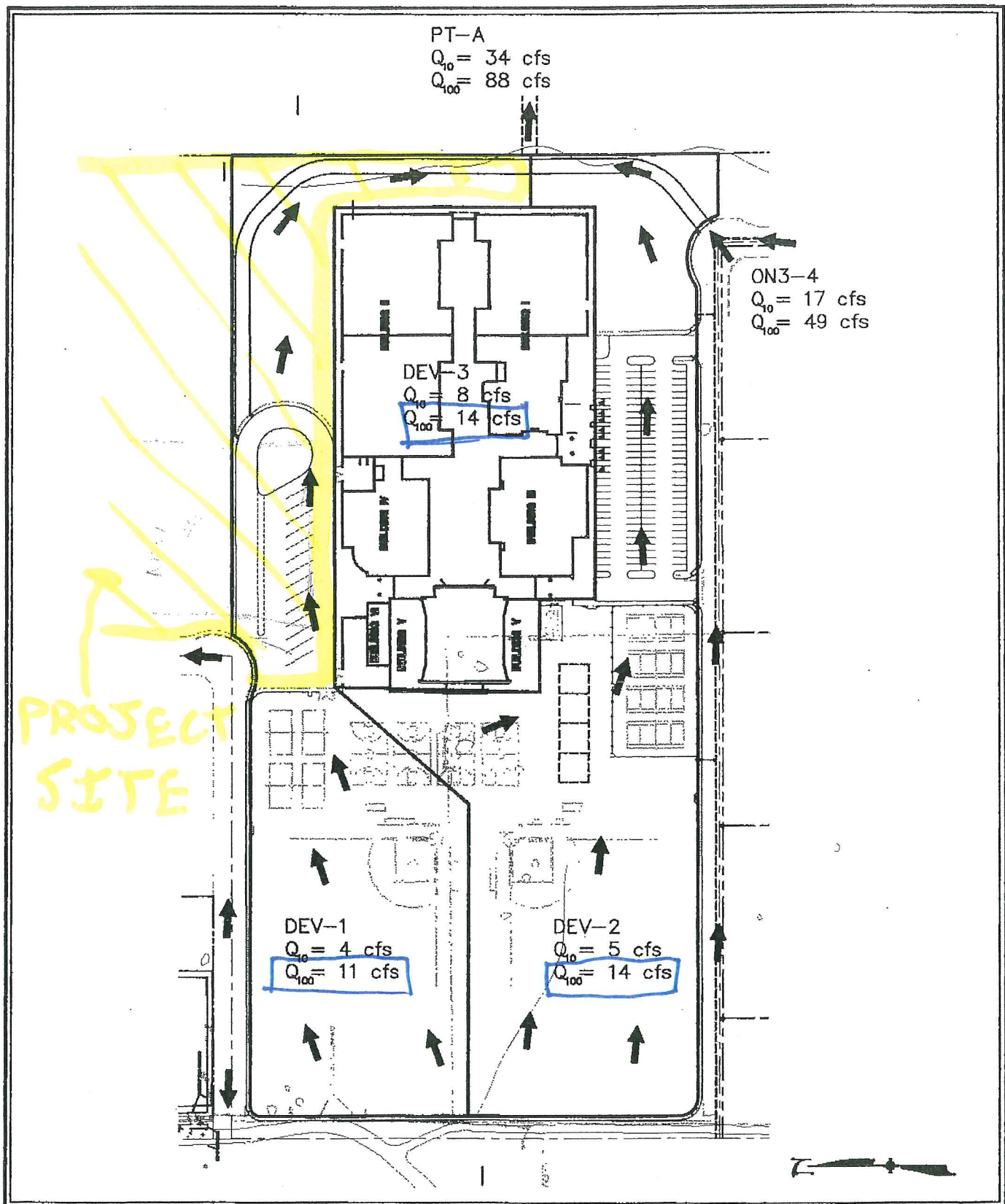
NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the City of Las Vegas Flood Control Section. Additionally, conditional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

PLANS SENT TO LAND DEVELOPMENT yes *SSW* (initial)

END OF REMARKS

dws

T/R/S 20S/61E/21
AREA M-21



DEVELOPED BASINS
 FIGURE 4

DATE 3/7/96
 JOB NO. 71082
 SCALE 1" = 180'

SUMMIT™ ENGINEERING CORPORATION
 CONSULTING ENGINEERS AND SURVEYORS
 3684 SOUTH HIGHLAND, LAS VEGAS, NEVADA
 (702) 252-3236

OWNER

CLARK COUNTY SCHOOL DISTRICT
4828 PEARL STREET
LAS VEGAS, NV 89121
(702)799-7604

ARCHITECT

WELLES-PUGSLEY ARCHITECTS
2480 E. TOMPKINS AVENUE, SUITE 222
LAS VEGAS, NEVADA 89121

CHARLES I. WEST MIDDLE SCHOOL

FORMERLY KNOWN AS

LAKE MEAD TONOPAH MIDDLE SCHOOL

STANDARD SPECIFICATIONS/STANDARD DETAILS

THE FOLLOWING LISTED DOCUMENTS CONTAIN THE STANDARD SPECIFICATIONS AND STANDARD DETAILS TO BE USED IN THE CONSTRUCTION OF THIS PROJECT. THE CONTRACTOR SHALL MAINTAIN A SET OF THE LISTED DOCUMENTS AT THE PROJECT SITE AT ALL TIMES.

- SPECIFICATIONS (STANDARD SPECIFICATIONS)
"UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA" (LATEST EDITION).
- STANDARD DRAWINGS (STD. DWGS.)
"UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA" (LATEST EDITION).
- WATER SYSTEM STANDARDS (U.D.A.C.S.)
"UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS" (LATEST EDITION).
- SEWER SYSTEM STANDARDS (D.C.S.)
"DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS" (LATEST EDITION).

PROJECT BENCHMARK

CITY OF LAS VEGAS BLM/2101 2104; A RIVET & PLATE IN TOP OF CURB AT THE NORTHEAST CORNER OF LAKE MEAD & MARTIN LUTHER KING BOULEVARD.
ELEVATION = 625.6597 METERS (NAVD 83) 2052.69 FEET

BASIS OF BEARINGS

NORTH 89°55'08" EAST, BEING THE NORTH LINE OF THE W 1/2 SW 1/4 OF SEC. 21, T. 20 S., R. 61 E., M.D.M., AS PER FILE 82 OF PARCEL MAPS, PAGE 74, CLARK COUNTY, NEVADA RECORDS' CUMULATIVE MAP INDEX.

CITY OF LAS VEGAS STREET LIGHT NOTES

- ALL STREET LIGHTING INSTALLATIONS SHALL CONFORM TO THE LATEST ISSUE OF THE STANDARD DETAILS AND SPECIFICATIONS OF THE CITY OF LAS VEGAS, AND SHALL ALSO CONFORM TO THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, 1995, UNLESS OTHERWISE NOTED.
- SEE UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION CITY OF LAS VEGAS DRAWING NO. 318.
- STREET LIGHT NOTE: ALL HANDCOVERS MUST BE INSTALLED, POLECAPS POURED, AND PULL BOX LIDS BOLTED DOWN PRIOR TO ENERGIZING CIRCUIT. ALL WIRES MUST HAVE THIN INSULATION.

CITY OF LAS VEGAS STREET NOTES

- A.C. PAVEMENT TO BE 1/2" ABOVE LIP OF GUTTER AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS.
- SUBGRADE FOR TYPE I UNDER CURB AND GUTTER AND UNDER A.C. (WHERE REQUIRED) TO BE CONTINUOUS.
- FOG SEAL TO BE APPLIED AFTER FINAL CORRECTIONS AND ADJUSTMENTS HAVE BEEN MADE.
- THE MAXIMUM GRADE BREAK OCCURRING IN THE CROSS SECTION SHALL BE 2% AND SHALL FALL BETWEEN DRIVING LANES OR BETWEEN A DRIVING LANE AND A PARKING LANE.
- IN PLACE NATIVE MATERIAL (NON-CEMENTED) MAY BE SUBSTITUTED FOR TYPE I AGGREGATE BASE PROVIDED THE FOLLOWING CONDITION IS MET: ALL OTHER REQUIREMENTS ARE THE SAME AS FOR TYPE I, AND APPROVED BY CONSTRUCTION SERVICES OFFICE.

CITY OF LAS VEGAS SEWER NOTES

- ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN & CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IN ALL CASES, THESE STANDARDS SHALL SUPERSEDE THE UNIFORM STANDARD SPECIFICATIONS. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATION BOOKS.
- 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 CONTROLLING AGENCY.
- CHISEL "S" OR "C" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
- POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OR TYPE B GRAVEL.
- ALL MANHOLES IN PAVED STREETS 8' R/W AND LARGER, SHALL HAVE CONCRETE COLLARS.
- TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO 12" DIAMETER SIZE. CONNECTIONS TO 15" OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES.
- A SEWER MAIN CROSSING OVER A WATER MAIN OR LESS THAN 18" UNDER A WATER MAIN MUST BE REINFORCED CONCRETE ENCASED FOR A DISTANCE NOT LESS THAN TEN FEET (10') TO EACH SIDE OF THE CENTERLINE OF THE WATER MAIN.
- ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CONTROLLING AGENCY MUST BE CLASS "A" CONTRACTORS.
- 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. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED AND REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY.

UTILITY NOTE

UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

Avoid cutting underground utility lines. It's costly.
Call before you dig
1-800-227-2600
UNDERGROUND SERVICE (USA)

CITY OF LAS VEGAS FIRE DEPARTMENT NOTES

- ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE CITY OF LAS VEGAS FIRE DEPARTMENT "HYDRANT SPECIFICATIONS", "HYDRANT INSTALLATIONS" AND ORDINANCE # 3944.
- AUTHORIZED HYDRANTS FOR THIS PROJECT ARE:
A. KENNEDY GUARDIAN
B. MUELLER A-423 CENTURIAN
C. CLOW MODEL 2546 MEDALLION
- ON ANY NEW HOME OR BUILDING INSTALLATION, ACCESSIBLE FIRE HYDRANTS SHALL BE INSTALLED BEFORE COMPLETION OF CONSTRUCTION COMMENCES AND SAID FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER WITH AN ADEQUATE WATER SUPPLY.
- CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT CENTERLINE OF STREET ADJACENT TO FIRE HYDRANT AS REQUIRED IN ORDINANCE # 3944 TO IDENTIFY FIRE HYDRANT LOCATIONS.
- CALL THE LAS VEGAS BUILDING DEPARTMENT AT 223-2071 FOR UNDERGROUND INSPECTION, PRESSURE AND FLUSH VERIFICATION OF ALL FIRE HYDRANTS AND FIRE LINES BEFORE COVERING.
- PAINTING OF THE CURBS AND HYDRANTS AND ANY WORK NECESSARY FOR PROTECTION OF HYDRANTS FROM PHYSICAL DAMAGE PER ORDINANCE # 3944 SHALL BE COMPLETED BEFORE APPROVAL BY THE CITY OF LAS VEGAS FIRE DEPARTMENT.
- A PERMIT IS REQUIRED FROM THE FIRE DEPARTMENT FOR ON-SITE WATER LINE AND FIRE HYDRANT. THE PERMIT AND CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER PRIOR TO ANY WORK BEGINNING.
- PRIVATE FIRE HYDRANTS SHALL BE PAINTED RED.
- A FLOW TEST MUST BE WITNESSED BY THE FIRE DEPARTMENT PRIOR TO OCCUPANCY FOR VERIFICATION OF REQUIRED ON-SITE WATER SUPPLY.
- ALL ON SITE FIRE MAIN MATERIALS MUST BE U.L. LISTED AND A.W.W.A. APPROVED.
- FIRE HYDRANT SPACINGS:
RESIDENTIAL - 500 FEET UNSPRINKLERED, 1,000 FEET SPRINKLERED
COMMERCIAL, INCLUDING MULTI-FAMILY - 500 FEET UNSPRINKLERED, 600 FEET SPRINKLERED.
- WHERE NEW WATER MAINS ARE EXTENDED ALONG STREETS, WHERE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF STRUCTURES, FIRE HYDRANTS SHALL BE SPACED AT MAXIMUM 1,000 FEET SPACING TO PROVIDE FOR TRANSPORTATION HAZARDS.
- NO FIRE HYDRANT SHALL BE LOCATED WITHIN THE REQUIRED RADIUS OF A CUL-DE-SAC OR WITHIN 20 FEET OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
- NO FIRE HYDRANT SHALL BE LOCATED WITHIN 6 FEET OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREET LIGHT OR ANY OTHER OBSTRUCTION.
- TWO SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE ARE 4 OR MORE FIRE HYDRANTS INSTALLED ON A SINGLE SYSTEM.
- NOT MORE THAN 2 HYDRANTS CAN BE OUT OF SERVICE DUE TO A SINGLE MAIN BREAK.
- FIRE APPARATUS ROADS SHALL HAVE AN UNOBSTRUCTED WIDTH OF NOT LESS THAN 20 FEET PROVIDED NO PARKING IS ALLOWED, NOT LESS THAN 28 FEET IF PARALLEL PARKING IS ALLOWED ON ONE SIDE, AND NOT LESS THAN 36 FEET IF PARALLEL PARKING IS ALLOWED ON BOTH SIDES. VERTICAL CLEARANCE SHALL BE NOT LESS THAN 13 FEET 6 INCHES.
- THE TURNING RADIUS FOR ANY FIRE APPARATUS ACCESS ROAD AND/OR FIRE LANE, PUBLIC OR PRIVATE SHALL BE NOT LESS THAN 45 FEET OUTSIDE RADIUS AND 22 FEET INSIDE RADIUS.
- A FIRE APPARATUS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FEET FROM A FIRE DEPARTMENT VEHICLE ACCESS. (SEE EXCEPTIONS IN USC 24, SECTION 902.2)
- ALL DEAD END FIRE APPARATUS ACCESS ROADS AND/OR FIRE LANES PUBLIC OR PRIVATE IN EXCESS OF 150 FEET IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURNAROUND AREA. SEE ORDINANCE #3944.
- 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 FEET ALONG ALL DESIGNATED FIRE LANES. SIGNS TO BE PROVIDED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FEET OR LESS THAN 6 FEET FROM ROADWAY LEVEL. THE CURBS ALONG OR ON THE PAVEMENT OF CEMENT IF CURB IS NOT PRESENT, SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS.
- ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECOVER SYSTEM. SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE CITY OF LAS VEGAS GUIDELINES FOR AUTOMATIC EMERGENCY VEHICLE ACCESS GATES.

- A MINIMUM EIGHTEEN (18) INCH VERTICAL SEPARATION (OUTSIDE TO OUTSIDE) MUST BE MAINTAINED WHEN THE WATER LINE IS INSTALLED OVER THE SANITARY OR STORM SEWER LINE. IF THE VERTICAL SEPARATION CANNOT BE MAINTAINED OR THE WATER LINE MUST BE PLACED UNDER THE SANITARY OR STORM SEWER LINE, THE SANITARY OR STORM SEWER LINE MUST BE CONSTRUCTED WITH ONE OF THE FOLLOWING OR AS SHOWN ON THESE PLANS:
A. POTABLE WATER SUPPLY QUALITY MATERIAL.
B. ENCASEMENT, WITH FOUR (4) INCH CONCRETE (MINIMUM) C. SLEEVING WITH POTABLE WATER SUPPLY QUALITY PIPE.
EACH PROVISION MUST EXTEND ALONG THE SANITARY OR STORM SEWER, ON EITHER SIDE OF THE MAIN, A MINIMUM 10 FOOT DISTANCE PERPENDICULAR TO THE WATER MAIN EXTERIOR.
- WARNING TAPE SHALL BE REQUIRED OVER ALL MAINS, ALL SIX (6) INCH DIAMETER AND LARGER SERVICE LATERALS, AND ANY SERVICE LATERAL NOT INSTALLED PERPENDICULAR TO THE MAIN IN ACCORDANCE WITH STANDARD PLATE NO. 27.
- ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LYVVO'S DISTRIBUTION SYSTEM.
- THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LYVVO CENTRAL STORES. TELEPHONE 226-3152. FORTY-EIGHT (48) HOURS PRIOR TO PICK-UP.
- CONSTRUCTION MAY INTERRUPT SERVICE WITH LYVVO APPROVAL AND PROPER NOTIFICATION, BETWEEN THE HOURS OF 10 PM AND 8 AM, SUNDAY THROUGH THURSDAY. CIRCUMSTANCES MAY REQUIRE TEMPORARY SERVICE FEES BE INSTALLED, WITHOUT LYVVO REIMBURSEMENT. ANY TEMPORARY SERVICE FEES MUST HAVE PRIOR LYVVO APPROVAL.
- ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LYVVO'S PRE-APPROVED MATERIALS AND MANUFACTURERS LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

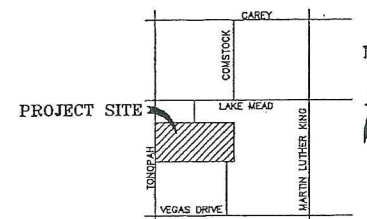
CITY OF LAS VEGAS TRAFFIC NOTES:

- 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 COUNTY STREETS IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
- ALL CONSTRUCTION SIGNING, BARRICAADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "NEVADA TRAFFIC CONTROL HANDBOOK - 1985" AND TO THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES - 1978". (REVISION NO. 4, MARCH, 1986).
- 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 LINE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.
- THE DEVELOPER SHALL BE RESPONSIBLE TO PROVIDE AND INSTALL ALL PERMANENT SIGNS SHOWN ON THE PLANS. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CITY OF LAS VEGAS STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF LAS VEGAS STANDARDS.
- IF A PROPOSED STREET LIGHT STANDARD IS FIELD LOCATED TO WITHIN FIVE (5) FEET OF ANY SIGN SHOWN HEREON TO BE MOUNTED ON A SIGN POST, THEN CHANGE MOUNTING TO ONE ON THE STREET LIGHT STANDARD.
- ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE APPROVED AND PLACED IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO ANY PORTION OF THE ROAD BEING IMPROVED HEREUNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR ON THESE PLANS.
- LVACTS INTERCONNECT CABLE POLICY IS IN EFFECT. INTERCONNECT CABLE MUST BE MAINTAINED AT ALL TIMES. DEVELOPER/CONTRACTOR SHALL PROVIDE TEMPORARY OVERHEAD INTERCONNECT CABLE WHILE PERMANENT CABLE IS BEING RELOCATED. ANY DAMAGE TO THIS CABLE IS DEEMED AN EMERGENCY BY LVACTS. CITY OF LAS VEGAS, CLARK COUNTY, AND NDOT. TEMPORARY AERIAL INSTALLATION MUST BE ACCEPTABLE TO COUNTY TRAFFIC MANAGER AND LVACTS.

SHEET INDEX:

- CIVIL NOTE SHEET
- HORIZONTAL CONTROL PLAN - WEST HALF
- HORIZONTAL CONTROL PLAN - EAST HALF
- GRADING PLAN - WEST HALF
- GRADING PLAN - EAST HALF
- STORM DRAIN
- UTILITY PLAN
- SIGNING & STRIPING
- PLAYGROUND EQUIPMENT PLAN
- DETAIL SHEET
- DETAIL SHEET
- DETAIL SHEET
- DETAIL SHEET

2493



VICINITY MAP

CITY OF LAS VEGAS GENERAL NOTES:

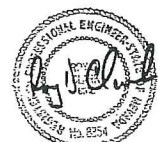
- ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST EDITION, THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA, NEVADA", LATEST EDITION, ANY 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 THE COVER SHEET AS "DEVIATIONS FROM STANDARDS". DEVIATIONS: NONE.
- 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 ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCES WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD OR UNDERGROUND POWER LINES AND/OR OTHER UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COSTS AND LIABILITY IN CONNECTION THEREWITH.
- 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 OR OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
- ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
- TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGN TO BE APPROVED BY THE QUALITY CONTROL DIVISION PRIOR TO USE ON THE PROJECT.
- PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT OF WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
- EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDE TYPE CURB.
- A.C. PAVEMENT TO BE 1/2" ABOVE LIP OF ALL GUTTER AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS.
- APPLY FOG SEAL ONLY AFTER ALL CORRECTIONS AND ADJUSTMENTS HAVE BEEN MADE.
- CURB & GUTTER WITH A GRADE OF LESS THAN FOUR TENTHS OF ONE PERCENT SHALL BE WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION. ANY CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY SHALL BE REMOVED AND REPLACED.
- 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.
- CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF TRANSITIONS TO BE AS SHOWN ON PLANS, OR AS DESIGNATED IN THE FIELD BY A CITY INSPECTOR.
- ALL GRADING WORK SHALL CONFORM TO THE SOLS REPORT AS PREPARED BY THE SOLS ENGINEER AND APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
- THE EXACT LOCATION OF SAWCUT LINES MAY BE DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS INSPECTOR IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATION.
- 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. 625.550.
- UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC. SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APPROACHES, FLOWLINES, AND VALLEY GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY, AND THE CITY ENGINEER.
- WALL NOTES:
A. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN FOR THE PURPOSE OF GRADING RELATIONSHIPS.
B. THE STRUCTURAL AND ARCHITECTURAL DESIGN OF ALL WALLS (RETAINING OR NON-RETAINING) MUST BE APPROVED BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
- ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT ON CITY STREETS. STRUCTURAL SECTION SHOWN IS BASED ON AN "R" VALUE OF 72.

APPROVALS

J. Spando 6/26/96
CITY OF LAS VEGAS FIRE DEPARTMENT DATE
George Jacoby 7/19/96
LAS VEGAS VALLEY WATER DISTRICT DATE
Quanita Rodriguez 6-26-96
NEVADA POWER DATE
Shelly McDuffy 6/26/96
SOUTHWEST GAS DATE
Nate Smith 6-26-96
SPRINT/CENTRAL TELEPHONE NEVADA DATE
Terrell Parker 6-26-96
PRIME CABLE DATE

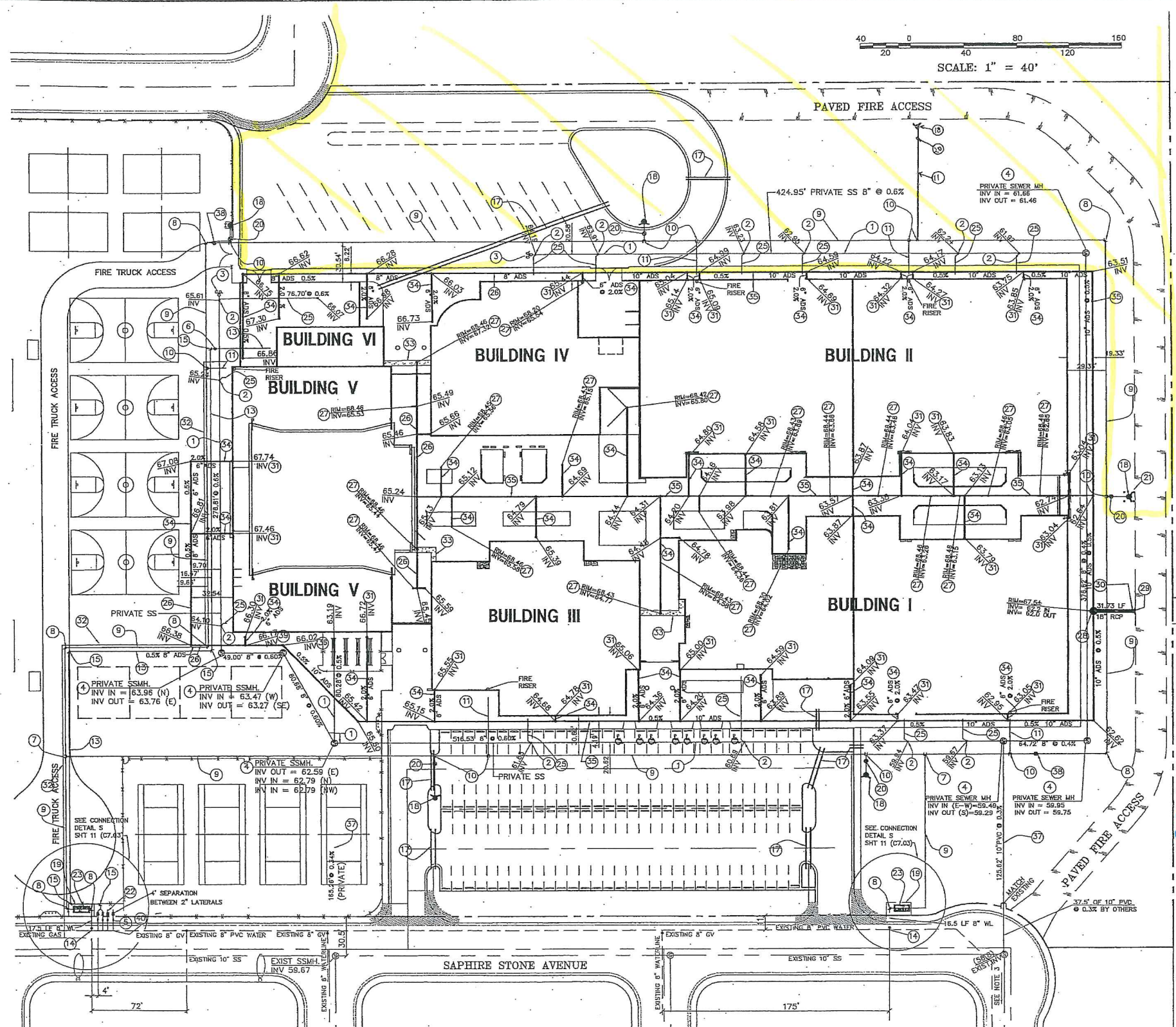
APPROVAL OF THESE PLANS BY THE CITY ENGINEER IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED RIGHTS-OF-WAY AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE THE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIFICALLY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

Dennis Anderson 8-15-96
DENNIS ANDERSON, P.E. DATE
CITY OF LAS VEGAS-CITY ENGINEER



SHEET	1	OF	13	SCALE	HORIZ. N/A	VERT. N/A	JOB NO. 71002	DATE	JUNE 26, 1996	DESIGNED BY: R.D.C.	DRAWN BY: R.D.C.	CHECKED BY: R.D.C.	SUMMIT ENGINEERING CORPORATION CONSULTING ENGINEERS AND SURVEYORS 3684 SOUTH HIGHLAND, LAS VEGAS, NEVADA 89103 PHONE (702) 252-3236 FAX (702) 252-3247
LAKE MEAD TONOPAH MIDDLE SCHOOL CCSD #0842 CIVIL NOTE SHEET													

PROJECT SITE



FIRE FLOW CALCULATION

FIRE FLOW REQUIREMENT IS 2,625 GALLONS PER MINUTE AT 20 PSI RESIDUAL

BASED ON:

SQUARE FOOTAGE	148,569 S.F. (6 BUILDINGS)
LARGEST AREA BETWEEN 4-HOUR AREA SEPARATION WALLS	52,034 S.F.
BUILDING HEIGHT	ONE-STORY
TYPE OF CONSTRUCTION	II-N & II-1H
OCCUPANCY	A-2.1, A-3, B-2, E-1
FULL AUTOMATIC FIRE SPRINKLER SYSTEM	YES

UTILITY NOTES:

- 1 - 8" PVC SANITARY SEWER LINE
- 2 - 6" PVC WYE, THE PLUMBING CONTRACTOR SHALL COORDINATE THE CONNECTION TO SANITARY SEWER WITH BUILDING SEWER LATERALS, SEE PLUMBING DRAWINGS
- 3 - 6" CLEANOUT W/ 2 45° BENDS
- 4 - INSTALL 48" SANITARY SEWER MANHOLE PER DCS STD DWG SD-1
- 5 - INSTALL 4-2" WATER METERS PER UDACS PLATE 1D
- 6 - INSTALL 4" GATE VALVE
- 7 - INSTALL 6" DUCTILE IRON TEE W/THRUST BLOCK
- 8 - INSTALL 8" DUCTILE IRON ELL (90°) W/THRUST BLOCK
- 9 - INSTALL 6" WATER MAIN AWWA C-900 CLASS 150 W/3.5' MIN BURIAL DEPTH
- 10 - INSTALL 6" X 6" DUCTILE IRON TEE W/THRUST BLOCK
- 11 - INSTALL 6" WATER MAIN FOR FIRE PROTECTION, AWWA C-900 CLASS 150
- 12 - INSTALL 4" SERVICE LINE FOR DOMESTIC SERVICE, AWWA C-900 CLASS 150
- 13 - INSTALL 6" X 6" M. J. TAPPING SLEEVE & VALVE
- 14 - INSTALL 4" DUCTILE IRON ELBOW W/THRUST BLOCK
- 15 - INSTALL 6" PVC CONDUIT FOR LANDSCAPING
- 16 - INSTALL FIRE HYDRANT PER UDACS PLATE NO 7
- 17 - LVVWD 10' X 20' EASEMENT
- 18 - INSTALL 6" GATE VALVE
- 19 - INSTALL BOLLARDS PER DETAIL 'Z' SHEET 13 (C7.05)
- 20 - INSTALL 4-2" RPPA'S PER UDACS PLATE 11A
- 21 - INSTALL 6" DOUBLE CHECK DETECTOR ASSEMBLY PER UDACS PLATE 20B
- 22 - INSTALL 6" PVC SANITARY SEWER LINE
- 23 - INSTALL 6" ADS DRAIN PIPE
- 24 - INSTALL 6" INLINE DRAIN PER DETAIL 'W' SHEET 12 (C7.04)
- 25 - INSTALL 48" STORM DRAIN MANHOLE
- 26 - INSTALL HEADWALL PER DETAIL 'Y' SHEET 13 (C7.05)
- 27 - INSTALL 18" RCP
- 28 - ON ALL ROOF DRAIN OUTLETS, EXTEND PIPE TO CAST IRON ROOF DRAINAGE PIPING, SEE PLUMBING DRAWINGS
- 29 - INSTALL 4" STEEL GAS LINE (BY SOUTHWEST GAS)
- 30 - INSTALL UTILITY TRENCH PER DETAIL 'X' SHEET 13 (C7.05)
- 31 - INSTALL 6" ADS DRAIN PIPE
- 32 - INSTALL 10" ADS DRAIN PIPE
- 33 - INSTALL 10" - 45° ADS ELBOW
- 34 - INSTALL 10" PVC SANITARY SEWER LINE
- 35 - INSTALL 6" GATE VALVE
- 36 - INSTALL 6" X 6" X 10" REDUCING TEE
- 37 - INSTALL 4 - 2" CORPORATION STOPS AND SERVICE LATERALS PER UDACS PLATE 1D

QUANTITIES:

1789 LF	13 EA	2 EA	4 EA	4 EA	1 EA	2 EA	8 EA	2650 LF	11 EA	140 LF	620 LF	2 EA	5 EA	770 LF	6 EA	6 EA	4 EA	4 EA	2 EA	300 LF	540 LF	20 EA	1 EA	1 EA	40 LF	26 EA	580 LF	1040 LF	1950 LF	1 EA	126 LF	2 EA	1 EA
---------	-------	------	------	------	------	------	------	---------	-------	--------	--------	------	------	--------	------	------	------	------	------	--------	--------	-------	------	------	-------	-------	--------	---------	---------	------	--------	------	------

UTILITY NOTE
UTILITY LOCATIONS SHOWN HEREIN ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THE EXACT LOCATION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION. THE CITY OF LAS VEGAS RESERVES THE RIGHT TO PREVENT THE PHYSICAL CONNECTION OF THIS PROJECT INTO THE DOWNSTEAM SEWER SYSTEM UNTIL ALL SEGMENTS HAVE BEEN COMPLETED AND ACCEPTED FOR MAINTENANCE.

SEWER CONNECTION NOTE:
A SEGMENT OF THE DOWNSTEAM SEWER SYSTEM THAT WILL SERVE THIS PROJECT HAS NOT BEEN COMPLETED AND/OR ACCEPTED FOR MAINTENANCE BY THE C.L.V. ANY WORK DONE ON THIS PROJECT PRIOR TO THE COMPLETION AND/OR ACCEPTANCE OF THE DOWNSTEAM SEWER SYSTEM(S) SHALL BE DONE AT THE DEVELOPER'S OWN RISK. THE CITY OF LAS VEGAS RESERVES THE RIGHT TO PREVENT THE PHYSICAL CONNECTION OF THIS PROJECT INTO THE DOWNSTEAM SEWER SYSTEM UNTIL ALL SEGMENTS HAVE BEEN COMPLETED AND ACCEPTED FOR MAINTENANCE.

- NOTES:**
1. THE UTILITY LOCATIONS INTO THE BUILDING ARE ASSUMED. IF THE FINAL LOCATIONS DIFFER SIGNIFICANTLY, THE CONTRACTOR SHALL CONTACT THE ENGINEER.
 2. ALL SANITARY SEWER NORTH OF THE NORTH RIGHT-OF-WAY LINE OF AMBERSTONE AVENUE IS PRIVATE.
 3. FOR LOCATION OF SEWER LINE EXTENSION TO A 12" COLLECTION SYSTEM SEE "SEWER VICINITY MAP" ON SHEET 13 (C7.05)
 4. FIRE RISER LOCATION SHOWN FOR REFERENCE ONLY

PROJECT BENCHMARK
CITY OF LAS VEGAS BENCHMARK 2104: A RIVET & PLATE IN TOP OF CURB AT THE NORTHEAST CORNER OF LAKE MEAD & MARTIN LUTHER KING BOULEVARD.
ELEVATION = 625.6597 METERS (NAVD 83) 2052.69 FEET

BASIS OF BEARINGS
NORTH 89°55'08" EAST, BEING THE NORTH LINE OF THE W 1/2 SW 1/4 OF SEC. 21, T. 20 S., R. 61 E., M.D.M., AS PER FILE B2 OF PARCEL MAPS, PAGE 74, CLARK COUNTY, NEVADA RECORDER'S CUMULATIVE MAP INDEX.

INSTALLATION OF DOUBLE CHECK DETECTOR ASSEMBLY - 8" (2 ea.)
THE DOUBLE CHECK DETECTOR ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE UDACS PLATE 20B.

ANY BLOCK WALL OR OTHER FENCE MATERIAL SHALL BE DESIGNED AND CONSTRUCTED AROUND THE OUTSIDE OF THE EASEMENT(S) SO AS TO ALLOW THE DISTRICT DIRECT ACCESS FROM THE ADJACENT RIGHT-OF-WAY.

APPROVED
James B. ...
LAS VEGAS VALLEY WATER DISTRICT
DATE: 7/19/96



SUMMIT™ ENGINEERING CORPORATION
CONSULTING ENGINEERS AND SURVEYORS
3845 SOUTH HOLLAND AVE., SUITE 100
LAS VEGAS, NEVADA 89119
PHONE: (702) 232-3238 FAX: (702) 232-3247

DESIGNED BY: R.D.C.
DRAWN BY: C.S.S.
CHECKED BY: R.D.C.
JUNE 26, 1996
NEVADA

LAKE MEAD TONOPAH MIDDLE SCHOOL
CCSD #0842
UTILITY PLAN

REV.	DATE	DESCRIPTION	BY	APP'D

SHEET	SCALE	HORIZ. 1"=40'	VERT. 1"=4'	JOB NO. 71082	DATE 7/19/96
7					
13					

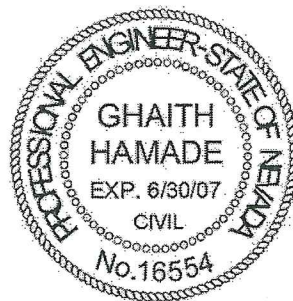
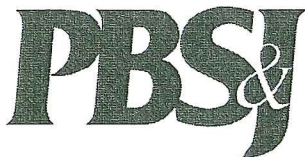
City of Las Vegas

**Central Neighborhood
Flood Control Master Plan**

Volume I – Report

March 2005

PBS&J Reference No. 511502





City of Las Vegas

CENTRAL NEIGHBORHOOD FLOOD CONTROL MASTER PLAN

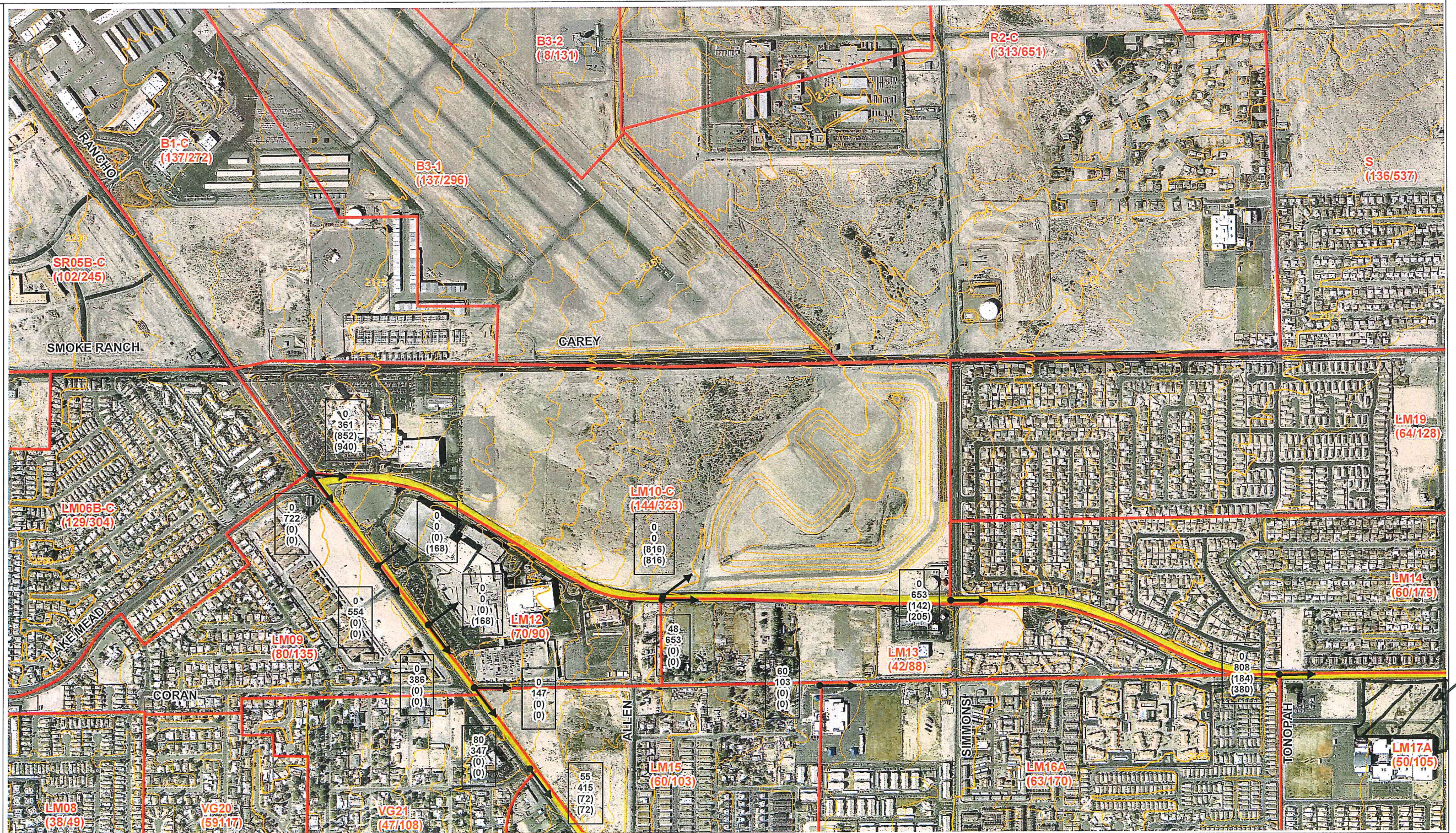
LEGEND

- Sub-basin Boundary
- LV12** Basin ID
- (10yr./100yr.)** Contributing flow from the basin (cfs)
- 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)
- Study Area Limit

PHOTO DATE: SPRING 2004

FIGURE E-1



EXISTING DRAINAGE CONDITIONS



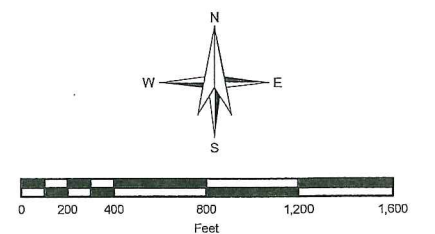
2270 Corporate Circle, Suite 100
Henderson, NV 89074
(702) 263-7275
Fax: (702) 263-7200

	Durango	Rainbow	Decatur	Tonopah	5th	Pecos	Nellis
Lake Mead				1	2		
Washington				3	4	5	6
Charleston	7	8	9	10	11	12	
Sahara	13	14	15	16	17		
Desert Inn		18	19				

NOTE:

Existing conditions are based on future Curve Number values with only existing local and CCRFCD facilities in place.

100-Year flows at locations where a 100-Year subbasin concentration point does not exist in the hydrology model were based on an area-weighted ratio of the 100-Year flows from concentration points upstream and downstream of the location. See Volume I for a more detailed explanation.



SCALE: 1 inch = 800 feet



City of Las Vegas

CENTRAL NEIGHBORHOOD FLOOD CONTROL MASTER PLAN

LEGEND

- Existing Regional Facility
- Category A Proposed Regional Facility (2002 MPU)
- Category B Proposed Regional Facility (2002 MPU)
- Category A Proposed Regional Facility (2004 CNFCMP)
- Existing Local Facility
- Proposed Local Facility
- Regional Culvert
- Regional Bridge
- Regional Pipeline
- Regional Channel
- Regional Levee
- Regional Detention Basin
- Local Storm Drain
- Local Culvert
- Proposed Local Storm Drain
- Regional ID-Mile Separator
- Local Facility Separator

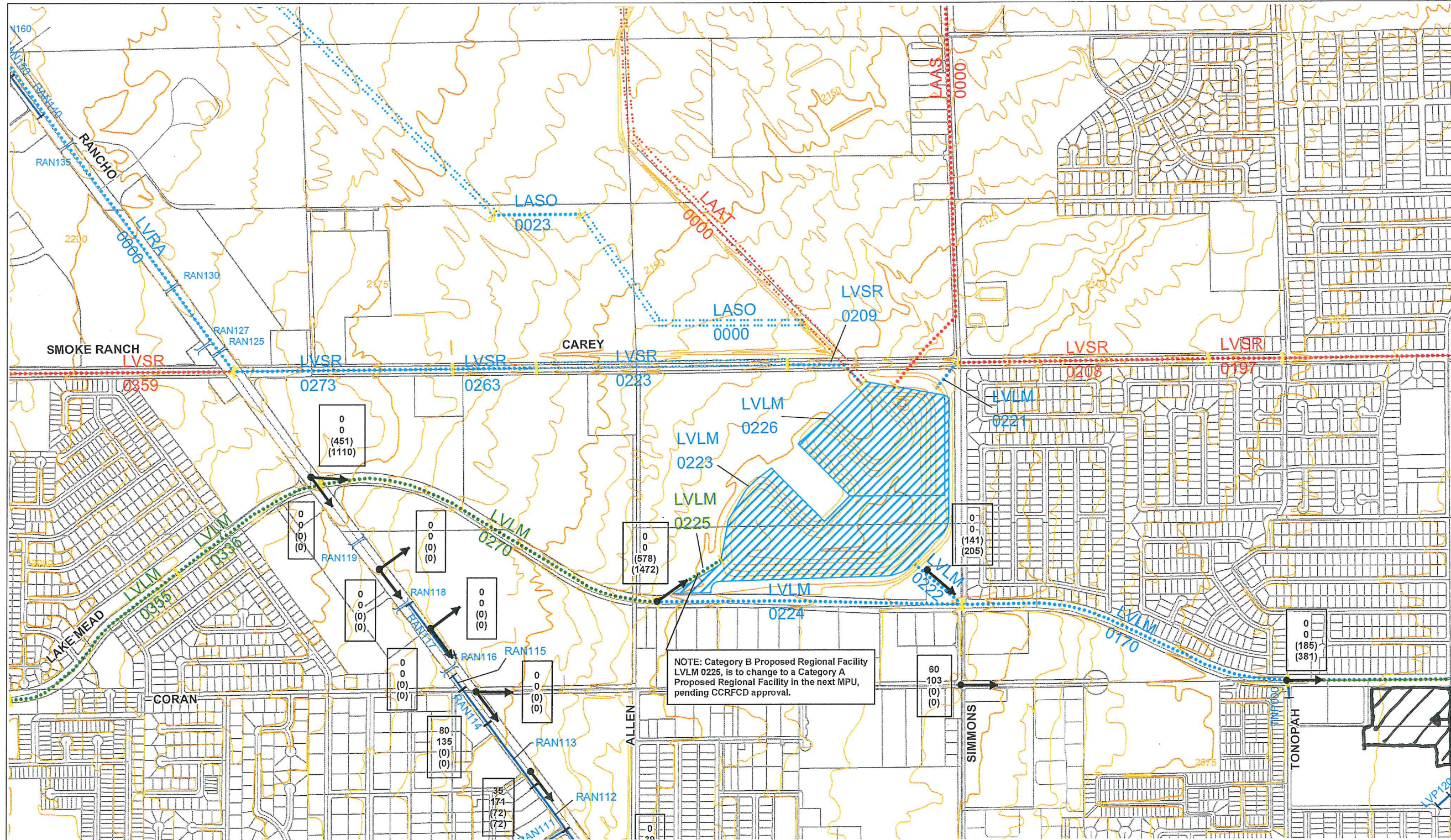
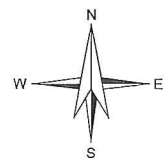


FIGURE F-1



SCALE: 1 inch = 800 feet

Flow Arrow

250
500
(300)
(800)

10-Year Street Flow
100-Year Street Flow
10-Year Facility Flow
100-Year Facility Flow

(Flows in CFS)

NOTE:
Ultimate drainage conditions are based on future Curve Number values with all flood control facilities in place.

100-Year flows at locations where a 100-Year subbasin concentration point does not exist in the hydrology model were based on an area-weighted ratio of the 100-Year flows from concentration points upstream and downstream of the location. See Volume I for a more detailed explanation.

Durango	Rainbow	Decatur	Tonopah	5th	Pecos	Nellis
			1	2		
			3	4	5	6
			7	8	9	10
			11	12	13	14
			15	16	17	18
			19			

FUTURE DRAINAGE CONDITIONS



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Henderson, NV 89074
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Fax: (702) 263-7200

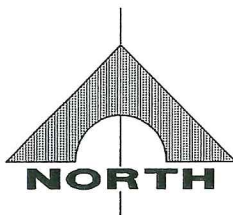


GRAPHIC SCALE



(IN FEET)

1 inch = 5000 ft.



CLARK COUNTY SCHOOL DISTRICT
WEST PREP ACADEMY
ELEM. SCHOOL ADDITION

FIGURE 1

VICINITY MAP



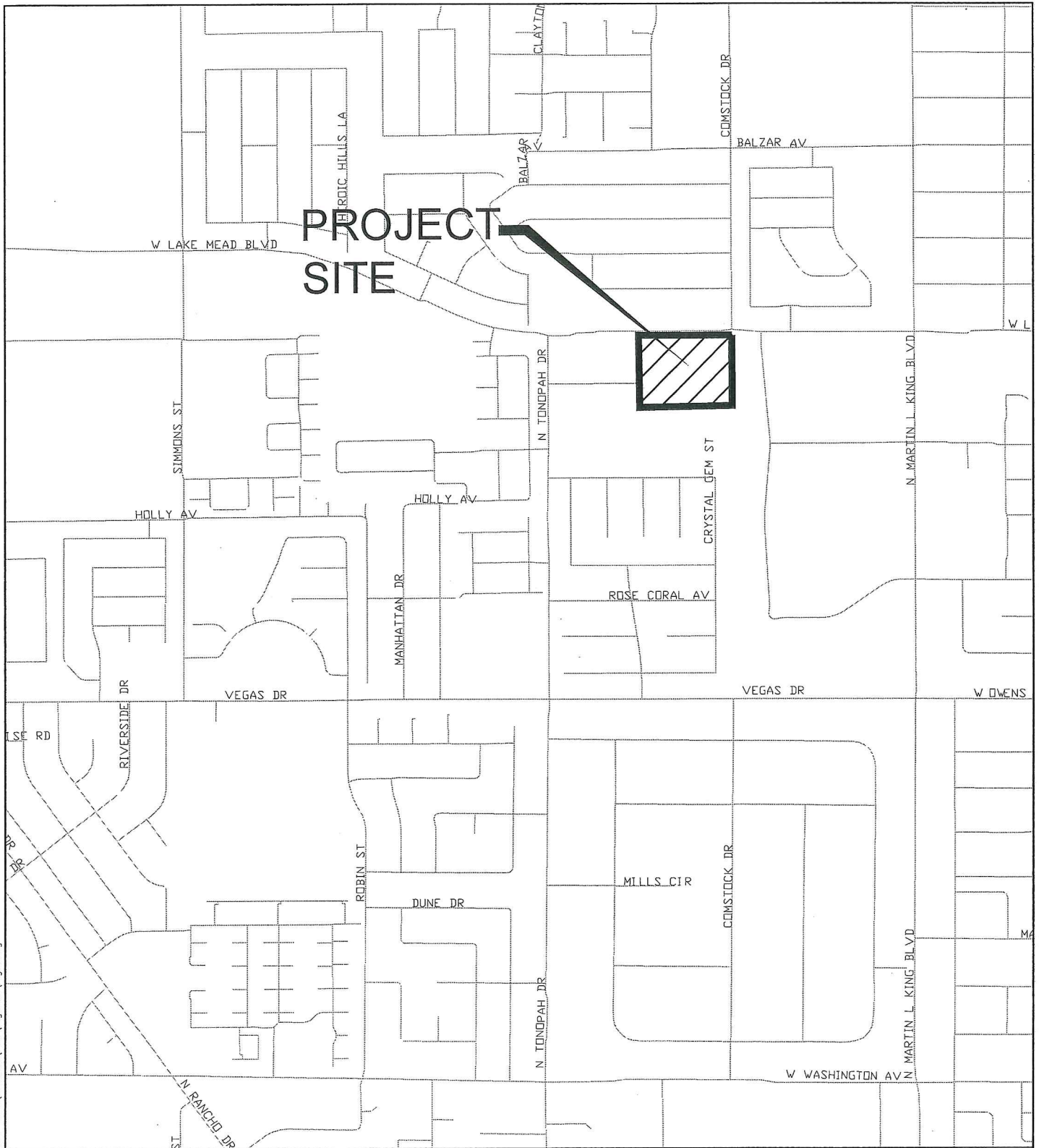
G. C. WALLACE COMPANIES

ENGINEERS | PLANNERS | SURVEYORS

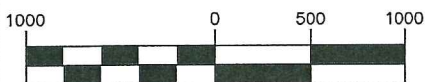
6655 S. CIMARRON ROAD • LAS VEGAS, NV 89113

T: 702.804.2000 • F: 702.804.2299 • GCWALLACE.COM

d:\clark 08-05-15 14:30:49 F:\Projects\800\858-004\Division\Fch\Figures\Fig2.dwg

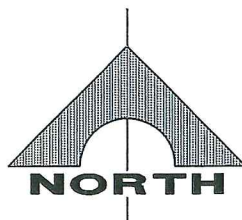


GRAPHIC SCALE



(IN FEET)

1 inch = 1000 ft.

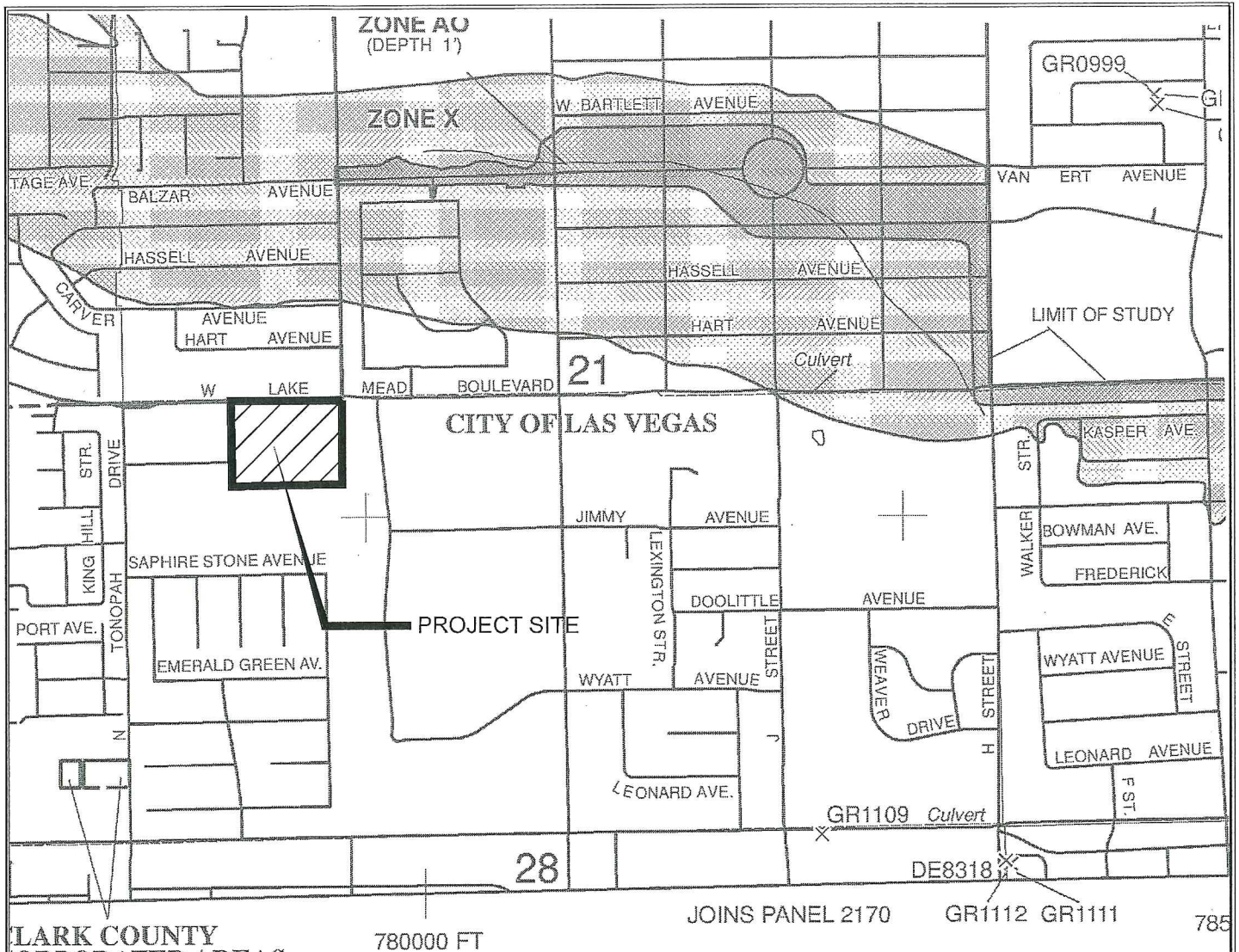


CLARK COUNTY SCHOOL DISTRICT
WEST PREP ACADEMY
ELEM. SCHOOL ADDITION

FIGURE 2
LOCATION MAP



G. C. WALLACE COMPANIES
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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2160F

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

PANEL 2160 OF 4090
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

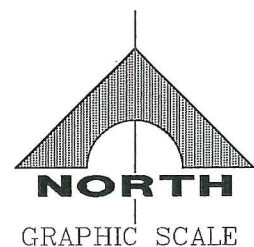
COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY	320003	2160	F
LAS VEGAS, CITY OF	008078	2160	F
NORTH LAS VEGAS, CITY OF	320007	2160	F

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
32003C2160F

MAP REVISED
NOVEMBER 16, 2011

Federal Emergency Management Agency



(IN FEET)

1 inch = 1000 ft.

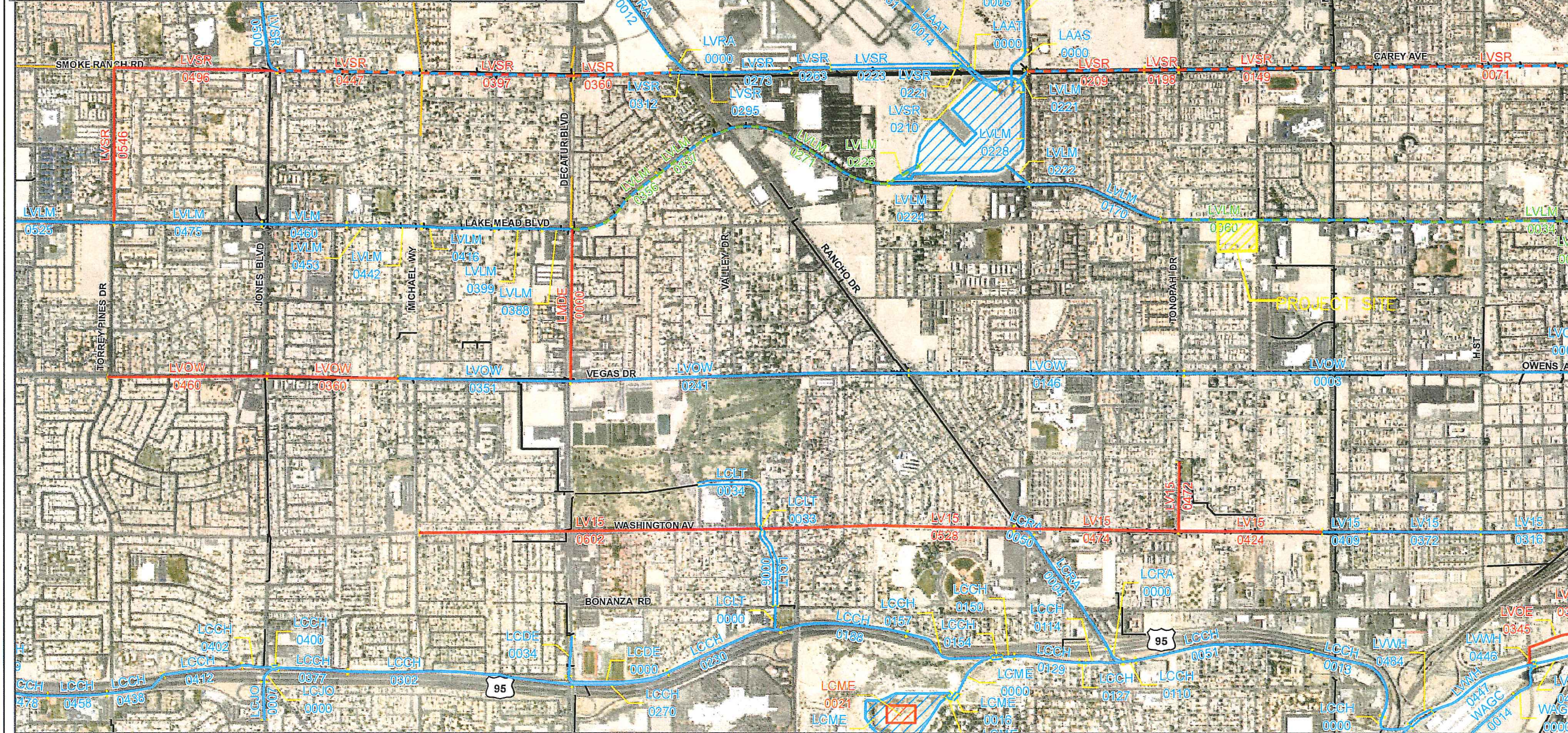
CLARK COUNTY SCHOOL DISTRICT
WEST PREP ACADEMY
ELEM. SCHOOL ADDITION

FIGURE 3
F.I.R.M.



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ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LVLN		LAS VEGAS WASH - LAKE MEAD						
0033	E	60" RCP (Replace w/ LVLN0034)	1186	994	CLM20-C	NW3SC	1.36	1.62
0034	P0	12' X 5' RCB (Replaces LVLN0033)	1186	994	CLM20-C	NW3SC	1.36	1.62
0059	E	72" RCP (Replace w/ LVLN0060)	5952	994	CLM20-C	NW3SC	1.36	0.66
0060	P0	12' X 6' RCB (Replaces LVLN0059)	5952	994	CLM20-C	NW3SC	1.36	0.66
0170	E	78" RCP	2421	378	CLM16A-C	NW3SC	0.38	1.17
0221	E	48" RCP Outlet	270	168	DR2	NW4	11.78	
0222	E	48" RCP Outlet	500	208	DCAREY	NW4	11.78	
0224	E	36" RCP	2429					0.53
0225	E	90" RCP (Replace w/ LVLN0226)	641	1933	CLM10-C	NW3	3.02	1.35
0226	P0	2' 10' X 8' RCB (Replaces LVLN0225)	641	1933	CLM10-C	NW3	3.02	0.50
0227	E	10,000 cfs PMF Spillway	10000		CARYLMIN	NW4	11.78	
0228	E	607 ac-ft Carey-Lake Mead Detention Basin	5184		CARYLMIN	NW4	11.78	
0270	E	90" RCP (Replace w/ LVLN0271)	3473	1933	CLM10-C	NW3	3.02	1.35
0271	P0	12' X 8' RCB (Replaces LVLN0270)	3473	1933	CLM10-C	NW3	3.02	1.35
0336	E	84" RCP (Replace w/ LVLN0337)	1050	1652	CLM06-C	NW3	2.61	1.16
0337	P0	12' X 8' RCB (Replaces LVLN0336)	1050	1652	CLM06-C	NW3	2.61	1.16
0355	E	90" RCP (Replace w/ LVLN0356)	1840	1652	CLM06-C	NW3	2.61	0.40
0356	P0	12' X 11' RCB (Replaces LVLN0355)	1840	1652	CLM06-C	NW3	2.61	0.40
0388	E	84" RCP	520	852	CLM05-C	NW3	1.00	1.40
0399	E	78" RCP	803	852	CLM05-C	NW3	1.00	1.07
0416	E	72" RCP	1320	852	CLM05-C	NW3	1.00	1.00
0442	E	60" RCP	725	565	CLM03-C	NW3	0.63	1.28
0453	E	54" RCP	589	565	CLM03-C	NW3	0.63	2.37
0460	E	54" RCP	1464	235	LM02-C	NW3	0.29	2.05
0475	E	48" RCP	2632	235	LM02-C	NW3	0.29	1.24
0525	E	48" RCP	2600	542	CLM01-C	NW3	0.64	1.24



2013
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

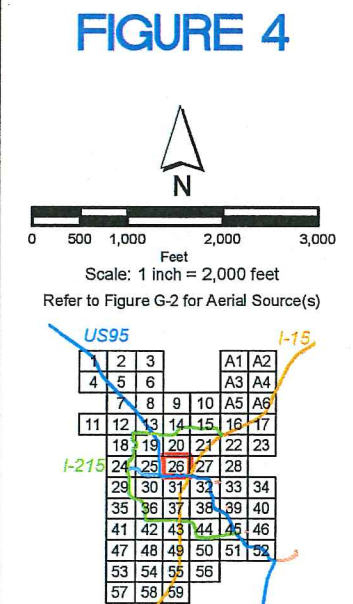
FIGURE F- 26
FLOOD CONTROL FACILITIES

LEGEND

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

Remove & Replace/Parallel Facilities

Category A	Category B
Channel	Channel
Stormdrain	Stormdrain





2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE
FIGURE H- 26
HYDROLOGIC SUMMARY

LEGEND

- Ultimate Development Boundary
- Watershed Boundary
- Subbasin Boundary
- Drought Ordinance Boundary
- Flow Arrows

Flood Control Facilities

- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Category A Remove & Replace/Parallel Facilities
- Category B Remove & Replace/Parallel Facilities

Type Hydrologic Soil Groups

- A Low Runoff Potential
- B Moderately Low Runoff Potential
- C Moderately High Runoff Potential
- D High Runoff Potential/Rock Outcrops

Typical Land Use

- 1 Undeveloped Land, Open Desert
- 2 Parks, Golf Courses
- 3 Rural
- 4 / 14* Low Density Residential
- 5 / 15* Medium Density Residential
- 6 / 16* High Density Residential
- 7 / 17* Public Facility, Residential
- 8 / 18* Very High Density Residential
- 9 / 19* Commercial, Retail, Casino, High Rise Condominiums
- 10 / 20* Light Industrial
- 11 / 21* Heavy Industrial
- 12 / 22* Schools
- 13 Lakes

* Drought Ordinance Applied

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

Scale: 1 inch = 2,000 feet

Refer to Figure G-2 for Aerial Source(s)

