DS #: 4576

APN: 125-27-113-006

PROJECT: The collision center

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:

CITY OF LAS VEGAS **INTER-OFFICE MEMORANDUM**				**DATE:** **November 26, 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: **The Collision Center**			**COPIES TO:** Rietz Consulting Inc.
Cross Streets:	NWQ of Azure Drive & Tenaya Way			Centennial Property LLC
File Number:	F:\Depot\DSMemos\DS4576A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-27-113-006			
Zoning Action:	SUP-46275; SDR-46278 & MOD-46280			
FEMA Flood Zone	YES	NO	**X**	
Proposed Storm Drain	YES	NO	**X**	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	11/13/2012	11/26/2012	See Comments Below	$400.00	301650: $400
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS:

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

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

1. Per **Condition #3** of **SDR-46278**, a six-foot tall wrought iron fence shall be installed along the portion of the north perimeter that is adjacent to the secured outside storage area. This required wrought iron fence should have been reflected in **Section Detail 6/DT1** but to no avail. Review and revise accordingly.

2. Referencing **Section Details 3/DT1**, **4/DT1** and **5DT1** with the grading plan, it appears that a proposed chain link fence does not align with the west property line continually. Explain why is that? It is recommended that the chain link fence be constructed at the west property line and show as such in the pertinent details.

3. Per the grading plan, the engineer/developer proposes to accept offsite flow from the west into the subject site and perpetuates southerly into *Azure Drive* for ultimate discharge. There are two options: i) Grant a public drainage easement (privately maintained) along the west boundary and to be recorded by separate document; or ii) Provide an offsite swale along the west boundary and obtain a notarized letter from the adjacent property owner for permission of offsite grading. Either one of the above options must be finished prior to the final approval of the drainage study.

4. Label an existing storm drain system in *Azure Drive* with *City of Las Vegas* recorded construction drawing number on the grading plan.

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

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

END OF REMARKS

ays

T/R/S: T19S/R60E/27

AREA G-27

****
*** FAX TX REPORT ***
****

TRANSMISSION OK

JOB NO.	0315
DESTINATION ADDRESS	2123963
PSWD/SUBADDRESS	
DESTINATION ID	
ST. TIME	11/26 16:57
USAGE T	00'42
PGS.	2
RESULT	OK

CITY OF LAS VEGAS
INTER-OFFICE MEMORANDUM

DATE: November 26, 2012

TO:
Land Development Services
Department of Public Works

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

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Centennial Property LLC
Bart Anderson, P.E., DevCo

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Rec'd: 11/13/12

DS4576

G-27

$400-

SDR-46278
SUP-46275
MOD-46280

RIETZ CONSULTING INC.

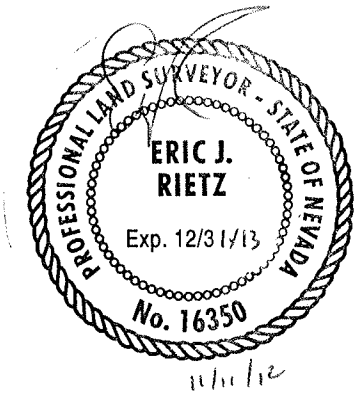
5740 S. Arville Suite 206
Las Vegas, NV 89118
Phone: 702-521-3355
Fax: 702-212-3693

TECHNICAL DRAINGAGE STUDY
FOR
The Collision Center

Las Vegas, Nevada

Job No.: Collision Center
Date: November 2012

Prepared By:
Rietz Consulting Inc.
5740 S. Arville Suite 206
Las Vegas, NV 89118
Phone: 702-521-3355
Fax: 702-212-3693



Prepared For:
Centennial Property, LLC
Michael Spears
700 N. Gibson Rd.
Henderson, NV 89011
Phone: 702-245-4177

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Collision Center Date: Nov 12, 2012

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

East/West: Azure

b) Section: 27 Township: 19 S Range: 60 E

c) APN : 125-27-113-006

Name of Owner: Centennial Property LLC

Telephone No.: 702-245-4177 Fax No.: E-Mail Address:

Address: 700 N. Gibson Rd. Henderson, NV 89011

Contact Person-Name: Eric Rietz **Telephone No.:** 702-521-3355

* **E-Mail Address:** eric.rietz@gmail.com **Fax No.:** 702-212-3963

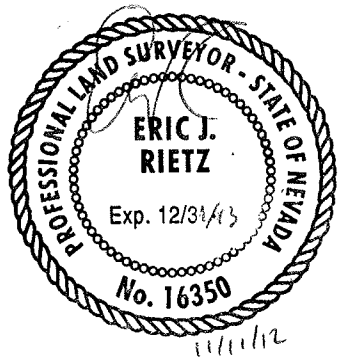
Firm: Rietz Consulting, Inc.

Address: 5740 S Arville # 206 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: 5.3 Being Developed/Disturbed: 5.3
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: 1.6 AC
6. Has the site drainage been evaluated in the past? ☒ **YES** ☐ **NO** If yes, please identify documentation: DS2525, DS4104, DS3449, AND DS3989
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: sheet flow to Azure
8. Briefly describe your proposed schedule for the subject project: To begin as soon as plans are approved.



11/11/12

Engineer's Seal

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

*New Required Field

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

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: THE COLLISION CENTER	Map ID: 32003C1745E
Firm Name: RIETZ CONSULTING	Engineer: ERIC RIETZ
Address: 5740 S. ARVILLE #206	
City: LAS VEGAS State: NV Zip: 89118	
Phone Number: 521-3355	Fax Number: 212-3963
Property Owner: Centennial Property, LLC.	
Address: 700 N. Gibson Rd.	
City: Henderson State: NV Zip: 89011	

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**

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**

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 basin s 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**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
____	____	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit.
____	____	Building and/or lot numbers.
____	____	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
____	____	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.
____	____	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**

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

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

REFERENCE:	**STANDARD FORM 2**

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

The following checklist is intended as a supplemental guide for the engineer preparing a Technical Drainage Study submittal to the City of Las Vegas. This supplement focuses on requirements specific to the City of Las Vegas. The requirements presented are in addition to the Clark County Regional Flood Control District (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	
		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.)

II. GRADING PLAN INFORMATION		
Yes	No	
		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.
		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.)
		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.
		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	
		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.
		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.
		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.
		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.
		Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
		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.
		Bubblers are required across 80 foot and greater ROW streets. When flows exceed 10 cfs, bubblers larger than 18 inches will be required up to a maximum of 36". Inlets must be sized to match the pipe size provided.

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

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

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1.4 CCRFCD Facility Information 1
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- Approval Letters
- Approved Drainage Study/Drainage Maps

Appendix F Reference Material
Technical Drainage Study for Tenaya Commercial (Ref. 7)
- Approval Letters
- Approved Drainage Study/Drainage Maps

Appendix G Reference Material
Technical Drainage Study for Tenaya Village Phase 1 Mini Storage- Update to Montecito East (Ref. 8)
- Approval Letters
- Approved Drainage Study/Drainage Maps

Appendix H Reference Material
Technical Drainage Study for Regena Substation (Ref. 9)
- Approval Letters
- Approved Drainage Study/Drainage Maps

Appendix I 2008 MPU Figure H-19

Appendix J Conditions of Approval

Appendix K Plans, Profiles and Details

1 INTRODUCTION

1.1 Project Overview & Study Purpose

Centennial Property, LLC. is proposing to develop a 5.63 ± acre parcel approximately 850-feet west of the intersection of Azure Drive and Tenaya Way in the City of Las Vegas, Nevada. The development is identified as *The Collision Center* (hereafter referred to as the project site) and proposes an Auto Body Facility on a paved lot.

1.2 Site Description

The project site is bound by the improved Azure Drive to the south, NV Energy substation to the north, undeveloped parcel (APN 125-27-101-035) to the west, and a commercially developed parcel (APN 125-27-113-007) to the east. The Assessor's parcel number is APN 125-27-113-006, located in Township 19 South, Range 60 East, Section 27. A location Map identified as Exhibit A is included in Appendix A for reference.

1.3 FEMA Flood Zone Designation

The project site is located within a FEMA designated Zone X as shown on Flood Insurance Rate Map (FIRM) Panels 32003C1745E, revised September 27, 2002. A Zone X is described as an area determined to be outside the 0.2% annual chance floodplain. Exhibit B identifying the project site on the FIRM Panel has been included in Appendix A for reference.

1.4 CCRFCD Facility Information

Figure F-19 from the 2008 Las Vegas Valley Flood Control Master Plan Update (MPU, Ref. 1) shows that the site is not adjacent to any existing and/or proposed Regional Facilities. Therefore, CCRFCD concurrence will not be required. Exhibit C identifying the project site on the MPU figure F-19 has been included in Appendix A for reference.

1.5 Reference Studies

The study entitled, *Technical Drainage Study for Tropical Parkway* (Tropical Parkway Study, Ref. 6) prepared by Primas and Associates and approved by The City of Las Vegas (CLV DS# 2525) had previously been prepared for the site. The previously approved Tropical Parkway Study comprised of approximately 53 acres in the area known as Montecito East. Since the approval of this study in January 2000 several parcels adjacent to Azure Drive have been developed or analyzed under the following approved studies:

1. The study entitled, *Technical Drainage Study for Tenaya Commercial* (Tenaya Commercial Study, Ref. 7) prepared by Wood Rodgers, Inc. and approved by The City of Las Vegas (CLV DS# 4104) was utilized to determine the drainage patterns for the existing developed and undeveloped properties surrounding to the project

site. The study comprised of Parcel 125-27-222-013, approximately 2.33 acres. Relevant reference material for the Tenaya Commercial Study has been included in the Appendix F.

2. The study entitled, *Tenaya Village Phase 1 Mini Storage- Update to Montecito East* (Tenaya Village Phase 1 Study, Ref. 8) prepared by Tetra Tech. Inc. and approved by The City of Las Vegas (CLV DS #3449) was utilized to determine the drainage patterns for the existing developed and undeveloped properties surrounding to the project site. The Study comprised of Parcels 125-27-113-005 & 007, approximately 8.57 acres. Relevant reference material for the Tenaya Village Phase 1 Study has been included in the Appendix G.

3. The study entitled, *Technical Drainage Study for Regena Substation* (Regena Substation Study, Ref. 9) prepared by Wright Engineers and approved by The City of Las Vegas (CLV DS #3989) was utilized to determine the drainage patterns for the existing developed and undeveloped properties surrounding to the project site. The study comprised of Parcels 125-27-199-020 & 026, 127-27-101-26 and a portion of 127-27-101-035, approximately 4.82 acres. Relevant reference material for the Regena Substation Study has been included in the Appendix H.

The above mentioned studies have been reviewed and determined acceptable references. Relevant reference material for the Tropical Parkway Study has been included in the Appendix E. The study and the improvement plans identified below

2 METHODOLOGY

2.1 Compliance

The methodologies utilized in the preparation of this study are in compliance with the Clark County Regional Flood Control District's Hydrologic and Drainage Design Manual (CCRFCD Manual, Ref. 2).

2.2 Hydrologic Modeling

Modeling: The SCS Unit Hydrograph Method (SCS Method) was utilized to determine peak flow rates. The SCS Method utilizes precipitation, drainage area, curve number and lag time parameters to determine peak flow rates. The SCS Method routine within the U.S. Army Corp of Engineers HEC-1 Flood Hydrograph Package Program (Ref. 4) was utilized to model the drainage subbasins analyzed by this study. Furthermore, for consistency, all sub-basins have been named to reflect previous drainage studies.

Precipitation: The site is located within the McCarran Rainfall Area, per CCRFCD Manual Figure 513. The precipitation values utilized in the HEC-1 models, per CCRFCD Manual Table 505 are 1.58 and 2.77 inches for the 10-year and 100-year storm events, respectively. In addition, since the drainage area of the contributing watershed is less than

8 square miles, the SDN 3 design storm contribution as taken from Table 503 in the CCRFCD Manual has been used. Reference tables and figures from the CCRFCD Manual are included in Appendix B.

Curve Number: The SCS curve number loss rate methodology was utilized to approximate infiltration for the drainage subbasins. The soils information within the watershed was obtained from the SCS Soil Survey of the Las Vegas Valley Area (Soil Survey, Ref. 3). Exhibit D depicts this study's project boundary on the soils map and has been included in Appendix A. Per the Soil Survey, the project site lies within Soil Types 192 (Dalian) and 305 (Las Vegas) which is comprised of Hydrologic Soil Groups 'B' and 'C' respectively.

The existing project site and undeveloped offsite tributary areas utilized composite curve numbers of 77 and 85 (Ref. 2 & 3), corresponding to 'desert shrub in poor condition' per CCRFCD Manual Table 602 (4 of 4). The developed site and developed offsite basins were analyzed based on a curve number 92 and 94, consistent with 'commercial' land use for hydrologic soil group 'B' and 'C'.. All soil and curve number data and computations, including CCRFCD Manual reference tables, have been included in Appendix B.

Lag Time: The lag time is defined as the time measured from the center mass of effective rainfall to the time to peak of the outflow hydrograph. The lag time is related to the time of concentration as 0.6 times the time of concentration. The time of concentration is defined as the time required for runoff to flow from the hydraulically most distant point of a subbasin to the outlet point of the subbasin. Standard Form 4, as outlined in the CCRFCD Manual, was utilized to determine the lag times for subbasins modeled. A copy of the lag time computations is included in Appendix B.

2.3 Hydraulic Modeling

Street Flow: Street flow has been analyzed utilizing the Flowmaster Version 5.13 software by Haestad Methods (Ref. 5). In accordance with the CCRFCD Manual, the velocity times depth factor (v x d) for street flow for the 100-year storm event must be less than or equal to 8 with a maximum depth of 2 feet. The velocity times depth factor (v x d) for street flow for the 10-year storm event must be less than or equal to 6 with a maximum depth of 1 foot.

3 EXISTING DRAINAGE CONDITION

3.1 Definition of Existing Drainage Condition

The existing drainage condition considers the site and tributary area in its current condition as it exists today with all sub-basins delineated based on the approved Tropical Parkway (Ref. 6), Tenaya Commercial Study (Ref. 7), and a recent site visit and topographic survey.

The project site is undeveloped with sparse desert shrub and generally slopes in a southeasterly direction. The parcel directly west of the project site is also undeveloped and generally slopes in a southeasterly direction. The parcel directly north of the project site is developed and generally slopes in the northeasterly direction towards Regena Avenue. Azure Drive to the south and adjacent Tenaya Village access road to the east are fully developed and generally slope to the east and south respectively.

3.2 Discussion of Existing Drainage Condition

Refer to Exhibit E, included in Appendix A, for a detailed illustration of the existing condition drainage patterns.

The project site lies within the Montecito East area which was originally analyzed as part of the Tropical Parkway Study (Ref. 6). Subsequent to the approval of the Tropical Parkway Study (Ref. 6), several surrounding parcels were developed which changed this study's initial assumptions. The revised analysis was presented in the Tenaya Commercial Study (Ref. 7).

The project site was previously identified as a portion of basin EXOFF1 in the Tenaya Commercial Study (Ref. 7). However, for this study, basin EXOFF1 (Ref. 7) was split into three (3) separate basins, OF1, OF2, and ON1, based on the current parcel lot lines and topographic survey. Flow generated by undeveloped basins OF1, OF2, and ON1 drain southeasterly towards Azure Drive. This flow combines with flows contained within the Azure Drive right-of-way (EXOFF2, Ref. 7) at combination point CPW (Ref. 7) before continuing east towards Tenaya Way (see exhibit E, Appendix A).

Azure Road includes an existing 36-inch storm drain pipe that connects into Tenaya Way storm drain system. This storm drain pipe in Azure Drive is designed to convey 55 cfs per the referenced Tropical Parkway Study (Ref. 6). Flow contained within this storm system will continue down Tenaya Way eventually combining with the regional flood control facilities 54-inch RCP (ANWE 0385) in Ann Road. See Exhibit C, figure F-19 for reference to the 2008 MPU CCRFCD Facilities Map.

The flows generated by the undeveloped and developed offsite basins OFFD1 & OND1 (Ref. 9) north of the project site drain northeasterly into the Regena Avenue right-of-way. These flows continue east within Regena Avenue towards Tenaya Way and do not impact the project site.

3.3 Summary of Existing Condition Flows

A summary of existing condition flow rates, as determined by the HEC-1 Analysis, is presented in Table 1. Refer to Appendix F for the existing condition HEC-1 Analysis (Ref. 4).

Table 1: Summary of Existing Condition Flow Rates			
Basin ID/ Concentration Point	**Area (ac)**	**Q_{100} (cfs)**	**Q_{10} (cfs)**
ON1	5.39	10	4
OF1	3.54	4	1
OF2	0.52	2	1
CPW*	N/A	171	72

*Tenaya Commercial Study, CPW = 169/70 cfs, EXOFF1 = 14/4 = Q100/Q10 cfs
EXOFF1 = ON1 + OF1 + OF2 = 16/6 = Q100/Q10 cfs,
increase of 2/2 cfs to CPW = 171/72 cfs

4 PROPOSED DRAINAGE CONDITION

4.1 Definition of Proposed Condition

The proposed drainage condition considers the site fully developed with a parking lot and Auto Body Facility. Street improvements to Azure Drive adjacent to the project site are complete and all surrounding offsite parcels are considered to be fully developed.

4.2 Discussion of Proposed Condition

Refer to exhibit F, included in Appendix A, for a detailed illustration of the proposed condition drainage patterns. The offsite sub-basin boundaries used in the proposed condition HEC-1 model are the same as those used in the existing condition model.

The project site was previously identified as a portion of basin UTOFF1 in the Tenaya Commercial Study (Ref. 7). For the ultimate condition of this study, basin UTOFF1 (Ref. 7) was split into five (5) separate basins, DON1A, DON1B, DON1C, DOF1, and DOF2, based on the current parcel lot lines and onsite grading.

The Flow generated by developed basin DON1A drains southeasterly combining with DOF2 at combination point CP1. Basin DON1C also flows southeasterly combining with the flows generated by basins DON1A and DOF2 at combination point CP2.

Flow generated by developed offsite basin DOF2 drains southeasterly combining with basin UTOFF2 (Ref. 7) within the Azure Drive right-of-way. DON1B drains south through the developed project site and combines with basins DOF2 and UTOFF2 (Ref. 7) within the Azure Drive right-of-way. These flows continue east along Azure Drive before ultimately combining with flows from DON1A, DOF2, and DON1C at combination point CPW. Flow from Combination Point CPW is conveyed east through the Azure Drive right-of-way to Tenaya Way.

4.3 Summary of Proposed Condition Flows

A summary of proposed condition flow rates, as determined by the HEC-1 Analysis, is presented in Table 2. Refer to Appendix C for the proposed condition HEC-1 Analysis.

Table 2: Summary of Proposed Condition Flow Rates

Basin ID/ Concentration Point	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
DON1A	1.93	6	3
DOF2	0.52	2	1
CP1 (DON1A+DOF2)	N/A	8	4
DON1C	0.84	3	1
CP2 (CP1+DON1C)	N/A	11	5
DOF1	3.54	10	5
DON1B	2.61	9	4
CPW*	N/A	228	115

*Tenaya Commercial Study, CPW = 224 cfs, EXOFF1 = 26/13 = Q100/Q10 cfs
EXOFF1 = ON1 + OF1 + OF2 = 30/14 = Q100/Q10 cfs,
increase of 4/1 cfs to CPW = 228/15 cfs

The proposed condition flowrates presented herein have been compared to the existing condition flowrates for the project site. Table 3 below summarizes the results of the comparison.

Table 3: Flow Rate Comparison (Existing Condition vs. Proposed Condition)

Location	Existing Condition $Q_{100/10}$ (cfs)	Location	Proposed Condition $Q_{100/10}$ (cfs)
CPW	171/72	Azure Drive/East Access Drive	228/115
CPW*	169/70	Azure Drive/East Access Drive	224/114

*Tenaya Commercial Study, CPW = 22 cfs

Upon review of Table 3, it is determined that the proposed condition for the project site produces an increase in the 100/10-year flows from the existing condition at Combination Point CPW (57/43). However, the increase is consistent with approved Tropical Parkway (Ref. 6) and Tenaya Commercial Studies (Ref. 7) at Combination Point CPW (55/44). Note that the increase is due to the increase in curve numbers based on the proposed land cover. The proposed development is based on 'commercial' land use, which is consistent with the previous approved Tropical Parkway (Ref. 6) and Tenaya Commercial Studies (Ref. 7). This use matches the anticipated land use of 'commercial', as analyzed with the 2008 MPU. See figure H-19 located in Appendix I for reference to the MPU land use. Since downstream facilities are designed based on the developed condition, the proposed

increase will not result in negative impacts to downstream facilities and/or property. Therefore, the proposed development is considered acceptable.

4.4 Summary of Proposed Condition Street Flows

The perimeter street of Azure Drive has been hydraulically analyzed to show that the flow in the roadway meets criteria as set forth in the CCRFCD Manual and as outlined in Section 2.3 of this report.. The street flow hydraulic computations have been included in Appendix D and are summarized in Table 4 below.

Table 4: Summary of Proposed Condition Street Flow Hydraulics

Section	Slope (%)	Q_{10} (cfs)	Q_{100} (cfs)	Depth 10yr (ft)	Depth 100yr (ft)	V_{10} (fps)	V_{100} (fps)	VxD 10yr	VxD 100yr	Dry Lane Width (ft)
Section 1 *Azure Drive* (Q = CPW)	1.15	60*	173*	0.64	0.86	4.36	5.87	2.8	5.0	39'
Section 2 *E. Acc.Rd* (Q = CP2)	1.97	5	11	0.39	0.49	3.98	4.79	1.55	2.3	N/A

*Tenaya Commercial Study, Azure 36-inch storm drain = 55 cfs, Q100 yr = 228-55 = 173 cfs, Q10 yr = 115-55 = 60 cfs

The flow rates at cross section 1 have been reduced by 55 cfs to account for the flows being conveyed by the Azure Drive storm drain. Therefore, the proposed condition street flow in Azure Drive meets the street flow criteria set forth in the CCRFCD Manual for both the 100-year and 10-year storm events.

The existing eastern access road has been analyzed to show the full containment of the 100-year flows within the existing curb and gutter section.

4.5 Summary of Proposed Condition Recommended Facilities

The facilities proposed with the project site consist of valley gutters, concrete flumes, and sidewalk under-drains.

Two (2) onsite sections have been hydraulically analyzed with this study. Sections 3 and 4 analyze flow from Basins DON1A and DON1B. Section 3 analyzes the upper eastern portion if the project site which conveys flows south and east through the site within a 2-foot-wide valley gutter and pavement section ultimately existing the site along a curb and gutter section. Section 4 analyzes flow conveyed south through the site within a 2-foot-wide valley gutter and pavement section. See Exhibit F located in Appendix A for section locations. The Flowmaster calculations for these sections are included in Appendix D and hydraulic characteristics are summarized in Table 5 below.

Table 5: Summary of Proposed Condition Onsite Section Hydraulics										
Section	**Slope (%)**	**Q_{10} (cfs)**	**Q_{100} (cfs)**	**Depth 10yr (ft)**	**Depth 100yr (ft)**	**V_{10} (fps)**	**V_{100} (fps)**	**VxD 10yr**	**VxD 100yr**	**Dry Lane Width (ft)**
Section 3 (Q = DON1A)	**0.5**	**3**	**6**	**0.36**	**0.45**	**2.02**	**2.31**	**0.73**	**1.04**	**N/A**
Section 4 (Q =DON1B)	**1.2**	**4**	**9**	**0.23**	**0.30**	**2.54**	**3.00**	**0.58**	**0.9**	**N/A**
*Section 4A Q =DON1B+DOF1	**1.2**	**9**	**19**	**0.30**	**0.40**	**3.00**	**3.54**	**0.9**	**1.42**	**N/A**

*combination of basins DON1B and DOF1= Q100/Q10 = 19/9 cfs

Note that the onsite sections have been determined to be adequately designed to convey the flow from Basins DON1A & DON1B. However, if portions of offsite flow from DOF1 were to enter the project site upstream of section 4, flow can still be contained within the proposed facilities and will continue to the southern boundary of the project site along the Azure Drive and no negative impacts will occur as a result.

4.6 Summary of Proposed Condition Finished Floors

The finished floor elevation for the Auto Body Facility meets criteria set forth in the CCRFCD Manual of being a vertical distance above the gutter flow lone of twice the depth of flow in the street in the high side of the lot up to 18-inches or 18-inches above the top of curb or centerline elevation at the middle of the lot, whichever is higher.

5 CONCLUSIONS & RECOMMENDATIONS

1. The project site is not located within a FEMA designated SFHA.

2. The project site is not adjacent to any existing or proposed CCRFCD Regional Facilities; therefore, CCRFCD concurrence will not be required.

3. The finished floor elevation for the proposed Auto Body Facility meets criteria set forth in the CCRFCD Manual.

4. The flow generated by the proposed Auto Body site is higher in the 10-year and 100-year storm events than determined with the existing condition. Since downstream facilities are designed based on the developed condition, the proposed increase will not result in negative impacts to downstream facilities and/or property; therefore, the proposed development is considered acceptable.

5. The grading plans included in Appendix K of this study support the drainage patterns, conclusions and/or recommendation detailed in this study.

6 REFERENCES

1. *Las Vegas Valley Flood Control Master Plan Updat*e. PBS&J, Inc., Louis Berger and Parsons-Brinckerhoff, 2008.

2. *Hydrologic Criteria and Drainage Design Manual*. Clark County Regional Flood Control District, 1990.

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

4. *HEC-1 Flood Hydrograph Package*, dated May 1991, prepared by U.S. Army Corps of Engineers, Version 4.1.

5. *FlowMaster Version* 5.13, dated 1994-1995. Prepared by Haestad Methods Inc.

6. *Technical Drainage Study for Tropical Parkway*, by Primas and Associates, August 1999 (CLV #DS 2525).

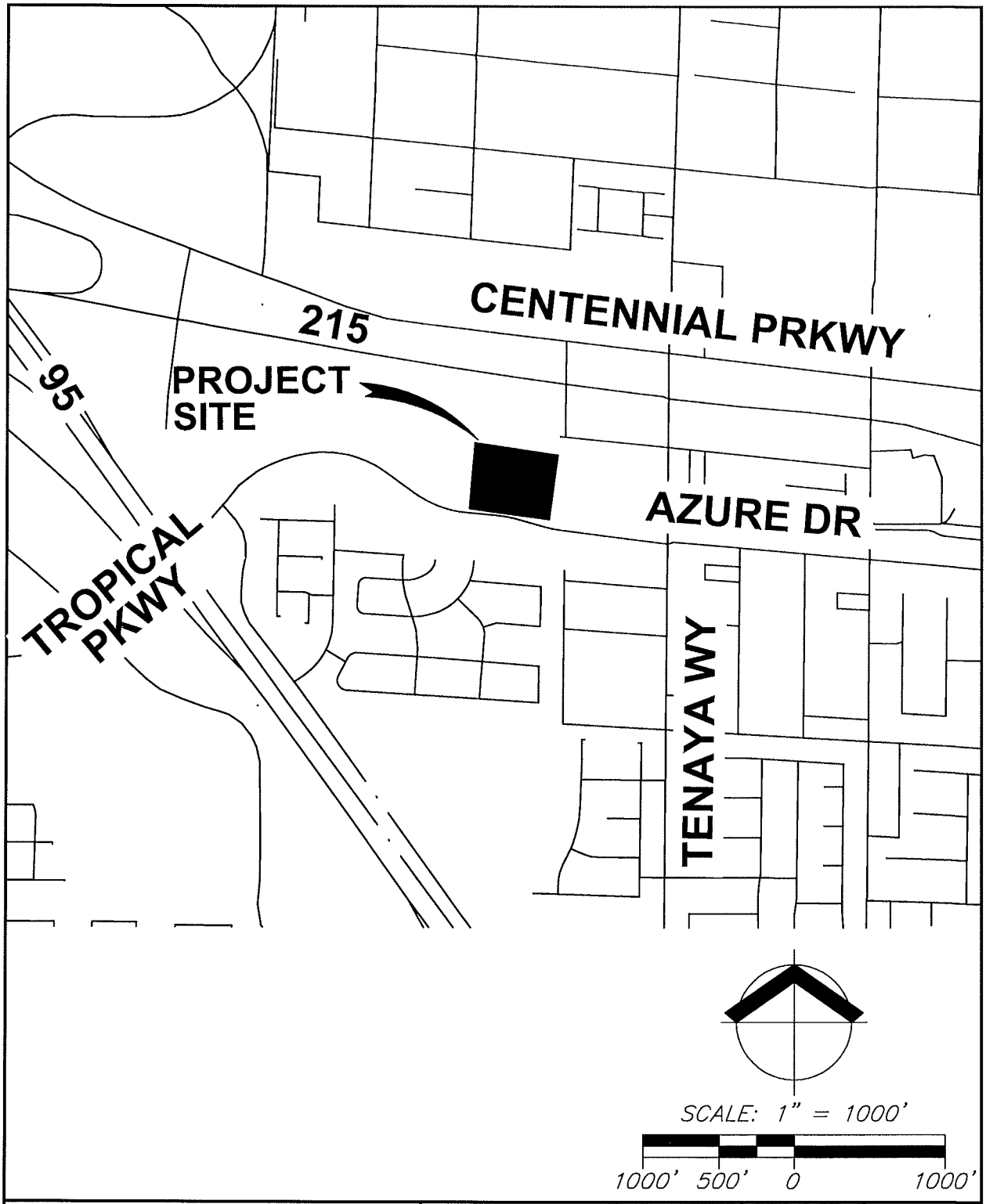
7. *Technical Drainage Study for Tenaya Commercial*, by Wood Rodgers, Inc., February 2007 (CLV #DS 4104).

8. *Technical Drainage Study for Tenaya Village Phase 1 Mini Storage- Update to Montecito East*, by Tetra Tech, Inc., December 2003 (CLV DS# 3449).

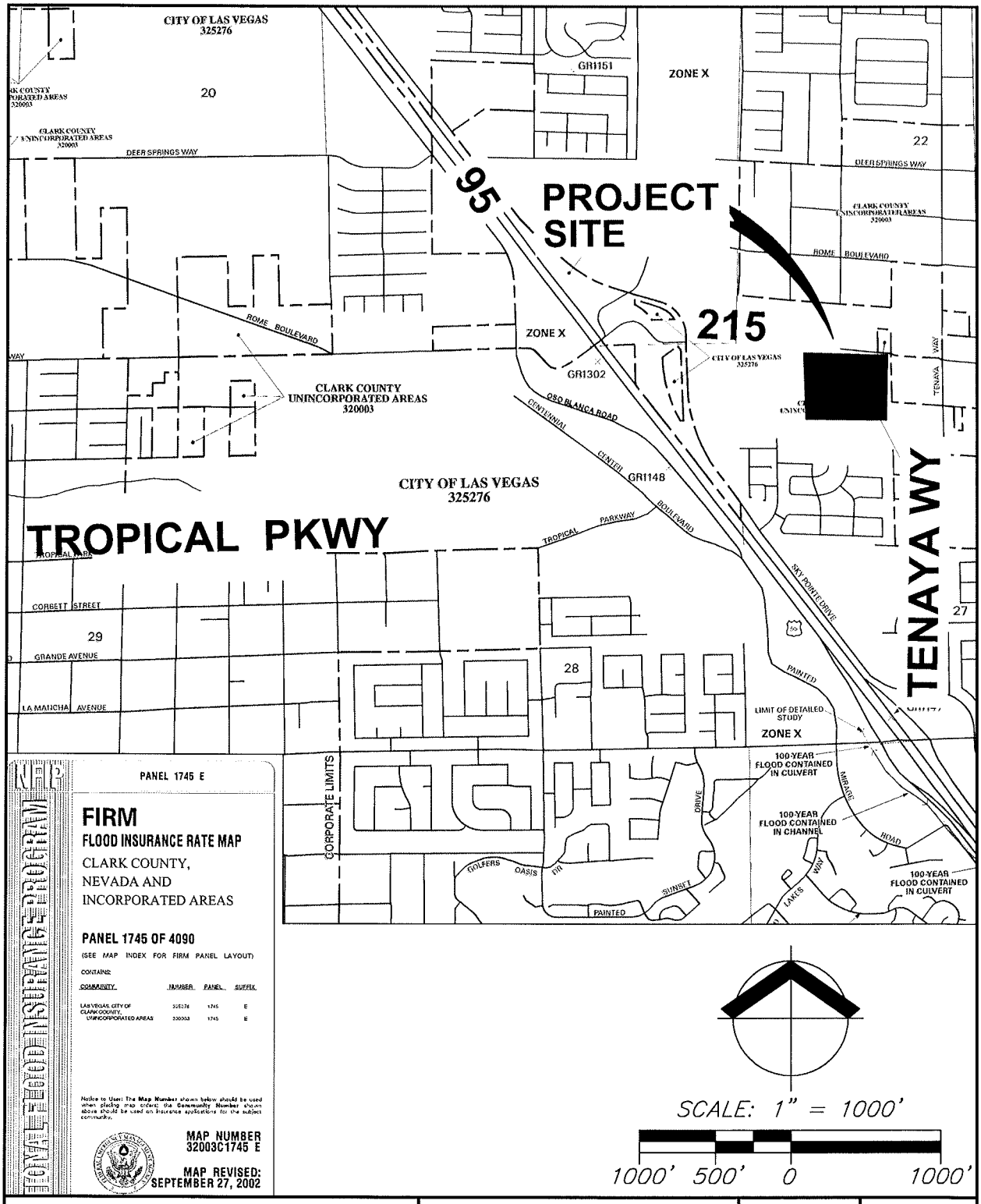
9. *Technical Drainage Study for Regena Substation*, by Wright Engineers, April 2006 (CLV DS# 3989).

APPENDIX A

Drainage Exhibits



RIETZ CONSULTING, INC. 5740 S. ARVILLE ST., STE. 206 LAS VEGAS, NV 89118 PH: (702) 251-3355	THE COLLISION CENTER CENTENNIAL PROPERTY, LLC. LOCATION MAP	DATE: 11-09-12 DRAFTER: MRL DESIGNER: MRL CHECKED: MRL	EXHIBIT A



RIETZ CONSULTING, INC. 5740 S. ARVILLE ST., STE. 206 LAS VEGAS, NV 89118 PH: (702) 251-3355	THE COLLISION CENTER CENTENNIAL PROPERTY, LLC. FIRM MAP	DATE: 11-09-12 DRAFTER: MRL DESIGNER: MRL CHECKED: MRL	EXHIBIT B

APPENDIX B

Precipitation, Curve Number and Lag Time Data

Precipitation Data

Rainfall and Precipitaion Computations

Project Name:	The Collision Center
Date:	11/6/2011
File Name:	COLLISION CNTR HEC
By:	MRL

5740 S. Arville St., Suite 206
Las Vegas NV 89118 Ph. 702-521-3355

DATA:

Project is located in: Township: 19S Range: 60E

Site is located in the McCarren Airport Rainfall Area *Figure 513**

Six Hour Depth Reduction Factors (DARF): *Table 502**

Area (gross acres): 5.36 = 0.008 square miles

DARF = 1.00

Calculations:

P_{10} = 1.58 10-Year Precipitation (in)

P_{100} = 2.77 100-Year Precipitation (in)

P_{10}/P_{100} = 0.57 HEC-1 Multiple Ratio Value

Equations:

P = (Rainfall) * (Precipitaion Adjustment Ratio) * (Depth Area Reduction Factor)

** Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual*

SIX HOUR DEPTH-AREA REDUCTION FACTORS

Drainage Area (Square Miles)	Six-Hour Depth-Area Reduction Factor
0.0	1.00
0.5	0.98
1.0	0.97
2.0	0.93
4.0	0.91
6.0	0.90
8.0	0.88
10.0	0.86
20.0	0.79
30.0	0.74
50.0	0.68
100.0	0.60
150.0	0.55
200.0	0.51
300.0	0.46
400.0	0.42
500.0	0.39

NOTES: 1. A graphical representation of these factors is presented in Figure 514.

2. Consult with the local entity and/or the CCRFCD for guidance in using the Depth-Area Reduction Factors for drainage areas greater than 200 square miles.

Revision	Date

SIX-HOUR STORM DISTRIBUTIONS

Storm Time (In Minutes)	Percent of Total Storm Depth SDN3	SDN4	SDN5	Storm Time (In Minutes)	Percent of Total Storm Depth 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

DEPTH-DURATION-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA

(IN INCHES)

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

NOTE: 1. Refer to Figure 513 for a description and drawing of the area included in the McCarran Airport Rainfall Area.

2. The 24 hour values presented above are for use with TR-55 only.

3. Table 501 adjustments not required.

Revision	Date

WRC ENGINEERING

REFERENCE:
USACE, Los Angeles District, 1988

TABLE 505

Curve Number Data

Soil & Curve Number Computations

Project Name: The Collision Center
Date: 11/6/2011
File Name: COLLISION CNTR HEC
By: MRL

5740 S. Arville St., Suite 206
Las Vegas NV 89118 Ph. 702-521-3355

DATA:

Project is located in the following soil types: Soils Group:

192-Dilian-McCullough- very gravelly fine sandy loam, 0 to 4 percent slpoes B

305 - Las Vegas - Destazo- fine sandy loam, 0 to 2 percent slpoes C

Soil Type 192-Dilian-McCullough

Hydrologic Soils Group	Desert Shrub (poor condition)*	Commercial/ Business*	Streets & Roads (w/curb & gutter)*
B	77	92	98

Soil Type 305 - Las Vegas - Destazo

Hydrologic Soils Group	Desert Shrub (poor	Commercial/ Business*	Streets & Roads (w/curb &
C	85	92	98

EXISTING CONDITIONS

Subbasin	Soil Type	Landuse	CN	Area (Acres)	Composite Cn
ON1	192 B	Desert	77.0	0.68	9.7
	305 C	Desert	85.0	4.70	74.2
			TOTAL	5.39	84.0

DEVELOPED CONDITIONS

Subbasin	Soil Type	Landuse	CN	Area (Acres)	Composite Cn
DON1B	192 B	Comm	92.0	0.56	19.8
	305 C	Comm	94.0	2.05	73.8
			TOTAL	2.61	93.6

** Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual*

Soil & Curve Number Computations

Project Name: The Collision Center
Date: 11/6/2011
File Name: COLLISION CNTR HEC
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DATA:

EXISTING CONDITIONS					
Subbasin	Soil Type	Landuse	CN	Area (Acres)	Composite Cn
ON1	192 B/305 C	Desert	84.0	5.39	84.0
OF1	192 B	Desert	77.0	3.54	77.0
OF2	305 C	Comm.	92.0	0.52	92.0

DEVELOPED CONDITIONS					
Subbasin	Soil Type	Landuse	CN	Area (Acres)	Composite Cn
DON1A	305 C	Comm.	92.0	1.93	94.0
DON1B	305 C	Comm.	92.0	2.61	93.6
DON1C	305 C	Comm.	92.0	0.84	94.0
DOF1	192 B	Comm.	92.0	3.54	92.0
DOF2	192 B	Comm.	92.0	0.52	92.0

** Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual*

United States Department of Agriculture

Soil Conservation Service

In cooperation with United States Department of the Interior, Bureau of Land Management, and University of Nevada Agricultural Experiment Station

Soil Survey of Las Vegas Valley Area Nevada

Part of Clark County

plants. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Excessive irrigation can dissolve gypsum in the soil and cause subsidence. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated. The Las Vegas soil is in horticultural group 6, the McCarran soil is in horticultural group 4, and the Grapevine soil is in horticultural group 2.

305—Las Vegas-Destazo complex, 0 to 2 percent slopes. This map unit is on relict alluvial flats.

This unit is 60 percent Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes, and 25 percent Destazo fine sandy loam, 0 to 2 percent slopes. These soils are in a random pattern on a relict surface and are topographically indistinguishable. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Bluepoint soils on small sand sheets, 5 percent Glencarb soils on recent alluvial flats, and 5 percent Skyhaven soils on the relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Las Vegas soil is shallow and well drained. It formed in alluvium derived dominantly from limestone, dolomite, and some lacustrine sediment that has a high content of lime. Typically, about 25 percent of the surface is covered with a desert pavement of hardpan fragments and pebbles. The surface layer is very pale brown gravelly fine sandy loam about 2 inches thick. The upper 6 inches of the underlying material is very pale brown fine sandy loam, and the next 4 inches is very pale brown gravelly sandy clay loam and gravelly loam. An indurated, lime-cemented hardpan is at a depth of about 12 inches. Depth to the hardpan ranges from 3 to 14 inches.

Permeability of the Las Vegas soil is moderately slow above the hardpan. Available water capacity is very low. Effective rooting depth is 3 to 14 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The Destazo soil is very deep and well drained. It formed in alluvium derived dominantly from limestone, dolomite, and sediment that has a high content of lime. Typically, about 25 percent of the surface is covered with a desert pavement of pebbles and lime nodules. The surface layer is very pale brown fine sandy loam about 11 inches thick. The upper 40 inches of the underlying material is stratified very pale brown to white very gravelly to extremely gravelly sandy clay loam, averaging very gravelly sandy clay loam, and the lower part to a depth of 62 inches is light brown sandy loam.

Permeability of the Destazo soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitations for construction of dwellings are the hazard of flooding and the limited depth to the hardpan in the Las Vegas soil. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavation for building sites is limited by the hardpan. Heavy equipment is needed for excavation.

The main limitations for septic tank absorption fields are the limited depth to the hardpan in the Las Vegas soil and the restricted permeability of the Destazo soil. Special design of septic tank absorption fields is needed. Heavy equipment is needed for excavation. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

This unit is limited for roads because of the limited depth to the hardpan in the Las Vegas soil. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

The main limitations for lawns and landscaping are the limited depth to the hardpan in the Las Vegas soil and the moderate available water capacity of the Destazo soil. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated. The Las Vegas soil is in horticultural group 6, and the Destazo soil is in horticultural group 2.

307—Las Vegas-Skyhaven complex, 0 to 4 percent slopes. This map unit is on relict alluvial flats.

This unit is 60 percent Las Vegas gravelly fine sandy loam, 0 to 4 percent slopes, and 30 percent Skyhaven very fine sandy loam, 0 to 4 percent slopes. The Las Vegas and Skyhaven soils are in a random pattern on relict alluvial flats and are topographically indistinguishable. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

violently effervescent; strongly alkaline; abrupt wavy boundary.

C3cam—11 inches; white (N 8/0) indurated lime-cemented petrocalcic hardpan, white (10YR 8/1) moist; extremely hard, extremely firm.

Depth to the petrocalcic horizon ranges from 3 to 14 inches. The particle-size control section is modified with 5 to 35 percent pebble-size rock fragments, mostly caliche. It is stratified and averages less than 18 percent clay, but it includes layers of sandy clay loam or loam that is more than 18 percent clay. The calcium carbonate equivalent ranges from 40 to 85 percent. A small amount of gypsum is in the C horizon in some pedons. The profile is moderately alkaline or strongly alkaline.

The petrocalcic horizon is indurated and has a platy structure or is massive. Plates of strongly cemented material are between indurated plates in some pedons. The petrocalcic horizon is more than 36 inches thick.

McCarran Series

The McCarran series consists of very deep, well drained soils on relict alluvial flats and foot slopes of basin floor remnants. These soils formed in mixed alluvium derived from limestone, sandstone, and gypsiferous sediment. Elevation is 1,500 to 2,300 feet. Slope is 0 to 8 percent.

Typical pedon of McCarran fine sandy loam, 0 to 4 percent slopes, 2,640 feet south and 2,140 feet west of the northeast corner of sec. 8, T. 21 S., R. 61 E.

About 20 percent of the surface is covered with pebbles.

A1—0 to 1 inch; very pale brown (10YR 7/4) fine sandy loam, light yellowish brown (10YR 6/4) moist; moderate thick and medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial and tubular pores; 10 percent pebbles; 13 percent calcium carbonate; violently effervescent; moderately alkaline; abrupt smooth boundary.

C1—1 to 4 inches; pink (7.5YR 7/4) fine sandy loam, light brown (7.5YR 6/4) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots and few fine roots; many very fine interstitial pores; 12 percent pebbles; 16 percent calcium carbonate; violently effervescent; moderately alkaline; abrupt wavy boundary.

C2—4 to 8 inches; pink (7.5YR 7/4) gravelly fine sandy loam, light brown (7.5YR 6/4) moist; weak coarse and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots and common fine roots; many very fine interstitial pores; 15 percent pebbles; 20 percent calcium carbonate; 3 percent very fine gypsum crystals; violently effervescent; moderately alkaline; abrupt wavy boundary.

C3cs—9 to 15 inches; pink (7.5YR 7/4) sandy loam, strong brown (7.5YR 5/6) moist; massive; soft and slightly hard, very friable, nonsticky and slightly plastic; few very fine, fine, and medium roots; many very fine interstitial pores; 10 percent pebbles with gypsum pendants on undersides; 11 percent calcium carbonate, 9 percent gypsum as fine secondary crystals and pendants; strongly effervescent; moderately alkaline; clear wavy boundary.

C4cs—15 to 48 inches; pinkish white (7.5YR 8/2) sandy loam, light brown (7.5YR 6/4) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; few very fine, fine, and medium roots; many very fine and fine interstitial pores; 10 percent pebbles with gypsum pendants; weakly cemented with gypsum and lime, 7 percent calcium carbonate; 35 percent gypsum as medium and fine crystals and secondary masses as much as 1 inch in diameter; effervescent; mildly alkaline; gradual wavy boundary.

IIC5cs—48 to 62 inches; pinkish white (7.5YR 8/2) gravelly loam, pink (7.5YR 8/4) moist; massive; hard, very friable, slightly sticky and slightly plastic; many very fine and common fine interstitial pores; 25 percent pebbles with gypsum pendants; weakly lime and gypsum cemented; 27 percent calcium carbonate; 13 percent gypsum as pendants, fine to coarse crystals, and secondary masses as much as three-fourths of an inch in diameter; strongly effervescent; moderately alkaline.

The particle-size control section is commonly fine sandy loam, sandy loam, or loam. In some pedons are minor strata of coarser or finer textured material. Rock fragment content ranges from 0 to 15 percent. The content of clay in the fine earth fraction averages less than 18 percent and is commonly 5 to 10 percent. Gypsum plus calcium carbonate equivalent averages less than 40 percent by weight.

In some parts of the gypsic horizon, the content of gypsum is as much as 40 percent. Reaction is mildly alkaline or moderately alkaline.

McCullough Series

The McCullough series consists of very deep, well drained soils on fan skirts. These soils formed in mixed alluvium derived from sedimentary and metamorphic rock. Elevation is 2,000 to 2,500 feet. Slope is 0 to 4 percent.

Typical pedon of a McCullough fine sandy loam in an area of McCullough-Jean-Blueprint complex, 0 to 4 percent slopes, approximately 600 feet east and 1,120 feet north of the southwest corner of sec. 5, T. 22 S., R. 61 E.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		#4	#10	#40	#200		
	In				Pct					Pct	
302*:											
Grapevine	0-10	Very fine sandy loam.	SM	A-4	0	100	100	85-95	44-70	20-26	NP-5
	10-60	Stratified fine sandy loam to silty loam.	SM, SM-SC	A-4	0	90-95	75-90	60-75	35-45	15-25	NP-10
303*:											
Las Vegas	0-2	Gravelly fine sandy loam.	SM	A-1, A-2	0	60-80	50-75	40-65	20-50	15-25	NP-5
	2-8	Fine sandy loam	SM	A-4	0	80-100	75-95	65-80	40-50	---	NP
	8-12	Gravelly sandy clay loam, gravelly loam.	SC, SM	A-2, A-6	0	60-80	50-75	30-60	25-45	25-35	10-15
	12	Indurated---------	---	---	---	---	---	---	---	---	---
304*:											
Destazo	0-11	Fine sandy loam	SM	A-2, A-4	0	95-100	90-100	70-95	30-50	20-30	NP-5
	11-51	Very gravelly clay loam, extremely gravelly sandy clay loam.	GP-GC, GC	A-2	0	15-55	10-50	10-45	5-30	25-40	10-20
	51-60	Sandy loam, sandy clay loam.	SM-SC, SC	A-4, A-6	0	90-100	85-100	50-70	35-55	20-35	5-15
307*:											
Las Vegas	0-1	Gravelly fine sandy loam.	SM	A-1, A-2	0	60-80	50-75	40-65	20-50	15-25	NP-5
	1-7	Fine sandy loam	SM	A-4	0	80-100	75-95	65-80	40-50	---	NP
	7-11	Gravelly sandy clay loam, gravelly loam.	SC, SM	A-2, A-6	0	60-80	50-75	30-60	25-45	25-35	10-15
	11	Indurated---------	---	---	---	---	---	---	---	---	---
Skyline	0-1	Very fine sandy loam.	SM, ML	A-4	0	80-100	75-100	70-95	40-70	15-25	NP-5
	1-8	Clay loam---------	CL	A-6	0	80-100	75-100	70-95	55-80	35-40	15-20
		Gravelly silty clay loam, gravelly loam, gravelly clay loam.	GC, SC	A-6	0-5	60-80	50-75	45-75	35-65	30-40	10-20
	37-60	Indurated---------	---	---	---	---	---	---	---	---	---
305---------- McCarran	0-9	Fine sandy loam	SM	A-2	5	85-95	80-90	60-80	25-35	15-25	NP-5
	9-60	Gypsiferous material.									
306---------- McCarran	0-9	Very cobbly fine sandy loam.	GM	A-1	40-60	50-80	45-55	30-45	10-25	---	NP
	9-60	Gypsiferous material.	---	---	---	---	---	---	---	---	---
308---------- Tarabico	0-10	Silt loam---------	CL-ML, ML	A-4	0	95-100	95-100	80-100	65-85	20-30	5-10
	10-35	Sandy loam, loam, silt loam.	ML, SM	A-4	0	85-100	80-100	55-90	40-70	20-30	NP-5
	35-60	Silt loam---------	CL-ML, ML	A-4	0	95-100	95-100	75-95	60-85	20-30	5-10
309*: Rock outcrop.											
St. Thomas	0-7	Extremely gravelly fine sandy loam.	GM, SM	A-1	55-75	45-70	30-60	25-50	10-35	15-20	NP-5
		Gravelly sandy loam.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
278----------	0-9	18-30	0.6-2.0	0.15-0.17	8.0-9.0	8-15	Low----------	0.28	5	2
Lund	9-10	15-27	2.0-6.0	0.06-0.13	>7.8	>16	Low----------	0.24		
	10-60	18-35	0.2-0.6	0.15-0.21	>7.8	>16	Moderate-----	0.37		
280----------	0-2	27-35	0.2-0.6	0.19-0.21	8.0-9.0	>16	Moderate-----	0.37	5	7
Lund	2-64	18-35	0.2-0.6	0.17-0.19	>7.8	>16	Moderate-----	0.37		
300, 301----------	0-1	8-15	2.0-6.0	0.08-0.11	7.9-9.0	<2	Low----------	0.20	1	4
Las Vegas	1-7	5-15	2.0-6.0	0.12-0.15	7.9-9.0	<4	Low----------	0.32		
	7-11	18-27	0.2-0.6	0.12-0.15	7.9-9.0	<4	Moderate-----	0.28		
	11	---	---	---	---	---	---	---		
302*:										
Las Vegas----------	0-1	8-15	2.0-6.0	0.08-0.11	7.9-9.0	<2	Low----------	0.20	1	4
	1-7	5-15	2.0-6.0	0.12-0.15	7.9-9.0	<4	Low----------	0.32		
	7-11	18-27	0.2-0.6	0.12-0.15	7.9-9.0	<4	Moderate-----	0.28		
	11	---	---	---	---	---	---	---		
McCarran----------	0-5	8-14	2.0-6.0	0.13-0.15	7.9-8.4	4-8	Low----------	0.28	5	3
	5-60	---	---	---	---	---	---	---		
Grapevine----------	0-10	10-15	2.0-6.0	0.16-0.18	7.9-9.0	2-4	Low----------	0.43	5	5
	10-60	10-15	0.6-2.0	0.12-0.15	8.5-9.0	4-8	Low----------	0.32		
305*:										
Las Vegas----------	0-2	5-15	2.0-6.0	0.08-0.11	7.9-9.0	<2	Low----------	0.20	1	4
	2-8	5-10	2.0-6.0	0.12-0.15	7.9-9.0	<4	Low----------	0.32		
	8-12	18-27	0.2-0.6	0.12-0.15	7.9-9.0	<4	Moderate-----	0.28		
	12	---	---	---	---	---	---	---		
Dentazo----------	0-11	8-18	2.0-6.0	0.09-0.18	7.9-8.4	<4	Low----------	0.20	5	3
	11-51	20-35	0.2-0.6	0.03-0.09	7.9-8.4	<4	Moderate-----	0.17		
	51-62	18-25	0.2-0.6	0.11-0.16	7.9-8.4	<4	Low----------	0.24		
307*:										
Las Vegas----------	0-1	8-15	2.0-6.0	0.08-0.11	7.9-9.0	<2	Low----------	0.20	1	4
	1-7	5-10	2.0-6.0	0.12-0.15	7.9-9.0	<4	Low----------	0.32		
	7-11	18-27	0.2-0.6	0.12-0.15	7.9-9.0	<4	Moderate-----	0.28		
	11	---	---	---	---	---	---	---		
Skyhaven----------	0-1	5-15	0.6-2.0	0.14-0.16	>7.8	4-8	Low----------	0.28	2	3
	1-8	27-35	0.2-0.6	0.16-0.18	>7.8	4-8	Moderate-----	0.32		
	8-37	20-35	0.2-0.6	0.12-0.16	>7.8	8-16	Moderate-----	0.17		
	37-60	---	---	---	---	---	---	---		
325----------	0-9	8-14	2.0-6.0	0.12-0.15	7.9-8.4	4-8	Low----------	0.28	5	3
McCarran	9-62	---	---	---	---	---	---	---		
326----------	0-9	7-10	2.0-6.0	0.08-0.11	7.9-8.4	4-8	Low----------	0.20	2	5
McCarran	9-62	---	---	---	---	---	---	---		
341----------	0-10	11-27	0.6-2.0	0.17-0.20	>7.8	8-16	Low----------	0.43	5	6
Paradise	10-39	8-18	0.6-2.0	0.14-0.18	>7.8	2-8	Low----------	0.43		
	39-62	14-27	0.6-2.0	0.18-0.20	>7.8	4-8	Low----------	0.55		
346:										
Rock outcrop.										
St. Thomas----------	0-7	8-15	2.0-6.0	0.08-0.10	7.9-9.0	<2	Low----------	0.10	1	8
	7	---	---	---	---	---	---	---		
380----------	0-1	5-15	0.6-2.0	0.14-0.16	>7.8	4-8	Low----------	0.28	2	3
Skyhaven	1-8	27-35	0.2-0.6	0.16-0.18	>7.8	4-8	Moderate-----	0.32		
	8-37	20-35	0.2-0.6	0.12-0.16	>7.8	8-16	Moderate-----	0.17		
	37-60	---	---	---	---	---	---	---		
381----------	0-11	27-35	0.06-0.2	0.17-0.19	>8.5	>16	Moderate-----	0.32	5	6
Cipriani	11-51	---	---	---	---	---	---	---		
	51-60	2%-15	0.06-2.0	0.17-0.19	>8.5	>16	Moderate-----	0.32		

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		Bedrock		Subsidence		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Hardness	Depth	Shrink-swell	Uncoated steel	Concrete
				Ft		Ft		In			
278---------- Lano	D	Rare----------	---	2.5-5.0	Dec-Apr	>60	---	---	---	High----------	High.
279---------- Lund	D	Rare----------	---	1.5-2.0	Jan-Dec	>60	---	---	---	High----------	High.
280---------- Lund	C	Rare----------	---	3.0-3.5	Jan-Dec	>60	---	---	---	High----------	High.
300, 301---------- Las Vegas	D	Rare----------	---	>6.0	---	>60	---	9-14	Thick	High----------	High.
302*: Las Vegas----------	D	Rare----------	---	>6.0	---	>60	---	9-14	Thick	High----------	High.
McCarran----------	B	Rare----------	---	>6.0	---	>60	---	---	---	High----------	High.
Grapevine----------	D	Rare----------	---	>6.0	---	>60	---	---	---	High----------	High.
* 305*: Las Vegas----------	D	Rare----------	---	>6.0	---	>60	---	9-14	Thick	High----------	High.
* Denzano----------	[illegible]	Rare----------	---	>6.0	---	>60	---	---	---	High----------	High.
307*: Las Vegas----------	D	Rare----------	---	>6.0	---	>60	---	9-14	Thick	High----------	High.
Skyhaven----------	C	Rare----------	---	>6.0	---	>60	---	24-40	Thick	High----------	High.
325, 326---------- McCarran	B	Rare----------	---	>6.0	---	>60	---	---	---	High----------	High.
341---------- Pahrump	C	Rare----------	---	3.0-5.0	Dec-Mar	>60	---	---	---	High----------	Low.
360*: Rock outcrop.											
St. Thomas----------	D	Rare----------	---	>6.0	---	8-20	Hard	---	---	High----------	Low.
380---------- Skyhaven	C	Rare----------	---	>6.0	---	>60	---	24-40	Thick	High----------	High.
390---------- Spring	C	Rare----------	---	>6.0	---	>60	---	---	---	High----------	High.
[illegible] Tahoma	B	Rare----------	---	>6.0	---	>60	---	7-20	Thick	High----------	Low.
[illegible] Wabuska	B	None----------	---	>6.0	---	>60	---	---	---	High----------	High.
[illegible] Rock outcrop.	D	None----------	---	>6.0	---	>60	---	---	---	High----------	High.
[illegible] Wolfman----------	D	None----------	---	>6.0	---	>60	---	---	---	High----------	High.
[illegible] Wyeast----------	B	None----------	---	>6.0	---	40-60	Hard	---	---	High----------	Low.
[illegible] [illegible]	D	None----------	---	>6.0	---	>60	---	---	---	High----------	Low.

See footnote at end of table.

moderate if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The McCullough soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of pebbles. The surface layer is pale brown very gravelly very fine sandy loam about 5 inches thick. The subsoil and upper part of the substratum to a depth of 30 inches are light yellowish brown, stratified loam to sandy loam, the next 10 inches or more is light yellowish brown, stratified coarse sand to loamy fine sand, and the lower part to a depth of 60 inches or more is light yellowish brown extremely gravelly loamy sand.

Permeability of the McCullough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

If the McCullough soil is used for septic tank absorption fields, the limitation of restricted permeability can be overcome by increasing the size of the absorption field.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitation for lawns and landscaping in areas of the Dalian soil is the pebbles on the surface and throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

200—Glencarb silt loam. This very deep, well drained soil is on recent alluvial flats. It formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is pale brown silt loam about 6 inches thick. The upper 10 inches of the underlying material is very pale brown clay loam, and the next 38 inches is very pale brown silty clay loam. The next layer to a depth of 54 inches is very pale brown very fine sandy loam. The lower part to a depth of 60 inches or more is a very pale brown silty clay loam.

Included in this unit are about 3 percent Bluepoint soils on sand sheets, 9 percent Land soils intermingled with the Glencarb soils on recent alluvial flats, and 3 percent McCarran soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Glencarb soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts below a depth of 6 inches.

This unit is used as habitat for desert wildlife and for recreation and urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

The main limitation for septic tank absorption fields is restricted permeability of the soil. Poor permeability increases the possibility of failure of septic tank absorption fields. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

Most climatically adapted plants can be used for lawns and landscaping in this unit.

This map unit is in capability subclasses IIs, irrigated, and VIIc, nonirrigated. It is in horticultural group 1.

206—Glencarb silt loam, flooded. This very deep, well drained soil is on flood plains. The drainage has been altered by seepage. The soil formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is very pale brown silt loam about 8 inches thick. The underlying material to a depth of 60 inches or more is pink silt loam and silty clay loam.

Included in this unit are about 5 percent Aztec soils on erosional fan remnants and 5 percent Land soils on the flood plains. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Glencarb soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 3 to 5 feet from July through June. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to

subangular blocky structure; slightly hard, friable, slightly sticky and plastic; common very fine roots and few fine and medium roots; many very fine interstitial pores and common fine and medium tubular pores; 70 percent pebbles and caliche fragments; thick and very thick lime coatings on pebbles; 30 percent calcium carbonate equivalent; violently effervescent; moderately alkaline; abrupt irregular boundary.

C3cam—11 to 29 inches; white (10YR 8/1) indurated petrocalcic horizon; abrupt irregular boundary.

IIC4cacs—29 to 40 inches; pinkish gray (5YR 7/2) gravelly clay loam, reddish brown (5YR 5/3) moist; massive; slightly hard, friable, slightly sticky and plastic; few very fine roots; common very fine interstitial and tubular pores; weakly cemented with lime; 30 percent pebbles; many thick lime coatings and pendants on gravel; common vertically oriented gypsum crystals; 52 percent calcium carbonate equivalent; violently effervescent; moderately saline; moderately alkaline; abrupt wavy boundary.

IIIC5cs—40 to 60 inches; light reddish brown (5YR 6/3) very cobbly coarse sandy loam; reddish brown (5YR 5/3) moist; massive; soft, very friable, nonsticky and slightly plastic; few very fine roots; many very fine and fine interstitial pores; 20 percent pebbles and 15 percent cobbles; common thick gypsum pendants on the undersides of rock fragments; slightly effervescent; 7 percent calcium carbonate equivalent; moderately saline; mildly alkaline.

Depth to the indurated petrocalcic horizon ranges from 5 to 18 inches. The particle-size control section is modified with 35 to 80 percent rock fragments. The fine earth fraction is sandy loam or very fine sandy loam and is 7 to 18 percent clay. Rock fragments are commonly coated with lime, and caliche fragments constitute a large percentage of the rock fragments in most pedons. The part of the profile immediately underlying the petrocalcic horizon is high in calcium carbonate content and is moderately saline. Gypsum crystals are common below the petrocalcic horizon in many pedons.

Dalian Series

The Dalian series consists of very deep, well drained soils on inset fans, fan skirts, and side slopes of fan remnants. These soils formed in alluvium derived primarily from limestone and dolomite. Elevation is 2,200 to 4,000 feet. Slope is 0 to 8 percent.

Typical pedon of Dalian very gravelly fine sandy loam, 2 to 4 percent slopes, about 500 feet south and 1,840 feet east of the northwest corner of sec. 5, T. 20 S., R. 60 E.

About 65 percent of the surface is covered with pebbles.

A1—0 to 4 inches; light yellowish brown (10YR 6/4) very gravelly fine sandy loam, dark yellowish brown (10YR 4/4) moist; moderate medium and thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine interstitial pores and few fine tubular pores; 40 percent pebbles; violently effervescent; moderately alkaline; abrupt smooth boundary.

C1ca—4 to 11 inches; light yellowish brown (10YR 6/4) extremely gravelly fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable nonsticky and nonplastic; common very fine and fine roots; many very fine interstitial pores; 65 percent pebbles and 5 percent cobbles; thin discontinuous lime coatings on undersides of rock fragments; violently effervescent; moderately alkaline; abrupt smooth boundary.

C2ca—11 to 17 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots and common fine and medium roots; many very fine interstitial pores; 55 percent pebbles; thin discontinuous lime coatings on undersides of pebbles; violently effervescent; moderately alkaline; abrupt smooth boundary.

C3ca—17 to 41 inches; light yellowish brown (10YR 6/4) extremely gravelly fine sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; many very fine interstitial pores; 75 percent pebbles and 5 percent cobbles; thin discontinuous lime coatings on undersides of rock fragments; violently effervescent; moderately alkaline; clear wavy boundary.

C4ca—41 to 46 inches; light yellowish brown (10YR 6/4) extremely gravelly fine sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, slightly sticky and nonplastic; few very fine and fine roots; many very fine interstitial pores; 70 percent pebbles and 5 percent cobbles; thin lime coatings surrounding or on undersides of rock fragments; violently effervescent; moderately alkaline; clear wavy boundary.

C5—46 to 61 inches; very pale brown (10YR 7/4) extremely gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and fine interstitial pores; 60 percent pebbles and 5 percent cobbles; violently effervescent; moderately alkaline.

The particle-size control section is modified with 35 to 80 percent rock fragments, mostly limestone pebbles. The fine earth fraction averages sandy loam or fine sandy loam and is 3 to 12 percent clay. Calcium carbonate content averages more than 40 percent.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
140----------	0-1	20-30	0.3-2.0	0.08-0.10	7.9-8.4	8-16	Moderate	0.20	5	7
Cheaga	1-21	27-35	0.06-0.2	0.14-0.22	7.9-8.4	4-8	Moderate	0.28		
	21-47	27-35	0.2-0.5	0.08-0.11	7.9-8.4	4-8	Moderate	0.17		
	47-60	5-18	2.0-6.0	0.05-0.10	7.9-8.4	8-16	Low	0.10		
150----------	0-8	10-30	0.6-2.0	0.05-0.10	7.4-8.4	<8	Low	0.17	1	5
Cave	8-60	---	---	---	---	---	---	---		
151----------	0-5	3-8	6.0-20	0.09-0.11	7.9-8.4	2-4	Low	0.17	1	7
Cave	5-11	10-20	0.6-2.0	0.07-0.12	7.9-8.4	2-4	Low	0.24		
	11-60	---	---	---	---	---	---	---		
152----------	0-12	10-30	0.6-2.0	0.07-0.12	7.9-8.4	2-4	Low	0.20	1	4L
Cave	12-36	---	---	---	---	---	---	---		
	36-60	2-5	2.0-6.0	0.04-0.06	7.9-8.4	<4	Low	0.10		
153----------	0-15	10-20	0.6-2.0	0.07-0.10	7.9-8.4	2-4	Low	0.20	1	4L
Cave	15-60	---	---	---	---	---	---	---		
160----------	0-11	8-16	2.0-6.0	0.10-0.12	7.9-8.4	<8	Low	0.17	5	8
Destano	11-40	20-35	0.2-0.6	0.05-0.10	7.9-8.4	<8	Low	0.10		
	40-60	10-20	0.6-2.0	0.09-0.11	7.9-8.4	<4	Low	0.17		
161*:										
Caliza----------	0-2	4-10	2.0-6.0	0.05-0.08	7.9-8.4	<2	Low	0.05	5	6
	2-14	3-8	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low	0.10		
	14-60	2-8	6.0-20	0.03-0.07	7.9-8.4	<2	Low	0.05		
Pittman----------	0-2	5-15	6.0-20	0.04-0.08	7.4-8.4	<2	Low	0.10	2	8
	2-23	8-18	6.0-20	0.04-0.08	7.9-8.4	<2	Low	0.17		
	23-32	---	---	---	---	---	---	---		
	32-50	---	---	---	---	---	---	---		
	50-60	0-5	6.0-20	0.03-0.05	7.4-8.4	<8	Low	0.05		
162*:										
Caliza----------	0-2	4-10	2.0-6.0	0.05-0.08	7.9-8.4	<2	Low	0.05	5	6
	2-14	3-8	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low	0.10		
	14-60	2-8	6.0-20	0.03-0.07	7.9-8.4	<2	Low	0.05		
Pittman----------	0-2	5-15	6.0-20	0.04-0.05	7.4-8.4	<2	Low	0.10	2	8
	2-23	8-18	6.0-20	0.04-0.08	7.9-8.4	<2	Low	0.17		
	23-32	---	---	---	---	---	---	---		
	32-50	---	---	---	---	---	---	---		
	50-60	0-5	6.0-20	0.03-0.06	7.4-8.4	<8	Low	0.05		
Arizo----------	0-8	2-8	6.0-20	0.04-0.06	7.4-9.0	<2	Low	0.15	5	4
	8-60	0-5	>20	0.04-0.06	7.4-9.0	<2	Low	0.10		
163----------	0-3	2-6	6.0-20	0.04-0.07	7.9-8.4	<2	Low	0.05	5	8
Caliza	3-60	2-5	2.0-6.0	0.03-0.07	7.9-8.4	<2	Low	0.05		
164----------	0-3	5-10	2.0-6.0	0.07-0.09	7.9-8.4	<2	Low	0.10	5	5
Caliza	3-10	5-10	2.0-6.0	0.05-0.08	7.9-8.4	<2	Low	0.15		
	10-60	3-7	6.0-20	0.03-0.04	7.9-8.4	<2	Low	0.05		
165----------	0-2	5-10	2.0-6.0	0.05-0.08	7.4-8.4	<2	Low	0.05	5	6
Caliza	2-14	3-8	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low	0.10		
	14-60	2-8	6.0-20	0.03-0.07	7.9-8.4	<2	Low	0.05		
166----------	0-4	5-10	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low	0.10	5	5
Caliza	4-61	3-12	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low	0.10		
167----------	0-5	5-15	2.0-6.0	0.06-0.09	7.9-8.4	<2	Low	0.15	5	5
Caliza	5-60	5-15	0.6-2.0	0.05-0.09	7.9-8.4	<2	Low	0.10		
168*:										
Caliza----------	0-2	5-10	2.0-6.0	0.05-0.09	7.4-8.4	<2	Low	0.10	5	5
	2-60	3-12	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low	0.10		

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Indurated	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
182*:											
Calixa-----------	B	None-----------	---	>6.0	---	>60	---	---	---	High-------	Low.
Pittman----------	D	None-----------	---	>6.0	---	>60	---	20-30	Thick	High-------	Low.
Arizo------------	A	Occasional	Mar-Sep	>6.0	---	>60	---	---	---	High-------	Low.
183*---------- Calixa	B	None-----------	---	>6.0	---	>60	---	---	---	High-------	Low.
184*---------- Calixa	B	Rare-----------	---	>6.0	---	>60	---	---	---	High-------	Low.
187*---------- Calixa	B	None-----------	---	>6.0	---	>60	---	---	---	High-------	Low.
190*---------- Dallan	B	None-----------	---	>6.0	---	>60	---	---	---	High-------	Low.
191*---------- Dallan	B	Rare-----------	---	>6.0	---	>60	---	---	---	High-------	Low.
192*:											
Dallan-----------	B	Rare-----------	---	>6.0	---	>60	---	---	---	High-------	Low.
McCullough-------	D	Rare-----------	---	>6.0	---	>60	---	---	---	High-------	Low.
200*---------- Glencarb	B	Rare-----------	---	>6.0	---	>60	---	---	---	High-------	Moderate.
206*---------- Glencarb	C	Occasional	Jul-Sep	3.0-5.0	Jul-Jun	>60	---	---	---	High-------	High.
222*---------- Glencarb	C	Rare-----------	---	3.0-5.0	Jul-Jun	>60	---	---	---	High-------	High.
236*---------- Glencarb	B	Rare-----------	---	>6.0	---	>60	---	---	---	High-------	High.
237*---------- Glencarb	B	Rare-----------	---	>6.0	---	>60	---	40-60	Thick	High-------	Low.
240*---------- Goodsprings	D	None-----------	---	>6.0	---	>60	---	9-20	Thick	High-------	Low.
252, 255*---------- Grapevine	B	Rare-----------	---	>6.0	---	>60	---	---	---	High-------	High.
260*---------- Jean	A	Rare-----------	---	>6.0	---	>60	---	---	---	High-------	Low.
262*:											
Jean-------------	A	Rare-----------	---	>6.0	---	>60	---	---	---	High-------	Low.
Jean-------------	A	Occasional	Jun-Sep	>6.0	---	>60	---	---	---	High-------	Low.
Goodsprings------	D	Rare-----------	---	>6.0	---	>60	---	9-20	Thick	High-------	Low.
263*:											
Jean-------------	A	Rare-----------	---	>6.0	---	>60	---	---	---	High-------	Low.
Jean-------------	A	Occasional	Jun-Sep	>6.0	---	>60	---	---	---	High-------	Low.
264*---------- Jean	A	Rare-----------	---	>6.0	---	>60	---	---	---	High-------	Low.

See footnote at end of table.

Lag Time Data

TIME OF CONCENTRATION AND HEC-1 INPUT

Project Name: The Collision Center
Date: 11/6/2011
File Name: COLLISION CNTR HEC
By: MRL

5740 S. Arville St., Suite 206
Las Vegas NV 89118 Ph. 702-521-3355

SUB-BASIN DATA					INTIAL/OVERLAND TIME (T_i)			TRAVEL TIME (T_t)					T_c	T_c CHECK (URBANIZED BASINS)			
KK				BA												UD	LS
Desig.	DEV./EX. (D or E)	K [1]*	AREA ac	AREA MI^2 [2]*	INITIAL LENGTH FT	SLOPE %	T_i MIN. [3]*	TRAVEL LENGTH FT	SLOPE %	V_1 VEL. FT/S [4]*	V_2 VEL. FT/S [5]*	T_t MIN. [6]*	T_c Calc.	TOTAL LENGTH FT [8]*	T_c Check [13]*	TLAG [15]*	CN [16]*
UNDEVELOPED																	
ON1	E	0.719	5.39	0.00842	500	2.3	11.71	199	2.1	2.14	4.25	1.55	13.26	699	N/A	0.13259	84.0
OF1	E	0.626	3.54	0.00553	500	1.5	16.65	54	2.8	2.48	4.92	0.36	17.02	554	N/A	0.17016	77.0
OF2	D	0.824	0.52	0.00080	66	4.7	2.41	378	1.5	2.48	3.76	2.54	4.95	444	12.47	0.04947	92.0
DEVELOPED																	
DON1A	D	0.851	1.93	0.00301	74	2.7	2.78	464	2.0	2.86	4.33	2.71	5.49	538	12.99	0.05489	94.0
DON1B	D	0.845	2.61	0.00408	42	4.9	1.75	441	1.7	2.66	4.02	2.77	4.51	483	12.68	0.04515	93.6
DON1C	D	0.851	0.84	0.00132	66	2.7	2.62	254	2.9	3.44	5.21	1.23	3.85	320	11.78	0.03854	94.0
DOF1	D	0.824	3.54	0.00553	75	1.0	4.30	580	1.5	2.47	3.75	3.72	8.02	655	13.64	0.08020	92.0
DOF2	D	0.824	0.52	0.00080	66	4.7	2.41	378	1.5	2.48	3.76	2.54	4.95	444	12.47	0.04947	92.0

** Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual*

APPENDIX C

Hydrologic Analysis

Existing Condition

HEC1 S/N: 1346000014 HMVersion: 6.33 Data File: PRE.hc1

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             MAY  1991                 *
*           VERSION 4.0.1E              *
*                                       *
*  RUN DATE  11/07/2012  TIME  16:08:34 *
*                                       *
*****************************************
```

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

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

```
:::::::::::::::::::::::::::::::::::::::::::::
:::                                       :::
:::  Full Microcomputer Implementation    :::
:::              by                       :::
:::        Haestad Methods, Inc.          :::
:::                                       :::
:::::::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

HEC-1 INPUT PAGE 1

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
          * 
          *
    1     ID
    2     ID                                   THE COLLISION CENTER
                                                HYDROLOGICAL MODEL
          *
          * ------------------------------------------------------------------------------
          *
    3     ID                                        RIETZ CONSULTING
          *
    4     ID                                     PROJECT:COLLISION CENTER
          *
          * ------------------------------------------------------------------------------
          *
    5     ID   PRE DEVELOPMENT HYDROLOGICAL MODEL
    6     ID   10-YR & 100-YR STORM EVENT                                    FILE: PRE.HC1
    7     ID   *** 6-HOUR  /  SDN 3 *****
          *
          *DIAGRAM
    8     IT       5       0       0     300
    9     IO       5
   10     IN       5
   11     JR    PREC    0.57    1.00
          *
          *
          * BEGIN RUNOFF MODEL
          *
   12     KK     ON1
   13     KM   RUNOFF FROM BASIN ON1
          *
   14     BA  .00842
   15     PB    2.77
   16     PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
   17     PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
   18     PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
   19     PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
   20     PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
   21     PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
   22     PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
   23     PC    .998    .999   1.00
   24     LS       0      84
   25     UD  .13259
          *
          *
   26     KK     OF1
   27     KM   RUNOFF FROM OFFSITE BASIN OF1
          *
   28     BA  .00553
   29     LS       0      77
   30     UD  .17016
          *
          *
```

HEC-1 INPUT PAGE 2

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   31     KK     OF2
   32     KM   RUNOFF FROM OFFSITE BASIN OF2
          *
   33     BA  .00080
   34     LS       0      92
   35     UD  .04947
          *
          *
   36     ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE (V) ROUTING (~~~>) DIVERSION OR PUMP FLOW

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

  12          ON1
                .
                .
  26            .          OF1
                .            .
                .            .
  31            .            .         OF2

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
HEC1 S/N: 1346000014         HMVersion: 6.33     Data File: PRE.hc1

**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*              MAY   1991                    *
*            VERSION 4.0.1E                  *
*                                            *
*  RUN DATE  11/07/2012  TIME  16:08:34      *
*                                            *
**********************************************

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

                                                    THE COLLISION CENTER
                                                   HYDROLOGICAL MODEL
                                                     RIETZ CONSULTING
                                                 PROJECT:COLLISION CENTER
                          PRE DEVELOPMENT HYDROLOGICAL MODEL
                          10-YR & 100-YR STORM EVENT                          FILE: PRE.HC1
                          *** 6-HOUR  /  SDN 3 *****

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

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

                   COMPUTATION INTERVAL     0.08 HOURS
                        TOTAL TIME BASE    24.92 HOURS

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

    JP            MULTI-PLAN OPTION
                     NPLAN          1  NUMBER OF PLANS

    JR            MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                  0.57      1.00


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

                                                          RATIOS APPLIED TO PRECIPITATION
OPERATION       STATION      AREA     PLAN                RATIO 1  RATIO 2
                                                            0.57     1.00
HYDROGRAPH AT
                  ON1        0.01      1   FLOW              4.       10.
                                           TIME            3.58     3.58
HYDROGRAPH AT
                  OF1        0.01      1   FLOW              1.        4.
                                           TIME            3.67     3.58
HYDROGRAPH AT
                  OF2        0.00      1   FLOW              1.        2.
                                           TIME            3.50     3.50


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

Proposed Condition

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             MAY  1991                 *
*          VERSION 4.0.1E               *
*                                       *
*  RUN DATE  11/10/2012  TIME  10:15:45 *
*                                       *
*****************************************
```

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

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

```
:::::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::::
:::                                       :::
:::  Full Microcomputer Implementation    :::
:::            by                         :::
:::        Haestad Methods, Inc.          :::
:::                                       :::
:::::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

HEC-1 INPUT PAGE 1

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
          * 
          *
    1     ID
    2     ID                                THE COLLISION CENTER
                                             HYDROLOGICAL MODEL
          * ------------------------------------------------------------------------------
          *
    3     ID                                RIETZ CONSULTING
          *
    4     ID                                PROJECT:COLLISION CENTER
          * ------------------------------------------------------------------------------
          *
    5     ID   POST DEVELOPMENT HYDROLOGICAL MODEL
    6     ID   10-YR & 100-YR STORM EVENT
    7     ID   *** 6-HOUR  /  SDN 3 *****                                  FILE: POST.HC1
          *
          *DIAGRAM
    8     IT       5       0       0     300
    9     IO       5
   10     IN       5
   11     JR    PREC    0.57    1.00
          *
          *
          * BEGIN RUNOFF MODEL
          *
   12     KK   DON1A
   13     KM   RUNOFF FROM BASIN DON1A
          *
   14     BA  .00301
   15     PB    2.77
   16     PC     .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
   17     PC     .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
   18     PC     .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
   19     PC     .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
   20     PC     .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
   21     PC     .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
   22     PC     .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
   23     PC     .998    .999   1.00
   24     LS        0      94
   25     UD  .05489
          *
          *
   26     KK    DOF2
   27     KM   RUNOFF FROM OFFSITE BASIN DOF2
          *
   28     BA  .00080
   29     LS        0      92
   30     UD  .04947
          *
          *
```

HEC-1 INPUT PAGE 2

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   31     KK     CP1
   32     KM   COMBINE DON1A AND DOF2
   33     HC       2
          *
          *
   34     KK   DON1C
   35     KM   RUNOFF FROM OFFSITE BASIN DON1C
          *
   36     BA  .00132
   37     LS        0      94
   38     UD  .03854
          *
          *
```

APPENDIX D

Hydraulic Section Computations

SECTION 1, 10-YR
Worksheet for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	OFFSITE SECTION 1 - AZURE DR, 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

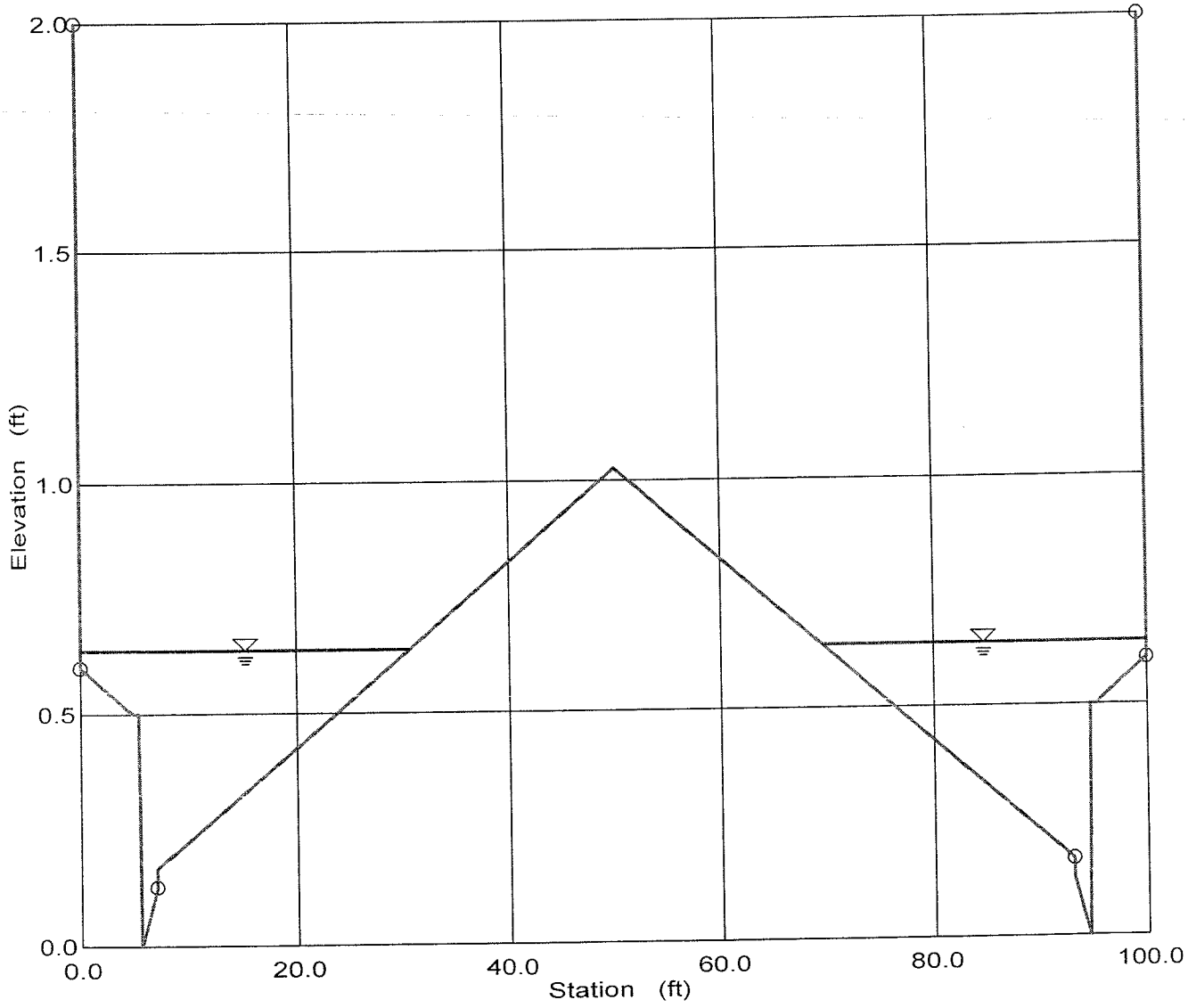
Input Data				
Channel Slope	0.015000 ft/ft			
Elevation range: 0.00 ft to 2.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	2.00	0.00	0.00	0.022
0.00	0.60	0.00	7.00	0.013
5.00	0.50	7.00	93.00	0.016
5.50	0.50	93.00	100.00	0.013
5.58	0.00	100.00	100.00	0.022
7.00	0.13			
7.00	0.17			
50.00	1.03			
93.00	0.17			
93.00	0.13			
94.42	0.00			
94.50	0.50			
95.00	0.50			
100.00	0.60			
100.00	2.00			
Discharge	60.00 cfs			

Results		
Wtd. Mannings Coefficient	0.015	
Water Surface Elevation	0.64	ft
Flow Area	13.78	ft²
Wetted Perimeter	62.09	ft
Top Width	61.06	ft
Height	0.64	ft
Critical Depth	0.73	ft
Critical Slope	0.005356	ft/ft
Velocity	4.36	ft/s
Velocity Head	0.29	ft
Specific Energy	0.93	ft
Froude Number	1.62	
Flow is supercritical.		
Flow is divided.		

SECTION 1, 10-YR
Cross Section for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	OFFSITE SECTION 1 - AZURE DR, 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

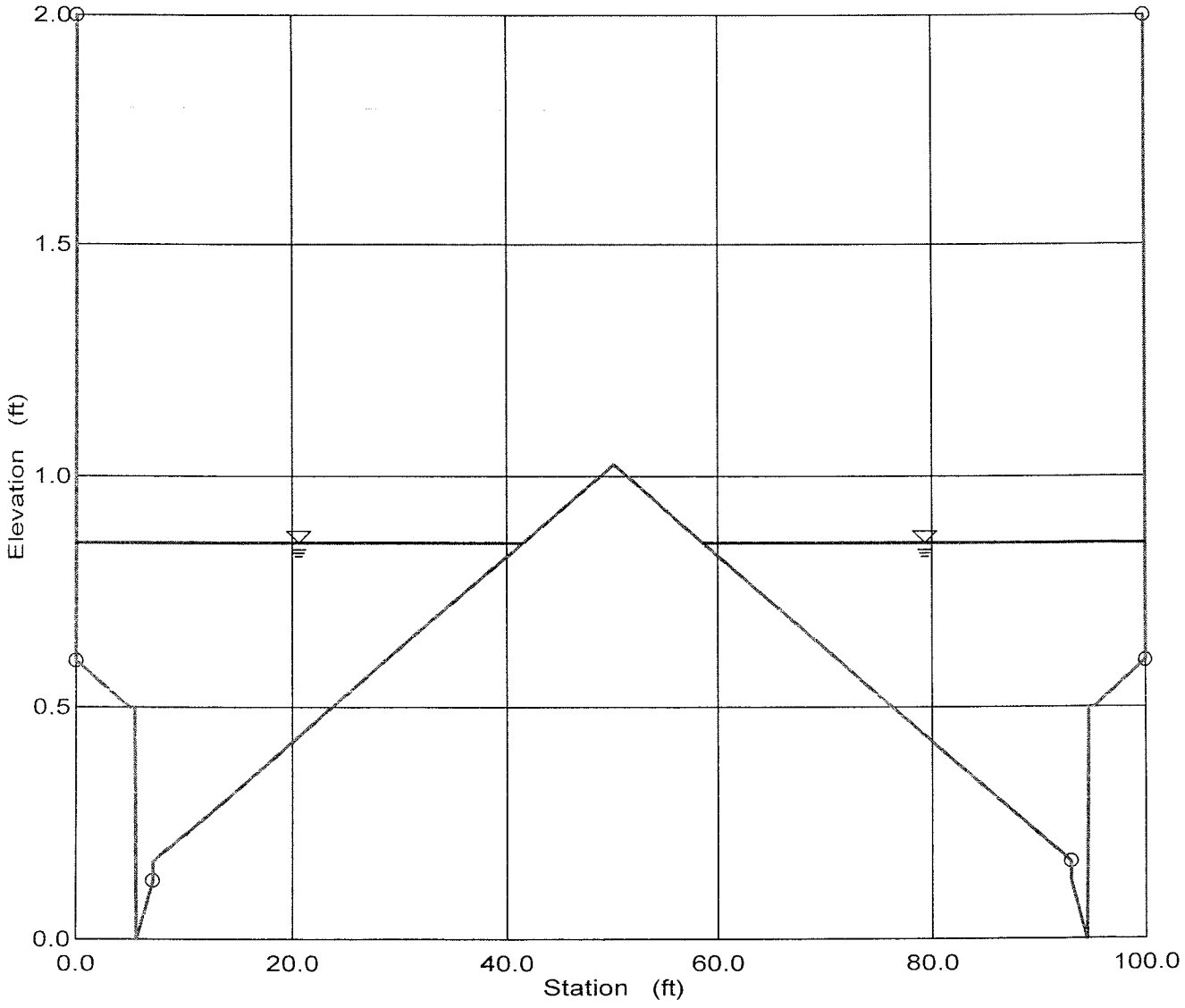
Section Data		
Wtd. Mannings Coefficient	0.015	
Channel Slope	0.015000	ft/ft
Water Surface Elevation	0.64	ft
Discharge	60.00	cfs



SECTION 1, 100-YR
Cross Section for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	OFFSITE SECTION 1 - AZURE DR, 10O-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.015	
Channel Slope	0.015000	ft/ft
Water Surface Elevation	0.86	ft
Discharge	173.00	cfs



Tenaya Commercial Access Road Hydraulic Condition Street Sections

SECTION 2, 100-YR
Worksheet for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	OFFSITE SECTION 2 - ACCESS RD, 100 YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

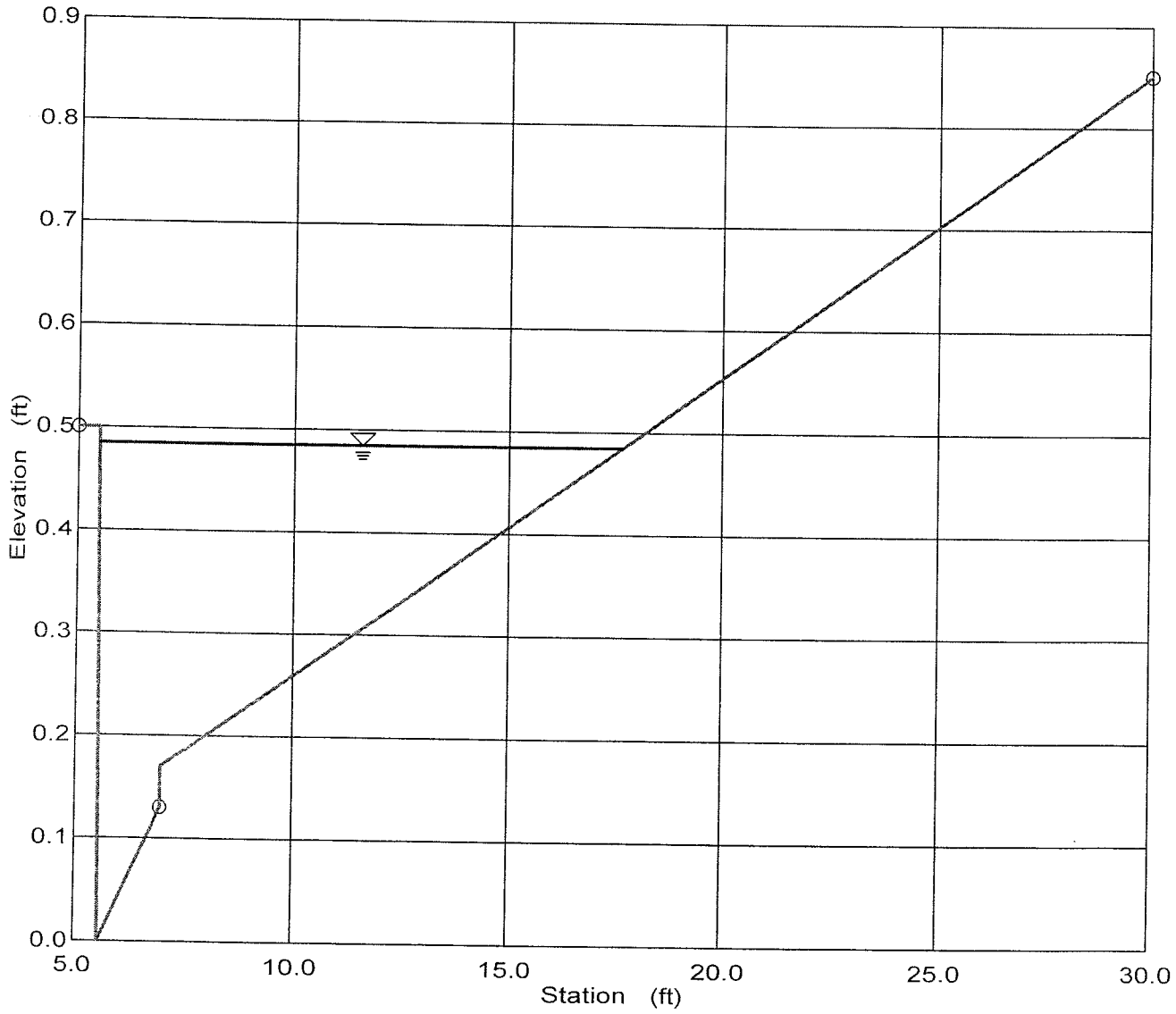
Input Data				
Channel Slope	0.019700 ft/ft			
Elevation range: 0.00 ft to 0.85 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
5.00	0.50	5.00	7.00	0.013
5.50	0.50	7.00	30.00	0.016
5.58	0.00			
7.00	0.13			
7.00	0.17			
30.00	0.85			
Discharge	11.00 cfs			

Results		
Wtd. Mannings Coefficient	0.014	
Water Surface Elevation	0.49	ft
Flow Area	2.30	ft²
Wetted Perimeter	12.62	ft
Top Width	12.16	ft
Height	0.49	ft
Critical Depth	0.60	ft
Critical Slope	0.005401	ft/ft
Velocity	4.79	ft/s
Velocity Head	0.36	ft
Specific Energy	0.84	ft
Froude Number	1.94	
Flow is supercritical.		

SECTION 2, 100-YR
Cross Section for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	OFFSITE SECTION 2 - ACCESS RD, 100 YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.014	
Channel Slope	0.019700	ft/ft
Water Surface Elevation	0.49	ft
Discharge	11.00	cfs



SECTION 3, 10-YR
Worksheet for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	ONSITE SECTION 3, 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.005000	ft/ft
Elevation range: 0.00 ft to 1.04 ft.		
Discharge	3.00	cfs

Station (ft)	Elevation (ft)
0.00	1.00
34.98	0.13
36.48	0.00
36.56	0.50
36.98	0.50
48.51	1.04
50.00	1.04

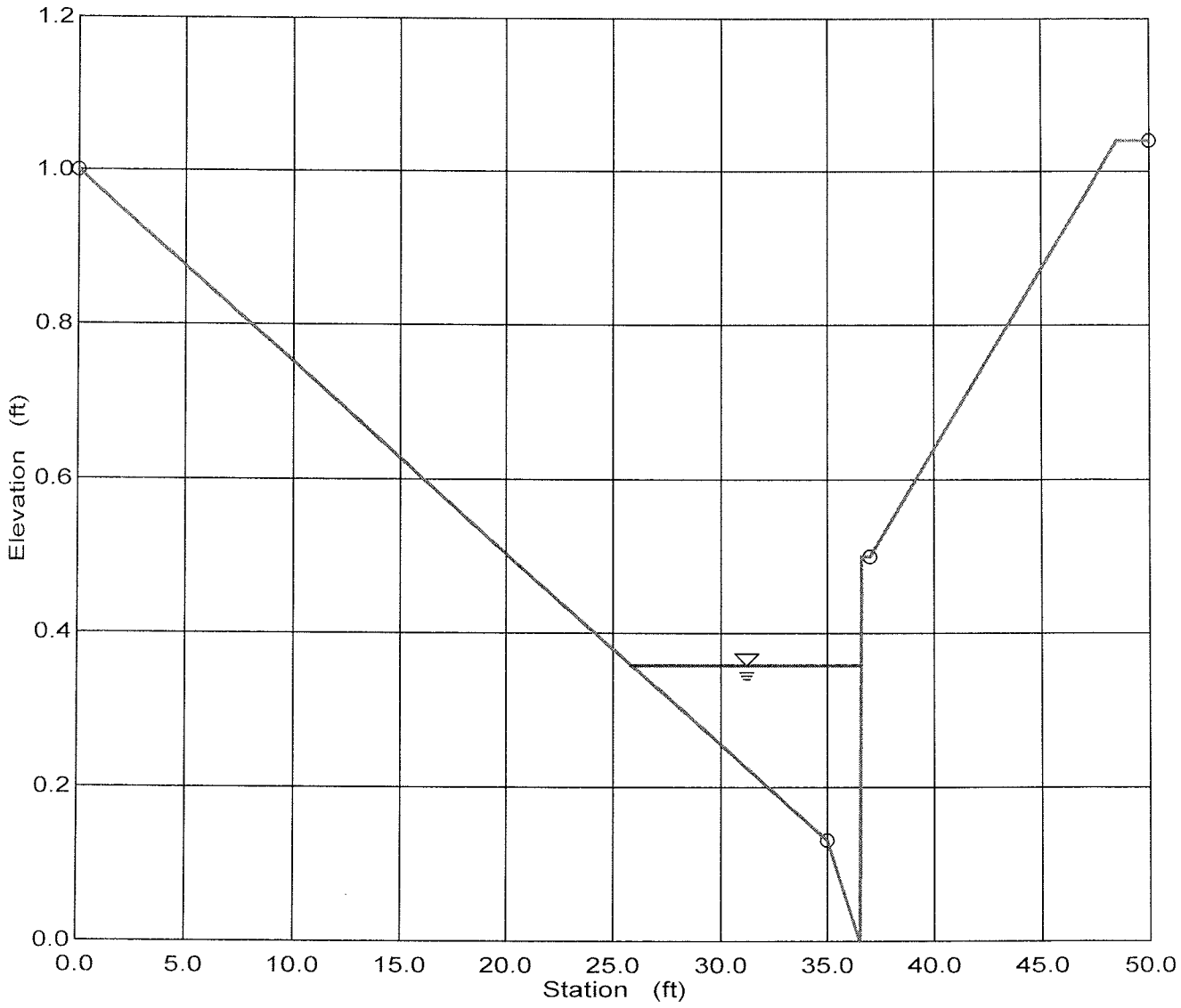
Start Station	End Station	Roughness
0.00	34.98	0.016
34.98	36.98	0.013
36.98	50.00	0.030

Results		
Wtd. Mannings Coefficient	0.014	
Water Surface Elevation	0.36	ft
Flow Area	1.49	ft²
Wetted Perimeter	11.01	ft
Top Width	10.69	ft
Height	0.36	ft
Critical Depth	0.35	ft
Critical Slope	0.005486	ft/ft
Velocity	2.02	ft/s
Velocity Head	0.06	ft
Specific Energy	0.42	ft
Froude Number	0.95	
Flow is subcritical.		

SECTION 3, 10-YR
Cross Section for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	ONSITE SECTION 3, 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.014	
Channel Slope	0.005000	ft/ft
Water Surface Elevation	0.36	ft
Discharge	3.00	cfs



SECTION 3, 100-YR
Worksheet for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	ONSITE SECTION 3, 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.005000	ft/ft
Discharge	6.00	cfs

Elevation range: 0.00 ft to 1.04 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	1.00	0.00	34.98	0.016
34.98	0.13	34.98	36.98	0.013
36.48	0.00	36.98	50.00	0.030
36.56	0.50			
36.98	0.50			
48.51	1.04			
50.00	1.04			

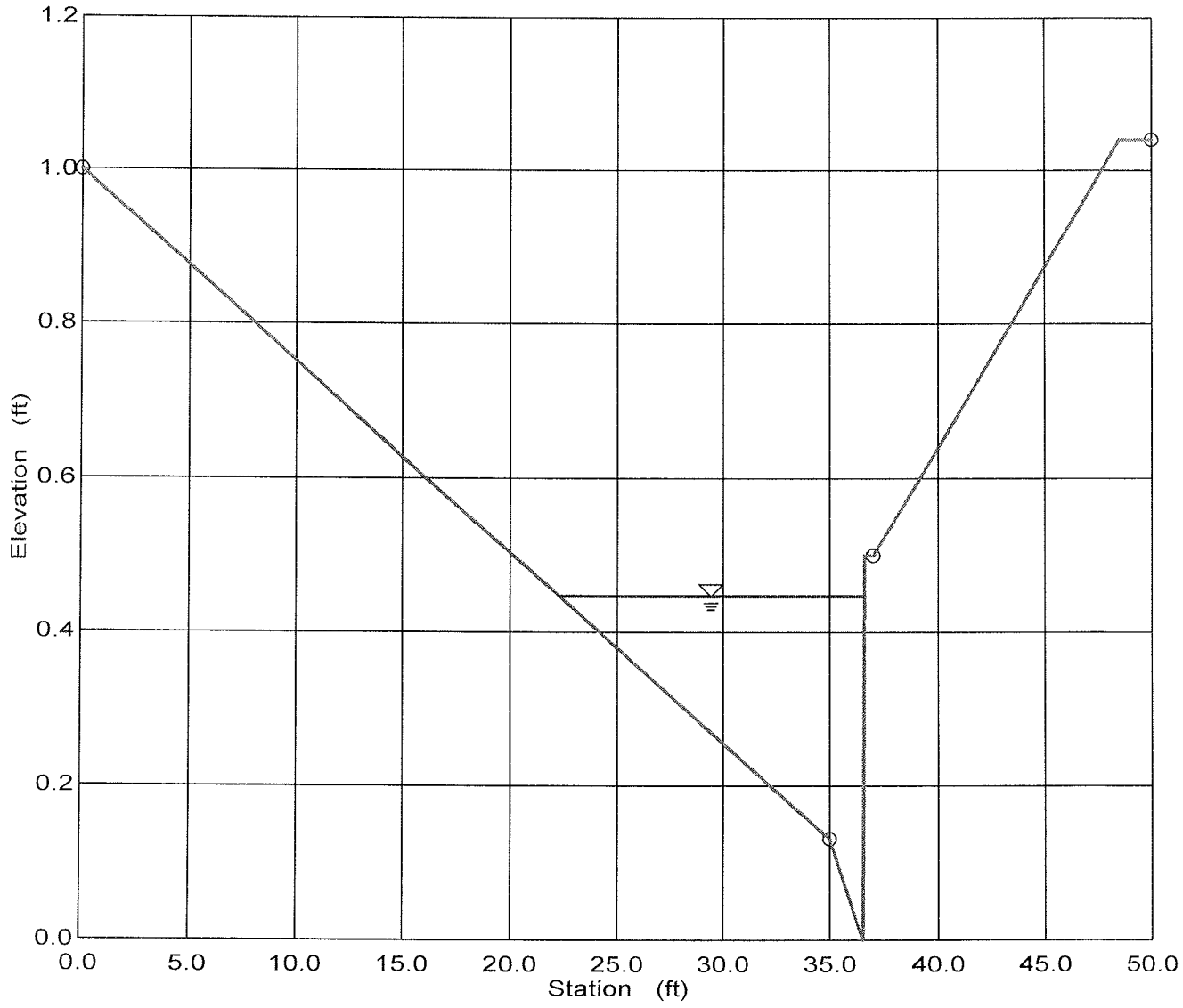
Results		
Wtd. Mannings Coefficient	0.014	
Water Surface Elevation	0.45	ft
Flow Area	2.60	ft²
Wetted Perimeter	14.69	ft
Top Width	14.30	ft
Height	0.45	ft
Critical Depth	0.44	ft
Critical Slope	0.005509	ft/ft
Velocity	2.31	ft/s
Velocity Head	0.08	ft
Specific Energy	0.53	ft
Froude Number	0.95	

Flow is subcritical.

SECTION 3, 100-YR
Cross Section for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	ONSITE SECTION 3, 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.014	
Channel Slope	0.005000	ft/ft
Water Surface Elevation	0.45	ft
Discharge	6.00	cfs



SECTION 4, 10-YR
Worksheet for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	ONSITE SECTION 4, 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

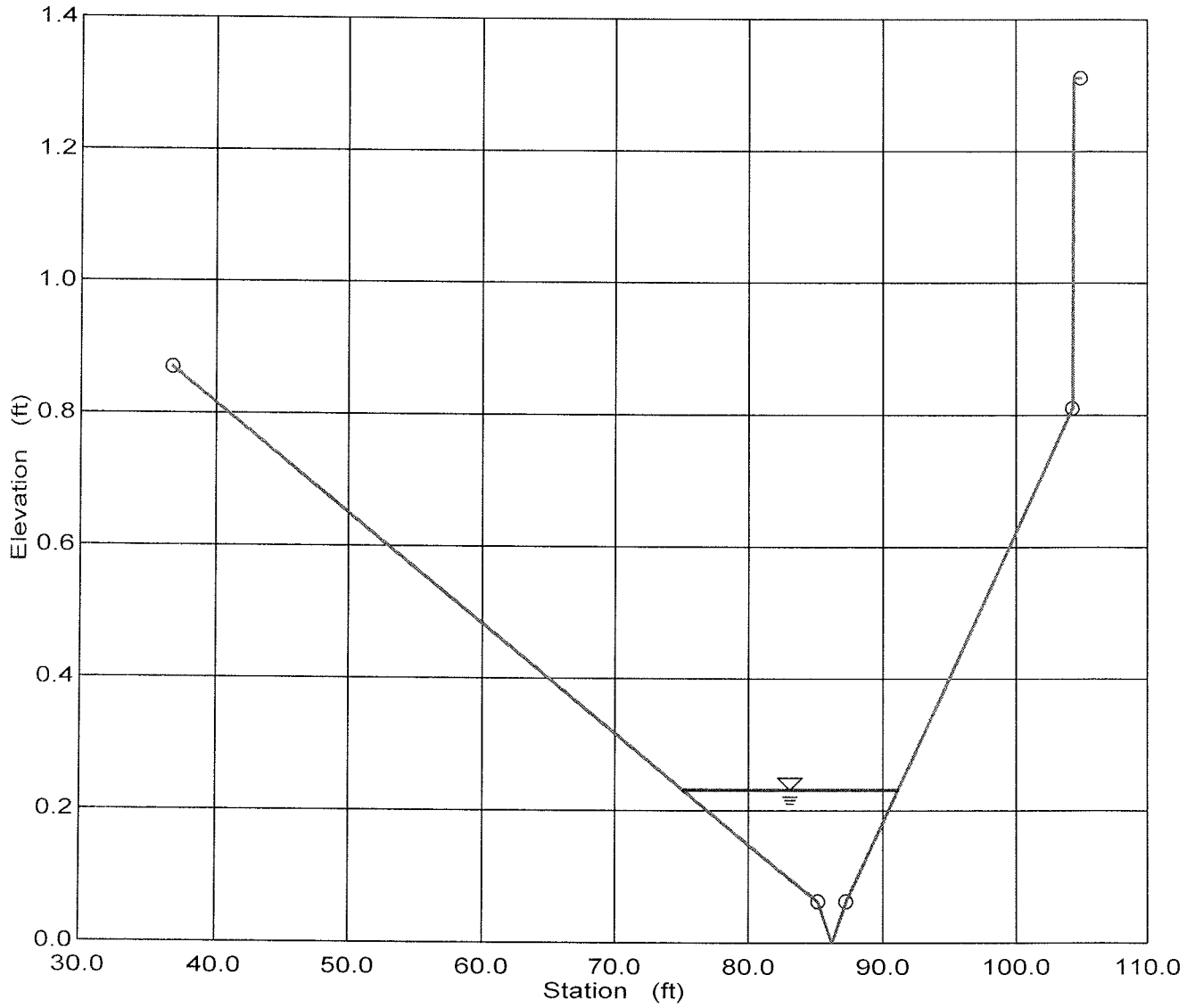
Input Data				
Channel Slope	0.012000 ft/ft			
Elevation range: 0.00 ft to 1.31 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
36.80	0.87	36.80	85.30	0.016
85.30	0.06	85.30	87.30	0.013
86.30	0.00	87.30	104.33	0.016
87.30	0.06	104.33	104.91	0.013
104.33	0.81			
104.41	1.31			
104.91	1.31			
Discharge	4.00 cfs			

Results		
Wtd. Mannings Coefficient	0.014	
Water Surface Elevation	0.23	ft
Flow Area	1.58	ft²
Wetted Perimeter	15.95	ft
Top Width	15.95	ft
Height	0.23	ft
Critical Depth	0.26	ft
Critical Slope	0.005882	ft/ft
Velocity	2.54	ft/s
Velocity Head	0.10	ft
Specific Energy	0.33	ft
Froude Number	1.42	
Flow is supercritical.		

SECTION 4, 10-YR
Cross Section for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	ONSITE SECTION 4, 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.014	
Channel Slope	0.012000	ft/ft
Water Surface Elevation	0.23	ft
Discharge	4.00	cfs



SECTION 4, 100-YR
Worksheet for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	ONSITE SECTION 4, 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.012000	ft/ft
Discharge	9.00	cfs

Elevation range: 0.00 ft to 1.31 ft.

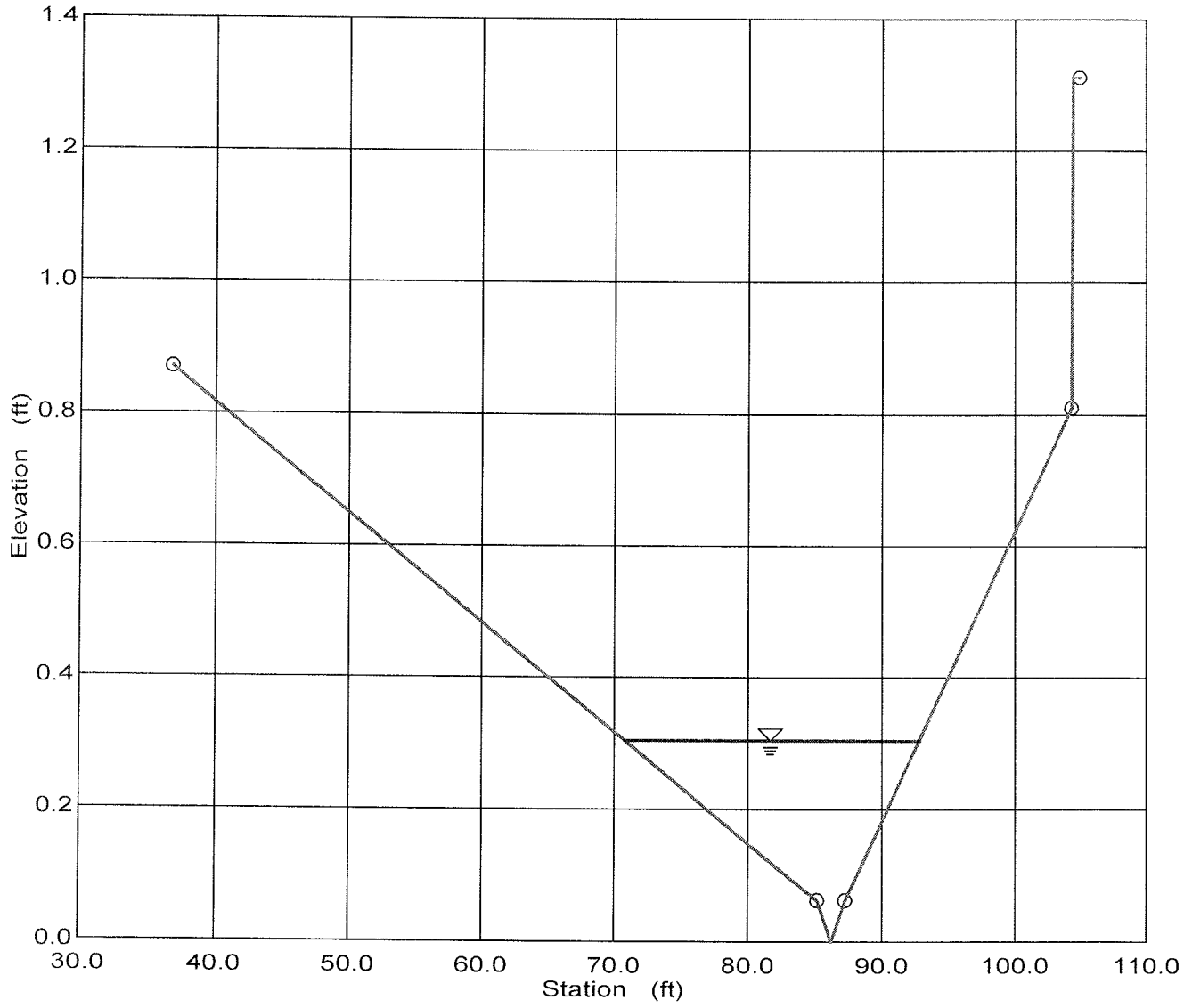
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
36.80	0.87	36.80	85.30	0.016
85.30	0.06	85.30	87.30	0.013
86.30	0.00	87.30	104.33	0.016
87.30	0.06	104.33	104.91	0.013
104.33	0.81			
104.41	1.31			
104.91	1.31			

Results		
Wtd. Mannings Coefficient	0.014	
Water Surface Elevation	0.30	ft
Flow Area	3.00	ft²
Wetted Perimeter	22.12	ft
Top Width	22.11	ft
Height	0.30	ft
Critical Depth	0.35	ft
Critical Slope	0.005694	ft/ft
Velocity	3.00	ft/s
Velocity Head	0.14	ft
Specific Energy	0.44	ft
Froude Number	1.44	
Flow is supercritical.		

SECTION 4, 100-YR
Cross Section for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	ONSITE SECTION 4, 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.014	
Channel Slope	0.012000	ft/ft
Water Surface Elevation	0.30	ft
Discharge	9.00	cfs



SECTION 4A, 10-YR
Worksheet for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	ONSITE SECTION 4A, 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data					
Channel Slope	0.012000 ft/ft				
Elevation range: 0.00 ft to 1.31 ft.					
Station (ft)	Elevation (ft)		Start Station	End Station	Roughness
36.80	0.87		36.80	85.30	0.016
85.30	0.06		85.30	87.30	0.013
86.30	0.00		87.30	104.33	0.016
87.30	0.06		104.33	104.91	0.013
104.33	0.81				
104.41	1.31				
104.91	1.31				
Discharge	9.00	cfs			

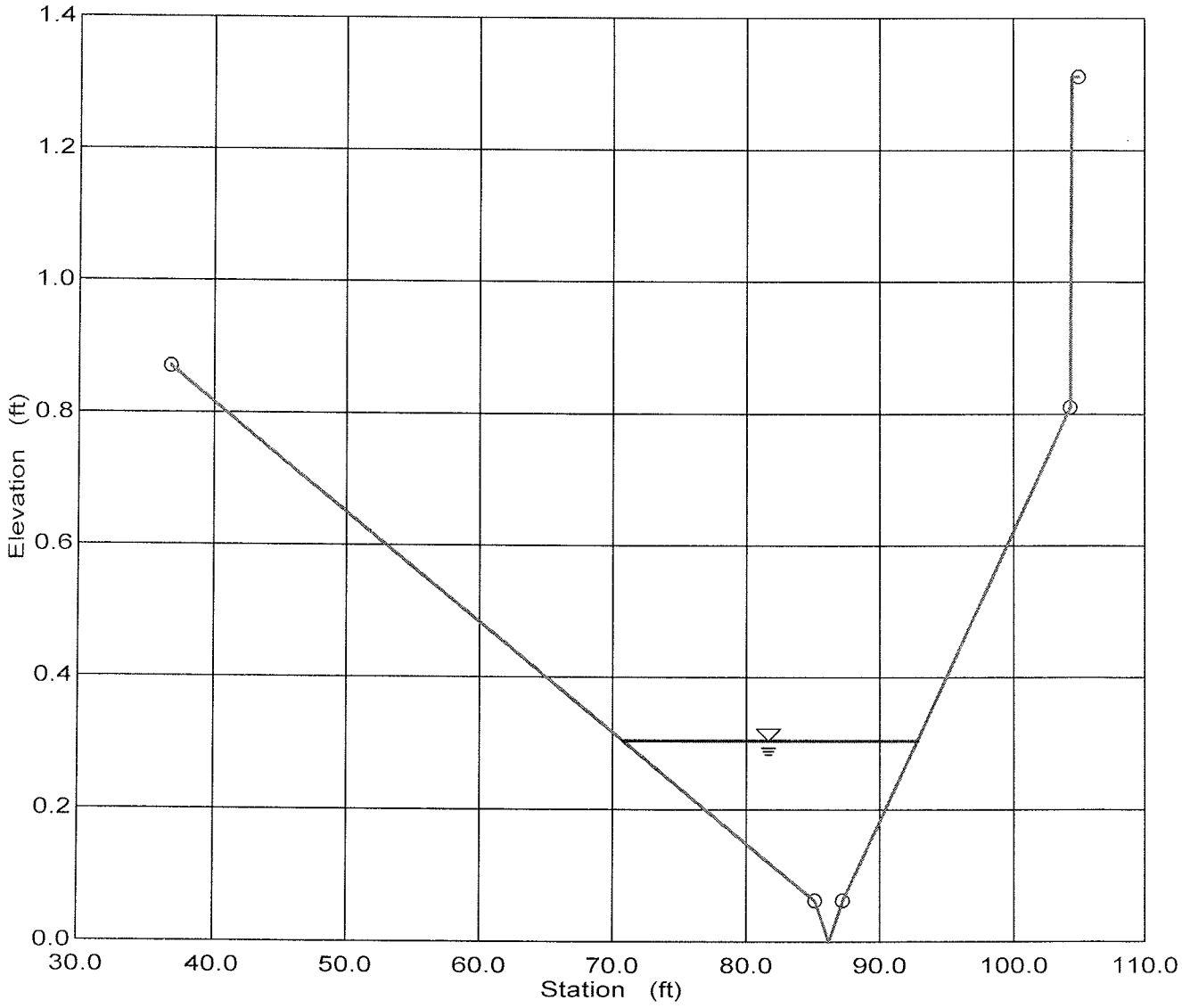
=> DON1R + DOF1 = 4 + 5 cfs

Results		
Wtd. Mannings Coefficient	0.014	
Water Surface Elevation	0.30	ft
Flow Area	3.00	ft²
Wetted Perimeter	22.12	ft
Top Width	22.11	ft
Height	0.30	ft
Critical Depth	0.35	ft
Critical Slope	0.005694	ft/ft
Velocity	3.00	ft/s
Velocity Head	0.14	ft
Specific Energy	0.44	ft
Froude Number	1.44	
Flow is supercritical.		

SECTION 4A, 10-YR
Cross Section for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	ONSITE SECTION 4A, 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.014	
Channel Slope	0.012000	ft/ft
Water Surface Elevation	0.30	ft
Discharge	9.00	cfs



SECTION 4A, 100-YR
Worksheet for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	ONSITE SECTION 4A, 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.012000 ft/ft			
Elevation range: 0.00 ft to 1.31 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
36.80	0.87	36.80	85.30	0.016
85.30	0.06	85.30	87.30	0.013
86.30	0.00	87.30	104.33	0.016
87.30	0.06	104.33	104.91	0.013
104.33	0.81			
104.41	1.31			
104.91	1.31			
Discharge	19.00 cfs			

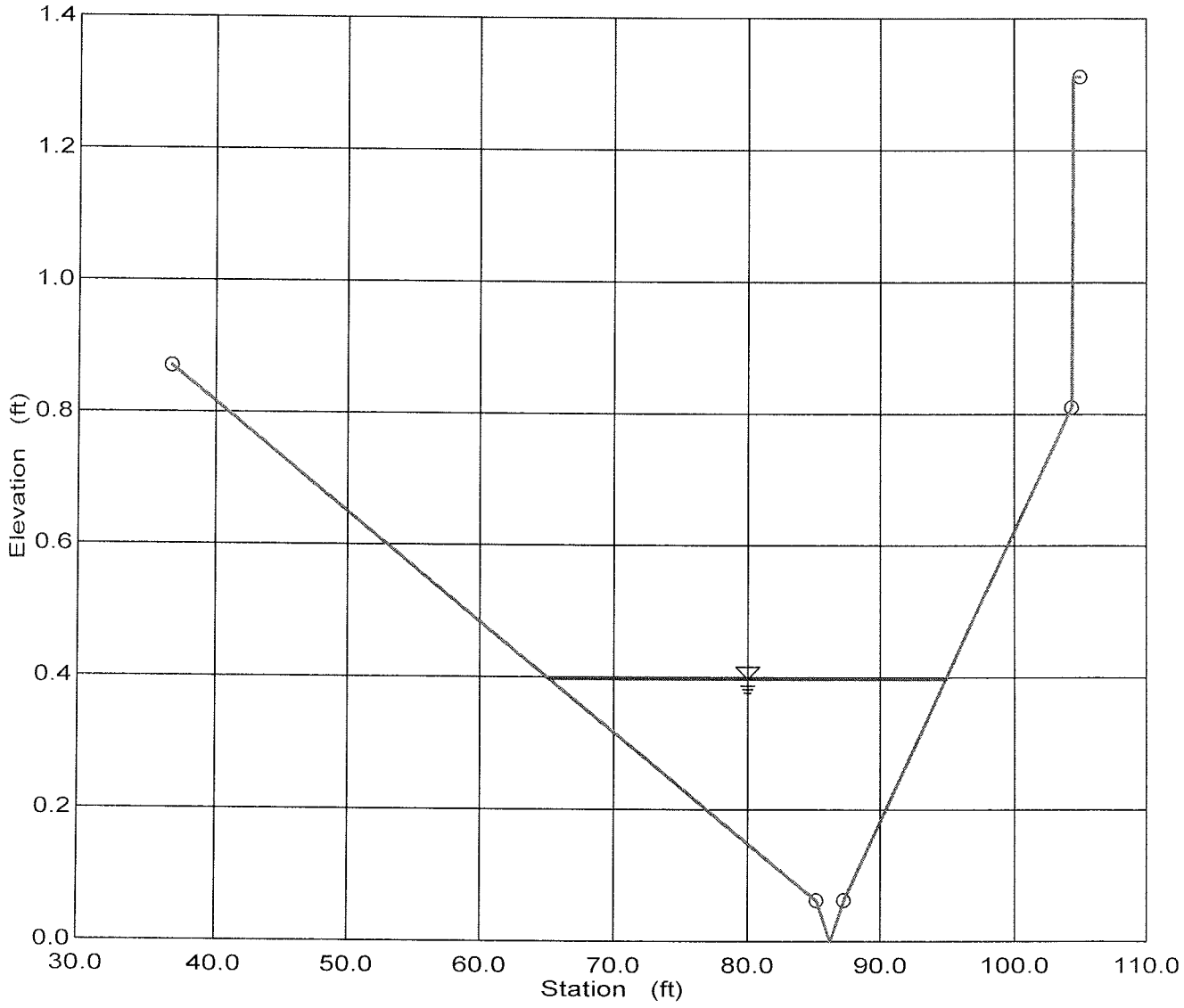
=> DON1B + DOF1 = 9 + 10 =

Results		
Wtd. Mannings Coefficient	0.015	
Water Surface Elevation	0.40	ft
Flow Area	5.37	ft²
Wetted Perimeter	29.69	ft
Top Width	29.68	ft
Height	0.40	ft
Critical Depth	0.46	ft
Critical Slope	0.005426	ft/ft
Velocity	3.54	ft/s
Velocity Head	0.19	ft
Specific Energy	0.59	ft
Froude Number	1.47	
Flow is supercritical.		

SECTION 4A, 100-YR
Cross Section for Irregular Channel

Project Description	
Project File	e:\erc\drng\clsnctr\clsnctr.fm2
Worksheet	ONSITE SECTION 4A, 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.015	
Channel Slope	0.012000	ft/ft
Water Surface Elevation	0.40	ft
Discharge	19.00	cfs



APPENDIX E

Technical Drainage Study for Tropical Parkway
by Primas and Assoc., CLV DS# 2525

Approval Letters

DS# 2525

DS INDEX

APN 125-27-101-027

PROJECT Tropical Parkway

SUBMITTAL 6th

scanning.doc

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CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: February 1, 2000
TO: Land Development Services Department of Public Works				FROM: Randy Fultz, P.E. Flood Control Project Manager Department of Public Works
SUBJECT: Drainage Study for: Tropical Parkway				COPIES TO: Montecito East, L.L.C. Primas & Associates Cheri Edelman, DEVCO Theresa Hanrahan - CLV CCPW
Cross Streets:	Azure Drive from Tenaya Way to 2800' west			
FILE NO.	F:\Depot\DSMEMOS\DS2525D.doc			
Parcel Number:	Not submitted			
Zoning Action:				
FEMA Flood Zone	YES	No	X	
Proposed Storm Drain	YES	No	X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1st Submittal	8/5/99	8/17/99	See Comments Below	$250.00
2nd Submittal	10/12/99	10/27/99	See Comments Below	$250.00
3rd Submittal	1/7/00	1/21/00	See Comments Below	N/A
4th Submittal	1/25/00	1/31/00	See Comments Below	N/A
			TOTAL FEES	$500.00

REMARKS: Tropical Parkway - US 95 to Tenaya Way.

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

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

Note: Acceptance of this drainage study is for Parcel Map and Vacation purposes only.

Following a meeting with the Primas and Associates Consulting Engineers on January 25, 2000, it is understood that their are mitigation measures needed prior to the development of the Tropical Parkway roadway plans. The measures necessary for development include the following:

1. **A storm drain system is needed to alleviate flows being conveyed within the proposed realignment of Tropical Parkway. The Tenaya Way roadway project is currently designing a 10-year storm drain system, which can accommodate the Tropical Parkway flows.**
2. **The design of the future storm drain system for Tropical Parkway will be added to the scope of the Tenaya Way project as an amendment to the Tenaya Way contract with the City (this is anticipated to go to City Council in mid February).**
3. **The drainage study for improvements in Tropical Parkway from US 95 to Tenaya Way will be completed with the Tenaya Way Project as part of an SID. Therefore, the drainage improvements in Tropical Parkway will be addressed in a separate drainage study.**

Additionally, the following comments must be addressed within the Tenaya Way roadway project or prior to any Tropical Parkway roadway development:

1. The currently approved flows for the Tropical Parkway/Azure and Tenaya Way intersection as per the Tenaya Way Road Project is 86 cfs for the 10-year event and 186 cfs for the 100-year event. The flows presented with this Tropical Parkway Project herein are 71 cfs and 151 cfs for the 10-year/100-year flows respectively. The City believes the maximum flow meeting the 12-foot dry lane criteria in the lower reach of Tropical Parkway (S=0.61%) was 12 cfs. Therefore, a storm system conveying 59 cfs (71 cfs - 12 cfs) will be needed as a minimum from CP2 to Tenaya Way, as shown on Figure 9 (of the Tropical Parkway drainage study). At CP1 the flow is 23 cfs and the allowable 12-foot dry lane flow is 17 cfs. Therefore, an 18-inch minimum storm drain is required from CP1 to CP2. At CP2 the flow is 44 cfs and the allowable street flow is 20 cfs. Therefore, a 24-inch minimum storm drain pipe will be needed from CP2 to Tenaya Way where the entire 71 cfs would need to be collected. (Please note: this assumes the Tropical Parkway flows are 71 cfs. This may be subject to revision based on the review by the Engineer as part of flow assessment at Tenaya Way as described above.)
2. The site is adjacent to Clark County boundaries. Clark County Public Works Department (CCPW) concurrence must be obtained prior to final acceptance of the study.
3. A drainage study update must be submitted for any future commercial developments along Tropical Parkway adjacent to this roadway project.

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 Contrd Section. Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the City of Las Vegas reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction.

PLANS SENT TO LAND DEVELOPMENT no **(initial)**

END OF REMARKS
pbj

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AREA G-27

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PRIMAS AND ASSOCIATES
CONSULTING ENGINEERS

January 25, 2000

City of Las Vegas
Department of Public Works
Flood Control Division
731 S. Fourth Street
Las Vegas, Nevada 89101

Attn: Mr. Randy Fultz, P.E.

RE: Drainage Study for Tropical Parkway – Tenaya Way to Tropical Overpass

Dear Mr. Fultz,

Submitted for your review and approval is a copy of the *Summary Drainage Improvement Letter* for the above-mentioned project.

If there are any questions in regards to this technical drainage study, please contact our office at (702) 228-8183

Sincerely,
Primas & Associates

Manny Belen, E.I.

1091 S. CIMARRON ROAD • SUITE A-3 • LAS VEGAS, NV 89145 • TEL (702) 228-8183 • FAX (702) 228-8194
15615 NORTH 71ST STREET • SUITE 202 • SCOTTSDALE, AZ 85254 • TEL (480) 596-5110 • FAX (480) 596-5118

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SUMMARY DRAINAGE IMPROVEMENT LETTER

Re: **Drainage Study for Tropical Parkway – Tenaya Way to Tropical Overpass**
PACE Project No. 9711.24

This letter has been prepared to provide the Department of Public Works Flood Control Division with a response to the comment, dated January 21, 2000 concerning the Technical Drainage Study for Tropical Parkway. The intent of this letter is to explain, clarify, and resolve any drainage issues that maybe of concern to both the City of Las Vegas (CLV) and Primas and Associates Consulting Engineers (PACE).

Initially, Tropical Parkway realignment was a developer-funded project that ran across the proposed Montecito East development. In order for the Tropical Parkway rights-of-way to be dedicated to the CLV by way of Parcel Map, a drainage study was needed. At the time of the initial drainage submittal for Tropical Parkway was submitted to CLV, no roadway drainage improvements were proposed for Tenaya Way. Many options were considered on how to convey flows to minimize impact, however none were feasible. Consequently, no storm drain system was incorporated in Tropical Parkway. Subsequent to the initial design of Tropical Parkway, the Tenaya Way roadway redesign (an S.I.D. improvement project) established a storm drain system along Tenaya Way from Sky Point to Azure Drive (a.k.a. Tropical Parkway). It is now feasible to install a storm drain system in Tropical Parkway.

A feasible connection is now an alternative and since Tropical Parkway roadway design is being incorporated into the Tenaya Way City of Las Vegas Contract the storm drain design will be further refined to include the flows being conveyed through Tropical Parkway. On 1/25/2000 a meeting was held at City of Las Vegas, to discuss how the Tropical Parkway and Tenaya Way drainage issues is to be resolved. Both CLV and PACE acknowledge that a storm system will be beneficial along Tropical Parkway to alleviate flows conveying within the proposed realignment now that a feasible system exists to convey the flow. Furthermore, PACE is still pursuing to obtain approval for the Vacation and Parcel Maps to dedicate Tropical Parkway.

As agreed by Randy Fultz on 1/25/2000, CLV will provide a drainage approval letter for the Montecito East Vacation and Parcel Maps with the understanding that the design of the future storm drain system will proceed as soon as the amendment to the Tenaya Way contract is approved on the anticipated date of February 8, 2000. This will allow the Vacation and Parcel Maps to move forward.

In summary, PACE agrees with the comments that the City of Las Vegas provided Primas and Associates on January 21, 2000. Also, PACE understands that a drainage study update must be submitted for any future commercial development along Tropical Parkway adjacent to the roadway project.

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: February 5, 2003
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: **Tropical Parkway (AKA Montecito East)**				**COPIES TO:** Montecito East, L.L.C. Primas & Associates Bart Anderson, P.E., DEVCO CCPW
Cross Streets:	Azure Drive from Tenaya Way to 2800' west			
FILE NO.	F:\Depot\DSMEMOS\DS2525F.doc			
Parcel Number:	Not submitted			
Zoning Action:				
FEMA Flood Zone	YES		No X	
Proposed Storm Drain	YES X		No	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID GR #
1st Submittal	8/5/99	8/17/99	Not Accepted	$250.00	97401
2nd Submittal	10/12/99	10/27/99	Not Accepted	$250.00	97401
3rd Submittal	1/7/00	1/21/00	Not Accepted	N/A	
4th Submittal	1/25/00	1/31/00	Accepted	N/A	
5th Submittal	4/12/02 & 4/18/02	4/24/02	Accepted	$250.00	97401
6th Submittal	1/13/03	2/5/03	See Comments Below	$250.00	97401
			TOTAL FEES	**$1000.00**	**Paid in Full**

REMARKS: Update for off sites adjacent to site.

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

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

1. The existing drainage berm constructed with the Mass Grading/Stockpile Plan must be shown on Sheet 3.
2. The engineer must add a note to the plans that states "*I certify that the plan is in conformance with the approved drainage study on file at the City of Las Vegas for this project.*"
3. The typical street section shown on Sheet 3 does not reflect the proposed street sections for Ranch House Road and Blooming Meadows Drive. Provide a revised street section for these streets. The revised section needs to also show the existing drainage berm.
4. A drainage study update must be submitted for any further development of this site.

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.

END OF REMARKS

pbj

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AREA G-27

PRIMAS AND ASSOCIATES
CONSULTING ENGINEERS

RECEIVED
JAN 13 2003
CLV PUBLIC WORKS
FLOOD CONTROL

2325-1
1/13/03

January 9, 2003

Mr. Peter Jackson, P.E.
Flood Control Project Engineer
Department of Public Works

Attention: **Peter Jackson, P.E.**

Subject: **Update to Drainage Study for Montecito East**

Dear Mr. Jackson:

This letter is written to update the Conceptual Drainage Study for Montecito East. Offsite streets that border Montecito East have been designed and will generally follow intended drainage paths. Three cul de sacs have been added to adjacent streets and a termination turn around has been added to one (1) street as well.

The termination turn around located at the end of Exotic Bloom Drive is designed entirely within existing roadway and will have no effect on existing drainage patterns.

The first cul de sac is located at the intersection of Durham Hall Avenue and Ranch House Road. Half street improvements for Ranch House Road and Blooming Meadows are also designed in this area. The existing streets in this area drain from north to south; it is our intention to maintain these drainage patterns. The cul de sac and half street improvements all drain to Endless Meadows Drive, where an 8' cross gutter exists. The area encompassed by the roadway improvements amounts to 0.39 acres of which all drains to the cross gutter.

The second cul de sac is located at the end of Bowles Drive. This cul de sac will drain to the south into the existing development as well. The cul de sac encompasses an area of 0.15 acres.

The third "cul de sac" (non standard) is located at the end of Monte Cristo Way. The drainage pattern in this area is from south to north; a high point located approximately 420' south of the existing end of Monte Cristo delineates the contributory drainage area. The area encompassed by the existing pavement and proposed cul de sac amounts to 0.62 acres. Flow generated by this area will drain into Montecito East therein perpetuating existing drainage patterns. This flow will require a public drainage easement upon future development of Montecito East Commercial Properties.

A Rational analysis was performed to quantify the impact the cul de sacs would have on bordering residential development. A time of concentration of 5 minutes (Min t_c for urban basins section 602.1 HCDDM) was used to determine rainfall intensity. Site is within McCarran Rainfall area as established in the original study, therefore rainfall intensities were taken from Table 506 of the HCDDM. 10/100-year intensities are 4.20/7.56 in/hr. Rational runoff coefficients of 0.90 and 0.93 from Table 601 HCDDM were used to model the pavement runoff

PRIMAS AND ASSOCIATES
CONSULTING ENGINEERS

response. The table below shows the results of the runoff calculations at each of the three discharge points.

Discharge Point	Contributing Area	Q_{10} cfs	Q_{100} cfs
Endless Meadows Drive	0.39 Acres	0.82	1.37
Bowels Drive	0.15 Acres	0.29	0.53
Monte Cristo Way	0.62 Acres	1.18	2.21

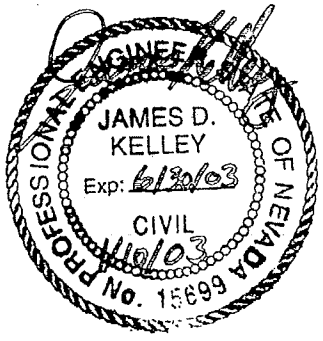
Flows impacting existing residential development are all less than 2 cfs and should have minimal effects on site drainage. Flows impacting Montecito East are also minimal, but will be included in future drainage design.

If you have any questions or comments, please feel free to contact me at the above number.

Primas and Associates Consulting Engineers

James Kelley

James Kelley, P.E.
Project Manager



Attachment: Offsite Roadway Improvement Plans

1091 S. CIMARRON ROAD, SUITE A-3 • LAS VEGAS, NV 89145 • TEL (702) 228-8183 • FAX (702) 228-8194
LAS VEGAS, NEVADA • SCOTTSDALE, ARIZONA • DURANGO, COLORADO

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JAN 13 2003
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FLOOD CONTROL

TRANSMITTAL

PACE Project No. 711.01114
Sent Via HAND DELIVERED

Date: January 10, 2003

To: City of Las Vegas Flood Control

Attention: Peter Jackson, P.E.

Subject: Montecito East

We are sending you the following items:

- Update letter
- Submittal Fee
- Copy of revised grading plans

These items are submitted:

☐ At Your Request
☒ For Your Review and Approval
☐ For Your Review and Comments
☐ Other:

☒ For Your Action
☐ For Your Use
☐ For Your Information

Remarks: If you have any questions, please feel free to contact me at (702) 228-8183.

By: Primas and Associates Consulting Engineers

James Kelley

James Kelley, P.E.
Project Manager

1/10/03

JN 10652 $684.00
JN 20442 $243.00
JN 5176 $75.00

cc: file

1091 S. CIMARRON ROAD, SUITE A-3 • LAS VEGAS, NV 89145 • TEL (702) 228-8183 • FAX (702) 228-8194
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Drainage Basin Map

APPENDIX F

Technical Drainage Study for Tenaya Commercial
by Wood Rodgers, Inc. CLV DS# 4104

Approval Letters

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CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: February 27, 2007
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: **Tenaya Commercial**		**COPIES TO:** Wood Rodgers, Inc.
Cross Streets:	SWC of Tenaya Way & Azure Drive		O'Connell Commercial, LLC
File Number:	F:\Depot\DSMemos\DS4104B.doc		Bart Anderson, P.E., DevCo
Parcel Number:	125-27-222-013		CCDDS
Zoning Action:	SDR-18372		
FEMA Flood Zone	YES	NO X	
Proposed Storm Drain	YES	NO X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1st Submittal	12/1/2006	12/15/2006	Not Approved	$400.00	58670: $400
2nd Submittal	2/12/2007	2/26/2007	See Comments Below	$400.00	62859: $400
			TOTAL FEES (LDDRS):	**$800.00**	----

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:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
X	is conditionally approved subject to Clark County Department of Development Services concurrence.

1. The site is adjacent to the jurisdiction of Clark County to the south. The engineer must coordinate with *Clark County Department of Development Services* (CCDDS) and incorporate any concerns for boundary conditions along the south border. CCDDS concurrence is required prior to final acceptance of the study.

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: T19S/R60E/27
AREA G-27

Approved Drainage Study

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Recd
2/12/07
DS4104
6-27
$400.00

ADDENDUM #1 TO THE TECHNICAL DRAINAGE STUDY FOR TENAYA COMMERCIAL

Prepared for:

O'Connell Commercial, LLC
1504 Eureka Road, Suite 230
Roseville, CA 95661
Phone: (916) 772-7500
Fax: (916) 772-7505

February 2007

Project 1943.001

Wood Rodgers, Inc.
9900 Covington Cross Dr., Ste. #102 * Las Vegas, NV 89144
Tel: 702.434.2953 * Fax: 702.434.2957
www.woodrodgers.com

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HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Tenaya Commercial — Date: February 2007

Location of Development: a) Descriptive (Cross Streets): North/South: Azure/Tropical — East/West: Tenaya/Sky Pointe

b) Sect. 27 — Twn. 19 S — Rng. 60 E

Name of Owner: O' Connell Commercial, LLC — Assessors Parcel No: 125-27-222-013

Telephone: (916)-772-7500 — Facsimile No: (916) 772-7505

Address: 1504 Eureka Road Suite #230 Roseville, CA 95661

Contact Person - Name: Chris Zrinyi, P.E. (czrinyi@woodrodgers.com) — Telephone No: (702) 233-4807

Firm: Wood Rodgers

Address: 9900 Covington Cross Drive Suite #102 Las Vegas, Nevada 89144

Type of Land Development / Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 2.34 Acre ± — Being Developed / Disturbed: 2.04 Acre ±
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? 0.15 sq. mile
6. Has the site drainage been evaluated in the past? YES NO If yes, please identify documentation:
   Technical Drainage Study for Tropical Parkway, Primas And Associates Consulting Engineers, July 28th, 1999
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site:
   North to Azure Drive and East to Parcel 125-27-222-011
8. Briefly describe your proposed schedule for the subject project: ASAP

PROFESSIONAL ENGINEER-STATE OF NEVADA
CHRISTOPHER R. ZRINYI
EXP. 6-30-08
CIVIL
No. 13676

2/09/07

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

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

Local Entity File No.

Revision	Date

REFERENCE:

STANDARD FORM 1

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WOOD RODGERS

1943.001

February 9, 2007

Albert Sung, P.E.
Flood Control Project Engineer
Department of Public Works
731 South Fourth Street
Las Vegas, NV 89101

Subject: **Addendum #1 to the Technical Drainage Study for Tenaya Commercial (CLV DS#4104A)**

Dear Mr. Sung:

The purpose of this letter is to address the comments from the City of Las Vegas Inter-office Memorandum dated December 19, 2006.

The comments are individually addressed as follows:

Comment: "1) The site is adjacent to the jurisdiction of Clark County to the south. The engineer must coordinate with Clark County Department of Development Services (CCDDS) and incorporate any concerns for boundary conditions along the south border. CCDDS concurrence is required prior to final acceptance of the study.

Response: The study and all addenda will be submitted to CCDDS for concurrence upon conditional approval by the City of Las Vegas.

Comment: "2) Provide a copy of the zoning/planning conditions associated with this site (VAR-18371 & SDR-18372) with the next submittal to verify compliance with conditions. Flood Control will not issue final approval of the drainage study without the associated zoning/planning conditions (issued by the City Council). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and submitted.

Response: The SDR was approved on January 12, 2007. A copy of the conditions of approval has been included in the Appendix. VAR-18371 was removed by the owner and is therefore no longer applicable to the site.

Comment: "3) Sections B/D-1 and C/D-1 show an onsite swale along Azure Drive. This swale must also be shown on the plan and designed with flow line elevations at regular intervals. Address how this swale goes through a handicap ramp at the northeast corner of Building 2.

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Response: The grading plan (Sheet G-1) has been updated to include flow line elevations for the swale at regular intervals. The alignment of the handicap ramp has been revised to allow for a sidewalk drain to connect into the swale. Construction Note #4 callouts out the sidewalk drain.

Comment: "4) Relocate a proposed sidewalk drain at the east end of the Azure frontage and tie it to the back of an existing drop inlet."

Response: The hood of the drop inlet is precast and an existing 25-foot high palm tree prevents the sidewalk drain from tying directly into the back of the drop inlet. A photo of the existing tree has been included in the Appendix. However, the onsite flume and sidewalk drain have been relocated approximately 5-feet upstream of the drop inlet to convey flows to the existing inlet.

Comment: "5) It appears that some offsite grading is required at the east boundary in order to match the existing adjacent grades properly. Provide the design in the next submittal and obtain a notarized letter of permission for such grading activities from the adjacent property owner prior to the final approval of the drainage study.

Response: The grading along the eastern boundary has been revised to match existing conditions. Since the grading has been revised a permission letter would not be required. Additionally, per a January 12, 2007 phone conversation between Richard Senecal (WR) and Albert Sung, a cross-access easement for the commercial subdivision will be acceptable in lieu of a permission to grade letter if one was required. Copied excerpts from the commercial subdivision CC&R's showing that access easements have been granted are included in the Appendix.

Comment: "6) The parking stalls along the southern boundary east of Monte Cristo Way appear to be draining to the south against a proposed "A"-curb. Revise the curb to an "L"-curb because it's receiving water. Revise all pertinent details and construction note accordingly.

Response: The "A"-curb has been revised to an "L"-curb and all pertinent details and construction notes have been updated.

Comment: "7) Provide a proposed onsite drainage basin plan.

Response: Figure 7 has been revised to Figure 7R to include the onsite drainage basins. Revisions to the grading plan have necessitated moving the boundary line between Subbasin ON1 and ON2. A revised HEC-1 model has been included in the Appendix. This model shows that the minor revision to the boundary line has not changed the HEC-1 output for the site. All other HEC-1 input parameters have not been revised from the previously submitted model.

Comment: "8) Label the existing storm drain in Azure Drive with City of Las Vegas recorded plan number. Identify all existing drop inlets with type and size on the grading plan.

Response: The existing storm drain has been labeled with the City of Las Vegas recorded plan number. All existing drop inlets with type and size have been identified on the grading plan.

If you have any questions or require additional information, please contact Wood Rodgers, Inc. at 434-2953.

Thank You,

WOOD RODGERS, INC.

Chris Zrinyi, P.E.
Associate
Flood Control Division

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DS 4104
12-1-06
G-27
$400.00

TECHNICAL DRAINAGE STUDY
FOR
TENAYA COMMERCIAL

Prepared for:

O'Connell Commercial, LLC
1504 Eureka Road, Suite 230
Roseville, CA 95661
Phone: (916) 772-7500
Fax: (916) 772-7505

December 2006

Project 1943.001

Wood Rodgers, Inc.
9900 Covington Cross Dr., Ste. #102 * Las Vegas, NV 89144
Tel: 702.434.2953 * Fax: 702.434.2957
www.woodrodgers.com

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I. INTRODUCTION

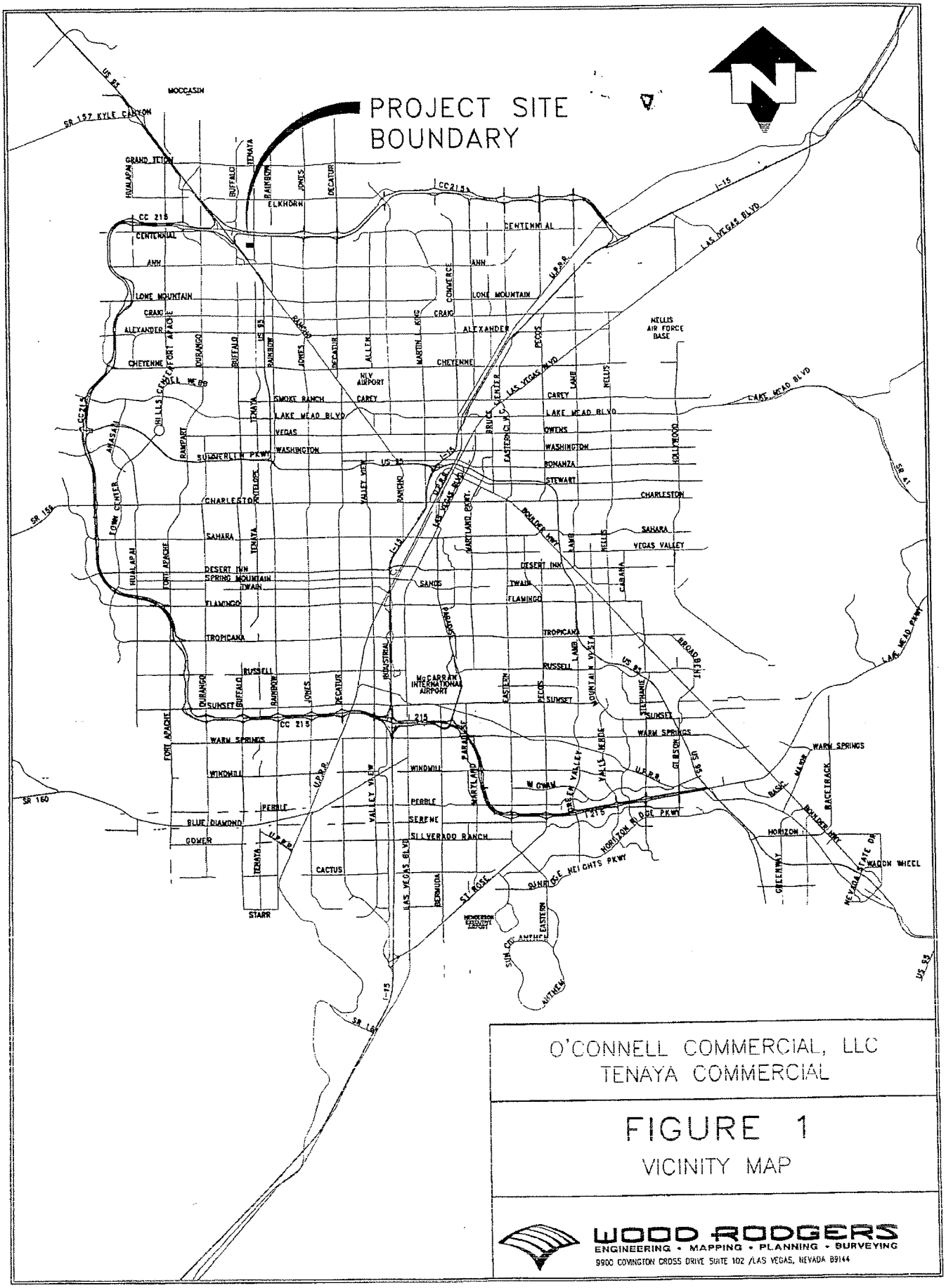
O'Connell Commercial, LLC is proposing to develop Tenaya Commercial as a commercial/retail parcel. The purpose of this report is to accompany the grading plans, to provide detailed hydrological and hydraulic analyses for the site, and to determine adequate protection for the project from offsite and onsite flows. The following tasks were performed in the preparation of this report:

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

II. LOCATION AND DESCRIPTION

The Project is located in Section 27, Township 19 South, Range 60 East, M.D.M., in Las Vegas, Nevada. The site is approximately 350 feet west of Tenaya Avenue and is bordered by Azure Drive on the north, future commercial development on the west, and Ranch House Estates on the south. Please refer to Figures 1 and 2 for the vicinity and location of the project site.

The majority of the 2.34± acre site is presently undeveloped with sparse vegetation. Currently, the southern 0.30± acres of the site consist of landscaping and a 10-foot wide meandering sidewalk path. Existing Azure Drive along the northern border of the site has been fully improved with the Montecito East infrastructure improvements. The proposed development with consist of two commercial buildings with approximately 109 parking spaces.



O'CONNELL COMMERCIAL, LLC
TENAYA COMMERCIAL

FIGURE 1

VICINITY MAP

WOOD RODGERS
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9900 COVINGTON CROSS DRIVE SUITE 102 /LAS VEGAS, NEVADA 89144

J:\Jobs\1943_TenayaCommercial\Civil\Docs\Studies\Civil\Figures\originals\Figure1.dwg 11/05/08 2:38pm rapoglioe

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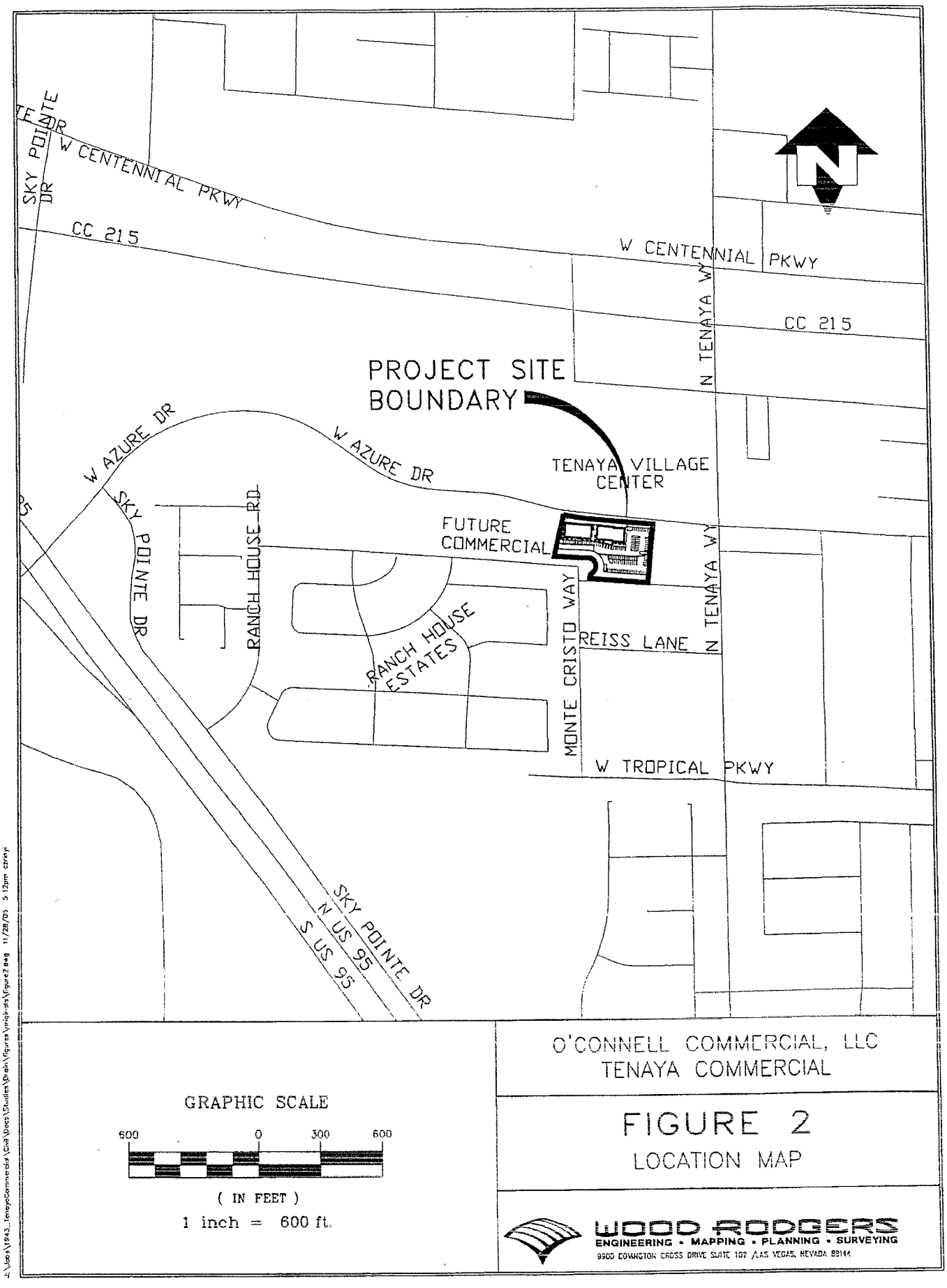

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III. FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD HAZARD ANALYSIS

Figure 3 was reproduced from the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) containing Community Panel Number 32003C1745 E, dated September 27, 2002. Review of the FIRM shows that the project is currently located within a Zone X. Therefore, the project is not located within a FEMA-designated Special Flood Hazard Area (SFHA).

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

Figure 4 is reproduced from Figure F-8 of the 2002 *Clark County Regional Flood Control District (CCRFCD) Master Plan Update* (Reference 1, hereinafter referred to as the 2002 MPU). This figure depicts the project site in relation to existing and proposed CCRFCD facilities. As shown on the figure, the site is not located adjacent to any existing or proposed CCRFCD facilities. Therefore, CCRFCD concurrence will not be required.

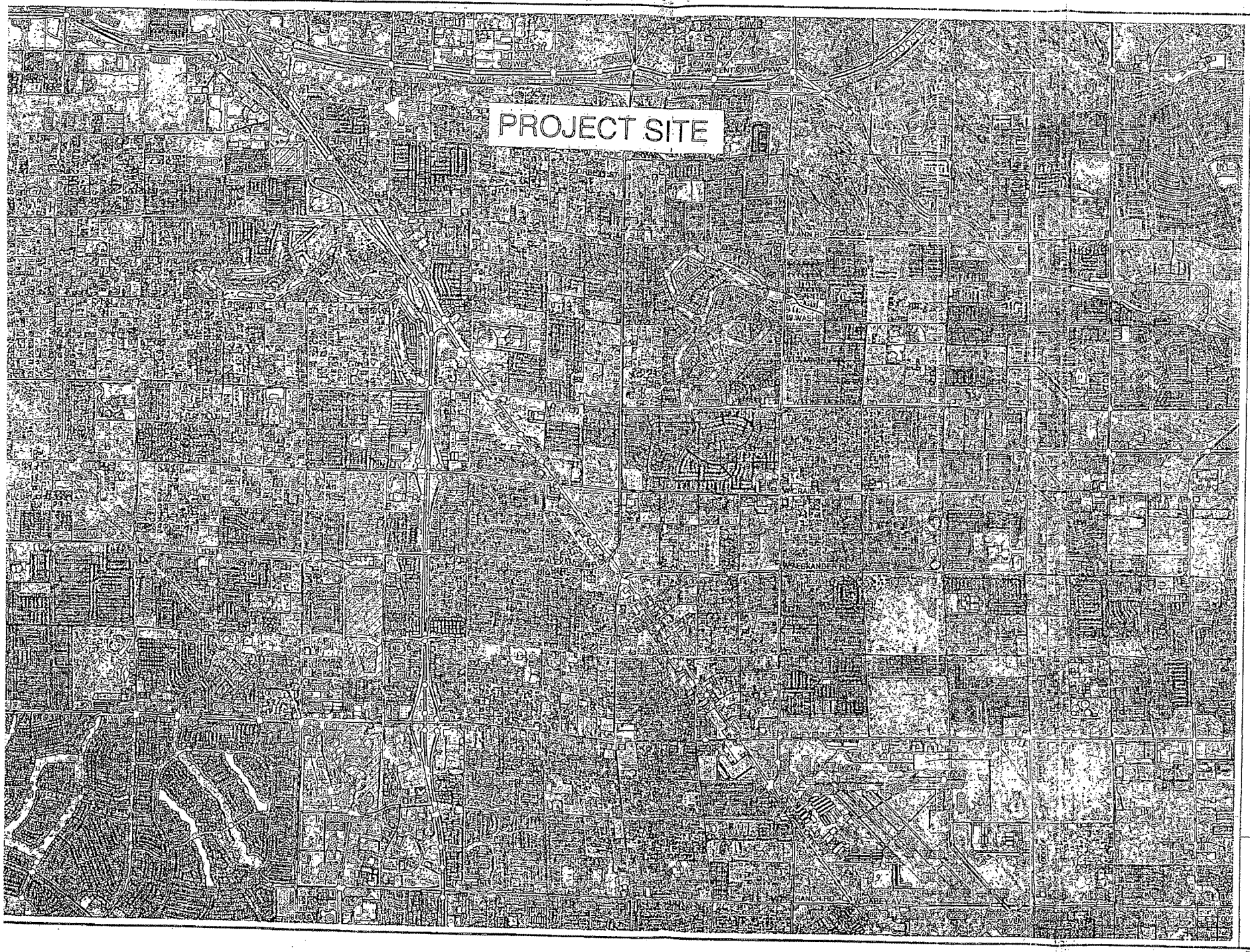
V. HYDROLOGY

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

Model Description - The watersheds were modeled using the SCS Unit Hydrograph method within the U.S. Army Corps of Engineers *HEC-1 Flood Hydrograph Package* (Reference 3).

Precipitation - The project site and tributary drainage areas lie within the McCarran Rainfall Area as identified in the Manual on Figure 513. Rainfall depths for the project site were referenced from Table 505 of the Manual. The point precipitation values are 2.77 inches for a 100-year storm event and 1.58 inches for a 10-year storm event. This equates to a 0.57 ratio between the 10-year and 100-year storm events. (See Appendix A)

Since the drainage area for the project will be less than 8 square miles, an SDN 3 design storm distribution per Table 503 of the Manual was selected for use in the HEC-1 computer model.



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FIGUI

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Curve Numbers (CN) – The soils information for the subject property was obtained from GIS data distributed with the 2002 MPU. The GIS soil coverage delineates families of soil types and the hydrologic soil group (HSG) of each family. The project area and offsite subbasins are comprised of soil types 192 and 305. The 2002 MPU GIS soil coverage delineates soil type 192 as HSG "B". The hydrologic characteristics of soil type 305 consist of HSG "D" and HSG "B". The 2002 MPUGIS Soil Coverage delineates soil type 305 as HSG "C". The majority of the site lies within soil type 305 with the western portion of the site being soil type 192.

For the given soils, CN values were determined from the appropriate columns of Table 602 and 602A of the Manual. The undeveloped subbasins were modeled using desert shrub in poor condition per Table 602 of the Manual. Developed subbasins were modeled using commercial or paved roadways per Table 602 of the MANUAL. Curve number calculations have been included in Appendix A. The majority of the offsite subbasins were referenced from adjacent approved drainage studies as shown in Appendix A on the CN calculation sheet.

Drainage Areas and Flow Patterns - The onsite subbasins and flow patterns used in the hydrologic modeling were determined from the grading plans for The Project. The majority of the offsite subbasins and flow patterns used in the hydrologic modeling were referenced from the following approved drainage studies:

- Technical Drainage Study for Findlay-Shack Honda by Hamilton Engineers (Reference 4, herein after referred to as the Honda study)
- Technical Drainage Study for Shea Commercial-Tenaya by Kimley-Horn and Associates, Inc. (Reference 5, herein after referred to as the Shea Commercial study)
- Technical Drainage Study for Tenaya Village Phase 1 Mini Storage by Tetra Tech, Inc. (Reference 6, herein after referred to as the Tenaya Village study).

Offsite subbasins not covered by the referenced studies were determined from GIS Aerial topography with a 5-foot contour interval.

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

VI. EXISTING CONDITIONS

The project site lies within the area known as Montecito East. A technical drainage study was approved in January 2000 for this master planned commercial subdivision entitled Tropical Parkway (AKA Montecito East) by Primas & Associates (Reference 7, hereinafter referred to as the Montecito East study). Since that time, several developments have been constructed that changed the assumptions as presented in the Montecito East study. Therefore, the flow rates in Azure Drive adjacent to the site were reanalyzed in this study based on the hydrology presented in the Shea Commercial, Tenaya Village, and Honda studies. The existing condition HEC-1 model includes KM cards noting that the subbasin input was referenced and what study it was referenced from. Figure 5 depicts the subbasins and drainage patterns used in the existing conditions hydrological analysis.

The Findlay-Shack Honda site located northwest of the proposed Project will be constructed in two phases. Phase 1 (Subbasins HON1A, HON1B & HON1C) is currently under construction and will be considered as being developed under existing conditions. Phase 2 (Subbasin HON2) is not under construction and will be considered as desert shrub. Phase 2 drains into Phase 1, then flows south to Azure Drive and continues east toward Tenaya Way. The CN calculations sheet in Appendix A shows a correlation from the Honda Study subbasins to subbasins used in this study. The developed Phase 1 subbasin is referenced as an existing commercial site, while the Phase 2 subbasin will be undeveloped desert shrub (poor condition) for the existing conditions model. Offsite Subbasins HON3 through HON9 input parameters and boundaries were referenced from the existing conditions HEC-1 model from the Honda Study. These subbasins have been denoted with the HON designation as shown on Figure 5. Pertinent excerpts from the referenced materials have been included in Appendix C.

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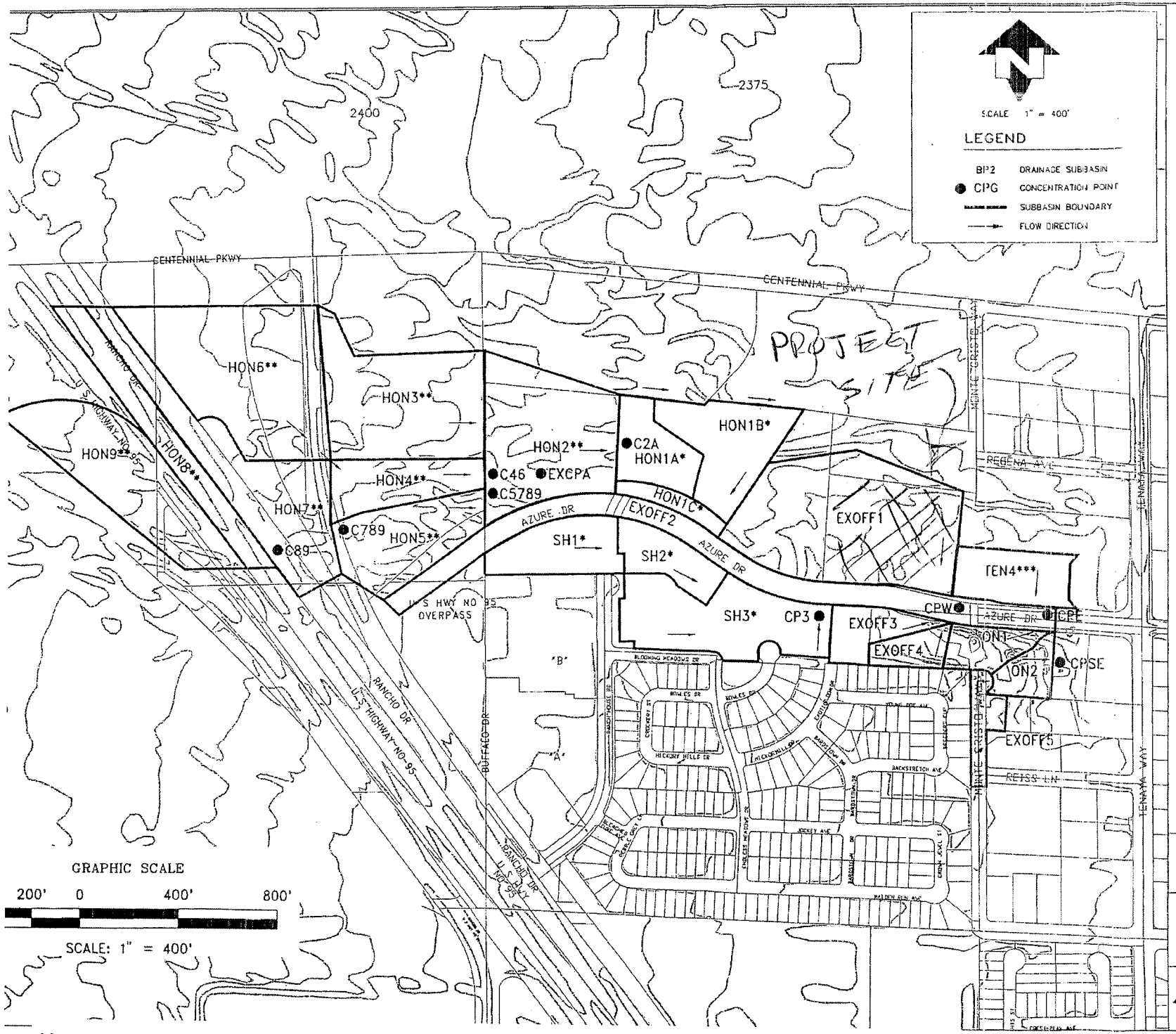

SUMMARY OF FL

BASIN OR LOCATION	Q100 (CFS)
HON1A**	9
HON1B**	12
HON1C**	1
HON2**	13
HON3**	15
HON4**	5
HON6**	21
C46**	26
HON7**	16
HON8**	8
HON9**	14
C89**	21
C789**	37
HON5**	8
C5789**	44
EXCPA**	85
C2A**	97
SH1*	7
SH2*	6
SH3*	13
CP3***	26
EXOFF1	14
EXOFF3	3
EXOFF2	18
CPW	169
EXOFF4	1
ON1	2
TEN4***	6
CPE	179
ON2	2
EXOFF5	3
CPSE	5

*OFFSITE SUBBASIN
REFERENCED FROM SHEA COMMER(
**OFFSITE SUBBASIN
REFERENCED FROM FINDLAY-SHAC
***OFFSITE SUBBASIN
REFERENCED FROM TENAYA VILLAC

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FIGURE
EXISTING CONDIT

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5930 COVINGTON CROSS DRIVE SUITE 102 LAS VEGA

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The Shea Commercial site (Subbasins SH1, SH2 & SH3) located west of the site is currently under construction and will be considered fully developed in the existing conditions model for this study. Subbasin input parameters and boundaries were referenced from the developed conditions HEC-1 model from the Shea Commercial Study. These subbasins have been denoted with the SH designation as shown on Figure 5. The CN calculations sheet in Appendix A shows a correlation from the Shea Commercial Study subbasins to subbasins used in this study. Pertinent excerpts from the referenced materials have been included in Appendix C.

The Tenaya Village site located north of Azure Avenue has been completed and will be considered fully developed. Subbasin TEN4 (DEON4) from the Tenaya Village future conditions HEC-1 model was the only subbasin used for this study since the other subbasins flow directly to Tenaya Way to the east, thus not affecting the Project. Subbasin input parameters and boundaries were referenced from the future conditions HEC-1 model from that study.

In addition to the subbasins referenced from the Shea Commercial, Tenaya Village, and Honda studies, five (5) additional offsite subbasins are tributary to Azure Drive and the Project. Subbasin EXOFF1 is undeveloped land located between the Honda and Tenaya Village sites. The northern boundary of this site was established based on 5 foot contours which show the subbasin drains southeast toward Azure Drive. Subbasin EXOFF2 consists of Azure Drive roadway improvements which flow east past the site to Tenaya Way. Subbasin EXOFF3 is partly developed commercial and partly undeveloped desert shrub located east of Shea Commercial. This subbasin flows northeast into Azure Drive. Subbasin EXOFF4 is undeveloped land which also drains directly into Azure Drive. The existing Ranch House Estates development drains to the south away from these subbasins. Subbasin EXOFF5 is located south of the project site and consists of Monte Cristo Way right of way and a ½ acre lot (20,000 square feet) that includes a house but the driveway and landscaping have not been completed. The southern boundary of this subbasin coincides with an existing high point in Monte Cristo Way. This subbasin flows onto the project site through an existing block wall opening along the eastern wall of the cul-de-sac on the north end of Monte Cristo Way. Copies of the improvement plans for Monte Cristo Way showing the high point and wall opening have been included in Appendix C.

The results of the HEC-1 model have been summarized below in Table 1. The project

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site consists of two onsite subbasins, ON1 (2 cfs) and ON2 (2 cfs). The site will generate a total of 4 cfs under existing conditions during a 100-year storm event. Of the total flow 2 cfs will be drain north to Azure Drive and 2 cfs will drain east.

TABLE 1
EXISTING CONDITIONS
HEC-1 MODEL SUMMARY

SUBBASIN OR CP*	100 YR (CFS)	10 YR (CFS)
HON1A	9	5
HON1B	12	7
HON1C	1	1
HON2	13	5
HON3	15	6
HON4	5	2
HON6	21	8
C46	26	10
HON7	16	6
HON8	8	3
HON9	14	5
C89	21	8
C789	37	14
HON5	8	3
C5789	44	16
EXCPA	85	31
C2A	97	35
SH1	7	3
SH2	6	3
SH3	13	6
CP3	26	12
EXOFF1	14	4
EXOFF3	3	1
EXOFF2	18	10
CPW	169	70
EXOFF4	1	0
ON1	2	1
TEN4	6	3
CPE	179	74
ON2	2	1
EXOFF5	3	1
CPSE	5	2

*See Figure 5

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VII. ULTIMATE CONDITIONS

Under ultimate conditions all offsite areas as well as the Project will be fully developed. Figure 6 depicts the subbasins and drainage patterns used in the ultimate conditions hydrological analysis. An ultimate condition HEC-1 model has been included in Appendix A. The results of the HEC-1 model are summarized below in Table 2. For referenced subbasins, the HEC-1 model includes KM cards noting that the subbasin input parameters were referenced and what study they were referenced from.

TABLE 2
ULTIMATE CONDITIONS HEC-1 MODEL SUMMARY

SB OR CP*	100 YR (CFS)	10 YR (CFS)
HON1A	9	5
HON1B	12	7
HON1C	1	1
HON2	22	12
HON3	25	14
HON4	8	5
HON6	31	17
C46	37	21
HON7	23	13
HON8	8	3
HON9	14	5
C89	21	8
C789	45	21
HON5	12	7
C5789	54	26
EXCPA	112	58
C2A	127	66
SH1	7	3
SH2	6	3
SH3	13	6
CP3	26	12
UTOFF1	26	13
UTOFF3	7	3
UTOFF2	18	10
CPW	224	114
ON1	6	3
TEN4	6	3
CPE	236	120
ON2	2	1
UTOFF5	3	1
CPSE	4	2

*See Figure 6.

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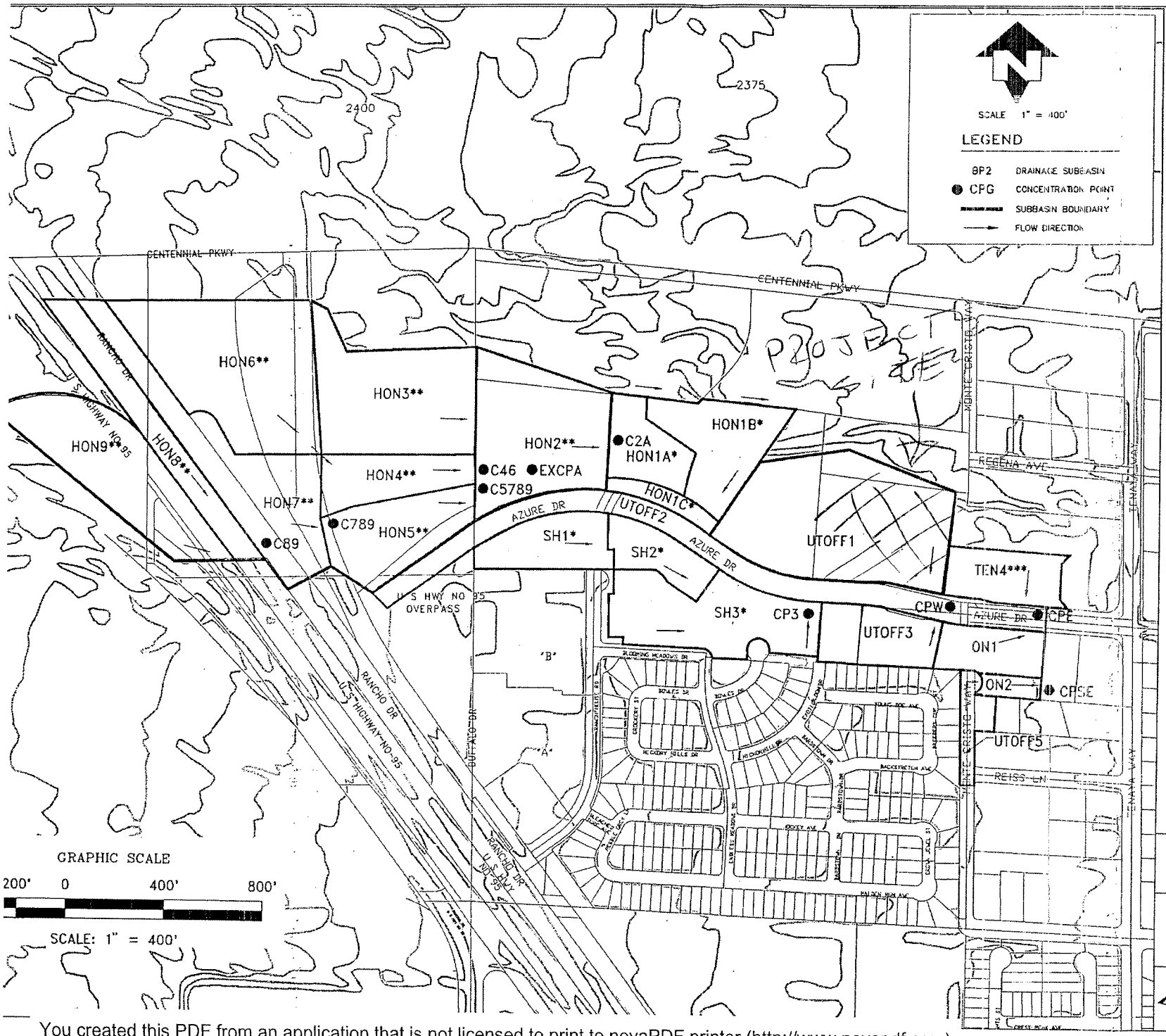

SUMMARY OF FLC

BASIN OR LOCATION	Q100 (CFS)
HON1A**	9
HON1B**	12
HON1C**	1
HON2**	22
HON3**	25
HON4**	8
HON6**	31
C46**	37
HON7**	23
HON8**	8
HON9**	14
C89**	21
C789**	45
HON5**	12
C5789**	54
EXCPA**	112
C2A**	127
SH1*	7
SH2*	6
SH3*	13
CP3***	26
UTOFF1	26
UTOFF3	7
UTOFF2	18
CPW	224
ON1	6
TEN4***	6
CPE	236
ON2	2
UTOFF5	3
CPSE	4

*OFFSITE SUBBASIN REFERENCED FROM SHEA COMMERCI
**OFFSITE SUBBASIN REFERENCED FROM FINDLAY-SHACK
***OFFSITE SUBBASIN REFERENCED FROM TENAYA VILLAGE

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FIGURE 6
ULTIMATE

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The subbasins boundaries used in the ultimate condition HEC-1 model are generally the same as those used in the existing condition model. Subbasins HON1A, HON1B, HON1C, SH1, SH2, SH3, and TEN4 were all considered developed in the existing conditions model, therefore these subbasins were not revised. The input parameters for Subbasins HON2 through HON9 were previously referenced from the existing conditions HEC-1 model from the Honda Study. Under ultimate conditions these subbasins are developed and have been referenced from the developed conditions HEC-1 model from the Honda Study. Existing Subbasins EXOFF3 and EXOFF4 have been combined to form Subbasin UTOFF3 which is now considered developed as a commercial property. Subbasins EXOFF2, EXOFF1, and EXOFF5 have been revised to developed subbasins and renamed UTOFF2, UTOFF1, and UTOFF5 respectively.

Onsite Subbasins ON1 and ON2 make up the Project and reflect the improvements shown on the proposed grading plan. Subbasin ON1 comprises the north half of the site which drains to Azure Drive through a concrete slot gutter located at the north east corner of the site. During a 100-year storm event Subbasin ON1 will produce 6 cfs of runoff. This is higher than the existing condition flow of 2 cfs. However, the Montecito East Study and all existing storm drain facilities have already been approved based on this site being developed as a commercial property. Therefore, the increase in flow between existing and ultimate conditions has already been accounted for. Runoff from Subbasin ON2 combines with offsite runoff from UTOFF5 at CPSE and drains east onto the adjacent parcel which will direct the flow north into Azure Drive. The total 100-year flow of 4 cfs at CPSE is lower than the existing condition flow of 5 cfs.

Azure Drive includes an existing 36-inch HDPE storm drain that connects into the Tenaya Way storm drain. Adjacent to the Project this storm drain was designed to convey 55 CFS per the referenced plan and profile sheet included in Appendix C. In general, the proposed development of Tenaya Commercial is in conformance with the existing drainage patterns for the site and the overall Montecito East commercial subdivision. Therefore, the proposed project will not result in any adverse impacts on downstream facilities or properties.

VIII. INTERIM CONDITIONS

Under interim conditions the Project will be developed and the offsite subbasins will remain the same as the existing conditions model. The storm drain in Azure Drive is existing and additional offsite storm drains to reduce flow rates or revise subbasin boundaries are not programmed. Therefore, interim conditions flow rates will be lower than or the same as ultimate conditions. Since, ultimate conditions provide for the worst case design flow rates an interim condition analysis and HEC-1 model was not prepared for the site.

The Montecito East commercial subdivision did not include access driveways for each Lot within the commercial subdivision. However, Notes 3 and 4 of the commercial subdivision map (See Appendix C) read as follows:

3. All properties within the site shall have perpetual, unobstructed access to all parking and all driveways servicing this site.
4. All subdivided parcels comprising this commercial subdivision shall provide perpetual intersite common drainage rights across all existing and future parcel limits.

Since, the properties east and west of this site are not developed an interim condition temporary 24 foot access roadway will be placed along the west side of the site. Once the parcels to the east and west of the project site are developed permanent access will be provided through their parking lots.

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IX. STREET HYDRAULICS

The site is located within the City of Las Vegas Northwest Neighborhood Study Phase 1. Figures E-5 and F-5 from that study have been included in Appendix B with the site shown thereon. The existing and ultimate condition HEC-1 models and analysis included with this study supercede the flow rates shown in the Northwest Neighborhood Study. However, the flow rates in Azure were checked for a worst case condition. Under ultimate conditions this study calculated a 100-year flow rate of 236 cfs within Azure Drive. The ultimate condition 100-year flow rate in Azure Drive was shown to be 209 cfs per the Northwest Neighborhood Study. Therefore, the flow rates per this study were higher and were used for calculating street characteristics.

The resulting street and parking lot flow data based on the flows established from the ultimate conditions HEC-1 model is presented below in Table 3. Figure 7 shows the locations of the cross sections corresponding to the calculations included in Table 3. Hydraulic calculations have been included in Appendix B.

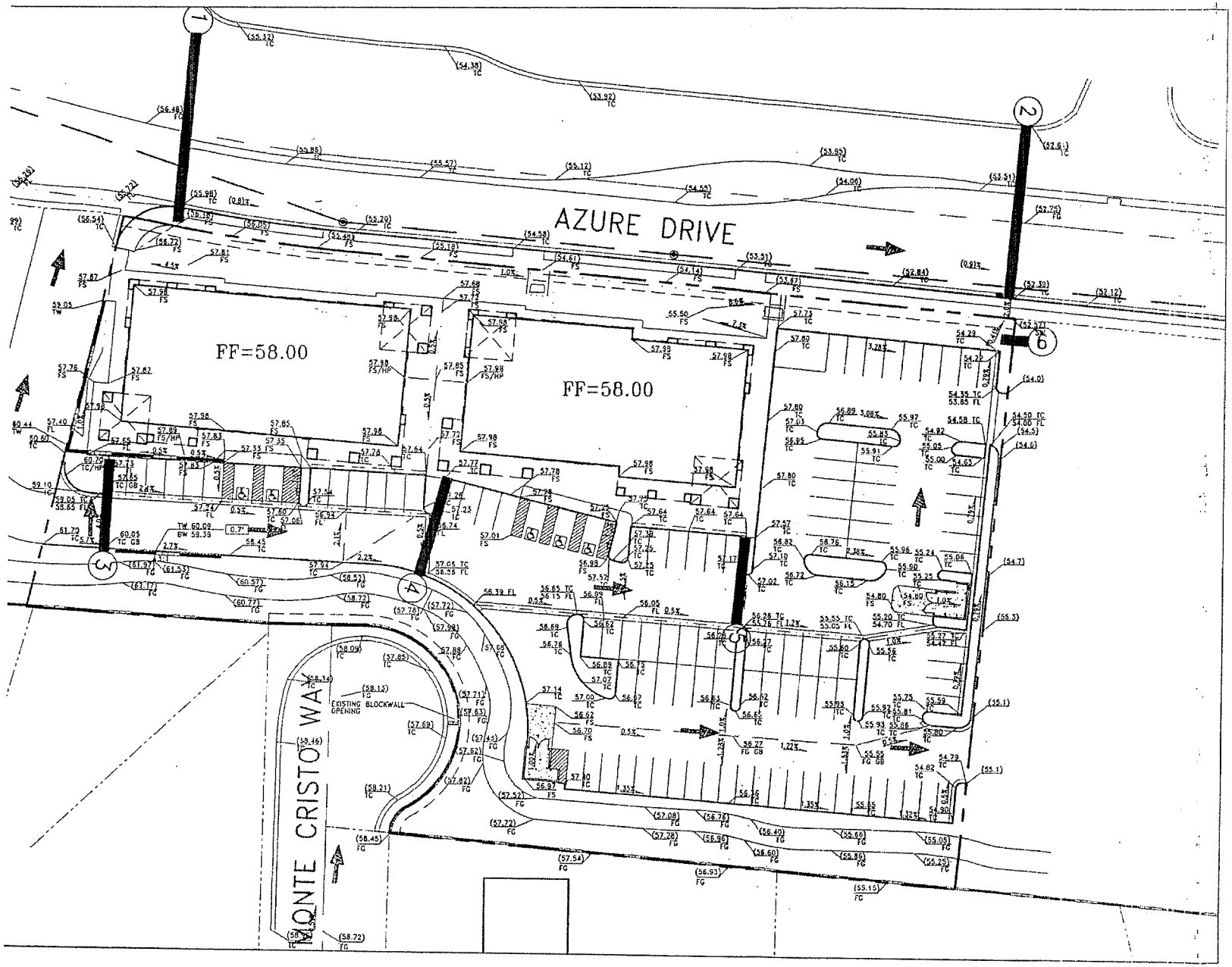
TABLE 3
100-YEAR HYDRAULIC CHARACTERISTICS
ULTIMATE CONDITIONS

Location*	Slope (%)	Q_{100} (cfs)	D_{100} (ft)	V_{100} (ft/sec)	$D*V_{100}$
Section 1	0.8	224-55=169	0.93	4.7	4.4
Section 2	0.9	236-55=181	0.94	5.0	4.7
Section 3	0.5	6	0.30	2.3	0.7
Section 4	0.5	6	0.20	1.6	0.3
Section 5	0.5	6	0.17	3.5	0.6
Section 6	10.4	6	0.24	12.4	N/A

*See Figure 7

Nuisance flows will be directed north into Azure Drive which includes an existing storm drain system. Nuisance flows on the south half of the site would be generated from the existing trail and landscaping. These nuisance flows will be continued east in their historical flow path.

The flow rates for Cross Sections 1 and 2 have been reduced by 55 cfs to account for the flows conveyed by the Azure Drive storm drain. Based on the calculated street flow characteristics, the Manual criteria for depth (D) and velocity times depth (V*D) during the 100-year storm event will be met.



SCALE 1" = 50'

LEGEND

(8) STREET FLOW CALCULATION

1.00% STREET SLOP

SUMMARY OF STREET

SECTION	Q100 (CFS)
1*	169
2**	181
3	6
4	6
5	6
6	6

*CPW FLOWS-55 CFS IN AZURE SD
**CPE FLOWS-55 CFS IN AZURE SD

GRAPHIC SCALE

50' 25' 0 50'

SCALE: 1" = 50'

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FIGURE 7

STREET SECTION

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The Azure Drive storm drain was designed to convey the 10-year flow per the Montecito East Study. However, approved studies for Shea Commercial, Tenaya Village, and Honda have shown an increase in the Azure Drive flows. Most notably the Honda Study revised on site CN values from a 92 to a 98 to more accurately reflect their site and added additional subbasins (HON 6 to HON9) that were not included with the Montecito East analysis (See Appendix C). Ultimate condition dry lane criteria calculations for Azure Drive have been included for Cross Sections 1 and 2 in Appendix B. Cross Section 1 is at the west edge of the site prior to flows from the site entering Azure Drive. Under ultimate conditions with all off-sites built, dry lane criteria will not be met based on the street depth of 0.69 feet. Cross Section 2 is at the east end of the site and includes the flows generated by the site. The depth at Cross Section two will be increased by 0.01 feet.

Dry lane criteria will not be met prior to site development and the flow depth will not be significantly increased (0.01 feet) after site development. Additionally, this 2.34 acre site only increases the 10-year flow by 2 cfs and it is part of a master planned area that already included storm drain facilities to meet dry lane criteria. Under interim conditions with the off-sites per the existing condition HEC-1 model and the site developed the 10-year flow in Azure Drive would be 20 cfs (74 cfs + 1 cfs more with ON1 developed – 55 cfs in the storm drain). Therefore, Azure Drive would meet dry lane criteria under interim conditions. For the reasons stated above WR believes this deviation is not a site specific problem and should be acceptable.

The proposed site will meet the City of Las Vegas criteria for finished floor elevations for the flow in Azure Drive. The City criteria requires that finished floor elevations are set at a vertical distance above the gutter flow line of at least twice the depth of flow or a minimum of 6-inches above highest adjacent top of curb. Building 1 meets these criteria for Azure Drive but not for the onsite parking lot. The parking lot includes a highpoint in the curb at elevation 60.7 at the south west corner of the building. However, the building includes parking spaces sloped away from the building with a 3-wide valley gutter. Section 3 has been conservatively modeled with 6 cfs generated by the entire onsite. Even with this conservative flow rate the depth of flow would be 0.3 feet in the valley gutter. The FF of Building 1 will be elevated as a minimum to twice this depth of flow.

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X. CONCLUSIONS AND RECOMMENDATIONS

1. Methodology used in this report is in compliance with the Clark County Regional Flood Control District (CCRFCD) criteria.

2. The proposed project lies within A FEMA Zone X. Therefore, the project is not currently located in a FEMA-designated Special Flood Hazard Area.

3. The site is not located adjacent to existing or proposed CCRFCD facilities. Therefore, CCRFCD concurrence will not be required.

4. The proposed development does not significantly alter existing peak flows or the character of flows downstream of the development.

5. Buildings to be constructed within this project will have adequate freeboard to be protected from onsite flows and offsite flows within Azure Drive.

XI. REFERENCES

1. Post, Buckley, Schuh & Jernigan Inc., Louis Berger Group, and GC Wallace Inc., *Clark County Regional Flood Control District - The 2002 Master Plan Update of the Las Vegas Valley,* 2003.

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

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

4. Hamilton Engineers, *Hydrology Study for Findlay-Shack Honda* and all Addenda. March 2006.

5. Kimley-Horn & Associates, *Technical Drainage Study for Shea Commercial-Tenaya* and all Addenda. June 2005.

6. Tetra Tech, Technical *Drainage Study for Tenaya Village Phase 1 Mini Storage* and all Addenda. December 2003.

7. Primas and Associates, *Technical Drainage Study for Tropical Parkway (AKA Montecito East)* and all Addenda. January 2000.

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Existing Hec-1 Model

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CN CALCULATIONS - EXISTING CONDITIONS

Basin	SOIL TYPE	% SOIL TYPE	HYDRO	CN-Commercial/ Business %	CN-Commercial/ Business CN	CN-DESERT SHRUB %	CN-DESERT SHRUB CN	CN-Streets/ Roads: Paved - Curbs %	CN-Streets/ Roads: Paved - Curbs CN	WEIGHTED CN
ON1	192	18	B			100.0	77			13.9
	305	82	C			100.0	85			69.7
										83.6
ON2	305	100	C			100.0	85			85.0
										0.0
										85.0
EXOFF1	192	49	B			100.0	77			37.7
	305	51	C			100.0	85			43.4
										81.1
EXOFF2	192	64	B					100.0	98	62.7
	305	36	C					100.0	98	35.3
										98.0
EXOFF3	192	66	B	69.0	92	31.0	77			57.7
	305	34	C	48.0	94	52.0	85			30.4
										88.0
EXOFF4	192	83	B			100.0	77			63.9
	305	17	C			100.0	85			14.5
										78.4
EXOFF5	305	100	C			28.2	85	71.8	98	94.3
										0.0
										94.3

*NOTE: Soil types were referenced from CCRFCD GIS data.

REFERENCED STUDY	MODEL	THIS STUDY
Findlay-Shack Honda		
ON1	Developed	HON1A
ON2	Developed	HON1B
ON3	Developed	HON1C
OFF-2	Existing	HON2
OFF-3	Existing	HON3
OFF-4	Existing	HON4
OFF-5	Existing	HON5
OFF-6	Existing	HON6
OFF-7	Existing	HON7
OFF-8	Existing	HON8
OFF-9	Existing	HON9
Shea Commercial		
DEON1	Developed	SH1
DEON2	Developed	SH2
DEON3	Developed	SH3
Tenaya Village Phase 1 Mini Storage		
ON4D	Developed	TEN4

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

WoodRodgers

TENAYA COMMERCIAL
O'CONNELL COMMERCIAL LLC
Existing Conditions

BY: NA
DATE: 11/29/06

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag	REMARKS
DESIG: (1)	DEV./EX. (D or E)	CN	K (2)	AREA Ac (3)	AREA Mi^2	INITIAL LENGTH Feet (4)	SLOPE % (5)	TI Min (6)	TRAVEL LENGTH Feet (7)	SLOPE % (8)	V1 VELOCITY FPS (9a)	V2 VELOCITY FPS (9b)	Tt Min (10)	Min (13)	Min (14)	Tlag= 0.6Tc/60 Hours	RAINFALL Q100/Q10 Inches
ON1	E	83.6	0.7135	1.31	0.0020	184	3.8	6.0	420	1.0	1.5	2.9	4.7	10.8	N/A	0.108	
ON2	E	85.0	0.7320	1.03	0.0016	132	1.5	6.6	233	2.0	2.1	4.2	1.9	8.5	N/A	0.085	Tc=10min.
EXOFF1	E	81.1	0.6805	9.79	0.0153	500	1.5	14.7	550	2.8	2.5	4.9	3.5	18.3	N/A	0.183	
EXOFF2	D	98.0	0.9036	6.36	0.0099	40	2.0	1.8	2900	1.3	2.3	3.5	15.0	16.8	26.3	0.168	
EXOFF3	E	88.0	0.7716	1.52	0.0024	110	2.0	4.9	667	1.7	1.9	3.8	5.0	10.0	N/A	0.100	
EXOFF4	E	78.4	0.6449	0.99	0.0015	300	2.0	11.3	102	2.0	2.1	4.2	0.8	12.1	N/A	0.121	
EXOFF5	D	94.3	0.8548	0.96	0.0015	30	2.0	1.9	574	0.5	1.4	2.2	6.3	8.3	13.4	0.083	

Tc = Ti + Tt Tlag = 0.6 Tc
Ti = 1.8 (1.1 - K) L^1/2 / S^1/3
K = 0.0132 (CN) - 0.39

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

Existing V1 = 14.8*(S/100)^1/2 Developed V1 = 20.2*(S/100)^1/2
Existing V2 = 29.4*(S/100)^1/2 Developed V2 = 30.6*(S/100)^1/2

Tc Check (Developed) = L/180+10

Minimum Tc (EX) = 10 Min per Section 602 Minimum Tc (DEV) = 5 Min per Section 602.1

REFERENCE :

STANDARD FORM 4

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```
1*************************************
*                                   *
*  FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*            JUN 1998               *
*          VERSION 4.1              *
*                                   *
* RUN DATE  28NOV06 TIME 08:11:26   *
*                                   *
*************************************
```


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


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

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

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


```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1      ID
          *DIAGRAM
   2      ID     TENAYA/AZURE
   3      ID     EXISTING CONDITIONS
   4      ID     DESIGN STORM = 100-YEAR 6-HOUR STORM
   5      ID     STORM DISTRIBUTION = SDN3
   6      ID     JR CARDS BASED ON THE FOLLOWING VALUES
   7      ID
   8      ID   1.00       =100 YEAR
   9      ID   0.57       = 10 YEAR
  10      ID
  11      IT      5       0       0     300
  12      IO      5       0       0
  13      IN      5       0       0
  14      JR   PREC    1.00    0.57
          *
  15      KK   HON1A
  16      KM   THIS BASIN REFERENCED FROM WESTERLY PART OF PHASE 1: HONDA SITE DEVELOPMENT
  17      KM   BASIN ON1-DEVELOPED HEC-1 MODEL
  18      BA   .0041
  19      PB    2.77
  20      PC  0.000  0.020  0.057  0.070  0.087  0.108  0.124  0.130  0.130  0.130
  21      PC  0.130  0.130  0.130  0.133  0.140  0.142  0.148  0.158  0.172  0.181
  22      PC  0.190  0.197  0.199  0.200  0.201  0.204  0.214  0.229  0.241  0.249
  23      PC  0.251  0.256  0.270  0.278  0.281  0.283  0.295  0.322  0.352  0.409
  24      PC  0.499  0.590  0.710  0.744  0.781  0.812  0.819  0.835  0.851  0.856
  25      PC  0.860  0.868  0.876  0.888  0.910  0.926  0.937  0.950  0.970  0.976
  26      PC  0.982  0.985  0.987  0.989  0.990  0.993  0.993  0.994  0.995  0.998
  27      PC  0.998  0.999  1.000
  28      LS      0     98
  29      UD  0.083
          *
  30      KK   HON1B
  31      KM   THIS BASIN REFERENCED FROM EASTERLY PART OF PHASE 1: HONDA SITE DEVELOPMENT
  32      KM   BASIN ON2-DEVELOPED HEC-1 MODEL
  33      BA   .0056
  34      LS      0     98
  35      UD  0.075
          *
  36      KK   HON1C
  37      KM   THIS BASIN REFERENCED FROM SOUTHERLY PART OF PHASE1: HONDA SITE DEVELOPMENT
  38      KM   BASIN ON3-DEVELOPED HEC-1 MODEL
  39      BA   .0006
  40      LS      0     98
  41      UD  0.118
          *
```



```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  42      KK  DVSITE
  43      KM   COMBINE ON SITE FLOW FOR DEVELOPED PHASE 1 AT HONDA SITE
  44      KM   REFERENCED FROM TOTAL DISCHARGE FROM PHASE 1: HONDA SITE DEVELOPMENT
```

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```
                45          HC       3
                            *
                46          KK    HON2
                47          KM   THIS BASIN REFERENCED FROM HONDA SITE DEVELOPMENT AS EXOFF2
                48          KM   EXISTING CONDITION HEC-1 MODEL
                49          BA   0.010
                50          LS       0      85
                51          UD   0.100
                            *
                52          KK    HON3
                53          KM   THIS BASIN REFERENCED FROM HONDA SITE DEVELOPMENT AS EXOFF3
                54          KM   EXISTING CONDITION HEC-1 MODEL
                55          BA   .0120
                56          LS       0      85
                57          UD   0.100
                            *
                58          KK    HON4
                59          KM   THIS BASIN REFERENCED FROM HONDA SITE DEVELOPMENT AS EXOFF4
                60          KM   EXISTING CONDITION HEC-1 MODEL
                61          BA   .0041
                62          LS       0      85
                63          UD   0.100
                            *
                64          KK    HON6
                65          KM   THIS BASIN REFERENCED FROM HONDA SITE DEVELOPMENT EXOFF6
                66          KM   EXISTING CONDITION HEC-1 MODEL
                67          BA   .0167
                68          LS       0      85
                69          UD    .105
                            *
                70          KK   RHON6
                71          KM   ROUTE HON6 THROUGH HON4
                72          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "ROUTE OFF6 THROUGH OFF4"
                73          RK     680    .017    .035            TRAP       3       3
                            *
                74          KK     C46
                75          KM   COMBINE HON4 AND HON6
                76          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "COMBINE OFF4 AND OFF6"
                77          HC       2
                            *
1                                                    HEC-1 INPUT                                                    PAGE  3
              LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
                78          KK    HON7
                79          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS EXOFF7
                80          KM   EXISTING CONDITION HEC-1 MODEL
                81          BA   .0128
                82          LS       0      85
                83          UD   0.115
                            *
                84          KK    HON8
                85          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS EXOFF8
                86          KM   EXISTING CONDITION HEC-1 MODEL
                87          BA   .0066
                88          LS       0      85
                89          UD    .130
                            *
                90          KK    HON9
                91          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS OFF9
                92          KM   EXISTING CONDITION HEC-1 MODEL
                93          BA   .0100
                94          LS       0      85
                95          UD   0.102
                            *
                96          KK     C89
                97          KM   COMBINE HON8 AND HON9
                98          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "COMBINE OFF8 AND OFF9"
                99          HC       2
                            *
               100          KK     R89
               101          KM   ROUTE C89 THROUGH HON7
               102          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "ROUTE C89 THROUGH OFF7"
               103          RK     160    .015    .035            TRAP       3       3
                            *
               104          KK    C789
               105          KM   COMBINE C89 AND HON7
               106          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "COMBINE C89 AND OFF7"
               107          HC       2
                            *
               108          KK    R789
               109          KM   ROUTE C789 THROUGH HON5
```

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```
110          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "ROUTE C789 THROUGH OFF5"
111          RK     560    .020    .035            TRAP       3       3
             *

112          KK    HON5
113          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS EXOFF5
114          KM   EXISTING CONDITION HEC-1 MODEL
115          BA   .0059
116          LS       0      85
117          UD   0.100
             *
```



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

118          KK   C5789
119          KM   COMBINE C789 AND HON5
120          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "COMBINE C789 AND OFF5"
121          HC       2
             *

122          KK   EXCPA
123          KM   COMBINE C5789, C46 AND HON3 AND ROUTE THROUGH HON2
124          KM   REFERENCED FROM HONDA SITE DEVELOPMENT
125          HC       3
             *

126          KK    RCPA
127          KM   ROUTE CONCENTRATION POINT "A" THROUGH HON2
128          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "A THROUGH OFF2"
129          RK     520    .017    .035            TRAP       3       3
             *

130          KK     C2A
131          KM   COMBINE CPA AND HON2
132          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS"COMBINE CPA AND OFF2"
133          HC       2
             *

134          KK     SH1
135          KM   REFERENCED FROM SHEA COMMERCIAL-TENAYA AS ON1D
136          KM   FUTURE CONDITION MODEL
137          BA   .0037
138          LS       0      92
139          UD   0.064
             *

140          KK     SH2
141          KM   REFERENCED FROM SHEA COMMERCIAL-TENAYA AS ON2D
142          KM   FUTURE CONDITION MODEL
143          BA   .0031
144          LS       0      90
145          UD    .050
             *

146          KK     SH3
147          KM   REFERENCED FROM SHEA COMMERCIAL-TENAYA AS ON3D
148          KM   FUTURE CONDITION MODEL
149          KM   BASE FLOW NOT USED-HONDA BASINS WERE INCORPORATED INSTEAD OF BASE FLOW
150          BA   .0077
151          LS       0      92
152          UD    .110
             *
```



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

153          KK     CP3
154          KM   REFERENCED FROM SHEA COMMERCIAL-TENAYA-COMBINES SH1, SH2, & SH3
155          HC       3
             *

156          KK  EXOFF1
157          BA   .0153
158          LS       0    81.1
159          UD    .183
             *

160          KK  EXOFF3
161          KM   BASIN PART OF DISCOUNT TIRE
162          BA   .0024
163          LS       0      88
164          UD    .100
             *

165          KK  EXOFF2
166          KM   AZURE DRIVE
167          BA   .0099
168          LS       0      98
169          UD    .168
             *

170          KK     CPW
```

```
            171           KM   COMBINATION OF SHEA, (CP3), EXOFF1, EXOFF3, EXOFF2, & HONDA BASINS
            172           KM   FLOW IN AZURE @ WEST SIDE OF SITE
            173           HC       6
                          *

            174           KK  EXOFF4
            175           BA   .0015
            176           LS       0    78.4
            177           UD    .121
                          *

            178           KK     ON1
            179           BA  .0020
            180           LS       0    83.6
            181           UD    .168
                          *

            182           KK    TEN4
            183           KM   REFERENCED FROM TENAYA VILLAGE PHASE 1 MINI STORAGE AS DEON4
            184           KM   FUTURE HEC-1 MODEL
            185           BA    .004
            186           LS       0      92
            187           UD    .124
                          *
1                                                    HEC-1 INPUT                                                    PAGE  6

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

            188           KK     CPE
            189           KM   COMBINATION OF TEN4, ON1, EXOFF4, & CPW
            190           KM   FLOW IN AZURE @ EAST SIDE OF SITE
            191           HC       4
                          *

            192           KK     ON2
            193           BA   .0016
            194           LS       0      85
            195           UD    .100
                          *

            196           KK  EXOFF5
            197           BA   .0015
            198           LS       0    94.3
            199           UD    .003
                          *

            200           KK    CPSE
            201           KM   COMBINE ON2 & EXOFF5
            202           KM   FLOW TO PARCEL EAST OF SITE
            203           HC       2
                          *
            204           ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    15       HON1A
             .
             .
    30       .       HON1B
             .          .
             .          .
    36       .          .       HON1C
             .          .          .
             .          .          .
    42       DVSITE.....................
             .
             .
    46       .        HON2
             .          .
             .          .
    52       .          .        HON3
             .          .          .
             .          .          .
    58       .          .          .        HON4
             .          .          .          .
             .          .          .          .
    64       .          .          .          .         HON6
             .          .          .          .           V
             .          .          .          .           V
    70       .          .          .          .         RHON6
             .          .          .          .           .
             .          .          .          .           .
    74       .          .          .        C46.............
             .          .          .          .
             .          .          .          .
    78       .          .          .          .         HON7
             .          .          .          .           .
             .          .          .          .           .
    84       .          .          .          .           .       HON8
             .          .          .          .           .         .
```

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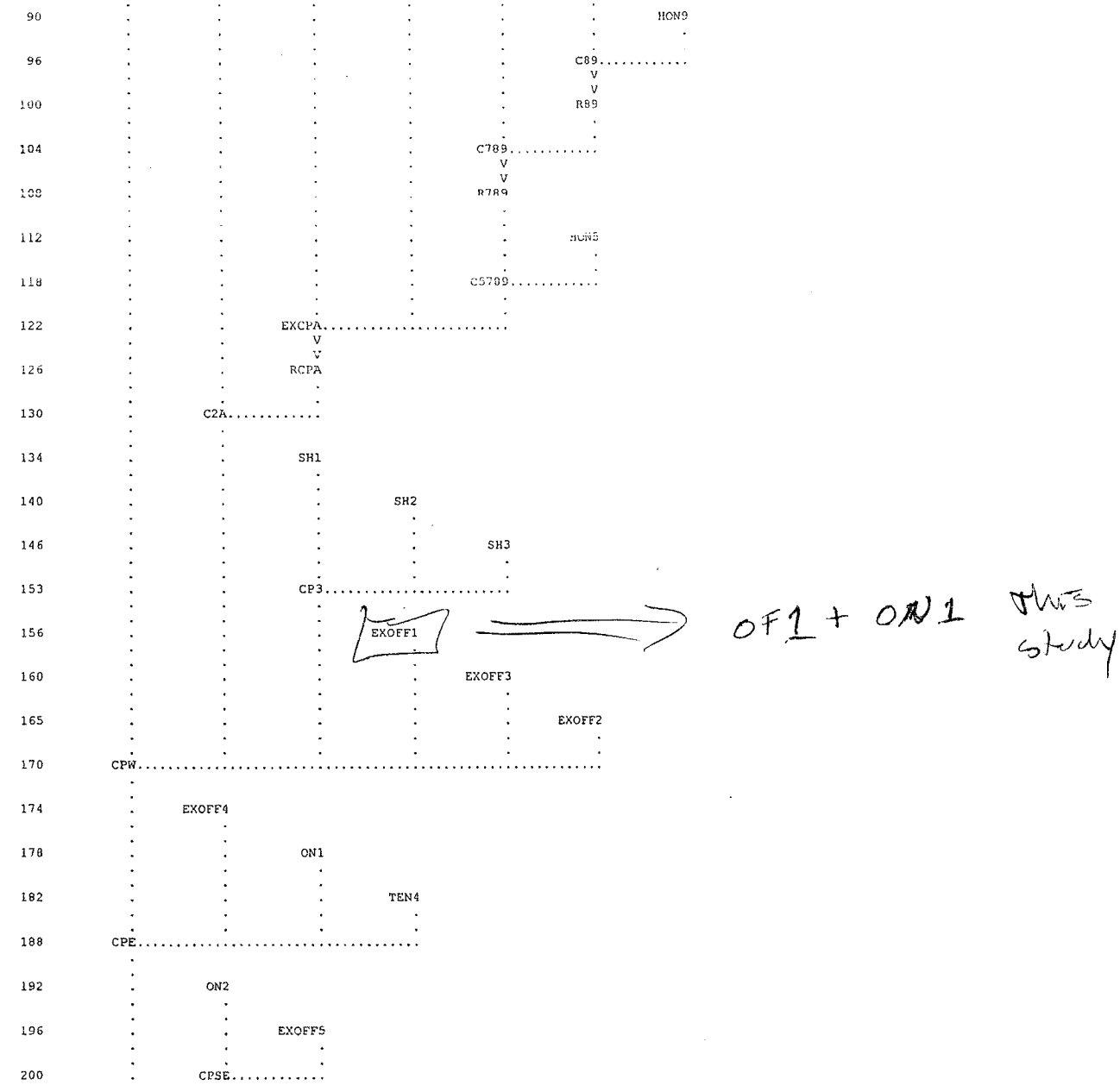

OF1 + ON1 this study

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   28NOV06  TIME  08:11:26   *
*                                       *
*****************************************
```

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

TENAYA/AZURE
EXISTING CONDITIONS
DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN3

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JR CARDS BASED ON THE FOLLOWING VALUES

1.00 =100 YEAR
0.57 = 10 YEAR

12 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

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

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

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

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00 .57

1

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00	RATIO 2 .57
HYDROGRAPH AT						
+	HON1A	.00	1	FLOW	9.	5.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	HON1B	.01	1	FLOW	12.	7.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	HON1C	.00	1	FLOW	1.	1.
				TIME	3.50	3.50
3 COMBINED AT						
+	DVSITE	.01	1	FLOW	22.	12.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	HON2	.01	1	FLOW	13.	5.
				TIME	3.50	3.58
HYDROGRAPH AT						
+	HON3	.01	1	FLOW	15.	6.
				TIME	3.50	3.58
HYDROGRAPH AT						
+	HON4	.00	1	FLOW	5.	2.
				TIME	3.50	3.58
HYDROGRAPH AT						
+	HON6	.02	1	FLOW	21.	8.
				TIME	3.50	3.58
ROUTED TO						
+	RHON6	.02	1	FLOW	21.	8.
				TIME	3.58	3.58
2 COMBINED AT						
+	C46	.02	1	FLOW	26.	10.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	HON7	.01	1	FLOW	16.	6.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	HON8	.01	1	FLOW	8.	3.

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				TIME	3.58	3.58
HYDROGRAPH AT						
	HON9	.01	1	FLOW	11.	5.
				TIME	3.50	3.58
2 COMBINED AT						
	C89	.02	1	FLOW	21.	8.
				TIME	3.58	3.58
ROUTED TO						
	R89	.02	1	FLOW	21.	8.
				TIME	3.58	3.58
2 COMBINED AT						
	C789	.03	1	FLOW	37.	14.
				TIME	3.58	3.58
ROUTED TO						
	R789	.03	1	FLOW	37.	14.
				TIME	3.58	3.58
HYDROGRAPH AT						
	HON5	.01	1	FLOW	8.	3.
				TIME	3.58	3.58
2 COMBINED AT						
	C5789	.04	1	FLOW	44.	16.
				TIME	3.58	3.58
3 COMBINED AT						
	EXCPA	.07	1	FLOW	85.	31.
				TIME	3.58	3.58
ROUTED TO						
	RCPA	.07	1	FLOW	84.	31.
				TIME	3.58	3.58
2 COMBINED AT						
	C2A	.08	1	FLOW	97.	35.
				TIME	3.58	3.58
HYDROGRAPH AT						
	SH1	.00	1	FLOW	7.	3.
				TIME	3.50	3.50
HYDROGRAPH AT						
	SH2	.00	1	FLOW	6.	3.
				TIME	3.50	3.50
HYDROGRAPH AT						
	SH3	.01	1	FLOW	13.	6.
				TIME	3.50	3.58
3 COMBINED AT						
	CP3	.01	1	FLOW	25.	12.
				TIME	3.50	3.50
HYDROGRAPH AT						
	EXOFF1	.02	1	FLOW	14.	4.
				TIME	3.58	3.67
HYDROGRAPH AT						
	EXOFF3	.00	1	FLOW	3.	1.
				TIME	3.50	3.50
HYDROGRAPH AT						
	EXOFF2	.01	1	FLOW	18.	10.
				TIME	3.58	3.58
6 COMBINED AT						
	CPW	.13	1	FLOW	169.	70.
				TIME	3.58	3.58
HYDROGRAPH AT						
	EXOFF4	.00	1	FLOW	1.	0.
				TIME	3.58	3.58
HYDROGRAPH AT						
	ON1	.00	1	FLOW	2.	1.
				TIME	3.58	3.58
HYDROGRAPH AT						
	TEN4	.00	1	FLOW	6.	3.
				TIME	3.58	3.58
4 COMBINED AT						
	CPE	.14	1	FLOW	179.	74.
				TIME	3.58	3.58
HYDROGRAPH AT						
	ON2	.00	1	FLOW	2.	1.
				TIME	3.50	3.58
HYDROGRAPH AT						

ON1 + OF1

⇒ 14 cfs / 5 cfs Q_{100}/Q_{10}

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```
+                EXOFFS       .00     1   FLOW          3.        1.
                                          TIME        3.50      3.50

  2 COMBINED AT
+                  CPSE       .00     1   FLOW          5.        2.
                                          TIME        3.50      3.50
1
                                    SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                        (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                 INTERPOLATED TO
                                                                                 COMPUTATION INTERVAL
            ISTAQ    ELEMENT        DT        PEAK     TIME TO      VOLUME        DT        PEAK     TIME TO      VOLUME
                                                         PEAK                                          PEAK
                                    (MIN)      (CFS)      (MIN)      (IN)      (MIN)      (CFS)      (MIN)      (IN)
          FOR PLAN = 1  RATIO= 1.00
             RHON6  MANE            .88      20.85    212.08       1.40       5.00      20.72    215.00       1.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1244E+01 EXCESS= .0000E+00 OUTFLOW= .1245E+01 BASIN STORAGE= .2202E-08 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .57
             RHON6  MANE            1.00      7.69    216.66        .50       5.00      7.65    215.00        .50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4476E+00 EXCESS= .0000E+00 OUTFLOW= .4481E+00 BASIN STORAGE= .2075E-08 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO= 1.00
              R89  MANE            .31      21.42    214.97       1.40       5.00      21.41    215.00       1.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1296E+01 EXCESS= .0000E+00 OUTFLOW= .1296E+01 BASIN STORAGE= .1336E-10 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .57
              R89  MANE            .28       8.00    215.41        .50       5.00       7.98    215.00        .50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4664E+00 EXCESS= .0000E+00 OUTFLOW= .4664E+00 BASIN STORAGE= .9913E-11 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO= 1.00
             R789  MANE            .63      37.12    215.32       1.40       5.00      37.05    215.00       1.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2252E+01 EXCESS= .0000E+00 OUTFLOW= .2252E+01 BASIN STORAGE= .7730E-09 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .57
             R789  MANE            .78      13.76    215.73        .50       5.00      13.60    215.00        .50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8101E+00 EXCESS= .0000E+00 OUTFLOW= .8107E+00 BASIN STORAGE= .8194E-09 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO= 1.00
             RCPA  MANE            .46      84.41    215.27       1.40       5.00      84.25    215.00       1.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5141E+01 EXCESS= .0000E+00 OUTFLOW= .5142E+01 BASIN STORAGE= .6957E-08 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .57
             RCPA  MANE            .55      31.29    216.14        .50       5.00      30.78    215.00        .50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1849E+01 EXCESS= .0000E+00 OUTFLOW= .1850E+01 BASIN STORAGE= .5772E-08 PERCENT ERROR=   -.1



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

Proposed HEC-1 Model

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HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

WoodRodgers

TENAYA COMMERCIAL
O'CONNELL COMMERCIAL LLC
Ultimate Conditions

BY: NA
DATE: 2/9/07

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag	REMARKS
DESIG: (1)	DEV./EX. (D or E)	CN	K (2)	AREA Ac (3)	AREA MI^2	INITIAL LENGTH Feet (4)	SLOPE % (5)	TI Min (6)	TRAVEL LENGTH Feet (7)	SLOPE % (8)	V1 VELOCITY FPS (9a)	V2 VELOCITY FPS (9b)	Tt Min (10)	Min (13)	Min (14)	Tlag= 0.6Tc/60 Hours	RAINFALL Q100/Q10 Inches
ON1	D	93.6	0.8455	1.92	0.0030	60	5.2	2.0	634	1.1	2.1	3.2	4.7	6.7	13.9	0.067	
ON2	D	94.0	0.8508	0.42	0.0007	70	2.0	3.0	220	0.7	1.7	2.6	2.2	5.1	11.6	0.051	
UTOFF1	D	93.0	0.8376	9.79	0.0153	100	1.0	4.7	1074	1.5	2.5	3.7	5.9	10.6	16.5	0.106	
UTOFF2	D	98.0	0.9036	6.36	0.0099	40	2.0	1.8	2900	1.3	2.3	3.5	15.0	16.8	26.3	0.168	
UTOFF3	D	92.5	0.8310	2.51	0.0039	110	2.0	4.0	667	1.7	2.7	4.0	3.8	7.8	14.3	0.078	
UTOFF5	D	92.9	0.8363	0.96	0.0015	30	2.0	2.1	574	0.5	1.4	2.2	6.4	8.5	13.4	0.085	

Tc = Ti + Tt Tlag = 0.6 Tc
Ti = 1.8 (1.1 - K) L^1/2 / S^1/3
K = 0.0132 (CN) - 0.39

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

Existing V1 = 14.8*(S/100)^1/2 Developed V1 = 20.2*(S/100)^1/2
Existing V2 = 29.4*(S/100)^1/2 Developed V2 = 30.6*(S/100)^1/2

Tc Check (Developed) = L/180+10

Minimum Tc (EX) = 10 Min per Section 602 Minimum Tc (DEV) = 5 Min per Section 602.1

REFERENCE :

STANDARD FORM 4

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```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*         JUN  1998                 *
*       VERSION 4.1                 *
*                                   *
*  RUN DATE  09FEB07  TIME  11:58:02    *
*                                   *
*************************************
```


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


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

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

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


```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1      ID
          *DIAGRAM
   2      ID     TENAYA/AZURE
   3      ID     ULTIMATE CONDITIONS
   4      ID     DESIGN STORM = 100-YEAR 6-HOUR STORM
   5      ID     STORM DISTRIBUTION = SDN3
   6      ID     JR CARDS BASED ON THE FOLLOWING VALUES
   7      ID
   8      ID   1.00       =100 YEAR
   9      ID   0.57       = 10 YEAR
  10      ID
  11      IT      5       0       0     300
  12      IO      5       0       0
  13      IN      5       0       0
  14      JR   PREC    1.00    0.57
          *
  15      KK   HON1A
  16      KM   THIS BASIN REFERENCED FROM WESTERLY PART OF PHASE 1: HONDA SITE DEVELOPMENT
  17      KM   BASIN ON1-DEVELOPED HEC-1 MODEL
  18      BA   .0041
  19      PB    2.77
  20      PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
  21      PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
  22      PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
  23      PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
  24      PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
  25      PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
  26      PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
  27      PC   0.998   0.999   1.000
  28      LS      0      98
  29      UD   0.083
          *
  30      KK   HON1B
  31      KM   THIS BASIN REFERENCED FROM EASTERLY PART OF PHASE 1: HONDA SITE DEVELOPMENT
  32      KM   BASIN ON2-DEVELOPED HEC-1 MODEL
  33      BA   .0056
  34      LS      0      98
  35      UD   0.075
          *
  36      KK   HON1C
  37      KM   THIS BASIN REFERENCED FROM SOUTHERLY PART OF PHASE1: HONDA SITE DEVELOPMENT
  38      KM   BASIN ON3-DEVELOPED HEC-1 MODEL
  39      BA   .0006
  40      LS      0      98
  41      UD   0.118
          *
```



```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  42      KK  DVSITE
  43      KM   REFERENCED FROM TOTAL DISCHARGE FROM PHASE 1: HONDA SITE DEVELOPMENT
  44      HC      3
```

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```
                *
          45    KK    HON2
          46    KM   THIS BASIN REFERENCED FROM HONDA SITE DEVELOPMENT AS DVOFF2
          47    KM   DEVELOPED CONDITION HEC-1 MODEL
          48    BA   0.010
          49    LS       0       98
          50    UD   0.071
                *
          51    KK    HON3
          52    KM   THIS BASIN REFERENCED FROM HONDA SITE DEVELOPMENT AS DVOFF3
          53    KM   DEVELOPED CONDITION HEC-1 MODEL
          54    BA   .0120
          55    LS       0       98
          56    UD   0.079
                *
          57    KK    HON4
          58    KM   THIS BASIN REFERENCED FROM HONDA SITE DEVELOPMENT AS DVOFF4
          59    KM   DEVELOPED CONDITION HEC-1 MODEL
          60    BA   .0041
          61    LS       0       98
          62    UD   0.097
                *
          63    KK    HON6
          64    KM   THIS BASIN REFERENCED FROM HONDA SITE DEVELOPMENT DVOFF6
          65    KM   DEVELOPED CONDITION HEC-1 MODEL
          66    BA   .0167
          67    LS       0       98
          68    UD    .138
                *
          69    KK   RHON6
          70    KM   ROUTE HON6 THROUGH HON4
          71    KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "ROUTE OFF6 THROUGH OFF4"
          72    RK     680    .005    .017             TRAP       3     100
                *
          73    KK     C46
          74    KM   COMBINE HON4 AND HON6
          75    KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "COMBINE OFF4 AND OFF6"
          76    HC       2
                *
1                                        HEC-1 INPUT                                                PAGE  3

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

          77    KK    HON7
          78    KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS DVOFF7
          79    KM   DEVELOPED CONDITION HEC-1 MODEL
          80    BA   .0128
          81    LS       0       98
          82    UD   0.153
                *
          83    KK    HON8
          84    KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS DVOFF8
          85    KM   DEVELOPED CONDITION HEC-1 MODEL
          86    BA   .0066
          87    LS       0       85
          88    UD    .130
                *
          89    KK    HON9
          90    KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS DVOFF9
          91    KM   DEVELOPED CONDITION HEC-1 MODEL
          92    BA   .0108
          93    LS       0       85
          94    UD   0.102
                *
          95    KK     C89
          96    KM   COMBINE HON8 AND HON9
          97    KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "COMBINE OFF8 AND OFF9"
          98    HC       2
                *
          99    KK    R89
         100    KM   ROUTE C89 THROUGH HON7
         101    KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "ROUTE C89 THROUGH OFF7"
         102    RK     160    .015    .037             TRAP       3     100
                *
         103    KK    C789
         104    KM   COMBINE C89 AND HON7
         105    KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "COMBINE C89 AND OFF7"
         106    HC       2
                *
         107    KK    R789
         108    KM   ROUTE C789 THROUGH HON5
         109    KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "ROUTE C789 THROUGH OFF5"
```

```
                110          RK     560    .020    .017            TRAP       3     100
                             *
                111          KK    HON5
                112          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS DVOFF5
                113          BA   .0059
                114          LS       0      98
                115          UD   0.090
                             *
1                                                    HEC-1 INPUT                                                    PAGE  4

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

                116          KK   C5789
                117          KM   COMBINE C789 AND HON5
                118          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "COMBINE C789 AND OFF5"
                119          HC       2
                             *
                120          KK   EXCPA
                121          KM   COMBINE C5789, C46 AND HON3 AND ROUTE THROUGH HON2
                122          KM   REFERENCED FROM HONDA SITE DEVELOPMENT
                123          HC       3
                             *
                124          KK    RCPA
                125          KM   ROUTE CONCENTRATION POINT "A" THROUGH HON2
                126          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS "A THROUGH OFF2"
                127          RK     520    .017    .017            TRAP       3     100
                             *
                128          KK     C2A
                129          KM   COMBINE CPA AND HON2
                130          KM   REFERENCED FROM HONDA SITE DEVELOPMENT AS"COMBINE CPA AND OFF2"
                131          HC       2
                             *
                132          KK     SH1
                133          KM   REFERENCED FROM SHEA COMMERCIAL-TENAYA AS ON1D
                134          KM   FUTURE CONDITION MODEL
                135          BA   .0037
                136          LS       0      92
                137          UD   0.064
                             *
                138          KK     SH2
                139          KM   REFERENCED FROM SHEA COMMERCIAL-TENAYA AS ON2D
                140          KM   FUTURE CONDITION MODEL
                141          BA   .0031
                142          LS       0      90
                143          UD    .050
                             *
                144          KK     SH3
                145          KM   REFERENCED FROM SHEA COMMERCIAL-TENAYA AS ON3D
                146          KM   FUTURE CONDITION MODEL
                147          KM   BASE FLOW NOT USED-HONDA BASINS WERE INCORPORATED INSTEAD OF BASE FLOW
                148          BA   .0077
                149          LS       0      92
                150          UD    .110
                             *
1                                                    HEC-1 INPUT                                                    PAGE  5

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

                151          KK     CP3
                152          KM   REFERENCED FROM SHEA COMMERCIAL-TENAYA-COMBINES SH1, SH2, & SH3
                153          HC       3
                             *
                154          KK   UTOFF1
                155          KM    FUTURE COMMERCIAL
                156          BA    .0153
                157          LS       0    93.0
                158          UD    .106
                             *
                159          KK   UTOFF3
                160          KM    FUTURE COMMERCIAL INCLUDING DISCOUNT TIRE
                161          BA   .0039
                162          LS       0    92.5
                163          UD    .078
                             *
                164          KK   UTOFF2
                165          KM    AZURE DRIVE
                166          BA   .0099
                167          LS       0    98.0
                168          UD    .168
                             *
                169          KK     CPW
                170          KM   COMBINATION OF SHEA (CP3), UTOFF1, UTOFF3, UTOFF2, & HONDA BASINS
```

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```
171          KM   FLOW IN AZURE @ WEST SIDE OF SITE
172          HC      6
             *

173          KK    ON1
174          KM   ONSITE COMMERCIAL TRIBUTARY TO AZURE
175          BA    .003
176          LS       0    93.6
177          UD    .067
             *

178          KK    TEN4
179          KM   REFERENCED FROM TENAYA VILLAGE PHASE 1 MINI STORAGE AS DEON4
180          KM   FUTURE HEC-1 MODEL
181          BA    .004
182          LS       0      92
183          UD    .124
             *

184          KK    CPE
185          KM   COMBINATION OF TEN4, ON1, & CPW
186          HC      3
             *
1                                        HEC-1 INPUT                                    PAGE  6

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

187          KK    ON2
188          KM   ONSITE COMMERCIAL TRIBUTARY TO SITE TO THE EAST
189          BA   .0007
190          LS       0      94
191          UD    .051
             *

192          KK  UTOFF5
193          BA   .0015
194          LS       0    92.9
195          UD    .085
             *

196          KK    CPSE
197          KM   COMBINE ON2 & UTOFF5
198          KM   FLOW TO PARCEL EAST OF SITE
199          HC      2
200          ZZ
1
          SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

 15        HON1A
             .
             .
 30          .       HON1B
             .          .
             .          .
 36          .          .       HON1C
             .          .          .
             .          .          .
 42        DVSITE.....................
             .
             .
 45          .        HON2
             .          .
             .          .
 51          .          .        HON3
             .          .          .
             .          .          .
 57          .          .          .        HON4
             .          .          .          .
             .          .          .          .
 63          .          .          .          .        HON6
             .          .          .          .          V
             .          .          .          .          V
 69          .          .          .          .        RHON6
             .          .          .          .          .
             .          .          .          .          .
 73          .          .          .        C45.....     .
             .          .          .          .          .
             .          .          .          .          .
 77          .          .          .          .        HON7
             .          .          .          .          .
             .          .          .          .          .
 83          .          .          .          .          .        HON8
             .          .          .          .          .          .
             .          .          .          .          .          .
 89          .          .          .          .          .          .        HON9
             .          .          .          .          .          .          .
             .          .          .          .          .          .          .
 95          .          .          .          .          .        C89.....     .
             .          .          .          .          .          V          .
             .          .          .          .          .          V          .
```

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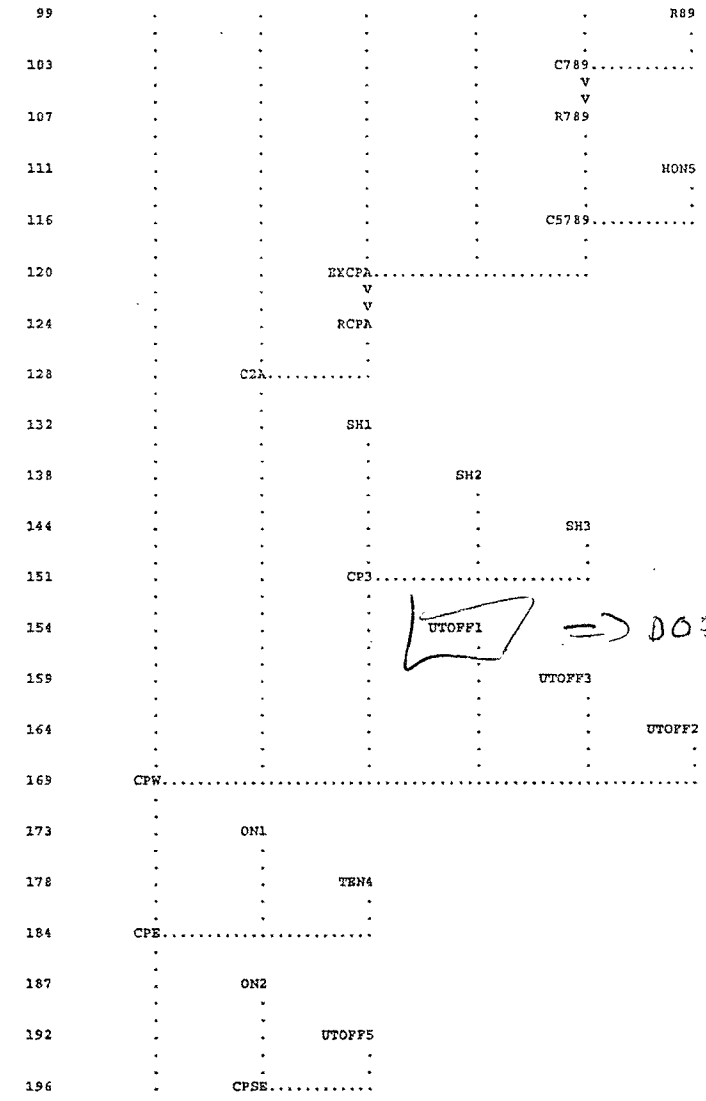

=> DOF1 + DONIA + DONIB + DONIC + DOF2

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*              JUN  1998             *
*           VERSION 4.1              *
*                                    *
*  RUN DATE   09FEB07  TIME  11:58.02*
*                                    *
**************************************
```

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

TENAYA/AZURE
ULTIMATE CONDITIONS
DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN3
JR CARDS BASED ON THE FOLLOWING VALUES

1.00 =100 YEAR
0.57 = 10 YEAR

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

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

                   COMPUTATION INTERVAL      .08 HOURS
                       TOTAL TIME BASE   24.92 HOURS

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

      JP          MULTI-PLAN OPTION
                       NPLAN           1  NUMBER OF PLANS

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

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

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

 HYDROGRAPH AT
+                  HON1A       .00     1   FLOW                        9.        5.
                                           TIME                      3.50      3.50

 HYDROGRAPH AT
+                  HON1B       .01     1   FLOW                       12.        7.
                                           TIME                      3.50      3.50

 HYDROGRAPH AT
+                  HON1C       .00     1   FLOW                        1.        1.
                                           TIME                      3.50      3.50

   3 COMBINED AT
+                  DVSITE      .01     1   FLOW                       22.       12.
                                           TIME                      3.50      3.50

 HYDROGRAPH AT
+                  HON2        .01     1   FLOW                       22.       12.
                                           TIME                      3.50      3.50

 HYDROGRAPH AT
+                  HON3        .01     1   FLOW                       25.       14.
                                           TIME                      3.50      3.50

 HYDROGRAPH AT
+                  HON4        .00     1   FLOW                        8.        5.
                                           TIME                      3.50      3.50

 HYDROGRAPH AT
+                  HON6        .02     1   FLOW                       31.       17.
                                           TIME                      3.58      3.58

 ROUTED TO
+                  RHON6       .02     1   FLOW                       30.       17.
                                           TIME                      3.58      3.58

   2 COMBINED AT
+                  C46         .02     1   FLOW                       37.       21.
                                           TIME                      3.58      3.58

 HYDROGRAPH AT
+                  HON7        .01     1   FLOW                       23.       13.
                                           TIME                      3.58      3.58

 HYDROGRAPH AT
+                  HON8        .01     1   FLOW                        8.        3.
                                           TIME                      3.58      3.58

 HYDROGRAPH AT
+                  HON9        .01     1   FLOW                       14.        5.
                                           TIME                      3.50      3.58

   2 COMBINED AT
+                  C89         .02     1   FLOW                       21.        8.
                                           TIME                      3.58      3.58
```

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		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= 1.00									
RHON6	MANE	1.38	30.49	216.68	2.55	5.00	29.99	215.00	2.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2262E+01 EXCESS= .0000E+00 OUTFLOW= .2268E+01 BASIN STORAGE= .1410E-07 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .57									
RHON6	MANE	1.68	16.98	217.95	1.36	5.00	16.55	215.00	1.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1209E+01 EXCESS= .0000E+00 OUTFLOW= .1212E+01 BASIN STORAGE= .1136E-07 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= 1.00									
R89	MANE	.29	21.42	215.12	1.40	5.00	21.41	215.00	1.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1296E+01 EXCESS= .0000E+00 OUTFLOW= .1297E+01 BASIN STORAGE= .1212E-10 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .57									
R89	MANE	.44	7.98	215.28	.50	5.00	7.96	215.00	.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4664E+00 EXCESS= .0000E+00 OUTFLOW= .4664E+00 BASIN STORAGE= .1140E-10 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00									
R789	MANE	.71	44.35	216.07	1.88	5.00	43.99	215.00	1.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3032E+01 EXCESS= .0000E+00 OUTFLOW= .3034E+01 BASIN STORAGE= .1026E-08 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .57									
R789	MANE	.85	20.69	216.75	.87	5.00	20.32	215.00	.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1394E+01 EXCESS= .0000E+00 OUTFLOW= .1395E+01 BASIN STORAGE= .1025E-08 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00									
RCPA	MANE	.61	111.42	215.00	2.26	5.00	111.42	215.00	2.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8283E+01 EXCESS= .0000E+00 OUTFLOW= .8286E+01 BASIN STORAGE= .1857E-07 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .57									
RCPA	MANE	.67	57.69	215.56	1.14	5.00	57.57	215.00	1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4200E+01 EXCESS= .0000E+00 OUTFLOW= .4202E+01 BASIN STORAGE= .2013E-07 PERCENT ERROR= .0

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

Drainage Basin Map

APPENDIX G

Technical Drainage Study for Tenaya Village Phase 1 Mini Storage – Update to Montecito East
by Tetra Tech, Inc. CLV DS# 3449

Approval Letters

Approved Drainage Study

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Rec'd 12/10/03
DS 3449
G-27
$400

ADDENDUM #1 TO THE UPDATE TO THE TECHNICAL DRAINAGE STUDY FOR ~~TROPICAL PARKWAY a.k.a. MONTECITO EAST~~ TENAYA VILLAGE PHASE 1 - MIN STORAGE

CITY OF LAS VEGAS

TT # P09072-0002

W.O. 4020

Prepared for:

MONTECITO COMPANIES

6600 W. Charleston Blvd., Suite 124

Las Vegas, NV 89146

Prepared by:

TETRA TECH, INC.

401 N. Buffalo Drive, Suite 100

Las Vegas, Nevada 89145

(702) 242-4200

FAX (702) 242-2100

December 2003

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Recd 11/12/03
DS 3449
G-27
$400.00
CCPW

Tenaya Village Phase 1
Mini Storage

UPDATE TO THE TECHNICAL DRAINAGE STUDY FOR ~~TROPICAL PARKWAY aka MONTECITO EAST~~

CITY OF LAS VEGAS

TT # P09072-0002

W.O. 4020

Prepared for:

MONTECITO COMPANIES

6600 W. Charleston Blvd., Suite 124

Las Vegas, NV

Prepared by:

TETRA TECH, INC.

401 N. Buffalo Drive, Suite 100

Las Vegas, Nevada 89145

(702) 242-4200

FAX (702) 242-2100

November 2003

TETRA TECH, INC.
Infrastructure Services Group

December 8, 2003

Albert Sung, P.E.
City of Las Vegas
731 S. Fourth Street
Las Vegas, NV 89101

RE: Addendum #1 to the Technical Hydrology Study for Tenaya Village Phase 1 Mini Storage – Update to Montecito East
DS# 3449A

TT#P09072-0002
WO# 4020

Mr. Sung:

Tetra Tech, Inc. has received the City of Las Vegas review comments for the above referenced study, dated November 4, 2003. The comments in the subject memorandum have been reproduced with accompanying responses as follows:

1. **Sites with a grade difference of 2 feet above or below existing are required to have approval from the City Planning and Development Department. The engineer must submit copies of the Grading plans and Detail sheet with a letter justifying the grade difference to Linda Hartman-Maynard [Tel: 229-6899] at the CLV Current Planning Division. The engineer must provide a Current Planning approval with the next submittal.**

A copy of the grading plan has been submitted to the City Planning and Development Department. A copy the approval letter is included in Appendix A.

2. **The subject site is accepting offsite flows from the west. Either provide a commercial subdivision map that contains a note for inter-site drainage right or provide public drainage easement (privately maintained) to perpetuate the offsite flows through the site. Record the public drainage easement by separate document prior to final approval of the drainage study.**

A copy of the Montecito Town Center South commercial subdivision map containing a note for inter-site drainage right is included with this addendum. Note number 4 has been highlighted for convenience.

401 North Buffalo Drive, Suite 100, Las Vegas, NV 89145
Tel 702.242.4200 Fax 702.242.2100
www.tetratech.com

3. **Offsite basins "DEOF1" and "DEOF2" impact the development along the west boundary and within basin "DEON6". Provide hydraulic calculation to justify that the 100-year flows are contained by the L-curb and will not overflow into the subject site. The Mini-Storage, Bldg 9 and Bldg 3 must be set at a minimum of twice the depth above the water surface in the L-curb. Review and revise accordingly.**

Hydraulic calculations have been bee provided to show that the L curb will contain the 100-year flows and the site will not be overflowed. A street section was taken between the Mini Storage and building 10 and another at DEON6 as shown in the revised figure 5 included with this addendum. Finished floor elevations have been revised to meet the twice the depth of flow. Hydraulic calculations are included in Appendix B of this addendum.

4. **The proposed block wall opening at the northwest corner of site is not clear in whether it is a single opening or multiple. Specify clearly on the grading plan.**

The block wall opening at the northwest corner of the site is a single opening. The detail sheet has been revised to reflect changes.

If there are any questions, or additional information is necessary, please contact this office.

Sincerely,
Tetra Tech, Inc.

Arnaldo R. Abad
Hydraulic Services

PROFESSIONAL ENGINEER STATE OF NEVADA
JOSHUA N. OWEN
Exp: 12/31/05
CIVIL
No. 15748
12/8/03

Joshua N. Owen, P.E.
Project Engineer

100-YR Sec 4-4
Worksheet for Irregular Channel

Project Description	
Project File	p:\p09072\0002\engineering\hydro\add1\flwmstr\streets2.fm2
Worksheet	100-Yr Sec 4-4
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.019700	ft/ft

Elevation range: 0.00 ft to 0.85 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.50	0.00	2.50	0.013
0.50	0.50	2.50	30.00	0.016
0.50	0.00			
2.50	0.13			
2.50	0.17			
30.00	0.85			

Discharge	10.00	cfs

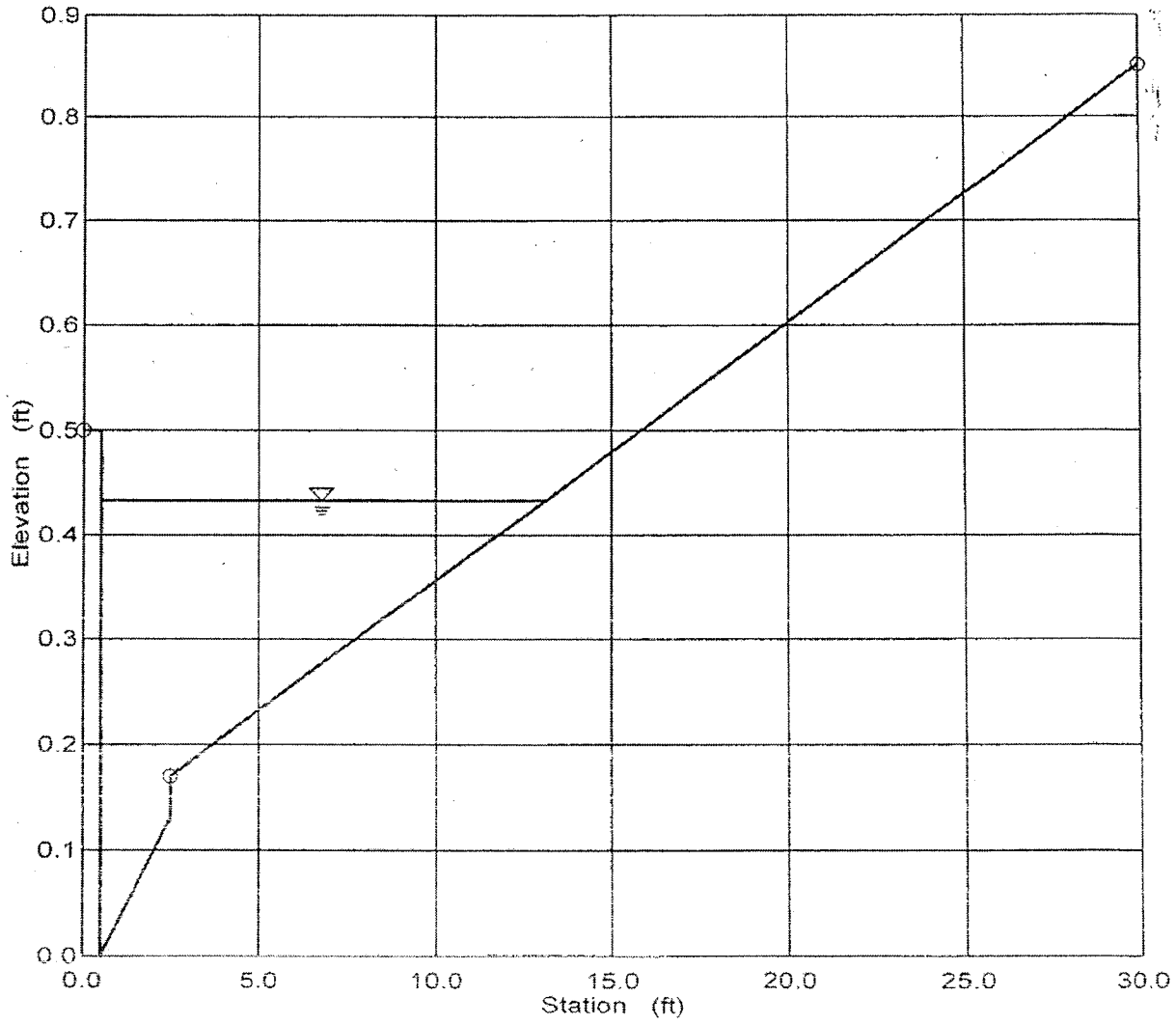
Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.43	ft
Flow Area	2.14	ft²
Wetted Perimeter	13.13	ft
Top Width	12.65	ft
Height	0.43	ft
Critical Depth	0.54	ft
Critical Slope	0.005296	ft/ft
Velocity	4.67	ft/s
Velocity Head	0.34	ft
Specific Energy	0.77	ft
Froude Number	2.00	

Flow is supercritical.

100-YR Sec 4-4
Cross Section for Irregular Channel

Project Description	
Project File	p:\p09072\0002\engineering\hydro\add1\flwmstr\streets2.fm2
Worksheet	100-Yr Sec 4-4
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.013	
Channel Slope	0.019700	ft/ft
Water Surface Elevation	0.43	ft
Discharge	10.00	cfs



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HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

Tetra Tech, Inc.
Project No. : P09072-0001

DEVELOPMENT : FUTURE BASINS
Tenaya Village
CALCULATED BY : ARA

DATE: November 2003

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc CHECK URBANIZED BASINS		FINAL Tc	Tlag	REMARKS
DESIG: (1)	CN	K (2)	AREA (acres, (3)	AREA (mi^2)	LENGTH (ft) (4)	SLOPE (%) (5)	Ti (min) (6)	LENGTH (ft) (7)	SLOPE (%) (8)	LAND COVER k	VELOCITY* (fps) (9)	Tt (min) (10)	Tc = Ti + Tt (min) (11)	TOTAL LENGTH (ft) (12)	Tc = (L/180)+10 (min) (13)	(min) (14)	Tlag= 0.6Tc/60 (hrs)	
DEON1	92	0.8244	1.55	0.0024	35	1.00	2.93	670	0.72	DEV	2.61	4.3	7.2	705.0	13.9	7.21	0.0721	
DEON2	92	0.8244	1.68	0.0026	30	2.00	2.16	650	1.06	DEV	3.17	3.4	5.6	680.0	13.8	5.57	0.0557	
DEON3	92	0.8244	1.48	0.0023	50	0.50	4.42	724	1.15	DEV	3.30	3.7	8.1	774.0	14.3	8.07	0.0807	
DEON4	92	0.8244	2.50	0.0039	344	0.50	11.59	244	2.91	DEV	5.25	0.8	12.4	588.0	13.3	12.36	0.1236	
DEON5	92	0.8244	1.14	0.0018	110	2.92	3.64	189	1.23	DEV	3.42	0.9	4.6	299.0	11.7	4.56	0.0500	
DEON6	92	0.8244	0.54	0.0008	25	2.50	1.83	427	1.97	DEV	4.32	1.6	3.5	452.0	12.5	3.47	0.0500	
DEOF1	92	0.8244	2.09	0.0033	119	0.74	5.98	750	1.87	DEV	4.21	3.0	9.0	869.0	14.828	8.95	0.0895	
DEOF2	92	0.8244	3.08	0.0048	267	0.74	8.96	800	1.87	DEV	4.21	3.2	12.1	1067.0	15.928	12.13	0.1213	
			14.06															

Ti = 1.8 (1.1 - K) L^1/2 / S^1/3
Tc = Ti + Tt
K = 0.0132 (CN) - 0.39 Tlag = 0.6Tc

* The velocity in column 9 was computed using the equation V = CS^.5
where C = 30.6 and S = travel slope, as outlined in section 602.1 of the CCRFCD Manual.

REFERENCE :

STANDARD FORM 4

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```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998             *
*           VERSION 4.1             *
*                                   *
*  RUN DATE   07NOV03  TIME  14:14:30   *
*                                   *
*************************************
```


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


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

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

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


```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1          ID
   2          ID   PREPARED FOR:
   3          ID              MONTECITO COMPANIES
   4          ID
   5          ID
   6          ID
   7          ID   @@@@@@@@@@@@@@@@@@
   8          ID
   9          ID            TECHNICAL HYDROLOGY STUDY FOR TENAYA VILLAGE- FUTURE 100 YR CONDIT
  10          ID   file name:  FUT100.TXT
  11          ID   Project Number: P09072-0001-00
  12          ID   WO#
  13          ID
  14          ID   TETRA TECH, INC.
  15          ID   401 N. Buffalo Drive, Suite 100
  16          ID   Las Vegas, Nevada  89145
  17          ID
  18          ID   **********************
  19          ID   *    SDN 3  VALUES   *
  20          ID   **********************
  21          ID
  22          ID
  23          ID
  24          ID
  25          ID
              *DIAGRAM
  26          IT       5       0       0     300
  27          IN       5       0       0
  28          IO       5       0       0
  29          JR    PREC     1.0
              *
  30          KK   DEON1
  31          KM   DEVELOPED ONSITE BASIN 1
  32          BA    .002
  33          BF       0
  34          PB    2.77
  35          PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
  36          PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
  37          PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
  38          PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
  39          PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
  40          PC    .860    .868    .876    .888    .918    .926    .937    .950    .970    .978
  41          PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
  42          PC    .998    .999   1.00
  43          LS       0      92
  44          UD    .072
              *
  45          KK   DEON2
  46          KM   DEVELOPED ONSITE BASIN 2
  47          BA    .003
  48          BF       0
  49          LS       0      92
  50          UD    .055
              *
```

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

  51          KK   DEOF1
  52          KM   DEVELOPED OFFSITE BASIN 1
  53          BA    .003
  54          BF      0
  55          LS      0      92
  56          UD    .089
              *

  57          KK     PT1
  58          KM  CONCENTRATION POINT 1- COMBINE DEON1, DEON2 AND DEOF1
  59          HC      3
              *

  60          KK   DEON3
  61          KM   DEVELOPED ONSITE BASIN 3
  62          BA    .002
  63          BF      0
  64          LS      0      92
  65          UD    .081
              *

  66          KK     PT2
  67          KM  CONCENTRATION POINT 2- COMBINE DEON3 AND PT1
  68          HC      2
              *

  69          KK   DEON6
  70          KM   DEVELOPED ONSITE BASIN 6
  71          BA    .001
  72          BF      0
  73          LS      0      92
  74          UD    .050
              *

  75          KK   DEOF2
  76          KM   DEVELOPED OFFSITE BASIN 2
  77          BA    .005
  78          BF      0
  79          LS      0      92
  80          UD    .121
              *

  81          KK     PT5
  82          KM  CONCENTRATION POINT 2- COMBINE DEON6 AND DEOF2
  83          HC      2
              *

  84          KK   DEON4
  85          KM   DEVELOPED ONSITE BASIN 4
  86          BA    .004
  87          BF      0
  88          LS      0      92
  89          UD    .124
              *
```



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

  90          KK     PT3
  91          KM  CONCENTRATION POINT 3- COMBINE PT5 AND DEON4
  92          HC      2
              *

  93          KK   DEON5
  94          KM   DEVELOPED ONSITE BASIN 5
  95          BA    .002
  96          BF      0
  97          LS      0      92
  98          UD    .050
              *

  99          KK     PT4
 100          KM  CONCENTRATION POINT 4- COMBINE PT3, PT2 AND DEON5
 101          HC      3
              *
 102          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

   30       DEON1
                .
   45                .       DEON2
                .                .
   51                .                .       DEOF1
```

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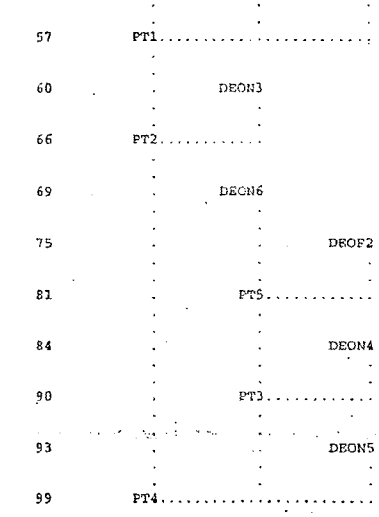

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   07NOV03  TIME  14:14:30   *
*                                       *
*****************************************
```

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

PREPARED FOR:
MONTECITO COMPANIES

@@@@@@@@@@@@@@@@@@

TECHNICAL HYDROLOGY STUDY FOR TENAYA VILLAGE- FUTURE 100 YR CONDIT
file name: FUT100.TXT
Project Number: P09072-0001-00
WO#

TETRA TECH, INC.
401 N. Buffalo Drive, Suite 100
Las Vegas, Nevada 89145

```
**********************
*    SDN 3  VALUES   *
**********************
```

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

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

              COMPUTATION INTERVAL      .08 HOURS
                  TOTAL TIME BASE    24.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
```

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SURFACE AREA ACRES
TEMPERATURE DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00

1

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

					RATIOS APPLIED TO PRECIPITATION
OPERATION	STATION	AREA	PLAN		RATIO 1
					1.00
HYDROGRAPH AT					
+	DEON1	.00	1	FLOW	4.
				TIME	3.50
HYDROGRAPH AT					
+	DEON2	.00	1	FLOW	6.
				TIME	3.50
HYDROGRAPH AT					
+	DEOF1	.00	1	FLOW	5.
				TIME	3.50
3 COMBINED AT					
+	PT1	.01	1	FLOW	15.
				TIME	3.50
HYDROGRAPH AT					
+	DEON3	.00	1	FLOW	4.
				TIME	3.50
2 COMBINED AT					
+	PT2	.01	1	FLOW	19.
				TIME	3.50
HYDROGRAPH AT					
+	DEON6	.00	1	FLOW	2.
				TIME	3.50
HYDROGRAPH AT					
+	DEOF2	.00	1	FLOW	8.
				TIME	3.58
2 COMBINED AT					
+	PT5	.01	1	FLOW	10.
				TIME	3.50
HYDROGRAPH AT					
+	DEON4	.00	1	FLOW	6.
				TIME	3.58
2 COMBINED AT					
+	PT3	.01	1	FLOW	16.
				TIME	3.50
HYDROGRAPH AT					
+	DEON5	.00	1	FLOW	4.
				TIME	3.50
3 COMBINED AT					
+	PT4	.02	1	FLOW	39.
				TIME	3.50

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

Drainage Basin Map

APPENDIX H

Technical Drainage Study for Regena Substation
by Wright Engineers, CLV DS# 3989

Approval Letters

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-4

DS #: 3989

APN: 125-27-101-026

PROJECT: Regena Substation

SUBMITTAL: CCPW & CC DDS

SCANNED BY/DATE: _____

CHECKED BY/DATE: _____

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CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM					DATE: December 12, 2006
TO: **Land Development Services** Department of Public Works					FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Technical Drainage Study for: **Regena Substation**				**COPIES TO:** Wright Engineers
Cross Streets:	Monte Cristo Way & Regena Avenue				Nevada Power Company
File Number:	F:\Depot\DSMEMOS\DS3989C.doc				Bart Anderson, P.E., DevCo
Parcel Number:	125-27-101-026				CCDDS
Zoning Action:	SUP-12170 & SDR-12171				CCPW
FEMA Flood Zone	YES		NO	X	
Proposed Storm Drain	YES		NO	X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Trn. No.
1st Submittal	4/17/2006	5/1/2006	Not Approved	$400.00	43516: $400
2nd Submittal	6/26/2006 & 7/21/2006	7/26/2006	Conditional Approval	$400.00	48419: $400
CCPW & CCDDS	12/8/2006	12/12/2006	Concurrences	N/C	N/C
			TOTAL FEES (LDDRS):	**$800.00**	—

REMARKS:

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

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

1. The proposed 10'-public drainage easement (privately maintained by *Nevada Power*) along the west boundary must be recorded by separate document prior to the final approval of the improvement plans.
2. Provide a mutual agreement between *Nevada Power* and the property owner to the west to provide access for *Nevada Power* for maintenance purpose. This agreement must be notarized and executed prior to the final approval of improvement plans.

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

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

END OF REMARKS
B&H/ays

T/R/S: T19S/R60E/27
AREA G-27

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Department of Public Works

500 S Grand Central Pky • PO Box 554000 • Las Vegas NV 89155-4000
(702) 455-6000 • Fax (702) 455-6040

Denis Cederburg, P.E., Director • E-Mail: dlc@co.clark.nv.us

Rec'd 12/8/06

December 7, 2006

Andrew Kitchen, P.E.
Wright Engineers Inc.
7425 Peak Drive
Las Vegas, NV 89128

DRAINAGE STUDY CONCURRENCE OF REGENA SUBSTATION BY NEVADA POWER COMPANY

Dear Mr. Kitchen:

Clark County Public Works reviewed the drainage study for the project approximately located at the southwest corner of Clark County 215 Bruce Woodbury Beltway and Tenaya Way, APN 125-27-101-026.

We concur with the project as it stands and find that no conditions and/or corrections are required to the drainage facilities and improvements as shown on the revised plan that were sealed by you on August 24, 2006. It appears that there is little if any impact to the Beltway.

Clark County Public Works is providing this letter of concurrence at your request and per the requirements of a review conducted by Mr. Albert Sung with the City of Las Vegas dated May 1, 2006.

Our concurrence with your plans does not imply that Clark County Public Works checked the accuracy of the drainage study, nor does it provide approval for your client or its contractors to use any part of the Beltway right-of-way for temporary or permanent access to the site.

An encroachment permit from the Clark County Department of Development Services is required for any work within or abutting the right-of-way for the Clark County 215 Bruce Woodbury Beltway. For details, please call Mr. Chris Lund with Development Services at 455-4600.

Should you have any questions or require any additional information, please call the undersigned at 455-6081.

DENIS CEDERBURG
DIRECTOR OF PUBLIC WORKS

BY: _____
MICHAEL MAMER
Associate Engineer
Design Engineering Division

MM:cf

cc: Albert Sung, City of Las Vegas
John Hargrove, Nevada Power Company
Mike Hand, Manager, Design Engineering Division

BOARD OF COUNTY COMMISSIONERS
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TOM COLLINS • YVONNE ATKINSON GATES • CHIP MAXFIELD • LYNETTE BOGGS McDONALD • BRUCE L. WOODBURY
VIRGINIA VALENTINE, P.E., County Manager

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Facsimile Transmission
Department of Public Works

Date: ___/___/___

Time: _____

Page 1 of _____

To: Quentin Allen Of: _____

Fax Number: _____/ 933-7001 Phone Number: _____/_____

From: Albert Sung Of: _____

		FAX	PHONE
☐	**Administration**	702-382-0848	702-229-6276
☐	City Engineer Division	868-6374	229-6272
☐	Architectural Services	382-3232	229-6535
☐	Construction Services	254-4541	229-6337
☐	Engineering Design	382-3232	229-6272
☐	Pavement Management	366-0032	229-2453
☐	Special Improvement Districts	366-0032	229-2136
☐	Survey	804-8582	229-6217
☒	**Engineering Planning**	382-8551	229-6541
☒	Flood Control	382-8551	229-6541
☐	Land Development	383-9767	229-6371
☐	Right-of-Way	382-8551	229-6483
☐	Roadway Planning	382-8551	229-6541
☐	Sanitary Sewer	382-8551	229-6541
☐	**Streets, Sanitation and Parks**	256-7817	229-6227
☐	Downtown Beautification Office	384-0220	229-6521
☐	Parks Maintenance	229-6144	229-6571
☐	**Traffic Engineering**	366-0032	229-6327
☐	LVACTS	229-6613	229-6611
☐	Traffic/Electrical Field Operations	382-0366	229-6331
☐	Traffic Signal Repair	382-5845	229-6075
☐	Transportation	474-7083	229-2452
☐	**Environmental (Water Pollution Control Facility)**	641-9738	229-6200
☐	Industrial Waste Pretreatment	641-9738	229-6200
☐	Lab	431-5133	229-6444
☐	Supply	431-7835	229-6414

Message: _____

_____

_____

☐	Survey	[illegible]	-
☒	**Engineering Planning**	382-8551	229-6541
☒	Flood Control	382-8551	229-6541
☐	Land Development	383-9767	229-6371
☐	Right-of-Way	382-8551	229-6483
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☐	Industrial Waste Pretreatment	641-9738	229-6200
☐	Lab	431-5133	229-6444
☐	Supply	431-7835	229-6414

Message: _____

_____

_____

City of Las Vegas ● 400 Stewart Avenue ● Las Vegas, Nevada 89101

TRANSACTION REPORT

DEC-13-2006 WED 12:58 PM

P.01

FOR: CITY OF LAS VEGAS 7023828551

DATE START	RECEIVER	TX TIME	PAGES	TYPE	NOTE	M#	DP
SEND							
DEC-13 12:58 PM	9337001	1'05"	3	FAX TX	OK	(01)	054

TOTAL : 1M 5S PAGES: 3

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Department of Development Services
Civil Engineering Division

500 S Grand Central Pky 1st Fl • PO Box 551799 • Las Vegas NV 89155-1799
(702) 455-4600 • Fax (702) 388-2550

Phil Rosenquist, Director

September 7, 2006

Wright Engineers
7425 Peak Drive
Las Vegas, NV 89128

CLARK COUNTY Review of Regena Substation
Study Dated: April 6, 2006
Addendum # 1 Dated: June 22, 2006
Supplement # 1 Dated: July 27, 2006
Supplement # 2 Dated: August 27, 2006
Location: Southwest corner of Monte Cristo Way and Regena Avenue
S. 27 T. 19 S., R. 60 E.
H.T.E. # 06-34529

The above-referenced project is located in the City of Las Vegas adjacent to Clark County, portions of the street improvements are in Clark County ROW. The County has reviewed the Technical Drainage Study, Addendum #1 and Supplements. In addition, the County has received a copy of the Approval Letter from V-Point for the City of Las Vegas, dated July 26, 2006.

The County concurs with the acceptance of this drainage study by the City of Las Vegas. Please note that the County's review of this development is limited to drainage issues significant to Clark County unincorporated areas.

1. The improvements proposed in Clark County shall be graded with respect to drainage as shown on "Regena Substation," sheets C5, C6, and C7, signed and sealed by Andrew J. Kitchen, P.E., on August 24, 2006

2. The following drainage facilities shall be constructed:
   a. An 8-ft wide cross gutter across Regena Avenue at Tenaya Way

3. A bond estimate must be submitted to Clark County Civil Engineering Division for the above-mentioned stormwater management facilities;

4. Mylars of the grading plan must be submitted to the Clark County Civil Engineering Division Plan Check for approval signatures prior to permit issuance;

5. Right-of-way dedication must be verified;

BOARD OF COUNTY COMMISSIONERS
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THOM REILLY, County Manager

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H.T.E. # 06-34529

The County's review is solely based on the information submitted by the Engineer of Record. The County's review is strictly limited to compliance with minimum County Codes and Standards. The Engineer of Record is responsible for researching and addressing situations that may require designs above and beyond the minimum codes for issues of public safety and impacts to upstream, downstream and adjacent properties. The County assumes no liability for information data, designs or conclusions of the Engineer of Record;

DEPARTMENT OF DEVELOPMENT SERVICES

By Glenn S Hale

Glenn S. Hale, P. E.
Senior Civil Engineer
Civil Engineering Division

GSH/wlw

cc: Nevada Power
Albert Sung, P. E. City of Las Vegas Flood Control Project Engineer
Development File

Drainage Basin Map

APPENDIX I

2008 MPU Figure H-19

APPENDIX J

Conditions of Approval

LAS VEGAS
CITY COUNCIL

CAROLYN G. GOODMAN
MAYOR

STAVROS S. ANTHONY
MAYOR PRO TEM
LOIS TARKANIAN
STEVEN D. ROSS
RICKI Y. BARLOW
BOB COFFIN
BOB BEERS

ELIZABETH N. FRETWELL
CITY MANAGER

October 22, 2012

Mr. Joe Gwerder
Centennial 95, Limited Partnership
2810 West Charleston Boulevard, Suite #80
Las Vegas, Nevada 89102

RE: MOD-46280 – MAJOR MODIFICATION
CITY COUNCIL MEETING OF OCTOBER 17, 2012
RELATED TO SUP-46275 AND SDR-46278

Dear Mr. Gwerder:

The City Council at a regular meeting held October 17, 2012, APPROVED the request for a Major Modification of the Town Center Land Use Plan to Amend the Special Land Use Designation FROM: SX-TC (SUBURBAN MIXED USE - TOWN CENTER) TO: GC-TC (GENERAL COMMERCIAL - TOWN CENTER) on 5.36 acres at 7280 West Azure Drive (APN 125-27-113-006). The Notice of Final Action was filed with the Las Vegas City Clerk on October 18, 2012.

Sincerely,

Angela Crolli
Deputy City Clerk for
Beverly K. Bridges, MMC, City Clerk

cc: Mr. Dan Coletti
Collison Authority
Sun West Homes
2575 Montessouri Street
Las Vegas, Nevada 89117

Mr. Joe Gwerder
RHS Management, LLC
2810 West Charleston Blvd., Suite #80
Las Vegas, Nevada 89102

CITY OF LAS VEGAS
495 S. MAIN STREET
LAS VEGAS, NEVADA 89101

VOICE 702.229.6011
TTY 702.386.9108
www lasvegasnevada.gov

LAS VEGAS
CITY COUNCIL

CAROLYN G. GOODMAN
MAYOR

STAVROS S. ANTHONY
MAYOR PRO TEM

LOIS TARKANIAN
STEVEN D. ROSS
RICKI Y. BARLOW
BOB COFFIN
BOB BEERS

ELIZABETH N. FRETWELL
CITY MANAGER

October 22, 2012

Mr. Joe Gwerder
Centennial 95, Limited Partnership
2810 West Charleston Boulevard, Suite #80
Las Vegas, Nevada 89102

RE: SDR-46278 – SITE DEVELOPMENT PLAN REVIEW
CITY COUNCIL MEETING OF OCTOBER 17, 2012
RELATED TO MOD-46280 AND SUP-46275

Dear Mr. Gwerder:

The City Council at a regular meeting held October 17, 2012, APPROVED the request for a Site Development Plan Review FOR AN AUTO BODY PAINT AND BODY REPAIR SHOP WITH A WAIVER TO ALLOW A ZERO FOOT LANDSCAPE BUFFER ALONG THE NORTH PERIMETER WHERE A MINIMUM EIGHT-FOOT BUFFER IS REQUIRED on 5.36 acres at 7280 West Azure Drive (APN 125-27-113-006), T-C (Town Center) Zone [SX-TC (Suburban Mixed Use - Town Center) Special Land Use Designation] [PROPOSED: GC-TC (General Commercial - Town Center)]. The Notice of Final Action was filed with the Las Vegas City Clerk on October 18, 2012. This approval is subject to:

Planning

1. Approval of and conformance to the Conditions of Approval for Rezoning [Z-76-98(20)], Modification (MOD-46280) and Special Use Permit (SUP-46275) shall be required, if approved.

2. This approval shall be void two years from the date of final approval, unless exercised pursuant to the provisions of LVMC Title 19.16. An Extension of Time may be filed for consideration by the City of Las Vegas.

3. A six-foot tall wrought-iron fence shall be installed along the portion of the north perimeter that is adjacent to the secured outside storage area. No CMU or solid wall is permitted along the north perimeter.

4. All development shall be in conformance with the site plan and landscape plan, date stamped 08/14/12 and building elevations, date stamped 08/10/12, and the phasing plan date stamped 08/14/12, except as amended by conditions herein.

5. A Waiver from Town Center Development Standards to allow a zero-foot landscape buffer along the north perimeter, where a minimum of eight-feet is required is hereby approved.

CITY OF LAS VEGAS
495 S. MAIN STREET
LAS VEGAS, NEVADA 89101

VOICE 702.229.6011
TTY 702.386.9108
www.lasvegasnevada.gov

6. The Phase II, 6,000 square-foot building pad shall be subject to a Minor Site Development Plan Review by Department of Planning staff.

7. All necessary building permits shall be obtained and final inspections shall be completed in compliance with Title 19 and all codes as required by the Department of Building and Safety.

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

9. A fully operational fire protection system, including fire apparatus roads, fire hydrants and water supply, shall be installed and shall be functioning prior to construction of any combustible structures.

10. Prior to the submittal of a building permit application, the applicant shall meet with Department of Planning staff to develop a comprehensive address plan for the subject site. A copy of the approved address plan shall be submitted with any future building permit applications related to the site.

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

Public Works

12. In accordance with code requirements of Title 13.56, remove and replace all substandard improvements and unused driveway cuts adjacent to this site and replace with new improvements meeting city Standards concurrent with development of this site. All existing paving damaged or removed by this development shall be restored at its original location and to its original width concurrent with development of this site.

13. The approved civil drawings for this site shall show the Site Visibility Restriction Zones (SVRZ) at all driveways abutting Azure Drive. All landscaping and private improvements installed with this project shall be situated and maintained so as to not create sight visibility obstructions for vehicular traffic at all development access drives and abutting street intersections. If required, comply with SVRZ related landscaping modifications for this site as recommended by the City Traffic Engineer.

14. A Drainage Plan and Technical Drainage Study must be submitted to and approved by the Department of Public Works prior to the issuance of any building or grading permits, submittal of any construction drawings or the submittal of a Map subdividing this site, whichever may occur first. Provide and improve all drainageways recommended in the approved drainage plan/study. The developer of this site shall be responsible to construct

such neighborhood or local drainage facility improvements as are recommended by the City of Las Vegas Neighborhood Drainage Studies and approved Drainage Plan/Study concurrent with development of this site.

Sincerely,

Angela Crolli
Deputy City Clerk for
Beverly K. Bridges, MMC, City Clerk

cc: Mr. Dan Coletti
Collison Authority
Sun West Homes
2575 Montessouri Street
Las Vegas, Nevada 89117

Mr. Joe Gwerder
RHS Management, LLC
2810 West Charleston Boulevard, Suite #80
Las Vegas, Nevada 89102

LAS VEGAS
CITY COUNCIL

CAROLYN G. GOODMAN
MAYOR

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MAYOR PRO TEM

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STEVEN D. ROSS
RICKI Y. BARLOW
BOB COFFIN
BOB BEERS

ELIZABETH N. FRETWELL
CITY MANAGER

October 22, 2012

Mr. Joe Gwerder
Centennial 95, Limited Partnership
2810 West Charleston Boulevard, Suite #80
Las Vegas, Nevada 89102

RE: SUP-46275 – SPECIAL USE PERMIT
CITY COUNCIL MEETING OF OCTOBER 17, 2012
RELATED TO MOD-46280 AND SDR-46278

Dear Mr. Gwerder:

The City Council at a regular meeting held October 17, 2012, APPROVED the request for a Special Use Permit FOR AN AUTO BODY PAINT AND BODY REPAIR SHOP WITH A WAIVER TO ALLOW OUTSIDE STORAGE OF WRECKED OR DISABLED VEHICLES at 7280 West Azure Drive (APN 125-27-113-006), T-C (Town Center) Zone [SX-TC (Suburban Mixed Use - Town Center) Special Land Use Designation] [PROPOSED: GC-TC (General Commercial - Town Center)]. The Notice of Final Action was filed with the Las Vegas City Clerk on October 18, 2012. This approval is subject to:

Planning

1. Conformance to all Minimum Requirements under Town Center Development Standards for an Auto Body Paint and Body Repair Shop use, except as amended herein.

2. Approval of and conformance to the Conditions of Approval for Modification (MOD-46280) and Site Development Plan Review (SDR-46278) shall be required.

3. A Waiver to allow outside storage of wrecked or disabled vehicles behind a six-foot tall wall to screen from public rights-of-way is approved.

4. This approval shall be void two years from the date of final approval, unless exercised pursuant to the provisions of LVMC Title 19.16. An Extension of Time may be filed for consideration by the City of Las Vegas.

5. All necessary building permits shall be obtained and final inspections shall be completed in compliance with Title 19 and all codes as required by the Department of Building and Safety.

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

CITY OF LAS VEGAS
495 S. MAIN STREET
LAS VEGAS, NEVADA 89101

VOICE 702.229.6011
TTY 702.386.9108
www.lasvegasnevada.gov

APPENDIX K

Plans, And Details

TRANSMITTAL

To: City of Las Vegas
Att: Flood Control

Date: 11/12/12
Project No.:

From: Eric Rietz

Subject: TDS for Collision Center

CC:
CC:
CC:
CC:
CC:

Transmitting Via:
- ☐ Mail
- ☒ Messenger / MDS
- ☐ Federal Express
- ☐ Pickup

For:
- ☒ Review & Comment
- ☐ Per your Request
- ☐ Information/File

Acknowledgement of Receipt:
- ☐ Not Required
- ☒ Acknowledgement Required

Received By:
Date: Time:

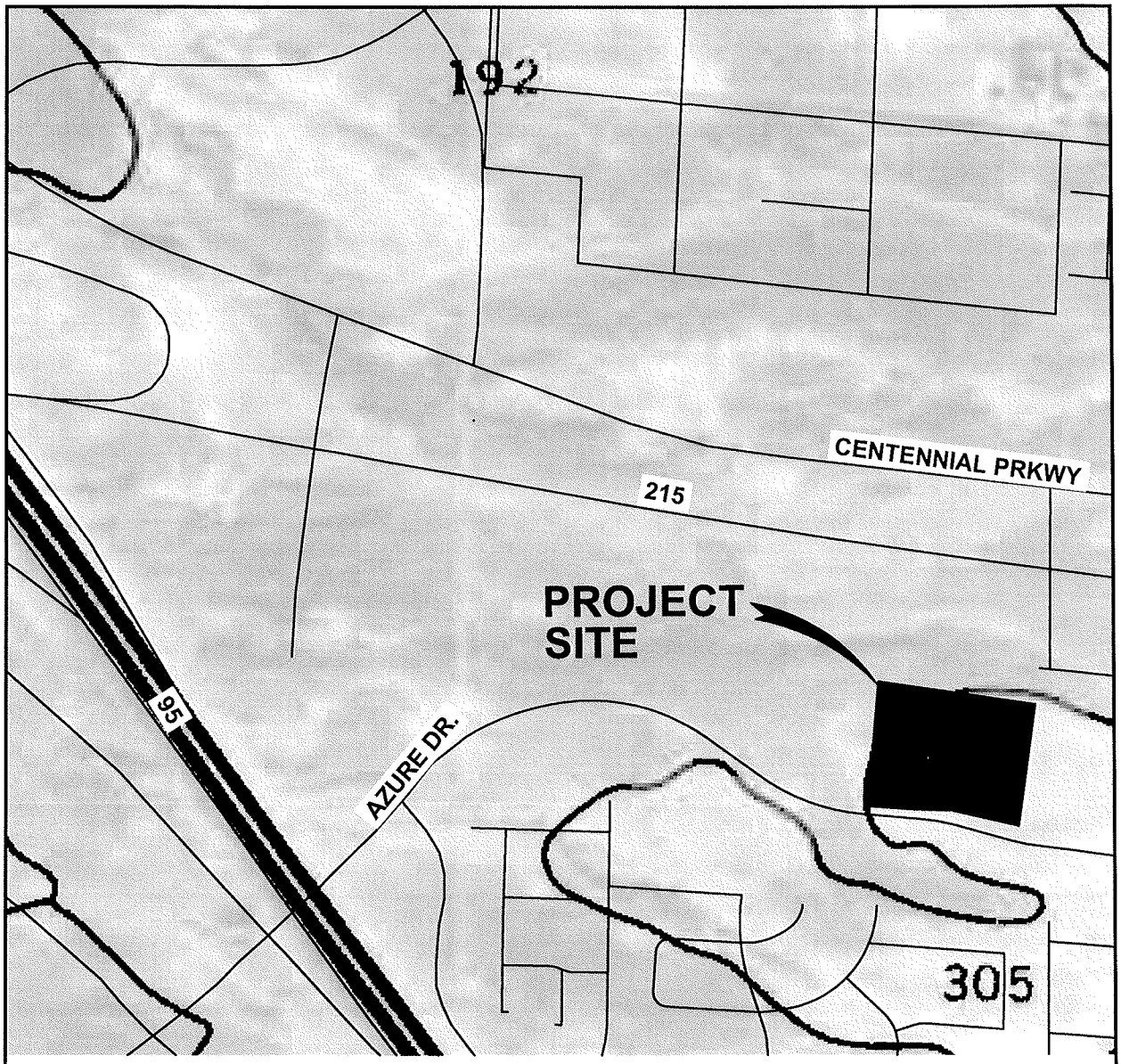
Copies	Description
1	Original TDS
1	TDS on Disk and Plans on Disk
1	Check for $400

Comments: Email: eric.rietz@gmail.com

Signed:

Please, notify us at (702) 212-3967 if there are any problems receiving this transmission.

5740 S. Arville Street #206, Las Vegas, NV 89118 ph (702) 212-3967 fax (702) 212-3963



SCALE: 1" = 600'

600' 300' 0 600'

RIETZ CONSULTING, INC. 5740 S. ARVILLE ST., STE. 206 LAS VEGAS, NV 89118 PH: (702) 251-3355	THE COLLISION CENTER CENTENNIAL PROPERTY, LLC SOILS MAP	DATE: 11-09-12 DRAFTER: MRL DESIGNER: MRL CHECKED: MRL	EXHIBIT D

REGIONAL FLOOD CONTROL DISTRICT

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE H-19
HYDROLOGIC SUMMARY

LEGEND

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

Flood Control Facilities

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

Type Hydrologic Soil Groups

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

Typical Land Use

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

* Drought Ordinance Applied

N

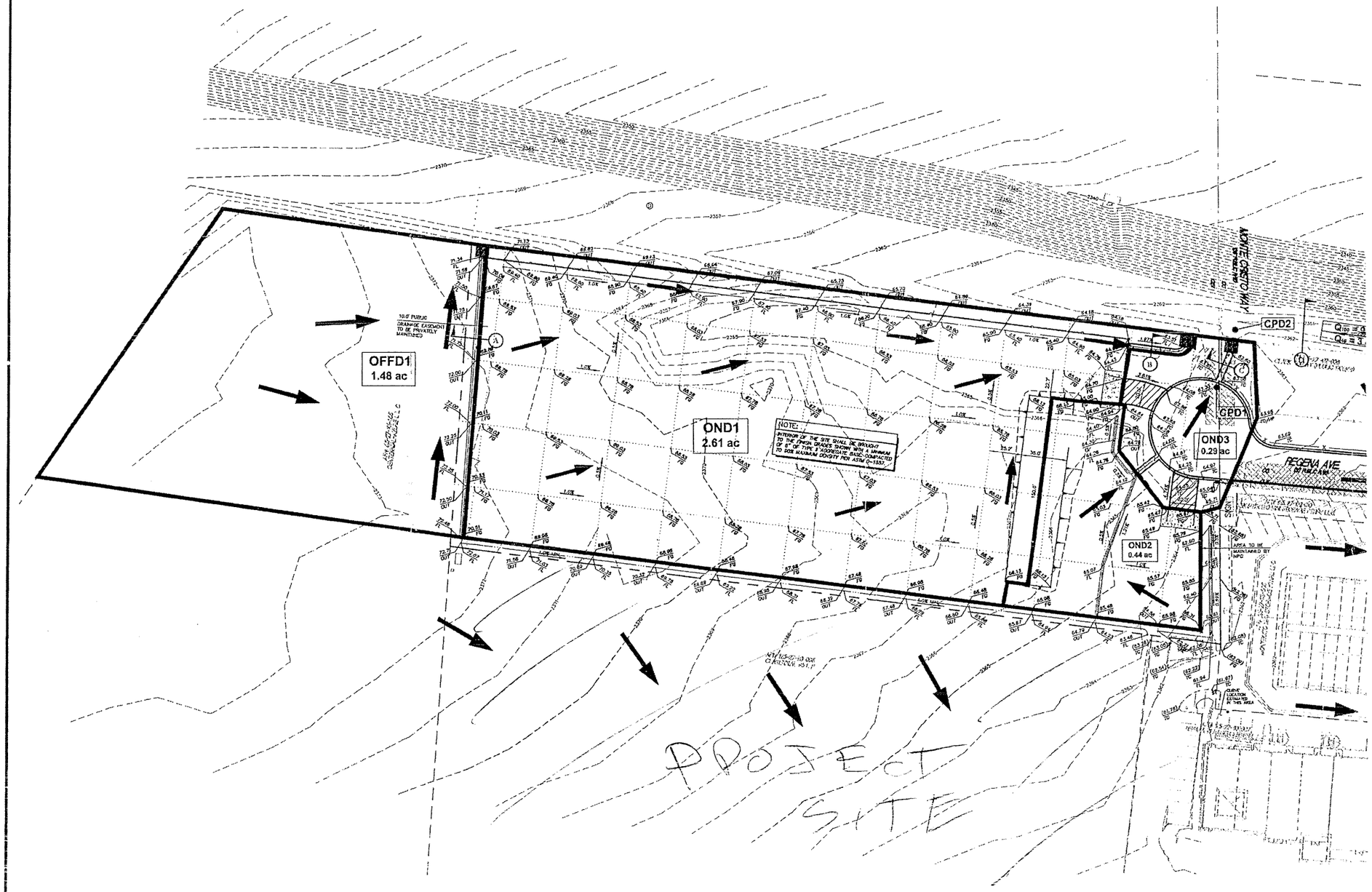
0 500 1,000 2,000 3,000
Feet

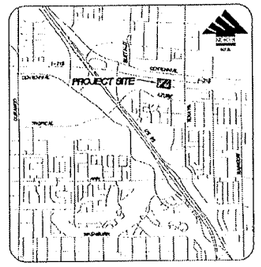
Scale: 1 inch = 2,000 feet

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

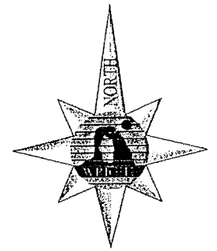
US95 I-15 I-215

PBS&J PB





VICINITY MAP
N.T.S.



LEGEND

- RIGHT OF WAY
- STREET CENTERLINE
- LOT LINE
- EASEMENT LINE
- 5' CONTOUR
- 1' CONTOUR
- 6' HIGH BLOCK WALL
- BASIN BOUNDARY
- SECTION INDICATOR
- FLOW PATH ARROW
- CONCENTRATION POINT
- OND1 0.00 ac — BASIN/ACREAGE LABEL

BASIS OF BEARING
NEVADA POWER COMPANY
LAS VEGAS VALLEY COORDINATE SYSTEM

BENCHMARK
BRASS CAP IN INTERSECTION OF TENAYA AND AZURE
ELEVATION = 2353.915 FROM PAGE 22 WESTIN FIBER
1. THE ELEVATIONS SHOWN HEREON ARE BASED ON FEET.

LEGAL DESCRIPTION
SURVEYED IN THE NORTHEAST QUARTER (NE 1/4) OF THE NORTHWEST QUARTER (NW 1/4) OF SECTION 23, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.B.&M., CLARK COUNTY, NEVADA.

CROSS SECTION DATA

CROSS SECTION	100-YEAR FLOW (cfs)	10-YEAR FLOW (cfs)	100-YEAR VELOCITY (ft/s)	100-YEAR DEPTH (ft)	100-YR VD PRODUCT (ft²/s)
A	4	2	2.92	0.53	1.61
B	5	2	5.54	0.36	1.99
C	2	1	3.81	0.14	0.53
D	11	5	2.48	0.70	1.74

BASIN DATA

BASIN	100-YEAR FLOW (cfs)	10-YEAR FLOW (cfs)
OND1	5	2
OND2	1	0
OND3	1	1
OFFD1	2	1
CPD1	4	2
CPD2	2	1
CPD2	11	5

grading plan part of drainage study # 3981 which was received on 6/20/06 and ___. Page 4 of 4.

BY	DATE	REV	APPROVAL

REVISIONS

Proj. ID

RON P. OSBORNE
Exp. 12/31/07
CIVIL
No. 14888
STATE OF NEVADA
PROFESSIONAL ENGINEER
JUN 2 2 2006

Nevada Power Co.
6226 WEST SAHARA AVE., MAIL STOP #13
LAS VEGAS, NEVADA 89146

	DRAWN	CHECKED	APP'D
DWG. NO.	11/7/05	11/7/05	11/7/05
PROJ. I.D. DS253X/SPA	DD	ALK	MMP

REGENA SUBSTATION

DRAINAGE PLAN

SHT. NO.
OF 18

WRIGHT ENGINEERS
7425 Peak Drive
Las Vegas, Nevada 89128
(702) 533-7000 Fax (702) 533-7001
www.wrightengineers.com

ISSUED FOR:
☐ CONSTRUCTION
☐ BID
☐ REVIEW

M:\Civil\2006\DN06018\dwg\hydrology\dwg\dn06018-dp-dwg on 27 Jun 2006 - 3:55pm

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M. MAHER – CLARK COUNTY PUBLIC WORKS DEGSN – BELTWAY Date

NOTE: AN ENCROACHMENT PERMIT FROM THE CLARK COUNTY DEPARTMENT OF DEVELOPMENT SERVICES IS REQUIRED FOR ANY WORK WITHIN OR ABUTTING THE RIGHT OF WAY FOR THE CLARK COUNTY 215 BRUCE WOODBURY BELTWAY. FOR DETAILS CALL (702) 455-4600.

NOTE:

REFER TO SECTION 5.2 "SITE GRADING AND EARTHWORK" FOR OVER EXCAVATION REQUIREMENTS

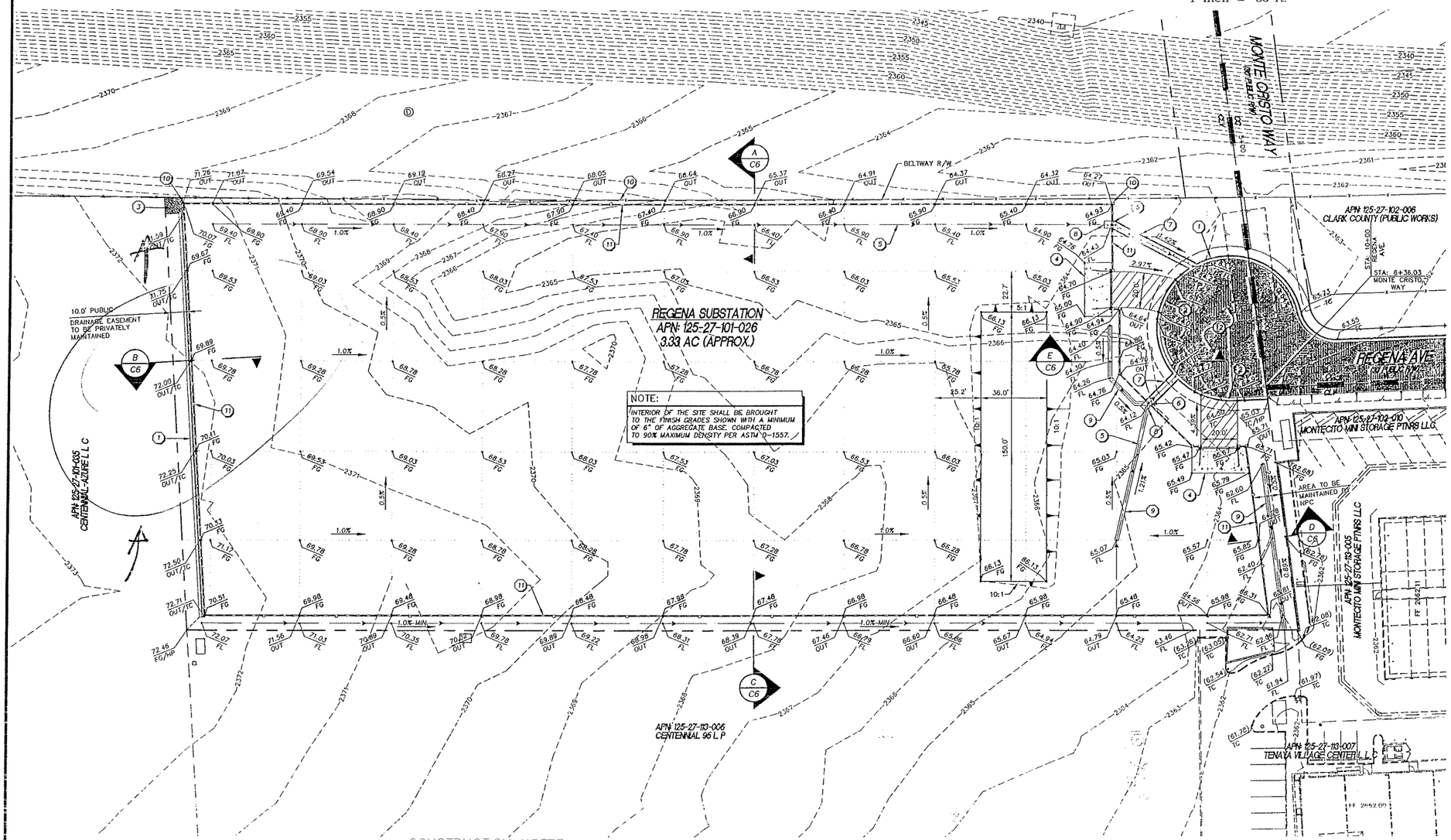
GEOTECHNICAL NOTE:

ALL GRADING, INCLUDING EXCAVATION, EMBANKMENT AND SUBGRADE PREPARATION FOR THIS PROJECT SHALL FOLLOW THE GEOTECHNICAL INVESTIGATION REPORT RECOMMENDATIONS BY CONVERSE CONSULTANTS – PROJECT #03-33271-29

NORTH
1"=30'

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.

CLARK COUNTY 215 BRUCE WOODBURY BELTWAY



VICINITY MAP
N.T.S.

LEGEND

- PROPOSED SCARP
- DAYLIGHT LINE
- RIGHT-OF-WAY LINE
- EASEMENT LINE
- SECTION LINE
- CENTERLINE
- FLOWLINE
- GRADE BREAK LINE
- RETAINING WALL WITH PILASTERS
- EXISTING WALL
- 2030 EXISTING MAJOR CONTOUR
- 2031 EXISTING MINOR CONTOUR
- CONCRETE
- ASPHALT
- SIGHT VISIBILITY ZONE
- ONSITE CONCRETE DRIVEWAY
- POWER POLE X18725 EXISTING POWER POLE
- PROPOSED POWER POLE
- 60.00 FG PROPOSED GRADE ELEVATION

BASIS OF BEARING

NORTH 54°50'48" EAST, BEING THE BEARING BETWEEN CLARK COUNTY GEODETIC CONTROL NETWORK STATION '819' AND STATION '909' BASED ON NEVADA POWER COMPANY LOCAL COORDINATE SYSTEM

NORTH 54°34'52" EAST, BEING THE BEARING BETWEEN CLARK COUNTY GEODETIC CONTROL NETWORK STATION '819' AND STATION '909' AS CALCULATED FROM THE POSITIONS SHOWN ON THAT CERTAIN MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE AS FILE 88, PAGE 53 OF SURVEYS.

BENCHMARK

8LV9627E6: RIVET & PLATE IN TOP OF CURB @ NE CORNER OF TROPICAL PARKWAY & RIO VISTA.

ELEVATION = 2340.05

THE ELEVATIONS SHOWN HEREON ARE BASED ON FEET.

LEGAL DESCRIPTION

SITUATED IN THE NORTHEAST QUARTER (NE 1/4) OF THE NORTHWEST QUARTER (NW 1/4) OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA.

CONSTRUCTION NOTES

1. INSTALL "L" TYPE CURB AND GUTTER PER CLARK COUNTY STD. DWG. #216.
2. INSTALL COMMERCIAL DRIVEWAY PER STD DWG. #224.
3. INSTALL 10'x10' RIP-RAP EROSION CONTROL. D_{50} = 6", 1'-0" THICK. TYP.
4. 15'x30' ONSITE CONCRETE DRIVEWAY PAD. TO BE INSTALLED BY ONSITE CONCRETE CONTRACTOR. SEE FOUNDATION PLANS FOR DETAILS
5. INSTALL SWALE.
6. INSTALL BLOCKWALL OPENING PER DETAIL 1 ON SHEET C6.
7. INSTALL CONCRETE FLUME PER DETAIL 5 SHEET C6.
8. INSTALL CONCRETE APRON PER DETAIL 6 SHEET C6.
9. INSTALL 2' VALLEY GUTTER PER DETAIL 7 SHEET C6.
10. REMOVE EXISTING CHAINKLINK FENCE AND TIE REMAINING FENCING INTO PROPOSED WALL.
11. INSTALL BLOCK WALL
12. CLARK COUNTY RIGHT-OF-WAY EASEMENT (WEST PORTION OF CUL-DE-SAC).

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY. HTE# 06-34529
ANDREW L. KITCHEN P.E. NO. 17375

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CITY OF LAS VEGAS – DS 3989.
ANDREW L. KITCHEN P.E. NO. 17375

Call before you UnderGround 1-702-455-7511 CLARK COUNTY TRAFFIC OPERATIONS AND 1-702-229-6611 LAS VEGAS AREA COMPUTERIZED TRAFFIC SYSTEM

Call before you Dig 1-800-227-2600

Call before you Overhead 1-702-227-2929

WRIGHT ENGINEERS
7425 Peak Drive
Las Vegas, Nevada 89128
(702) 933-7000 Fax (702) 933-7001
www.wrightengineers.com

This grading plan is a part of drainage study #3989 which was received on 3/7/07 and approval on 3/7/07. Page 1 of 2

BY	DATE	REV	APPROVAL	Proj. ID
				REVISIONS

ANDREW L. KITCHEN EXP 6-30-09 CIVIL No. 17375 PROFESSIONAL ENGINEER STATE OF NEVADA

FEB 15 2007

Nevada Power
6226 WEST SAHARA AVE. MAIL STOP #10
LAS VEGAS, NEVADA 89146

	DRAWN	CHECKED	APP'D
	BD	AJK	RK
DWG. NO. DS2400CTCS-C5	2/15/07	2/15/07	2/15/07
PROJ. I.D. DS2400CTCTS			

CONSTRUCTION ☐ BID ☐ REVIEW ☐

ISSUED FOR:

REGENA SUBSTATION

GRADING PLAN

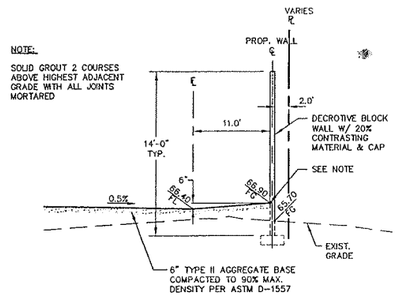
SHT. NO. C5 OF 17

CLV PLAN#

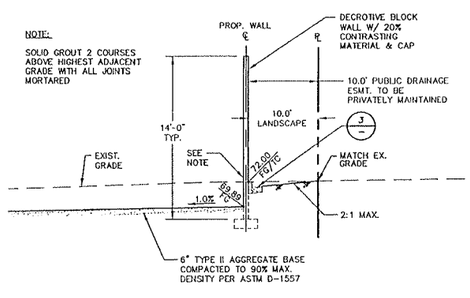
CLV H#

M:_civil\2006\06081604e\civil\improvements\DS2400CTCTS-05-c5.dwg Feb 15, 2007 - 10:15am

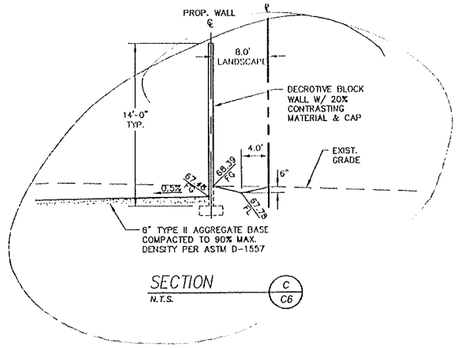
HTE# 06-40963



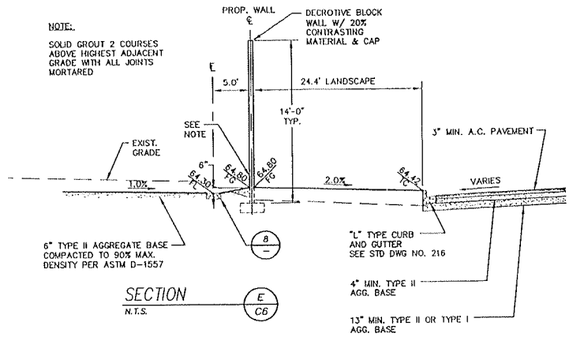
SECTION A C6
N.T.S.



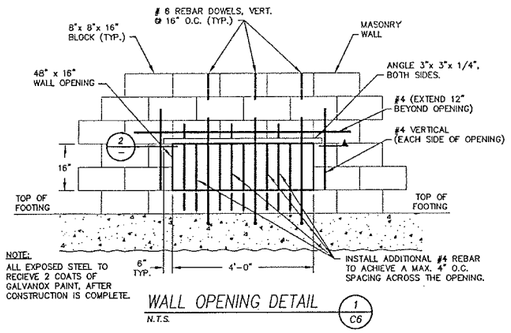
SECTION B C6
N.T.S.



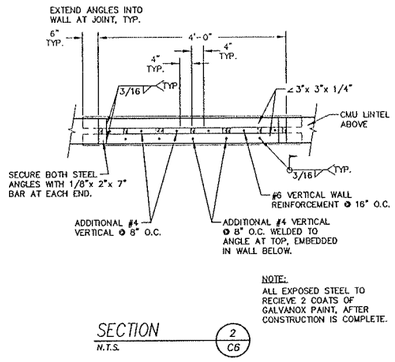
SECTION C C6
N.T.S.



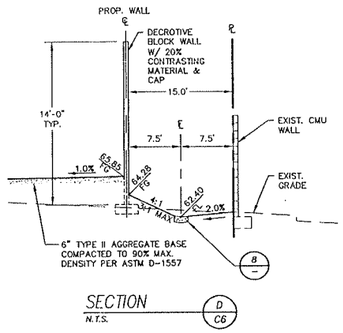
SECTION E C6
N.T.S.



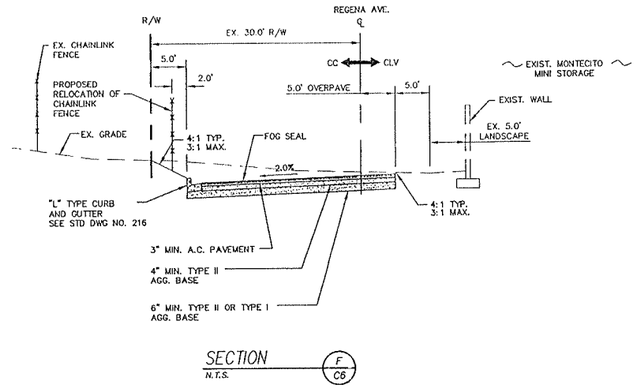
WALL OPENING DETAIL 1 C6
N.T.S.



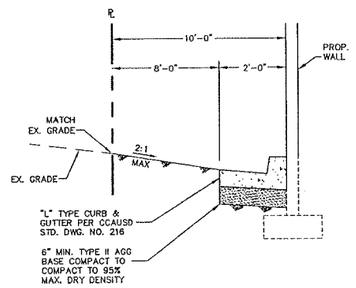
SECTION 2 C6
N.T.S.



SECTION D C6
N.T.S.



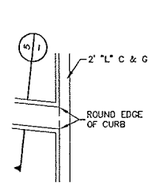
SECTION F C6
N.T.S.



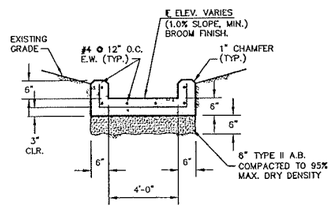
NOTE:

1. EXPANSION JOINTS REQUIRE AT 30' MAX. INTERVALS.
2. WEAKENED PLANE JOINTS REQUIRED AT 10' MAX. SPACING.
3. REFER TO PROJECT GEOTECHNICAL REPORT FOR TYPE II AGGREGATE OR SELECTED MATERIAL DEPTH AND COMPACT, SUB-GRADE PREPARATION, MEMBRANES AND OTHER PLACEMENT RECOMMENDATIONS.

"L" TYPE CURB & GUTTER @ WALL 3 C6
N.T.S.



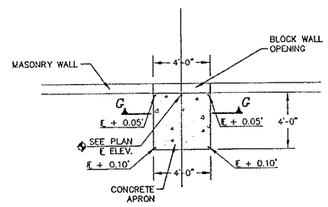
GUTTER CONNECTION 4 C6
N.T.S.



NOTE:

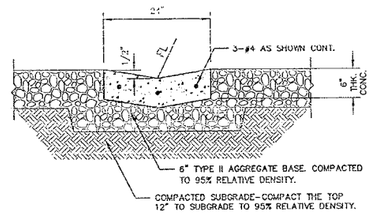
1. EXPANSION JOINTS REQUIRE AT ALL LOCATIONS WHERE CHANNEL MEETS CURB AND CHANNEL INTERSECTION.
2. CONCRETE TO TYPE V WITH 4500 psi COMPRESSIVE STRENGTH @ 28 DAYS.
3. REFER TO PROJECT GEOTECHNICAL REPORT FOR TYPE II AGGREGATE OR SELECTED MATERIAL DEPTH AND COMPACT, CUB-GRADE PREPARATION, MEMBRANES AND OTHER PLACEMENT RECOMMENDATIONS.

4' WIDE CONC. FLUME 5 C6
N.T.S.



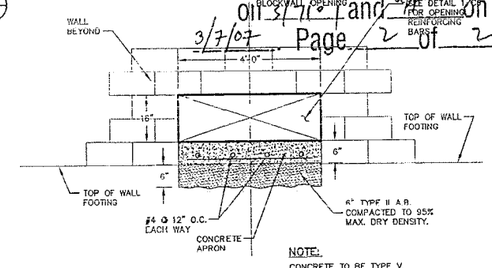
TYPICAL BLOCKWALL DRAIN (ENLARGED VIEW) 6 C6
N.T.S.

This grading plan is a part of drainage study #3989 which was received on 3/7/07 and approved on 3/7/07. Page 2 of 2



NOTE:
PROVIDE EXPANSION JOINTS @ 30' O.C. AND WEAKEN PLANE JOINTS @ 10' O.C. IN CONCRETE SPAN.

2' WIDE CONC. VALLEY GUTTER 7 C6
N.T.S.



NOTE:
CONCRETE TO BE TYPE V, WITH 4500 psi COMPRESSIVE STRENGTH @ 28 DAYS.

CONCRETE APRON G C6
N.T.S.

E ELEV. VARIES

BY	DATE	REV	APPROVAL

REVISIONS

Proj. ID

ANDREW L. KITCHEN EXP. 6-30-09 CIVIL No. 17175

FEB 15 2007

Nevada Power
6226 WEST SAHARA AVE. MAIL STOP #10
LAS VEGAS, NEVADA 89146

DRAWN	2/15/07	DD
CHECKED	2/15/07	ALK
APP'D	2/15/07	RK

DWG. NO. DS240CTCTS-C6
PROJ. I.D. DS240CTCTS

M:_civil\2006\06d0816\dwg\plot\plotmaster\DS2-80CTCS-06-DTL #4 pl Fri 1:30:07 - 10:15am

CONSTRUCTION ☐ BID ☐ REVIEW ☐ ISSUED FOR:

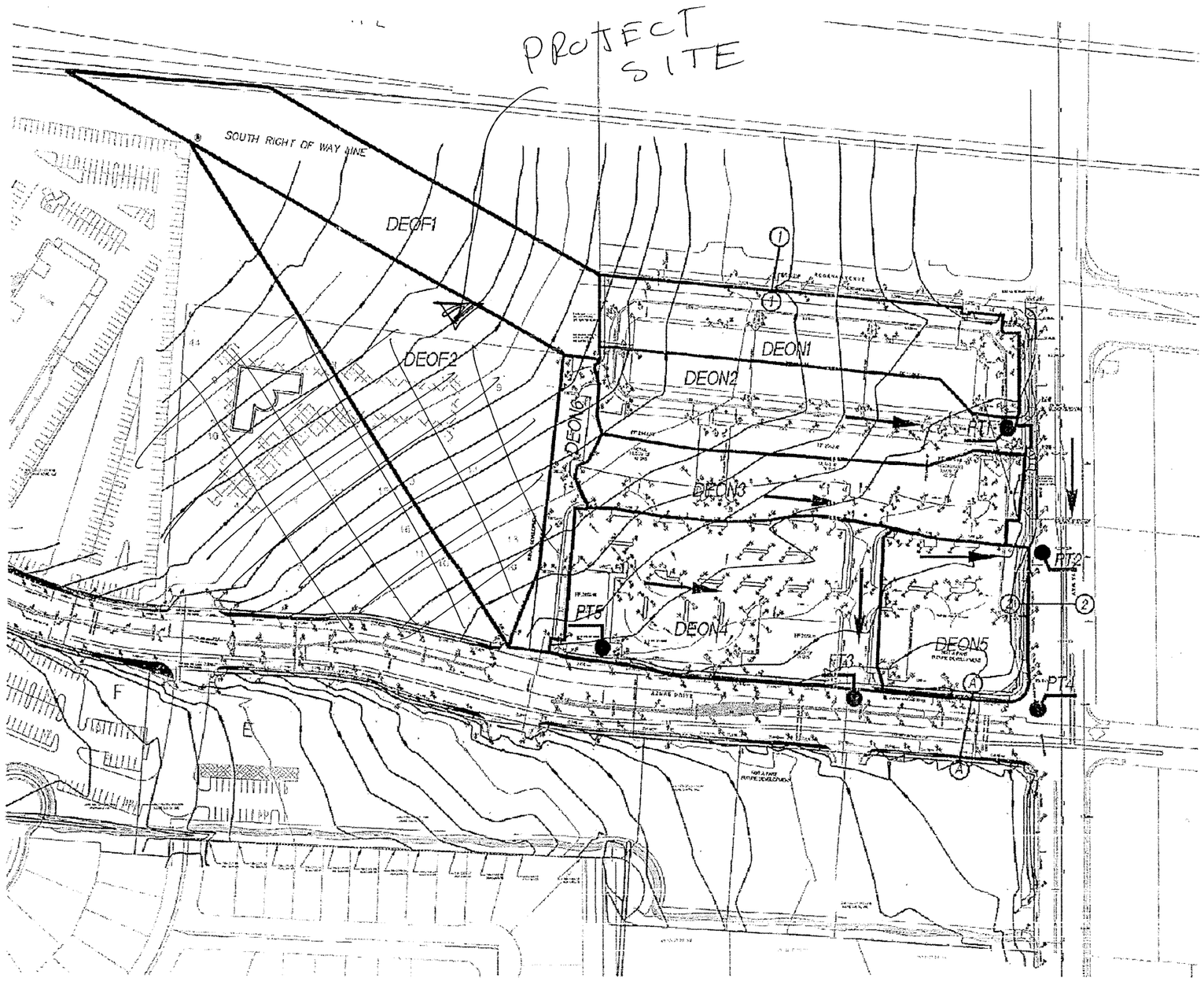
REGENA SUBSTATION

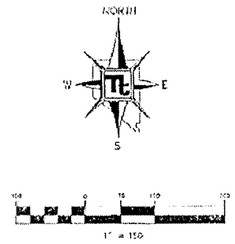
MISCELLANEOUS DETAILS AND TYPICAL SECTIONS

SHT. NO.
C6 OF 17

CLV PLAN#
CLV H#

HTE# 06-40963





LEGEND

DEON1 BASIN NAME

BASIN BOUNDARY

FLOW DIRECTION

PT1 CONCENTRATION POINT

1 STREET SECTION

BASIN / CONC. PT.	Q10 CFS	Q100 CFS
DEON1	5	9
DEON2	4	7
DEON3	7	13
DEON4	3	6
DEON5	2	4
DEOF1	5	9
DEOF2	6	11
PT1	7	13
PT2	9	17
PT3	10	19
PT4	18	32
PT5	9	17

STREET SECTION	Q10 / Q100 CFS	D10, V10 D100, V100 FT, FPS	V10 / V100 FPS
DEON1 AVE. (SEC 1-1)*	5/21	.05/1.0	1.0/4.32
TENAYA WAY (SEC 2-2)	9/19	.5/.93	3.24/5.85
ALONE LANE (SEC A-A)**	-/151	-/.91	-/4.12

*FLOWS BASED ON MINOR CONDITIONS

** FUTURE FLOWS ALONG CHANNEL FROM RECORDON JR TO THE TECHNICAL DRAINAGE STUDY FOR TROPICAL PARKWAY

This grading plan is a part of drainage study # 3999 which was received on 11/20/03 and rejected on 11/26/03. Page 5 Of 5.

MONTECITO COMPANIES
6600 W. CHARLESTON BLVD. SUITE 174
LAS VEGAS, NEVADA
(702) 255-1277

TETRA TECH, INC.
INFRASTRUCTURE SERVICES GROUP
401 N. Buffalo Dr. Suite 300, Las Vegas, Nevada 89145 (702) 242-4200

NO	DATE	BY	REVISION

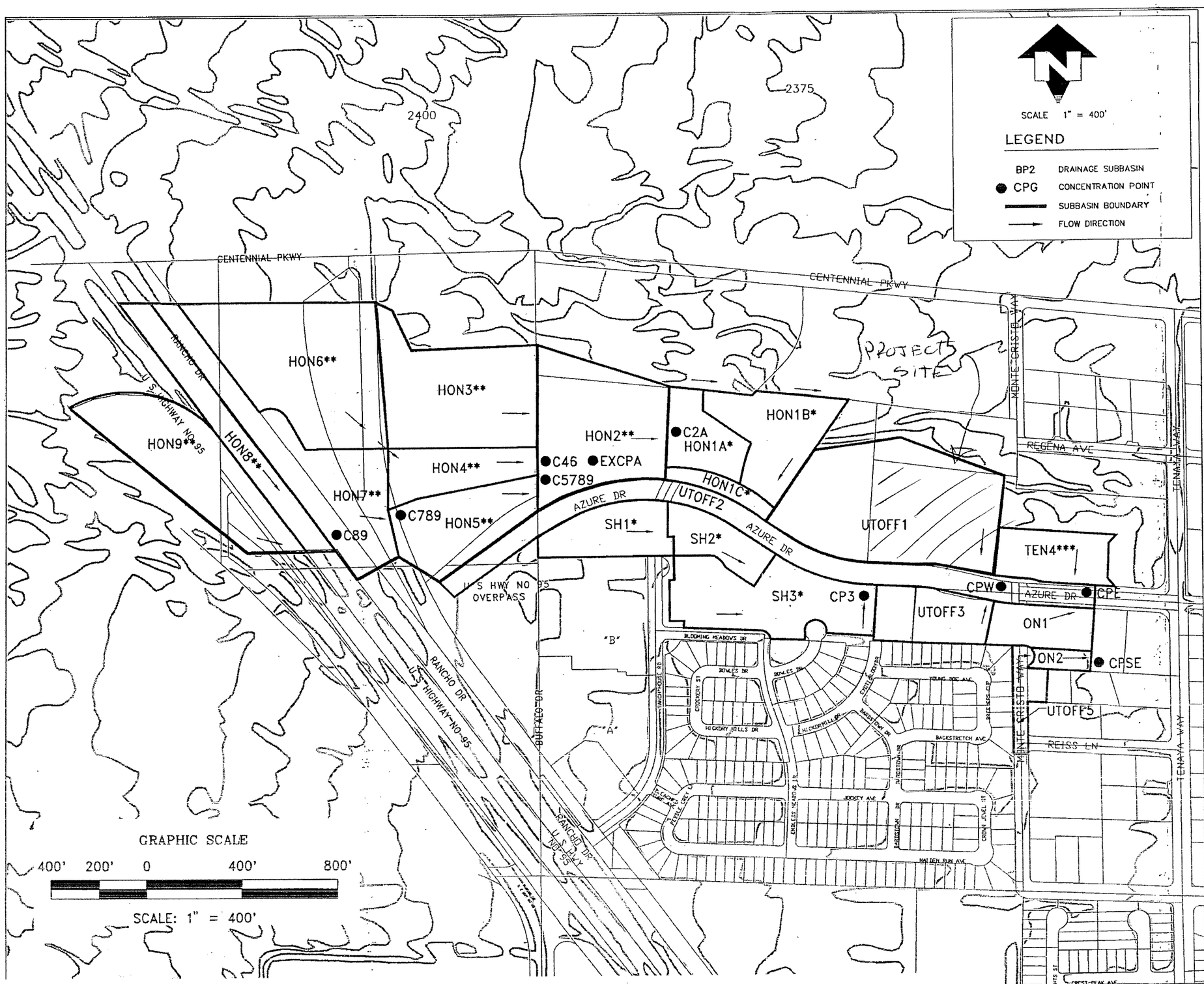
DRAWN BY
DESIGN BY
QUALITY CONTROL BY
QUALITY CONTROL BY
CHECKED BY
ISSUED
PROJECT NO.
P09072-0002

SHEET
FIGURE 5
FUTURE OFF-SITE DRAINAGE BASINS

TITLE
TENAYA VILLAGE
CITY OF LAS VEGAS

SHEET 1 OF 1

DRAWING NO.



SUMMARY OF FLOWS

BASIN OR LOCATION	Q100 (CFS)	Q10 (CFS)
HON1A**	9	5
HON1B**	12	7
HON1C**	1	1
HON2**	22	12
HON3**	25	14
HON4**	8	5
HON6**	31	17
C46**	37	21
HON7**	23	13
HON8**	8	3
HON9**	14	5
C89**	21	8
C789**	45	21
HON5**	12	7
C5789**	54	26
EXCPA**	112	58
C2A**	127	66
SH1*	7	3
SH2*	6	3
SH3*	13	6
CP3***	26	12
UTOFF1	26	13
UTOFF3	7	3
UTOFF2	18	10
CPW	224	114
ON1	6	3
TEN4***	6	3
CPE	236	120
ON2	2	1
UTOFF5	3	1
CPSE	4	2

*OFFSITE SUBBASIN
REFERENCED FROM SHEA COMMERCIAL-TENAYA
**OFFSITE SUBBASIN
REFERENCED FROM FINDLAY-SHACK HONDA
***OFFSITE SUBBASIN
REFERENCED FROM TENAYA VILLAGE PHASE 1

O'CONNELL COMMERCIAL
TENAYA COMMERCIAL

FIGURE 6
ULTIMATE

WOOD RODGERS
ENGINEERING • MAPPING • PLANNING • SURVEYING
9900 COVINGTON CROSS DRIVE SUITE 102 /LAS VEGAS, NEVADA 89144

\Jobs\1943_TenayaCommercial\Civil\Docs\Studies\Drain\figures\originals\figure6.dwg 11/30/06 4:50pm nappuglise

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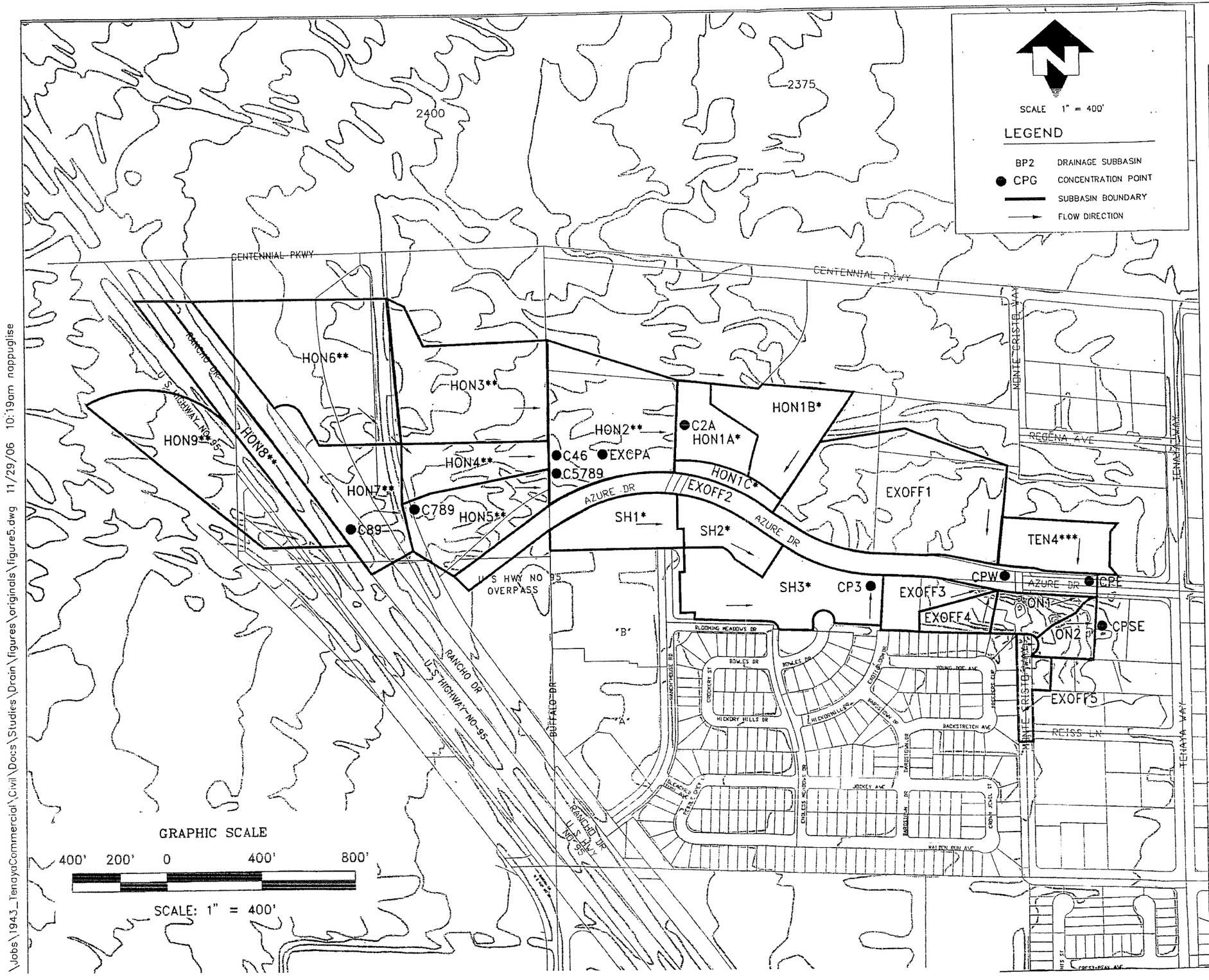

SUMMARY OF FLOWS

BASIN OR LOCATION	Q100 (CFS)	Q10 (CFS)
HON1A**	9	5
HON1B**	12	7
HON1C**	1	1
HON2**	13	5
HON3**	15	6
HON4**	5	2
HON6**	21	8
C46**	26	10
HON7**	16	6
HON8**	8	3
HON9**	14	5
C89**	21	8
C789**	37	14
HON5**	8	3
C5789**	44	16
EXCPA**	85	31
C2A**	97	35
SH1*	7	3
SH2*	6	3
SH3*	13	6
CP3***	26	12
EXOFF1	14	4
EXOFF3	3	1
EXOFF2	18	10
CPW	169	70
EXOFF4	1	0
ON1	2	1
TEN4***	6	3
CPE	179	74
ON2	2	1
EXOFF5	3	1
CPSE	5	2

*OFFSITE SUBBASIN
REFERENCED FROM SHEA COMMERCIAL-TENAYA
**OFFSITE SUBBASIN
REFERENCED FROM FINDLAY-SHACK HONDA
***OFFSITE SUBBASIN
REFERENCED FROM TENAYA VILLAGE PHASE 1

O'CONNELL COMMERCIAL
TENAYA COMMERCIAL

FIGURE 5
EXISTING CONDITIONS

WOOD RODGERS
ENGINEERING • MAPPING • PLANNING • SURVEYING
9900 COVINGTON CROSS DRIVE SUITE 102 /LAS VEGAS, NEVADA 89144

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SOILS MAP

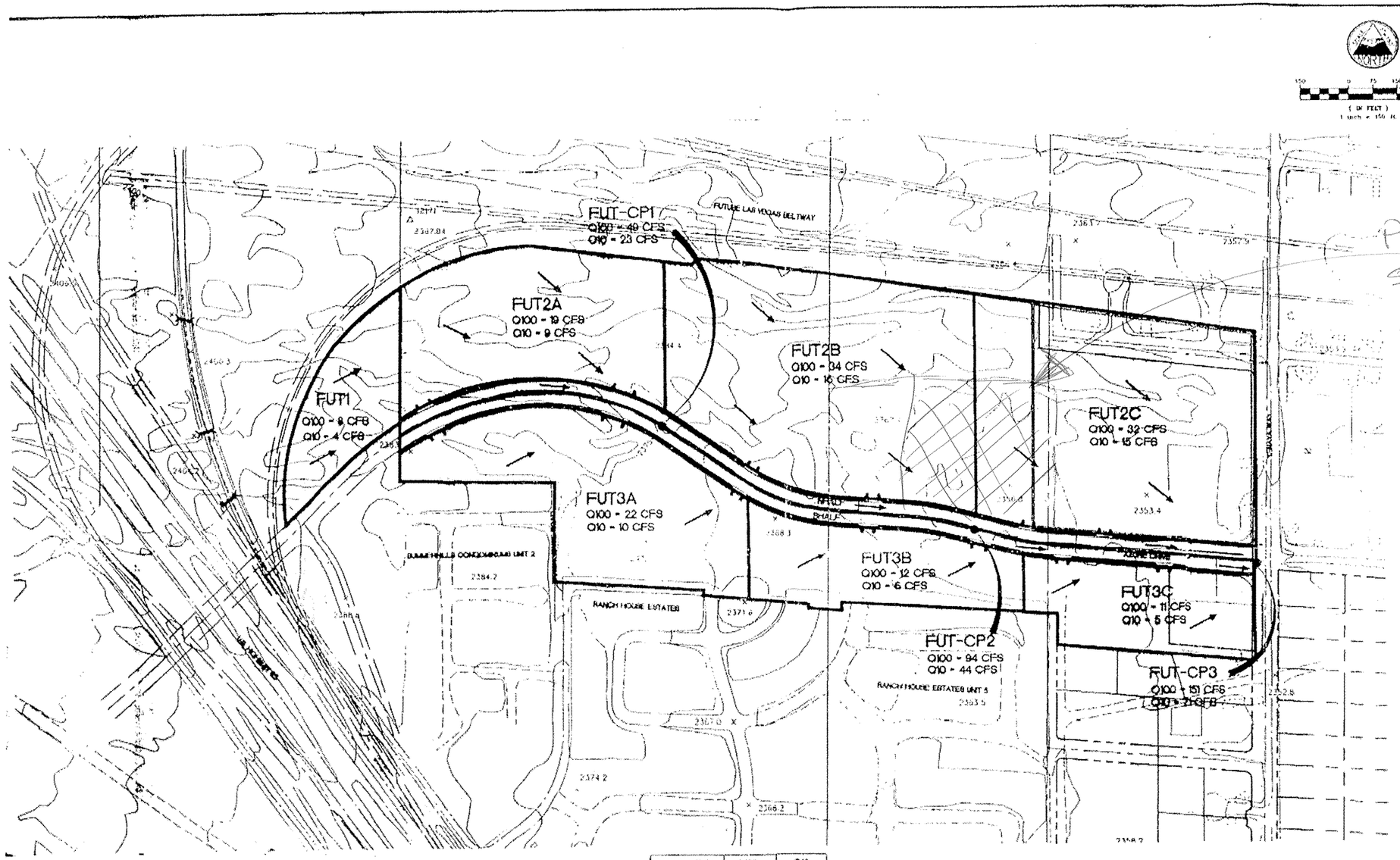
ULTIMATE SUBBASINS

250' 0 500' 1000'

SCALE: 1" = 500'

WOOD RODGERS
DEVELOPING • INNOVATIVE • DESIGN • SOLUTIONS
9900 Covington Cross Dr. Ste. 102 Tel 702.434.2953
Las Vegas, NV. 89144 Fax 702.434.2957

J:\Jobs\1943_TenayaCommercial\Civil\Docs\Studies\Drain\figures\originals\Exhibit B.dwg 11/29/06 2:44pm nappuglise



DESIGNATION	Q100	Q10
FUT1	8 CFS	4 CFS
FUT2A	19 CFS	9 CFS
FUT2B	34 CFS	16 CFS
FUT2C	32 CFS	15 CFS
FUT3A	22 CFS	10 CFS
FUT3B	12 CFS	6 CFS
FUT3C	11 CFS	5 CFS
NHALF	8 CFS	5 CFS
SHALF	8 CFS	5 CFS
FUTCP1	49 CFS	23 CFS
FUTCP2	94 CFS	44 CFS
FUTCP3	151 CFS	71 CFS

LEGEND

- BASIN DELINATION
- PROJECT BOUNDARY
- PROPOSED INTERNAL PARCEL LINE
- 2355 EXISTING GROUND CONTOUR
- 2360 PROPOSED MASS GRADE CONTOUR
- ( ) EXISTING GRADE
- FLOW PATH
- EXA BASIN DESIGNATION

BASIS OF BEARING

N 00°55'40"E BEING THE WEST LINE OF NW 1/4 OF SEC 27 T19 S., R 60 E., M.D.M., AS SHOWN ON FINAL MAP OF CENTENNIAL RANCH CONDOMINIUMS, RECORDED IN BOOK 75 PAGE 91 OF PLATS

BENCHMARKS

#LVS0/27N4, CLV, PLS 2050 AL CAP W1/4 SEC 27
ELEV. 2381.17 NAVD 88

#LVS0/27N4, CLV, AL CAP, PLS 2984,
CENTENNIAL PKWY & TENAYA WAY
ELEV. 2358.41 NAVD 88

ER NOTE

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

Call before you Overhead

This grading plan is a part of drainage study # 2525 which was received on 4/18/06 and Accepted on 4/19/06. Page 1 Of 2.

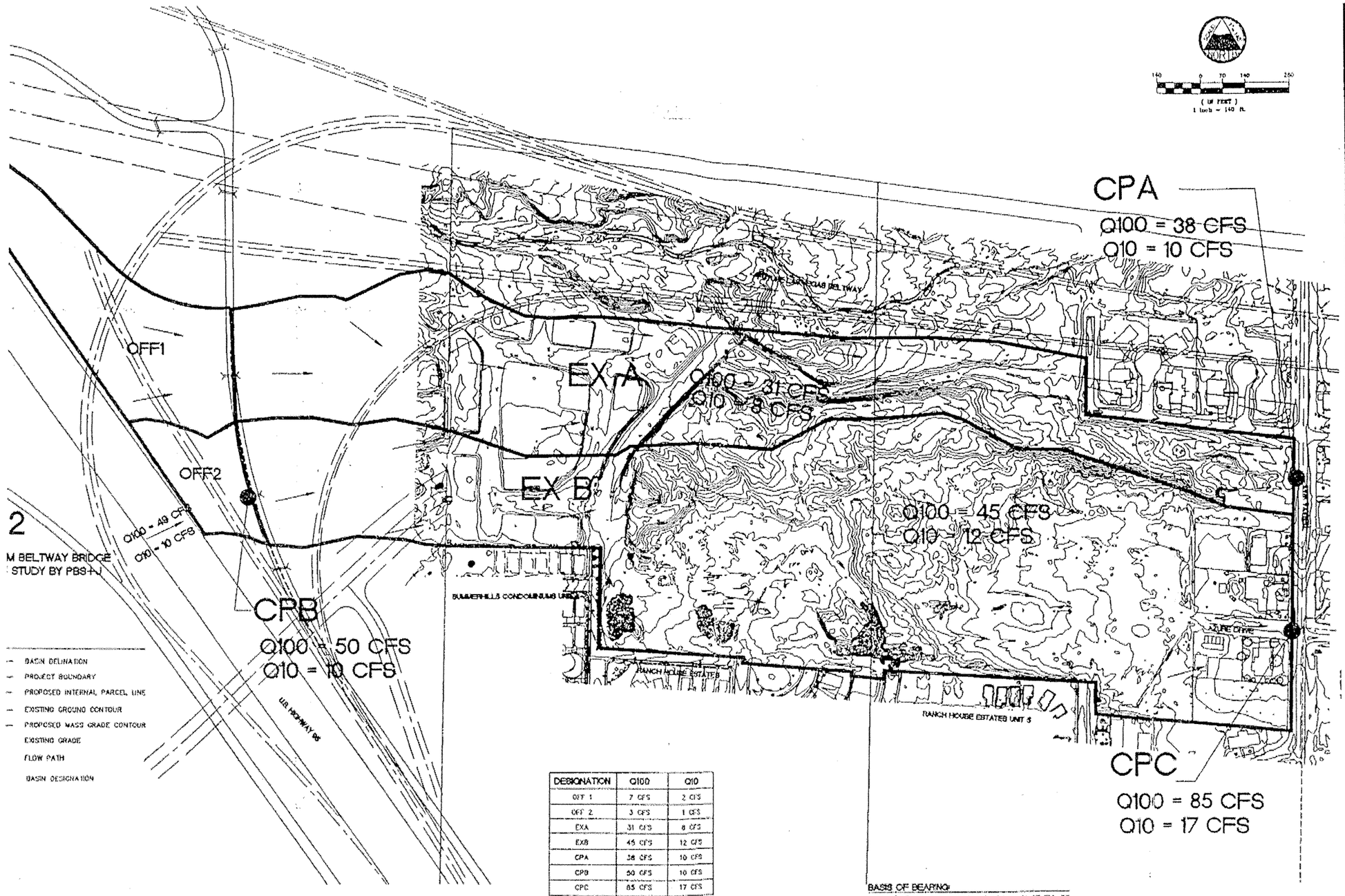
PRIMAS AND ASSOCIATES
CONSULTING ENGINEERING

MONTECITO L.L.C.
MONTECITO EAST

RECOMMENDED

SCALE (H) 1"=150'
SCALE (V)
DRAWN
DESIGN
CHECKED

PROJECT 9711.23
SHEET 1



DESIGNATION	Q100	Q10
OFF 1	7 CFS	2 CFS
OFF 2	3 CFS	1 CFS
EXA	31 CFS	8 CFS
EXB	45 CFS	12 CFS
CPA	38 CFS	10 CFS
CPB	50 CFS	10 CFS
CPC	85 CFS	17 CFS

BASIS OF BEARING:

N 00°55'40"E BEING THE WEST LINE OF NW 1/4 OF SEC. 27 T.19 S., R.60 E., M.D.M., AS SHOWN ON FINAL MAP OF CENTENNIAL RANCH CONDOMINIUMS, RECORDED IN BOOK 75 PAGE 91 OF PLATS.

BENCHMARKS:

#LV90/27W4, CLV, PLS 2050 AL CAP W1/4 SEC.27
ELEV. 2381.17 NAVD 88

#LV90/27N4, CLV, AL CAP, PLS 2984,
CENTENNIAL PKWY & TENAYA WAY
ELEV. 2356.41 NAVD 88

THIS IS A PLANNING DOCUMENT

THESE PLANS REPRESENT A CONCEPTUAL DESIGN ONLY BASED ON THE OWNER'S PLANNING CRITERIA. ALTHOUGH LOCAL AND CITY OF LAS VEGAS DESIGN CRITERIA MAY HAVE BEEN INCORPORATED, THESE PLANS DO NOT NECESSARILY REPRESENT "APPROVABLE" ENGINEERING PLANS. ANY CONSTRUCTION ACTIVITY BASED SOLELY ON THESE PLANS, WITHOUT PERFORMING FINAL ENGINEERING DESIGN OR OBTAINING CITY OF LAS VEGAS APPROVAL IS AT THE OWNER'S RISK.

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

811 dig safely. call before you dig

PRIMAS AND ASSOCIATES
CONSULTING ENGINEERS

NO.	REVISIONS	BY	DATE	APPR

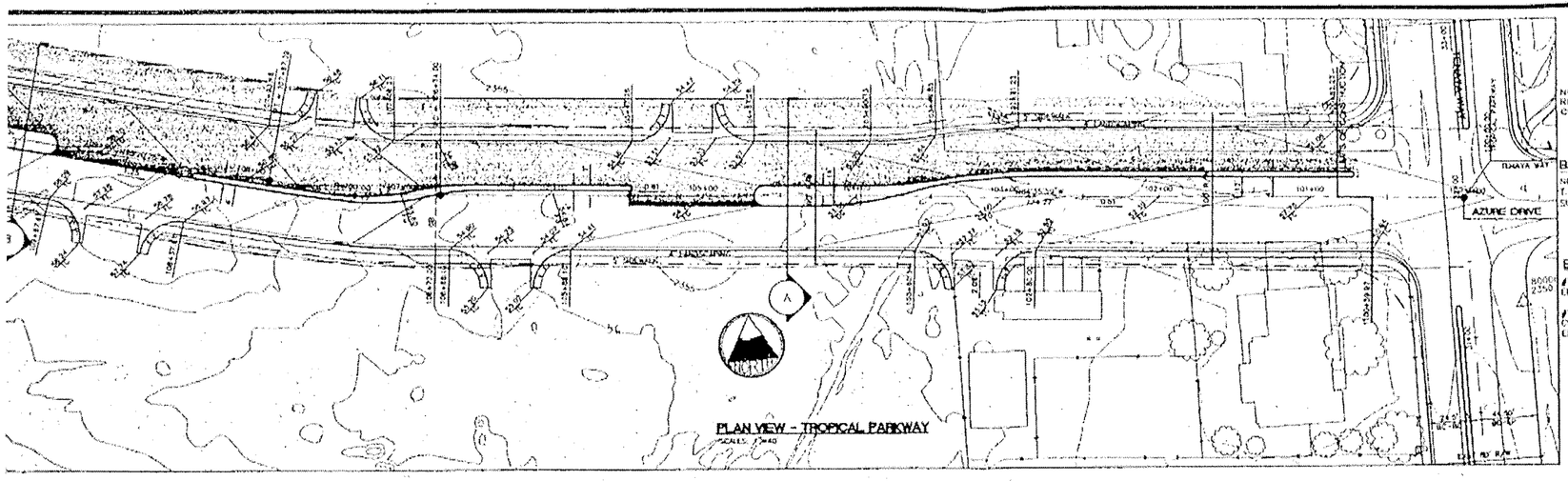
SCALE (H): 1"=140'
SCALE (V):
DRAWN:
DESIGNED:
CHECKED:
DATE: 6-11-99

MONTECITO L.L.C.
MONTECITO EAST
FIGURE 6 - EXISTING DRAINAGE MAP

CRAIG A. PRIMAS, P.E.
R.C.E. NO. 8638

PROJECT NO.
9711.24

SHEET
1
OF 1



PLAN VIEW - TROPICAL PARKWAY
SCALE: 1"=40'

NOTE: GRADING WITHIN TENAYA WAY AND CURB RETURNS FOR TROPICAL PARKWAY COVERED UNDER CONTRACT WITH THE CITY OF LAS VEGAS

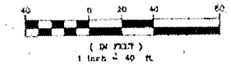
BASIS OF BEARING

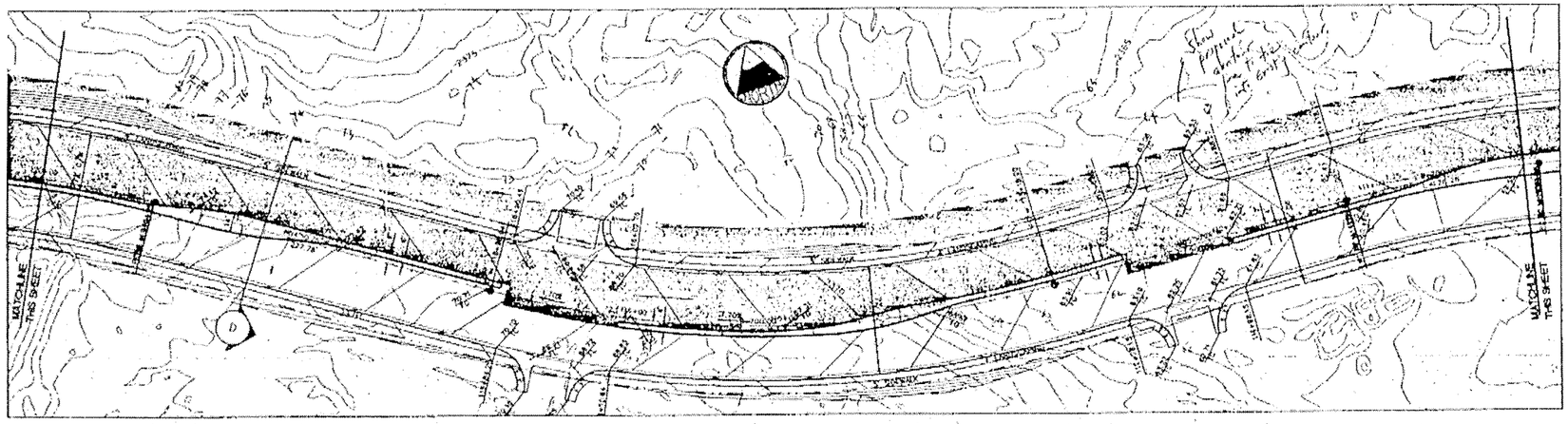
N00°55'40"E BEING THE WEST LINE OF NW 1/4 OF SEC. 27 T.19 S., R.60 E., M.D.M., AS SHOWN ON THE RECORD OF SURVEY RECORDED 6/17/99 IN FILE 103, PAGE 25 OF SURVEYS.

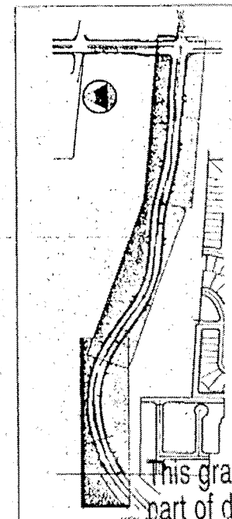
BENCHMARKS

#LV90/27W4, CLV, PLS 2050 AL CAP W1/4 SEC.27
ELEV. 2381.17 NAVD 88

#LV90/27N4, CLV, AL CAP, PLS 2984,
CENTENNIAL PKWY & TENAYA WAY
ELEV. 2359.41 NAVD 88







This grading plan is a part of drainage study # 2525 which was approved on 1/7/00 and is on file. Page 1 of 4

DISCLAIMER NOTE 1/21/00

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Call before you Overhead

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

ADING FROM STATION 125+86.34 COVERED OPICAL OVERPASS CONTRACT WITH THE AS VEGAS.

DEPARTMENT OF PUBLIC WORKS
400 EAST STEWART AVE.
LAS VEGAS, NV 89101
(702) 229-5276

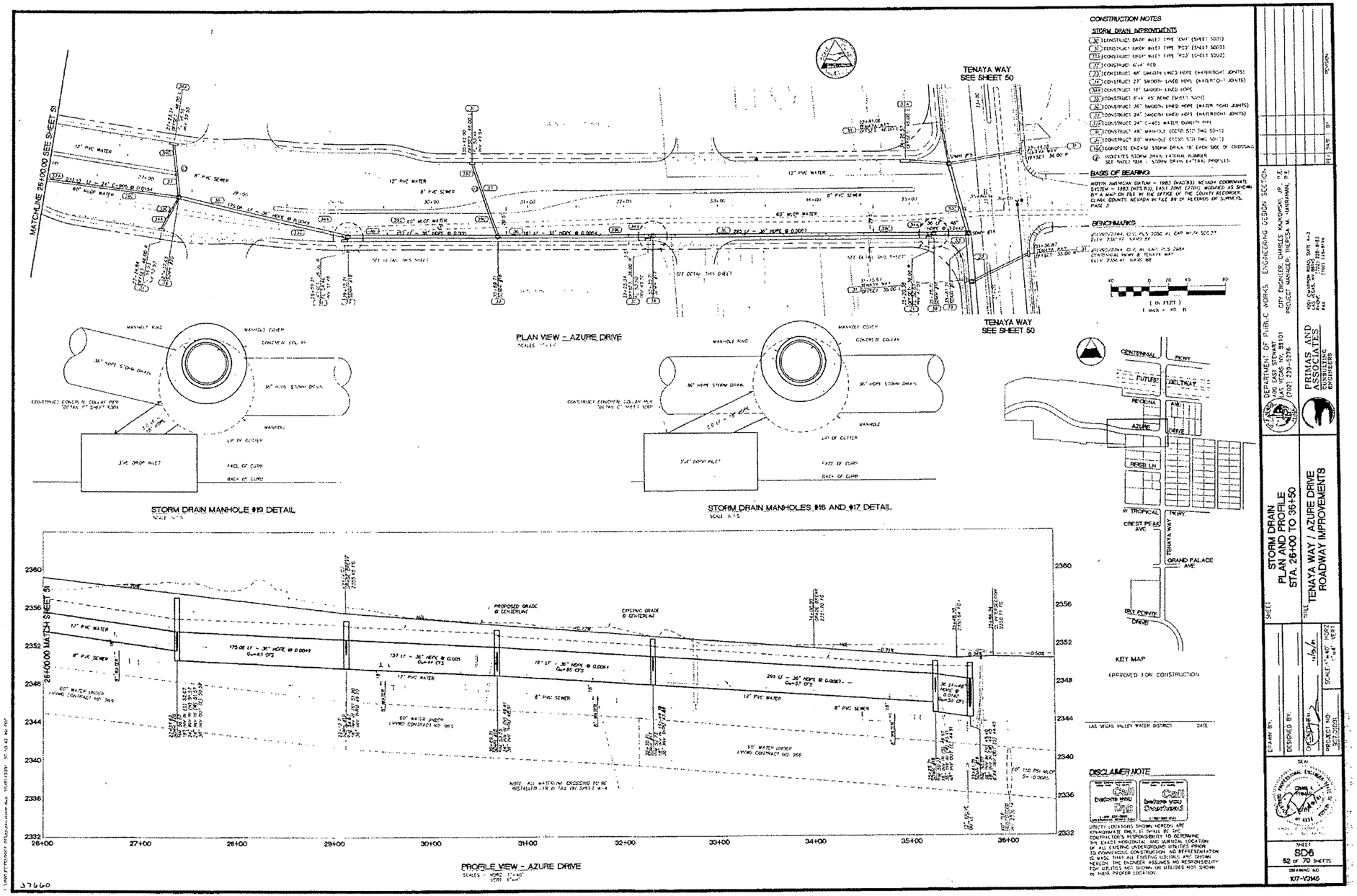
PRIMAS AND ASSOCIATES
CONSULTING
100 DELAWARE BLVD. SUITE 4-3
LAS VEGAS, NEVADA 89101
PHONE (702) 229-8183
FAX (702) 229-8444

SHEET: GRADING PLAN
TITLE: TROPICAL PARKWAY TENAYA WAY TO TROPICAL OVERPASS

DRAWN BY	1/6/00
DESIGNED BY	1/6/00
CHECKED BY	1/6/00
PROJECT NO.	SCALE 1"=40' HOR.

GRANT A. PRIMAS, P.E.
R.P.E. NO. 6656

SHEET Q2 OF SHEETS
DRAWING NO.



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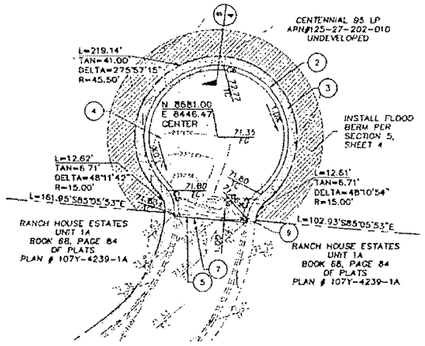
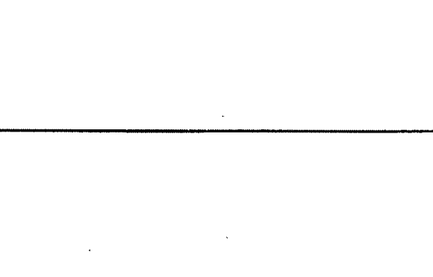


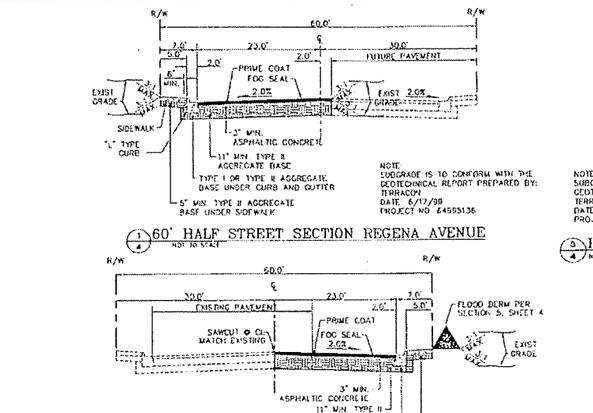
BOWLES DRIVE CUL-DE-SAC GRADING

SCALE: 1"=30'



EXOTIC BLOOM DRIVE TERMINATION GRADING

SCALE: 1"=30'

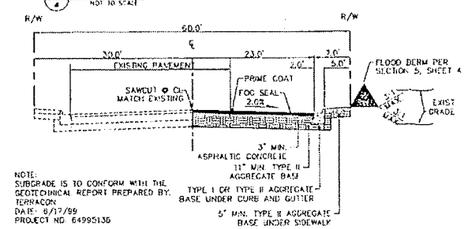


MONTE CRISTO WAY TERMINATION GRADING

SCALE: 1"=30'

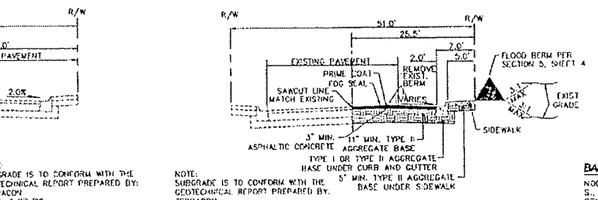
NOTE:
SUBGRADE IS TO CONFORM WITH THE GEOTECHNICAL REPORT PREPARED BY: TERRACON
DATE: 6/17/99
PROJECT NO 64995136

1/4 60' HALF STREET SECTION REGENA AVENUE
NOT TO SCALE



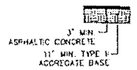
NOTE:
SUBGRADE IS TO CONFORM WITH THE GEOTECHNICAL REPORT PREPARED BY: TERRACON
DATE: 6/17/99
PROJECT NO 64995136

2/4 60' HALF STREET SECTION RANCH HOUSE
NOT TO SCALE

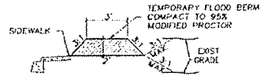


NOTE:
SUBGRADE IS TO CONFORM WITH THE GEOTECHNICAL REPORT PREPARED BY: TERRACON
DATE: 6/17/99
PROJECT NO 64995136

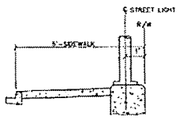
3/4 PAVEMENT SECTION - BLOOMING MEADOWS DRIVE
NOT TO SCALE



4/4 TYPICAL PAVEMENT SECTION
NOT TO SCALE



5/4 FLOOD BERM CROSS SECTION
NOT TO SCALE



TYPICAL STREET LIGHT LOCATION
N.T.S.

STREET LIGHT NOTE:
ALL HAND HOLE COVERS MUST BE INSTALLED, POLE CAPS POURED, AND PULL BOX LIDS BOLTED DOWN PRIOR TO ENERGIZING CIRCUIT. ALL WIRE MUST HAVE THW INSULATION.

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

JAMES D. KELLEY P.E. 6990 — DATE 5/16/03

BASIS OF BEARING

N00°55'40"E BEING THE WEST LINE OF SEC. 27 T.19 S., R.60 E., M.D.M., AS SHOWN ON FINAL MAP OF CENTENNIAL RANCH CONDOMINIUMS, RECORDED IN BOOK 75 PAGE 91 OF PLATS.

BENCHMARK

#1:VSD/27N4, CLV, AL CAP, PLS, 2984, CENTENNIAL PARKWAY AND TENAYA WAY
ELEV 2356.41 NAVD 88

COORDINATE SYSTEM

PROJECT UTILIZES SITE SPECIFIC COORDINATE SYSTEM. POINT N10,000.00, E10,000.00 IS LOCATED AT THE INTERSECTION OF TENAYA AND CENTENNIAL CENTERLINES AS SHOWN ON REGENA PLAN.

KEY NOTES

1. CONSTRUCT TYPE "L" CURB AND GUTTER PER USD #215.
2. CONSTRUCT ROLL TYPE CURB AND GUTTER PER USD #217A.
3. CONSTRUCT 4" THICK SIDEWALK PER USD #234.
4. CONSTRUCT 3" THICK AC PAVING PER SECTION 4 SHEET 4.
5. SAW CUT AND/OR REMOVE EXISTING ASPHALT.
6. REMOVE EXISTING SIDEWALK, CURB AND GUTTER.
7. MATCH EXISTING ASPHALT GRADE AT LINE SHOWN
8. ADJUST UTILITY VAULT TO NEW SIDEWALK GRADE.
9. PROTECT EXISTING LIGHT POLE IN PLACE.
10. INSTALL SIDEWALK UNDER DRAIN PER USD #236.
11. INSTALL 150 WATT HPS LUMINAIRE.
12. INSTALL 1-1/4" CPVC CONDUIT INTERCONNECTS.
13. CONNECT TO EXISTING PULL BOX.
14. INSTALL 8" CROSS.
15. INSTALL 8" CAP W/ 2" B.O. PER UDACS PLATE #4.
16. INSTALL 8"X6" TEE.
17. INSTALL FIRE HYDRANT ASSEMBLY PER UDACS PLATE #7.
18. INSTALL 8" GATE VALVE.
19. INSTALL 10"X6" TAPPING SLEEVE W/ 6" TAPPING VALVE.
20. INSTALL 8"X6" TAPPING SLEEVE W/ 6" TAPPING VALVE.
21. INSTALL #3-1/2 PULL BOX.

LEGEND

19.00 TC / 0.5%	SPOT ELEVATION / SLOPE/FLOW DIRECTION
	LOT LINE, R/W LINE
	ROADWAY CENTER LINE
	EXISTING CONTOURS
	EXISTING IMPROVEMENTS
	PROPOSED IMPROVEMENTS
	FUTURE IMPROVEMENTS
	PROPOSED R/W
	PAVEMENT SAWCUT LINE
	EASEMENT BOUNDARY

ABBREVIATIONS

TC- TOP OF CURB
FG-FINISHED GRADE
BS-BACK OF SIDEWALK
FL-FLOW LINE
HP-HIGH POINT
GB-GRADE BREAK
WM-WATER METER
TW-TOP OF WALL
ES-EDGE OF SIDEWALK
EA-EDGE OF ASPHALT
FS-FACE OF SIDEWALK
F-FUTURE IMPROVEMENT
WV-WATER VALVE

BACK OF CURB LINE TABLE		
LINE	LENGTH	BEARING
L1	399.91	N86°19'44"W
L2	118.63	N00°55'40"E

BACK OF CURB CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C1	92°47'22"	35.50	57.49	37.27
C2	87°55'24"	25.00	38.07	23.83
C3	41°20'46"	25.00	18.04	9.43
C4	180°35'04"	40.50	127.65	7841.18
C5	48°11'43"	20.00	16.82	8.95
C6	275°52'15"	40.50	195.06	36.50
C7	48°10'54"	20.00	16.82	8.94
C8	179°44'25"	20.50	64.31	INFINITE
C9	61°05'32"	19.50	20.79	11.51
C10	151°18'12"	40.50	196.95	158.33
C11	90°00'00"	38.50	60.48	38.50
C12	42°07'35"	19.50	14.34	7.51
C13	35°45'01"	40.50	25.98	13.45

DISCLAIMER NOTE

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Call before you Overhead

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PRIMAS AND ASSOCIATES
CONSULTING ENGINEERS
1091 SOUTH EDMONTON RD, STE 4-4
LAS VEGAS, NEVADA 89118
PH (702) 228-4683
FAX (702) 228-8554

NO	REVISIONS	BY	DATE	APPR.

SCALE (H): 1"=30' N/A
SCALE (V): N/A
DESIGN: M. K.
CHECKED: M. K.
DATE: 05/05/03

MONTECITO COMPANIES, L.L.C.
MONTECITO EAST COMMERCIAL SUBDIVISION
OFFSITE ROADWAY IMPROVEMENTS

RECOMMENDED BY:
JAMES D. KELLEY
No. 15693
5/16/03
JAMES D. KELLEY, P.E.
R.P.E. NO. 15693

SHEET 4 OF 5
711.01114
C.V. DRAWING # 1674-4150

52799

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(Project site

REGIONAL FLOOD CONTROL DISTRICT

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-19
FLOOD CONTROL FACILITIES

LEGEND

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

Remove & Replace/Parallel Facilities

Category A	Category B
Channel	Channel
Stormdrain	Stormdrain
Crossing	Crossing

FIGURE C
1 of 2

N

0 500 1,000 2,000 3,000
Feet
Scale: 1 inch = 2,000 feet
Refer to Figure G-2 for Aerial Source(s)

US95 I-15 I-215

1	2	3					
4	5	6					
	7	8	9	10			
11	12	13	14	15	16	17	
	18	19	20	21	22	23	
	24	25	26	27	28		
	29	30	31	32	33	34	
	35	36	37	38	39	40	
	41	42	43	44	45	46	
	47	48	49	50	51	52	
	53	54	55	56			
	57	58	59				

PBS&J
PB

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
ANRB		ANN ROAD CHANNEL WEST - RAINBOW						
0000	P1	10' X 7' RCB	1320	721	CNW2B5-C	WEST3	0.99	0.40
ANWE		ANN ROAD CHANNEL WEST						
0245	E	10' X 9' RCB	1721	993	CNW2D1-C	WEST3	6.84	0.80
0279	E	10' X 9' RCB	553	743	2CNW2B5C	WEST3	6.37	0.80
0290	E	8' X 8' RCB	2050	743	2CNW2B5C	WEST3	6.37	0.70
0327	E	6' X 6' RCB	2360	161	RCHOOT	WEST3	5.38	0.87
0371	E	6' X 6' RCB	760	161	RCHOOT	WEST3	5.38	0.34
0385	E	54" RCP	1950	161	RCHOOT	WEST3	5.38	1.17
CNWE		CENTENNIAL PKWY CHANNEL WEST						
0150	P2	Conc Chnl 42'W 10'D 0:1 SS	720	4233	CNW3B3-C	WEST3	5.64	0.40
0173	P2	42' X 10' RCBC @ Torrey Pines	190	4233	CNW3B3-C	WEST3	5.64	0.40
0176	P2	Conc Chnl 32'W 12'D 0:1 SS	795	4233	CNW3B3-C	WEST3	5.64	0.40
0189	P2	Conc Chnl 32'W 10'D 0:1 SS	1845	4067	CNW2D4-C	WEST3	5.15	0.54
0226	P2	Conc Chnl 12'W 12'D 2:1 SS	1165	4067	CNW2D4-C	WEST3	5.15	1.00
0251	P2	Conc Chnl 12'W 12'D 2:1 SS	1135	3951	CNW2D3-C	WEST3	4.65	0.59
0271	P2	Conc Chnl 32'W 10'D 0:1 SS	185	3951	CNW2D3-C	WEST3	4.65	0.59
0274	E	32' X 10' RCBC @ Tenaya	130	3951	CNW2D3-C	WEST3	4.65	0.45
0277	P2	Conc Chnl 13'W 10'D 2:1 SS	590	3951	CNW2D3-C	WEST3	4.65	0.45
0287	P2	Conc Chnl 13'W 10'D 2:1 SS	605	3593	CNW2B2-C	WEST3	3.84	1.19
0301	P2	Conc Chnl 32'W 10'D 0:1 SS	235	3593	CNW2B2-C	WEST3	3.84	1.19
0304	P2	32' X 10' RCB	6510	3593	CNW2B2-C	WEST3	3.84	1.75
GO95		GOWAN OUTFALL - U.S. 95 CHANNEL						
0000	P1	Conc Chnl 12'W 4'D 2:1 SS	2640	299	GD17BG-C	ALLGOW3	0.36	0.30
0050	P1	Conc Chnl 12'W 4'D 2:1 SS	2450	299	GD17BG-C	ALLGOW3	0.36	0.30
GOA2		GOWAN OUTFALL - ALEXANDER BRANCH						
0000	P1	8' X 5' RCB	2281	523	CPT41-C	ALLGOW3	0.61	0.90
GOAL		GOWAN OUTFALL - ALEXANDER ROAD FACILITIES						
0111	P1	10' X 8' RCB	3000	880	CPT2B2	ALLGOW3	2.28	0.83
0168	P1	10' X 8' RCB	4200	880	CPT2B2	ALLGOW3	2.28	0.50
0247	P1	Conc Chnl 12'W 5.5'D 2:1 SS	2640	757	CGD20BMC	ALLGOW3	1.98	0.30
GOBU		GOWAN NORTH - BUFFALO BRANCH						
0000	E	2: 12' X 6' RCB	1705	961	CGD14CBC	ALLGOW3	2.53	0.20
0032	E	2: 12' X 5' RCB	1248	850	CGD14AAC	ALLGOW3	2.30	0.25
0058	E	2: 11' X 4' RCB	1398	745	CGD17AAC	ALLGOW3	1.90	0.25
0085	E	11' X 5' RCB	1266	614	CGD17ABC	ALLGOW3	1.52	0.25
0112	P1	8' X 6' RCB	1535	484	CGD20ABC	ALLGOW3	1.15	0.54
0136	P1	7' X 6' RCB	1400	344	CGD20AAC	ALLGOW3	0.76	0.36
GOBW		GOWAN BELTWAY WEST						
0000	E	48" RCP	2527	116	LMBWDB	ALLGOW4	10.68	4.37
0048	E	72" RCP	131	116	LMBWDB	ALLGOW4	10.68	2.21
0051	P2	72" RCP Outlet	1508	116	LMBWDB	ALLGOW4	10.68	0.30
0052	P2	589 ac-ft Lone Mountain-Beltway Detention Basin		5140	CLMBW1	GW3SC	3.50	
0082	P2	51,400 cfs PMF Spillway		51400	CLMBW1	GW3SC	3.50	
0096	P1	8' X 8' RCB Connector Pipe Under Beltway	839	5140	CLMBW1	GW3SC	3.50	0.30
0097	P2	54" RCP	394	525	UVB1-2	ALLGOW3	0.34	8.09
0106	P2	8' X 8' RCB Connector Pipe Under Lone Mountain	697	5140	CLMBW1	GW3SC	3.50	0.30
0128	P2	Conc Chnl 20'W 10'D 0:1 SS	190	3429	CWRBW1	ALLGOW3	6.06	25.00
0132	P2	Conc Chnl 14'W 10'D 0:1 SS	1286	2869	CHLBW1-C	GW3SC	1.84	5.00
0156	P2	Conc Chnl 16'W 10'D 0:1 SS	221	2869	CHLBW1-C	GW3SC	1.84	1.05
0160	P2	16' X 8' RCB	1230	2869	CHLBW1-C	GW3SC	1.84	1.05
GOBX		GOWAN BOX CANYON						
0000	P2	66" RCP	794	753	LWBW1	ALLGOW3	0.48	9.45
GODU		GOWAN NORTH - DURANGO BRANCH						
0000	E	12' X 6' RCB	2629	1150	CLV14-C	ALLGOW3	1.40	0.91
0050	E	9' X 6' RCB	865	835	CLV20-C	ALLGOW3	0.97	1.50
GOEC		GOWAN NORTH - EL CAPITAN BRANCH						
0000	P1	10' X 7' RCB	1445	1233	CLWFR-C	ALLGOW3	2.20	1.36
0026	P1	10' X 8' RCB	1320	1162	CWRJS-C	ALLGOW3	1.95	0.91
0051	P1	10' X 7' RCB	1320	1027	CHLFR-C	ALLGOW3	1.69	1.06
0076	P1	10' X 6' RCB	1320	894	CARFR-C	ALLGOW3	1.45	1.06

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
GOEC		GOWAN NORTH - EL CAPITAN BRANCH						
0100	P1	10' X 6' RCB	1320	745	CEAFR-C	ALLGOW3	1.21	0.76
0126	P1	10' X 7' RCB	1320	635	CTRFR-C	ALLGOW3	0.96	0.38
0152	P1	7' X 6' RCB	1320	485	CARFP-C	ALLGOW3	0.70	0.77
0176	P1	78" RCP	1320	363	CCPFR-C	ALLGOW3	0.46	1.15
GOL2		GOWAN LONE MOUNTAIN SYSTEM-BRANCH 2						
0000	E	5' X 4' RCB	150	461	CRBW	ALLGOW3	0.44	14.60
0003	E	66" RCP	607	461	CRBW	ALLGOW3	0.44	1.97
0014	E	84" RCPC @ Alexander	125	461	CRBW	ALLGOW3	0.44	4.00
GOLM		GOWAN LONE MOUNTAIN SYSTEM						
0000	E	78" RCP	2590	345	CLV15-C	ALLGOW4	11.88	1.80
0049	E	6' X 5' RCB	585	345	CLV15-C	ALLGOW4	11.88	1.87
0060	E	66" RCP	817	345	CLV15-C	ALLGOW4	11.88	2.40
0075	E	60" RCP	1385	345	CLV15-C	ALLGOW4	11.88	2.55
0101	E	54" RCP	701	190	LMTNDB	ALLGOW4	11.52	1.74
0115	E	48" RCP	1799	190	LMTNDB	ALLGOW4	11.52	3.08
0140	E	42" RCP	439	190	LMTNDB	ALLGOW4	11.52	1.60
0142	E	48" RCP	348	190	LMTNDB	ALLGOW4	11.52	2.14
0144	E	66" RCP	196	190	LMTNDB	ALLGOW4	11.52	5.44
0145	E	66" RCP Outlet	378	190	LMTNDB	ALLGOW4	11.52	0.90
0146	E	888 ac-ft Lone Mountain Detention Basin		7252	LMTNIN	GW3SC	6.13	
0147	E	36,000 cfs PMF Spillway		36000	LMTNIN	GW3SC	6.13	
0150	E	Drop Structure	481	6323	CGABW	GW3SC	5.12	
0162	E	28' X 8' RCBC @ Hualapai	625	6323	CGABW	GW3SC	5.12	1.86
0174	E	Conc Chnl 28'W 8'D 0:1 SS	2715	6173	CCLMT5	GW3SC	4.92	3.20
GOLO		GOWAN OUTFALL - LONE MTN. ROAD BRANCH						
0275	P1	8' X 6' RCB	3000	590	CPT3AA2	ALLGOW3	1.16	0.77
GONO		GOWAN NORTH SYSTEM						
0000	E	8' X 8' RCB Outlet	184	558	GWNNDB	ALLGOW5	68.49	0.51
0001	E	8' X 8' RCB Outlet	156	558	GWNNDB	ALLGOW5	68.49	0.63
0006	E	30,780 cfs PMF Spillway		30780	GWNNDB	ALLGOW5	68.49	
0008	E	921 ac-ft Gowan North Detention Basin		4937	CCLV43-C*	GW4SC	11.93	
0009	E	3: 13' X 8' RCB	1662	4937	CCLV43-C	GW4SC	11.93	0.62
0012	E	Conc Chnl 30'W 8'-9.5'D 0:1 SS	2665	4117	CCLV36-C	GW4SC	8.54	1.18
0062	E	Bridge 30'W 8.5'D @ Cimarron	80	3844	CCLV15-C	GW4SC	8.03	0.30
0063	E	Conc Chnl 30'W 8.5'-10'D 0:1 SS	2302	3844	CCLV15-C	GW4SC	8.03	1.00
0110	E	2: 12' X 8' RCAC @ Alexander	547	3352	CCRSFR-C*	GW3SC	6.10	1.00
0117	E	2: 12' X 8' RCAP	424	3352	CCRSFR-C*	GW3SC	6.10	1.10
0124	E	Conc Chnl 24'W 9'D 0:1 SS	887	3352	CCRSFR-C*	GW3SC	6.10	1.36
0141	E	Conc Chnl 24'W 9'-10.5'D 0:1 SS	2064	3352	CCRSFR-C	GW3SC	6.10	0.59
0181	E	Bridge 30'W 7'D @ Craig	142	2846	CRSFR-C	GW3SC	5.20	0.65
0183	E	Conc Chnl 22'W 8'-10.6'D 0:1 SS	2193	2846	CRSFR-C	GW3SC	5.20	0.72
0225	E	Conc Chnl Width Varies Depth Varies 0:1 SS	508	2605	CCLWFR-C	GW3SC	4.54	1.05
0230	E	13' X 5' RCB	256	1486	CCWRHW-C	GW3SC	2.34	2.78
0234	E	12' X 6' RCB	2010	1486	CCWRHW-C	GW3SC	2.34	1.67
0272	E	10' X 6' RCB	2797	1486	CCWRHW-C	GW3SC	2.34	3.15
0325	E	15' X 7' RCB	291	1486	CCWRHW-C	GW3SC	2.34	1.79
0335	E	15' X 7' RCB	529	1486	CWRHW-C	ALLGOW3	2.34	1.79
0350	P1	10' X 9' RCB	3473	1486	CWRHW-C	ALLGOW3	2.34	0.88
0411	P1	10' X 9' RCB	1320	1404	CARHW-C	ALLGOW3	1.89	0.76
0436	P1	10' X 7' RCB	1320	1173	CEAHW-C	ALLGOW3	1.53	1.14
0461	P1	10' X 9' RCB	1320	959	CTRHW-C	ALLGOW3	1.22	0.38
0486	P1	8' X 7' RCB	1320	747	CADHW-C	ALLGOW3	0.90	0.76
0511	P1	7' X 6' RCB	1320	546	CCPHW-C	ALLGOW3	0.60	1.14
GOOF		GOWAN OUTFALL FACILITIES						
0511	E	8' X 5' RCB	8390	699	CPT6B-C	GW3SC	1.08	0.50
0531	E	8' X 5' RCB	1300	558	GWNNDB	ALLGOW5	68.49	0.50
0551	E	72" RCP	524	558	GWNNDB	ALLGOW5	68.49	0.62
0773	E	60" RCP	803	286	LV30-C	ALLGOW3	0.42	1.40
0775	E	60" RCP	1300	286	LV30-C	ALLGOW3	0.42	1.00

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
RCHB		RANCHO ROAD SYSTEM - BELTWAY						
0000	E	2: 12' X 8.5' RCAP	1700	2631	CNW1C-W	WEST3	4.68	0.63
0034	E	Conc Chnl 21'W 8'D 0:1 SS	1000	2631	CNW1C-W	WEST3	4.68	1.19
0053	E	2: 12' X 8' RCBC @ South Ramp Connector	85	2304	CDW1C1	WEST3	4.31	1.40
0054	E	Conc Chnl 21'W 8'D 0:1 SS	432	2304	CDW1C1	WEST3	4.31	1.51
0062	E	Transition Structure	130	2304	CDW1C1	WEST3	4.31	1.51
0065	E	24' X 7' RCB	480	2304	CDW1C1	WEST3	4.31	0.30
0074	E	24' X 6' RCB	50	2226	CNWBC6-C	WEST3	4.17	0.30
0075	E	20' X 6' RCBC @ Beltway	428	2226	CNWBC6-C	WEST3	4.17	2.81
0083	P2	20' X 6' RCB	950	2226	CNWBC6-C	WEST3	4.17	2.49
0101	P2	Conc Chnl 20'W 7'D 0:1 SS	980	2226	CNWBC6-C	WEST3	4.17	2.38
0120	E	20' X 6' RCBC @ Grand Montecito	120	2226	CNWBC6-C	WEST3	4.17	1.00
0122	P2	Conc Chnl 16'-20'W 6'D 0:1 SS	350	2226	CNWBC6-C	WEST3	4.17	1.84
0130	P2	Conc Chnl 16'W 6'D 0:1 SS	1012	2226	CNWBC6-C	WEST3	4.17	2.67
RCHO		RANCHO ROAD SYSTEM						
0000	E	60" RCP with 36" Orifice Plate	1183	161	RCHODB	WEST3	5.38	0.74
0025	E	321 ac-ft Rancho Road Detention Basin		3115	RCHOIN	WEST3	5.38	
0027	E	18,000 cfs PMF Spillway		18000	RCHOIN	WEST3	5.38	
0050	E	Energy Dissipator	90	402	CNW1A4-C	WEST3	0.51	
0052	E	Conc Chnl 10'W 10'D 0:1 SS	115	402	CNW1A4-C	WEST3	0.51	11.43
0054	E	10' X 5' RCB	128	402	CNW1A4-C	WEST3	0.51	0.50
0056	E	10' X 5' RCB	815	402	CNW1A4-C	WEST3	0.51	0.47
0071	E	72" RCP	3140	402	CNW1A4-C	WEST3	0.51	1.80

The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.

*** As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.*

^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e., HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).

REGIONAL FLOOD CONTROL DISTRICT

2008 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY
FIGURE F - 19

LEGEND

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

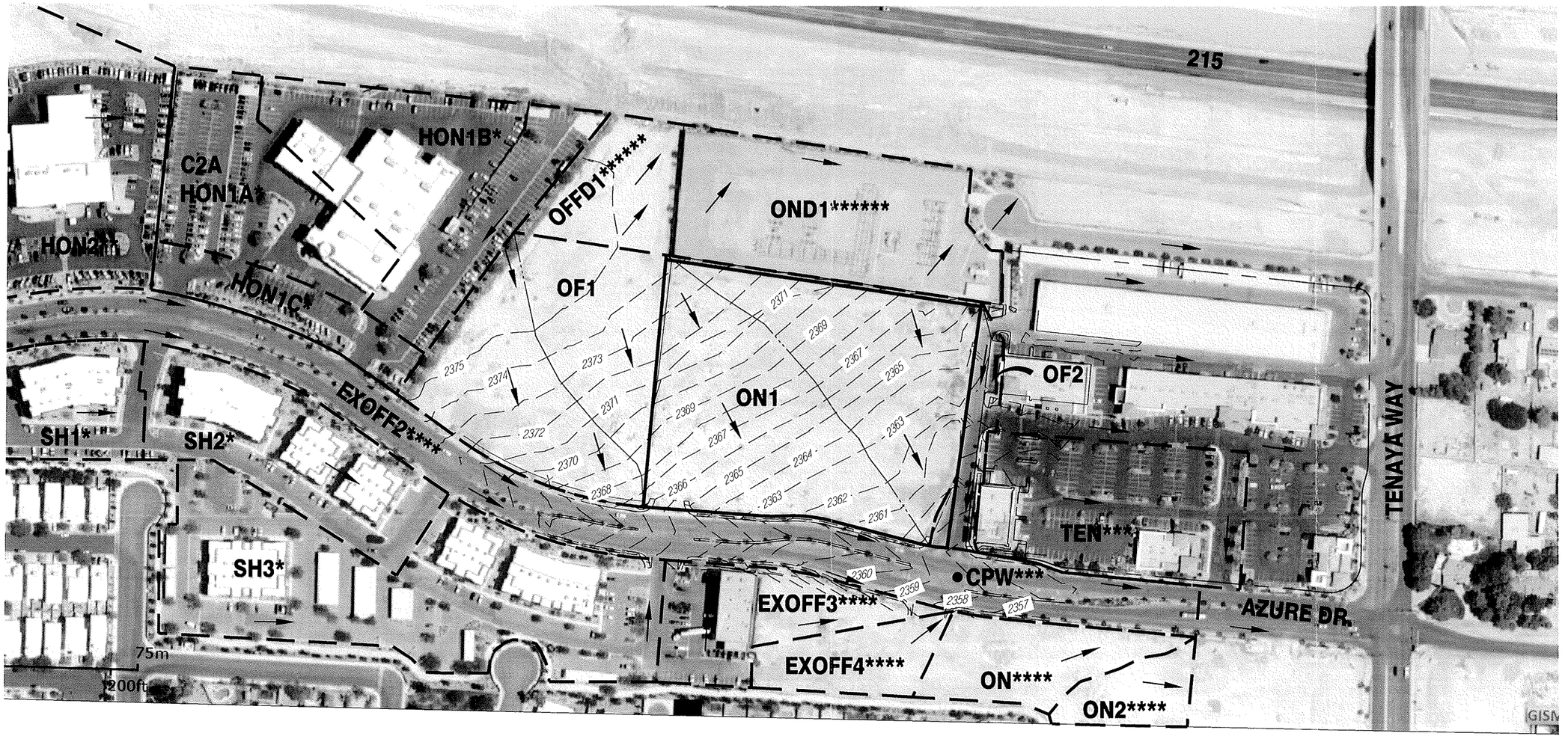
Existing Facility..... E
Proposed or Modified Facility..... P
Contingency Level
Category B..... P0
Master Plan..... P1
Preliminary Design..... P2
Design..... P3

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

Construction Features

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

PBS&J
PB



VICINITY MAP - NOT TO SCALE

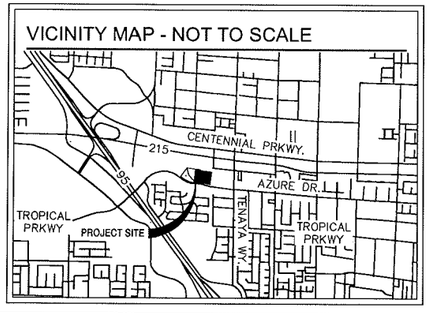


Table 1: Summary of Existing Condition Flow Rates

Basin ID/ Concentration Point	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
ON1	5.39	10	4
OF1	3.54	4	1
OF2	0.52	2	1
CPW*	N/A	171	72

*Tenaya Commercial Study, CPW = 169/70 cfs, EXOFF1 = 14/4 = Q100/Q10 cfs
EXOFF1 = ON1 + OF1 + OF2 = 16/6 = Q100/Q10 cfs,
increase of 2/2 cfs to CPW = 171/72 cfs

LEGEND

	SUBBASIN BOUNDARY
→	FLOW DIRECTION
●	COMBINATION POINT
ON 1	SUBBASIN ID

OFFSITE SUBBASIN
*REFERENCED FROM SHEA COMM.-TENAYA
**REFERENCED FROM FINDLAY-SHACK HONDA
***REFERENCED FROM TENAYA VILLIAGE PH. I
****REFERENCED FROM O'CONNEL COMM.-TENAYA
*****REFERENCED FROM REGENA SUBSTATION

SCALE: 1" = 200'

200' 100' 0 200'

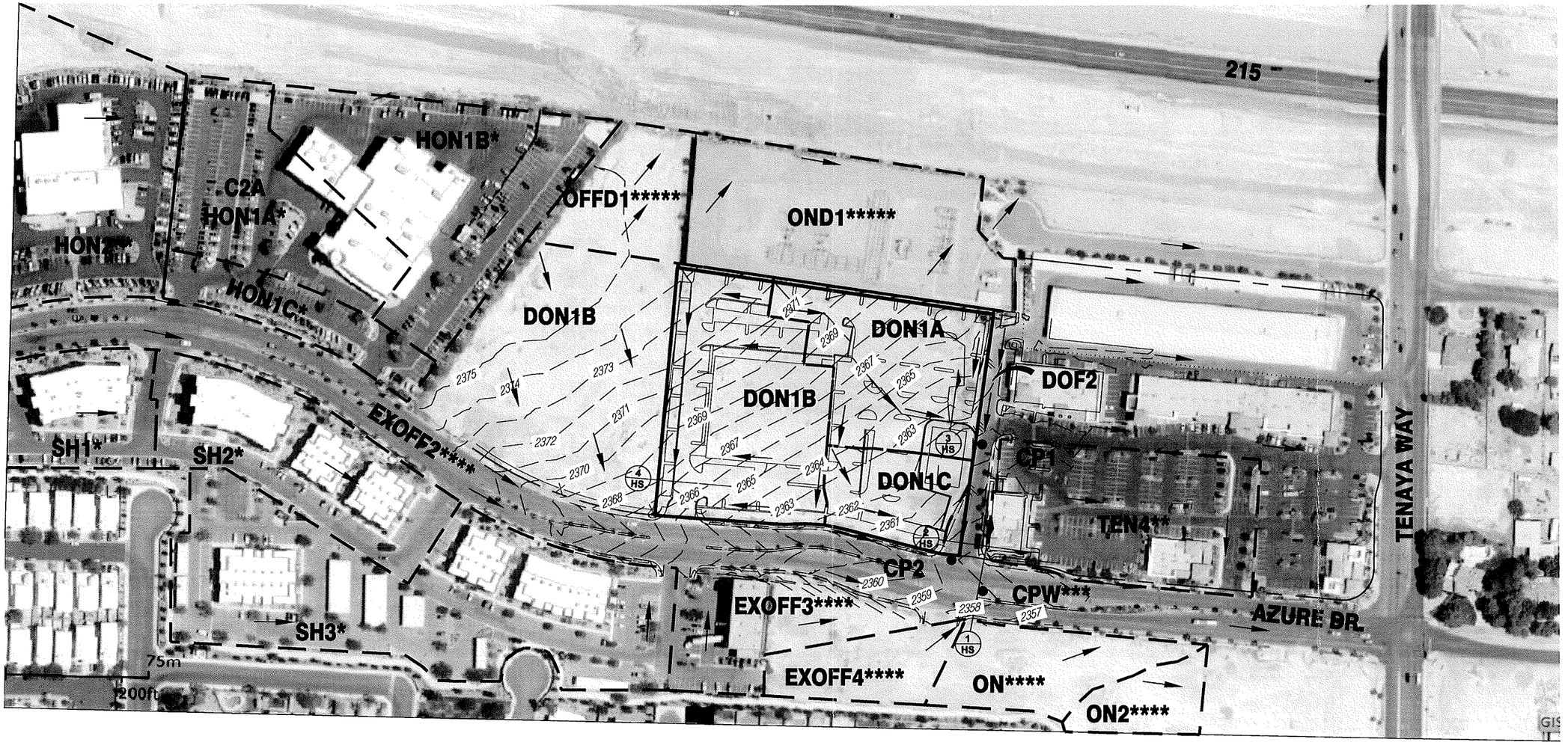
RIETZ CONSULTING INC.
5740 SOUTH ARVILLE STREET, #206
LAS VEGAS, NEVADA 89118
PH:702.521.3355 FX:702.212.3963

THE COLLISION CENTER

CENTENNIAL PROPERTY, LLC.
EXISTING CONDITION

DATE: 11-09-12
DRAFTER: MRL
DESIGNER: MRL
CHECKED: MRL

EXHIBIT
E



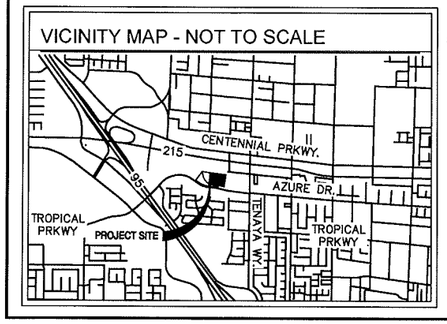


Table 2: Summary of Proposed Condition Flow Rates

Basin ID/ Concentration Point	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
DON1A	1.93	6	3
DOF2	0.52	2	1
CP1 (DON1A+DOF2)	N/A	8	4
DON1C	0.84	3	1
CP2 (CP1+DON1C)	N/A	11	5
DOF1	3.54	10	5
DON1B	2.61	9	4
CPW*	N/A	228	115

*Tenaya Commercial Study, CPW = 224 cfs, EXOFF1 = 26/13 = Q100/Q10 cfs
EXOFF1 = ON1 + OF1 + OF2 = 30/14 = Q100/Q10 cfs,
increase of 4/1 cfs to CPW = 228/15 cfs

LEGEND

- SUBBASIN BOUNDARY
- FLOW DIRECTION
- COMBINATION POINT
- DON1A — SUBBASIN ID
- (1) — FLOWMASTER SECTION

OFFSITE SUBBASIN
*REFERENCED FROM SHEA COMM.-TENAYA
**REFERENCED FROM FINDLAY-SHACK HONDA
***REFERENCED FROM TENAYA VILLIAGE PH. I
****REFERENCED FROM O'CONNEL COMM.-TENAYA
*****REFERENCED FROM REGENA SUBSTATION

SCALE: 1" = 200'

200' 100' 0 200'

RIETZ CONSULTING INC.
5740 SOUTH ARVILLE STREET, #206
LAS VEGAS, NEVADA 89118
PH:702.521.3355 FX:702.212.3963

THE COLLISION CENTER

CENTENNIAL PROPERTY, LLC.
PROPOSED CONDITION

DATE: 11-09-12
DRAFTER: MRL
DESIGNER: MRL
CHECKED: MRL

EXHIBIT F

200005 1/2

00661

PARCEL MAP

A DIVISION OF PARCEL 2 AS SHOWN ON FILE 97, PAGE 42 OF PARCEL MAPS
LOCATED IN THE NORTH WEST QUARTER (NW1/4) OF SECTION 27, TOWNSHIP 19 SOUTH,
RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.
A.P.N. 125-27-101-023

OWNER'S CERTIFICATE AND DEDICATION

WE, CENTENNIAL 95 LIMITED PARTNERSHIP, A NEVADA LIMITED PARTNERSHIP BY: LAGUNA CONSULTANTS, L.L.C. AS ITS GENERAL PARTNER, DO HEREBY CERTIFY THAT, BEING THE OWNERS OF THE LAND SUBDIVIDED WITHIN THE BOUNDARY SHOWN HEREON, CONSENT TO THE PREPARATION AND RECORDATION OF THIS PARCEL MAP AND HAVE CAUSED THE LAND TO BE SURVEYED AND PLATTED INTO PARCELS, STREETS, AND EASEMENTS AS SHOWN HEREON, AND DO HEREBY OFFER AND DEDICATE TO THE CITY OF LAS VEGAS, ITS SUCCESSORS AND ASSIGNS, EASEMENTS AND RIGHTS OF WAY AS SHOWN HEREON, FOR THE CONSTRUCTION AND MAINTENANCE OF SURFACE AND SUBTERRANEAN UTILITIES, AND SUCH GRADING AND DRAINAGE AS REQUIRED PER N.R.S. 278.010 TO 278.30 AND IN CONFORMANCE WITH FLOOD CONTROL DIVISION REQUIREMENTS.

DATED THIS 4 DAY OF MAY, 2000
CENTENNIAL 95 LIMITED PARTNERSHIP, A NEVADA LIMITED PARTNERSHIP

BY FRANK NIELSEN, CO-MANAGER, LAGUNA CONSULTANTS, L.L.C., ITS GENERAL PARTNER

ACKNOWLEDGMENT

STATE OF NEVADA)
S.S.
COUNTY OF CLARK)

THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME ON THIS 4 DAY OF MAY, 2000
BY FRANK NIELSEN AS CO-MANAGER OF
LAGUNA CONSULTANTS, L.L.C., GENERAL PARTNER OF
CENTENNIAL 95 LIMITED PARTNERSHIP, A NEVADA LIMITED PARTNERSHIP

Lorraine A. Wisner
NOTARY PUBLIC
MY COMMISSION EXPIRES: April 30, 2003

Notary Public-State Of Nevada
COUNTY OF CLARK
LORRAINE A. WISNER
My Appointment Expires
April 30, 2003
No. 92-0378-1

SURVEYOR'S CERTIFICATE

I, EDWARD F. VINCENT, A PROFESSIONAL LAND SURVEYOR IN THE STATE OF NEVADA, AS AGENT FOR PRIMAS AND ASSOCIATES, DO HEREBY CERTIFY THAT:

1. THIS PLAT REPRESENTS THE RESULTS OF A SURVEY CONDUCTED UNDER MY DIRECT SUPERVISION AT THE INSTANCE OF THE CENTENNIAL 95 LIMITED PARTNERSHIP.

2. THE LANDS SURVEYED LIE WITHIN THE NORTHWEST QUARTER (NW 1/4) OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK, COUNTY, NEVADA, AND THE SURVEY WAS COMPLETED ON THE 3RD DAY OF MAY, 2000.

3. THIS MAP COMPLIES WITH THE APPLICABLE STATE STATUTES AND ANY LOCAL ORDINANCES IN EFFECT ON THE DATE THAT THE GOVERNING BODY GAVE ITS FINAL APPROVAL.

4. THE MONUMENTS DEPICTED ON THE PLAT ARE OF THE CHARACTER SHOWN, OCCUPY THE POSITIONS INDICATED AND ARE OF SUFFICIENT NUMBER AND DURABILITY.

STATE OF NEVADA
EDWARD F. VINCENT
5-3-00
No. 9003

EDWARD F. VINCENT
PROFESSIONAL LAND SURVEYOR
NEVADA CERTIFICATE NO. 9003

CITY SURVEYOR'S CERTIFICATE

PAUL H. SULLIVAN, ASST. CITY SURVEYOR OF THE CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, DO HEREBY CERTIFY THAT ON THIS 11 DAY OF MAY, 2000, I DID EXAMINE THIS PARCEL MAP AND THAT IT IS TECHNICALLY CORRECT AND THAT ALL OF THE CONDITIONS OF APPROVAL HAVE BEEN SATISFIED.

Paul H. Sullivan
PAUL H. SULLIVAN P.L.S. 9886
ASST. CITY SURVEYOR
CITY OF LAS VEGAS

LEGEND

- ● FOUND MONUMENT (AS NOTED)
- ○ FOUND REBAR W/CAP-PLS 5088
- ◉ SET REBAR W/ ALUMINUM CAP - PLS 12463
- ▣ SET REBAR W/ ALUMINUM CAP - PLS 9003
- (R) RADIAL BEARING
- ROW RIGHT-OF-WAY
- APN ASSESSOR'S PARCEL NUMBER
- BOUNDARY LINE
- PARCEL LINE
- CENTER LINE
- RIGHT-OF-WAY LINE
- SECTION LINE

CITY OF LAS VEGAS
DEPARTMENT OF PUBLIC WORKS
NEVADA

PLANNING & DEVELOPMENT APPROVAL

THIS IS TO CERTIFY THAT THE DEPARTMENT OF PLANNING AND DEVELOPMENT OF THE CITY OF LAS VEGAS, NEVADA, ON THIS 11th DAY OF MAY, 2000 DID APPROVE FOR THE PURPOSES OF LAND DIVISION AND ACCEPT IN BEHALF OF THE PUBLIC, THIS MAP AND ANY PARCELS OF LAND OFFERED FOR DEDICATION FOR THE PUBLIC USE IN CONFORMITY WITH THE TERMS OF THE OFFER OF DEDICATION PER N.R.S. 278.010 THROUGH 278.630 INCLUSIVE.

W.T. Chow 5-11-2000
W.T. CHOW
DIRECTOR OF PLANNING AND DEVELOPMENT
CITY OF LAS VEGAS, NEVADA

CURVE TABLE				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
C1	700.00'	113.12'	56.68'	9°15'32"
C2	700.00'	128.28'	64.32'	10°30'00"
C3	655.00'	9.81'	4.91'	0°51'30"
C4	700.00'	10.49'	5.24'	0°51'30"

REFERENCE MAPS

1) PARCEL MAP FILE 97, PAGE 42

THIS MAP IS SUBJECT TO AN EASEMENT TO THE SOUTHWEST GAS CORPORATION, OVER, ACROSS AND UNDER THOSE PORTIONS OF THOSE PUBLIC RIGHTS-OF-WAY AS RESERVED BY THE CITY OF LAS VEGAS, IN THE ORDER OF VACATION (VAC-24-99)

BASIS OF BEARING:

N 00°51'56"E BEING THE EAST LINE OF NW 1/4 OF SEC. 27 T.19 S., R.60 E., M.D.M., AS SHOWN ON PARCEL MAP, RECORDED IN FILE 97, PAGE 42.

RECORDER'S NOTE

ANY SUBSEQUENT CHANGES TO THIS MAP SHOULD BE EXAMINED AND MAY BE DETERMINED BY REFERENCE TO THE COUNTY RECORDER'S CUMULATIVE MAP INDEX N.R.S. 278.5695.

PM-15-00

SHEET 1 OF 1

PARCEL MAP

A DIVISION OF PARCEL 2 AS SHOWN ON FILE 97, PAGE 42 OF PARCEL MAPS
LOCATED IN THE NORTHWEST QUARTER (NW1/4) OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

PRIMAS AND ASSOCIATES
CONSULTING ENGINEERS
1091 SOUTH CIMARRON RD, STE A-3, LAS VEGAS, NEVADA 89128
(702) 228-8183 FAX(702) 228-8194

FILE NO. 00661
FILED AT THE REQUEST OF PRIMAS AND ASSOCIATES
DATE 5-12-2000 AT 11:16
FILE 98 PAGE 5
OF PARCEL MAPS
OFFICIAL RECORDS BOOK NO. 200005 1/2
CLARK COUNTY, NEVADA RECORDS
JUDITH A. VANDEVER, RECORDER
FEE 17.00 DEPUTY KB

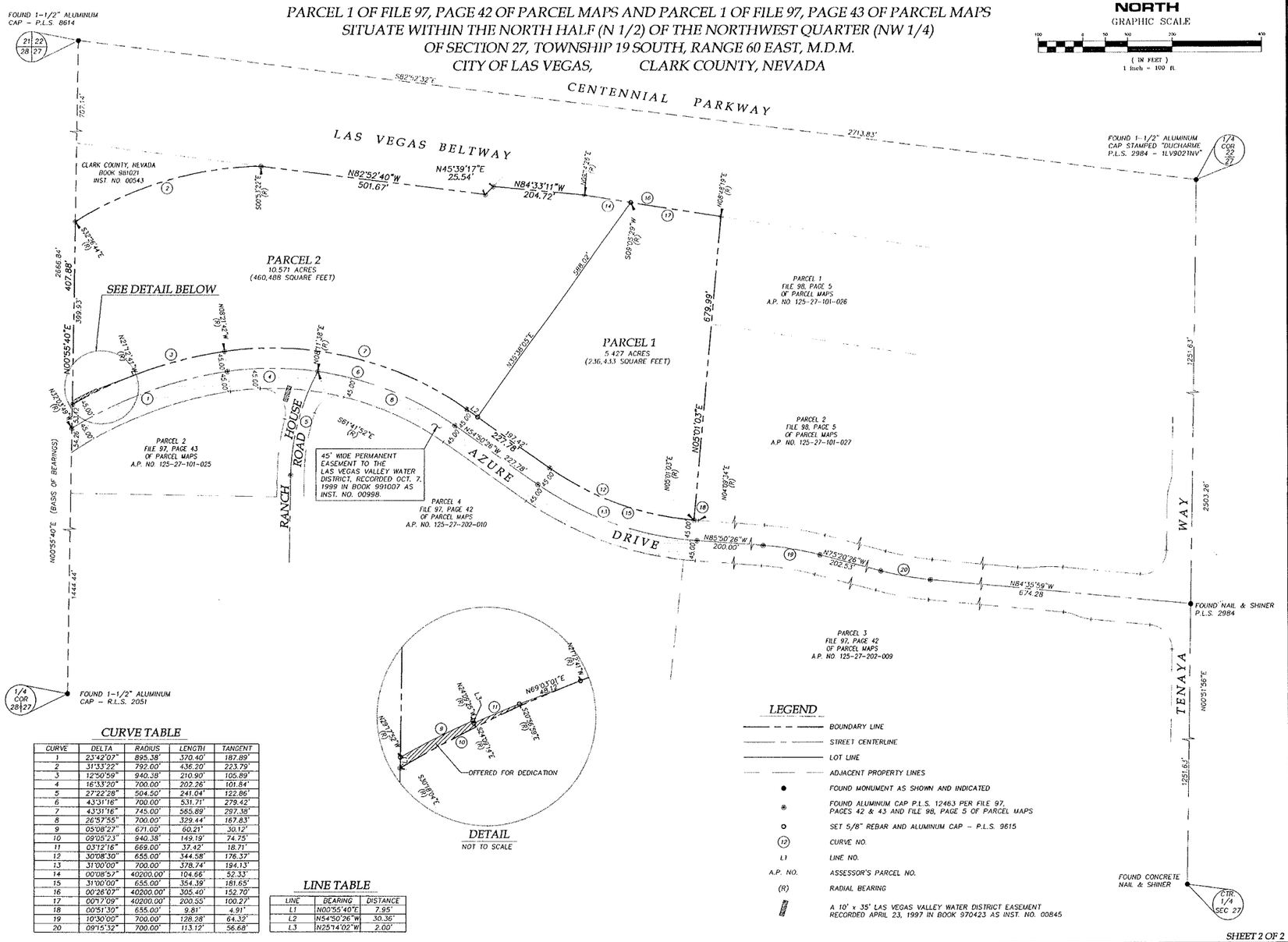
FILE 98 PAGE 5

MERGER AND RESUBDIVISION

OF

PARCEL 1 OF FILE 97, PAGE 42 OF PARCEL MAPS AND PARCEL 1 OF FILE 97, PAGE 43 OF PARCEL MAPS
SITUATE WITHIN THE NORTH HALF (N 1/2) OF THE NORTHWEST QUARTER (NW 1/4)
OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M.
CITY OF LAS VEGAS, CLARK COUNTY, NEVADA

NORTH
GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.



CURVE TABLE

CURVE	DELTA	RADIUS	LENGTH	TANGENT
1	23°42'07"	895.38'	370.40'	187.89'
2	31°33'22"	792.00'	436.20'	223.79'
3	12°50'59"	940.38'	210.90'	105.89'
4	16°33'20"	700.00'	202.26'	101.84'
5	27°22'28"	504.50'	241.04'	122.86'
6	43°31'16"	700.00'	531.71'	279.42'
7	43°31'16"	745.00'	565.89'	297.38'
8	26°57'55"	700.00'	329.44'	167.83'
9	05°08'27"	671.00'	60.21'	30.12'
10	09°05'23"	940.38'	149.19'	74.75'
11	03°12'16"	669.00'	37.42'	18.71'
12	30°08'30"	655.00'	344.58'	176.37'
13	31°00'00"	700.00'	378.74'	194.13'
14	00°08'57"	40200.00'	104.66'	52.33'
15	31°00'00"	655.00'	354.39'	181.65'
16	00°26'07"	40200.00'	305.40'	152.70'
17	00°17'09"	40200.00'	200.55'	100.27'
18	00°51'30"	655.00'	9.81'	4.91'
19	10°30'00"	700.00'	128.28'	64.32'
20	09°15'32"	700.00'	113.12'	56.68'

LINE TABLE

LINE	BEARING	DISTANCE
L1	N00°55'40"E	7.95'
L2	N54°50'26"W	30.36'
L3	N25°14'02"W	2.00'

DETAIL
NOT TO SCALE

LEGEND

- BOUNDARY LINE
- STREET CENTERLINE
- LOT LINE
- ADJACENT PROPERTY LINES
- ● FOUND MONUMENT AS SHOWN AND INDICATED
- ⊛ FOUND ALUMINUM CAP P.L.S. 12463 PER FILE 97, PAGES 42 & 43 AND FILE 98, PAGE 5 OF PARCEL MAPS
- ○ SET 5/8" REBAR AND ALUMINUM CAP - P.L.S. 9615
- (12) CURVE NO.
- L1 LINE NO.
- A.P. NO. ASSESSOR'S PARCEL NO.
- (R) RADIAL BEARING
- A 10' x 35' LAS VEGAS VALLEY WATER DISTRICT EASEMENT RECORDED APRIL 23, 1997 IN BOOK 970423 AS INST. NO. 00845

SHEET 2 OF 2

FILE 101 PAGE 0091

MERGER AND RESUBDIVISION
OF
PARCEL 1 OF FILE 97, PAGE 42 OF PARCEL MAPS AND PARCEL 1 OF FILE 97, PAGE 43 OF PARCEL MAPS
SITUATE WITHIN THE NORTH HALF (N 1/2) OF THE NORTHWEST QUARTER (NW 1/4)
OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M.
CITY OF LAS VEGAS, CLARK COUNTY, NEVADA

OWNER'S CERTIFICATE

NTC HOLDING TRUST NO. 70-2000, DOES HEREBY CERTIFY THAT, BEING THE OWNER OF THE LAND SUBDIVIDED WITHIN THE BOUNDARY SHOWN HEREON, DOES CONSENT TO THE PREPARATION AND RECORDATION OF THIS MAP AND HAS CAUSED THE LAND TO BE SURVEYED AND PLATTED INTO PARCELS, AND DOES HEREBY OFFER AND DEDICATE TO THE CITY OF LAS VEGAS, IT SUCCESSORS AND ASSIGNS, STREETS AS SHOWN HEREON TO AND FOR THE USE OF THE PUBLIC AND EASEMENTS AS SHOWN HEREON FOR THE CONSTRUCTION AND MAINTENANCE OF SURFACE AND SUBTERRANEAN UTILITIES AND SUCH GRADING AND DRAINAGE AS REQUIRED PER N.R.S. 278.020 TO 278.630 AND IN CONFORMANCE WITH FLOOD CONTROL DIVISION REQUIREMENTS.

NTC HOLDING TRUST NO. 70-2000

BY: _____ 12-26-01
CHARLES T. COOK, PRESIDENT — DATE

ACKNOWLEDGMENT

STATE OF NEVADA)
SS
COUNTY OF CLARK)

THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME ON Dec. 26 _____, 2001
BY CHARLES T. COOK AS PRESIDENT OF NTC HOLDING TRUST NO. 70-2000.

Patricia L. Knauer
PATRICIA L. KNAUER
NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE
MY COMMISSION EXPIRES April 23, 2005

BASIS OF BEARINGS

NORTH 00°55'40" EAST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW 1/4) OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN ON A MAP ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE AS BOOK 75, PAGE 91 OF PLATS.

SURVEYOR'S CERTIFICATE

I, BRUCE L. STRATTON, A PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF NEVADA, AS AGENT FOR PRIMAS AND ASSOCIATES, DO HEREBY CERTIFY THAT:

1. THIS PLAT REPRESENTS THE RESULTS OF A SURVEY CONDUCTED UNDER MY DIRECT SUPERVISION AT THE INSTANCE OF FINDLAY MANAGEMENT GROUP.
2. THE LANDS SURVEYED LIE WITHIN THE NORTHWEST QUARTER (NW 1/4) OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., THE SURVEY WAS COMPLETED ON 24 JULY 2001.
3. THIS PLAT COMPLIES WITH THE APPLICABLE STATE STATUTES AND ANY LOCAL ORDINANCES IN EFFECT ON THE DATE THAT THE SURVEY WAS COMPLETED.
4. THE MONUMENTS DEPICTED ON THE PLAT ARE OF THE CHARACTER SHOWN, OCCUPY THE POSITIONS INDICATED AND ARE OF SUFFICIENT NUMBER AND DURABILITY.

BRUCE L. STRATTON
PROFESSIONAL LAND SURVEYOR
NEVADA CERTIFICATE NO. 9615

PROFESSIONAL LAND SURVEYOR — BRUCE L. STRATTON — No. 9615 — STATE OF NEVADA

26 DEC 2001

APPROVALS

THIS IS TO CERTIFY THAT THE DEPARTMENT OF PLANNING AND DEVELOPMENT, CITY OF LAS VEGAS, CLARK COUNTY, NEVADA ON THIS 27TH DAY OF DECEMBER 2001 I, DID APPROVE, FOR THE PURPOSES OF LAND DIVISION AND ACCEPT IN BEHALF OF THE PUBLIC, THIS MAP AND ANY PARCELS OF LAND OFFERED FOR DEDICATION FOR THE PUBLIC USE IN CONFORMITY WITH THE TERMS OF THE OFFER OF DEDICATION PER N.R.S. 278.010 THROUGH 278.630, INCLUSIVE

ROBERT S. GENZER
DIRECTOR OF PLANNING AND DEVELOPMENT

CITY SURVEYOR'S CERTIFICATE

MAP APPROVED FOR THE PURPOSE OF LAND DIVISION THIS 4TH DAY OF JANUARY, 2002

Paul H. Sullivan

PAUL H. SULLIVAN P.L.S.
ASST. CITY SURVEYOR OF THE CITY OF LAS VEGAS
NEVADA CERTIFICATE NO 9866

CITY OF LAS VEGAS — DEPARTMENT OF PUBLIC WORKS — NEVADA

RECORDER'S NOTE

ANY SUBSEQUENT CHANGES TO THIS MAP SHOULD BE EXAMINED AND MAY BE DETERMINED BY REFERENCE TO THE COUNTY RECORDER'S CUMULATIVE MAP INDEX. N.R.S. 278.5695.

PM-28-01

MERGER AND RESUBDIVISION
OF PARCEL 1 OF FILE 97, PAGE 42 OF PARCEL MAPS AND PARCEL 1 OF FILE 97, PAGE 43 OF PARCEL MAPS
FOR
NTC HOLDING TRUST NO. 70-2000

SITUATE WITHIN THE NORTHWEST QUARTER (NW 1/4) OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA

PRIMAS AND ASSOCIATES
CONSULTING ENGINEERS
1091 SOUTH CAMARRON RD, STE A-3
LAS VEGAS, NEVADA 89128
(702) 228-8185
FAX (702) 228-8194

INSTRUMENT NO. 02151
OFFICIAL RECORDS BOOK NO. 20020104
FILED AT THE REQUEST OF:
PRIMAS AND ASSOCIATES
DATE 1-4-2002 AT 15:13
FILE 101 PAGE 0091
OF PARCEL MAPS
CLARK COUNTY, NEVADA RECORDS
JUDITH A. VANDEVER, RECORDER
FEE $31.00 DEPUTY STX

SHEET 1 OF 2

MERGER AND RESUBDIVISION OF
MONTECITO EAST
A COMMERCIAL SUBDIVISION

PARCEL 2 OF FILE 98, PAGE 5 OF PARCEL MAPS, PARCELS 3 AND 4 OF FILE 97, PAGE 42 OF PARCEL MAPS AND PARCEL 2 OF FILE 97, PAGE 43 OF PARCEL MAPS SITUATE WITHIN THE NORTHWEST QUARTER (NW 1/4) OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

NORTH
GRAPHIC SCALE
(IN FEET)
1 inch = 60 ft.

LEGEND
- BOUNDARY LINE
- STREET CENTERLINE
- ADJACENT PROPERTY LINE
- EASEMENT LINE
- FOUND MONUMENT AS SHOWN AND DESCRIBED
- (27) CURVE NUMBER
- L1 LINE NUMBER
- A. P. NO. ASSESSOR'S PARCEL NO.
- SIGHT VISIBILITY ZONE

MONTE CRISTO WAY

FOUND REBAR AND CAP PLS 5269

1/4 COR 22 27

FOUND ALUMINUM CAP STAMPED "DUCHARME-PLS 2984-1LV9027NV"

N83°44'12"W 30.00' REGENA AVENUE 677.00'

N83°44'12"W 609.66'

625.82'

125.64'

FOUND NAIL & SHINER PLS 2984

30.00'

45.00'

PARCEL 1
FILE 98, PAGE 5
OF PARCEL MAPS

N81°35'50"W 612.85'

N00°52'55"E 106.51'

PARCEL 1
FILE 101, PAGE 91
OF PARCEL MAPS

438.77'

N05°01'03"E

LOT 1
13.95 ACRES

SVRZ LINE TABLE*

LINE	BEARING	DISTANCE
SL1	N79°20'08"W	26.47'
SL2	S04°09'33"W	1.85'
SL3	N70°38'57"W	30.90'
SL4	S05°01'03"W	9.18'
SL5	S85°50'26"E	46.46'
SL7	S04°09'34"W	45.00'
SL8	S04°09'34"W	45.00'
SL9	S67°06'54"E	9.34'
SL10	N04°09'33"E	0.27'
SL11	S87°52'14"E	77.06'
SL12	N85°50'27"W	85.87'
SL13	S76°58'49"E	167.80'
SL14	N85°50'27"W	18.76'
SL15	S04°09'34"W	45.00'
SL16	N79°43'08"W	30.22'
SL17	S14°39'33"W	2.00'
SL18	N89°38'01"W	7.35'
SL19	S77°12'24"E	20.74'
SL20	N14°39'33"E	2.51'
SL21	N88°48'01"E	3.47'
SL22	N84°35'59"W	31.88'
SL23	N70°37'31"E	7.16'
SL24	S77°51'34"E	25.56'
SL25	S80°40'49"E	43.51'
SL26	N70°36'15"E	7.09'
SL27	N84°35'59"W	49.85'

SVRZ CURVE DATA*

CURVE	DELTA	RADIUS	LENGTH	TANGENT
SC1	12°48'30"	109.00'	24.37'	12.23'
SC2	20°00'56"	91.00'	31.79'	16.06'
SC3	08°17'26"	655.00'	94.78'	47.47'
SC4	06°30'44"	239.00'	27.16'	13.60'
SC5	02°19'44"	261.00'	10.61'	5.30'
SC6	00°51'30"	655.00'	9.81'	4.91'
SC7	07°03'36"	261.00'	32.16	16.10
SC8	04°56'15"	239.00'	20.60'	10.30'
SC9	00°50'34"	261.00'	3.84'	1.92'

PUBLIC STREET - DEDICATED PER PM FILE 97, PG 42

N00°51'56"E 282.47'

N00°51'56"E 625.82'

45.00'

N70°56'21"W (R)

20

N00°51'56"E 174.28'

55.00'

DETAIL "C"
1 inch = 30 ft.

SEE DETAIL "C"

DETAIL "B"
1 inch = 30 ft.

SEE DETAIL "B"

DETAIL "A"
1 inch = 30 ft.

SEE DETAIL "A"

* NO WALLS, FENCES, TREES, SHRUBS, UTILITY APPURTENANCES OR ANY OTHER OBJECT, OTHER THAN TRAFFIC CONTROL DEVICES AND STREET LIGHT POLES, MAY BE CONSTRUCTED OR INSTALLED WITHIN THE SIGHT VISIBILITY ZONE UNLESS SAID OBJECT IS MAINTAINED AT LESS THAN 24 INCHES IN HEIGHT, MEASURED FROM TOP OF CURB, OR WHERE NO CURB EXISTS, A HEIGHT OF 27 INCHES MEASURED FROM THE TOP OF ADJACENT ASPHALT, GRAVEL OR PAVEMENT STREET SURFACE.

N85°50'26"W 200.00'

N85°50'26"W 200.00'

PUBLIC STREET - DEDICATED PER PM FILE 97, PG 42

N85°50'26"W 42.30'

N75°20'27"W 139.42'

N84°35'59"W 35.38'

PUBLIC STREET - DEDICATED PER DOCUMENT NO. 20010925.00350

N84°35'59"W 458.45'

N75°20'26"W 202.53'

PUBLIC STREET - DEDICATED PER PM FILE 97, PG 42

N84°35'59"W 674.27'

N75°20'26"W 100.00'

PUBLIC STREET - DEDICATED PER DOCUMENT NO. 20010925.00350

AZURE DRIVE

N84°35'59"W 587.83'

FOUND NAIL & SHINER PLS 2984

TENAYA WAY

LOT 2
7.238 ACRES

LOT 3

269.09'

S06°03'11"W

N89°00'42"W (R)

L1

S 48.50' 51.50'

100.00'

N84°52'56"W (R)

N86°19'21"W 603.27'

N89°25'47"W 45.25'

N89°07'05"W (R)

N85°01'54"W 606.42'

40.00'

218.18'

312.91'

1251.62'

N00°51'56"E

S00°51'56"W

938.72'

10.10'

FOUND CONCRETE NAIL & SHINER

CENTER 1/4 COR S. 27

EXOTIC BLOOM DRIVE

RANCH HOUSE ESTATES UNIT 5
BOOK 81, PAGE 8
OF PLATS

PUBLIC STREET - DEDICATED PER PM FILE 97, PG 42

MONTE CRISTO WAY

A.P. NO. 125-27-202-003
PARCEL 1
FILE 46, PAGE 25
OF PARCEL MAPS

A.P. NO. 125-27-202-004
PARCEL 2
FILE 46, PAGE 25
OF PARCEL MAPS

A.P. NO. 125-27-202-005
PARCEL 3
FILE 46, PAGE 25
OF PARCEL MAPS

MATCH LINE - SEE SHEET 3

CURVE DATA

CURVE	DELTA	RADIUS	LENGTH	TANGENT
1	31°00'00"	655.00'	354.39'	181.65'
2	02°00'35"	745.00'	26.12	13.06'
3	31°00'00"	700.00'	378.74'	194.13'
4	04°07'46"	352.50'	25.41'	12.71'
5	00°51'30"	655.00'	9.81'	4.91'
6	08°07'49"	250.00'	35.48'	17.77'
7	08°17'26"	655.00'	94.78'	47.47'
8	10°30'00"	700.00'	128.28'	64.32'
9	16°10'44"	250.00'	70.59'	35.53'
10	20°00'56"	91.00'	31.79'	16.06'
11	02°27'04"	755.00'	32.30'	16.15'
12	17°48'22"	109.00'	33.87'	17.07'
13	11°56'48"	261.00'	54.42'	27.31'
14	12°00'13"	239.00'	50.07'	25.13'

CURVE DATA

CURVE	DELTA	RADIUS	LENGTH	TANGENT
15	09°35'39"	239.00'	40.02'	20.06'
16	09°23'20"	261.00'	42.77'	21.43'
17	09°15'33"	700.00'	113.12'	56.68'
18	06°54'24"	745.00'	89.81'	44.96'
19	06°38'39"	635.00'	73.64'	36.86'
20	61°05'32"	14.50'	15.46'	8.56'
21	151°24'14"	45.50'	120.23'	178.53'
22	18°11'42"	109.00'	34.61'	17.45'
23	18°11'42"	91.00'	28.90'	14.57'
24	54°32'05"	54.00'	89.10'	58.45'
25	85°27'55"	54.00'	80.55'	49.89'
26	18°11'41"	91.00'	28.90'	14.57'
27	84°36'08"	25.00'	36.91'	22.75'
28	18°11'41"	109.00'	34.61'	17.45'
55	28°59'25"	745.00'	376.95	192.60'

LINE TABLE

LINE	BEARING	DISTANCE
L1	N85°05'53"W	102.93'
L2	N01°11'25"W	12.62'

SHEET 2 OF 3

PRIMAS AND ASSOCIATES
CONSULTING ENGINEERS
1091 SOUTH CIMARRON RD, STE A-3
LAS VEGAS, NEVADA 89128
(702) 228-8183
FAX (702) 228-8194

113-0026

MERGER AND RESUBDIVISION OF
MONTECITO EAST
A COMMERCIAL SUBDIVISION

PARCEL 2 OF FILE 98, PAGE 5 OF PARCEL MAPS, PARCELS 3 AND 4 OF FILE 97, PAGE 42 OF PARCEL MAPS AND PARCEL 2 OF FILE 97, PAGE 43 OF PARCEL MAPS SITUATE WITHIN THE NORTHWEST QUARTER (NW 1/4) OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

OWNERS CERTIFICATE AND DEDICATION

CENTENNIAL RANCH L.L.C., A NEVADA LIMITED LIABILITY COMPANY AS OWNER OF LOT 3; CENTENNIAL 95 LP, A NEVADA LIMITED LIABILITY COMPANY AS OWNER OF LOTS 1 & 4; AND AZURE SOUTH INCORPORATED AS OWNER OF LOT 2, DO HEREBY CERTIFY THAT THEY ARE THE OWNERS OF THE PARCEL OF LAND WHICH IS SHOWN UPON THE FINAL MAP OF MERGER AND RESUBDIVISION OF MONTECITO EAST AND DO HEREBY CONSENT TO THE PREPARATION AND RECORDATION OF THIS MAP, AND DO HEREBY OFFER AND DEDICATE ALL PUBLIC STREETS, EASEMENTS, RIGHTS-OF-WAY AND PUBLIC PLACES AS INDICATED AND OUTLINED HEREON FOR THE USE OF THE PUBLIC.

FURTHERMORE, THE UNDERSIGNED OWNERS HEREBY GRANTS AND CONVEYS TO NEVADA POWER COMPANY AND SPRINT, JOINTLY AND SEVERALLY, SOUTHWEST GAS CORPORATION, LAS VEGAS VALLEY WATER DISTRICT AND COX COMMUNICATIONS LAS VEGAS, INC., AND TO THEIR RESPECTIVE SUCCESSORS AND ASSIGNS: A PERMANENT EASEMENT AS SHOWN HEREON AS PRIVATE STREETS AND COMMON AREAS AND ALL AREAS NOT OCCUPIED BY ANY BUILDING STRUCTURE FOR THE CONSTRUCTION, MAINTENANCE, OPERATION, AND FINAL REMOVAL OF TELEPHONE, POWER, GAS, WATER, CABLE TELEVISION LINES, ABOVE GROUND TRANSFORMERS AND TELEPHONE EQUIPMENT PADS, STREET LIGHTS, FIRE HYDRANTS AND APPURTENANCES, TOGETHER WITH THE RIGHT OF INGRESS AND EGRESS THERETO. FURTHER, THE UNDERSIGNED OWNERS HEREBY GRANT AND CONVEY TO THE CITY OF LAS VEGAS AND ITS SUCCESSORS AND ASSIGNS, A FIVE (5) FOOT WIDE EASEMENT ADJACENT TO ALL PROPERTY LINES THAT ABUT PUBLIC STREETS FOR PURPOSES OF PLACING PUBLIC FIRE HYDRANTS, PUBLIC STREETLIGHTS, TRAFFIC SIGNALS & APPURTENANCE, THERETO, AND AN ADDITIONAL EASEMENT OF UP TO TWO (2) FEET IN RADIUS FROM EACH FIRE HYDRANT AND STREET LIGHT, AND TRAFFIC SIGNALS AND APPURTENANCE TO EXTEND BEYOND THE FIVE-FOOT EASEMENT IF NECESSARY, TOGETHER WITH THE RIGHT OF INGRESS AND EGRESS FROM THESE EASEMENTS.

DATED THIS 21st DAY OF May, 2003

CENTENNIAL 95, LP

BY: LVLM, LLC — TITLE: ITS MANAGER
BY: LAGUNA CONSULTANTS, LLC — TITLE: ITS MANAGER
BY: FRANK NIELSEN — TITLE: ITS CO-MANAGER

AZURE SOUTH, INCORPORATED

BY: FRANK NIELSEN — TITLE: ITS SECRETARY

CENTENNIAL RANCH L.L.C.

BY: LVLM, LLC — TITLE: ITS MANAGER
BY: LAGUNA CONSULTANTS, LLC — TITLE: ITS MANAGER
BY: FRANK NIELSEN — TITLE: ITS CO-MANAGER

ACKNOWLEDGMENT

STATE OF Nevada)
COUNTY OF Clark) SS.

THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME ON May 21st, 2003
BY Frank Nielsen AS CO-MANAGER OF AZURE SOUTH, INCORPORATED
AS CO-MANAGER OF CENTENNIAL 95, LP
AS CO-MANAGER OF CENTENNIAL RANCH, LLC

Barbara Baird

NOTARY PUBLIC IN AND FOR
SAID COUNTY AND STATE
MY COMMISSION EXPIRES: June 1, 2003

Notary Public - State of Nevada
County of Clark
BARBARA BAIRD
Appointment Expires
June 1, 2003

UTILITY / AGENCY APPROVALS

WE THE HEREIN NAMED PUBLIC UTILITY COMPANIES AND AGENCIES APPROVE THE GRANT OF THE DESIGNATED EASEMENTS.

TONY C. LEWIS — 5/23/03 DATE
LAS VEGAS VALLEY WATER DISTRICT

5.22.03 DATE
SOUTHWEST GAS CORPORATION Kenya Henderson

Roger Trentini — 5-23-03 DATE
NEVADA POWER COMPANY

Dean P. Whitmer — 052303 DATE
SPRINT

Marisa L. Tapia — 5/23/03 DATE
Marisa L. Tapia
COX COMMUNICATIONS LAS VEGAS, INC.

6-9-2003 DATE
CHARLES KAJKOWSKI, JR., P.E. NO. 4784
CITY ENGINEER
CITY OF LAS VEGAS

SURVEYOR'S CERTIFICATE

I, EDWARD F. VINCENT, A PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF NEVADA, AS AN AGENT FOR PRIMAS AND ASSOCIATES, DO HEREBY CERTIFY THAT:

1. THIS PLAT REPRESENTS THE RESULTS OF A SURVEY CONDUCTED UNDER MY DIRECT SUPERVISION AT THE INSTANCE OF MONTECITO TOWN CENTER, L.L.C.
2. THE LANDS SURVEYED LIE WITHIN THE NORTHWEST QUARTER (NW 1/4) OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA. THIS SURVEY WAS COMPLETED ON FEBRUARY 15, 2002.
3. THIS PLAT COMPLIES WITH THE APPLICABLE STATE STATUTES AND ANY LOCAL ORDINANCES IN EFFECT ON THE DATE THAT THE GOVERNING BODY GAVE ITS FINAL APPROVAL.
4. THE MONUMENTS DEPICTED ON THE PLAT WILL BE OF THE CHARACTER SHOWN AND OCCUPY THE POSITIONS INDICATED BY 6/6/04 AND AN APPROPRIATE FINANCIAL GUARANTEE WILL BE POSTED WITH THE GOVERNING BODY BEFORE RECORDATION TO ASSURE THE INSTALLATION OF THE MONUMENTS.

EDWARD F. VINCENT
PROFESSIONAL LAND SURVEYOR
NEVADA CERTIFICATE NO. 9003

EDWARD F. VINCENT — EXP: 6/30/04 — No. 9003 — PROFESSIONAL LAND SURVEYOR — STATE OF NEVADA

5/13/03

LEGAL DESCRIPTION

SITUATE WITHIN THE NORTHWEST QUARTER (NW 1/4) OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

PARCEL 2 OF THAT CERTAIN PARCEL MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE AS FILE 98, PAGE 5 OF PARCEL MAPS, PARCELS 3 AND 4 OF THAT CERTAIN PARCEL MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE AS FILE 97, PAGE 42 OF PARCEL MAPS AND PARCEL 3 OF THAT CERTAIN PARCEL MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE AS FILE 97, PAGE 43 OF PARCEL MAPS. EXCEPTING THOSE PORTIONS OF LAND DEDICATED TO THE CITY OF LAS VEGAS PER DOCUMENTS #20010925:00350 AND #20020129:01550 RECORDS OF CLARK COUNTY, NEVADA.

CONTAINING 30.54 ACRES

BASIS OF BEARINGS

NORTH 00°51'56" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHWEST QUARTER (NW 1/4) OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN ON A MAP ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE AS FILE 97, PAGE 42 OF PARCEL MAPS.

REFERENCE MAPS

1) RECORD OF SURVEY – FILE 103, PAGE 25
2) RECORD OF SURVEY – FILE 101, PAGE 17
3) SUBDIVISION PLAT – BOOK 75, PAGE 91
4) SUBDIVISON PLAT – BOOK 70, PAGE 47
5) SUBDIVISION PLAT – BOOK 76, PAGE 53
6) SUBDIVISION PLAT – BOOK 58, PAGE 84
7) SUBDIVISION PLAT – BOOK 81, PAGE 08
8) PARCEL MAP – FILE 22, PAGE 66
9) PARCEL MAP – FILE 66, PAGE 24
10) PARCEL MAP – FILE 66, PAGE 08
11) PARCEL MAP – FILE 40, PAGE 46
12) PARCEL MAP – FILE 83, PAGE 32
13) PARCEL MAP – FILE 83, PAGE 33
14) PARCEL MAP – FILE 46, PAGE 25
15) PARCEL MAP – FILE 97, PAGE 42
16) PARCEL MAP – FILE 97, PAGE 43
17) PARCEL MAP – FILE 98, PAGE 05

CITY OF LAS VEGAS — DEPARTMENT OF PUBLIC WORKS — NEVADA

NOTES

1. RECORDATION OF THIS SUBDIVISION MAP ESTABLISHES A LIMITED WATER COMMITMENT FROM THE LAS VEGAS VALLEY WATER DISTRICT AS FOLLOWS:

LOT/BLOCK	ACRE-FEET/YEAR
1	1.0
2	1.0
3	1.0
4	1.0

2. ON-SITE SEWERS ARE A COMMON ELEMENT PRIVATELY OWNED AND MAINTAINED PER THE CONDITIONS, COVENANTS, AND RESTRICTIONS (CC&Rs) OF THIS COMMERCIAL SUBDIVISION.
3. ALL PROPERTIES WITHIN THIS SITE SHALL HAVE PERPETUAL, UNOBSTRUCTED ACCESS TO ALL PARKING AND ALL DRIVEWAYS SERVICING THIS SITE.
4. ALL SUBDIVIDED PARCELS COMPRISING THIS COMMERCIAL SUBDIVISION SHALL PROVIDE PERPETUAL INTERSITE COMMON DRAINAGE RIGHTS ACROSS ALL EXISTING AND FUTURE PARCEL LIMITS.

CITY SURVEYOR'S CERTIFICATE

I, RITA M. LUMOS, CITY SURVEYOR OF THE CITY OF LAS VEGAS, DO HEREBY CERTIFY THAT I HAVE EXAMINED THE FINAL MAP OF MERGER AND RESUBDIVISION OF MONTECITO EAST, AND AM SATISFIED THAT THE MAP IS TECHNICALLY CORRECT. THE MONUMENTS HAVE NOT BEEN SET, BUT A PROPER PERFORMANCE BOND HAS BEEN DEPOSITED TO GUARANTEE THEIR SETTING ON OR BEFORE 6/6/04.

Rita M. Lumos — 7/9/03 DATE
RITA M. LUMOS, P.L.S. /
CITY SURVEYOR – CITY OF LAS VEGAS
NEVADA CERTIFICATE NO. 5094

DISTRICT BOARD OF HEALTH CERTIFICATE

THIS FINAL MAP IS APPROVED BY THE CLARK COUNTY DISTRICT BOARD OF HEALTH. THIS APPROVAL CONCERNS SEWAGE DISPOSAL, WATER POLLUTION. WATER QUALITY AND WATER SUPPLY FACILITIES AND IS PREDICATED UPON PLANS FOR A PUBLIC WATER SUPPLY AND A COMMUNITY SYSTEM FOR DISPOSAL OF SEWAGE.

Walter B. Ross — 05/23/03 DATE
CLARK COUNTY DISTRICT BOARD OF HEALTH - WALTER B. ROSS

DIVISION OF WATER RESOURCES CERTIFICATE

THIS FINAL MAP IS APPROVED BY THE DIVISION OF WATER RESOURCES OF THE DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES CONCERNING WATER QUANTITY SUBJECT TO THE REVIEW OF APPROVAL ON FILE IN THIS OFFICE.

5-20-03 DATE
DIVISION OF WATER RESOURCES – ROBERT COACHE, P.E.

CERTIFICATE OF DIRECTOR OF PLANNING & DEVELOPMENT

I CERTIFY THAT THIS FINAL MAP SUBSTANTIALLY COMPLIES WITH THE TENTATIVE MAP AND ANY APPROVED ALTERATIONS THERETO; THAT THE MAP COMPLIES WITH APPLICABLE STATUTORY AND ORDINANCE PROVISIONS; THAT ALL CONDITIONS IMPOSED UPON THE FINAL MAP HAVE BEEN MET; AND THAT THE MAP WAS APPROVED AND THE PARCELS HEREIN WERE ACCEPTED BY THE PLANNING & DEVELOPMENT DEPARTMENT OF THE CITY OF LAS VEGAS, NEVADA ON THE 18TH DAY OF JUNE, 2003.

6/18/03 DATE
ROBERT S. GENZER
DIRECTOR OF PLANNING AND DEVELOPMENT
OF THE CITY OF LAS VEGAS

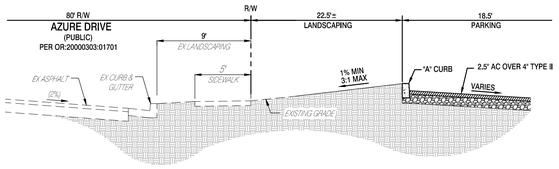
COUNTY RECORDER'S NOTE

ANY SUBSEQUENT CHANGES TO THIS MAP SHOULD BE EXAMINED AND MAY BE DETERMINED BY REFERENCE TO THE COUNTY RECORDER'S CUMULATIVE MAP INDEX. N.R.S. 278.5695

FMP - 2063

INSTRUMENT NO. 02936
OFFICIAL RECORDS BOOK NO. 20031008
FILED AT THE REQUEST OF:
PRIMAS AND ASSOCIATES
DATE 10-08-03 AT 16:36
BOOK 113 PAGE 0026
OF PLATS
CLARK COUNTY, NEVADA RECORDS
FRANCES DEANE, RECORDER
FEE $ 74.00 DEPUTY MRP

PRIMAS AND ASSOCIATES
CONSULTING ENGINEERS
1031 SOUTH CIMARRON RD. STE A-3
LAS VEGAS, NEVADA 89128
(702) 228-8183
FAX (702) 228-8194



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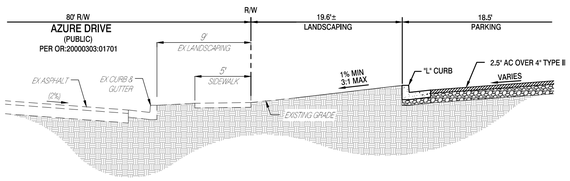

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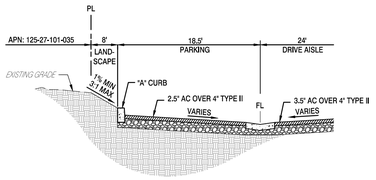

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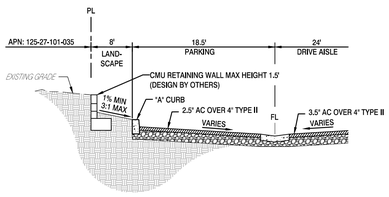

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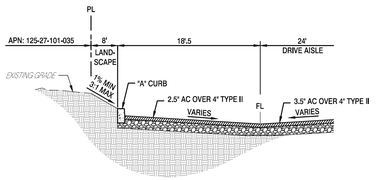

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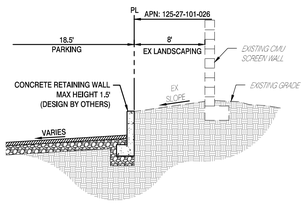

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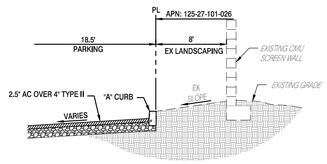

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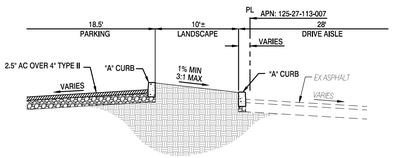

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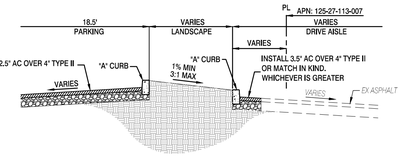

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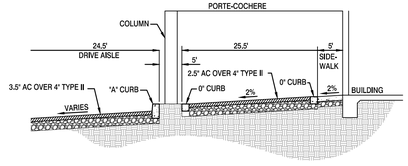

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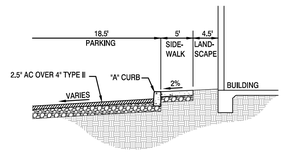

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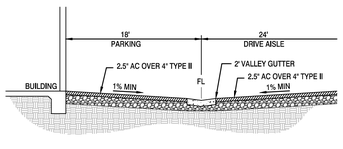

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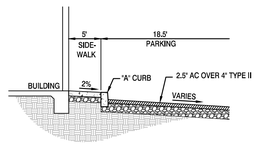

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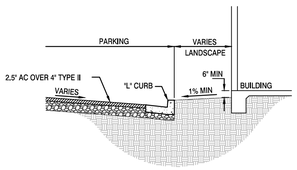

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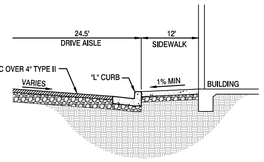

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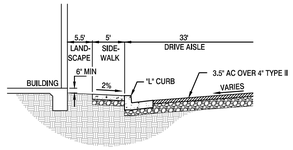

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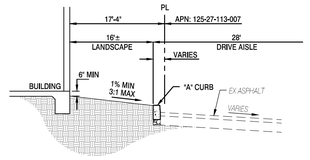

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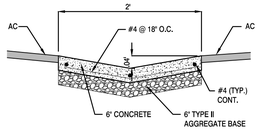
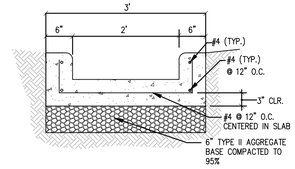
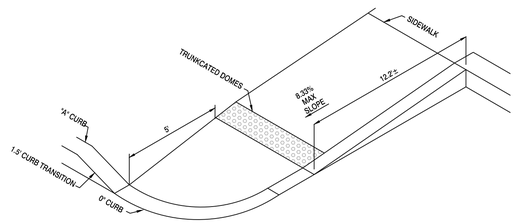


18 2' WIDE VALLEY GUTTER
NTS



19 2' WIDE CONCRETE FLUME



20 SIDEWALK RAMP
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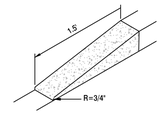


21 0"-6" CURB TRANSITION
NTS

RIETZ
CONSULTING INC.
5740 SOUTH ARVILLE STREET #206
LAS VEGAS, NEVADA 89118
PH: 702.521.3355
FX: 702.212.3963

REV.	DATE	DESCRIPTION

DETAIL SHEET

THE COLLISION CENTER
CENTENNIAL PROPERTY LLC.
LAS VEGAS, NEVADA
APN# 125-27-113-006

DATE:	DRAFTER:	CHECKED:	SCALE:
11/13/12	RS	EJR	NTS

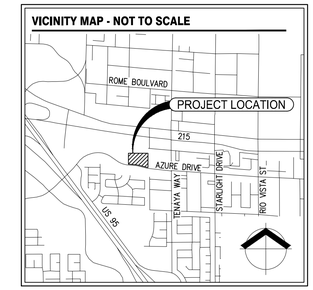
PROFESSIONAL ENGINEER - STATE OF NEVADA
ERIC J. RIETZ
Exp: 12/31/13
CIVIL
No.16350

SHEET
D1
SHEET 2 OF 2 SHEETS

CNLV

U:\Eric\Collision Center\CSD\SHEET 4 DETAIL SHEET.dwg - 11/12/2012 10:38 PM

VICINITY MAP - NOT TO SCALE



VICINITY MAP

LEGEND

- PROPERTY BOUNDARY
- ADJACENT LOT LINE
- RIGHT-OF-WAY
- CENTER LINE
- EXST "L" TYPE CURB
- EXST "A" TYPE CURB
- 1900 EXST MAJOR CONTOUR LINE
- 1902 EXST MINOR CONTOUR LINE
- EXST SCREEN WALL AS INDICATED
- EXST BUILDING FOOTPRINT
- EXST EDGE OF PAVEMENT
- "L" TYPE CURB
- "A" TYPE CURB
- CHAIN LINK FENCE
- SWALE FLOW LINE
- SAWCUT LINE
- EXST FIRE HYDRANT
- EXST TELEPHONE VAULT
- EXST CABLE T.V. BOX
- EXST ELECTRICAL VAULT
- EXST ON-SITE AREA LIGHT
- EXST STREET LIGHT
- EXST STORM DRAIN MANHOLE
- EXST WATER BACKFLOW PREVENTER
- EXST WATER METER
- EX 24" HDPE STORM — EXST STORM DRAIN PIPE

EXISTING		PROPOSED	
(00.00) TC	TOP BACK CURB	00.00 TC	TOP BACK CURB
(00.00) FG	FINISH GRADE	00.00 FG	FINISH GRADE
(00.00) EP	EDGE OF PAVEMENT	00.00 EP	EDGE OF PAVEMENT
(00.00) FL	FLOW LINE	00.00 FL	FLOW LINE
(00.00) AC	ASPHALT CONCRETE	00.00 AC	ASPHALT CONCRETE
		00.00 GB	GRADE BREAK
		00.00 HP	HIGH POINT
		00.00 TC=AC	TOP OF CURB = ASPHALT
		00.00 TW	TOP OF WALL
		00.00 TF	TOP OF FOOTER

BENCHMARK

RIVET & PLATE TOP CURB NORTHWEST CORNER TENAYA WAY & AZURE DRIVE.
ELEVATION: 716.550 METERS = 2350.88 FEET
NAVD88

BASIS OF BEARING

N 00°51'56" E - BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M. CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN ON MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA, IN BOOK 113 OF PLATS, AT PAGE 26, AND FILE 135 OF SURVEYS PAGE 01.

DISCLAIMER NOTE:

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

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

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811
OR
1-800-227-2600
AND
CLARK COUNTY TRAFFIC OPERATIONS
1-702-455-7544

AVOID HITTING UNDERGROUND TRAFFIC SIGNAL SYSTEMS AND STREET LIGHT SYSTEM CONDUITS. IT'S COSTLY
Call before you do UnderGround
1-702-455-7511
CLARK COUNTY TRAFFIC OPERATIONS
AND
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

FLOOD ZONE

THIS SITE IS LOCATED IN ZONE "X", AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 32003C1745E, CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002.

Line Table		
Line #	Length	Direction
L1	200.00'	N85°50'26"W
L2	202.53'	N75°20'26"W
L3	200.00'	N85°50'26"W

Curve Table			
Curve #	Length	Radius	Delta
C1	35.47'	250.00'	8°07'48"
C2	70.59'	250.00'	16°10'44"
C3	50.07'	239.00'	12°00'13"
C4	1.80'	261.00'	0°23'42"
C5	128.28'	700.00'	10°30'00"
C6	113.12'	700.00'	9°15'32"
C7	378.74'	700.00'	31°00'00"

NOTES

1. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING STRUCTURES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.
2. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.
3. OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED OR OBSCURED DURING CONSTRUCTION.

GRADING

1. CONSTRUCT "L" CURB AND GUTTER PER CCAUSD #216
2. TURN OUT "L" CURB TO ENSURE POSITIVE DRAINAGE
3. CONSTRUCT "A" CURB AND GUTTER PER CCAUSD #219
4. CONSTRUCT SIDEWALK PER CCAUSD #234
5. CONSTRUCT CASE I SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIV. PER CCAUSD #235, A & B = 8' UNLESS OTHERWISE NOTED
6. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIV. PER DETAIL 20 SHEET D1
7. CONSTRUCT 2' VALLEY GUTTER PER DETAIL 18 SHEET D1
8. MAIN CORRIDOR (TRUCK ACCESS) INSTALL 3.5" AC OVER 4" TYPE II AGGREGATE BASE
9. AUTOMOBILE ROUTE / PARKING. INSTALL 2.5" AC OVER 4" TYPE II AGGREGATE BASE
10. SAWCUT CLEAN AND REMOVE EXISTING ASPHALT
11. CONNECT TO EXISTING CURB AND GUTTER
12. RELOCATED EXISTING CHAIN LINK FENCE TO PROPERTY LINE
13. INSTALL TRASH ENCLOSURE (SEE ARCHITECTURAL PLANS FOR DETAILS)
14. CONSTRUCT 2-FT FLUME PER DETAIL 19 SHEET D1
15. INSTALL CURB STOPS PER CCAUSD #238
16. CONSTRUCT CMU RETAINING WALL, HEIGHT PER PLAN, STRUCTURAL BY OTHERS
17. CONSTRUCT SIDEWALK UNDERDRAIN PER CCAUSD #236
18. REMOVE EXISTING DIRT STOCK PILE
19. CONSTRUCT ASPHALT FLOW LINE
20. CONSTRUCT ASPHALT TRANSITION FROM 0" CURB TO "A" CURB
21. CONSTRUCT 1.5' CURB TRANSITION, 0"-6" PER DETAIL 21 SHEET D1

APN # APN # 125-27-113-006
5.36 ACRES

DATUM

ADD 2300.00 TO PLAN GRADES, EXCEPT FOR CONTOURS.
CONTOUR INTERVAL = 1'

SCALE: 1" = 40'
40 20 0 40

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

ERIC J. RIETZ, P.E. No. 16350 — DATE

REV.	DATE	DESCRIPTION

RIETZ CONSULTING INC.
5740 SOUTH ARVILLE STREET, #206
LAS VEGAS, NEVADA 89118
PH: 702.521.3355
FX: 702.212.3963

GRADING PLAN

THE COLLISION CENTER
CENTENNIAL PROPERTY, LLC.
LAS VEGAS, NEVADA
APN# 125-27-113-006

DATE:	DRAFTER:	CHECKED:	SCALE:
11/13/12	RS	EJR	1" = 40'

PROFESSIONAL ENGINEER STATE OF NEVADA
ERIC J. RIETZ
Exp: 12/31/13
CIVIL
No. 16350

SHEET
G1
SHEET 1 OF 2 SHEETS

XXXX

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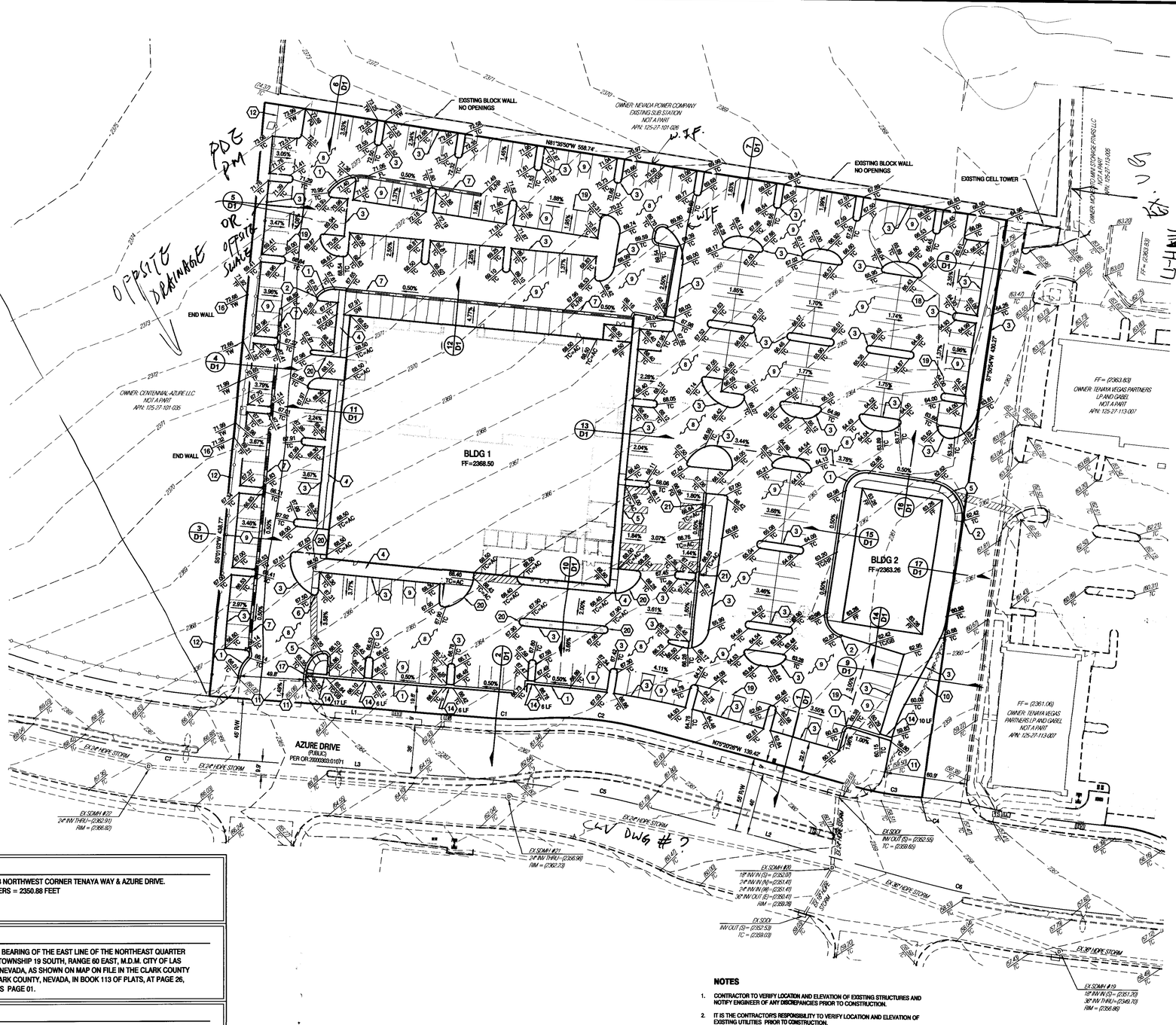

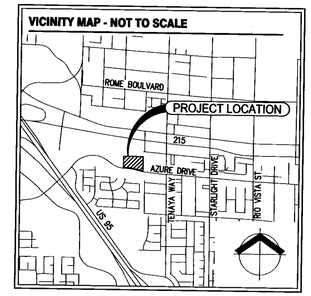

VICINITY MAP

LEGEND

- PROPERTY BOUNDARY
- ADJACENT LOT LINE
- RIGHT-OF-WAY
- CENTER LINE
- EXST "L" TYPE CURB
- EXST "A" TYPE CURB
- 1900 EXST MAJOR CONTOUR LINE
- 1902 EXST MINOR CONTOUR LINE
- EXST SCREEN WALL AS INDICATED
- EXST BUILDING FOOTPRINT
- EXST EDGE OF PAVEMENT
- "L" TYPE CURB
- "A" TYPE CURB
- CHAIN LINK FENCE
- SWALE FLOW LINE
- SAWCUT LINE
- EXST FIRE HYDRANT
- EXST TELEPHONE VAULT
- EXST CABLE T.V. BOX
- EXST ELECTRICAL VAULT
- EXST ON-SITE AREA LIGHT
- EXST STREET LIGHT
- EXST STORM DRAIN MANHOLE
- EXST WATER BACKFLOW PREVENTER
- EXST WATER METER
- EX 24" HDPE STORM — EXST STORM DRAIN PIPE

EXISTING		PROPOSED	
00.00 TC	TOP BACK CURB	00.00 TC	TOP BACK CURB
00.00 FG	FINISH GRADE	00.00 FG	FINISH GRADE
00.00 EP	EDGE OF PAVEMENT	00.00 EP	EDGE OF PAVEMENT
00.00 FL	FLOW LINE	00.00 FL	FLOW LINE
00.00 AC	ASPHALT CONCRETE	00.00 AC	ASPHALT CONCRETE
		00.00 GB	GRADE BREAK
		00.00 HP	HIGH POINT
		00.00 TC=AC	TOP OF CURB = ASPHALT
		00.00 TW	TOP OF WALL
		00.00 TF	TOP OF FOOTER

This grading plan is a part of drainage study # 4576 which was received on 11/13/12 and Reported on 11/26/12. Page 1 of 2.

BENCHMARK

RIVET & PLATE TOP CURB NORTHWEST CORNER TENAYA WAY & AZURE DRIVE.
ELEVATION: 716.550 METERS = 2350.88 FEET
NAVD88

BASIS OF BEARING

N 00°51'56" E - BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 27, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M. CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN ON MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA, IN BOOK 113 OF PLATS, AT PAGE 26, AND FILE 135 OF SURVEYS PAGE 01.

DISCLAIMER NOTE:

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

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

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811
OR 1-800-227-2600
AND CLARK COUNTY TRAFFIC OPERATIONS 1-702-455-7544

AVOID HITTING UNDERGROUND TRAFFIC SIGNAL SYSTEMS AND STREET LIGHT SYSTEM CONDUITS. IT'S COSTLY.
Call before you do UnderGround
1-702-455-7511
CLARK COUNTY TRAFFIC OPERATIONS AND
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

FLOOD ZONE

THIS SITE IS LOCATED IN ZONE "X", AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 32003C1745E, CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002.

Line Table		
Line #	Length	Direction
L1	200.00'	N85°50'26"W
L2	202.53'	N75°20'26"W
L3	200.00'	N85°50'26"W

Curve Table			
Curve #	Length	Radius	Delta
C1	35.47'	250.00'	8°07'48"
C2	70.59'	250.00'	16°10'44"
C3	50.07'	236.00'	12°9'13"
C4	1.80'	261.00'	0°23'42"
C5	128.28'	700.00'	10°30'00"
C6	113.12'	700.00'	9°15'32"
C7	378.74'	700.00'	31°00'00"

NOTES

1. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING STRUCTURES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.
2. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.
3. OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED OR OBSCURED DURING CONSTRUCTION.

GRADING

1. CONSTRUCT "L" CURB AND GUTTER PER CCAUSD #216
2. TURN OUT "L" CURB TO ENSURE POSITIVE DRAINAGE
3. CONSTRUCT "A" CURB AND GUTTER PER CCAUSD #219
4. CONSTRUCT SIDEWALK PER CCAUSD #234
5. CONSTRUCT CASE I SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIV. PER CCAUSD #235, A & B = 0' UNLESS OTHERWISE NOTED
6. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIV. PER DETAIL 20 SHEET D1
7. CONSTRUCT 2' VALLEY GUTTER PER DETAIL 18 SHEET D1
8. MAIN CORRIDOR (TRUCK ACCESS) INSTALL 3.5" AC OVER 4" TYPE II AGGREGATE BASE
9. AUTOMOBILE ROUTE / PARKING. INSTALL 2.5" AC OVER 4" TYPE II AGGREGATE BASE
10. SAWCUT CLEAN AND REMOVE EXISTING ASPHALT
11. CONNECT TO EXISTING CURB AND GUTTER
12. RELOCATED EXISTING CHAIN LINK FENCE TO PROPERTY LINE
13. INSTALL TRASH ENCLOSURE (SEE ARCHITECTURAL PLANS FOR DETAILS)
14. CONSTRUCT 2-FT FLUME PER DETAIL 19 SHEET D1
15. INSTALL CURB STOPS PER CCAUSD #238
16. CONSTRUCT CMU RETAINING WALL, HEIGHT PER PLAN, STRUCTURAL BY OTHERS
17. CONSTRUCT SIDEWALK UNDERDRAIN PER CCAUSD #236
18. REMOVE EXISTING DIRT STOCK PILE
19. CONSTRUCT ASPHALT FLOW LINE
20. CONSTRUCT ASPHALT TRANSITION FROM 0" CURB TO "A" CURB
21. CONSTRUCT 1.5' CURB TRANSITION, 0"-6" PER DETAIL 21 SHEET D1

APN # APN # 125-27-113-006
5.36 ACRES

DATUM

ADD 2300.00 TO PLAN GRADES, EXCEPT FOR CONTOURS.
CONTOUR INTERVAL = 1'

SCALE: 1" = 40'
40 20 0 40

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

ERIC J. RIETZ, P.E. No. 16350 — DATE 11/12/13

NO.	DESCRIPTION	DATE

RIETZ CONSULTING INC.
5740 SOUTH ARVILLE STREET, #206
LAS VEGAS, NEVADA 89118
PH: 702.521.3355
FX: 702.212.3963

GRADING PLAN

THE COLLISION CENTER
CENTENNIAL PROPERTY, LLC.
LAS VEGAS, NEVADA
APN# 125-27-113-006

DATE:	DRAWN:	CHECKED:	SCALE:
11/13/12	RS	EJR	1" = 40'

PROFESSIONAL ENGINEER — STATE OF NEVADA — ERIC J. RIETZ Exp.12/31/13 CIVIL No.16350 — 11/12/13

SHEET
G1
SHEET 1 OF 2 SHEETS

XXXX

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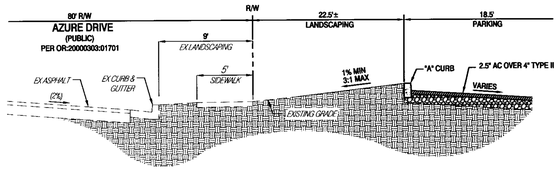

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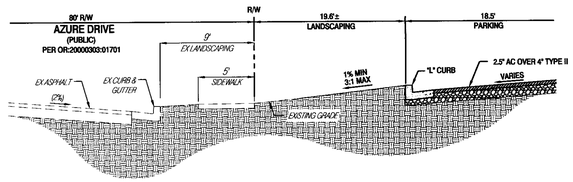

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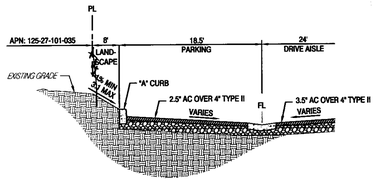

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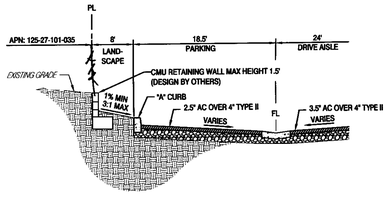

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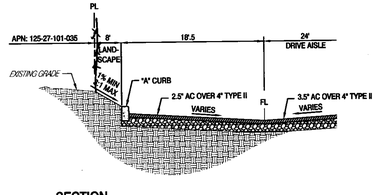

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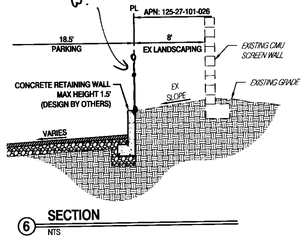

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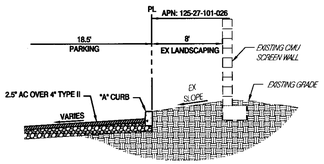

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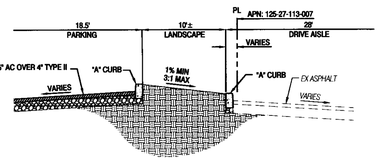

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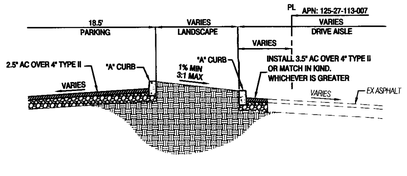

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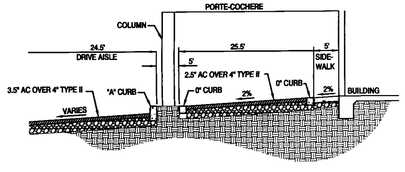

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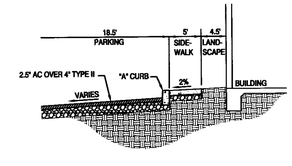

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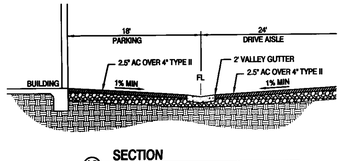

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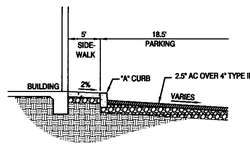

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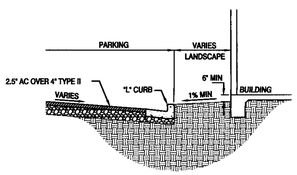

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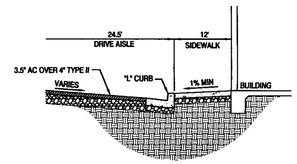

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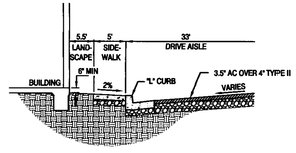

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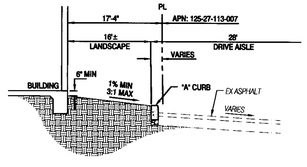

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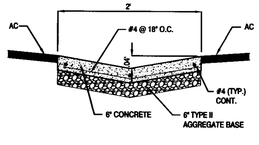

18 2' WIDE VALLEY GUTTER
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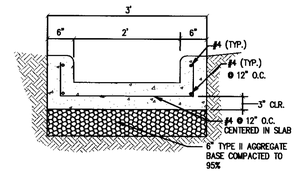
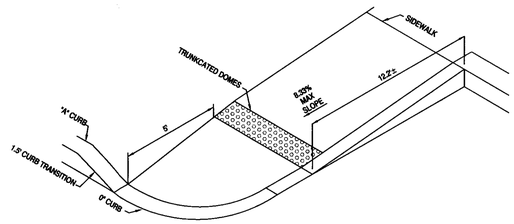


19 2' WIDE CONCRETE FLUME



20 SIDEWALK RAMP
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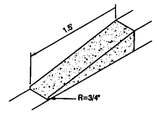

21 0"-6" CURB TRANSITION
NTS

This grading plan is a part of drainage study #4576 which was received on 11/13/12 and Rejected on 11/26/12. Page 2 of 2.

REV:	DATE:	DESCRIPTION:

RIETZ CONSULTING INC.
5740 SOUTH ARVILLE STREET, #206
LAS VEGAS, NEVADA 89118
PH: 702.521.3355
FX: 702.212.3963

DETAIL SHEET

THE COLLISION CENTER
CENTENNIAL PROPERTY, LLC.
LAS VEGAS, NEVADA
APN# 125-27-113-006

DATE:	DRAFTER:	CHECKED:	SCALE:
11/13/12	RS	EJR	NTS

PROFESSIONAL ENGINEER · STATE OF NEVADA
ERIC J. RIETZ
Exp. 12/31/13
CIVIL
No. 16350
11/13/12

SHEET
D1
SHEET 2 OF 2 SHEETS

CNLV

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