

DS #: 4568

APN: 138-30-113-018

PROJECT: 1450 Surface Parking Lot at
1450 Center Crossing Rd.

SUBMITTAL: Supplement

SCANNED BY/DATE: _____

CHECKED BY/DATE: _____





CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		October 2, 2012
TO: Land Development Services Department of Public Works		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:	COPIES TO:
	1450 Surface Parking Lot at 1450 Center Crossing Rd.	CivilWorks Inc.
Cross Streets:	SWC of Summerlin Pkwy. & Town Center Dr.	1451 Center Crossing LLC
File Number:	F:\Depot\DSMemos\DS4568A.doc	Bart Anderson, P.E., DevCo
Parcel Number:	138-30-113-018	CCRFC
Zoning Action:	CRG-46741	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES	NO X

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	8/23/2012	9/5/2012	Not Approved	\$400.00	293781: \$400
Supplement	10/2/2012	10/2/2012	See Comments Below	N/C	N/C
			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:
	must be resubmitted or supplemented including the following:
X	is conditionally approved subject to Clark County Regional Flood Control District concurrence.

This drainage study is acceptable in concept; however, *City of Las Vegas* will not formally accept the study until the *Clark County Regional Flood Control District* (CCRFC) has issued a letter of concurrence. The Engineer should contact the CCRFC to confirm that they have begun their review.

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

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

END OF REMARKS

ays

T/R/S: T20S/R60E/30
AREA L-30

Albert Sung

From: Jennifer K. Nuesca [jkn@civilworksonline.com]
Sent: Monday, October 01, 2012 8:06 AM
To: Albert Sung
Subject: 1450 Surface Parking Lot Drainage Study
Attachments: 3260_001.pdf; C5-12015-GR C5 GR (1).pdf; C7-12015-DT C7 DT (1).pdf

Albert,

I have attached the Conditions of Approval as well as the revised Grading and Detail Sheets.

As discussed, the following revisions to the plans have been made:

1. Height of 10' concrete flume changed from 6" to 8"
2. Additional grading at the southwest corner of the site to allow for transition between existing ground (dirt) and proposed edge of pavement.
3. Detail of concrete flume to existing concrete channel connection.
4. Label existing Regional Facility

Let me know if you need anything else.

Thank you,

Jennifer K. Nuesca, E.I.
Civil EIT

CIVILWORKS, INC.

4945 W. Patrick Lane
Las Vegas, NV 89118
Phone: (702) 534-1827
Fax: (702) 534-1825
Cell: (702) 461-4869



LAS VEGAS
CITY COUNCIL

CAROLYN G. GOODMAN
MAYOR

STAVROS S. ANTHONY
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ELIZABETH N. FRETWELL
CITY MANAGER

September 27, 2012

Mr. Kevin Budny
1451 Center Crossing Drive, LLC
10000 West Charleston Boulevard, Suite #260
Las Vegas, Nevada 89135

Re: CRG-46741 - CITY REFERRAL GROUP

Dear Mr. Budny:

Your request for possible action on a request for a Minor Amendment of an approved Summerlin Site Development Plan Review (SV-0016-01) FOR A PROPOSED PARKING LOT EXPANSION on a portion of 26.5 acres at 1451 Center Crossing Road (APN 138-30-113-018), P-C (Planned Community) Zone, Ward 2 (Beers), was considered by the City Referral Group on Wednesday, September 26, 2012.

The City Referral Group **APPROVED** your request subject to the following:

Department of Planning

1. Conformance to the Conditions of Approval for Rezoning (Z-0044-87) shall be required, except as amended herein.
2. Conformance to the requirements and conditions of the Summerlin Non-Residential Design Review Committee (SNRDDC) Preliminary Design Approval addressed in a letter dated 08/20/12.
3. This approval shall be void two years from the date of final approval, unless exercised pursuant to the provisions of LVMC Title 19.18. An Extension of Time may be filed for consideration by the City of Las Vegas.
4. All development shall be in conformance with the site plan and landscape plan date stamped 09/05/12, except as amended by conditions herein.
5. These Conditions of Approval shall be affixed to the cover sheet of any plan set submitted for building permit.
6. Parking lot lighting standards shall be no more than 30 feet in height and shall utilize downward-directed lights with full cut-off luminaires.

CITY OF LAS VEGAS
DEPARTMENT OF PLANNING
DEVELOPMENT SERVICES CENTER
333 NORTH RANCHO DRIVE
3RD FLOOR
LAS VEGAS, NEVADA 89106

VOICE 702.229.6301

FAX 702.474.0352

TTY 702.386.9108

www.lasvegasnevada.gov

Mr. Kevin Budny
SRG-46741 - Page Two
September 27, 2012

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

Public Works

8. Remove all substandard public street improvements, if any, adjacent to this site and replace with new improvements meeting current City Standards concurrent with on-site development activities. All existing public improvements adjacent to this site damaged during construction shall be repaired at the applicant's expense. We note that the driveways for this site are acceptable as shown on the approved site plan.
9. All landscaping and private improvements installed with this project shall be situated and maintained so as not to create sight visibility obstructions for vehicular traffic at all development access drives and abutting street intersections. No structures and no trees or vegetation taller than three feet shall be allowed within the existing public sewer easement as shown on the approved site plan.
10. A Drainage Plan and Technical Drainage Study, such as DS4568, must be submitted to and approved by the Department of Public Works prior to the issuance of any building or grading permits or submittal of any construction drawings, whichever may occur first. Provide and improve all drainageways recommended in the approved drainage plan/study.
11. Site development to comply with all applicable Summerlin Development and Improvement Standards.

This action by the City Referral Group on September 26, 2012 is final unless a written appeal is filed with the Director of the Department of Planning within ten (10) days of the date of the City Referral Group's decision.

Sincerely,



Yorgo Kagafas, AICP
Senior Planner
Department of Planning
Case Planning Division

YK:clb

cc: Mr. John J. Darin
The Korte Company
9225 West Flamingo Road, Suite #100
Las Vegas, Nevada 89147

TRANSMITTAL 03:

Project Name: SURFACE PARKING LOT

Project #: 106112015.00

Date: 2OCT12

Time: 12:38 PM

By: JKN

Page: 1 of 1

Company: CLV

Attention: Albert Sung

Address: _____

Phone: _____

Regarding: _____

Please note the following is/are:	☐ Attached	☐ Print	☐ Shop Drawings
	☐ Plans	☐ Samples	☐ Specifications
	☐ Copy of Letter	☐ Change Order	☐ Other: _____

Copies:	Date:	#:	Description:
1	2OCT12		Copy of Grading Plan and Detail Sheet
1	2OCT12		Copy of Conditions of Approval

- | | | |
|--|---|--|
| ☐ For your approval | ☐ Reviewed as submitted | ☐ Resubmit ____ copies for approval |
| ☐ For your use | ☐ Reviewed as noted | ☐ Submit ____ copies for distribution |
| ☐ As requested | ☐ Returned for correction | ☐ Return ____ corrected prints |
| ☒ For review and comment | ☐ Prints returned after loan to us | ☐ For bids due by: _____ |
| ☐ Other: _____ | | |

Remarks:	
Received by:	Date:

Distribution:	Fax:	Date:	Initial:	Signed by:
_____	000-000-0000	00 Mon 00	_____	_____
_____	_____	_____	_____	Name: Jennifer Nuesca
_____	_____	_____	_____	Title: Civil EIT
_____	_____	_____	_____	Last printed: 2-Oct-12 12:38 PM
☐ Mail	☐ Please reply	Reviewed By: _____		
☐ Deliver	☒ No Reply Necessary Unless Exception Taken	☒ Project Files ☐ H.R.M. Files		
☒ Fax/Email		☐ Account Files ☐ Other: _____		

Copyright © 2003 CivilWorks, Inc. X:\2012 Projects\106112015.00 1450SURFACE PARKING LOT @ 1450 Center Crossing\15 - Transmittals

CivilWorks Inc
Engineering with "sensible" solutions tailored to your "specific" needs.

4945 W. Patrick Lane Las Vegas, NV 89118
Office: (702) 534-7555 Fax: (702) 534-1825

TECHNICAL DRAINAGE STUDY FOR 1450 SURFACE PARKING LOT AT 1450 CENTER CROSSING ROAD

Project No. 106112015.00

August 2012

Prepared for:

TKC Design, PC
9225 W. Flamingo Road, Suite #100
Las Vegas, NV 89147
Contact: John Darin
PHONE: (702) 228-9551

Prepared by:

CivilWorksInc
Engineering with "sensible" solutions tailored to your "specific" needs.

4945 W. Patrick Lane Las Vegas, NV 89118
Office: (702) 534-7555 Fax: (702) 534-1825

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: SURFACE PARKING LOT Date: 22-AUG-2012

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

East/West: COVINGTON CROSS

b) Section: 20 Township: 30S Range: 60E

c) APN : 138-30-113-018

Name of Owner: 1451 CENTER CROSSING DRIVE LLC

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

Address: 1451 CENTER CROSSING DRIVE LAS VEGAS, NV 89144

Contact Person-Name: Jennifer Nuesca Telephone No.: 702-534-1827

* E-Mail Address: jkn@civilworksonline.com Fax No.: 702-534-1825

Firm: CivilWorks, Inc.

Address: 4945 W Patrick Lane, Las Vegas, NV 89118

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 26.5 Being Developed/Disturbed: 2.5-ac

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

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

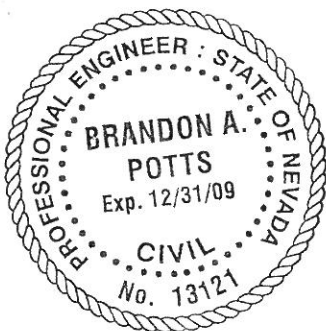
4. Proposed type of development (Residential, Commercial, Etc.): Commercial

5. Approximate upstream land area which drains to the subject site: 2.2-ac.

6. Has the site drainage been evaluated in the past? ☐ YES ☒ NO If yes, please identify documentation: _____

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: NEC OF SITE, INTO EXISTING CONCRETE CHANNEL (REGIONAL FACILITY APSP 0069)

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



Engineer's Seal

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

*New Required Field

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

	Revision	Date

Local Entity File No. _____

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.)
	✓	Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions.
✓		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	
✓		(1) 24" X 36" copy of the Grading Plan, (including all Detail Sheets) sealed by the engineer.
✓		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.
✓		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.
	N/A	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.
✓		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.
✓		Back of lot elevations and lot drainage pattern for all lots including common lots.
	✓	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.
✓		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.
	N/A	Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
	N/A	Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
	N/A	Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
	N/A	The limits of the flood zones and the base flood elevations (BFE) must be shown on all grading plans for all developments within a Special Flood Hazard Zone A, AO, AE, etc.
	N/A	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.
	N/A	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: <u>SURFACE PARKING LOT</u>		Map ID:	
Firm Name: <u>CIVILWORKS</u>		Engineer: <u>BRANDON POTTS</u>	
Address: <u>4945 W. PATRICK LANE</u>			
City: <u>LAS VEGAS</u>		State: <u>NV</u>	Zip: <u>89118</u>
Phone Number: <u>702-534-1827</u>		Fax Number: <u>702-534-1825</u>	
Property Owner: <u>1451 CENTER CROSSING DRIVE LLC</u>			
Address: <u>1451 CENTER CROSSING DRIVE</u>			
City: <u>LAS VEGAS</u>		State: <u>NV</u>	Zip: <u>89144</u>
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
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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. |
| ☒ | ☐ | Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs. |
| ☒ | ☐ | On-site drainage basin maps for existing 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. |

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	
☒	☐	Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.
☐	☒	Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
☐	☒	Proposed typical street sections.
☐	☒	Streets with off-set crowns.
☒	☐	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
☒	☐	Property lines.
☐	☒	Right-of-way lines and widths, existing and proposed.
☒	☐	Existing improvements and their elevations.
☒	☐	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
☒	☐	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
☒	☐	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
☒	☐	Location and cross-section of street capacity calculations.
☒	☐	Cross-sectional detail for channels, including cutoff wall locations.
☒	☐	Existing and proposed drainage facilities, appurtenances, and connections (i.e., 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.
☐	☒	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
☐	☒	Location and detail of existing, proposed, and future block wall openings. Minimum size is 16" x 48". Wrought iron gate is required for flows > 10 cfs.
☐	☒	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

- ☒ N/A 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.
- ☒ N/A Building and/or lot numbers.
- ☒ Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
- ☒ N/A Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.
- ☒ 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 stormwater flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where applicable.
- ☒ Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
- ☒ On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes No

- | | |
|---|---|
| <p>_____ <u>N/A</u></p> <p>☒ _____</p> <p>_____ <u>N/A</u></p> <p>_____ <u>N/A</u></p> <p>_____ <u>N/A</u></p> <p>_____ <u>N/A</u></p> <p>_____ <u>N/A</u></p> <p>_____ <u>N/A</u></p> <p>_____ <u>N/A</u></p> <p>☒ _____</p> | <p>Flow split calculations and supporting documentation or reference for the method of flow split calculations used.</p> <p>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. $Q_{100} \text{ d x v} \leq 8$. $Q_{10} \text{ d x v} \leq 6$ and 12 foot dry lane for rights-of-way ≥ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.</p> <p>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.</p> <p>Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)</p> <p>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.</p> <p>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.</p> <p>A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones.</p> <ul style="list-style-type: none"> • 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. <p>Provide a 50 percent clogging factor in the capacity calculation for drop inlets.</p> <p>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.</p> <p>The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.</p> |
|---|---|

REFERENCE:

STANDARD FORM 2

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1.0 INTRODUCTION AND PURPOSE

1.1 Scope

This report has been prepared as the Technical Drainage Study for 1450 Surface Parking Lot. The purpose of this report is to provide detailed hydrologic and hydraulic analysis for the proposed development. This report will address the existing and proposed conditions of the project site. The criterion set forth in the Clark County Regional Flood Control District's (CCRFC) Hydrologic Criteria and Drainage Design Manual (HCDDM) has been used as the technical basis for this study.

1.2 Location

The commercial development is located within a portion of Section 30, Township 20 South, Range 60 East, M.D.M., Clark County, Nevada. The property is located at 1450 Center Crossing Road, just west of Town Center Drive. Please refer to Figure 5: *Vicinity Map*, in Appendix A. The Assessors Parcel Number for this site is 138-30-113-018. Please see Figure 1 in Appendix A, for the Assessor's Parcel Map with the project site delineated.

1.3 Description of Project

The total subject site encompasses a +/- 26.5-acre area. The total disturbed area for the scope of work is only 2.5-acres. The site is bounded by Summerlin Parkway to the north, commercial business to the east, vacant lot to the west, and Center Crossing Road to the south. Center Crossing Road is not a public right-of-way.

1.4 Master Planning Information

The subject site is located in the Las Vegas Master-Planned Community of Summerlin within Clark County. The Clark County Regional Flood Control District's 2008 Las Vegas Valley Flood Control Master Plan Update (2008 CCRFC MP) has been used to model storm flows upstream from the project site. See Figure 2 (H-25 from the Update) and Figures 3 & 4 (F-25 and its corresponding inventory sheet from the Update) located in Appendix A. There is an existing Regional Facility located to the north of the subject site. The existing drainage channel (APSP 0069) is a 10'W x 6'D concrete channel with 2:1 side slopes and conveys 1697-cfs. The subject site currently drains into the channel via surface flow.

1.5 Floodplain Information

The subject site is located within Zone "X", as shown on F.I.R.M. Community-Panel Number 32003C2150E, revised to reflect LOMR effective September 27, 2002. Zone "X" is defined as "areas determined to be outside the 0.2% annual chance

floodplain”. See Figure 3 in Appendix A for the F.I.R.M Panel with the project site delineated.

1.6 Previous Drainage Studies

No known drainage studies for the existing site.

1.7 Compliance with Regulations and Adopted Plans

This study was prepared to conform with Clark County Flood Control policies, FEMA Regulations and Policies, Clark County Regional Flood Control District’s 2002 Las Vegas Valley Flood control Master Plan Update and the CCRFCD Hydrologic Criteria and Drainage Design Manual, adopted August 12, 1999.

2.0 **DRAINAGE BASIN DESCRIPTION**

2.1 **Existing On-site Drainage Description**

The historical drainage pattern for the subject site is generally from west to east. There is an existing low point located at the northeast corner of the site that discharges into an existing Regional Facility (APSP 0069 – Concrete Trapezoidal Channel) via surface flow. Please see Figure 8: Existing Conditions Basin Map in Appendix A.

2.2 **Interim On-site Drainage Description**

In the Interim Condition, it is assumed that the on-site basin will be fully developed as a parking lot while the off-site basin contributing runoff to the site remains undeveloped. The on-site flow patterns and discharge point will be maintained. A 10' concrete flume is proposed at the northeast corner of the site. The flume will convey the runoff collected at the low point and tie into the existing concrete channel to the north of the site. The 10-year and 100-year Existing, Interim and Future Condition flows are shown in Table 1 below. Please refer to Figure 9: Interim Conditions Basin Map in Appendix A.

TABLE 1

FLOW SUMMARY			
CONDITION	BASIN	Q10 (cfs)	Q100 (cfs)
EXISTING	EON1	0	1
EXISTING	EOFF1	0	1
EXISTING	STRT1	3	6
INTERIM	PON1	5	9
INTERIM	EOFF1	0	1
INTERIM	STRT1	3	6
FUTURE	PON1	5	9
FUTURE	POFF1	22	40
FUTURE	STRT1	3	6

2.3 **Existing Off-site Drainage Description**

The existing off-site flows currently enter the subject site via surface flow from the west. Most of the runoff discharges at an existing low point at the northeast corner of the site. Approximately 2.2-acres were accounted for in the contribution of off-site flow impacting the subject site. The rest was assumed to surface flow directly north into the existing concrete channel. Please refer to Figure 8: Existing Conditions Basin Map.

2.4 Interim Off-site Drainage Description

No changes to the off-site drainage conditions are proposed at this time. During the Interim Condition, it is assumed that the off-site basin is still undeveloped. Only a portion of the off-site flows will enter and discharge through the site. Please refer to Figure 9: Interim Conditions Basin Map.

2.5 Future Off-site Drainage Description

The worst case scenario was based on the Future Condition. In the Future Condition, it is assumed the entire off-site will be developed as a parking lot (Curve Number of 98) and all runoff generated by this area will discharge through the on-site parking lot. The Future Condition hydrologic calculations and hydraulic modeling was used as the basis for design of the on-site drainage facilities. Note that the design of the proposed 10' concrete flume was based on the Future Conditions. Please refer to Figure 10: Future Conditions Basin Map.

3.0 PROPOSED DRAINAGE FACILITIES

3.1 Proposed On-site Drainage Facilities

It is proposed to maintain the existing flow pattern and discharge point. A 10' concrete flume is proposed at the existing low point located at the northeast corner of the site. The flume is designed to accept all the on-site and off-site flow during the Future Condition (worst case scenario). Please refer to Figure 10: Future Conditions Basin Map.

3.2 Proposed Off-site Drainage Facilities

The proposed 10' concrete flume will be installed to match into the existing concrete channel to the north of the site.

4.0 HYDROLOGIC ANALYSIS

The U.S. Army Corps of Engineers HEC-1 flood hydrograph package was used to determine the peak runoff generated by the 100-year, 6-hour storm event. The HEC-1 computer model has the ability to simulate the surface runoff response of a given basin and smaller sub-basins to rainfall. The computed hydrographs from each sub-basin are then combined at the appropriate locations, from which a final discharge hydrograph is obtained.

4.1 Precipitation

The project site was determined to lie outside the McCarran Airport Rainfall Area. The rainfall depths for the 6-hour, 10-year and 100-year storm events were obtained per the CCRFCD Hydrologic Criteria and Drainage Design Manual (1999), Section 500. The adjusted 6-hour Depth-Duration-Frequency Values for the site are 1.74-in. and 3.07-in. for the 10- and 100-year storm events, respectively. Since the site encompasses less than 8-square miles, a Storm Distribution Number Three (SDN #3) was used for the HEC-1 model. HEC-1 parameters are included in the Appendix B.

4.2 Hydrologic Abstractions

The SCS curve number method was used to determine the infiltration rates for the drainage basins. The soil groups for the existing project site lie inside the SCS Soil Survey of the Las Vegas Valley. The soils are primarily within Hydrologic Group A. This information is based on Figure H-25 of the 2008 MPU (Figure 2 in Appendix A) and is confirmed by the National Resources Conservation Service “Web soil Survey 2.0”. Information referenced from NRCS has also been included in Appendix A (see Figure 7). Runoff curve numbers have been highlighted on Table 606 (Pages 1-4) and Table 606A of the HCDDM (see Appendix B).

4.3 Basin Area

Basin areas for the on-site drainage basins were determined using AutoCad. Note that lag times have been adjusted to result in a minimum time of concentration of five minutes ($T_{lag}=0.050$), per Section 602 and 602.1 of the Drainage Design Manual. The HEC-1 parameter calculations are located in the Appendix B of this study.

4.4 SCS Lag-Time with Time of Concentration

Lag-time, T_{lag} , is defined as the time measured from the centroid of effective rainfall to the peak of the outflow hydrograph. It is a measure of the watershed’s response time and is related to basin length, slope, roughness characteristics, and land use. Lag-times for this study were estimated by calculating the drainage basin’s time of concentration, T_C . The time of concentration consists of two component times; the

initial overland flow time, t_i , and the gutter or channel flow time, t_t . The equation for the time of concentration is: $T_C = t_i + t_t$. The equation for lag-time is: $T_L = 0.6T_C$

5.0 HYDRAULIC ANALYSIS

5.1 Street Hydraulics

Hydraulic calculations show that the proposed driveway hump has been adequately set (please see Table 2). Hydraulic calculations have been provided on the FlowMaster reports in Appendix C.

TABLE 2

DRIVEWAY HYDRAULIC SUMMARY				
ALL CONDITIONS	DEPTH	WSE	WSE + D	DRIVE AC
10-YEAR	0.15'	2802.93'	2803.08'	2803.28
100-YEAR	0.20'	2802.98	2803.18'	2803.28'

6.0 **CONCLUSIONS AND RECOMMENDATIONS**

The project site is located at 1450 Center Crossing Road. Improvements include: a parking lot, curb and gutter, driveway and concrete flume.

The project site is located within Flood Zone X. Zone X is defined by FEMA as “areas determined to be outside the 0.2% annual chance floodplain”. Map number 32003C2150E, effective September 27, 2002.

Hydraulic calculations show that the proposed driveway is adequately set to prevent offsite flows from Center Crossing Road to enter the site.

The development of this site is in compliance with the CCRFCD Flood Control Master Plan Update, and the drainage design criteria set forth in the Hydrologic Criteria & Drainage Design Manual.

7.0 **REFERENCES**

1. Clark County Regional Flood Control District, "Hydrologic Criteria & Drainage Design Manual", August 1999.
2. Federal Emergency Management Agency "Flood Insurance Rate Map Clark County, Nevada and Incorporated Areas Map Number 32003C2150E," dated September 27, 2002.
3. National Resources Conservation Service "Web soil Survey 2.0"

APPENDIX

FIGURES

Figure 1: Assessor's Parcel Map

Figure 2: 2008 MPU Hydrologic Map

Figure 3: 2008 MPU Facility Map

Figure 4: 2008 MPU Facility Table

Figure 5: Vicinity Map

Figure 6: F.I.R.M.

Figure 7: Soils Map

Figure 8: Existing Conditions Basin Map

Figure 9: Interim Conditions Basin Map

Figure 10: Future Conditions Basin Map

NOTES

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

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

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

MAP LEGEND

PARCEL BOUNDARY

SUB BOUNDARY

PM/LD BOUNDARY

ROAD EASEMENT

MATCH / LEADER LINE

HISTORIC LOT LINE

HISTORIC SUB BOUNDARY

HISTORIC PM/LD BOUNDARY

SECTION LINE

CONDOMINIUM UNIT

AIR SPACE PCL

RIGHT OF WAY PCL

SUB-SURFACE PCL

001 ROAD PARCEL NUMBER

001 PARCEL NUMBER

1.00 ACREAGE

202 PARCEL SUB/SEQ NUMBER

PB 24-45 PLAT RECORDING NUMBER

5 BLOCK NUMBER

5 LOT NUMBER

GL5 GOV. LOT NUMBER

BOOK T20S R60E

SEC 30

MAP N 2 NW 4

138-30-1

127 126 125 124

136 137 138 139

165 164 163 162

6 5 4 3 2 1

7 8 9 10 11 12

18 17 16 15 14 13

19 20 21 22 23 24

30 29 28 27 26 25

31 32 33 34 35 36

8 4 8 4

5 1 5 1

6 2 6 2

7 3 7 3

8 4 8 4

5 1 5 1

CLARK COUNTY

ASSESSOR

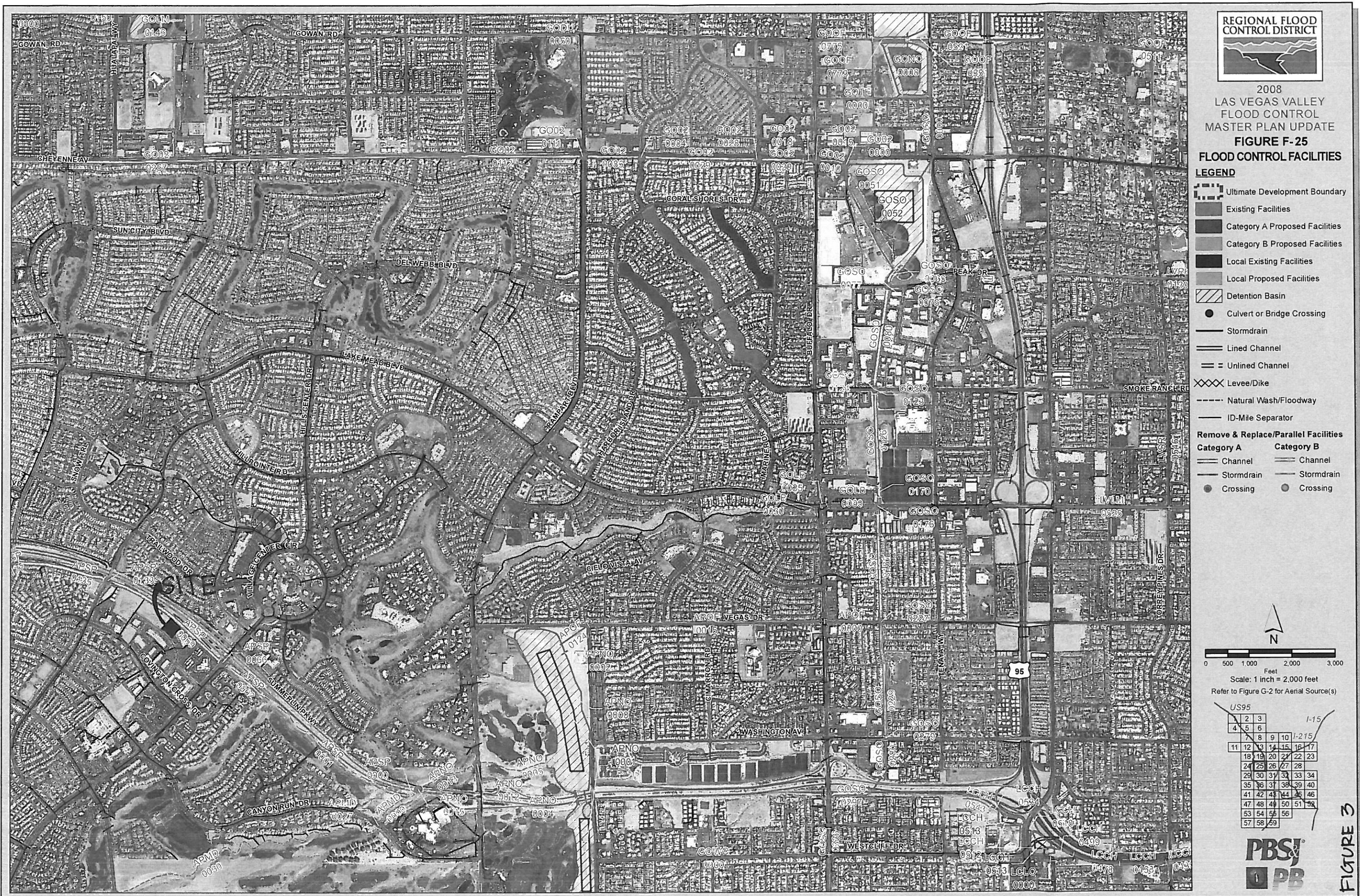
NEVADA

Scale: 1" = 200'

Rev: 02/09/2011

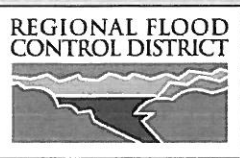
FIGURE 1

TAX DIST 200



ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
APMD 0000	E	ANGEL PARK - MIDDLE BRANCH						
0027	E	Natural Wash	940	6048	C11A-3*	ALLGOW4	11.31	2.90
0030	E	1: 12' X 10' and 2: 12' X 2' RCBC @ Canyon Run	170	6048	C11A-3*	ALLGOW4	11.31	3.00
0132	E	Natural Wash	7000	6048	C11A-3*	ALLGOW4	11.31	3.00
	E	2: 12'x10' RCBC @ Hualapai	120	6048	C11A-3*	ALLGOW4	11.31	1.00
APNO 0000	E	ANGEL PARK NORTH						
0001	P1	1,400 ac-ft Angel Park Detention Basin		9199	ANGLPKIN	ALLGOW5	21.99	
0002	E	Upgrade to 1,512 ac-ft Angel Park Detention Basin		9199	ANGLPKIN	ALLGOW5	21.99	
0004	E	2: 33" & 1: 42" RCP Emergency Outlet	190	406	ANGLPKDB	ALLGOW5	21.99	
0005	E	14' X 12' RCB Connector Pipe under Summerlin Pkwy	380	9199	ANGLPKIN	ALLGOW5	21.99	1.00
0012	E	Natural Wash	1559	7988	CC3B-2B*	GW3SC	7.68	2.00
0013	E	3: 12' X 10' RCBC @ Rampart	232	7988	CC3B-2B*	GW3SC	7.68	1.00
0015	E	Natural Wash	1283	7988	CC3B-2B	GW3SC	7.68	1.40
	E	Two Span Bridge 28' W 14'D @ Summerlin Pkwy	236	7988	CC3B-2B	GW3SC	7.68	1.00
APOF 0000	E	ANGEL PARK OUTFALL						
0015	E	66" RCP	1297	728	CGD34AC	GW3SC	0.65	1.90
0124	E	60" RCP	5472	454	CGD34AB	ALLGOW5	22.25	2.20
	E	54" RCP Outlet	810	406	ANGLPKDB	ALLGOW5	21.99	2.50
APSP 0000	E	ANGEL PARK - SUMMERLIN PARKWAY						
0001	E	Concrete Chute Drop	103	7988	CC3B-2B	GW3SC	7.68	3.00
0002	E	Unlined Chnl with Gabion Drops 20'W Depth Varies 2:1 SS	3924	2746	C3B-2B	ALLGOW3	2.67	3.00
0066	E	Unlined Chnl with Gabion Drops 50'W 3:1 SS	1424	2746	C3B-2B	ALLGOW3	2.67	3.50
	E	5: 8' X 4' RCBC at Town Center Dr	200	1697	C8B-2	ALLGOW3	1.56	2.40
0069	E	Conc Chnl 10'W 6'D 2:1 SS	3195	1697	C8B-2	ALLGOW3	1.56	2.40
0133	E	3: 9'X4' RCBC @ Crestdale	180	1173	C8B-1	ALLGOW3	1.14	2.33
0135	E	Conc Chnl 10'W 6'D 2:1 SS	2030	1173	C8B-1	ALLGOW3	1.14	2.40
GO02 0000	E	GOWAN SOUTH FACILITIES (CHEYENNE CHANNEL)						
0010	E	Free Span Bridge 34'W 9.25'D @ Ronemus	100	4978	C16-C	ALLGOW3	7.09	0.50
0015	E	Conc Chnl 30'W 9'D 0:1 SS	600	4978	C16-C	ALLGOW3	7.09	0.50
0018	E	Free Span Bridge 31'W 7.25'D @ Buffalo	102	4978	C16-C	ALLGOW3	7.09	1.40
0020	E	Conc Chnl 30'W 9'D 0:1 SS	250	4978	C16-C	ALLGOW3	7.09	1.50
0028	E	Conc Chnl 10'W 7.25'D 1.5:1 SS	1000	4978	C16-C	ALLGOW3	7.09	1.50
0029	E	Free Span Bridge 35'W 7'D @ Soft Breezes	72	4800	CC7-C	ALLGOW3	6.78	2.20
0084	E	Conc Chnl 10'W 7.25'D 1.5:1 SS	2700	4800	CC7-C	ALLGOW3	6.78	1.50
0085	E	Free Span Bridge 35'W 7'D @ Soaring Gulls	95	4657	CCB-C	ALLGOW3	6.07	1.30
0111	E	Conc Chnl 10'W 7.25'D 1.5:1 SS	1240	4657	CCB-C	ALLGOW3	6.07	1.50
0112	E	Free Span Bridge 35'W 7'D @ Rampart	127	4657	CCB-C	ALLGOW3	6.07	2.90
0257	E	Conc Chnl 10'W 7'D 1.5:1 SS	7640	4225	CC-C	ALLGOW3	5.42	2.30
	E	Conc Chnl 10'W 6.75'D 1.5:1 SS	4293	2577	CCJ-C	ALLGOW3	2.97	4.10
GO95 0000	P1	GOWAN OUTFALL - U.S. 95 CHANNEL						
	P1	Conc Chnl 12'W 4'D 2:1 SS	2840	299	GD17BG-C	ALLGOW3	0.36	0.30
GODU 0000	E	GOWAN NORTH - DURANGO BRANCH						
0050	E	12' X 6' RCB	2629	1150	CLV14-C	ALLGOW3	1.40	0.91
	E	9' X 6' RCB	865	835	CLV20-C	ALLGOW3	0.97	1.50
GOLB 0000	E	GOWAN LAKE MEAD-BUFFALO						
0025	E	12' X 6' RCB	1294	1071	CCVILL23	ALLGOW3	1.46	1.50
0030	E	10' X 7' RCB	145	1071	CCVILL23	ALLGOW3	1.46	0.50
	E	2: 8' X 4' RCB	408	1071	CCVILL23	ALLGOW3	1.46	0.85
GOLM 0146	E	GOWAN LONE MOUNTAIN SYSTEM						
	E	888 ac-ft Lone Mountain Detention Basin		7252	LMTNIN	GW3SC	6.13	
GONO 0000	E	GOWAN NORTH SYSTEM						
0001	E	8' X 8' RCB Outlet	184	558	GWNNDB	ALLGOW5	68.49	0.51
0006	E	8' X 8' RCB Outlet	156	558	GWNNDB	ALLGOW5	68.49	0.63
0008	E	30,780 cfs PMF Spillway		30780	GWNNDB	ALLGOW5	68.49	
	E	921 ac-ft Gowan North Detention Basin		4937	CCLV43-C*	GW4SC	11.93	
GOOF 0511	E	GOWAN OUTFALL FACILITIES						
0531	E	8' X 5' RCB	8390	669	CPT6B-C	GW3SC	1.08	0.50
0551	E	8' X 5' RCB	1300	558	GWNNDB	ALLGOW5	68.49	0.50
0773	E	72" RCP	524	558	GWNNDB	ALLGOW5	68.49	0.62
	E	60" RCP	803	286	LV30-C	ALLGOW3	0.42	1.40
	E	60" RCP	1300	286	LV30-C	ALLGOW3	0.42	1.00
GO50 0000	E	GOWAN SOUTH FACILITIES						
0050	E	72" RCP Outlet	2303	454	GWNSDB	GW5SC	12.13	0.53
0051	E	39,030 cfs PMF Spillway		39030	GWNSIN	GW5SC	12.13	
0052	E	624 ac-ft Gowan South Detention Basin		5625	GWNSIN	GW5SC	12.13	
0052	P1	Upgrade to 688 ac-ft Gowan South Detention Basin		5625	GWNSIN	GW5SC	12.13	
0068	E	Conc Chnl 15'W 7'D 2:1 SS	380	3796	CBUF01-C	GW3SC	4.88	0.40
0076	E	2: 10' X 7' RCBC @ Peak Dr	80	2119^	CBUF01-C^	GW3SC	4.88	0.56
0077	P0	Add 2: 14' X 7' RCBC @ Peak Dr	80	1677^	CBUF01-C^	GW3SC	4.88	0.56
0078	E	Conc Chnl 22'W 10'D 0:1 SS	60	3796	CBUF01-C	GW3SC	4.88	0.56
0080	E	Conc Chnl 12'W 7'D 2:1 SS	2078	3796	CBUF01-C	GW3SC	4.88	0.56
0119	E	Conc Chnl 22'W 10'D 0:1 SS	180	3587	CCCIL23	GW3SC	4.52	0.95
0123	E	2: 10' X 7' RCBC @ Smoke Ranch	100	2229^	CCCIL23^	GW3SC	4.52	0.62
0124	P0	Add 2: 10' X 7' RCBC @ Smoke Ranch	100	1358^	CCCIL23^	GW3SC	4.52	0.62
0125	E	Conc Chnl 22'W 9'D 0:1 SS	50	3587	CCCIL23	GW3SC	4.52	0.62
0126	E	Conc Chnl 12'W 7'D 2:1 SS	2155	3587	CCCIL23	GW3SC	4.52	0.62
0170	E	Conc Chnl 12'W 7'D 2:1 SS	220	2657	CCGD34AC	GW3SC	3.06	0.62
0173	E	Conc Chnl 22'W 7'D 0:1 SS	158	2657	CCGD34AC	GW3SC	3.06	0.62
0176	E	2: 10' X 7' RCBC @ Lake Mead	100	2657	CCGD34AC	GW3SC	3.06	0.62
0178	E	Conc Chnl 22'W 7'D 2:1 SS	150	2657	CCGD34AC	GW3SC	3.06	1.00
0181	E	Conc Chnl 12'W 7'D 2:1 SS	2429	2657	CCGD34AC	GW3SC	3.06	0.58
0227	E	2: 10' X 7' RCBC @ Vegas Drive	100	2065	CGD34AA	ALLGOW3	2.41	1.36
0229	E	Conc Chnl 12'W 7'D 1:1 SS	2649	2065	CGD34AA	ALLGOW3	2.41	1.36
0279	E	12' X 7' RCB	80	2065	CGD34AA	ALLGOW3	2.41	1.36
0280	E	12' X 8' RCB	875	2065	CGD34AA	ALLGOW3	2.41	0.34
0297	E	12' X 7' RCB	2124	1825	CW1BB-C	ALLGOW3	2.14	1.60
0336	E	12' X 7' RCB	602	1593	C1-WESTC	ALLGOW3	1.84	3.40
0352	E	2: 8' X 5' RCB	2740	1374	C1-DUCHC	ALLGOW3	1.60	0.73
GOTE 0000	E	GOWAN - TENAYA BRANCH						
	E	60" RCP	1954	272	LV29-C	ALLGOW3	0.28	1.30
GOWC 0000	E	GOWAN SOUTH FACILITIES - WEST CLIFF						
	E	24" RCP	5400	257	1-WEST-C	ALLGOW3	0.24	1.67
LCCH 0438	E	LAS VEGAS CREEK CHANNEL						
0458	E	60" RCP	1090	162	CLC01-C	SW3	1.20	1.60
0478	E	60" RCP	1060	162	CLC01-C	SW3	1.20	1.60
0499	E	60" RCP	1110	162	CLC01-C	SW3	1.20	0.55
0512	E	42" RCP Outlet	660	85	RAINBWB	SW3	1.11	1.88
0513	E	45 ac-ft Rainbow Detention Basin		970	RAINBWIN	SW3	1.11	
0518	P3	Upgrade to 102 ac-ft Rainbow Detention Basin		970	RAINBWIN	SW3	1.11	
0534	E	60" RCP Connector Pipe Under Rainbow Blvd	670	970	RAINBWIN	SW3	1.11	1.85
0543	E	60" RCP	460	279	AL00A-C	SW3	0.23	5.38
0543	E	Conc Chnl 10'W 4'D 0:1 SS	700	279	AL00A-C	SW3	0.23	1.88
LCLO 0000	P3	LAS VEGAS CREEK - LORENZI						
0008	P3	7' X 6' RCB	445	265	DAL00A	SW3	0.41	3.37
	P3	7' X 6' RCB	2415	265	DAL00A	SW3	0.41	0.40
LVLM 0475	E	LAS VEGAS WASH - LAKE MEAD						
0525	E	48" RCP	2632	235	LM02-C	NW3	0.29	1.24
	E	48" RCP	2600	542	CLM01-C	NW3	0.64	1.24
LVOW 0460	P1	OWENS AVENUE SYSTEM						
	P1	7' X 6' RCB	2700	616	CVG03-C	NW3	0.95	1.48
LVPK 0130	E	PEAK DRIVE SYSTEM						
	E	7' X 5' RCB	1435	400	CPD01-C	NW3	0.67	0.61
LVSR 0496	P1	LAS VEGAS WASH - SMOKE RANCH						
0546	P1	10' X 7' RCB	2855	1245	CSR02E	NW3	1.64	1.27
	P1	8' X 8' RCB	2640	758	CSR00A	NW3	1.01	0.57

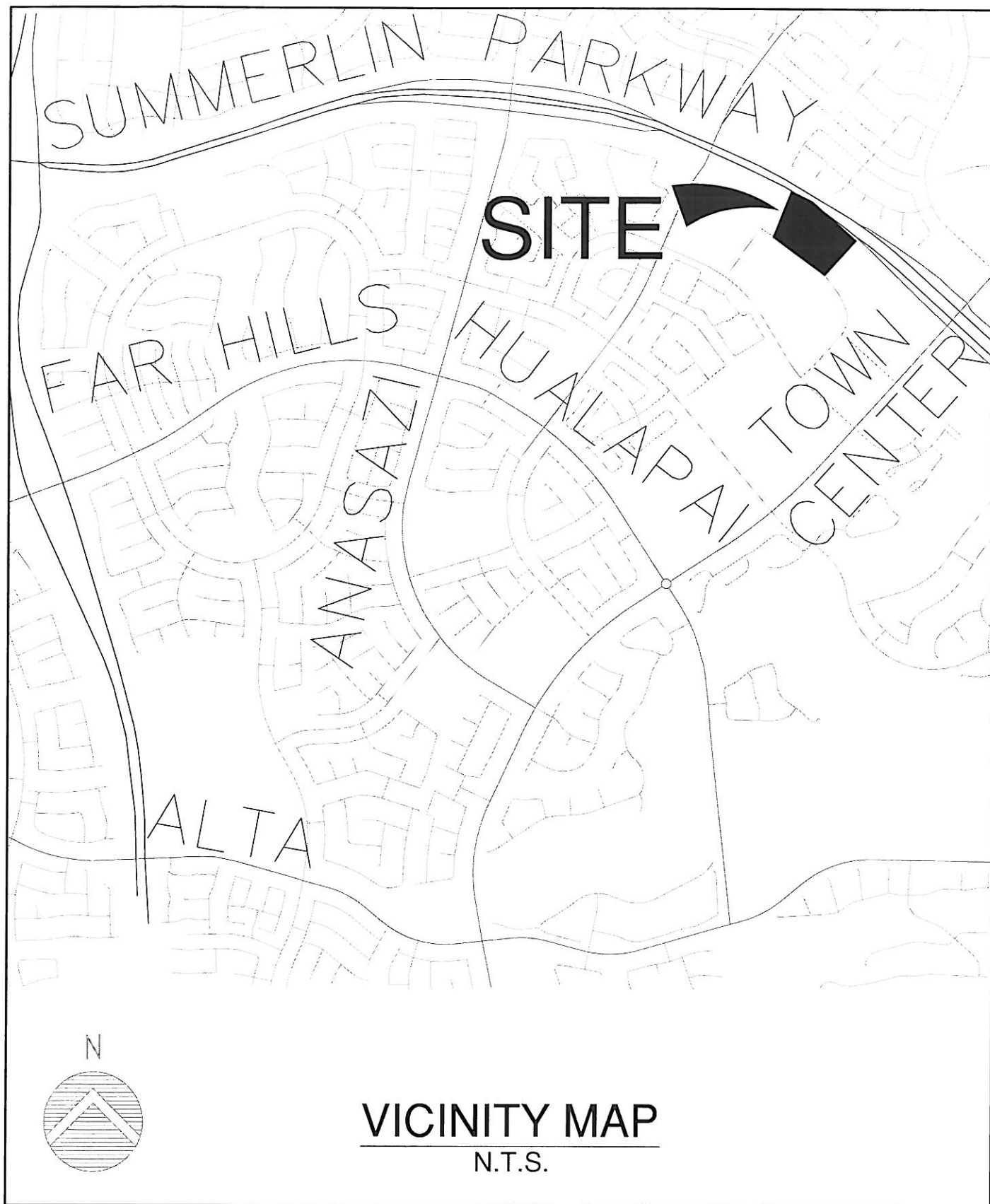
* The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.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



2008 LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FACILITY INVENTORY
FIGURE F - 25

LEGEND	ID (Facility Identifier)	AABB	Existing Facility	E	Bottom Width	W	Cast in Place Concrete Pipe	CIPCP	Reinforced Concrete Arch Culvert	RCAC
	Parent Stream Name		Proposed or Modified Facility	P	Depth	D	Corrugated Metal Arch Pipe Culvert	CMAP	Reinforced Concrete Box Culvert	RCB
	Stream Name		Contingency Level		Side Slope, H:V	SS	Corrugated Metal Pipe Culvert	CMPC	Reinforced Concrete Pipe Culvert	RCPC
	River Mile	0000	Category B	P0			High Density Polyethylene	HDPE	Reinforced Concrete Storm Sewer Pipe	SSP
	Distance Above Confluence with Parent Stream (Miles)		Master Plan	P1			Horizontal Elliptical Reinforced Concrete Pipe	HERCP		
	Miles in Hundredths		Preliminary Design	P2						
			Design	P3						



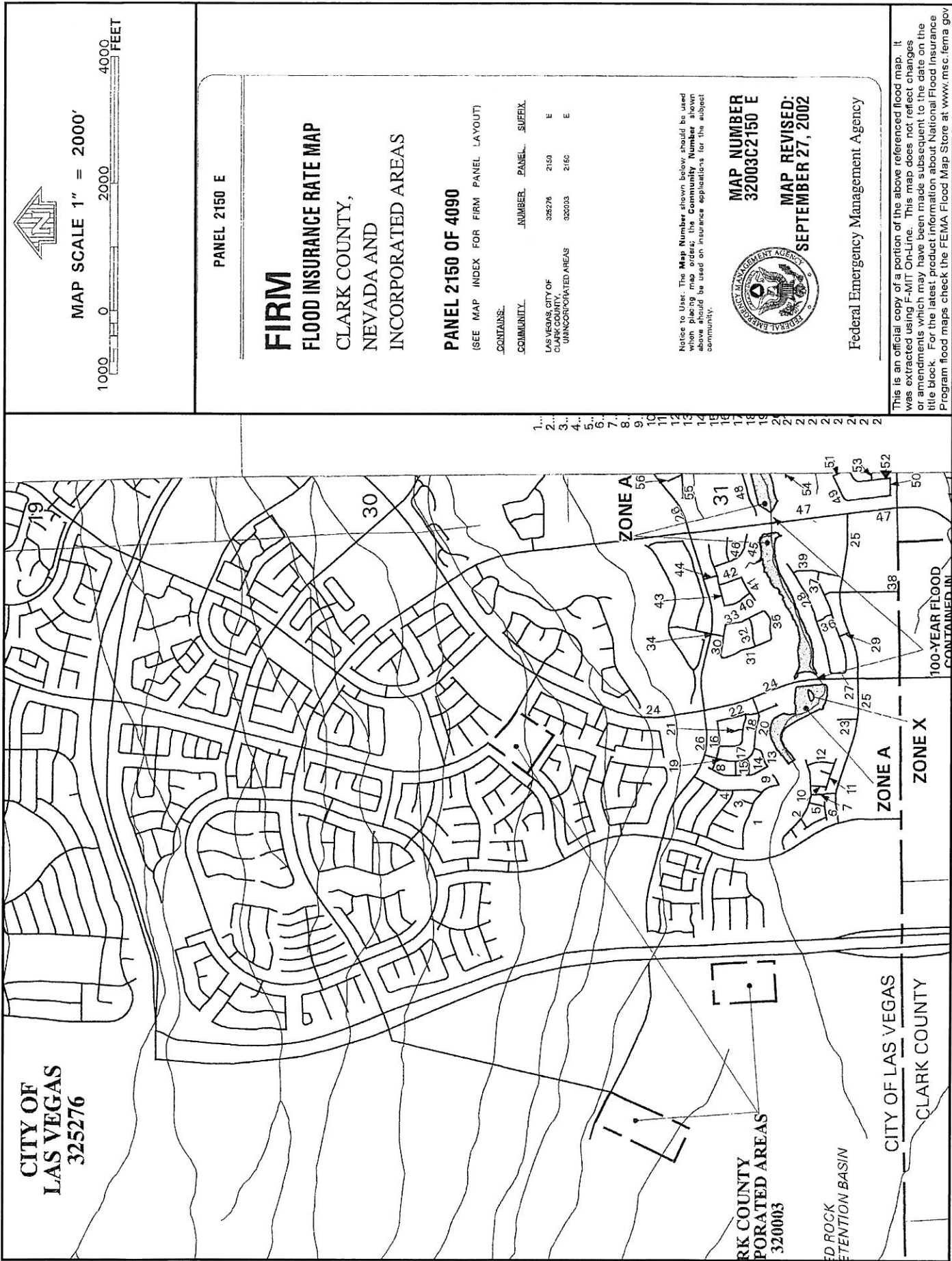


FIGURE 6

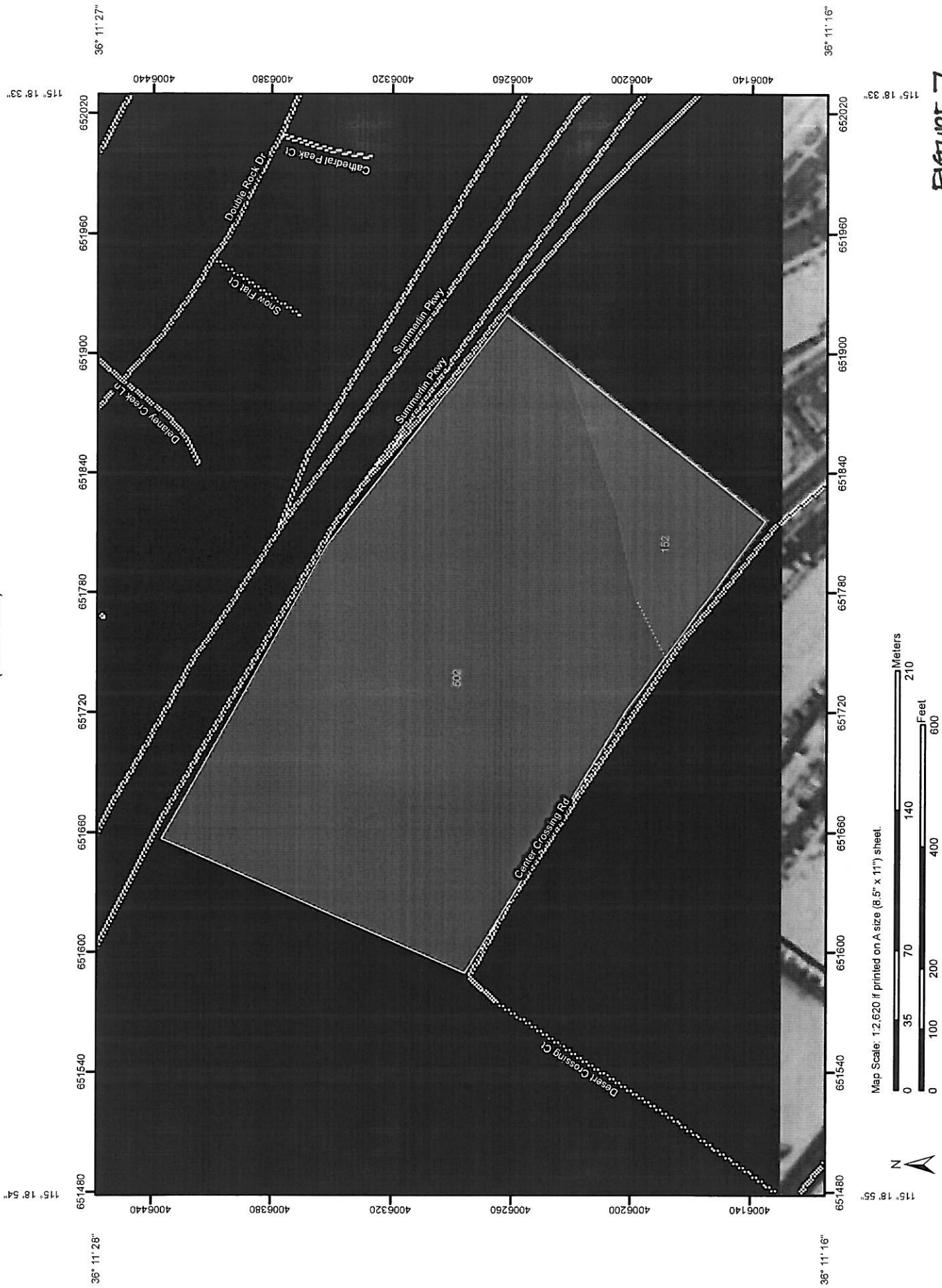


FIGURE 7

MAP LEGEND

	Area of Interest (AOI)
	Area of Interest (AOI)
	Soils
	Soil Map Units
Soil Ratings	
	A
	A/D
	B
	B/D
	C
	C/D
	D
	Not rated or not available
Political Features	
	Cities
Water Features	
	Streams and Canals
Transportation	
	Rails
	Interstate Highways
	US Routes
	Major Roads
	Local Roads

MAP INFORMATION

Map Scale: 1:2,620 if printed on A size (8.5" x 11") sheet.
The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: UTM Zone 11N NAD83

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

Soil Survey Area: Las Vegas Valley Area, Nevada, Part of Clark County
Survey Area Data: Version 8, Apr 6, 2012

Date(s) aerial images were photographed: 5/26/2006

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Las Vegas Valley Area, Nevada, Part of Clark County (NV788)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
152	Cave gravelly fine sandy loam, 0 to 4 percent slopes	D	1.4	11.6%
502	Canutio-Cave gravelly fine sandy loams, 2 to 8 percent slopes	A	10.8	88.4%
Totals for Area of Interest			12.2	100.0%

Description

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

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

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

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

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

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

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition



Component Percent Cutoff: None Specified

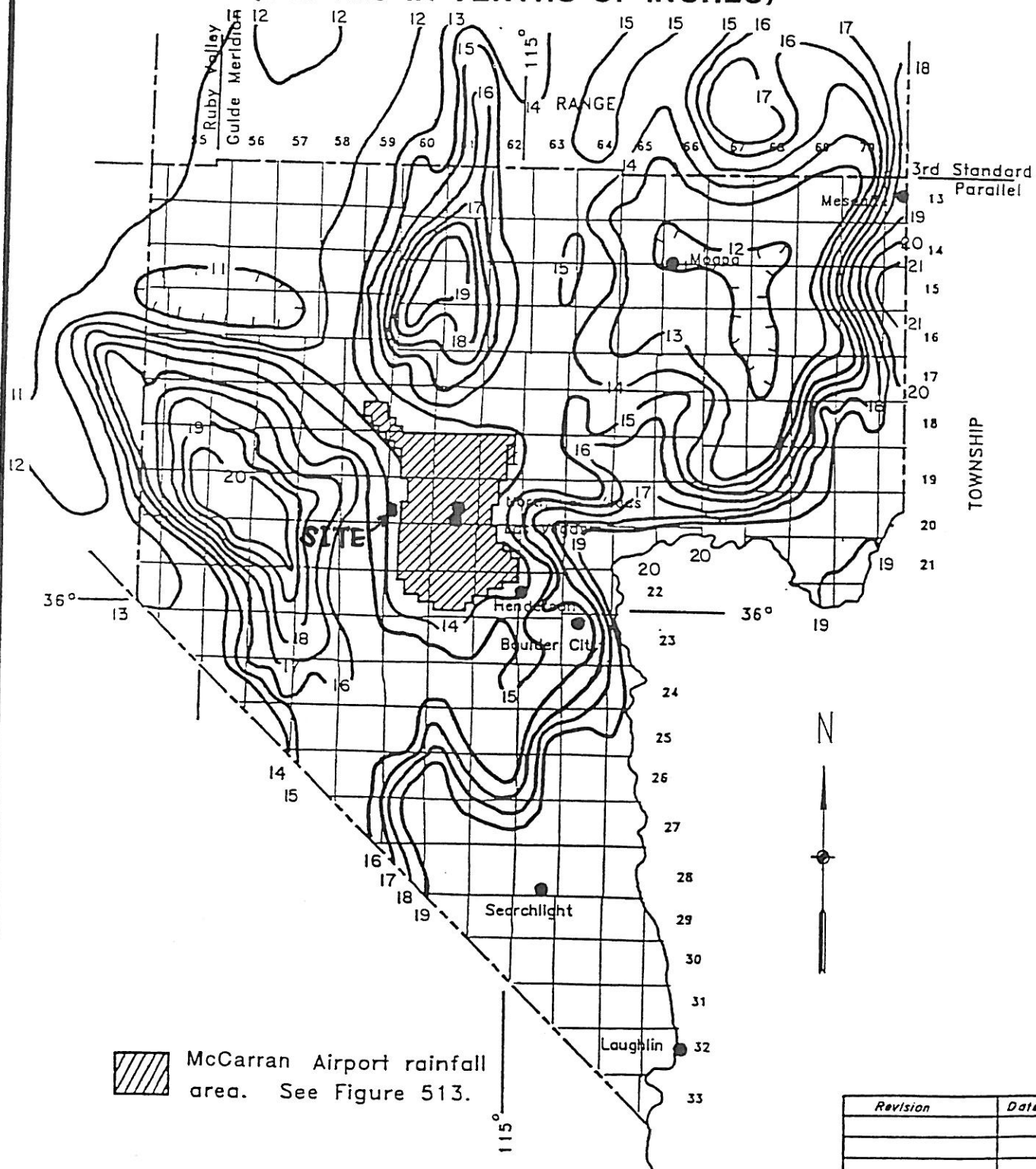
Tie-break Rule: Higher

HYDROLOGIC PARAMETERS

**Rainfall Data
Curve Numbers
Standard Form 4
HEC-1 Analyses**

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RAINFALL DEPTH-DURATION-FREQUENCY 10-YEAR, 6-HOUR (DEPTHS IN TENTHS OF INCHES)

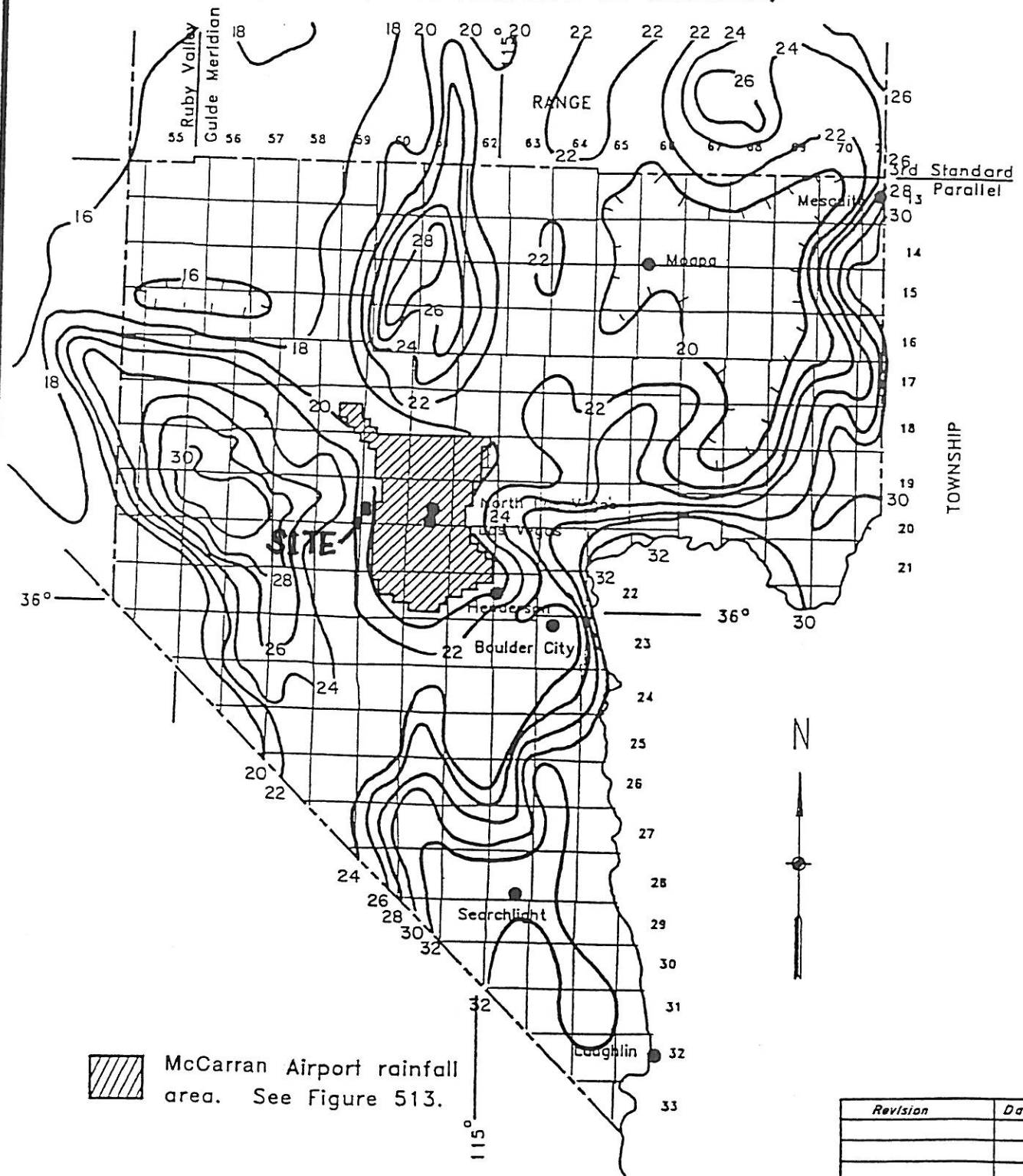


McCarren Airport rainfall area. See Figure 513.

Revision	Date

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RAINFALL DEPTH-DURATION-FREQUENCY 100-YEAR, 6-HOUR (DEPTHS IN TENTHS OF INCHES)



PRECIPITATION ADJUSTMENT RATIOS

<u>Recurrence Interval</u>	<u>Ratio to NOAA Atlas 2</u>
2-year	1.00
5-year	1.16
→ 10-year	1.24 ←
25-year	1.33
50-year	1.39
→ 100-year	1.43 ←

- NOTE:
1. Multiply the values obtained from the NOAA Atlas 2 by the above ratios to obtain the adjusted precipitation values.
 2. NOAA Atlas 2 values for use with TR-55 shall not be adjusted by the above ratios.
 3. Tables 505 and 506 require no adjustments.

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX-HOUR STORM DISTRIBUTIONS

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

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

Revision	Date

REFERENCE:

TABLE 503

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 $I_A = 0.2S$.
- 2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system. Impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figure 603.
- 3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
- 4 Composite CN's for natural desert landscaping should be computed using Figure 603 based on the impervious area percentage (CN #98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.
- 5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using Figure 603 based on the degree of development impervious area percentage) and the CN's for the newly graded pervious areas.

Revision	Date

WRC
ENGINEERING

REFERENCE:

SCS TR-55, USDA, June 1986.

TABLE 602
1 of 4

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RUNOFF CURVE NUMBERS (SEMIARID RANGELANDS¹)

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

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

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

Fair: 30 to 70% ground cover.

Good: >70% ground cover.

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

Revision	Date

**WRC
ENGINEERING**

REFERENCE:

SCS TR-55, USDA, June 1986.

**TABLE 602
4 of 4**

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

DEVELOPMENT : SURFACE PARKING LOT														DATE : 08/21/12							
PROJECT # : 10612015.00																					
FILE : STDFRM4.XLS																					
Sub-Basin Data				Initial/Overland Time (T _i)				Travel Time (T _t)				T _c		T _c Check (Urbanized Basins)		Final T _c		T _{lag}		Remarks	
DESIG	CN	K	AREA (acres)	AREA (mi ²)	LENGTH (ft)	SLOPE (%)	T _i (min)	LENGTH (ft)	SLOPE (%)	V ₁ (fps)	V ₂ (fps)	T _t (min)	T _c = T _i + T _t (min)	TOTAL (ft)	T _c (min)	T _c (min)	T _c (min)	T _{lag} (hrs)			
EXISTING CONDITIONS																					
EON1	63	0.442	2.5	0.0039	433	6.0	13.6	155	1.3	1.69	N/A	1.5	15.1	N/A	N/A	15.1				Existing	
EOFF1	63	0.442	2.2	0.0035	82	2.6	7.8	260	1.4	1.75	N/A	2.5	10.3	N/A	N/A	10.3				Existing	
STR1	98	0.904	1.6	0.0025	20	2.0	1.3	1500	1.9	2.78	4.22	6.9	8.2	1520.0	18.4	8.2				Developed	
INTERIM CONDITIONS																					
PON1	98	0.904	2.5	0.0039	433	2.8	5.2	305	0.5	1.43	N/A	3.6	8.8	738.0	14.1	8.8				Developed	
EOFF1	63	0.442	2.2	0.0035	82	2.6	7.8	260	1.4	1.75	N/A	2.5	10.3	N/A	N/A	10.3				Existing	
STR1	98	0.904	1.6	0.0025	20	2.0	1.3	1500	1.9	2.78	4.22	6.9	8.2	1520.0	18.4	8.2				Developed	
FUTURE CONDITIONS																					
PON1	98	0.904	2.5	0.0039	433	2.8	5.2	305	0.5	1.43	N/A	3.6	8.8	738.0	14.1	8.8				Developed	
POFF1	98	0.904	10.4	0.0163	175	2.6	3.4	870	3.0	3.50	5.30	3.5	6.9	1045.0	15.8	6.9				Developed	
STR1	98	0.904	1.6	0.0025	20	2.0	1.3	1500	1.9	2.78	4.22	6.9	8.2	1520.0	18.4	8.2				Developed	

Travel Time Velocity Formulas		All basins over one square mile are calculated by the equation $T_{lag} = 20Kn(L^*L_c/S^{0.5})^{0.33}$ and denoted by shaded gray (See Worksheet).	
Existing	Developed		
$V_1 = 14.8*(S/100)^{1/2}$ $V_2 = 29.4*(S/100)^{1/2}$	$V_1 = 20.2*(S/100)^{1/2}$ $V_2 = 30.6*(S/100)^{1/2}$		

For the travel time (T _i) calculations, V ₁ applies to the first 500 feet of travel distance; V ₂ applies to the remaining travel distance.		STANDARD FORM 4	
$T_i = (1.48(1-K)L^{1/2})/(S^{1/3})$ $T_c = T_i + T_t$ $K = 0.0132(CN) - 0.39$ $T_{lag} = 0.6T_c$	REFERENCE:		


```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 21AUG12 TIME 15:43:36
*
*****

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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 X X X XX
X X X X X
XXXXXX XXXX X XXXXX 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 STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
 NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
 DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
 KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
*DIAGRAM
1 ID PREPARED BY CIVILWORKSINC
2 ID SURFACE PARKING LOT - TDS - EXISTING CONDITIONS
3 ID HEC-1 ANALYSIS TO DETERMINE 100-YEAR FLOWS
4 ID 21AUG2012 BY JENNIFER K. NUESCA, E.I.
5 ID FILE: 12015EX.DAT
*
6 IT 5 0 0
7 IO 5 0 0
8 IN 5 0 0
9 JR PREC 0.57 1.00
10 KK EON1
11 KM ON-SITE BASIN
12 BA .0039
13 PC .000 .020 .057 .070 .087 .108 .124 .130 .130 .130
14 PC .130 .130 .130 .133 .140 .142 .148 .158 .172 .181
15 PC .190 .197 .199 .200 .201 .204 .214 .229 .241 .249
16 PC .251 .256 .270 .278 .281 .283 .295 .322 .352 .409
17 PC .499 .590 .710 .744 .781 .812 .819 .835 .851 .856
18 PC .860 .868 .878 .888 .910 .926 .937 .950 .970 .976
19 PC .982 .985 .987 .989 .990 .993 .993 .994 .995 .998
20 PC .998 .999 1.000
21 PB 3.07
22 LS 0 63
23 UD .151
24 KK EOFF1
25 KM OFF-SITE BASIN
26 BA .0035
27 LS 0 63
28 UD .103
29 KK STR1
30 KM STREET BASIN
31 BA .0025
32 LS 0 98
33 UD .082
34 ZZ

```

```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW
10 EON1
.
.
24 EOFF1
.
.
29 STR1
.

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1*****
*
*
*
*

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```

* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 21AUG12 TIME 15:43:36 *
*
*****

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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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PREPARED BY CIVILWORKSINC
SURFACE PARKING LOT - TDS - EXISTING CONDITIONS
HEC-1 ANALYSIS TO DETERMINE 100-YEAR FLOWS
21AUG2012 BY JENNIFER K. NUESCA, E.I.
FILE: 12015EX.DAT

```

```

7 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         101  NUMBER OF HYDROGRAPH ORDINATES
          NDDATE     1  0  ENDING DATE
          NDTIME     0820  ENDING TIME
          ICENT      19  CENTURY MARK

          COMPUTATION INTERVAL .08 HOURS
          TOTAL TIME BASE 8.33 HOURS

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

JP        MULTI-PLAN OPTION
          NPLAN      1  NUMBER OF PLANS

JR        MULTI-RATIO OPTION
          RATIOS OF PRECIPITATION
          .57        1.00

```

1

```

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

```

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
				.57	1.00
HYDROGRAPH AT					
+	EON1	.00	1 FLOW	0.	1.
			TIME	4.92	3.58
HYDROGRAPH AT					
+	EOFF1	.00	1 FLOW	0.	1.
			TIME	4.83	3.58
HYDROGRAPH AT					
+	STR1	.00	1 FLOW	3.	6.
			TIME	3.50	3.50

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

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 21AUG12 TIME 15:43:45
*
*****

```

```

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

```

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

```

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

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

1

HEC-1 INPUT

PAGE 1

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
*DIAGRAM
1 ID PREPARED BY CIVILWORKSINC
2 ID SURFACE PARKING LOT - TDS - INTERIM CONDITIONS
3 ID HEC-1 ANALYSIS TO DETERMINE 100-YEAR FLOWS
4 ID 21AUG2012 BY JENNIFER K. NUESCA, E.I.
5 ID FILE: 12015INT.DAT
*
6 IT 5 0 0
7 IO 5 0 0
8 IN 5 0 0
9 JR PREC 0.57 1.00
10 KK PON1
11 KM ON-SITE BASIN
12 BA .0039
13 PC .000 .020 .057 .070 .087 .108 .124 .130 .130 .130
14 PC .130 .130 .130 .133 .140 .142 .148 .158 .172 .181
15 PC .190 .197 .199 .200 .201 .204 .214 .229 .241 .249
16 PC .251 .256 .270 .278 .281 .283 .295 .322 .352 .409
17 PC .499 .590 .710 .744 .781 .812 .819 .835 .851 .856
18 PC .860 .868 .878 .888 .910 .926 .937 .950 .970 .976
19 PC .982 .985 .987 .989 .990 .993 .993 .994 .995 .998
20 PC .998 .999 1.000
21 PB 3.07
22 LS 0 98
23 UD .088
24 KK EOFF1
25 KM OFF-SITE BASIN
26 BA .0035
27 LS 0 63
28 UD .103
29 KK STR1
30 KM STREET BASIN
31 BA .0025
32 LS 0 98
33 UD .082
34 ZZ

```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```

INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW
10 PON1
.
.
24 . EOFF1
.
.
29 . STR1
.

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1

```

*****
*
*
*

```

```

* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 21AUG12 TIME 15:43:45 *
*****

```

```

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

```

```

PREPARED BY CIVILWORKSINC
SURFACE PARKING LOT - TDS - INTERIM CONDITIONS
HEC-1 ANALYSIS TO DETERMINE 100-YEAR FLOWS
21AUG2012 BY JENNIFER K. NUESCA, E.I.
FILE: 12015INT.DAT

```

```

7 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         101 NUMBER OF HYDROGRAPH ORDINATES
      NDDATE      1 0 ENDING DATE
      NDTIME      0820 ENDING TIME
      ICENT      19 CENTURY MARK

```

```

      COMPUTATION INTERVAL .08 HOURS
      TOTAL TIME BASE 8.33 HOURS

```

```

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

```

```

JP MULTI-PLAN OPTION
      NPLAN      1 NUMBER OF PLANS

```

```

JR MULTI-RATIO OPTION
      RATIOS OF PRECIPITATION
      .57 1.00

```

1

```

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

```

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
				.57	1.00
HYDROGRAPH AT					
+	PON1	.00	1 FLOW	5.	9.
			TIME	3.50	3.50
HYDROGRAPH AT					
+	EOFF1	.00	1 FLOW	0.	1.
			TIME	4.83	3.58
HYDROGRAPH AT					
+	STR1	.00	1 FLOW	3.	6.
			TIME	3.50	3.50

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

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 21AUG12 TIME 15:43:53
*
*****

```

```

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

```

```

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

```

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -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
1 ID PREPARED BY CIVILWORKSINC
2 ID SURFACE PARKING LOT - TDS - FUTURE CONDITIONS
3 ID HEC-1 ANALYSIS TO DETERMINE 100-YEAR FLOWS
4 ID 21AUG2012 BY JENNIFER K. NUESCA, E.I.
5 ID FILE: 12015FUT.DAT
*
6 IT 5 0 0
7 IO 5 0 0
8 IN 5 0 0
9 JR PREC 0.57 1.00
10 KK PON1
11 KM ON-SITE BASIN
12 BA .0039
13 PC .000 .020 .057 .070 .087 .108 .124 .130 .130 .130
14 PC .130 .130 .130 .133 .140 .142 .148 .158 .172 .181
15 PC .190 .197 .199 .200 .201 .204 .214 .229 .241 .249
16 PC .251 .256 .270 .278 .281 .283 .295 .322 .352 .409
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18 PC .860 .868 .878 .888 .910 .926 .937 .950 .970 .976
19 PC .982 .985 .987 .989 .990 .993 .993 .994 .995 .998
20 PC .998 .999 1.000
21 PB 3.07
22 LS 0 98
23 UD .088
24 KK POFF1
25 KM OFF-SITE BASIN
26 BA .0163
27 LS 0 98
28 UD .069
29 KK STR1
30 KM STREET BASIN
31 BA .0025
32 LS 0 98
33 UD .082
34 ZZ

```

```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW
10 PON1
.
.
24 . POFF1
.
.
29 . STR1
.

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1*****
*
*
*

```

```

* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 21AUG12 TIME 15:43:53 *
*
*****

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* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
*
*****

```

```

PREPARED BY CIVILWORKSINC
SURFACE PARKING LOT - TDS - FUTURE CONDITIONS
HEC-1 ANALYSIS TO DETERMINE 100-YEAR FLOWS
21AUG2012 BY JENNIFER K. NUESCA, E.I.
FILE: 12015PUT.DAT

```

```

7 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         101 NUMBER OF HYDROGRAPH ORDINATES
      NDDATE      1 0 ENDING DATE
      NDTIME      0820 ENDING TIME
      ICENT      19 CENTURY MARK

```

```

      COMPUTATION INTERVAL .08 HOURS
      TOTAL TIME BASE 8.33 HOURS

```

```

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

```

```

JP MULTI-PLAN OPTION
      NPLAN      1 NUMBER OF PLANS

```

```

JR MULTI-RATIO OPTION
      RATIOS OF PRECIPITATION
      .57 1.00

```

1

```

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

```

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
				.57	1.00
HYDROGRAPH AT					
+	PON1	.00	1 FLOW	5.	9.
			TIME	3.50	3.50
HYDROGRAPH AT					
+	POFF1	.02	1 FLOW	22.	40.
			TIME	3.50	3.50
HYDROGRAPH AT					
+	STR1	.00	1 FLOW	3.	6.
			TIME	3.50	3.50

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

HYDRAULIC ANALYSES

FlowMaster Cross Sections

10' CONCRETE FLUME - 10YR
Worksheet for Rectangular Channel

Project Description	
Project File	x:\2012 projects\106112015.00 1450 surface parking lot @ 1450 center crossing\08 - phase
Worksheet	10' CONCRETE FLUME-10YR
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

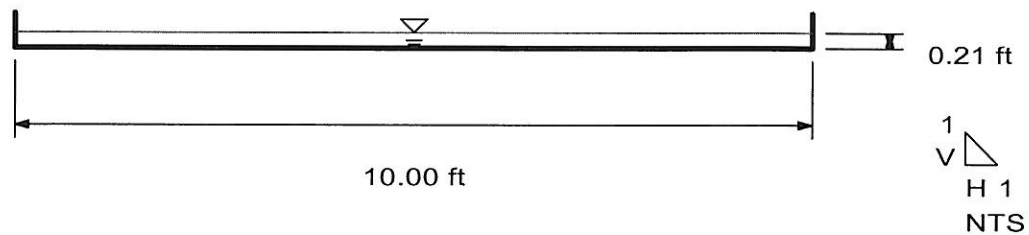
Input Data		
Mannings Coefficient	0.013	
Channel Slope	11.0000 %	
Bottom Width	10.00	ft
Discharge	27.00	cfs

Results		
Depth	0.21	ft
Flow Area	2.08	ft ²
Wetted Perimeter	10.42	ft
Top Width	10.00	ft
Critical Depth	0.61	ft
Critical Slope	0.003386	ft/ft
Velocity	12.96	ft/s
Velocity Head	2.61	ft
Specific Energy	2.82	ft
Froude Number	5.01	
Flow is supercritical.		

10' CONCRETE FLUME - 10YR
Cross Section for Rectangular Channel

Project Description	
Project File	x:\2012 projects\106112015.00 1450 surface parking lot @ 1450 center crossing\08 - phase
Worksheet	10' CONCRETE FLUME-10YR
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.013
Channel Slope	11.0000 %
Depth	0.21 ft
Bottom Width	10.00 ft
Discharge	27.00 cfs



10' CONCRETE FLUME - 100YR
Worksheet for Rectangular Channel

Project Description	
Project File	x:\2012 projects\106112015.00 1450 surface parking lot @ 1450 center crossing\08 - phase
Worksheet	10' CONCRETE FLUME-100YR
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

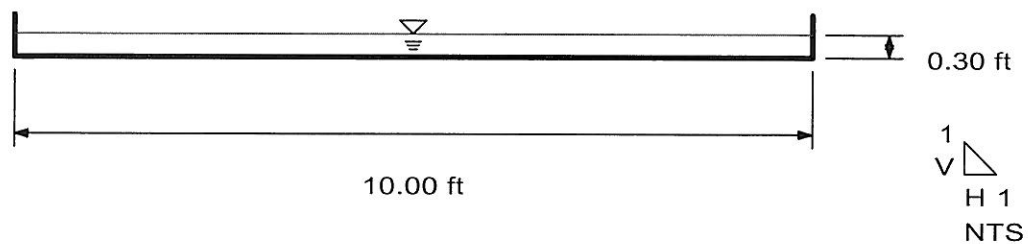
Input Data	
Mannings Coefficient	0.013
Channel Slope	11.0000 %
Bottom Width	10.00 ft
Discharge	49.00 cfs

Results		
Depth	0.30	ft
Flow Area	3.00	ft ²
Wetted Perimeter	10.60	ft
Top Width	10.00	ft
Critical Depth	0.91	ft
Critical Slope	0.003177	ft/ft
Velocity	16.34	ft/s
Velocity Head	4.15	ft
Specific Energy	4.45	ft
Froude Number	5.26	
Flow is supercritical.		

10' CONCRETE FLUME - 100YR
Cross Section for Rectangular Channel

Project Description	
Project File	x:\2012 projects\106112015.00 1450 surface parking lot @ 1450 center crossing\08 - phase
Worksheet	10' CONCRETE FLUME-100YR
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.013
Channel Slope	11.0000 %
Depth	0.30 ft
Bottom Width	10.00 ft
Discharge	49.00 cfs



40' ROW-10YR
Worksheet for Irregular Channel

Project Description	
Project File	x:\2012 projects\106112015.00 1450 surface parking lot @ 1450 center crossing\08 - phase
Worksheet	40' ROW-10YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

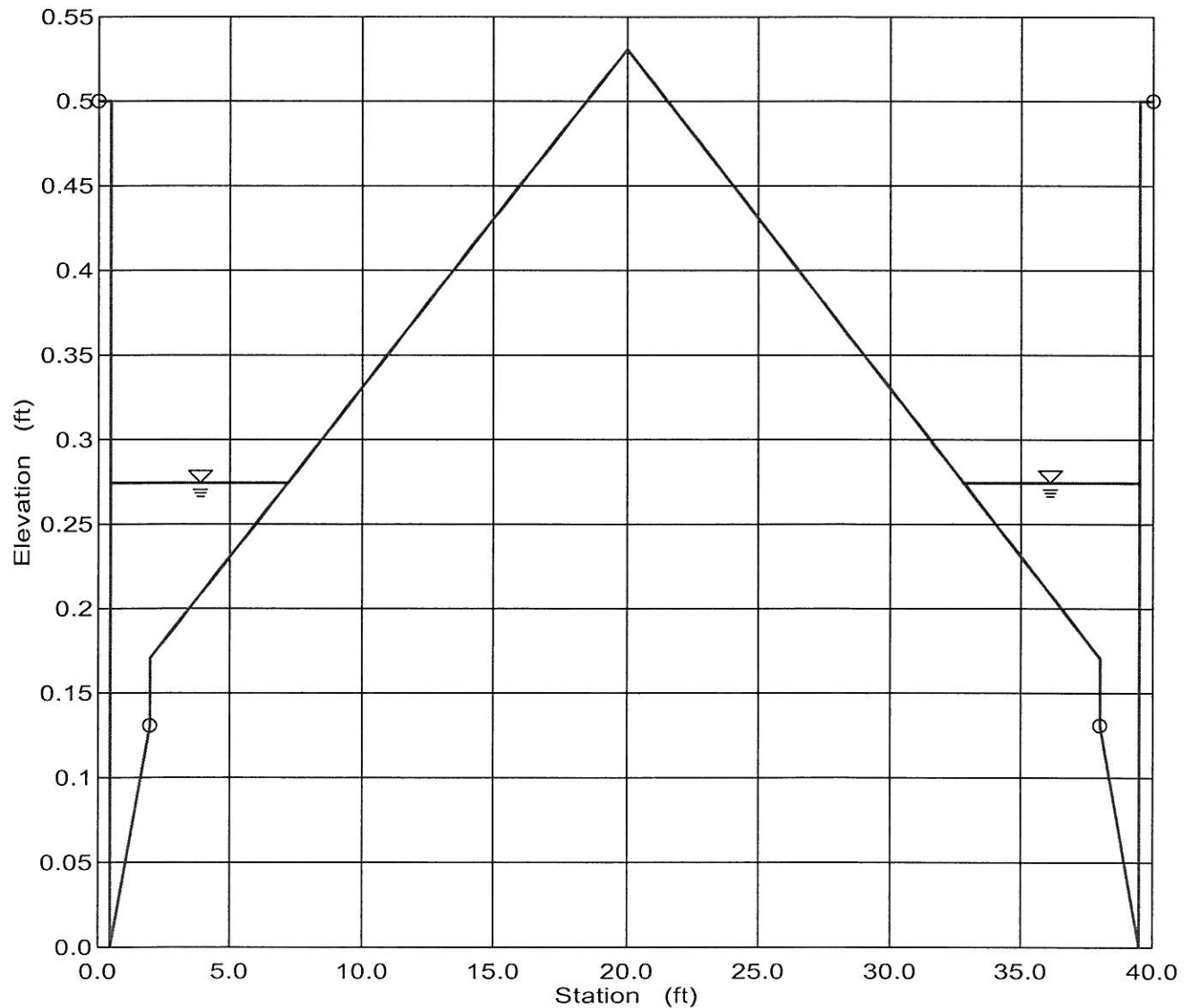
Input Data				
Channel Slope	1.9000 %			
Elevation range: 0.00 ft to 0.53 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.50	0.00	2.00	0.013
0.50	0.50	2.00	38.00	0.016
0.50	0.00	38.00	40.00	0.013
2.00	0.13			
2.00	0.17			
20.00	0.53			
38.00	0.17			
38.00	0.13			
39.50	0.00			
39.50	0.50			
40.00	0.50			
Discharge	3.00	cfs		

Results		
Wtd. Mannings Coefficient	0.015	
Water Surface Elevation	0.27	ft
Flow Area	1.17	ft ²
Wetted Perimeter	14.08	ft
Top Width	13.44	ft
Height	0.27	ft
Critical Depth	0.31	ft
Critical Slope	0.007874	ft/ft
Velocity	2.56	ft/s
Velocity Head	0.10	ft
Specific Energy	0.38	ft
Froude Number	1.53	
Flow is supercritical.		
Flow is divided.		

40' ROW-10YR
Cross Section for Irregular Channel

Project Description	
Project File	x:\2012 projects\106112015.00 1450 surface parking lot @ 1450 center crossing\08 - phase
Worksheet	40' ROW-10YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.015
Channel Slope	1.9000 %
Water Surface Elevation	0.27 ft
Discharge	3.00 cfs



40' ROW-100YR
Worksheet for Irregular Channel

Project Description	
Project File	x:\2012 projects\106112015.00 1450 surface parking lot @ 1450 center crossing\08 - phase
Worksheet	40' ROW-100YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

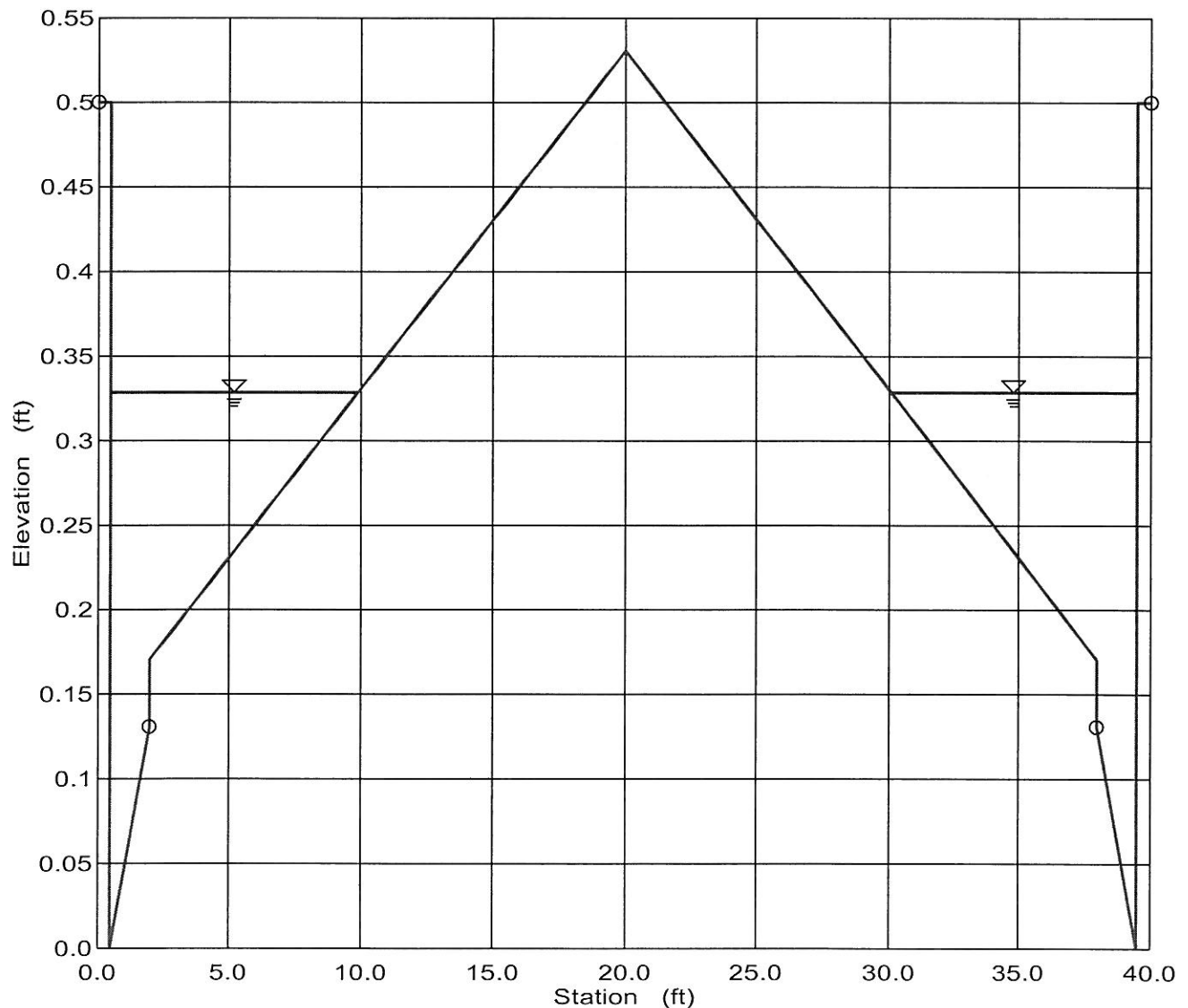
Input Data					
Channel Slope		1.9000 %			
Elevation range: 0.00 ft to 0.53 ft.					
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness	
0.00	0.50	0.00	2.00	0.013	
0.50	0.50	2.00	38.00	0.016	
0.50	0.00	38.00	40.00	0.013	
2.00	0.13				
2.00	0.17				
20.00	0.53				
38.00	0.17				
38.00	0.13				
39.50	0.00				
39.50	0.50				
40.00	0.50				
Discharge	6.00	cfs			

Results		
Wtd. Mannings Coefficient	0.015	
Water Surface Elevation	0.33	ft
Flow Area	2.04	ft ²
Wetted Perimeter	19.58	ft
Top Width	18.83	ft
Height	0.33	ft
Critical Depth	0.37	ft
Critical Slope	0.005326	ft/ft
Velocity	2.94	ft/s
Velocity Head	0.13	ft
Specific Energy	0.46	ft
Froude Number	1.57	
Flow is supercritical.		
Flow is divided.		

40' ROW-100YR
Cross Section for Irregular Channel

Project Description	
Project File	x:\2012 projects\106112015.00 1450 surface parking lot @ 1450 center crossing\08 - phase
Worksheet	40' ROW-100YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.015
Channel Slope	1.9000 %
Water Surface Elevation	0.33 ft
Discharge	6.00 cfs



DRIVEWAY-10YR

Worksheet for Irregular Channel

Project Description	
Project File	x:\2012 projects\106112015.00 1450 surface parking lot @ 1450 center crossing\08 - phase
Worksheet	DRIVEWAY-10YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

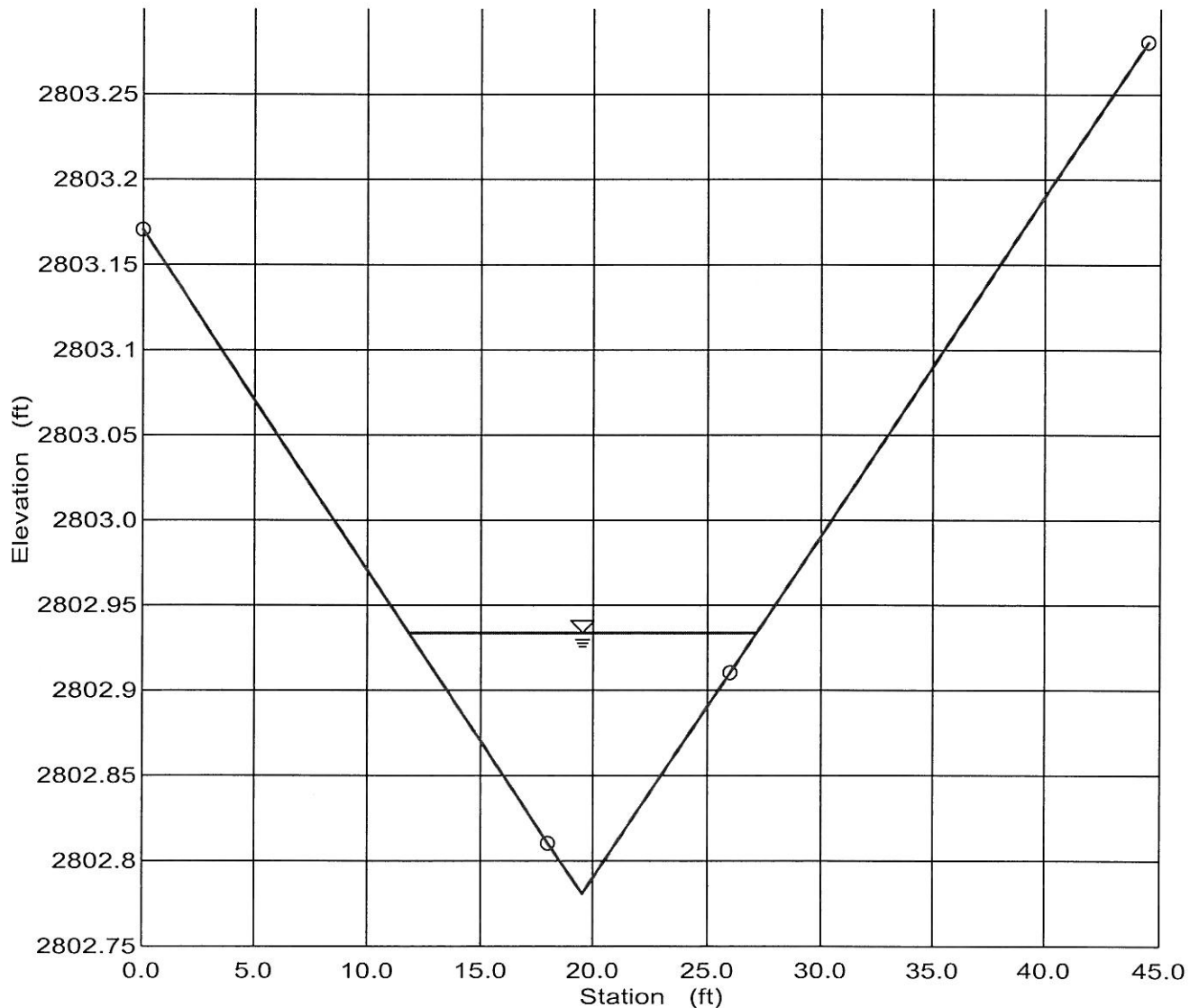
Input Data				
Channel Slope		1.9000 %		
Elevation range: 2,802.78 ft to 2,803.28 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	2,803.17	0.00	18.00	0.016
18.00	2,802.81	18.00	26.00	0.013
19.50	2,802.78	26.00	44.50	0.016
26.00	2,802.91			
44.50	2,803.28			
Discharge	3.00	cfs		

Results		
Wtd. Mannings Coefficient	0.014	
Water Surface Elevation	2,802.93	ft
Flow Area	1.17	ft ²
Wetted Perimeter	15.33	ft
Top Width	15.33	ft
Height	0.15	ft
Critical Depth	2,802.97	ft
Critical Slope	0.006996	ft/ft
Velocity	2.55	ft/s
Velocity Head	0.10	ft
Specific Energy	2,803.03	ft
Froude Number	1.63	
Flow is supercritical.		

DRIVEWAY-10YR
Cross Section for Irregular Channel

Project Description	
Project File	x:\2012 projects\106112015.00 1450 surface parking lot @ 1450 center crossing\08 - phase
Worksheet	DRIVEWAY-10YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.014
Channel Slope	1.9000 %
Water Surface Elevation	2,802.93 ft
Discharge	3.00 cfs



DRIVEWAY-100YR
Worksheet for Irregular Channel

Project Description	
Project File	x:\2012 projects\106112015.00 1450 surface parking lot @ 1450 center crossing\08 - phase
Worksheet	DRIVEWAY-100YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

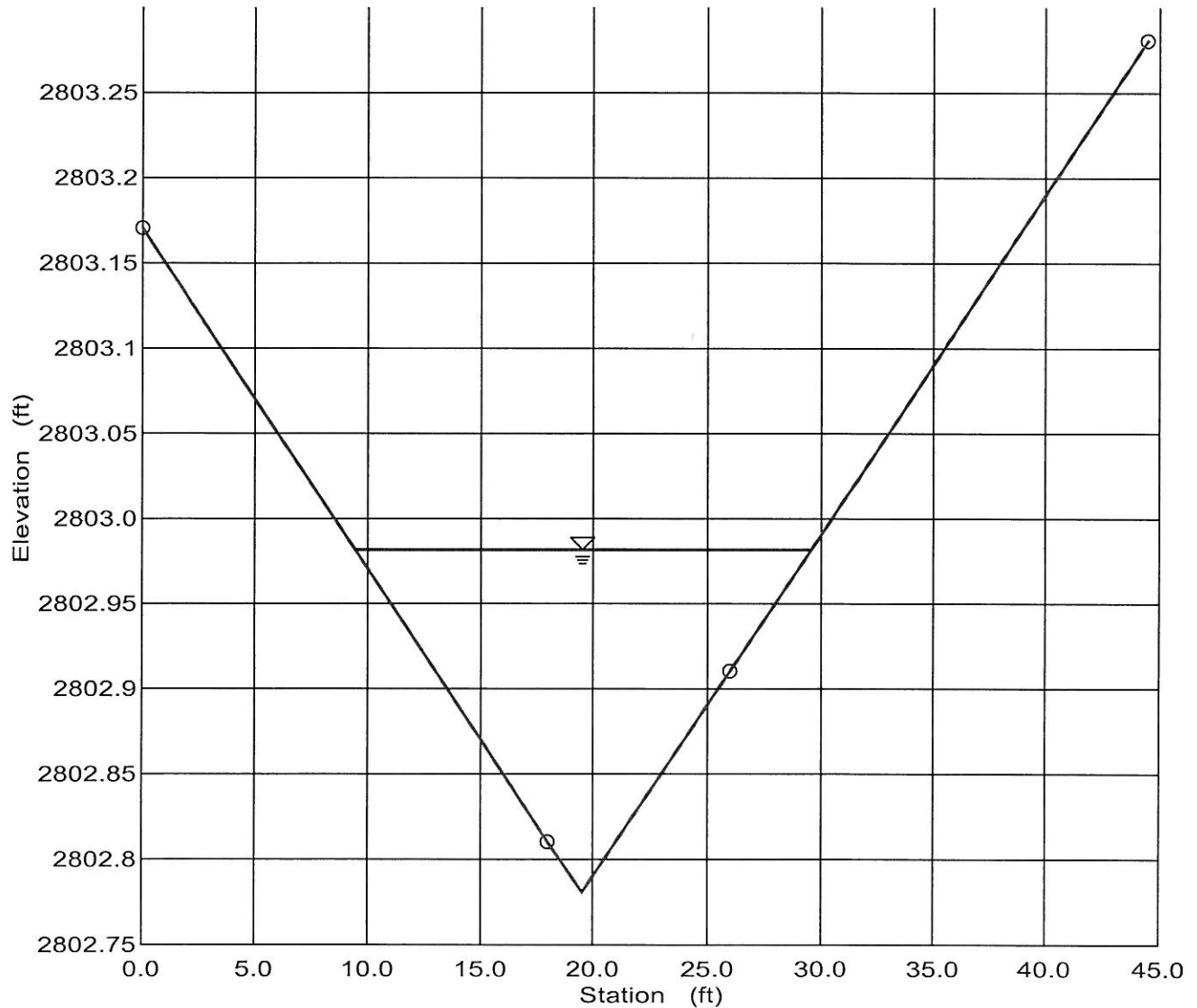
Input Data				
Channel Slope		1.9000 %		
Elevation range: 2,802.78 ft to 2,803.28 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	2,803.17	0.00	18.00	0.016
18.00	2,802.81	18.00	26.00	0.013
19.50	2,802.78	26.00	44.50	0.016
26.00	2,802.91			
44.50	2,803.28			
Discharge	6.00	cfs		

Results		
Wtd. Mannings Coefficient	0.015	
Water Surface Elevation	2,802.98	ft
Flow Area	2.01	ft ²
Wetted Perimeter	20.07	ft
Top Width	20.07	ft
Height	0.20	ft
Critical Depth	2,803.03	ft
Critical Slope	0.006648	ft/ft
Velocity	2.98	ft/s
Velocity Head	0.14	ft
Specific Energy	2,803.12	ft
Froude Number	1.66	
Flow is supercritical.		

DRIVEWAY-100YR
Cross Section for Irregular Channel

Project Description	
Project File	x:\2012 projects\106112015.00 1450 surface parking lot @ 1450 center crossing\08 - phase
Worksheet	DRIVEWAY-100YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

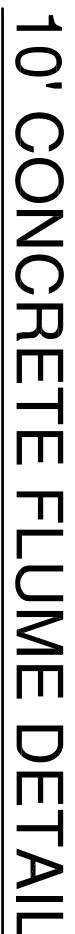
Section Data	
Wtd. Mannings Coefficient	0.015
Channel Slope	1.9000 %
Water Surface Elevation	2,802.98 ft
Discharge	6.00 cfs



PLANS

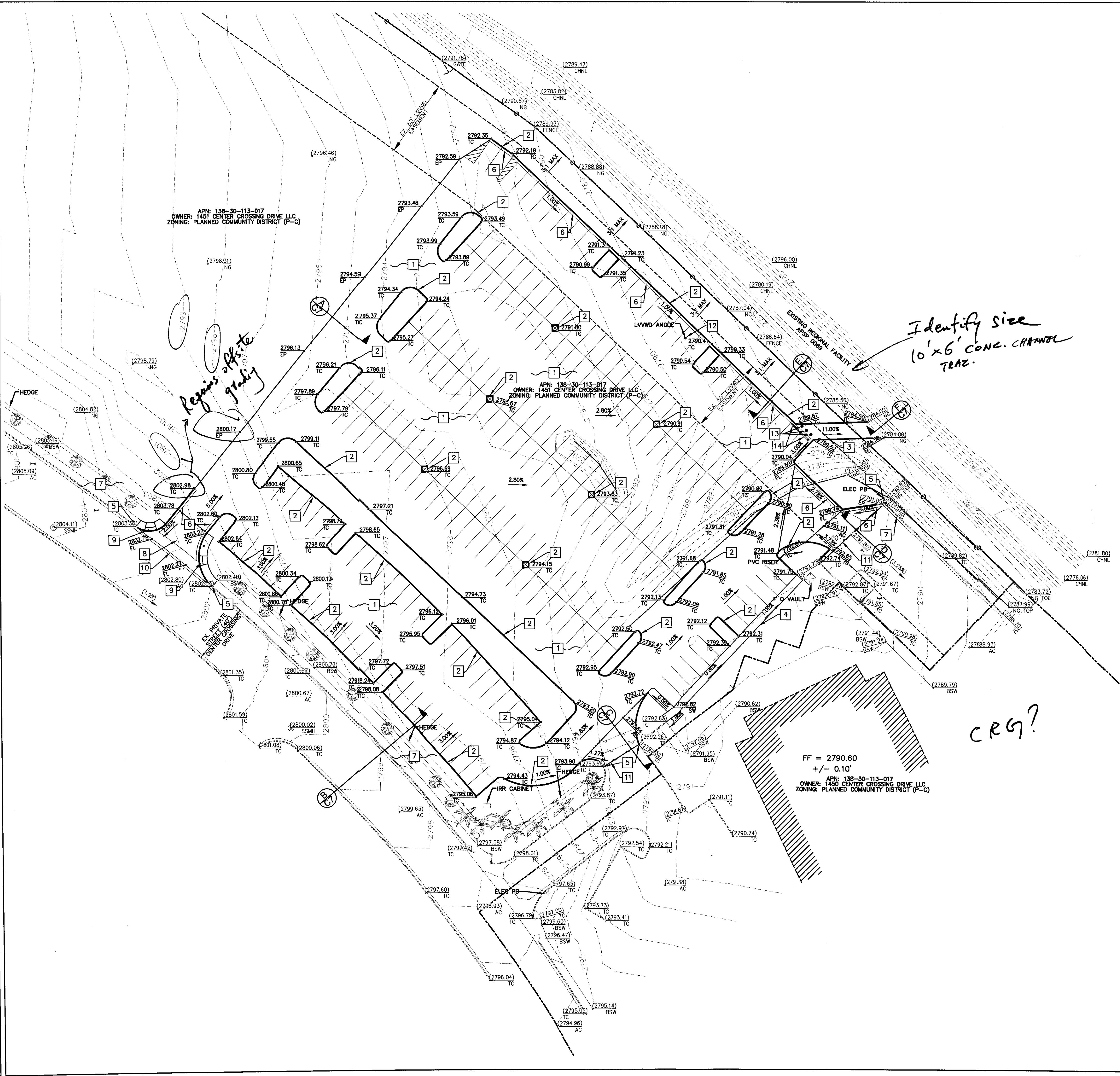
Grading Plan

Detail Sheet

[illegible]

ABBREVIATIONS		
AC	ASPHALTIC CONCRETE	
ADJ	ADJUST	
AGG	AGGREGATE	
BC	BACK OF CURB	
BCR	BEGINNING OF CURB RETURN	
BEG	BEGIN	
BSW	BACK OF SIDEWALK	
BVC	BEGINNING OF VERTICAL CURVE	
CATV	CABLE TV	
CCAUUSD	CLARK COUNTY AREA UNIFORM STANDARD DRAWING	
CORFCD	CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT CENTERLINE	
CL	CITY OF LAS VEGAS	
CMU	CONCRETE MASONRY UNIT	
CO	CLEAN OUT	
COMM	COMMUNICATIONS	
CONC	CONCRETE	
COND	CONDUIT	
CULV	CULVERT	
DC	DEPRESSED CURB	
DI	DROP INLET	
DIP	DUCTILE IRON PIPE	
DOM	DOMESTIC	
ELEC	ELECTRIC	
EAC	EDGE OF AC	
EC	END OF CURVE	
EOR	END OF CURB RETURN	
ELEV	ELEVATION	
EP	EDGE OF PAVEMENT	
EV	END OF VERTICAL CURVE	
EX	EXISTING	
FAST	FREWAY & ARTERIAL SYSTEM OF TRANSPORTATION	
FF	FINISH FLOOR	
FG	FINISH GRADE	
FH	FIRE HYDRANT	
FL	FLOW LINE	
FO	FIBER OPTICS	
FS	FINISHED SURFACE	
G	GAS	
GB	GRADE BREAK	
HOPE	HIGH DENSITY POLYETHYLENE	
HOWL	HYDRAULIC GRADE LINE	
HPL	HIGH POINT	
HP	INVERT	
IRR	IRRIGATION	
LAT	LATERAL	
LF	LINEAL FEET	
LS	LANDSCAPE	
LT	LEFT	
LVWD	LAS VEGAS VALLEY WATER DISTRICT	
MAX	MAXIMUM	
MH	MANHOLE	
MIN	MINIMUM	
MTR	METER	
NDOT	NEVADA DEPARTMENT OF TRANSPORTATION	
PB	PULL BOX	
PL	PROPERTY LINE	
PP	POWER POLE	
PROP	PROPOSED	
PVC	POLY VINYL CHLORIDE PIPE	
PVMT	PAVEMENT	
RT	RIGHT	
ROW	RIGHT-OF-WAY	
SS	SANITARY SEWER	
SD	STORM DRAIN	
SNWA	SOUTHERN NAVAJO WATER AUTHORITY	
STA	STATION	
STLT	STREET LIGHT	
SVZ	SIGHT VISIBILITY ZONE	
TEL	TELEPHONE	
TC	TOP OF CURB	
TF	TOP OF FOOTING	
TW	TOP OF WALL	
TYP	TYPICAL	
UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS	
VG	VALLEY GUTTER	
WL	WATER LINE	

LEGEND		
DESCRIPTION	EXISTING	PROPOSED
UTILITIES		
B.O. VALVE		
FIRE HYDRANTS		
CLEAN OUT		
GATE VALVE		
METER		
REDUCER		
CAP		
11.25' ELBOW		
22.5' ELBOW		
45' ELBOW		
90' ELBOW		
CROSS		
TEE		
MANHOLES		
ELECTRICAL		
SANITARY SEWER		
STORM DRAIN		
TELEPHONE		
STREET LIGHTS		
100W HPS STLT.		
150W HPS STLT.		
200W HPS STLT.		
250W HPS STLT.		
400W HPS STLT.		
GRADING		
SPOT ELEV.	(12.34)	12.34
SLOPE	(1:2%)	1:2%
5' CONT.	(2005)	2005
1' CONT.	(2007)	2007
SITE		
SIGN		
"L" CURB		
"A" CURB		
EDGE OF PAVT.		
WALL		
LINE TYPES		
CL OR SECTION LINE		
PROPERTY LINE		
RIGHT OF WAY LINE		
EASMENT LINE		
SAWTOOTH LINE		
FLOW LINE		
SHADES		
HEAVY AC PAVEMENT		
LIGHT AC PAVEMENT		
CONCRETE PAVEMENT		



GRAPHIC SCALE

(IN FEET)

1 inch = 30 ft.

CONSTRUCTION NOTES:

- ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS (C.C.A.U.S.D.) LATEST EDITION AND/OR REGULATING ENTITY HAVING JURISDICTION.
- NOT ALL NOTES USED ON THIS SHEET -
- INSTALL AC PAVEMENT PER DETAIL ON SHEET C7.
- INSTALL "A" TYPE CURB PER C.C.A.U.S.D. No. 219.
- INSTALL CONCRETE FLUME PER DETAIL ON SHEET C7.
- INSTALL CONCRETE SIDEWALK PER C.C.A.U.S.D. No. 234 (MAX 2.0% CROSS SLOPE).
- MATCH EXISTING CURB
- INSTALL "L" TYPE CURB PER C.C.A.U.S.D. No. 219.
- PROTECT IN PLACE.
- INSTALL DRIVEWAY PER C.C.A.U.S.D. No. 225.
- INSTALL CASE IN SIDEWALK RAMP PER C.C.A.U.S.D. No. 235.
- INSTALL CROSS GUTTER PER C.C.A.U.S.D. No. 228.
- SAWOUT EXISTING AC AND REPLACE TO MATCH EXISTING GRADES.
- PROTECT IN PLACE AND RAISE TO MATCH PROPOSED GRADE.
- INSTALL BOLLARDS PER U.D.A.C.S. PLATE No. 75.
- INSTALL BUMPER BLOCK C.C.A.U.S.D. No. 238.

GRADING PLAN CERTIFICATION

NAME: BRANDON POTTS PE #13121 DATE:

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

GEOTECHNICAL NOTE:

A GEOLOGIST OR GEOTECHNICAL ENGINEER SHALL BE ON SITE DURING EXCAVATION AND MASS GRADING OPERATIONS TO EXAMINE THE SOIL CHARACTERISTICS AND GEOLOGICAL CONDITIONS ENCOUNTERED, AND TO PROVIDE PROFESSIONAL ADVICE TO THE OWNER IN THE EVENT THAT UNANTICIPATED SOIL PROBLEMS ARISE AND/OR SUBSURFACE SITE CONDITIONS ARE FOUND TO BE SIGNIFICANTLY DIFFERENT THAN DEFINED BY PRE-DESIGN EXPLORATION AND TESTING.

GRADING NOTES:

- SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY AND SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.
- CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.
- CONTRACTOR SHALL NOTIFY CIVILWORKS INC WITHIN 24 HOURS OF OMISSIONS AND ERRORS DISCOVERED ON PLANS. CIVILWORKS INC WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

GEOTECHNICAL NOTE:

CONTRACTOR TO ENSURE POSITIVE DRAINAGE. NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION. REFER TO THE REPORT PREPARED BY:

TERRACON
ORIGINAL DATE: MARCH 4, 1999; UPDATED: JULY 27, 2012
PROJECT #64995059(U)

GEOTECHNICAL NOTE:

A GEOLOGIST OR GEOTECHNICAL ENGINEER SHALL BE ON SITE DURING EXCAVATION AND MASS GRADING OPERATIONS TO EXAMINE THE SOIL CHARACTERISTICS AND GEOLOGICAL CONDITIONS ENCOUNTERED, AND TO PROVIDE PROFESSIONAL ADVICE TO THE OWNER IN THE EVENT THAT UNANTICIPATED SOIL PROBLEMS ARISE AND/OR SUBSURFACE SITE CONDITIONS ARE FOUND TO BE SIGNIFICANTLY DIFFERENT THAN DEFINED BY PRE-DESIGN EXPLORATION AND TESTING.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: 1451 CENTER CROSSING DRIVE, CRESDALE LN & COVINGTON CROSS

RIVET AND PLATE IN TOP OF CURB CORNER

ELEV. = 873.395 (METRIC)
2865.46 (US SURVEY FEET)

BASIS OF BEARING

SOUTH 48°00'00" EAST, BEING THE CENTERLINE OF COVINGTON CROSS DRIVE AS SHOWN BY MAP THEREOF ON FILE IN FILE 125 OF SURVEYS, PAGE 68 IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

SAFETY ALERT

Call before you dig

1-702-455-7511

1-702-432-5300

1-702-227-2929

This grading plan is a part of drainage study #15568 which was received on 8/23/12 and 9/5/12. Page 1 of 1

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4945 W. Patrick Lane Las Vegas, NV 89118

Office#: (702)534-7555 Fax#: (702)534-1825

CONSULTANT LIST:

HHNSurveysInc

1000 S. MOUNTAIN VIEW BLVD. SUITE 101

LAS VEGAS, NEVADA 89102

PHONE: (702) 254-1111

FAX: (702) 254-1111

SURFACE PARKING LOT

AT 1450 CENTER CROSSING DRIVE

OWNER/DEVELOPER: TKC DESIGN

9225 W. FLAMINGO ROAD

LAS VEGAS, NV 89147

PHONE: 702-228-9551

CONTACT: JOHN DARIN

DATE: 2/24/2012

BY: BRANDON POTTS

ENGR. CHR.

PROJECT: 1451 CENTER CROSSING DRIVE

REVISIONS:

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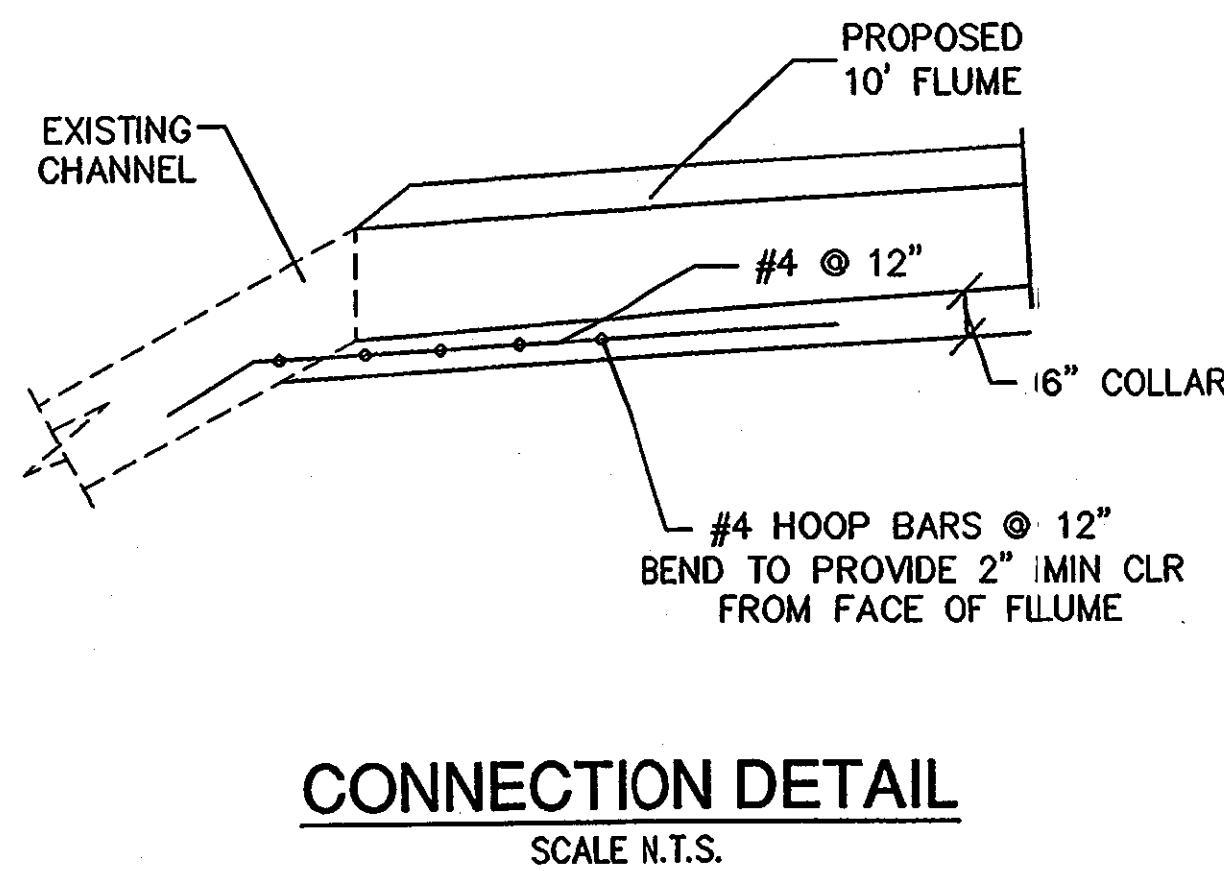
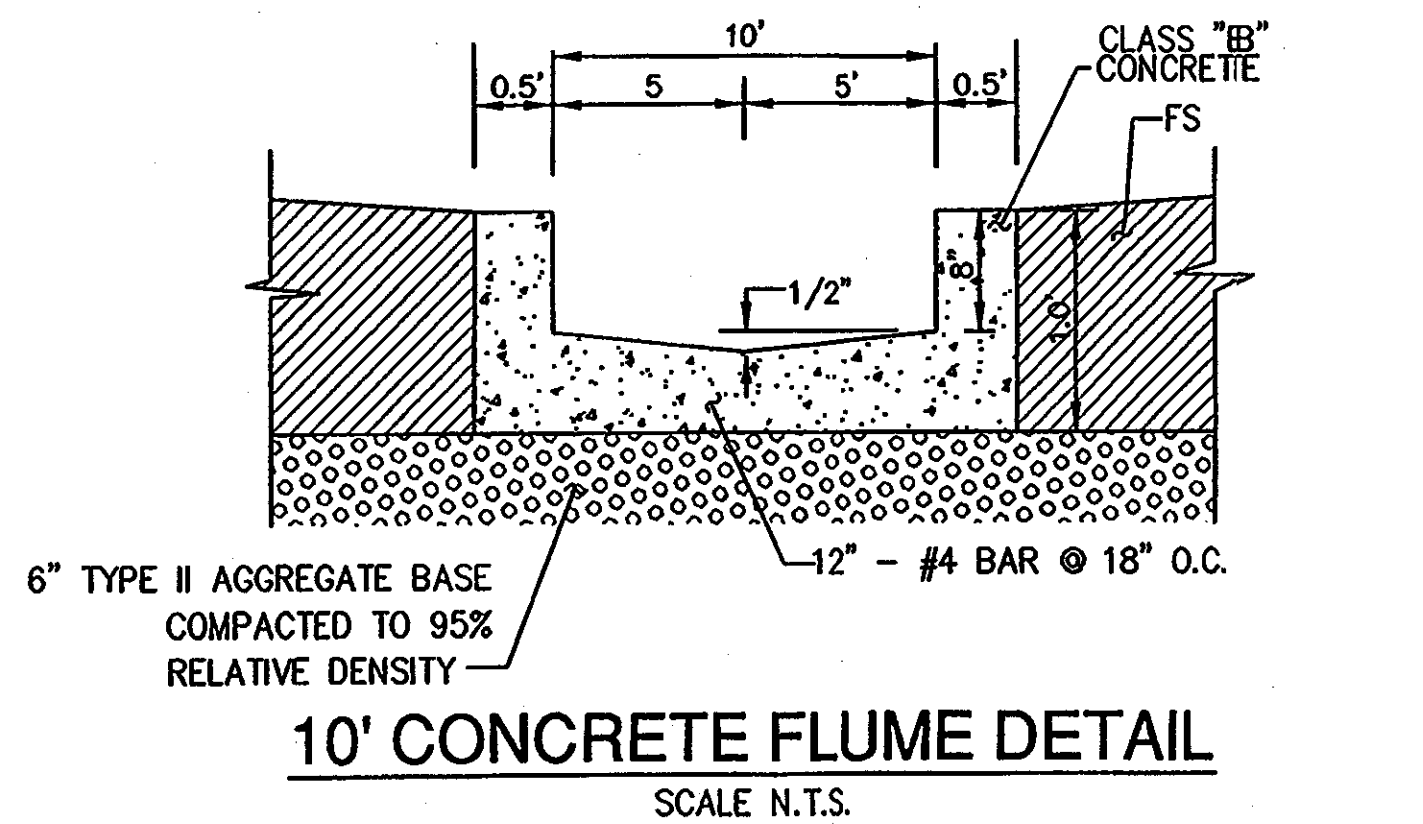
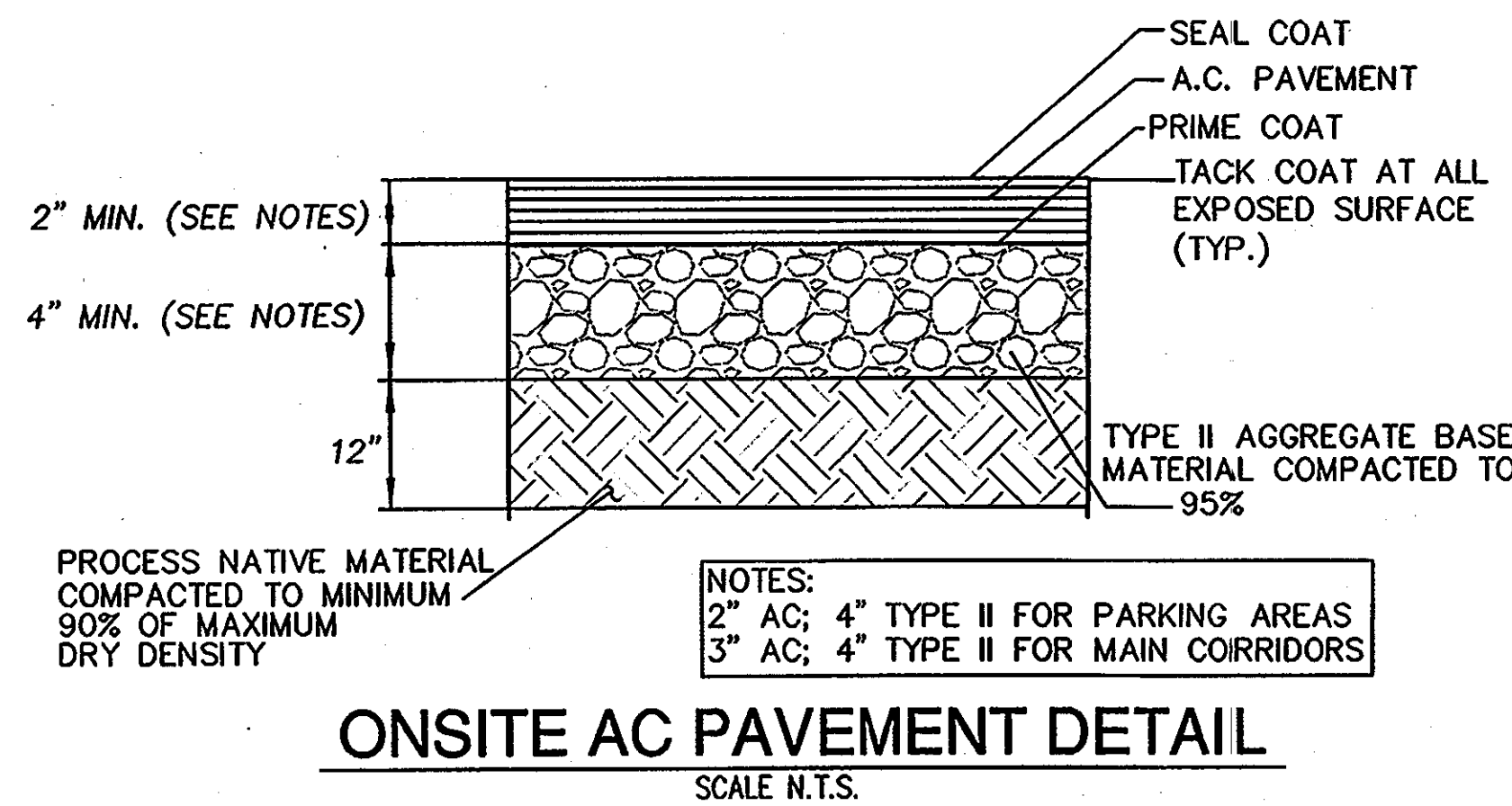
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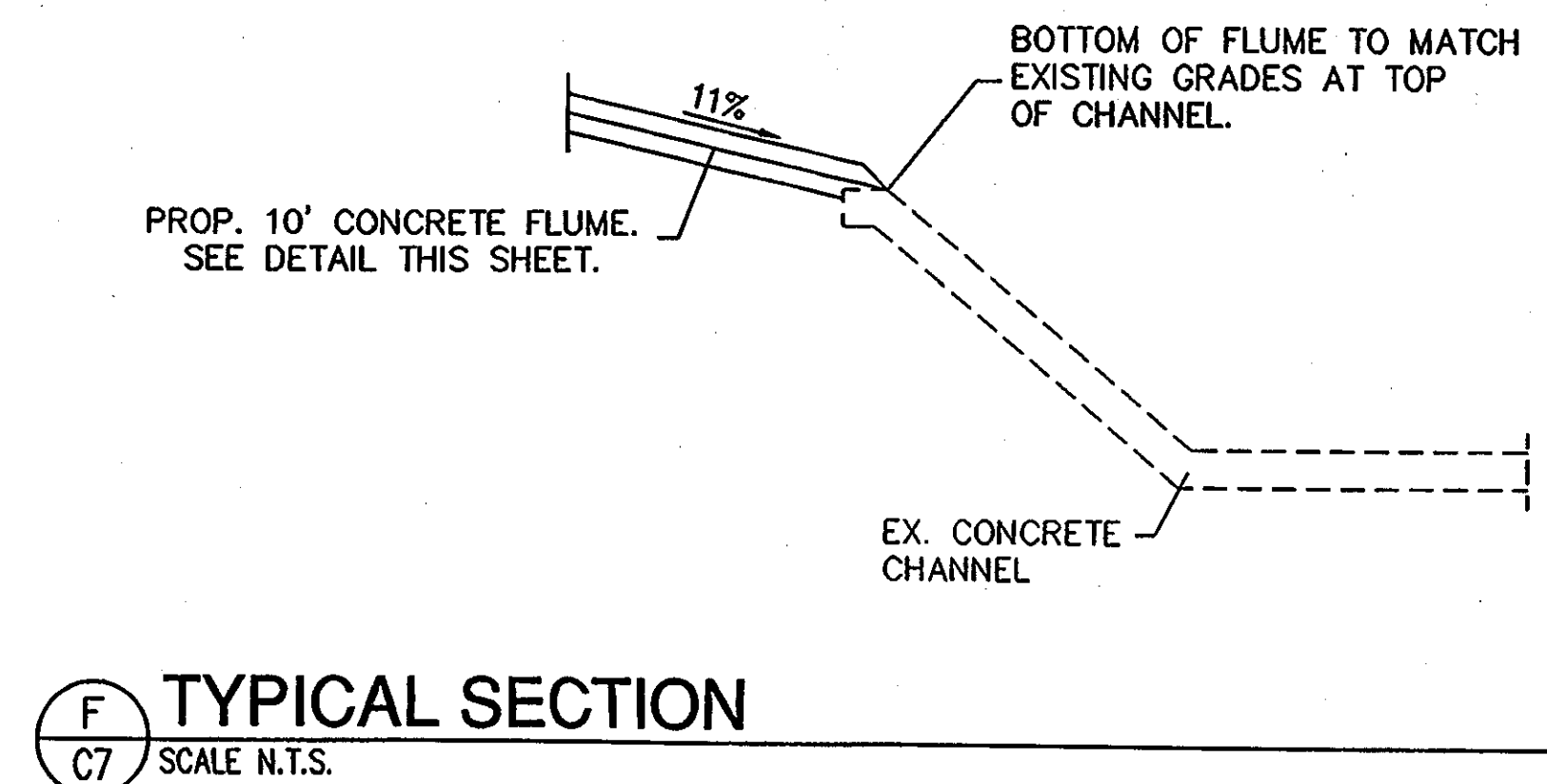
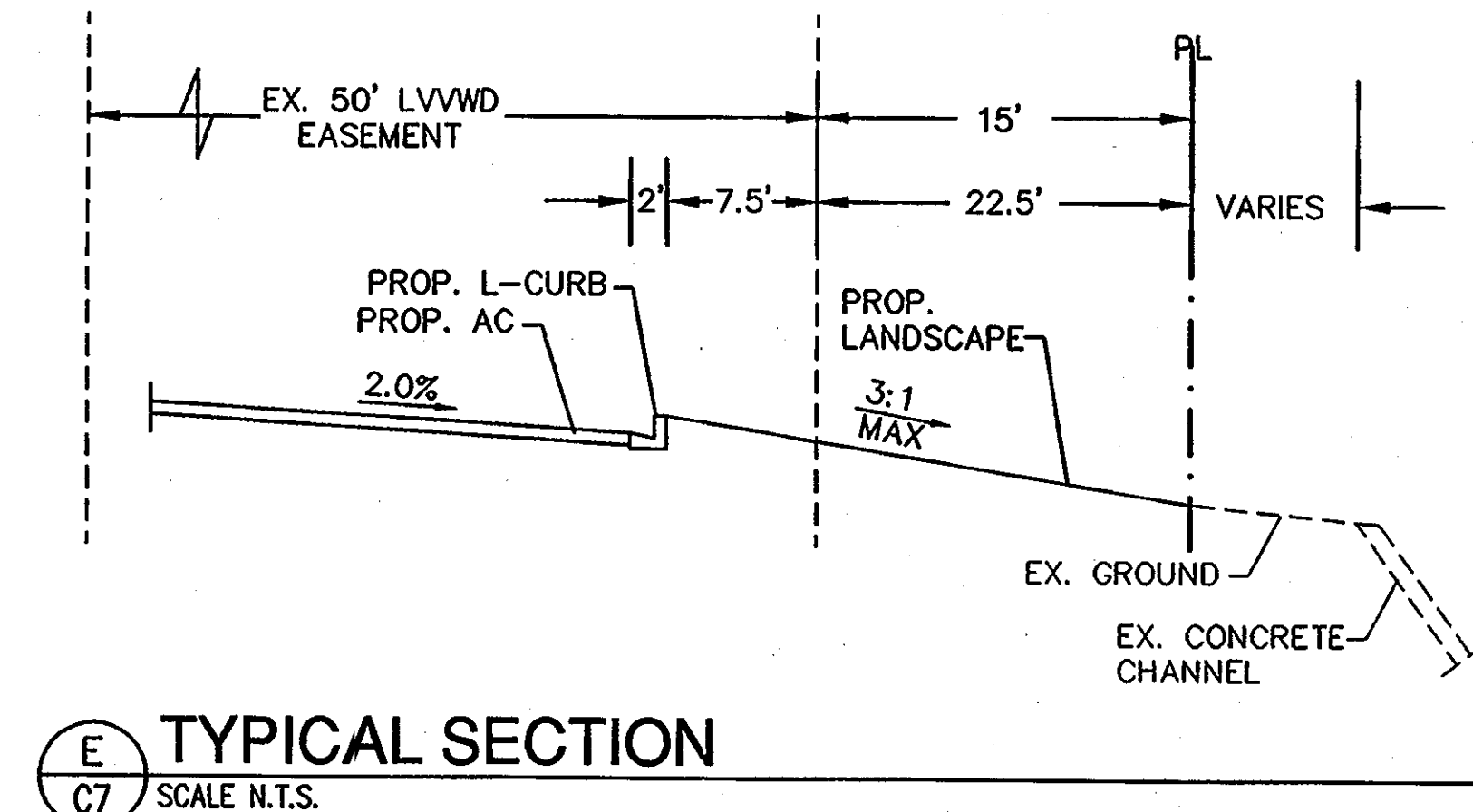
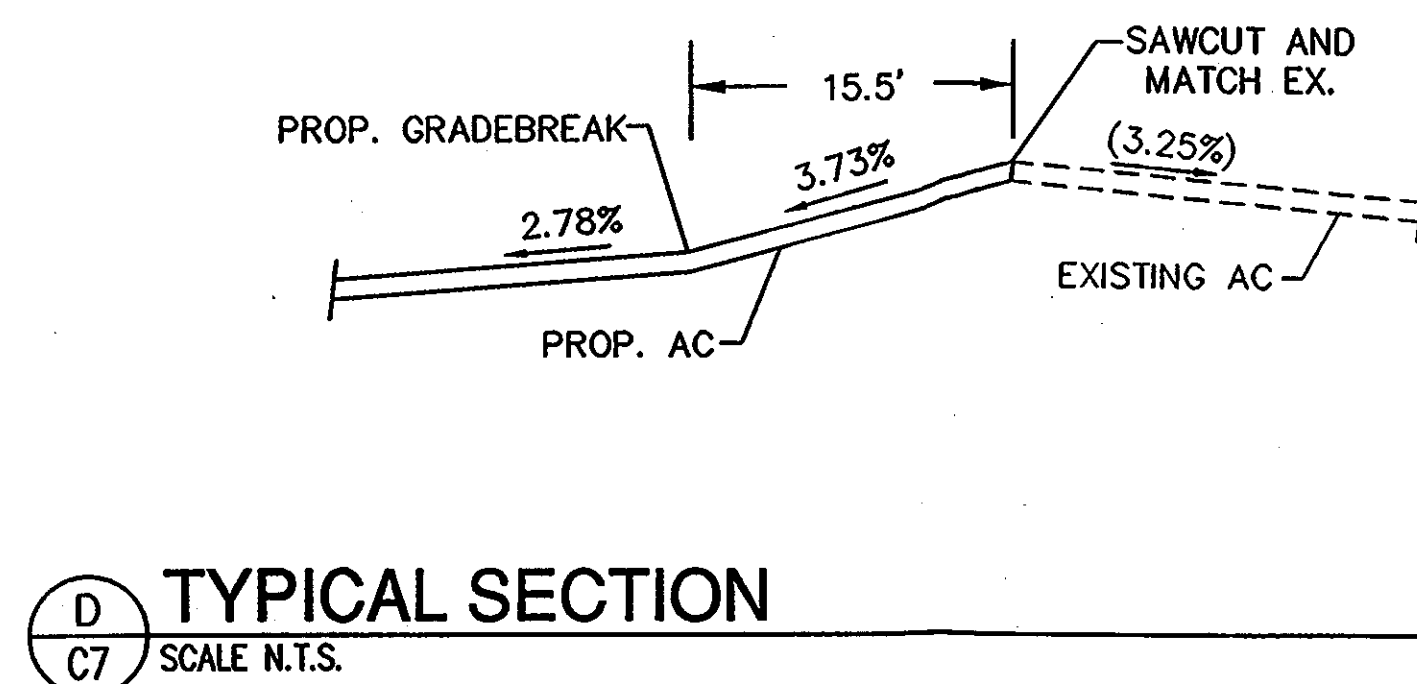
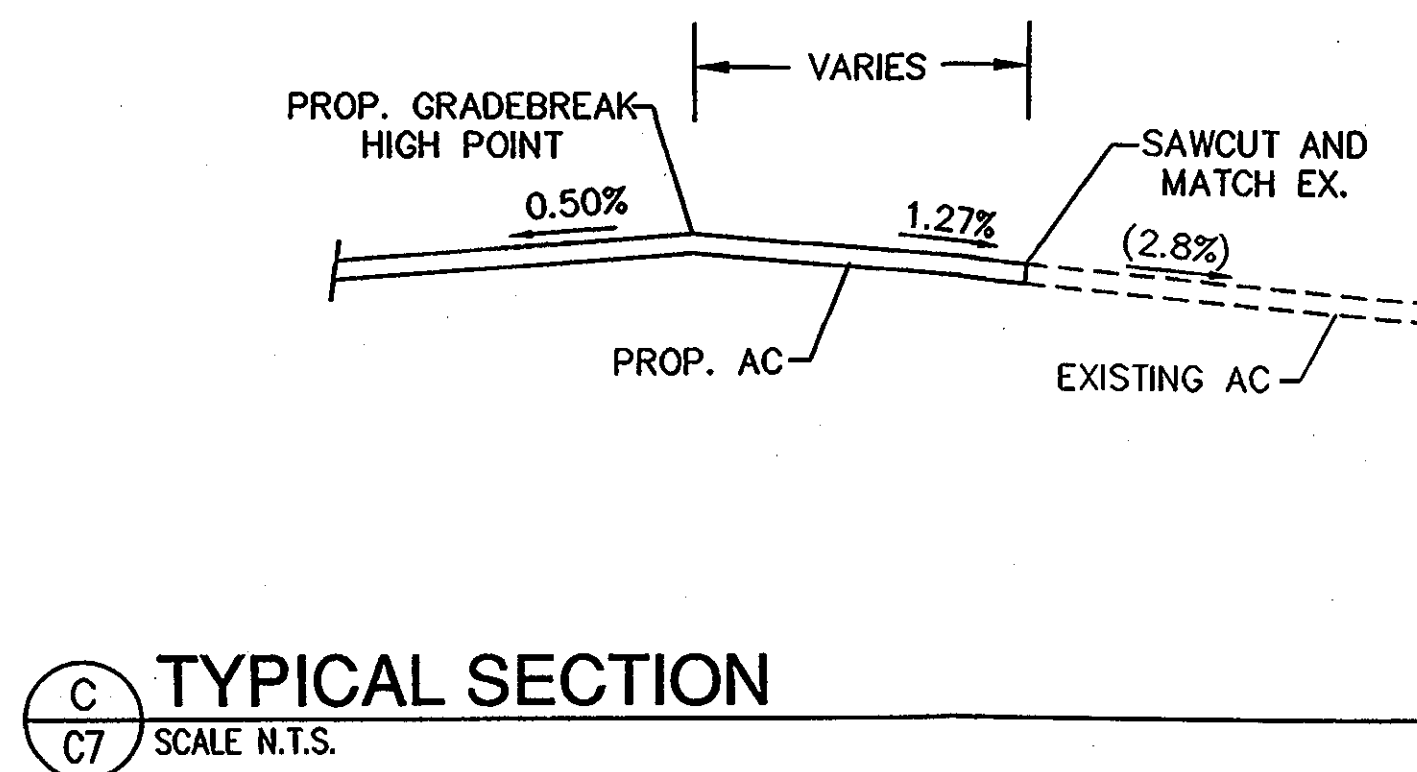
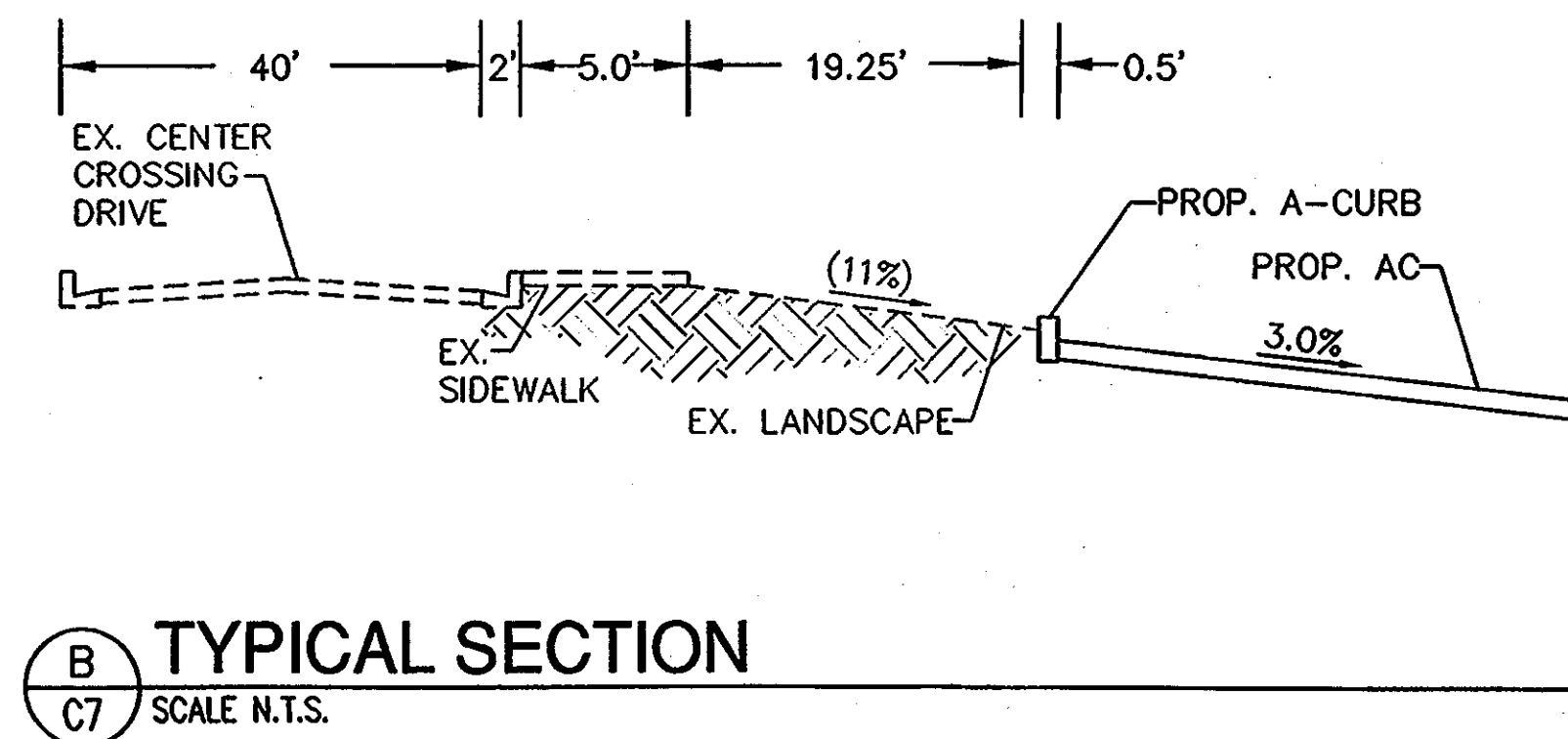
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ABBREVIATIONS		
AC	ASPHALTIC CONCRETE	
ADJ	ADJUST	
AGG	AGGREGATE	
BC	BACK OF CURB	
BCR	BEGINNING OF CURB RETURN	
BEG	BEGIN	
BSW	BACK OF SIDEWALK	
BVC	BEGINNING OF VERTICAL CURVE	
CATV	CABLE TV	
CCASD	CLARK COUNTY AREA STANDARD DRAWING	
CCRFCD	CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT CENTERLINE	
CL	CITY OF LAS VEGAS	
CMU	CONCRETE MASONRY UNIT	
CO	CLEAN OUT	
COM	COMMUNICATIONS	
CONC	CONCRETE	
COND	CONDUIT	
CULV	CULVERT	
DC	DEPRESSED CURB	
DI	DROP INLET	
DIP	DUCTILE IRON PIPE	
DOM	DOMESTIC	
ELEC	ELECTRIC	
EAC	EDGE OF AC	
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FS	FIBER OPTICS	
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HGL	HYDRAULIC GRADE LINE	
HP	HIGH POINT	
INV	INVERT	
IRR	IRRIGATION	
LAT	LATERAL	
LF	LINEAL FEET	
LS	LANDSCAPE	
LT	LEFT	
LVVWD	LAS VEGAS VALLEY WATER DISTRICT	
MAX	MAXIMUM	
MH	MANHOLE	
MIN	MINIMUM	
MTR	METER	
NDOT	NEVADA DEPARTMENT OF TRANSPORTATION	
PB	PULL BOX	
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PVMT	PAVEMENT	
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ROW	RIGHT-OF-WAY	
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SD	STORM DRAIN	
SNWA	SOUTHERN NEVADA WATER AUTHORITY	
STA	STATION	
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TYP	TYPICAL	
UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS	
VC	VALLEY CUTTER	
WL	WATER LINE	

LEGEND		
DESCRIPTION	EXISTING	PROPOSED
UTILITIES		
B.G. VALVE		
FIRE HYDRANTS		
CLEAN OUT		
GATE VALVE		
METER		
REDUCER		
CAP		
11.25' ELBOW		
22.5' ELBOW		
45' ELBOW		
90' ELBOW		
CROSS		
TEE		
MANHOLES		
ELECTRICAL		
SANITARY SEWER		
STORM DRAIN		
TELEPHONE		
STREET LIGHTS		
100W HPS STL		
150W HPS STL		
200W HPS STL		
250W HPS STL		
400W HPS STL		
GRADING		
SPOT ELEV.	(12.34)	12.34
SLOPE	(1.2%)	1.2%
5' CONT.	(2000)	2000
1' CONT.	(2007)	2007
SITE		
SGN		
"L" CURB		
"A" CURB		
EDGE OF PAVT.		
WALL		
LINE TYPES		
CL OR SECTION LINE		
PROPERTY LINE		
RIGHT OF WAY LINE		
EASEMENT LINE		
SAWNOT LINE		
FLOW LINE		
SHADES		
HEAVY AC PAVEMENT		
LIGHT AC PAVEMENT		
CONCRETE PAVEMENT		



A TYPICAL SECTION
C7 SCALE N.T.S.



This grading plan is a part of drainage study #4568 which was received on 10/2/12 and App'd on 10/2/12. Page 2 of 2

BENCHMARK
CITY OF LAS VEGAS BENCHMARK: 1LV09 24SSE6
RIVET AND PLATE IN TOP OF CURB @ NW CORNER OF CRESTDALE LN & COWINGTON CROSS
ELEV. = 873.395 (METRIC)
2865.46 (US SURVEY FEET)
BASIS OF BEARING
SOUTH 48°00'00" EAST, BEING THE CENTERLINE OF COWINGTON CROSS DRIVE AS SHOWN BY MAP THEREOF ON FILE IN FILE 125 OF SURVEYS, PAGE 68 IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

SAFETY ALERT
Call Before You Dig
1-702-455-7511
Underground C.C. TRAFFIC OPERATIONS
1-702-227-2929

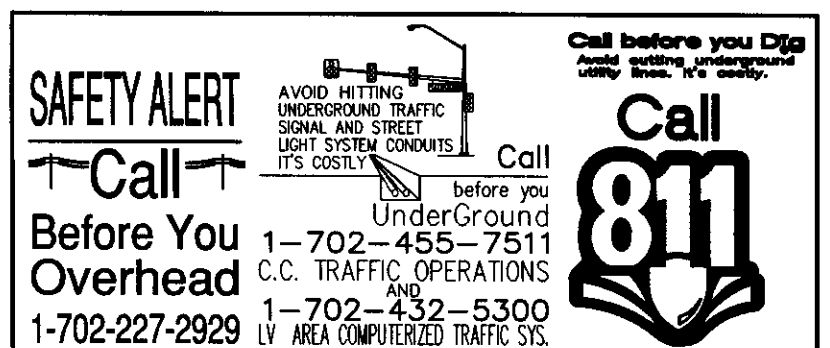
Call 811
Before You Dig
1-702-455-7511
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4945 W. Patrick Lane Las Vegas, NV 89118
Office #: (702)534-7555 Fax #: (702)534-1825

1450 SURFACE PARKING LOT
AT 1450 CENTER CROSSING DRIVE
OWNER/DEVELOPER: TKG DESIGN
9225 W. FLAMINGO ROAD
LAS VEGAS, NV 89147
PHONE: 702-228-9551
CONTACT: JOHN DARIN

DETAIL SHEET
SHEET # C7 OF 2
BRANDON A. POTTS
Exp: 12/31/13
CIVIL
No. 13121
10/2/12

DESCRIPTION	LEGEND	
	EXISTING	PROPOSED
	UTILITIES	
B.O. VALVE		
FIRE HYDRANTS		
CLEAN OUT		
GATE VALVE		
METER		
REDUCER		
CAP		
11.25' ELBOW		
22.5' ELBOW		
45' ELBOW		
90' ELBOW		
CROSS		
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MANHOLES		
ELECTRICAL		
SANITARY SEWER		
STORM DRAIN		
TELEPHONE		
STREET LIGHTS		
100W HPS STL.		
150W HPS STL.		
200W HPS STL.		
250W HPS STL.		
400W HPS STL.		
GRADING		
SPOT ELEV.		
SLOPE		
5' CONT.		
1' CONT.		
SITE		
SIGN		
"L" CURB		
"A" CURB		
EDGE OF PAVT.		
WALL		
LINE TYPES		
CL OR SECTION LINE		
PROPERTY LINE		
RIGHT OF WAY LINE		
EASEMENT LINE		
SAWCUT LINE		
FLOW LINE		
SHADES		
HEAVY AC PAVEMENT		
LIGHT AC PAVEMENT		



EXISTING CONDITIONS BASIN MAP

FIGURE 8

CivilWorks Inc
Engineering with "sensible" solutions tailored to your "specific" needs.

4945 W. Patrick Lane Las Vegas, NV 89118
Office#: (702)534-7555 Fax#: (702)534-1825

CONSULTANT LIST:

HHMSurveyingInc⁴
7865 DEAN MARTIN DRIVE, SUITE 101
LAS VEGAS, NEVADA 89130
OFFICE: (702) 254-1710
FAX: (702) 254-1710

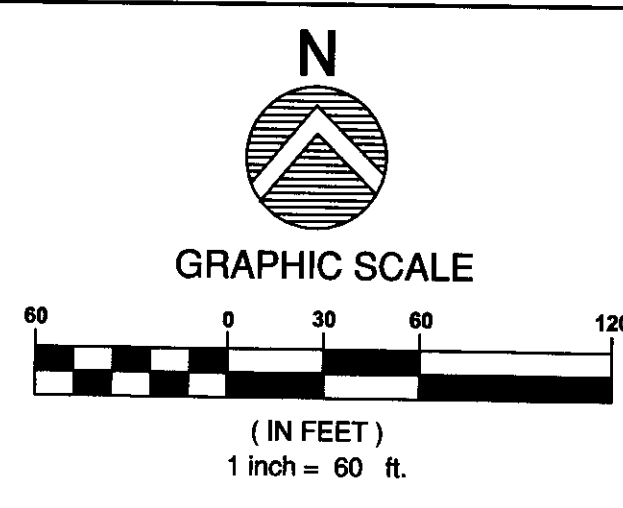
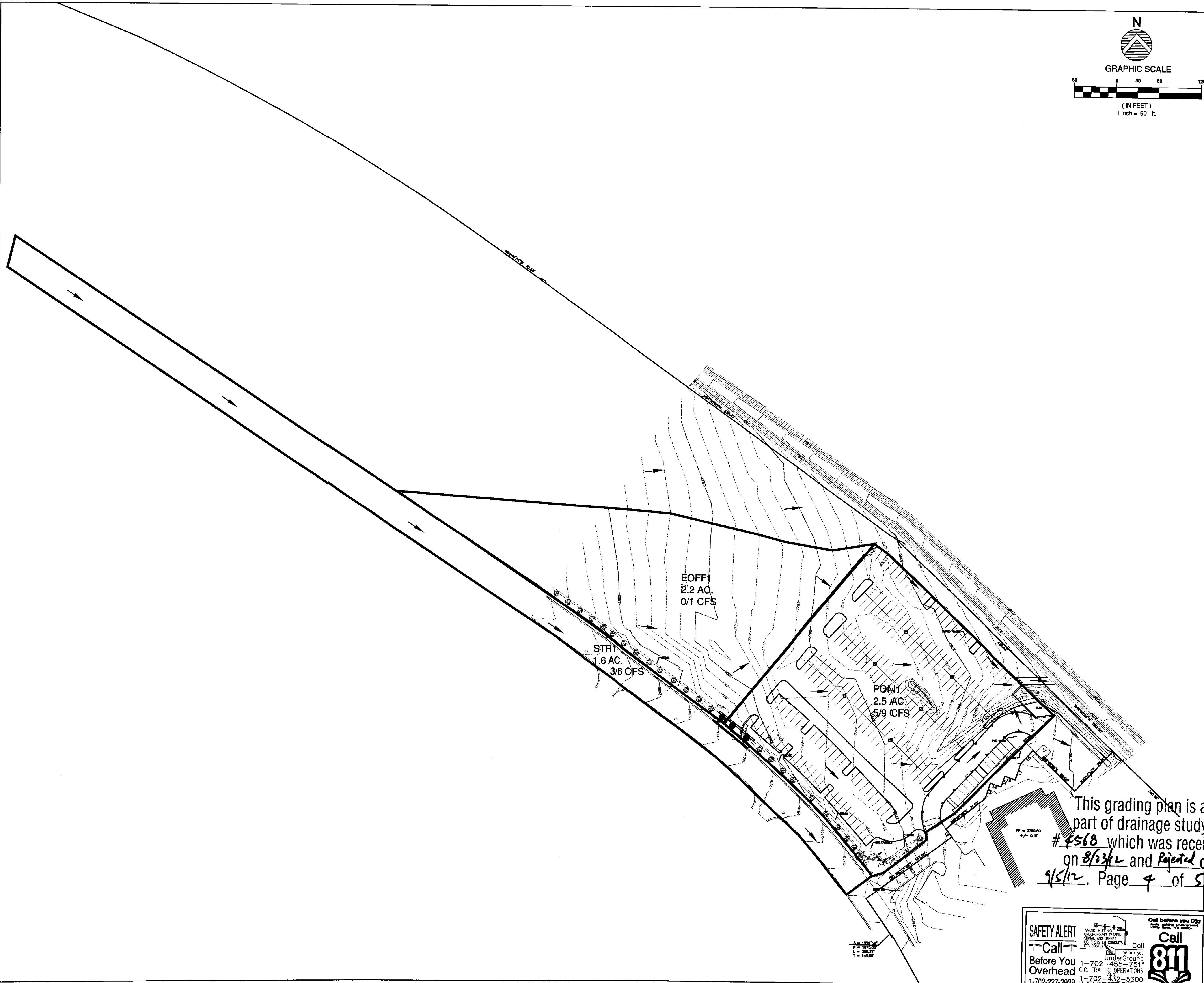
SURFACE PARKING LOT
AT 1450 CENTER CROSSING DRIVE

PROJ. No.	06112015-00	DATE	22 Aug 12
PROJ. ENGR.		TECHN	
PROJ. MGR		FISRT CHG	
REVISIONS:	△		
	△		
	△		
	△		
	△		
	△		



ABBREVIATIONS	
AC	ASPHALTIC CONCRETE
ADJ	ADJUST
AGG	AGGREGATE
BC	BACK OF CURB
BCR	BEGINNING OF CURB RETURN
BEG	BEGIN
BSW	BACK OF SIDEWALK
BVC	BEGINNING OF VERTICAL CURVE
CATV	CABLE TV
CCAUSSD	CLARK COUNTY AREA UNIFORM STANDARD DRAWING
CORFCD	CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
CL	CENTERLINE
CLV	CITY OF LAS VEGAS
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT
COMM	COMMUNICATIONS
CONC	CONCRETE
COND	CONDUIT
CULV	CULVERT
DC	DEPRESSED CURB
DI	DROP INLET
DIP	DUCTILE IRON PIPE
DOM	DOMESTIC
ELEC	ELECTRIC
EAC	EDGE OF AC
EC	END OF CURVE
ECR	END OF CURB RETURN
ELEV	ELEVATION
EP	EDGE OF PAVEMENT
EVC	END OF VERTICAL CURVE
EX	EXISTING
FAST	FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION
FF	FINISH FLOOR
FG	FINISH GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
FO	FIBER OPTICS
FS	FINISHED SURFACE
G	GAS
GB	GRADE BREAK
HDPE	HIGH DENSITY POLYETHYLENE
HDWL	HEADWALL
HGL	HYDRAULIC GRADE LINE
HP	HIGH POINT
INV	INVERT
IRR	IRRIGATION
LAT	LATERAL
LF	LINEAL FEET
LS	LANDSCAPE
LT	LEFT
LVWWD	LAS VEGAS VALLEY WATER DISTRICT
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MTR	METER
NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
PB	PULL BOX
PL	PROPERTY LINE
PP	POWER POLE
PROP	PROPOSED
PVC	POLY VINYL CHLORIDE PIPE
PVMT	PAVEMENT
RT	RIGHT
ROW	RIGHT-OF-WAY
SS	SANITARY SEWER
SD	STORM DRAIN
SNWA	SOUTHERN NEVADA WATER AUTHORITY
STA	STATION
STLT	STREET LIGHT
SVZ	SIGHT VISIBILITY ZONE
SW	SIDEWALK
TEL	TELEPHONE
TC	TOP OF CURB
TF	TOP OF FOOTING
TW	TOP OF WALL
TYP	TYPICAL
UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
VG	VALLEY GUTTER
WL	WATER LINE

LEGEND		
DESCRIPTION	EXISTING	PROPOSED
UTILITIES		
B.O. VALVE		
FIRE HYDRANTS		
CLEAN OUT		
DATE VALVE		
METER		
REDUCER		
CAP		
11.25' ELBOW		
22.5' ELBOW		
45' ELBOW		
90' ELBOW		
CROSS		
TEE		
MANHOLES		
ELECTRICAL		
SANITARY SEWER		
STORM DRAIN		
TELEPHONE		
STREET LIGHTS		
100W HPS STLT.		
150W HPS STLT.		
200W HPS STLT.		
250W HPS STLT.		
400W HPS STLT.		
GRADING		
SPOT ELEV.		
SLOPE		
5' CONT.		
1' CONT.		
SITE		
SIGN		
"L" CURB		
"A" CURB		
EDGE OF PAVT.		
WALL		
LINE TYPES		
CL OR SECTION LINE		
PROPERTY LINE		
RIGHT OF WAY LINE		
EASEMENT LINE		
SANICUT LINE		
FLOW LINE		
SHADES		
HEAVY AC PAVEMENT		
LIGHT AC PAVEMENT		
CONCRETE PAVEMENT		



CivilWorksInc
Engineering with "sensible" solutions tailored to your "specific" needs.

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Las Vegas, NV 89118
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CONSULTANT LIST:
MMH Surveying Inc.
1000 S. DEAN MARTIN DRIVE, SUITE 101
LAS VEGAS, NEVADA 89147
PHONE: (702) 296-7110

OWNER/DEVELOPER: TKC DESIGN
9225 W. FLAMINGO ROAD
LAS VEGAS, NV 89147
PHONE: 702-228-9651
CONTACT: JOHN DARIN

DATE: 22 AUG 12	DATE: 22 AUG 12
PROJECT: 106112013.00	PROJECT: 106112013.00
PROJ. NO: 106112013.00	PROJ. NO: 106112013.00
PROJ. NAME: SURFACE PARKING LOT	PROJ. NAME: SURFACE PARKING LOT
REVISIONS:	REVISIONS:
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3	3
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5	5
6	6
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100	100

SAFETY ALERT
Call before you Dig
1-800-4-A-ROAD
1-800-455-7511
1-702-227-2929

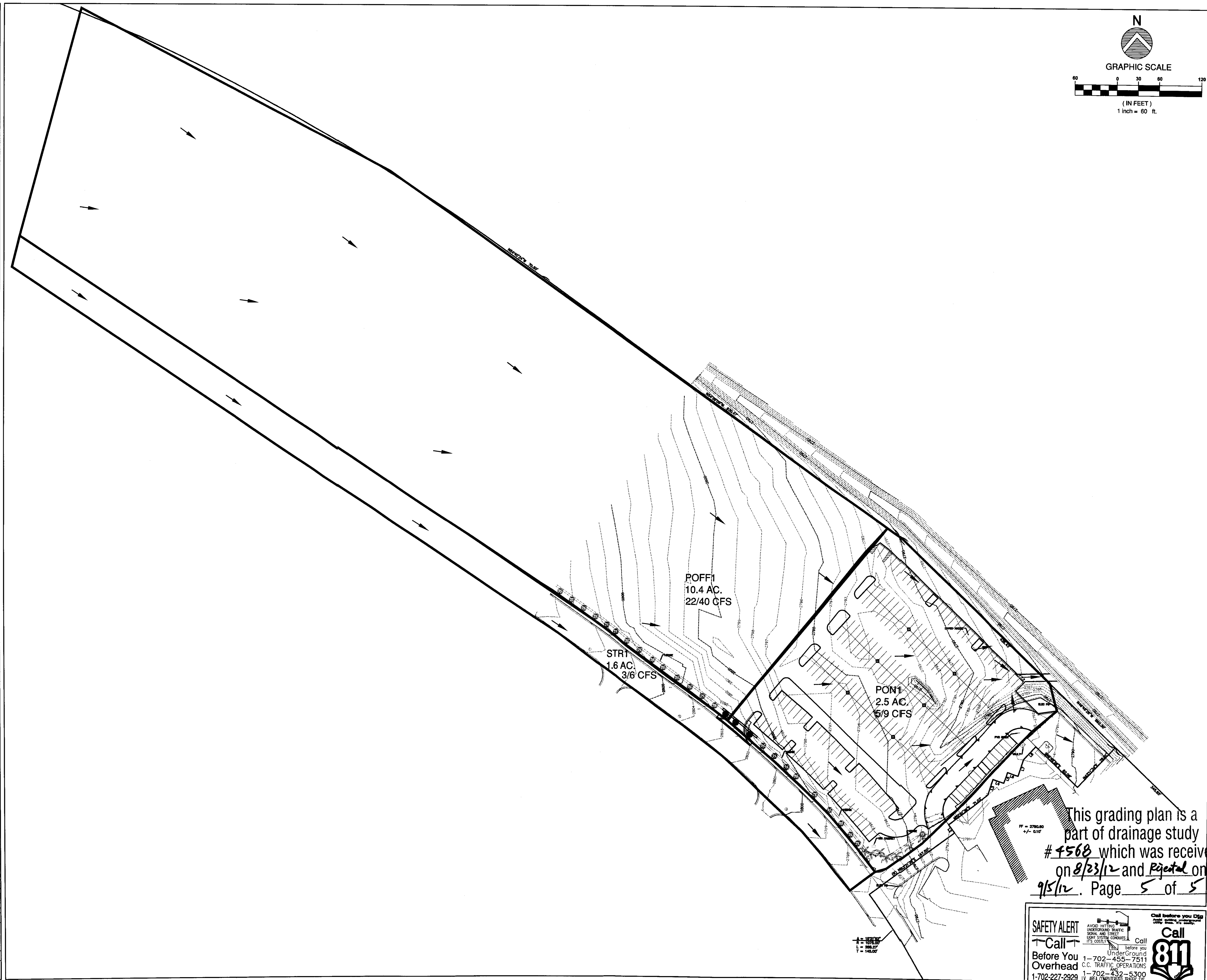
Call before you Dig
1-800-4-A-ROAD
1-800-455-7511
1-702-227-2929

Call before you Dig
1-800-4-A-ROAD
1-800-455-7511
1-702-227-2929

INTERIM CONDITIONS BASIN MAP

FIGURE 9

LEGEND		
DESCRIPTION	EXISTING	PROPOSED
UTILITIES		
B.O. VALVE		
FIRE HYDRANTS		
CLEAN OUT		
GATE VALVE		
METER		
REDUCER		
CAP		
11.25' ELBOW		
22.5' ELBOW		
45' ELBOW		
90' ELBOW		
CROSS		
TEE		
MANHOLES		
ELECTRICAL		
SANITARY SEWER		
STORM DRAIN		
TELEPHONE		
STREET LIGHTS		
100W HPS SILT.		
150W HPS SILT.		
200W HPS SILT.		
250W HPS SILT.		
400W HPS SILT.		
GRADING		
SPOT ELEV.	(12.34)	12.34 TC
SLOPE	(1.2%±)	1.23%
5' CONT.		
1' CONT.		
SITE		
SIGN		
"L" CURB		
"A" CURB		
EDGE OF PYMT.		
WALL		
LINE TYPES		
CL OR SECTION LINE		
PROPERTY LINE		
RIGHT OF WAY LINE		
EASEMENT LINE		
SANCTUARY LINE		
FLOW LINE		
SHADES		
HEAVY AC PAVEMENT		
LIGHT AC PAVEMENT		
CONCRETE PAVEMENT		



FUTURE CONDITIONS BASIN MAP

FIGURE 10

CivilworksInc
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Office#: (702)534-7555 Fax#: (702)534-1825

CONSULTANT LIST:

HHH Surveying Inc.¹
7625 DEAN MARTIN DRIVE, SUITE 101
LAS VEGAS, NEVADA 89139
TEL: (702) 264-1770
FACSIMILE F: (702) 264-1770

SURFACE PARKING LOT
AT 1450 CENTER CROSSING DRIVE

OWNER/DEVELOPER: TKC DESIGN
9225 W. FLAMINGO ROAD
LAS VEGAS, NV 89147
PHONE: 702-228-9551
CONTACT: JOHN DARIN

PROJECT No.	108112015.00	DATE	22 Aug 12
FOR		TECHN.	
PROJECT		CODE	
NO.		CHG.	
REVISIONS: 			
			
			
			
			
			



SAFETY ALERT

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811

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 UnderGround
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 LV AREA COMPUTERIZED TRAFFIC SYS.



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BOB COFFIN
BOB BEERS

ELIZABETH N. FRETWELL
CITY MANAGER

September 27, 2012

Mr. Kevin Budny
1451 Center Crossing Drive, LLC
10000 West Charleston Boulevard, Suite #260
Las Vegas, Nevada 89135

Re: CRG-46741 - CITY REFERRAL GROUP

Dear Mr. Budny:

Your request for possible action on a request for a Minor Amendment of an approved Summerlin Site Development Plan Review (SV-0016-01) FOR A PROPOSED PARKING LOT EXPANSION on a portion of 26.5 acres at 1451 Center Crossing Road (APN 138-30-113-018), P-C (Planned Community) Zone, Ward 2 (Beers), was considered by the City Referral Group on Wednesday, September 26, 2012.

The City Referral Group **APPROVED** your request subject to the following:

Department of Planning

1. Conformance to the Conditions of Approval for Rezoning (Z-0044-87) shall be required, except as amended herein.
2. Conformance to the requirements and conditions of the Summerlin Non-Residential Design Review Committee (SNRDDC) Preliminary Design Approval addressed in a letter dated 08/20/12.
3. This approval shall be void two years from the date of final approval, unless exercised pursuant to the provisions of LVMC Title 19.18. An Extension of Time may be filed for consideration by the City of Las Vegas.
4. All development shall be in conformance with the site plan and landscape plan date stamped 09/05/12, except as amended by conditions herein.
5. These Conditions of Approval shall be affixed to the cover sheet of any plan set submitted for building permit.
6. Parking lot lighting standards shall be no more than 30 feet in height and shall utilize downward-directed lights with full cut-off luminaries.

CITY OF LAS VEGAS
DEPARTMENT OF PLANNING
DEVELOPMENT SERVICES CENTER
333 NORTH RANCHO DRIVE
3RD FLOOR
LAS VEGAS, NEVADA 89106

VOICE 702.229.6301

FAX 702.474.0352

TTY 702.386.9108

www.lasvegasnevada.gov



Mr. Kevin Budny
SRG-46741 - Page Two
September 27, 2012

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

Public Works

8. Remove all substandard public street improvements, if any, adjacent to this site and replace with new improvements meeting current City Standards concurrent with on-site development activities. All existing public improvements adjacent to this site damaged during construction shall be repaired at the applicant's expense. We note that the driveways for this site are acceptable as shown on the approved site plan.
9. All landscaping and private improvements installed with this project shall be situated and maintained so as not to create sight visibility obstructions for vehicular traffic at all development access drives and abutting street intersections. No structures and no trees or vegetation taller than three feet shall be allowed within the existing public sewer easement as shown on the approved site plan.
10. A Drainage Plan and Technical Drainage Study, such as DS4568, must be submitted to and approved by the Department of Public Works prior to the issuance of any building or grading permits or submittal of any construction drawings, whichever may occur first. Provide and improve all drainageways recommended in the approved drainage plan/study.
11. Site development to comply with all applicable Summerlin Development and Improvement Standards.

This action by the City Referral Group on September 26, 2012 is final unless a written appeal is filed with the Director of the Department of Planning within ten (10) days of the date of the City Referral Group's decision.

Sincerely,



Yorgo Kagafas, AICP
Senior Planner
Department of Planning
Case Planning Division

YK:clb

cc: Mr. John J. Darin
The Korte Company
9225 West Flamingo Road, Suite #100
Las Vegas, Nevada 89147