DS #: 5114

APN: 125-20-601-003

PROJECT: Monteeito Unit 1

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: April 23, 2019
TO: **Land Development Services** Department of Building & Safety			FROM: Jennifer Shinn, P.E. Flood Control, Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for: **Montecito Unit 1**		**COPIES TO:** Slater Hanifan Group
Cross Streets:	NEC of Grand Montecito & Deer Springs		KB Home
File Number:	F:\Depot\DSMemos\DS5114B.doc		Bart Anderson, P.E., DevCo
Parcel Number:	125-20-601-003		CCRFCD
Zoning Action:			
FEMA Flood Zone	YES	NO X	
Proposed Storm Drain	YES X	NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	3/18/2019	4/22/2019	Not Approved	$400.00	3055931:$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. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

   Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

   http://gustfront.ccrfcd.org/LandDev/LandDev.aspx

2. The project proposes to construct facilities and/or increase flows within Nevada Department of Transportation (NDOT) right-of-way. The engineer must contact NDOT for encroachment permit for the proposed project.

3. Provide a copy of the zoning/planning conditions associated with this site with the next submittal to verify compliance with conditions. *Flood Control* will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the *City Council*). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.

4. Sites with a grade difference of 2 feet above or below existing grades are required to have approval from the *City of Las Vegas Planning and Development Department*. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to the *City*

Planning Department (229-6301). The engineer must provide *City Planning* approval with the next submittal.

5. This site accepts offsite flows and conveys them through the site. Provide a "Public Drainage Easement to be Privately Maintained" and show the easement on the grading plan. Public drainage easements must be recorded by separate document prior to the final acceptance of the improvement plans unless they are to be recorded by parcel or final map.

6. The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.

7. Provide a section detail of the drainage easement required for the storm drain facility within Common Element "P" to demonstrate adequate clearances and minimum easement width is provided by the Manual.

8. Provide section details of the drainage easement required for all areas where offsite flows are conveyed through the site.

9. This drainage study assumes that the Unit 1 project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition(s).

10. The rough graded onsite without any permanent cover such as paving, building construction or planting, is considered an ongoing project under construction whereas a *Stormwater Pollution Prevention Plan* must be kept active under the NDEP Permit. In order to close out the permit, the developer must install permanent cover to the site to stabilize and control stormwater pollution to the satisfaction of NDEP.

11. The grading plan shows a significant area of inundation for the 100-year storm. Provide a notarized letter from the property owner acknowledging the inundation and associated maintenance and liability.

12. The following finish floors do not meet the Regional Flood Control District minimum criteria of twice the Q100 depth of flow up to 18-inches above the water surface (CCRFCD Manual Section 304.4.E.1) or 6-inch minimum above the highest adjacent top of curb (CCRFCD Manual Section 1602 304.4.E.1). The following finish floors should be revised or alternate flood protection provided.

LOT	FF shown	Min FF
43	2526.50	2528.31
44	2526.80	2528.03
45	2527.10	2527.99
75	2522.70	2522.97
87	2520.50	2521.03
91	2519.00	2519.26

13. It appears there is a potential for offsite Q100 flows in Grand Montecito to overtop the curb and enter the site at the western end of Vulturo Avenue, between Lots 42 and 43. Provide a cross section detail to demonstrate the area is adequately flood protected.

14. The flow in Deer Springs is above the back of sidewalk and is erosive. Provide erosion protection for the landscape area in the form of a stem wall, rip rap, or approved alternate as required in the

Regional Flood Control District Manual in section 904.3. Revise the grading plan and sections accordingly.

15. Provide calculations to demonstrate the 10-year dry lane criteria is satisfied for the adjacent streets.

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

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

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
JKS

T/R/S: T19S/R60E/20 & 21
AREA G-20

TECHNICAL DRAINAGE STUDY

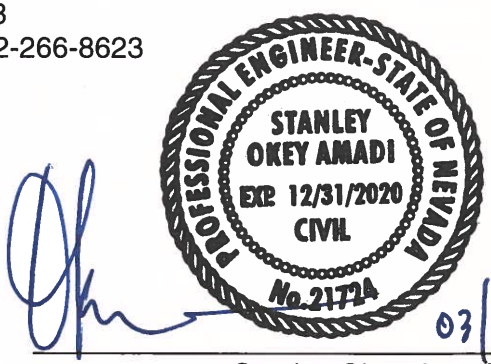
Montecito 60 - Unit 1

City of Las Vegas, Nevada

Job No.: KBH1805.001
Date: March 2019

Prepared By:
Slater Hanifan Group, Inc.
5740 S. Arville Street, Suite 216
Las Vegas, Nevada 89118
Phone: 702-284-5300 ▪ Fax: 702-284-5399

Prepared For:
KB Home
5795 Badura Avenue, Ste 180
Las Vegas, NV 89118
Phone: 702-266-8400 ▪ Fax: 702-266-8623



03/18/19

Stanley Okey Amadi, P.E.
NV Professional Engineer No. 21724

Assisted By: Jonathan S. Rocha, E.I.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Montecito Unit 1 Date: March 2019

Location of Development:
a) Descriptive (Cross Streets): North/South: Grand Montecito Parkway
East/West: Deer Springs Way
b) Section: 20 & 21 Township: 19 S Range: 60 E
c) APN: 125-20-601-003, 125-20-601-006, 125-20-602-002, 125-20-602-005, 125-20-602-009,125-20-602-010, 125-20-603-001, 125-20-603-002, 125-20-603-003, 125-20-603-004, 125-21-201-001

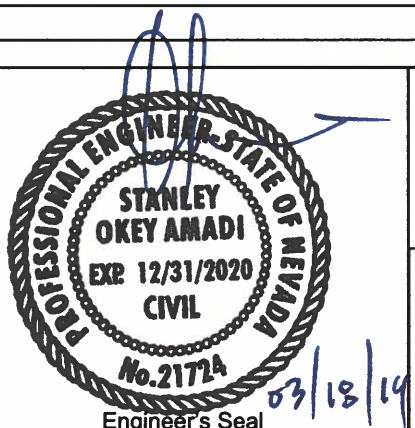
Name of Owner: KB Home Nevada Aquisition
Telephone No.: (702) 266-8400 Fax No.: (702) 266-8623 E-mail Address: pchao@kbhome.com
Address: 5795 Badura Ave Ste 180 Las Vegas NV 89118

Contact Person – Name: Stanley Okey Amadi, P.E. Telephone No.: (702) 284-5300
*E-mail Address: Samadi@shg-inc.com Fax No.: (702) 284-5399
Firm: Slater Hanifan Group, A Westwood Team
Address: 5740 S. Arville #216 Las Vegas NV 89118

Type of Land Development/Land Disturbance Process:

☐	Rezoning	☐	Subdivison Map	☐	Clearing and grading Only
☐	Parcel Map	☒	Planned Unit Development	☐	Other (Please specify below)
☐	Large Parcel Map	☐	Building Permit	☐	storm drain infrastructure

1. Total Owned Land Area: At Site: ± 52.4 acres Being Developed/Disturbed: ± 11.6 acres
2. Is a portion or all of the subject property located in a FEMA Flood Hazard Area? ☐ Yes** ☒ No
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ Yes** ☐ No
4. Proposed type of development (Residential, Commercial, Etc.): Residential
5. Approximate upstream land area which drains to the subject site:
6. Has the site drainage been evaluated in the past? ☐ Yes** ☒ No If yes, please identify documentation:
•Technical Drainage Study for Centennial Parkway Channel West – US95 CC215 to Durango Drive
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: To CCRFCD (CN95 000) facility along US95
8. Briefly describe your proposed schedule for the subject project: ASAP



03/18/19

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.

*Newly 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

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	
X	-	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.)
-	N/A	Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions.
X	-	An electronic copy of the complete submittal is required to be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output device replicating your submittal. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats. If figures are in color, they must be scanned in color and saved as a separate file. S.O.K. by initial here, the engineer on record acknowledges that the electronic copy is an identical replicate of the original hard copy submitted to the City of Las Vegas.

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

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

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

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

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

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Montecito Unit 1	Map ID:
Firm Name: Slater Hanifan Group, A Westwood Team	Engineer: Stanley Okey Amadi, P.E.
Address: 5740 S. Arville #216	
City: Las Vegas	State: NV Zip: 89118
Phone Number: (702) 284-5300	Fax Number: (702) 284-5399
Property Owner: KB Home Nevada Aquisition	
Address: 5795 Badura Ave Ste 180	
City: Las Vegas	State: NV Zip: 89118

Reviewed By:	Date Received:	Date Accepted for Review:

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

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

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

I. GENERAL REQUIREMENT

Yes	No	
X	-	Design Manual **Standard Form 1** with the engineer's seal and signature.
X	-	Design Manual **Standard Form 4**.
X	-	2 copies of the 24" x 36" Drainage Plan.
-	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

Yes	No	
X	-	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
X	-	A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
-	N/A	For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
X	-	Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
X	-	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
-	N/A	Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

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

REFERENCE:	STANDARD FORM 2

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1 INTRODUCTION

1.1 Project Overview & Study Purpose

KB Home is proposing to develop a 11.60 ± acre site, located northeast of the Montecito Parkway and Deer Springs Drive intersection, within the City of Las Vegas, Nevada. The proposed project is identified as *Montecito 60 - Unit 1* (hereinafter referred to as the Project Site or Unit 1 Site). The proposed improvements include single-family lots and private right-of-way street improvements. The proposed average lot size is less than 6,000 square feet. The Unit 1 Site is part of a larger residential development identified as Montecito 60 Site, hereby identified as the Montecito residential development.

The purpose of this study is to provide a detailed hydrologic and hydraulic analysis for the project site in order to protect the property from onsite and offsite runoff in accordance with local storm water management criteria as well as to support the finished floor elevation design of the proposed lots.

1.2 Site Description

The project site is located within the following APNs: 125-20-601-003, 125-20-601-006, 125-20-602-009, 125-20-602-009, 125-20-603-003, 125-20-603-004, 125-21-201-001. The project site is located within Township 19 South, Range 60 East, and Section 20. The project site is currently undeveloped land with desert vegetation typical of southern Nevada and drains in a southeasterly direction. The project site is bound by Grand Montecito Parkway to the west, existing Deer Springs Way to the south, and undeveloped land to the north and east. A location map identified as Exhibit A has been included in Appendix A for reference.

1.3 FEMA Flood Zone Designation

The project site is located within a portion of the current Flood Insurance Rate Map (FIRM) Panel 32003C1745E, effective date September 27, 2002. Review of the Panel indicates that the project site is located within a FEMA designated Zone 'X' (unshaded). Zone 'X' (unshaded) is described by FEMA as areas determined to be outside the 0.2% annual chance flood plain. Exhibit B, identifying the site on the above-mentioned current FIRM Panel, has been included in Appendix A for reference.

1.4 Northwest Neighborhood Study

The project site has been illustrated on the existing and future drainage condition maps from the Northwest Neighborhood Study. Refere to Exhibits C1 and C2 provided in Appendix A.

1.5 CCRFCD Facility Information

Figures F-11 from the 2018 Las Vegas Valley Flood Control Master Plan Update (2018 MPU, Reference 1) shows that the project site is not adjacent to, crossed by, or has a direct impact to an existing or future planned CCRFCD MPU regional facility. Exhibit D1 identifying the project site on the 2018 MPU facilities figure and Exhibit D2 indicating the facility inventory, have been included in Appendix A for reference.

1.6 CCRFCD Hydrology Information

Figures W-2B from the Las Vegas Valley Flood Control Master Plan Update (2018 MPU, Reference 1) shows the project site on the 2018 MPU watershed figure. Exhibit D3 indicating the location of the project site on the figures has been included in Appendix A for reference.

1.7 Reference Studies

The following prior approved studies listed below have been utilized in preparation of this study. The reports have been reviewed and are considered acceptable for reference with exceptions as noted in this report. Slater Hanifan Group concurs with all referenced and adopted hydrologic and hydraulic analyses from the studies and the results established therein.

- *Technical Drainage Study for Montecito Offsite Storm Drain Infrastructure,* (hereinafter referred to as the Infrastructure Study, Reference 4) and prepared by Slater Hanifan Group. The study has been utilized to reference future storm drain provided in the ultimate condition. Relevant reference materials from the Infrastructure Study have been included in Appendix E. Note the Infrastructure Study is being currently reviewed by City of Las Vegas and no approval letter has been provided, but the future storm drain improvements are not considered existing in any condition and therefore does not influence the project site.

- *Technical Drainage Study for Centennial Parkway Channel West – US95 CC215 to Durango Drive* (hereinafter referred to as the Centennial Study, Reference 5) and prepared by CH2M, has conceptually established drainage patterns and flow rates for the site. The study has been referenced for storm drain improvements for the existing drainage facilities within Oso Blanca and US-95. Relevant reference materials from the Centennial Study have been included in Appendix F.

- *Technical Drainage Study for Grand Montecito Parkway* (hereinafter referred to as the Grand Montecito Parkway Study, Reference 6) and prepared by VTN, has established drainage patterns and flow rates for the 42" and 36" RCP storm drain systems located in Deer Springs Way and Grand Montecito Parkway intersection. The study has been referenced for storm drain improvements for the existing drainage facilities within the intersection. Relevant reference materials from the Grand Montecito Parkway Study have been included in Appendix G.

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 Criteria and Drainage Design Manual (CCRFCD Manual, Reference 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 was utilized to model the drainage basins analyzed by this study.

Precipitation:

Precipitation information has been provided Appendix B. The project site is located outside of the McCarran Airport Rainfall Area. The precipitation values utilized in the HEC-1 models, per CCRFCD Manual Figures 513 and 505, are 1.55 and 2.80 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 distribution as taken from Table 503 in the CCRFCD Manual was used. Precipitation data has been included in Appendix B.

Curve Number:

The SCS curve number loss rate methodology was utilized to approximate infiltration for the drainage basins. The soils information within the watershed was obtained from the US Department of Agriculture (USDA) Natural Resources Conservation Service NRCS Soil Survey of the Las Vegas Valley Area, Nevada, Part of Clark County (Soil Survey, Reference 3).

Exhibit E1 & E2 depicts the project site boundary on the soils map and have been included in Appendix A. Per the Soil Survey, the project site and all tributary areas lie within the following soil type:

- Soil Type 191, which is comprised of 100% Hydrologic Soil Group (HSG) 'A'. Soil Type 191 is described as Dalian very cobbly fine sandy loam, 2 to 8 percent slopes.

The following land use have been utilized for the existing and ultimate conditions:

- "Desert shrub (poor)" land use for existing undeveloped land
- "Commercial" land use for future onsite residential lots with average size of <6,000 square feet;
- "Apartments and condominiums" land use for future onsite apartments/condos.

All onsite and offsite soil and curve number data and computations, including CCRFCD Manual reference tables, have been included in Appendix B.

Curve Number Comparison

The Centennial Channel Study had previously analyzed the onsite and offsite watershed impacting the project site based on the anticipated development of the site. The conceptual curve numbers utilized in the hydrologic computations and HEC-1 modeling have been determined to be more conservative in comparison to the curve numbers proposed for development of the project site. Therefore, this study has referenced the ultimate developed condition hydrologic computations and peak flow rates from the Centennial Channel Study as the previous analysis remains accurate and more conservative to the proposed improvements. Refer to Appendix B for the hydrologic computations and to Appendix F for relevant referenced hydrologic computations from the Centennial Channel Study.

Lag Time:

The lag time is defined as the time measured from the center of mass of excess 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 basin to the outlet point of the basin. Standard Form 4, as outlined in the CCRFCD Manual, was utilized to determine the lag times for the basins modeled. The lag time computations have been included in Appendix B.

2.3 Hydraulic Modeling

Street Flow: Street flows have been analyzed utilizing the FlowMaster Version v8i software by Haestad Methods. In accordance with the CCRFCD Manual, 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-ft. 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-ft.

Swales and Channels: Swales and channels have been analyzed utilizing the FlowMaster Version v8i software by Haestad Methods. Consideration for erosion protection has been analyzed where velocities become erosive.

Drop Inlet: Drop inlets have been assessed using an in-house computation spreadsheet which utilizes equations outlined in Section 805 of the CCRFCD Manual, which includes a 50% clogging factor in determining sizes.

Storm Drain: The hydraulic gradient line (HGL) for all storm drain modeling has been determined utilizing the windows version of the Water Surface and Pressure Gradient (WSPGW) Hydraulic Analysis System software by the Los Angeles County Department of Public Works.

As outlined in the CCRFCD Manual, storm drain facilities are designed to maintain their hydraulic gradient line (HGL) at a minimum 1-ft below the finished grade elevations and limit the flow velocities in the facility between 3 ft/s and 25 ft/s.

3 EXISTING DRAINAGE CONDITION

3.1 Definition of Existing Drainage Condition

The existing drainage condition is defined as the current state of the onsite and offsite watershed. The offsite watershed is considered fully developed while the onsite is currently undeveloped comprising of the characteristic desert shrub and stock piled materials. The analysis of the offsite tributary has been referenced from the Centennial Study.

3.2 Discussion of Existing Drainage Condition

Onsite: The existing onsite drainage condition is defined as undeveloped land which drains in an easterly/southeasterly direction via natural earthen washes. The proposed improvements from the Centennial Study are considered existing. Multiple drainage facilities, from the Centennial Study improvements, are located along Oso Blanca and are intended to collect the existing surface runoff from onsite Basin NWBB3-B. CCRFCD Facility CN95 0000 is considered existing and located adjacent to the US-95 which connects to the existing Centennial Study culverts. Offsite runoff from the west drains north of the site thru the existing 8'x5' RCB culvert in Grand Montecito Parkway.

Offsite: The offsite watershed is defined as fully developed with fully improved roadways surrounding the project site. Existing storm drain improvements within Grand Montecito Parkway and Deer Springs Way intercept offsite flows and then discharges through the project site. A 42" RCP storm drain system and drop inlets west of the Deer Springs Way and Grand Montecito Parkway (DSM) intersection collect offsite surface runoff from the west. The 42" RCP storm drain system drains convey flows south within Grand Montecito Parkway (GMP). Flows within GMP drain into a low point along GMP and is collected by drop inlets in sump which connect to a 36" RCP storm drain and discharges into the existing onsite. Note the watershed and flowrate impacting the 42" RCP and 36" RCP storm drain systems have been referenced from the Grand Montecito Parkway Study.

Refer to Exhibit F in Appendix A for an illustration of the existing drainage condition.

3.3 Summary of Existing Condition Flows

A summary of the Existing Condition flowrates, as determined by the HEC-1 models has been presented in a summary table on Exhibit F. Refer to Appendix A for Exhibit F and Appendix B for the HEC-1 model, respectively.

4 UNIT 1 INTERIM DRAINAGE CONDITION

4.1 Definition of Unit 1 Interim Condition

The Unit 1 Interim Condition assumes that the offsite watershed remains as described from the existing condition but with proposed improvements for Unit 1 as fully constructed. Proposed ditches are located north and east of the project site, and existing 36" RCP discharging into the project site (per Grand Montecito Parkway Study improvements) will be extended per proposed onsite storm drain improvements. Additionally, a portion of the

future Montecito site has been mass graded for the developments, located downstream and adjacent to the Unit 1 site.

4.2 Discussion of Unit 1 Interim Condition

The Unit 1 Interim Condition drainage patterns are illustrated on Exhibit G provided in Appendix A.

Onsite: Onsite Basin NWBB3-B-A is proposed to drain east towards Oso Blanca. The basin has been provided for the Unit 1 project site improvements and the mass graded/non-developed portion of the Montecito site has been analyzed as Basin NWBB3-B-I.

Proposed Unit 1 storm drain improvements mitigate flows during the 100-year storm event for the interior roadways and connects with the existing 36" RCP storm drain system, south of Unit 1 and previously discharging onsite in the existing condition. A proposed ditch to the east of the Unit 1 Site collects the proposed storm drain flow and is conveyed as surface flow to ensure collection by the existing 6'x5' RCB culvert within Oso Blanca. The non-developed portion of Basin NWBB3-B-I drains southeasterly via a proposed ditch located north and east of the Unit 1 Site.

Offsite: Offsite flows do not impact the project site or Unit 1 improvements. Surface flow from the southwest are conveyed within GMP to an existing low point to be collected by existing 36" RCP storm drain system. The 36" RCP storm drain connects to proposed onsite storm drain system. Surface flows within Deer Springs are conveyed east towards Doe Brook Trail. Runoff from the northwest are conveyed within an 8'x5' RCB culvert located at GMP and Dorrell Lane. The storm drain culvert drains in a easterly direction which does not impact the Unit 1 Site.

Flowsplit: A flowsplit occurs at the Deer Springs Way and GMP intersection. The DSM intersection has been analyzed for the flows directed to the south and to the east, which have been utilized for the finished floor assessment. Refer to Section 4.4 for discussion of the flowsplit analysis; and Section 7 for further discussion of the finished floor analysis.

4.3 Summary of Unit 1 Interim Condition Flows

A summary of the Unit 1 Interim condition flowrates, as determined by the HEC-1 models has been presented in a summary table on Exhibit G. Refer to Appendix A for Exhibit G and Appendix B for the HEC-1 model, respectively.

Basins are further divided into subbasins to quantify the flows in the offsite hydraulic sections to accurately determine flow depths used for finished floor analysis and street flow criteria.

4.4 Summary of Unit 1 Interim Condition Street Flows

The flowsplit located at the Deer Springs Way and GMP intersection has been analyzed using the PIMA County methodology. Deer Springs Way has been identified as the main street for the PIMA County computations and FlowMaster sections have been analyzed for the roadway. Refer to Appendix C for flowsplit computations.

The ultimate condition flow rates have been used in the analysis of the fully improved street sections. Therefore, a separate street flow summary table for fully improved roadways have not provided for the Unit 1 Interim condition. Refer to Section 5.4 of this report for the ultimate condition street flows.

5 ULTIMATE DRAINAGE CONDITION

5.1 Definition of Ultimate Condition

In the ultimate condition, the future residential developments for the Montecito residential development is considered fully developed and all roadways are fully improved.

5.2 Discussion of Ultimate Condition

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

As previously mentioned, the conceptual ultimate developed condition of the project site and its tributary watershed has already been analyzed by the Centennial Channel Study. A curve number analysis of the project site based on the planned land use of single family and multi-family development yields a lower curve number than the Centennial Channel Study estimated a higher curve number which is more conservative. Therefore, the hydrologic analysis for the ultimate development of the site has been referenced from the Centennial Channel Study.

The ultimate condition Basin NWBB3-B has been prorated into subbasins. Subbasin A, D & E are collected in a local onsite storm drain system which tie into the proposed 48" RCP stub at the southeast corner of the site. Subbasins B and C drain into proposed trapezoid channel intended to convey flows to existing culvert located southeast of the Unit 1 site. The caped 36" RCP in the alignment of the middle private road will be extended upstream and connected to a series drop inlets to capture the flows within the road. A storm drain stub will be provided thru the back of one of the inlets to capture the entire flows from Subbasin C. Therefore, all the flows generated by the project site will be captured and conveyed by storm drain and will not discharge surface runoff into Oso Blanca Road. Refer to Appendix B for the ultimate condition hydrologic computations and to Appendix F for the hydrologic model referenced from the Centennial Study.

The offsite flows from the existing 8'x5' RCBC in Grand Montecito Parkway will be conveyed by the proposed 54" RCP as described in the proposed condition. However, the storm drain alignment will ultimately become the internal subdivision roadway and onsite drive aisle of the future multi-family development. The lateral offsite flows from a portion of the Mountain Ridge Park will still be captured by the proposed 24" RCP lateral. Likewise, the proposed field inlet at the northeast corner of the site will be replaced with a curb inlet upon full improvement of Oso Blanca Road to still capture the entire flows tributary to northeast corner of the site. Other existing laterals along Oso Blanca Road will be provided with curb inlets in the future upon Oso Blanca Road improvement.

5.3 Summary of Ultimate Condition Flows

A summary of the ultimate condition flow rates has been provided in a table on Exhibit H, included in Appendix A. A summary table of the prorated subbasins is also provided on

Exhibit H. The associated referenced HEC-1 analysis utilized to determine the peak flow rates identified on Exhibit H has been included in Appendix F. The ultimate condition HEC-1 utilized for the curve number comparison has been provided in Appendix B. Note the Ultimate Condition has generated the worst-case flowrate for the Unit 1 Site and therefore street flow depth computations have utilized flowrates from the Ultimate Condition, refer to Section 5.4 for discussion of the street flow sections.

5.4 Summary of Ultimate Condition Street Flows

As previously stated, the ultimate condition generated the worst-case flowrates for the project site and therefore, have been utilized for the hydraulic analysis of the street flows. Where multiple street grades are provided for the street section, the hydraulic section has been analyzed for the minimum and maximum slopes.

The street flow summary table have been included on Exhibit H, and the supporting FlowMaster street flow computations have been included in Appendix C for reference. Review of the street flow calculations indicate that DxV and 100-year depth criteria has been met, furthermore, the 100-year flows satisfied the 10-year criteria; thus, no 10-year street flow calculations have been provided. Additionally, the proposed streets are less than 80-ft in ROW width and are thus not required to adhere to 10-year dry lane criteria; therefore, 10-year dry lane computations have not been analyzed.

6 SUMMARY OF RECOMMENDED FACILITIES

Summary table and illustration indicating the locations of the existing, proposed and future drainage facilities has been provided on Exhibit G & H, in Appendix A, for the Unit 1 Interim and Ultimate conditions, respectively.

Swales and Ditches: Hydraulic computations for the proposed swales and ditches located have been included in Appendix C.

Two trapezoidal earthen ditches have been provided during the Unit 1 interim condition, located east of the Unit 1 improvements intended to mitigate offsite flows to be collected by the existing culverts located along Oso Blanca; the other located east of the Unit 1 Site to convey storm drain discharge towards the existing drainage facilities in Oso Blanca. A swale section has been provided for the berm located north of the project site. The section has been identified as Section T1. FlowMaster computations have been provided for the hydraulic sections and included in Appendix C.

Proposed Storm Drain System: The proposed 36" RCP storm drain system has been analyzed as the SD1 model and the 24" RCP lateral as the SD1-L model. The SD1 system connects the existing 36" RCP to proposed onsite storm drain which is proposed to discharge east of the project site. A proposed drop inlet located at the eastern terminus of Vulturo Avenue connects to the proposed storm drain system, this lateral system has been identified as the SD1-L Model. WSPGW computations for the storm drain models have been provided in Appendix C.

7 SUMMARY OF FINISHED FLOORS

The ultimate condition was used to assess finished floor elevations. All the proposed finished floors have been adequately flood protected above twice the depth of flow in the adjacent streets, up to 18-inches, measured at the high side of the lot and 18-inches above the top of curb or centerline elevations measured at the middle of the lot, whichever is higher. The finished floor elevation assessments have been included in Appendix D.

8 CONCLUSIONS & RECOMMENDATIONS

1. The project site is not located within a FEMA designated SFHA. Therefore, notification to FEMA will not be required for this study.

2. The project site is not adjacent to or crossed by any CCRFCD regional facilities. Therefore, concurrence from CCRFCD will not be required for this study.

3. The interior and perimeter roadways meet all CCRFCD Manual criteria as discussed in Section 2.3.

4. All storm drainage facilities proposed by the project site are in conformance with storm drain criteria.

5. Routine maintenance of the drainage infrastructures and storm drain systems is required to support the designed levels of functionality and integrity summarized herein. Failure to provide adequate maintenance can prevent the drainage systems from performing in accordance with their designed intent. It is the responsibility of the owner of the facilities to provide ongoing maintenance and to ensure that the drainage systems are functioning as intended.

6. The recommended drainage patterns by this study are in conformance with the anticipated drainage patterns by adjacent and downstream properties and result in no adverse impacts. Therefore, the development of the proposed project site is considered acceptable.

7. Finished floor elevations have been elevated at least to a height of two times the depth of flow in the adjacent streets measured from the high side of the building at the middle of the building whichever is higher.

8. The improvement plans have been included of this study to support the drainage pattern, conclusions and/or recommendations detailed in this study.

9 REFERENCES

1. *Las Vegas Valley Flood Control Master Plan Update.* Clark County Regional Flood Control District, 2018.

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

3. *Soil Survey of Las Vegas Valley Area, Nevada.* U.S. Department of Agriculture, Natural Resources Conservation Service, September 2016.

4. *Technical Drainage Study for Montecito Storm Drain Infrastructure;* SHG, February 2019.

5. *Technical Drainage Study for Centennial Parkway Channel* West – *US95 CC215 to Durango Drive*; CH2M, November 2016.

6. *Technical Drainage Study for Grand Montecito Parkway*; VTN, February 2007.

LIST OF APPENDICES

Appendix A Drainage Exhibits
- Exhibit A – Location Map
- Exhibit B – FEMA FIRM Panel Map
- Exhibit C1 – Northwest Neighborhood Study Existing Drainage Condition Map
- Exhibit C2 – Northwest Neighborhood Study Future Drainage Condition Map
- Exhibit D1 – CCRFCD MPU Facility Map
- Exhibit D2 – CCRFCD MPU Facility Inventory List
- Exhibit D3 – CCRFCD MPU Watershed Map
- Exhibit E1 – Existing Condition Soils Map
- Exhibit E2 –Unit 1 Interim Condition Soils Map
- Exhibit F – Existing Condition Drainage Map
- Exhibit G – Unit 1 Interim Condition Drainage Map
- Exhibit H – Ultimate Condition Drainage Map

Appendix B Hydrologic Analyses
- Precipitation Data
- Curve Number Computations & Soils Data
- Standard Form 4 Computations
- HEC-1 Analysis - Existing Condition
- HEC-1 Analysis - Unit 1 Interim Condition
- HEC-1 Analysis – Ultimate Condition

Appendix C Hydraulic Analyses
- 100-YR Street Flowsplit Computations
- 100-YR Street Flow Computations – Ultimate Condition
- Hydraulic Swale and Channel Computations
- Drop Inlet Sizing Computations
- WSPGW Storm Drain Computations
- Emergency Overflow Computations

Appendix D Finished Floor Analysis

Appendix E Reference Material
Technical Drainage Study for Montecito Storm Drain Infrastructure, By SHG
- Referenced Report Excerpt
- Referenced Improvement Plans

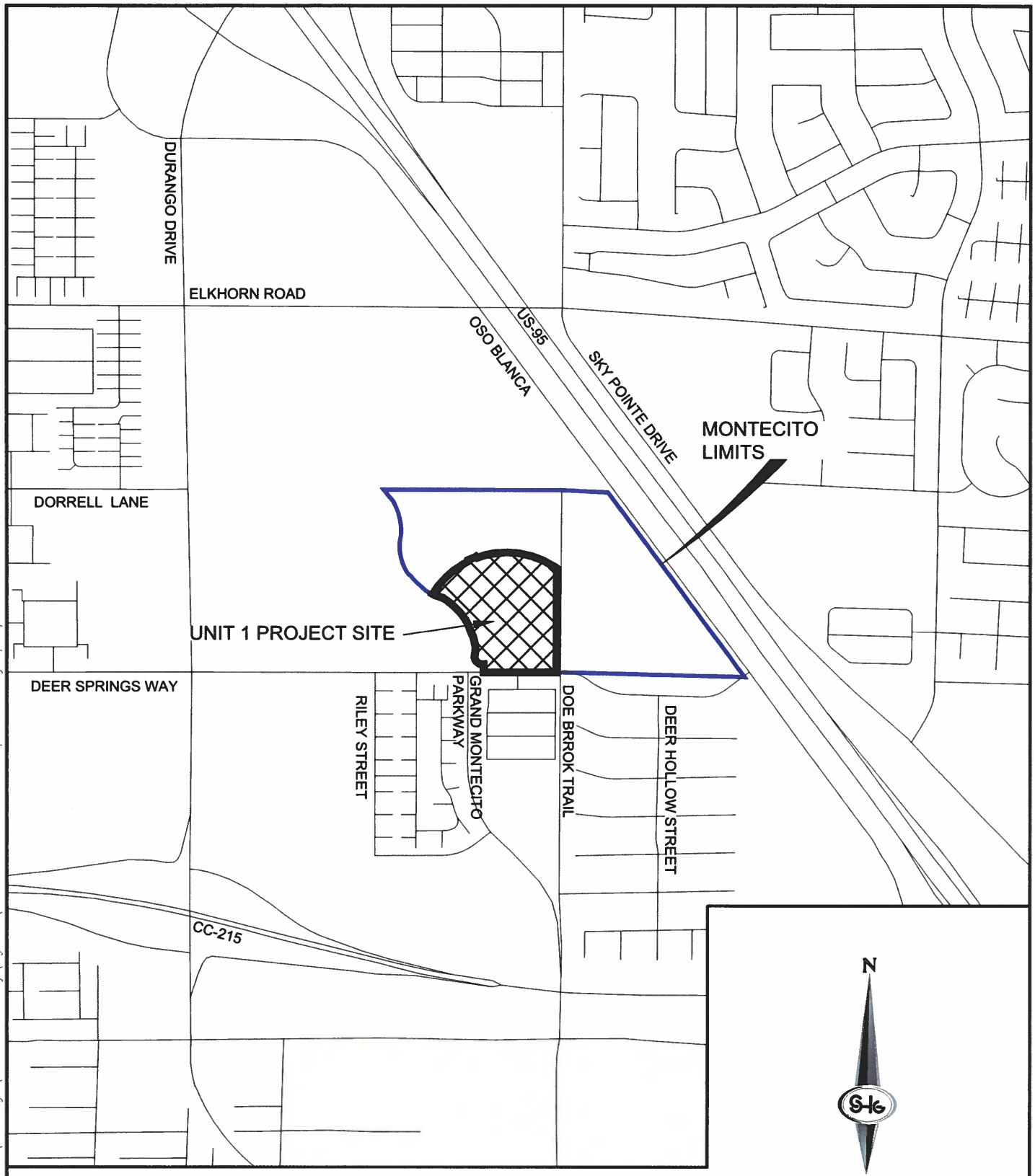
Appendix F Reference Material
Final Design Report for Centennial Parkway Channel West – US95, CC215 to Durango Drive, By CH2M
- Referenced Report Excerpt Referenced Drainage Exhibits
- Referenced Hydrologic Data
- Referenced Hydraulic Data
- Referenced Improvement Plans

Appendix G Reference Material
Technical Drainage Study for Grand Montecito Parkway, By VTN
- Approval Letters
- Referenced Report Excerpt
- Referenced Drainage Exhibits
- Referenced Hydrologic Data
- Referenced Hydraulic Data
- Referenced Improvement Plans

Appendix H CD of Electronic Files & Improvement Plans

APPENDIX A

Drainage Exhibits



SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

KB HOME

MONTECITO UNIT 1

LOCATION MAP

DATE: MAR 2019	PROJECT NO. KBH1805.001
DRAFTER: DCH	
DESIGNER: DCH	EXHIBIT A
CHECKED: SOA	SHEET 1 OF 1

j:\kbh1805-001 montecito 60 unit 1\drainage\technical study\figures\kbh1805.001 exh a-e upfronts.dwg 3/17/2019 7:17 PM Jonathan Rocha

320003

OSO BLANCA ROAD

DU

SUNNY SPRINGS LANE

ELKHORN ROAD

K COUNTY
ORATED AREAS
320003

CLARK COUNTY
UNINCORPORATED AREAS
320003

CITY OF LAS VEGAS
325276

20

GR1151

ZONE X

CLARK COUNTY
UNINCORPORATED AREAS
320003

DEER SPRINGS WAY

21

UNIT 1 PROJECT SITE

CLARK COUNTY
UNINCORPORATED AREAS
320003

ROME BOULEVARD

PARKWAY

ZONE X

GR1302

CITY

CLARK COUNTY
UNINCORPORATED AREAS
320003

OSO BLANCA ROAD

CENTENNIAL

CINTER

GR1148

CITY OF LAS VEGAS
325276

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

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

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

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

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

ZONE A99 Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- Coastal Barrier Boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross Section Line
- 23 — 23 — Transect Line
- 87° 07' 45", 32° 22' 30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4276000M — 1000-meter Universal Transverse Mercator grid values, zone 11
- 600000 FT — 5000-foot grid ticks
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1745 E

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

PANEL 1745 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAS VEGAS, CITY OF	325276	1745	E
CLARK COUNTY, UNINCORPORATED AREAS	320003	1745	E

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

MAP NUMBER
32003C1745 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

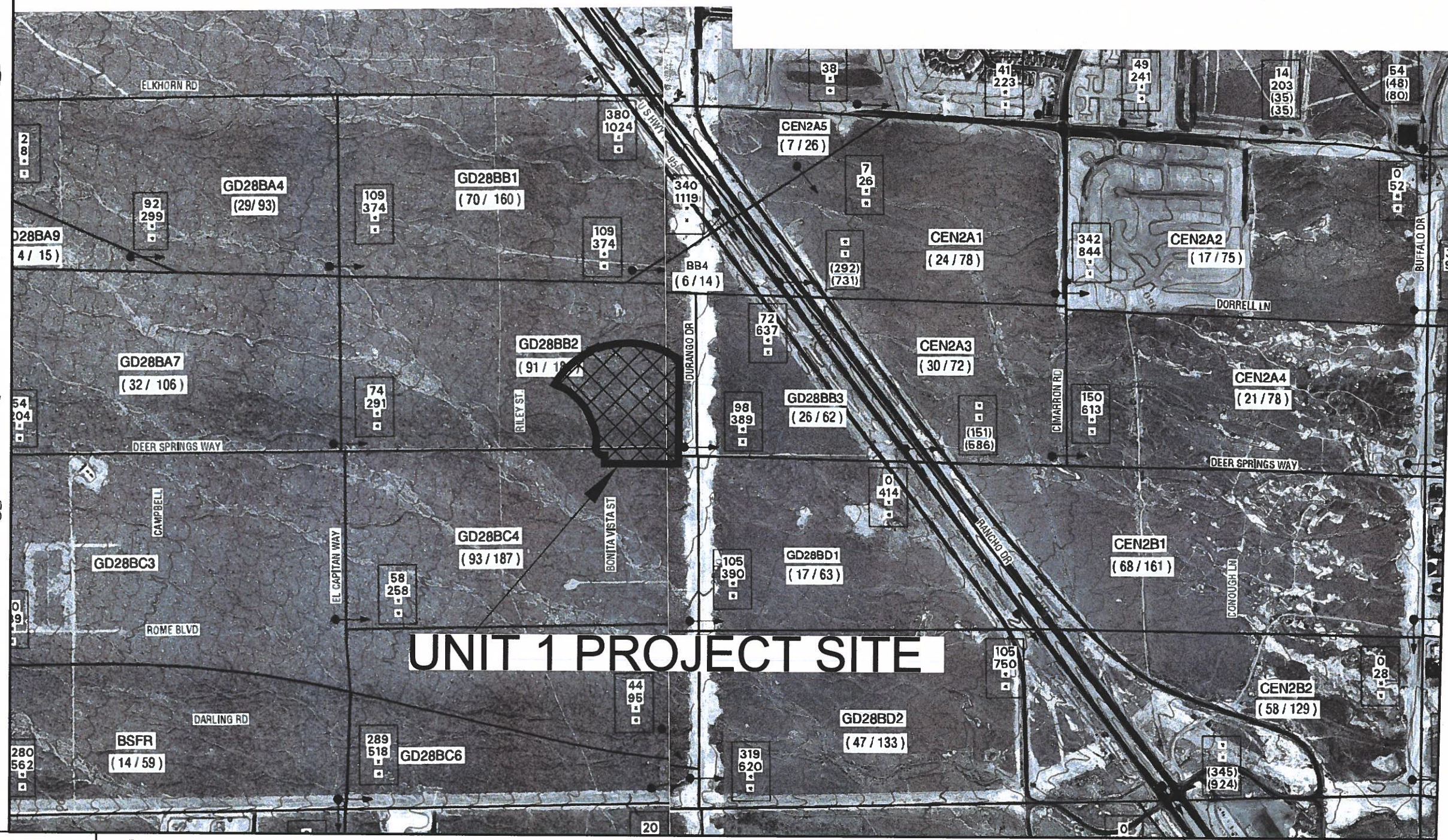
KB HOME

MONTECITO UNIT 1
FEMA FIRM PANEL

DATE: MAR 2019
DRAFTER: DCH
DESIGNER: DCH
CHECKED: SOA
PROJECT NO.
KBH1805.001

EXHIBIT B
SHEET 1 OF 1

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CITY OF LAS VEGAS NEVADA

NORTHWEST NEIGHBORHOOD STUDY

LEGEND

- SUB-BASIN BOUNDARY
- FLOW ARROW
- 250 10-YEAR STREET FLOW
- 500 100-YEAR STREET FLOW
- 300 10-YEAR FACILITY FLOW
- 800 100-YEAR FACILITY FLOW

(FLOWS IN CFS)

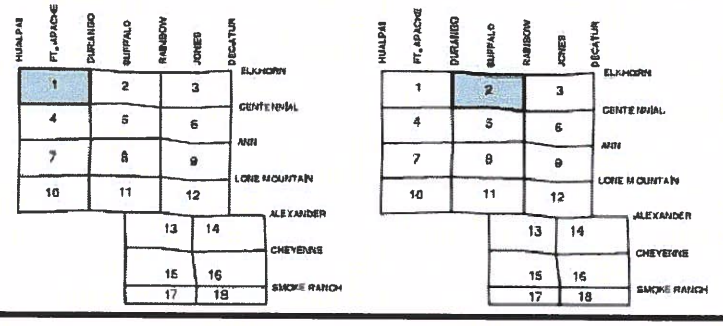
- BWJS — Basin-ID
- (13 / 59) — Contributing flow (10-Year / 100-Year) from the basin (cfs)

PHOTO DATE: APRIL 1996

FIGURE E-1
FIGURE E-2

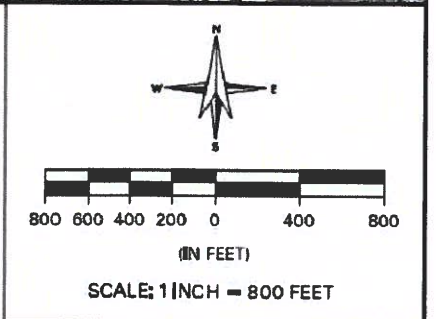
EXISTING DRAINAGE CONDITIONS

POST, BUCKLEY, SCHUH & JERNIGAN, INC.
ENGINEERING PLANNING SURVEYING GIS
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REVISED SEPTEMBER 1999

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



SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
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MONTECITO UNIT 1

NORTHWEST NEIGHBORHOOD STUDY EXISTING DRAINAGE CONDITION MAP

DATE: MAR 2019
DRAFTER: DCH
DESIGNER: DCH
CHECKED: SOA
PROJECT NO. KBH1805.001

EXHIBIT C1
SHEET 1 OF 1

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UNIT 1 PROJECT SITE

NORTHWEST NEIGHBORHOOD STUDY

LEGEND

- EXISTING REGIONAL DETENTION BASINS
- PROPOSED REGIONAL DETENTION BASINS
- EXISTING LOCAL DETENTION BASINS
- EXISTING REGIONAL BRIDGES
- PROPOSED REGIONAL BRIDGES
- EXISTING LOCAL BRIDGES
- EXISTING REGIONAL CULVERT
- PROPOSED REGIONAL CULVERT
- EXISTING LOCAL CULVERT
- EXISTING REGIONAL PIPELINE
- PROPOSED REGIONAL PIPELINE
- EXISTING LOCAL PIPELINE
- PROPOSED LOCAL PIPELINE
- EXISTING REGIONAL CHANNEL
- PROPOSED REGIONAL CHANNEL
- EXISTING LOCAL CHANNEL
- PROPOSED REGIONAL PIPELINE (Not Included in 1996 MPU)
- PROPOSED REGIONAL CHANNEL (Not Included in 1996 MPU)
- EXISTING REGIONAL DIKE/LEVEE
- PROPOSED REGIONAL DIKE/LEVEE
- EXISTING LOCAL DIKE/LEVEE
- EXISTING STORM WATER PUMPING STATION
- PROPOSED BELTWAY ALIGNMENT

FIGURE F-1

FIGURE F-2

FLOW ARROW

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

(FLOWS IN CFS)

SCALE: 1 INCH = 800 FEET

(IN FEET)

NOTE:

Ultimate drainage conditions are based on future CN values with all flood control facilities in place

See the "September 1999 City of Las Vegas Northwest Neighborhood Study Phase 2" for proposed facilities in and north of Elkhorn.

REVISED SEPTEMBER 1999

HUALAPAI	PT. APACHE	DURANGO	BUFFALO	RAINBOW	JONES	DECATUR	
1		2		3			ELKHORN
4		5		6			CENTENNIAL
7		8		9			ANN
10		11		12			LONE MOUNTAIN
			13	14			ALEXANDER
			15	16			CHEYENNE
			17	18			SMOKE RANCH

FUTURE DRAINAGE CONDITIONS

PBS&J
701 North Green Valley Parkway, Suite 100
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ENGINEERING PLANNING SITE SURVEYING CONSTRUCTION SERVICES

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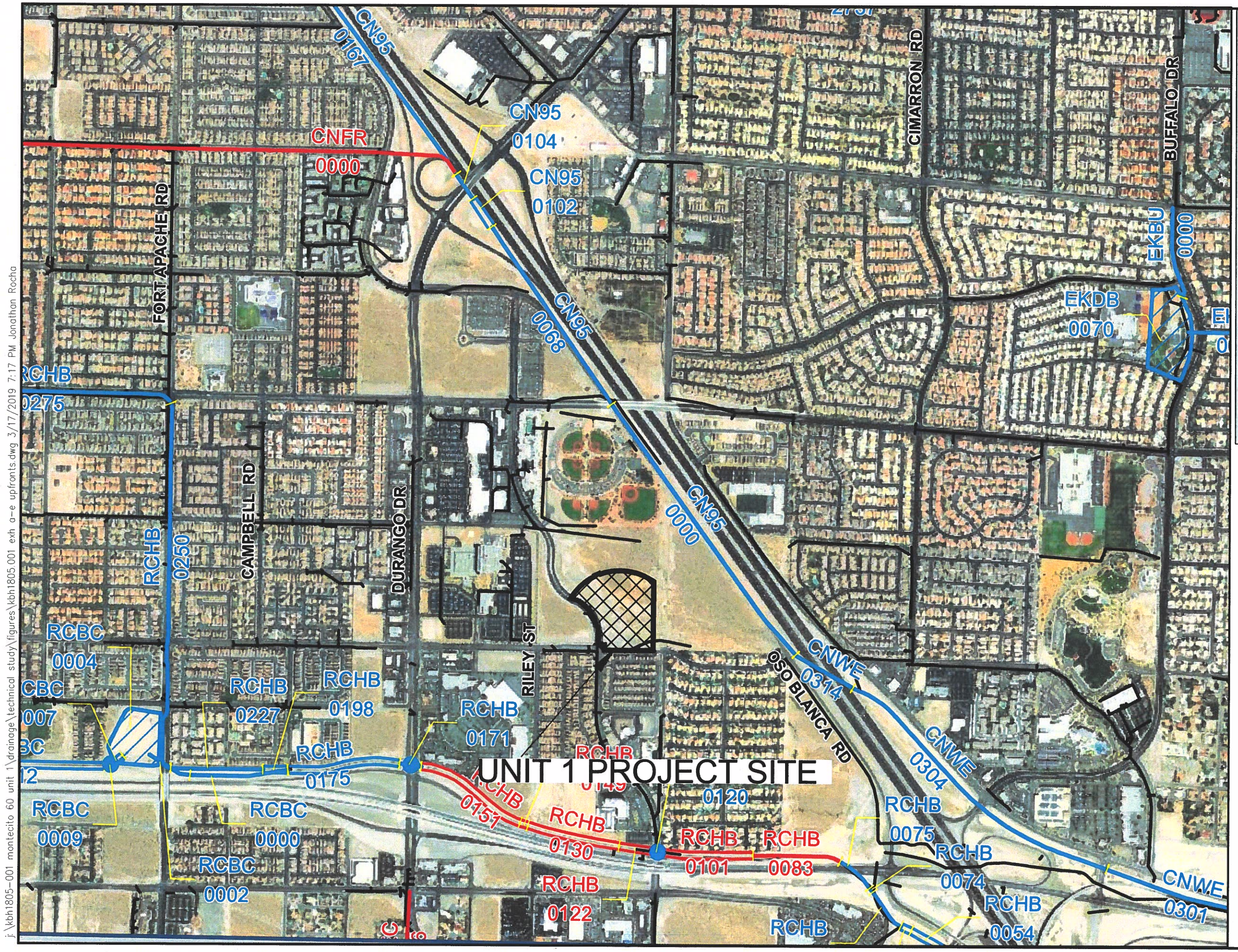
MONTECITO UNIT 1

NORTHWEST NEIGHBORHOOD STUDY FUTURE DRAINAGE CONDITION MAP

DATE: MAR 2019
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DESIGNER: DCH
CHECKED: SOA
PROJECT NO. KBH1805.001

EXHIBIT C2
SHEET 1 OF 1

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REGIONAL FLOOD CONTROL DISTRICT

2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-11
FLOOD CONTROL FACILITIES

LEGEND

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

Remove & Replace/Parallel Facilities

Category A	Category B
Channel	Channel
Stormdrain	Stormdrain
Crossing	Crossing

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MONTECITO UNIT 1
MPU FACILITY MAP

DATE:	MAR 2019
DRAFTER:	DCH
DESIGNER:	DCH
CHECKED:	SOA
PROJECT NO.	KBH1805.001

EXHIBIT D1
SHEET 1 OF 1

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ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
BCHU		**BELTWAY CHANNEL - HUALAPAI**						
0000	E	12' X 5' RCAP	853	206	DBA3-C	WEST3	0.84	1.11
0017	E	8' X 5' RCAP	1216	218	CBA3-C	WEST3	0.84	1.33
0040	E	66" RCP	60	57	DNW26-C	WEST3	0.51	1.04
0042	E	60" RCP	615	57	DNW26-C	WEST3	0.51	1.42
0054	E	54" RCP	615	57	DNW26-C	WEST3	0.51	1.23
BRDB		**BRENT DRAINAGE SYSTEM**						
0000	E	36" RCP WITH 18" ORIFICE PLATE	2170	36	BRDB	WEST3	2.37	0.40
0031	E	45,080 CFS PMF SPILLWAY		45080	CBRDB	WEST3	2.37	
0032	E	450 AC-FT SOUTH ENVIRONMENTAL ENHANCEMENT AREA		1885	CBRDB	WEST3	2.37	
0033	E	ENERGY DISSIPATOR	100	1052	CNW147W	WEST3	1.75	
0043	E	20' X 7' RCBC	135	1052	CNW147W	WEST3	1.75	0.50
0045	E	CONC CHNL 12'W 7'D 2:1 SS	983	1352	CNW147W	WEST3	1.75	2.00
0058	E	12' X 6' RCB	1688	951	CNW113-C	WEST3	1.47	1.81
0107	P	8' X 6' RCB	2560	951	CNW113-C	WEST3	1.47	2.40
0157	P	12' X 7' RCB	2580	621	CNW96-C	WEST3	0.84	0.25
CN95		**CENTENNIAL PKWY CHANNEL WEST / U.S 95 BRANCH**						
0000	E	20' X 7' RCB	3335	2778	CNWB83-C	WEST3	3.35	2.00
0068	E	20' X 7' RCB	2300	2725	CNW103-C	WEST3	3.04	2.10
0102	E	CONC CHNL 20'W 9'D 0:1 SS	375	2548	2CNW89-C	WEST3	2.65	1.77
0104	E	2- 12' X 10' RCB	300	2548	2CNW89-C	WEST3	2.65	1.10
0167	E	16' X 8' RCB	3521	2548	2CNW89-C	WEST3	2.65	1.58
0199	E	15' X 9' RCB	407	1467	2CNW72-C	WEST3	1.13	0.41
0218	E	15' X 9' RCB	1227	1467	2CNW72-C	WEST3	1.13	0.82
0257	E	TRANSITION STRUCTURE	59	1467	2CNW72-C	WEST3	1.13	0.77
0259	E	15' X 9' RCB	284	599	CNW74-C	WEST3	0.40	0.77
0313	E	10' X 6 RCB	2680	599	CNW74-C	WEST3	0.40	2.50
0318	E	TRANSITION STRUCTURE	60	599	CNW74-C	WEST3	0.40	1.50
0333	E	5' X 5' RCB	670	259	NW62-S	WEST3	0.16	1.50
CNFR		**CENTENNIAL PKWY CHANNEL WEST / FARM ROAD**						
0000	P	8' X 6' RCB	8350	775	CNW89-C	WEST3	1.05	2.00
CNGT		**CENTENNIAL PKWY CHANNEL WEST / GRAND TETON BRANCH**						
0000	E	10' X 5' RCB	2376	543	CNW71-E	WEST3	0.47	2.58
0020	E	10' X 5' RCB	1570	543	CNW71-E	WEST3	0.47	3.50
0043	E	8' X 6' RCB	2470	543	CNW71-E	WEST3	0.47	3.60
0118	E	6' X 5' RCAP	5472	349	KYLEDET	KYLEDB	58.61	3.72
CNKC		**CENTENNIAL PKWY CHANNEL WEST / KYLE CANYON BRANCH**						
0000	E	12' X 4' RCB	377	954	CNW72-C	WEST3	0.74	4.58
0007	E	10' X 5' RCB	874	954	CNW72-C	WEST3	0.74	3.28
0024	E	8' X 5' RCB	1385	954	CNW72-C	WEST3	0.74	2.40
0050	E	72" RCP	2757	437	NW45-S	WEST3	0.31	3.60
CNWE		**CENTENNIAL PKWY CHANNEL WEST**						
0195	E	CONC CHNL 36'W 9'D 0:1 SS	1130	3771	CNW3B3-C	WEST3	5.64	0.60
0200	E	CONC CHNL 36'W 9'D 0:1 SS	1340	3523	CNW2D4-C	WEST3	5.14	1.00
0226	E	2- 18' X 8.5' RCBC @ RIO VISTA	100	3523	CNW2D4-C	WEST3	5.14	0.51
0241	E	CONC CHNL 36'W 9.5'D 0:1 SS	405	3523	CNW2D4-C	WEST3	5.14	0.51
0251	E	CONC CHNL 36'W 9'D 0:1 SS	575	3234	CNW2D3-C	WEST3	4.64	0.51
0271	E	CONC CHNL 32'W 10'D 0:1 SS	229	3234	CNW2D3-C	WEST3	4.64	0.51
0274	E	32' X 10' RCBC @ TENAYA	142	3234	CNW2D3-C	WEST3	4.64	0.51
0277	E	CONC CHNL 32'W 9'D 0:1 SS	579	3234	CNW2D3-C	WEST3	4.64	0.64
0287	E	CONC CHNL 32'W 8'D 0:1 SS	865	2992	CNW2B2-C	WEST3	3.83	1.59
0301	E	2- 15' X 7' RCB	1738	2992	CNW2B2-C	WEST3	3.83	1.30
0304	E	22' X 7' RCB	3410	2992	CNW2B2-C	WEST3	3.83	1.85
0314	E	22' X 7' RCB	703	2822	CNWBD2-N	WEST3	3.45	1.94
EKBU		**ELKHORN SPRINGS AND BUFFALO**						
0000	E	60" RCP	1046	255	NW134-C	WEST3	0.46	0.89
EKDB		**ELKHORN SPRINGS DETENTION BASIN**						
0000	E	GRASS CHNL 15'W 5.8'D 3.5:1 SS	2575	221	CNW150-C	WEST3	1.41	0.39
0025	E	4' X 3' RCB	160	106	ELKBASIN	WEST3	0.84	0.50
0026	E	48" RCP	1270	106	ELKBASIN	WEST3	0.84	1.23
0049	E	60" RCP	1006	106	ELKBASIN	WEST3	0.84	0.13
0070	E	48 AC-FT ELKHORN SPRINGS DETENTION BASIN		456	CNW133-C	WEST3	0.84	

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
EKHU		**ELKHORN AND HUALAPAI**						
0003	E	6' X 4' RCAP	980	393	CNW26-C	WEST3	0.51	3.6'
0022	E	6' X 5' RCAP	150	393	CNW26-C	WEST3	0.51	3.6'
0023	E	8' X 5' RCAP	1200	393	CNW26-C	WEST3	0.51	0.90
GOEC		**GOWAN NORTH - EL CAPITAN BRANCH**						
0175	P	78" RCP	1320	150	CCPFR-C	GOW3A	0.46	1.15
GONO		**GOWAN NORTH SYSTEM**						
0511	P	6' X 5' RCB	1320	326	CCPHW-C	GOW3A	0.60	1.14
LVMD		**LAS VEGAS WASH - MIDDLE**						
2507	E	2- 13' X 9' RCB	2831	1808	CNW168-C	CWEST3	4.43	0.36
2525	E	24' X 8' RCB	1140	1598	CNW159-C	CWEST3	3.92	0.40
2550	E	24' X 8' RCB	1445	1312	CD161'-C	CWEST3	3.42	0.40
2574	E	24' X 8' RCB	1430	1312	CD161'-C	CWEST3	3.42	0.4'
2599	E	CONC CHNL 24'W 7'D 2:1 SS	1577	1268	CNW162-C	CWEST3	3.10	0.5'
2632	E	18' X 5' RCB	1443	695	CNW138-C	WEST3	1.16	0.47
2661	E	18' X 5' RCB	3003	695	CNW138-C	WEST3	1.16	0.78
2711	E	10' X 5' RCB	2440	560	CNW139-C	WEST3	0.93	2.00
2737	E	6' X 5' RCB	265	560	CNW139-C	WEST3	0.93	2.25
2763	E	6' X 5' RCB	1565	560	CNW139-C	WEST3	0.93	2.4'
2789	E	6' X 5' RCB	910	560	CNW139-C	WEST3	0.93	2.00
MOHU		**MOCCASIN-HUALAPAI BRANCH**						
0000	P0	13' X 6' RCB	1478	924	2CNW33-C	LOWER3	2.08	1.80
0029	P0	11' X 6' RCB	1654	560	CNW45-N	LOWER3	1.25	0.50
0061	P0	9' X 6' RCB	779	560	CNW45-N	LOWER3	1.25	0.50
0075	P0	60" RCP	1000	263	CNW45-C	LOWER3	1.03	3.00
0095	P0	NATURAL WASH	865	263	CNW45-C	LOWER3	1.03	3.00
0111	P0	6' X 5' RCBC @ EGAN CREB DR	164	263	CNW45-C	LOWER3	1.03	6.10
0116	P0	NATURAL WASH	1900	263	CNW45-C	LOWER3	1.03	3.00
0151	P0	54" RCPC @ SHAUMBER	438	72	MODB1	LOWER3	0.86	2.00
MOIR		**MOCCASIN - IRON MOUNTAIN BRANCH**						
0000	P0	60" RCP	1060	410	CNW33-C	LOWER3	0.83	4.50
0023	P0	54" RCP	1161	71	MODB2	LOWER3	0.56	3.20
0041	P0	42" RCP	1236	71	MODB2	LOWER3	0.56	5.00
0065	P0	60" RCP	1099	71	MODB2	LOWER3	0.56	0.40
MOKC		**MOCCASIN AND KYLE CANYON**						
0000	P0	9' X 6' RCB	6140	1072	CNW35-C	LOWER3	2.69	3.40
MOLC		**MOCCASIN - LOG CABIN BRANCH**						
0000	P0	20' X 10' RCB	2206	2265	2CMW64	LOWER3	6.06	0.65
0072	P0	12' X 8' RCB	4493	2265	2CMW64	LOWER3	6.06	2.66
0149	E	13' X 6' RCB	520	1817	CNW62-N	LOWER3	4.88	2.00
0157	P	13' X 6' RCB	288	1817	CNW62-N	LOWER3	4.88	1.40
0162	P0	13' X 6' RCB	435	1817	CNW62-N	LOWER3	4.88	1.80
MSNV		**MOUNTAIN SPA/VISTA RANCH**						
0000	E	6: 12' X 5' RCBC @ GRAND TETON	273	639	CNW163-C	CWEST3	1.69	0.40
0005	E	GRASS CHNL 100'W 4.5'D 10:1 SS	6325	259	CNW155-C	WEST3	4.46	0.40
0125	E	GRASS CHNL 100'W 4.5'D 10:1 SS	1300	66	CNW147E	WEST3	1.55	0.40
RACD		**RACEL STREET COLLECTOR**						
0000	E	14' X 7' RCB BAFFLED ENERGY DISSIPATOR	87	424	CNW111S	WEST3	0.55	0.29
0001	E	78" RCP	3245	424	CNW111S	WEST3	0.55	2.46
0064	E	78" RCP	2650	347	DNW111S	WEST3	0.44	2.09
RCBC		**RANCHO ROAD SYSTEM - BELTWAY CHANNEL**						
0000	E	6' X 5' RCB	1062	173	FADB	WEST3	1.54	1.04
0002	E	54" RCP OUTLET WITH 41" ORIFICE	503	173	FADB	WEST3	1.54	2.38
0003	E	2,341 CFS PMF SPILLWAY		2341	FADBIN	WEST3	1.54	
0004	E	76 AC-FT FORT APACHE DETENTION BASIN		658	FADBIN	WEST3	1.54	
0007	E	ENERGY DISSIPATOR	100	658	FADBIN	WEST3	1.54	
0009	E	12' X 6' RCBC @ FORT APACHE DETENTION BASIN	133	658	FADBIN	WEST3	1.54	1.79
0012	E	CONC CHNL 12'W 6'-7'D 0:1 SS	1937	658	FADBIN	WEST3	1.54	3.15
0048	E	12' X 6' RCBC @ GRAND CANYON	140	559	CMNA1	WEST3	1.27	3.15
0051	E	CONC CHNL 12'W 6'-8'D 0:1 SS	2860	559	CMNA1	WEST3	1.27	3.44
0093	E	1: 10' X 6' AND 1: 6' X 6' RCBC @ HUALAPAI WAY	190	559	CMNA1	WEST3	1.27	1.93
0100	E	CONC CHNL 12'W 5.5'D 0:1 SS	2085	475	CDMNA1	WEST3	0.43	2.88

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
RCBC		**RANCHO ROAD SYSTEM - BELTWAY CHANNEL**						
0140	E	CONC CHNL 10'W 5'D 0:1 SS	2155	475	CDMNA1	WEST3	0.43	1.65
RCHB		**RANCHO ROAD SYSTEM - BELTWAY**						
0053	E	2- 12' X 8' RCBC @ SOUTH RAMP CONNECTOR	85	1465	CDW1C1-C	WEST3	3.55	1.40
0054	E	CONC CHNL 21'W 8'D 0:1 SS	432	1465	CDW1C1-C	WEST3	3.55	1.51
0062	E	TRANSITION STRUCTURE	130	1465	CDW1C1-C	WEST3	3.55	1.51
0065	E	24' X 7' RCB	480	1465	CDW1C1-C	WEST3	3.55	0.30
0074	E	24' X 6' RCB	50	1414	CNWBC6-C	WEST3	3.41	0.30
0075	E	20' X 6' RCBC @ BELTWAY	428	1414	CNWBC6-C	WEST3	3.41	2.81
0083	P	20' X 4' RCB	950	1414	CNWBC6-C	WEST3	3.41	2.49
0101	P	CONC CHNL 20'W 5'D 0:1 SS	980	1414	CNWBC6-C	WEST3	3.41	2.38
0120	E	20' X 6' RCBC @ GRAND MONTECITO	120	1414	CNWBC6-C	WEST3	3.41	1.00
0122	P	CONC CHNL 16'-20'W 6'D 0:1 SS	350	1414	CNWBC6-C	WEST3	3.41	1.84
0130	P	CONC CHNL 16'W 5.5'D 0:1 SS	1012	1414	CNWBC6-C	WEST3	3.41	2.87
0149	P	CONC CHNL 16'W 5-5.5'D 0:1 SS	87	1115	CNWBC3	WEST3	2.99	2.27
0151	P	CONC CHNL 16'W 5'D 0:1 SS	1255	1115	CNWBC3	WEST3	2.99	2.65
0171	E	16' X 6' RCBC @ EL CAPITAN WAY	234	1115	CNWBC3	WEST3	2.99	1.75
0175	E	CONC CHNL 14'W 7'D 0:1 SS	1220	1115	CNWBC3	WEST3	2.99	2.93
0198	E	CONC CHNL 14'W 7'D 0:1 SS	225	758	CNWBA6-C	WEST3	1.88	2.93
0227	E	12' X 6' RCB	995	758	CNWBA6-C	WEST3	1.88	1.73
0250	E	12' X 6' RCB	4020	758	CNWBA6-C	WEST3	1.88	1.12
0275	E	7' X 6' RCB	2650	535	CNW66-C	WEST3	1.04	3.30
0265	P	7' X 6' RCB	2980	431	CNW53-C	WEST3	0.80	3.60
TSDB		**TULE SPRINGS DRAINAGE SYSTEM**						
0000	E	2: 10' X 4' RCBC @ ECHO GRANDE	100	25	TULEDB	WEST3	1.37	1.04
0002	E	36" RCP WITH 22" ORIFICE PLATE	320	25	TULEDB	WEST3	1.37	0.33
0010	E	14,013 CFS PMF SPILLWAY		14013	CTULEDB	WEST3	1.37	
0011	E	117 AC-FT NORTH ENVIRONMENTAL ENHANCEMENT AREA		551	CTULEDB	WEST3	1.37	
0012	E	ENERGY DISSIPATOR	260	333	CNW148-C	WEST3	0.59	
0023	P	78" RCP	1320	333	CNW148-C	WEST3	0.59	0.80
0059	P	72" RCP	2640	333	CNW148-C	WEST3	0.59	1.03

*The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.

**As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.

^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e. HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).

REGIONAL FLOOD CONTROL DISTRICT

2018 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F-11

LEGEND

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

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

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

Construction Features

Cast in Place Concrete Pipe..... CIPCP
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

ATKINS
Member of the SNC Lavalin Group
Louis Berger

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

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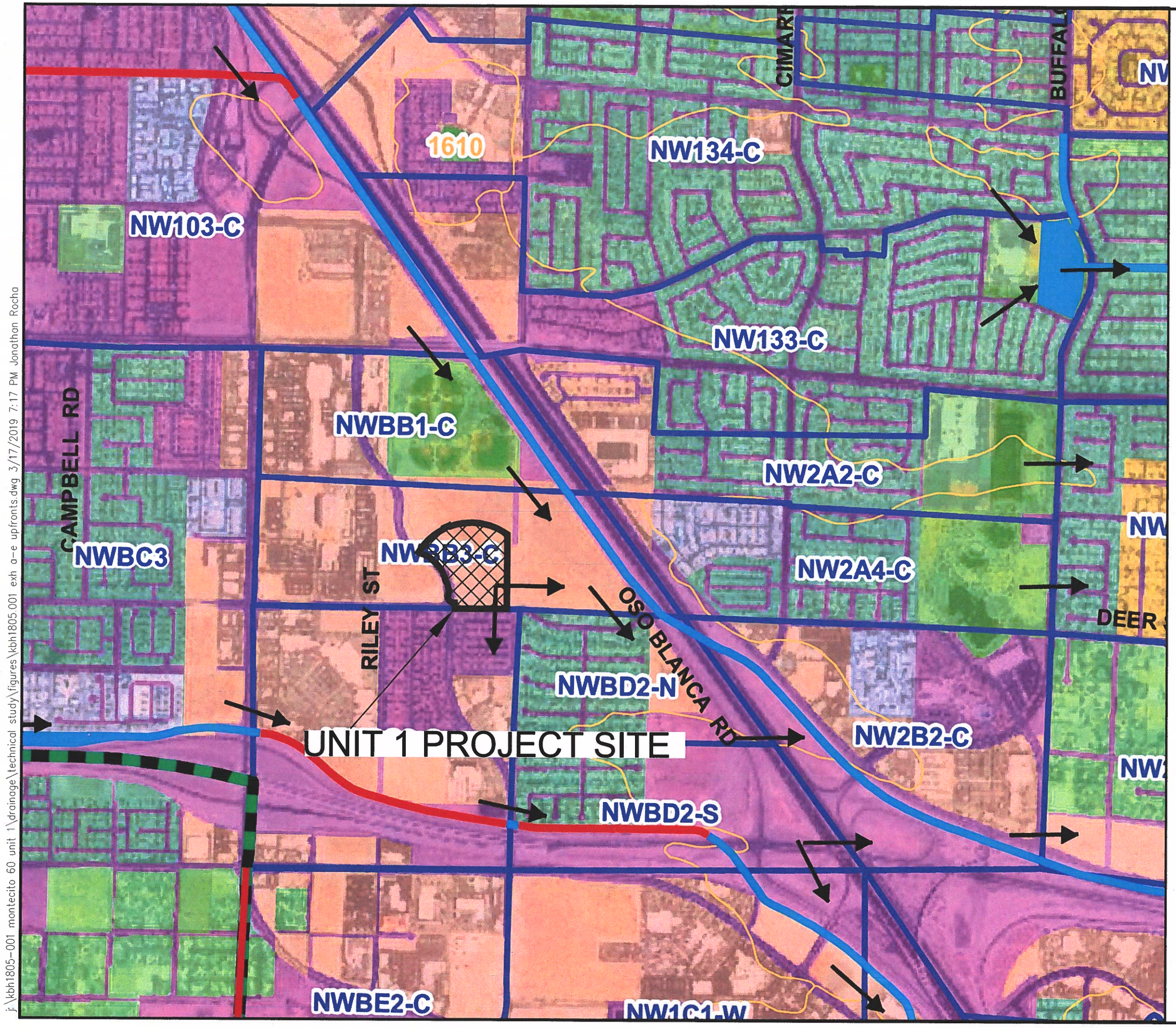
MONTECITO UNIT 1

MPU FACILITY SUMMARY

DATE: MAR 2019
DRAFTER: DCH
DESIGNER: DCH
CHECKED: SOA
PROJECT NO. KBH1805.001

EXHIBIT D2
SHEET 1 OF 1

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REGIONAL FLOOD CONTROL DISTRICT

2018 Las Vegas Valley Master Plan Update

Figure W-2B
Upper Northern Las Vegas Wash Watershed

Legend

- Flow Arrows
- NodeID flow(cfs) Concentration Points
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Ultimate Development Boundary
- Watershed
- BasinID Subbasins
- MUSYM Soils
- 1: Undeveloped Land, Open desert
- 2: Parks, Golf Courses
- 3: Rural, 0.5-1 units per acre (uses 1 unit/acre)
- 4: Low-Density Residential, 1-2 units per acre (uses 2 units/acre)
- 5: Medium-Density Residential, 2-4 units per acre (uses 3 units/acre)
- 6: High-Density Residential, 4-8 units per acre (uses 6 units/acre)
- 7: Public Facility and Residential, 8-12 units/acre
- 8: Very High-Density Residential, 12 units/acre or more
- 9: Commercial, Retail, Casino, High Rise Condominiums
- 10: Light Industrial
- 11: Heavy Industrial
- 12: Schools
- 13: Lakes

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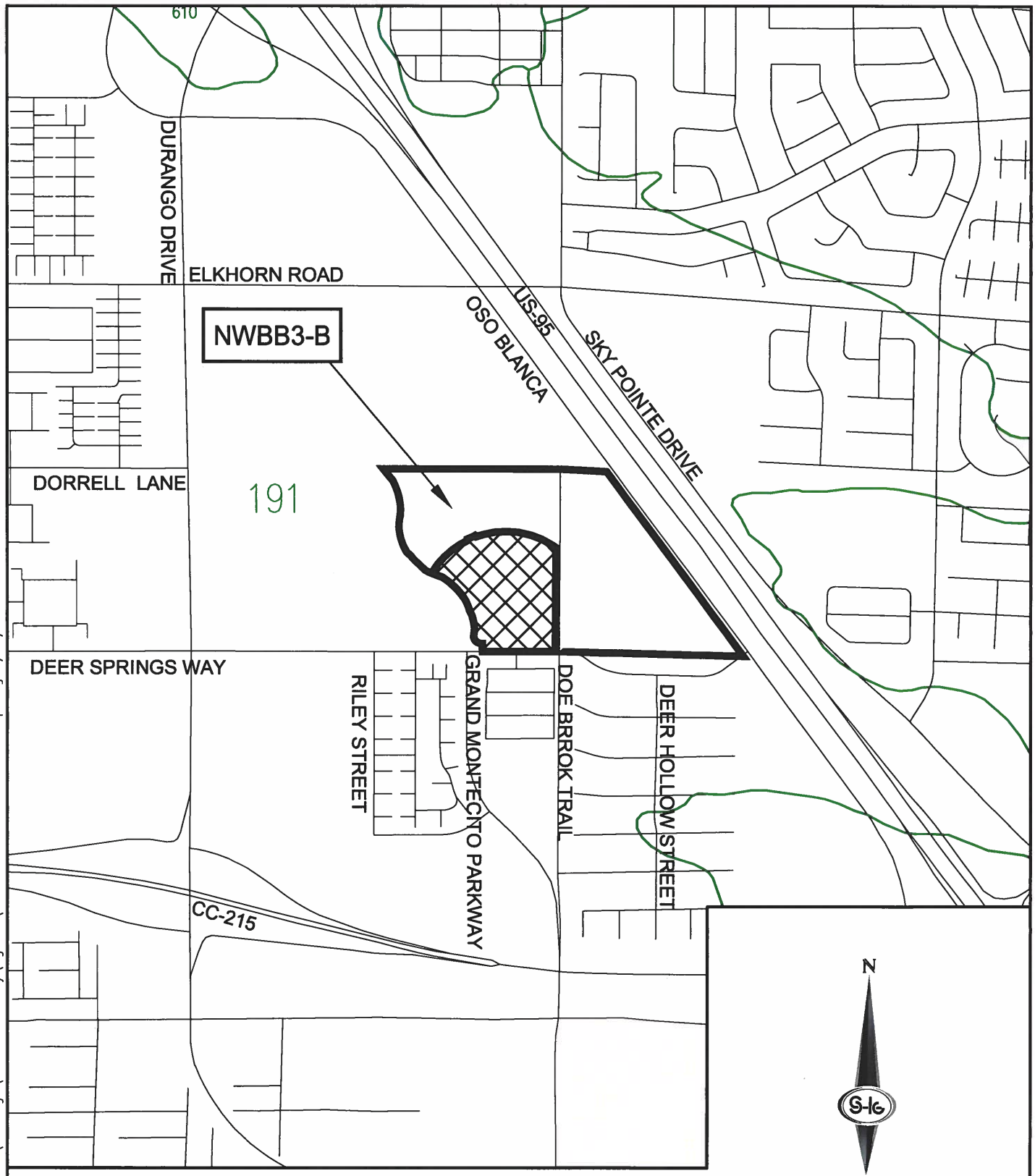
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MONTECITO UNIT 1
WATERSHED MAP

DATE: MAR 2019
DRAFTER: DCH
DESIGNER: DCH
CHECKED: SOA
PROJECT NO. KBH1805.001

EXHIBIT D3
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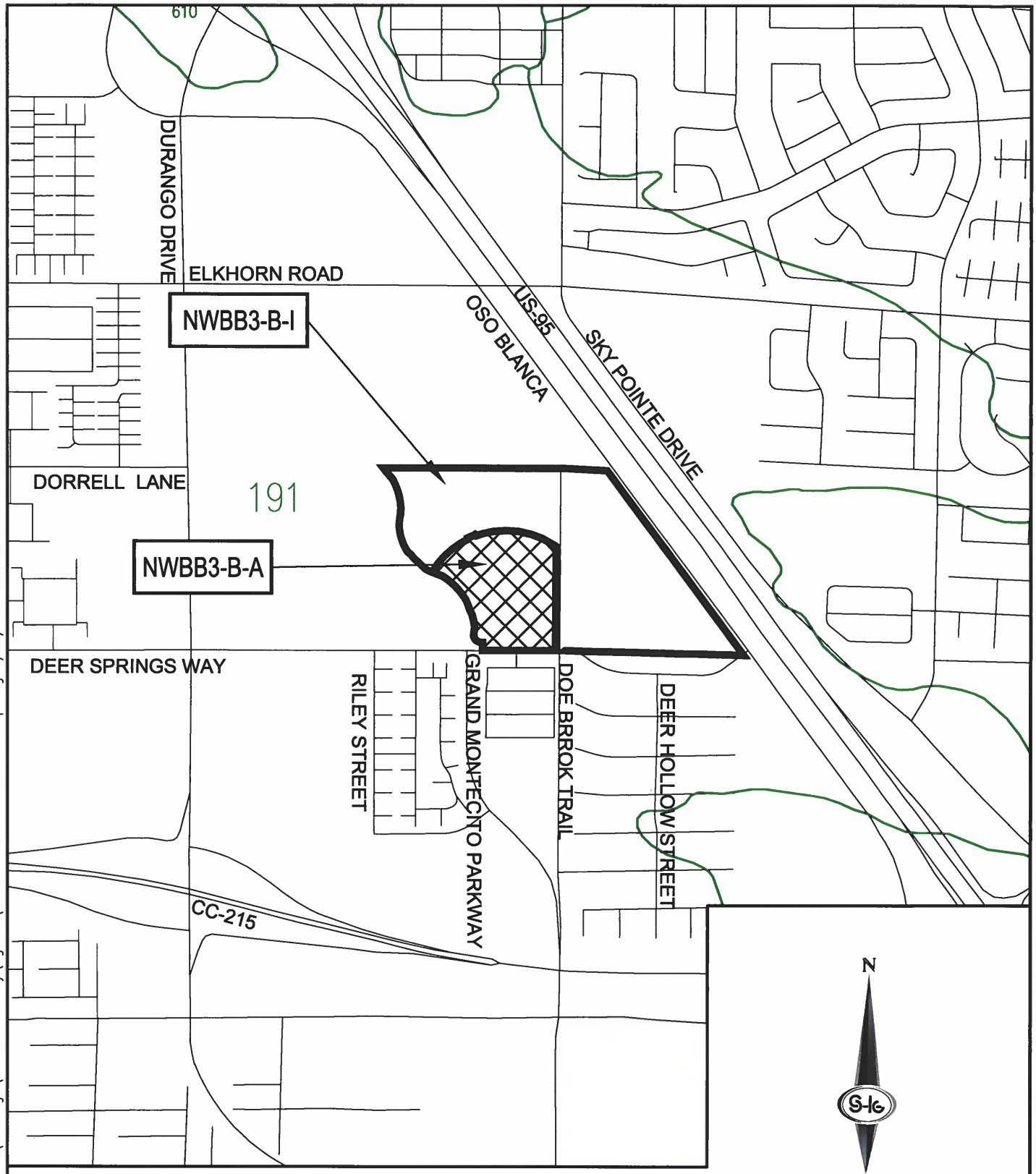
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MONTECITO UNIT 1

SOILS MAP

DATE: MAR 2019	PROJECT NO. KBH1805.001
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MONTECITO UNIT 1

INTERIM SOILS MAP

DATE: MAR 2019	PROJECT NO. KBH1805.001
DRAFTER: DCH	
DESIGNER: DCH	EXHIBTI E2
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LEGEND

- BASIN BOUNDARY
- PRO-RATED SUBBASIN BOUNDARY
- EXISTING DRAINAGE FACILITIES
- PROPOSED DRAINAGE FACILITIES
- FUTURE DRAINAGE FACILITIES
- ID — BASIN ID
- ID — PRO-RATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID

Existing Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
NWBB3-B	53.0	17	1
NWBB1-4*	33.0	30	(17)
CNWBB1-1 Q = REF*	N/A	227	(125)
CNBB1-4 Q = REF*	N/A	3334	(1834)
2CNWBB3-B* Q = REF*	N/A	3579	(1968)

(Q10) VALUES DENOTED IN PARENTHESIS HAVE BEEN ALGEBRAICALLY PRODUCED FROM 0.55 PRECIPITATION RATIO.
* DENOTES REFERENCED FROM CENTENNIAL CHANNEL STUDY

Existing Prorated Flow Summary

Basin ID	Q_{100} (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)
NWBB1-4	30	33.0	0.9
Subbasin ID	**Q_{100} (cfs)**	**Area (acres)**	**100-yr Unit Flow (cfs/acre)**
NWBB1-4(A)	22	24.5	0.9
NWBB1-4(B)	8	8.6	0.9
TOTAL	***30***	***33.0***	

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MONTECITO UNIT 1
EXISTING CONDITION DRAINAGE MAP

S 25
T 23S
R 60E

DATE: MAR 2019
DRAFTER: JSR
DESIGNER: JSR
CHECKED: SOA

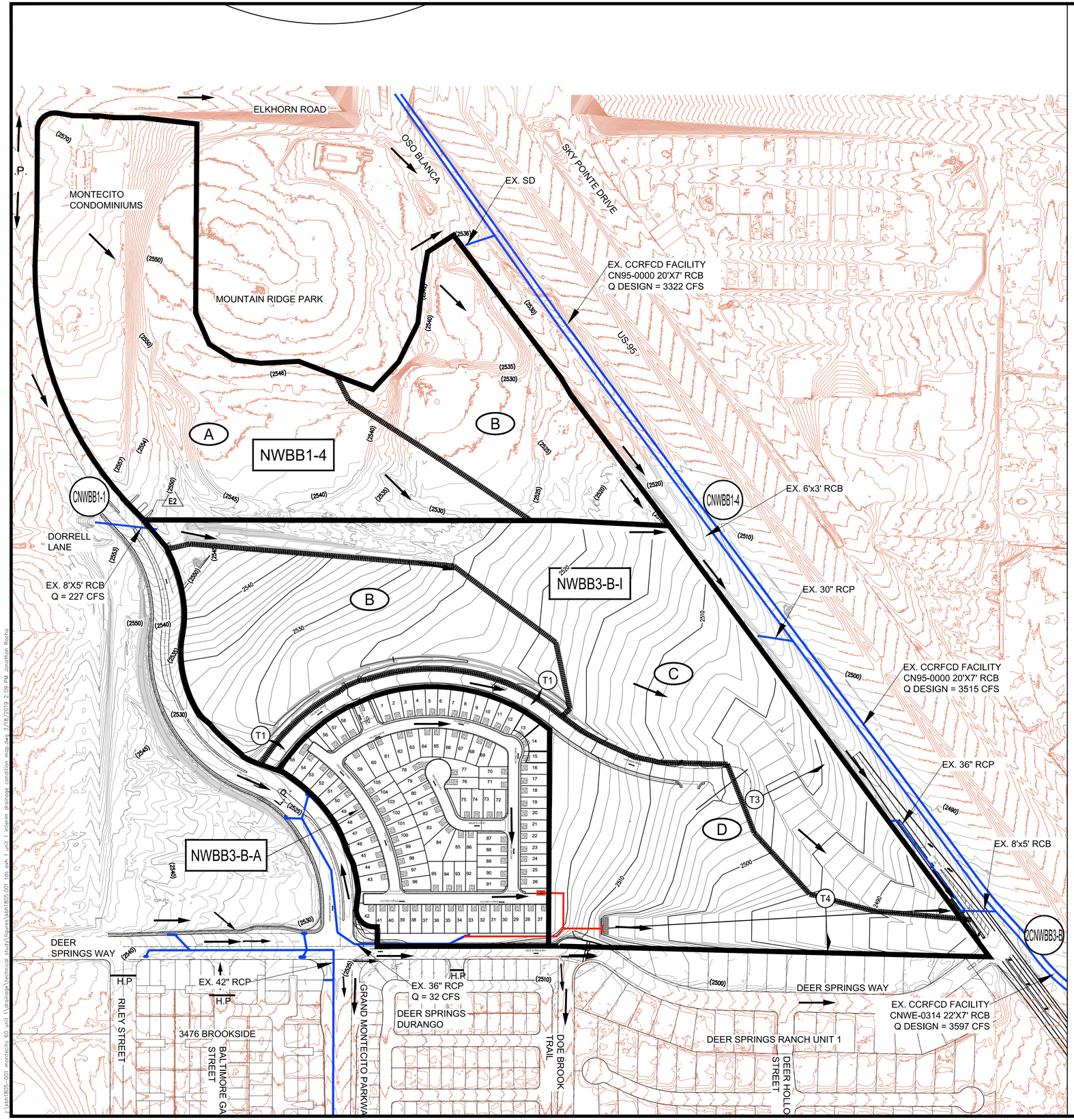
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SCALE – 1"=150' FEET

EXHIBIT F
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SCALE – 1"=150' FEET

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LEGEND

- BASIN BOUNDARY
- PRO-RATED SUBBASIN BOUNDARY
- EXISTING DRAINAGE FACILITIES
- PROPOSED DRAINAGE FACILITIES
- FUTURE DRAINAGE FACILITIES
- ID — BASIN ID
- ID — PRO-RATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID

Unit 1 Interim Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
NWBB3-B-A	11.6	26	10
NWBB3-B-I	41.4	45	10
NWBB1-4*	33.0	30	(17)
CNWBB1-1 Q = REF*	N/A	227	(125)
CNBB1-4 Q = REF*	N/A	3334	(1834)
2CNWBB3-B* Q = REF*	N/A	3579	(1968)
DSM-E Q = FLOWSPLIT EAST	N/A	117	(64)
DSM-S Q = FLOWSPLIT SOUTH	N/A	38	(21)

(Q10) VALUES DENOTED IN PARENTHESIS HAVE BEEN ALGEBRAICALLY PRODUCED FROM 0.55 PRECIPITATION RATIO.
* DENOTES REFERENCED FROM CENTENNIAL CHANNEL STUDY

Unit 1 Interim Prorated Flow Summary

Basin ID	Q_{100} (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)
NWBB1-4	30	33.0	0.9
NWBB3-B-I	45	41.4	1.1
Subbasin ID	**Q_{100} (cfs)**	**Area (acres)**	**100-yr Unit Flow (cfs/acre)**
NWBB1-4(A)	22	24.5	0.9
NWBB1-4(B)	8	8.6	0.9
TOTAL	***30***	***33.0***	
NWBB3-B-I(B)	12	10.8	1.1
NWBB3-B-I(C)	20	18.1	1.1
NWBB3-B-I(D)	14	12.5	1.1
TOTAL	***45***	***41.4***	

Hydraulic Section Summary

Section ID	Section Description	Q_{100} (cfs)	Slope (%)	Depth (ft)	Velocity (fps)
Section T1 Q = NWBB3-B-I(B)	Trap Channel, 3:1 SS, 5' BW	12.0	0.92	0.55	3.26
			1.16	0.52	3.53
Section T3 Q = 227-CFS + NWBB3-B-I(B+C)	Trap Channel, 5:1 SS, 110' BW	259.0	2.00	0.46	4.97
Section T4 Q = 32-CFS + NWBB3-B-A + NWBB3-B-I(D)	Trap Channel, 5:1 SS, 110' BW	74.0	1.16	0.37	3.20
			2.00	0.31	3.82

NOTE: UNIT 1 SITE GENERATED 30-CFS IN ULTIMATE CONDITION, THEREFORE SECTION T4 UTILIZED THE WORST-CASE FLOWRATE

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MONTECITO UNIT 1
UNIT 1 INTERIM CONDITION DRAINAGE MAP

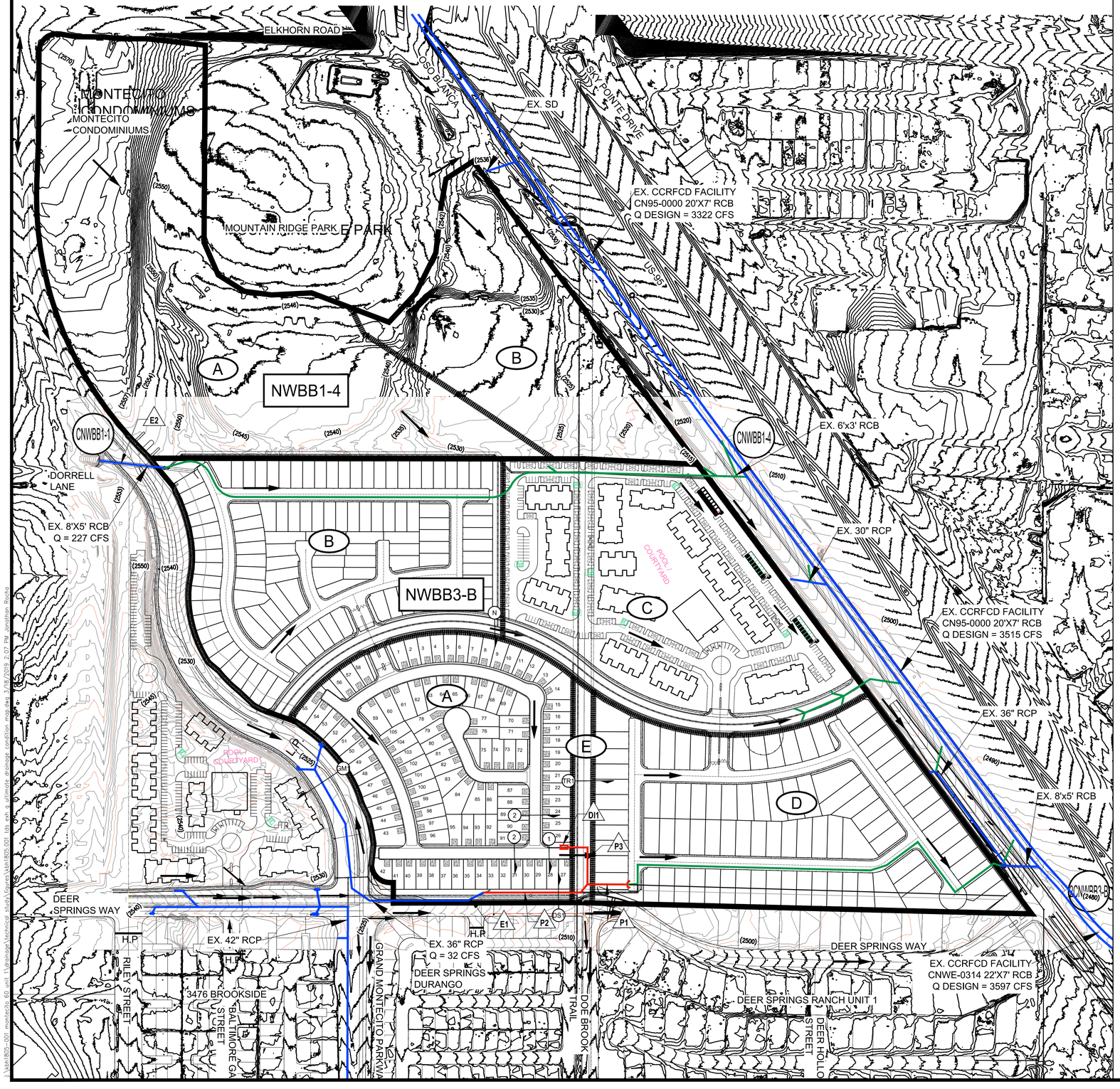
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T 22S
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DATE: MAR 2019
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PROJECT NO.
KBH1805.001

EXHIBIT G
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SCALE – 1"=150' FEET

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LEGEND

- BASIN BOUNDARY
- PRO-RATED SUBBASIN BOUNDARY
- EXISTING DRAINAGE FACILITIES
- PROPOSED DRAINAGE FACILITIES
- FUTURE DRAINAGE FACILITIES
- ID — BASIN ID
- ID — PRO-RATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID

Ultimate Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
NWBB3-B*	53.0	135	(74)
NWBB1-4*	33.0	30	(17)
CNWBB1-1 Q = REF*	N/A	227	(125)
CNBB1-4 Q = REF*	N/A	3334	(1834)
2CNWBB3-B* Q = REF*	N/A	3579	(1968)

(Q10) VALUES DENOTED IN PARENTHESIS HAVE BEEN ALGEBRAICALLY PRODUCED FROM 0.55 PRECIPITATION RATIO.
* DENOTES REFERENCED FROM CENTENNIAL CHANNEL STUDY

Ultimate Prorated Flow Summary

Basin ID	Q_{100} (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)
NWBB1-4	30	33.0	0.9
NWBB3-B	137	53.0	2.6
Subbasin ID	**Q_{100} (cfs)**	**Area (acres)**	**100-yr Unit Flow (cfs/acre)**
NWBB1-4(A)	22	24.5	0.9
NWBB1-4(B)	8	8.6	0.9
TOTAL	***30***	***33.0***	
NWBB3-B(A)	30	11.6	2.6
NWBB3-B(B)	34	13.0	2.6
NWBB3-B(C)	36	13.9	2.6
NWBB3-B(D)	35	13.7	2.6
NWBB3-B(E)	2	0.8	2.6
TOTAL	***137***	***53.0***	

100-Year Street Flow Summary

Section ID	Q_{100} (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV
DS1 Q = CNWBB3-A	155	2.82	0.87	7.4	6.4
1 Q = NWBB3-B(A)	30	1.63	0.51	4.2	2.1
2 Q = NWBB3-B(A)	30	0.60	0.57	3.0	1.7
		1.75	0.51	4.1	2.1
N1 Q = NWBB3-B(B)	34	1.00	0.60	3.0	1.8
DS1 Q = DSM Flowsplit	117	0.48	1.03	3.7	3.8
GM1 Q = RCP1	32	1.16	0.58	3.7	2.2

Recommended Flood Control Facility Summary

Facility ID	Facility Description	Total/Approaching Flow (cfs) Q_{100}/Q_{10}	Facility Flow (cfs) Q_{100}/Q_{10}	Surface/Bypass Flow (cfs) Q_{100}/Q_{10}	Notes
DI1	Proposed 12.5' Type CM2 D.I.	30	30	0	In Sump. 4 Grate
P3	Proposed 24" RCP	-	30	-	
E1	Ex. 36" RCP	-	32	-	
P2	Proposed 36" RCP	-	32	-	
P1	Proposed 36" RCP	-	62	-	
E2	Ex. 8'X5' RCB	-	227	-	

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MONTECITO UNIT 1
ULTIMATE CONDITION DRAINAGE MAP

S 25
T 22S
R 60E

DATE: MAR 2019
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DESIGNER: DCH
CHECKED: SOA
PROJECT NO. KBH1805.001

EXHIBIT H
SHEET 1 OF 1

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APPENDIX B

Hydrologic Analyses

Precipitation Data

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Rainfall and Precipitation Computation

Project Name: KBH1805.004 Montecito Offsite Storm Drain
Date: 3/17/2019
File Name: KBH1805 TDS Precipitation Calcs.xls
By: J. Rocha

Data:

Reference:

Project is located in: Township: 19 S. Range: 60 E. Section: 20 — APN Map

Site is NOT located in the McCarran Airport Rainfall Area — Figure 513*

Rainfall Depth-Duration-Frequency 10-Year, 6-Hour: 1.25 inches — Figure 503*

Rainfall Depth-Duration-Frequency 100-Year, 6-Hour: 1.96 inches — Figure 506*

Precipitation Adjustment Ratios:

10-Year: 1.24 — Table 501*
100-Year: 1.43 — Table 501*

Six Hour Depth Area Reduction Factors (DARF):
Area (gross acres): 53.0 = 0.0828 square miles — Table 502*
DARF = 1.00

Calculations:

P_{10} = 1.55 10-Year Precipitation (in)
P_{100} = 2.80 100-Year Precipitation (in)

P10/P100= 0.55 HEC-1 Multiple Ratio Value

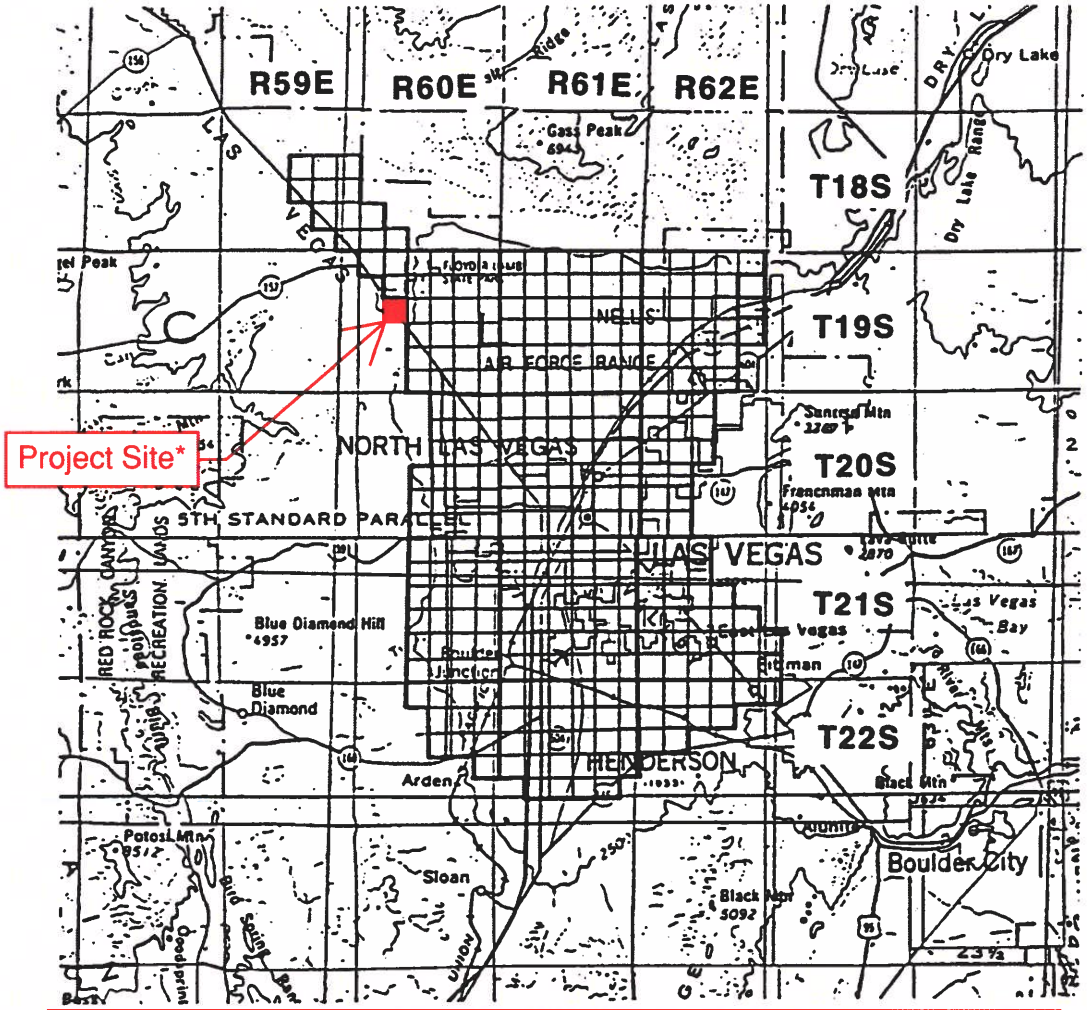
Equations:

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

* Equations taken from the Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Desi

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McCARRAN AIRPORT RAINFALL AREA



*Project site not located within the McCarran Rainfall area (T19-R60-S20)

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

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

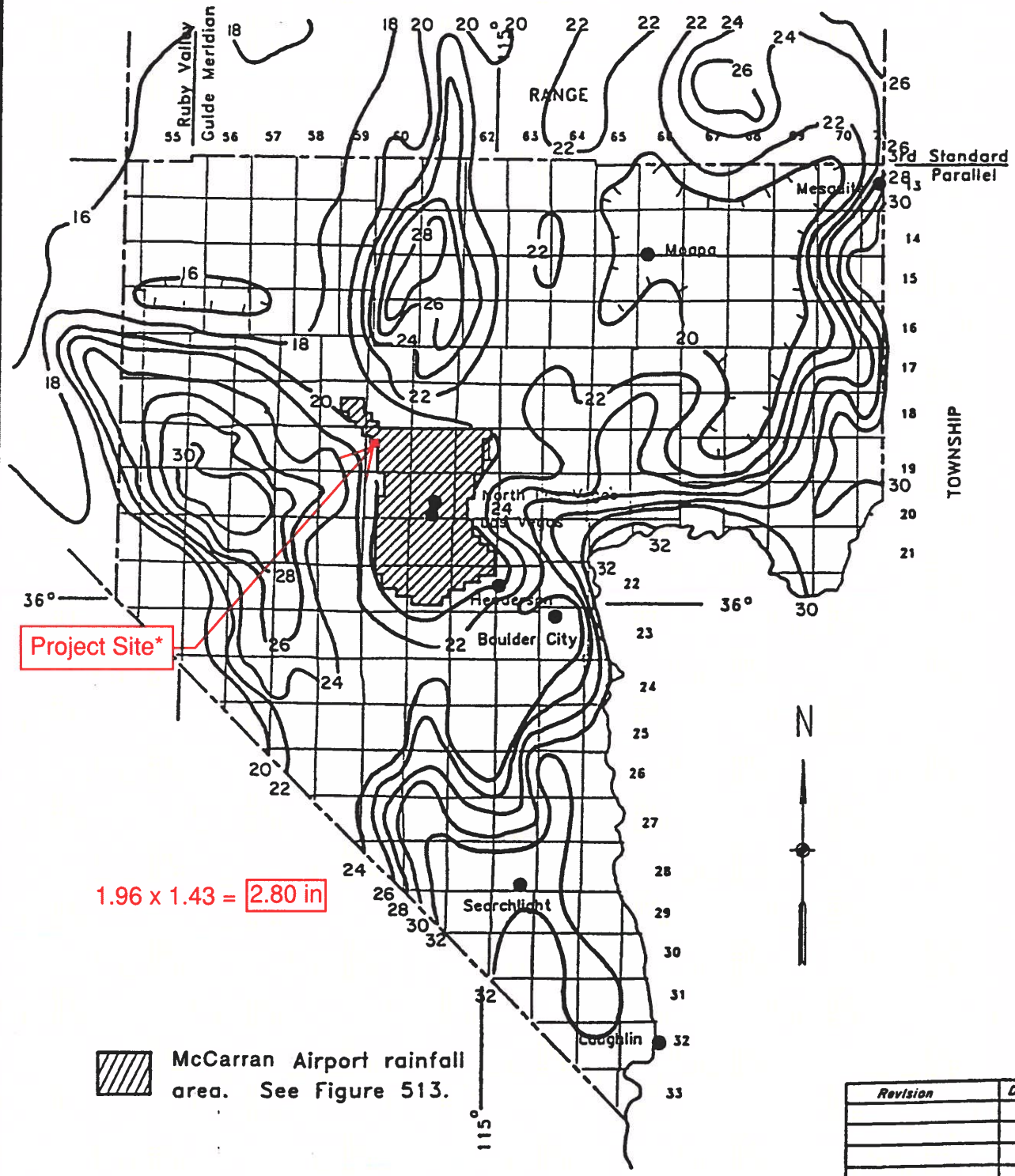
Revision	Date

WRC ENGINEERING

REFERENCE:
USACE, Los Angeles District, 1988

FIGURE 513

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



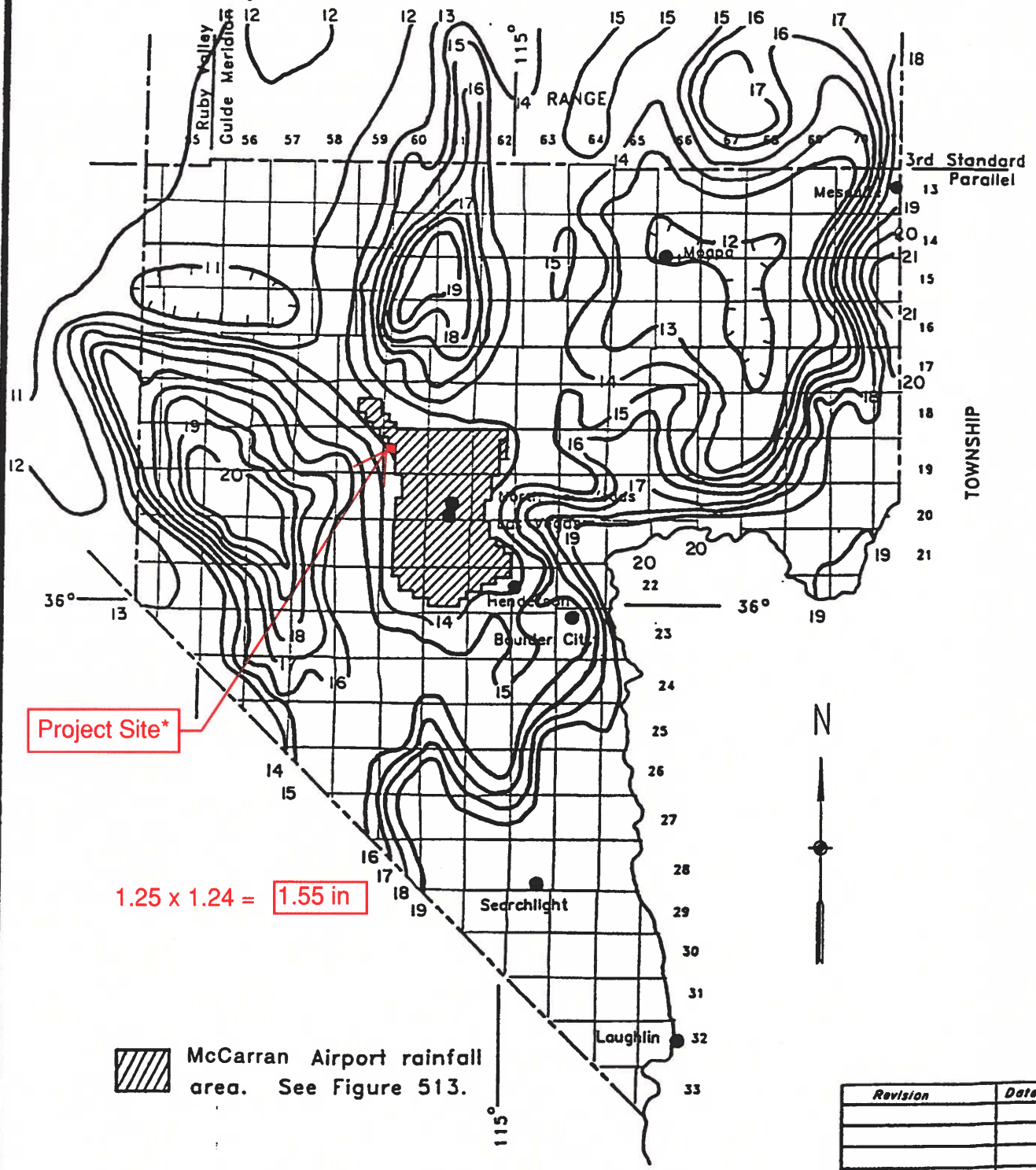
Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 506

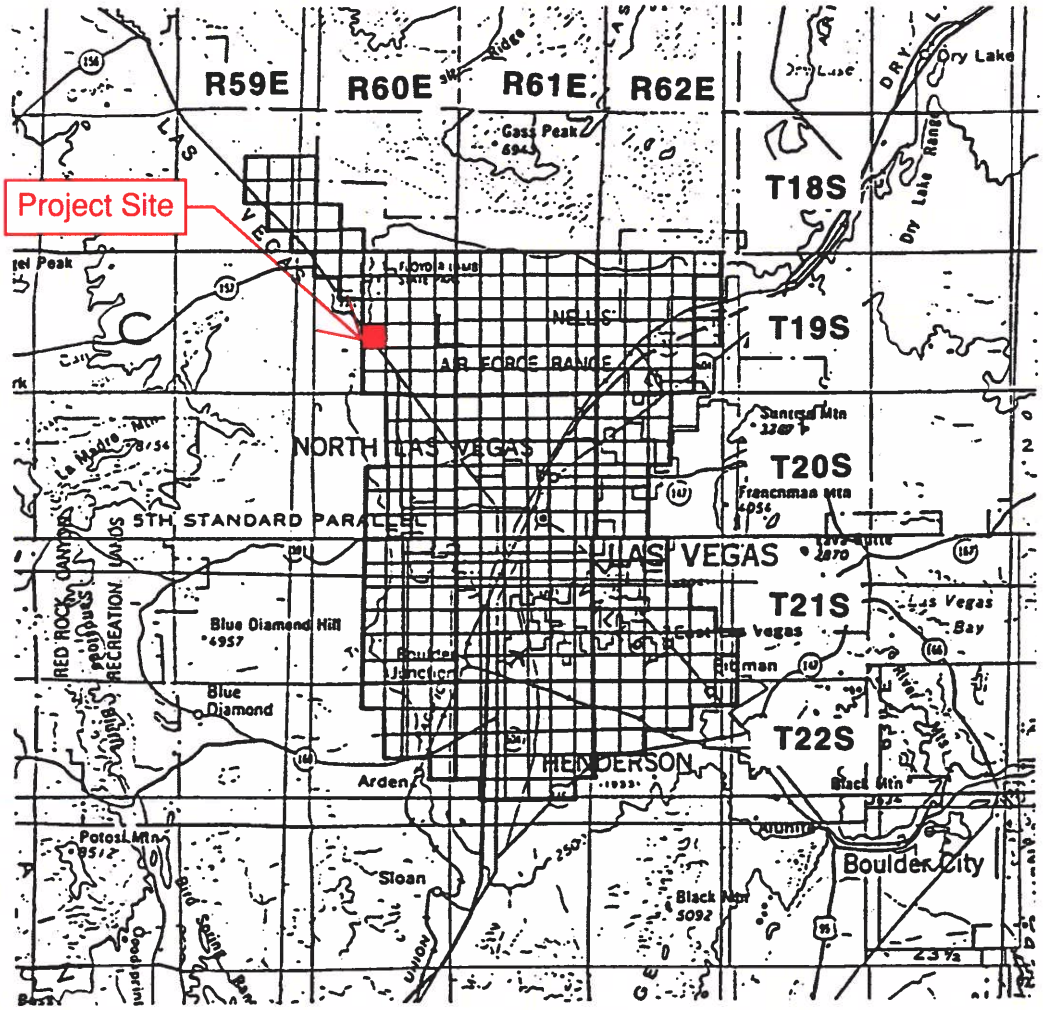
RAINFALL DEPTH-DURATION-FREQUENCY
10-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

WRC ENGINEERING	REFERENCE: NOAA ATLAS 2, VOLUME VII NEVADA, 1973	FIGURE 503

McCARRAN AIRPORT RAINFALL AREA



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

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

Revision	Date

WRC ENGINEERING

REFERENCE:
USACE, Los Angeles District, 1988

FIGURE 513

DEPTH-DURATION-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA

(IN INCHES)

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

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

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

3. Table 501 adjustments not required.

Revision	Date

PRECIPITATION ADJUSTMENT RATIOS

Recurrence Interval	Ratio to NOAA Atlas 2
2-year	1.00
5-year	1.16
10-year	1.24
25-year	1.33
50-year	1.39
100-year	1.43

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

Revision	Date

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

Curve Number Computations & Soils Data

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Soil Data & Curve Number Computation

Project Name & Number: KBH1805.001 Montecito - Unit 1
Date: 3/17/2019
By: J.Rocha

Data:

Reference: NRCS Soil Data

Soil Type - Soil Survey Area & Version, Soil Description				A	B	C	D
LV	191	Las Vegas Valley 2016	Dalian very cobbly fine sandy loam, 2 to 8 percent slopes	100%	0%	0%	0%

Land Use	A	B	C	D
Residential (<6,000 sf)*	89	92	94	95
Commercial	89	92	94	95
Apartments & Condos	81	88	91	93
Newly Graded	77	86	91	94

*Commercial land use per Note 3

EXISTING CONDITION

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
NWBB3-B	LV	191	100.0%	Desert Shrub (poor)	100%	0%	0%	0%	63	77	85	88	52.96	63.00
		TOTAL PERCENT	100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									52.96	63.0

UNIT 1 INTERIM CONDITION

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
NWBB3-B-A	LV	191	100.0%	Residential (<6,000 sf)*	100%	0%	0%	0%	89	92	94	95	11.60	89.00
		TOTAL PERCENT	100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									11.60	89.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
NWBB3-B-I	LV	191	100.0%	Newly Graded	100%	0%	0%	0%	77	86	91	94	41.36	77.00
		TOTAL PERCENT	100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									41.36	77.0

ULTIMATE CONDITION

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
NWBB3-B	LV	191	73.9%	Residential (<6,000 sf)*	100%	0%	0%	0%	89	92	94	95	39.13	65.76
	LV	191	26.1%	Apartments & Condos	100%	0%	0%	0%	81	88	91	93	13.83	21.15
		TOTAL PERCENT	100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									52.96	86.9

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RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved: curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved: open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
See Table 602A					
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94

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

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

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

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

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

Revision	Date

RUNOFF CURVE NUMBERS
(SEMIARID RANGELANDS[1])

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

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

[2]*Poor:* <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: >70% ground cover.

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

Revision	Date

RUNOFF CURVE NUMBERS - RESIDENTIAL DISTRICTS

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

1 Lot size should represent the size of the average lot and not the gross acreage divided by the number of lots.
2 Actual percent impervious value should be compared to selected land use type.
3 In cases where average residential lots are smaller than 6,000 sq ft, commercial/business/industrial land use should be used.

Revision	Date

REFERENCE:

TABLE 602A

United States Department of Agriculture

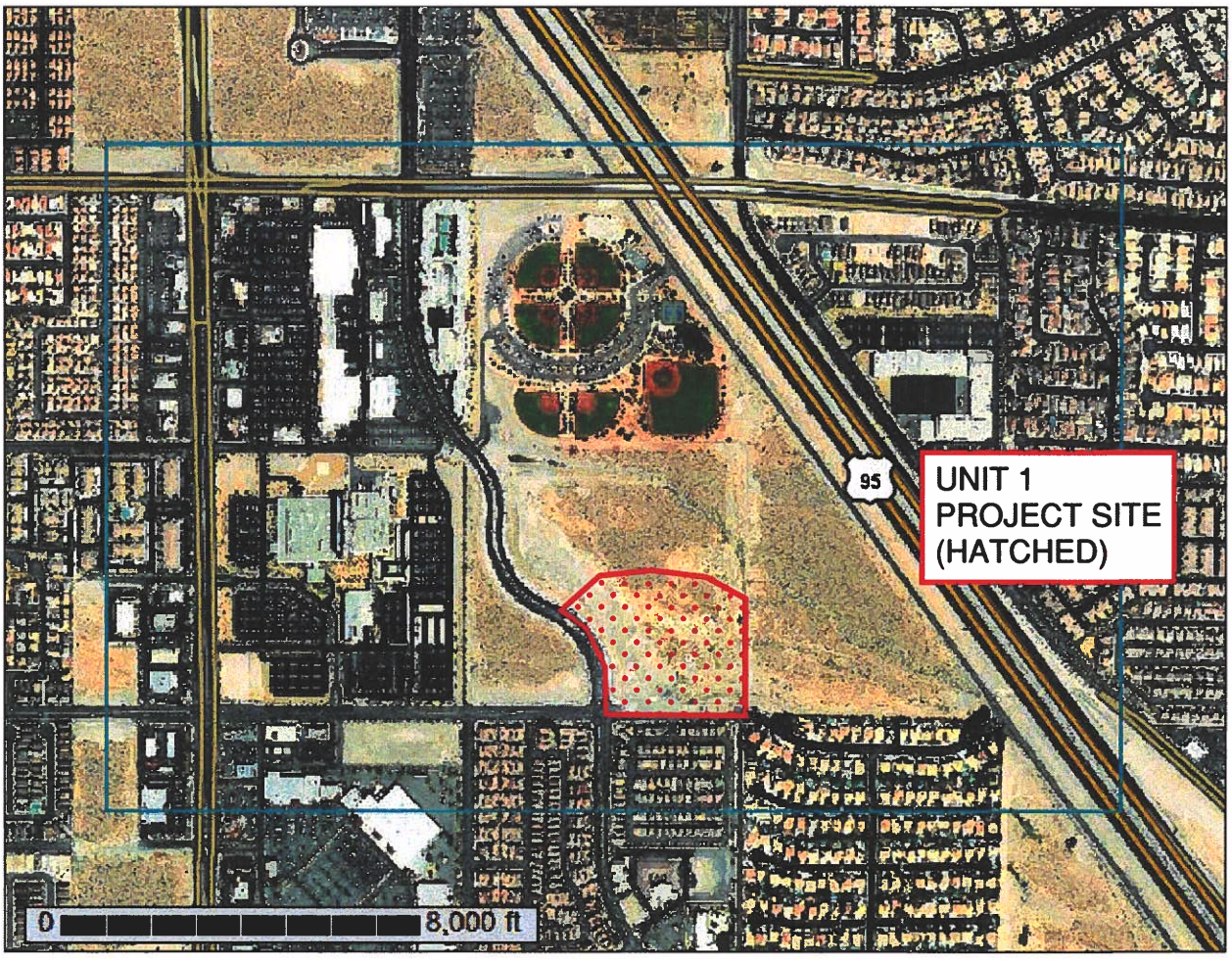
NRCS

Natural Resources Conservation Service

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

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

Montecito



February 11, 2019

Preface

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

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

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

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

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

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

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How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

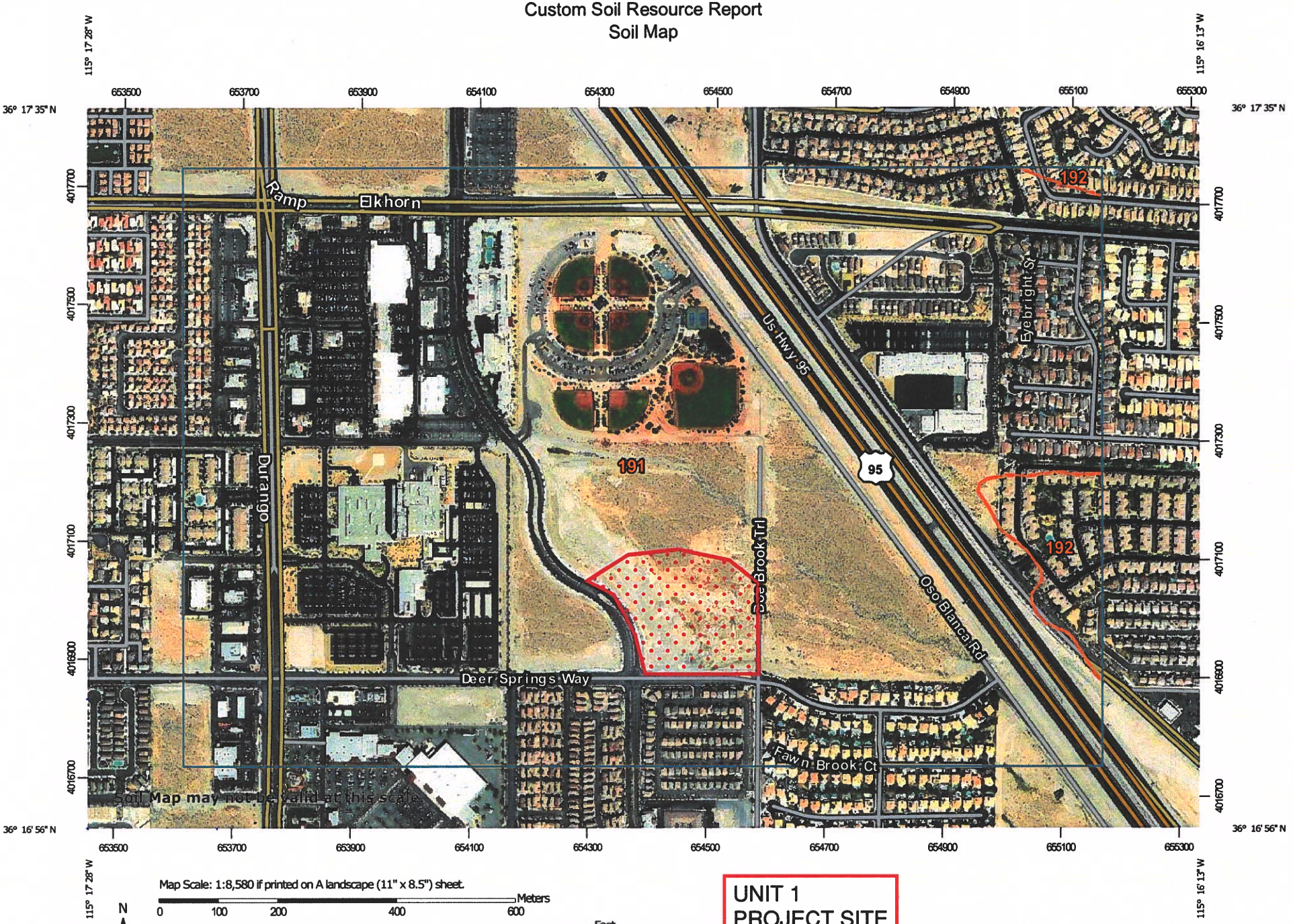
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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

Soil Map

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

Custom Soil Resource Report
Soil Map



UNIT 1
PROJECT SITE
(HATCHED)

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Las Vegas Valley Area, Nevada, Part of Clark County
Survey Area Data: Version 13, Sep 14, 2018

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

Date(s) aerial images were photographed: Jul 3, 2016—Oct 1, 2017

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

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
191	Dalian very cobbly fine sandy loam, 2 to 8 percent slopes	378.8	97.2%
192	Dalian-McCullough complex, 0 to 4 percent slopes	11.0	2.8%
Totals for Area of Interest		**389.8**	**100.0%**

Map Unit Descriptions

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

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

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

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

onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Las Vegas Valley Area, Nevada, Part of Clark County

191—Dalian very cobbly fine sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hrb4
Elevation: 2,200 to 3,400 feet
Mean annual precipitation: 4 to 6 inches
Mean annual air temperature: 61 to 66 degrees F
Frost-free period: 210 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Dalian

Setting

Landform: Fan skirts
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Alluvium derived from limestone and dolostone

Typical profile

H1 - 0 to 5 inches: very cobbly fine sandy loam
H2 - 5 to 60 inches: very gravelly fine sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

192—Dalian-McCullough complex, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: hrb5
Elevation: 1,800 to 5,700 feet
Mean annual precipitation: 4 to 10 inches
Mean annual air temperature: 57 to 68 degrees F
Frost-free period: 170 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Dalian and similar soils: 55 percent
Mccullough and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dalian

Setting

Landform: Fan skirts
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Alluvium derived from limestone and dolostone

Typical profile

H1 - 0 to 5 inches: very gravelly fine sandy loam
H2 - 5 to 60 inches: very gravelly fine sandy loam

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Mccullough

Setting

Landform: Fan skirts
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 5 inches: very gravelly very fine sandy loam
H2 - 5 to 30 inches: stratified sandy loam to loam
H3 - 30 to 40 inches: stratified coarse sand to loamy fine sand
H4 - 40 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Other vegetative classification: LIMY 3-5" P.Z. (030XB019NV_3)
Hydric soil rating: No

Minor Components

Las vegas

Percent of map unit: 5 percent
Landform: Basin-floor remnants
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: LIMY 3-5" P.Z. (030XB019NV_3)
Hydric soil rating: No

Tencee

Percent of map unit: 5 percent
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Water Features

This folder contains tabular reports that present soil hydrology information. The reports (tables) include all selected map units and components for each map unit. Water Features include ponding frequency, flooding frequency, and depth to water table.

Hydrologic Soil Group and Surface Runoff

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

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

The four hydrologic soil groups are:

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

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

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

soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

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

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Report—Hydrologic Soil Group and Surface Runoff

Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

Hydrologic Soil Group and Surface Runoff–Las Vegas Valley Area, Nevada, Part of Clark County			
Map symbol and soil name	**Pct. of map unit**	**Surface Runoff**	**Hydrologic Soil Group**
191—Dalian very cobbly fine sandy loam, 2 to 8 percent slopes			
Dalian	100	Low	A
192—Dalian-McCullough complex, 0 to 4 percent slopes			
Dalian	55	Very low	A
Mccullough	35	Low	B
Las vegas	5	Very high	D
Tencee	5	Very high	D

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Standard Form 4 Computations

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION

Project Name & Number: KBH1805.001 Montecito - Unit 1
Description: STANDARD FORM 4
By: J.Rocha
Date: 3/17/2019

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
DESIG:	DEV./EX. (D or E)	CN	K [1]	AREA Ac	AREA Mi^2 [2]	INITIAL LENGTH Feet	SLOPE %	Ti Min [3]	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY FPS [4]	V2 VELOCITY FPS [5]	Tt Min [6]	Tc Calc. [7]	Total Length Feet [8]	Tc Check [9]	Tlag Hours [10]
EXISTING CONDITION																	
NWBB3-B	E	63.0	0.442	53.0	0.0828	300	3.16	13.99	2830	2.12	2.15	4.28	12.94	26.93			0.269
UNIT 1 INTERIM CONDITION																	
NWBB3-B-A	D	89.0	0.785	11.6	0.0181	100	1.00	5.67	1290	0.93	1.95	2.95	8.74	14.41	1390	17.722	0.144
NWBB3-B-I	D	77.0	0.626	41.4	0.0646	300	3.16	10.06	2830	2.12	2.94	4.46	11.55	21.61	3130	27.389	0.216
ULTIMATE CONDITION																	
NWBB3-B	D	86.9	0.757	53.0	0.0828	100	1.00	6.17	3440	1.98	2.84	4.30	14.32	20.50	3540	29.667	0.205

[1] K = 0.0132 (CN) - 0.39
[2] A = Area/640
[3] Ti = (1.8 (1.1-K) L^0.5)/S^0.33
[4] For Existing Conditions: V1 = 14.8 * (S/100)^0.5
For Developed Conditions: V1 = 20.2 * (S/100)^0.5
[5] For Existing Conditions: V2 = 29.4 * (S/100)^0.5
For Developed Conditions: V2 = 30.6 * (S/100)^0.5
[6] Tt = L/(60*V)
[7] Tc = Ti + Tt
[8] Total L = Initial L + Travel L
[9] Tc = (L/180) + 10
[10] Tlag = (0.6*Tc)/60
[11] Min Tlag =0.05
Note: For Travel Time Calcs: V1 applies to first 500 feet and V2 applies to remaining distance.

REFERENCE : STANDARD FORM 4

HEC-1 Analysis - Existing Condition

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   17MAR19  TIME  14:30:43  *
*                                      *
****************************************
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```
****************************************
*                                      *
*    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

1 HEC-1 INPUT PAGE 1

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

                        *DIAGRAM
 *** FREE ***
              1         ID     SLATER HANIFAN GROUP, A WESTWOOD TEAM
              2         ID     MONTECITO 60 UNIT 1
              3         ID     TECHNICAL DRAINAGE STUDY
              4         ID     MARCH 2019
              5         ID     EXISTING DRAINAGE CONDITION
              6         ID
              7         ID     RETURN PERIOD ------- 100 & 10-YEAR
              8         ID     DISTRIBUTION -------- 6-HOUR SDN3
              9         ID     PROJECT NO. --------- KBH1805.001
             10         ID     FILENAME ------------ EX.H1
             11         ID     DATE ---------------- 03/17/2019
             12         ID     MODELED BY ---------- JSR
             13         ID
             14         ID        PRECIPITATION STORM EVENT RATIOS
             15         ID        STORM EVENT             RATIO
             16         ID        100-YR                  1.00
             17         ID        10-YR                   0.55
             18         ID
             19         IT       5       0       0     300
             20         IO       5       0       0
             21         IN       5       0       0
             22         JR    PREC    1.00    0.55
                        *

             23         KK NWBB3-B
             24         KM   ONSITE BASIN
             25         BA  0.0828
             26         PB    2.80
             27         PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
             28         PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
             29         PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
             30         PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
             31         PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
             32         PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
             33         PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
             34         PC   0.998   0.999   1.000
             35         LS       0    63.0
             36         UD   0.269
                        *
             37         ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    23     NWBB3-B

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```


```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
```

```
*           VERSION 4.1               *
*                                     *
*  RUN DATE   17MAR19  TIME  14:30:43  *
*                                     *
***************************************
```


```
*         609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616       *
*           (916) 756-1104            *
*                                     *
***************************************
```


SLATER HANIFAN GROUP, A WESTWOOD TEAM
MONTECITO 60 UNIT 1
TECHNICAL DRAINAGE STUDY
MARCH 2019
EXISTING DRAINAGE CONDITION

RETURN PERIOD ------- 100 & 10-YEAR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- KBH1805.001
FILENAME ------------ EX.H1
DATE ---------------- 03/17/2019
MODELED BY ---------- JSR

PRECIPITATION STORM EVENT RATIOS

STORM EVENT	RATIO
100-YR	1.00
10-YR	0.55

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

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

                   COMPUTATION INTERVAL     .08 HOURS
                        TOTAL TIME BASE   24.92 HOURS

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

     JP          MULTI-PLAN OPTION
                       NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                    1.00       .55
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      .55

 HYDROGRAPH AT
+                NWBB3-B       .08     1   FLOW                 17.       1.
                                           TIME                3.83     5.00


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

HEC-1 Analysis - Unit 1 Interim Condition

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1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   17MAR19  TIME  14:43:39  *
*                                      *
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```

```
**************************************
*                                    *
*    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

1 HEC-1 INPUT PAGE 1

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

 *** FREE ***
                        *DIAGRAM
              1         ID     SLATER HANIFAN GROUP, A WESTWOOD TEAM
              2         ID     MONTECITO 60 UNIT 1
              3         ID     TECHNICAL DRAINAGE STUDY
              4         ID     MARCH 2019
              5         ID     UNIT 1 INTERIM DRAINAGE CONDITION
              6         ID
              7         ID     RETURN PERIOD ------- 100 & 10-YEAR
              8         ID     DISTRIBUTION -------- 6-HOUR SDN3
              9         ID     PROJECT NO. --------- KBH1805.001
             10         ID     FILENAME ------------ UNIT1.H1
             11         ID     DATE ---------------- 03/17/2019
             12         ID     MODELED BY ---------- JSR
             13         ID
             14         ID        PRECIPITATION STORM EVENT RATIOS
             15         ID        STORM EVENT            RATIO
             16         ID        100-YR                 1.00
             17         ID        10-YR                  0.55
             18         ID
             19         IT       5       0       0     300
             20         IO       5       0       0
             21         IN       5       0       0
             22         JR    PREC    1.00    0.55
                        *

             23         KKNWBB3-B-A
             24         KM   ONSITE INTERIM BASIN
             25         BA  0.0181
             26         PB    2.80
             27         PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
             28         PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
             29         PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
             30         PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
             31         PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
             32         PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
             33         PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
             34         PC   0.998   0.999   1.000
             35         LS       0    89.0
             36         UD   0.144
                        *

             37         KKNWBB3-B-I
             38         KM   OFFSITE INTERIM BASIN
             39         BA  0.0646
             40         LS       0    77.0
             41         UD   0.216
                        *
             42         ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

```
   23    NWBB3-B-
               .
               .
               .
   37          .    NWBB3-B-

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                    ****************************************
 *                                      *                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS       *
 *              JUN   1998              *                    *   HYDROLOGIC ENGINEERING CENTER      *
 *           VERSION 4.1                *                    *        609 SECOND STREET             *
 *                                      *                    *      DAVIS, CALIFORNIA 95616         *
 *  RUN DATE   17MAR19  TIME  14:43:39  *                    *          (916) 756-1104              *
 *                                      *                    *                                      *
 ****************************************                    ****************************************

                          SLATER HANIFAN GROUP, A WESTWOOD TEAM
                          MONTECITO 60 UNIT 1
                          TECHNICAL DRAINAGE STUDY
                          MARCH 2019
                          UNIT 1 INTERIM DRAINAGE CONDITION

                          RETURN PERIOD ------- 100 & 10-YEAR
                          DISTRIBUTION -------- 6-HOUR SDN3
                          PROJECT NO. --------- KBH1805.001
                          FILENAME ------------ UNIT1.H1
                          DATE ---------------- 03/17/2019
                          MODELED BY ---------- JSR

                             PRECIPITATION STORM EVENT RATIOS
                             STORM EVENT            RATIO
                             100-YR                 1.00
                             10-YR                  0.55


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

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

                    COMPUTATION INTERVAL     .08 HOURS
                         TOTAL TIME BASE   24.92 HOURS

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

     JP           MULTI-PLAN OPTION
                       NPLAN          1  NUMBER OF PLANS

     JR           MULTI-RATIO OPTION
                      RATIOS OF PRECIPITATION
                     1.00       .55
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      .55

 HYDROGRAPH AT
+                NWBB3-B-       .02     1   FLOW          26.      10.
                                            TIME        3.58     3.58

 HYDROGRAPH AT
+                NWBB3-B-       .06     1   FLOW          45.      10.
                                            TIME        3.67     3.75


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

HEC-1 Analysis – Ultimate Condition

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   17MAR19  TIME  14:43:11  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    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

1 HEC-1 INPUT PAGE 1

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

                        *DIAGRAM
 *** FREE ***
              1         ID     SLATER HANIFAN GROUP, A WESTWOOD TEAM
              2         ID     MONTECITO 60 UNIT 1
              3         ID     TECHNICAL DRAINAGE STUDY
              4         ID     MARCH 2019
              5         ID     ULTIMATE DRAINAGE CONDITION
              6         ID
              7         ID     RETURN PERIOD ------- 100 & 10-YEAR
              8         ID     DISTRIBUTION -------- 6-HOUR SDN3
              9         ID     PROJECT NO. --------- KBH1805.001
             10         ID     FILENAME ------------ ULT.H1
             11         ID     DATE ---------------- 03/17/2019
             12         ID     MODELED BY ---------- JSR
             13         ID
             14         ID        PRECIPITATION STORM EVENT RATIOS
             15         ID        STORM EVENT            RATIO
             16         ID        100-YR                 1.00
             17         ID        10-YR                  0.55
             18         ID
             19         IT       5       0       0     300
             20         IO       5       0       0
             21         IN       5       0       0
             22         JR    PREC    1.00    0.55
                        *

             23         KK NWBB3-B
             24         KM   ONSITE BASIN
             25         PB    2.80
             26         PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
             27         PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
             28         PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
             29         PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
             30         PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
             31         PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
             32         PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
             33         PC   0.998   0.999   1.000
             34         BA  0.0828
             35         LS       0    86.9
             36         UD   0.205
                        *
             37         ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    23     NWBB3-B

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```


```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
```

```
*           VERSION 4.1              *                                    *         609 SECOND STREET          *
*                                    *                                    *       DAVIS, CALIFORNIA 95616      *
*  RUN DATE   17MAR19  TIME  14:43:11 *                                    *         (916) 756-1104             *
*                                    *                                    *                                    *
**************************************                                    **************************************
```

SLATER HANIFAN GROUP, A WESTWOOD TEAM
MONTECITO 60 UNIT 1
TECHNICAL DRAINAGE STUDY
MARCH 2019
ULTIMATE DRAINAGE CONDITION

RETURN PERIOD ------- 100 & 10-YEAR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- KBH1805.001
FILENAME ------------ ULT.H1
DATE ---------------- 03/17/2019
MODELED BY ---------- JSR

PRECIPITATION STORM EVENT RATIOS

STORM EVENT	RATIO
100-YR	1.00
10-YR	0.55

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

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

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.92 HOURS

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

     JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                    1.00       .55
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      .55

 HYDROGRAPH AT
+                NWBB3-B       .08     1   FLOW          95.      35.
                                           TIME         3.67     3.67


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

APPENDIX C

Hydraulic Analyses

100-YR Street Flowsplit Computations

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Pima County Flow Split Computation

Project Name: KBH1805 Montecito 60 Unit 1
File Name: KBH1805 TDS PIMA Flow Split Calc.xlsx
By: J. Rocha
Date: 1/17/2019

Location: Deer Springs and Montecito Intersection

Reference:

$Q_L = 0.042*[(Q_M^{0.93} * W_{SS}^{0.85})/(S_M^{0.41} * W_M^{0.79})]$

From the Pima County Drainage Manual (Tuscon, Arizona) Equation 12.3

Q_{TOT} =	155	Total Flow in Main Street (cfs)
Q_{LOB} =	15	Est. Left Overbank Flow (cfs)
Q_{ROB} =	15	Est. Right Overbank Flow (cfs)

$Q_M = Q_{TOT}-Q_{LOB}-Q_{ROB}$

Q_M =	125	$Q_{TOT}-Q_{LOB}-Q_{ROB}$ = Main street flow measured between curbs (cfs)
S_M =	0.0282	Main street slope (ft/ft)
W_M =	74	Main street width (ft)
W_{SS} =	81	Side street width (ft)

Q_L = 23 **Lateral flow into side street (cfs)**

$Q_O = 46.8 * y_o * W_{SS} * S_{SS}^{0.5} - Q_L$ Equation 12.4

yo =	0.29	Average depth of overbank flow intercepted by side street (ft) (get from FlowMaster)
S_{SS} =	0.0101	Slope of side street (ft/ft)

Q_O = 88 **Overbank flow intercepted by side street (cfs)**

If $Q_o > Q_{LOB}$, assume all overbank flow goes to side street

Q_{LOB} = 15 **Overbank flow intercepted by side street (cfs)**

$Q_{SS} = Q_{LOB} + Q_L$

Q_{SS} = 38 **Total flow into side street (cfs)**

$Q_{MS} = Q_T - Q_{SS}$

Q_{MS} = 117 **Total flow remaining in main street (cfs)**

Note: 1) If the main street has an inverted crown, or if the side street has been crested to impede flow, Q_M should be calculated as only that portion of the total discharge flowing above the elevation of the crest.

2) If flow extends beyond the curbs, Q_M should be only that portion of the total discharge which would be flowing between the curbs. Equation 12.4 is then used to calculated the maximum amount of "overbank" flow which will also turn and flow down the side street. Note that if Q_O from Equation 12.4 is positive and is greater than the actual overbank flow, it should be assumed that all of the actual overbank flow turns and flows down the side street. Also, if Q_O calculated from 12.4 is negative, it should be assumed that no overbank flow turns and flows down the side street.

5740 S. Arville St., Suite 216 - Las Vegas, NV 89118
Ph. 702-284-5300 - Fx. 702-284-5399

Worksheet for Deer Springs 90' ROW - FULL STREET

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.82	%
Discharge	155.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+42.00	0.97
0+42.00	0.97
0+72.00	0.37
0+72.00	0.33
0+73.50	0.20
0+73.50	0.68
0+74.00	0.70

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+02.00, 0.13)	0.013
(0+02.00, 0.13)	(0+72.00, 0.33)	0.016
(0+72.00, 0.33)	(0+74.00, 0.70)	0.013

Options

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

Worksheet for Deer Springs 90' ROW - FULL STREET

Results

Normal Depth		0.87	ft
Elevation Range	0.00 to 0.97 ft		
Flow Area		20.97	ft²
Wetted Perimeter		65.73	ft
Hydraulic Radius		0.32	ft
Top Width		64.12	ft
Normal Depth		0.87	ft
Critical Depth		1.11	ft
Critical Slope		0.00469	ft/ft
Velocity		7.39	ft/s
Velocity Head		0.85	ft
Specific Energy		1.72	ft
Froude Number		2.28	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.87	ft
Critical Depth	1.11	ft
Channel Slope	2.82	%
Critical Slope	0.00469	ft/ft

Cross Section for Deer Springs 90' ROW - FULL STREET

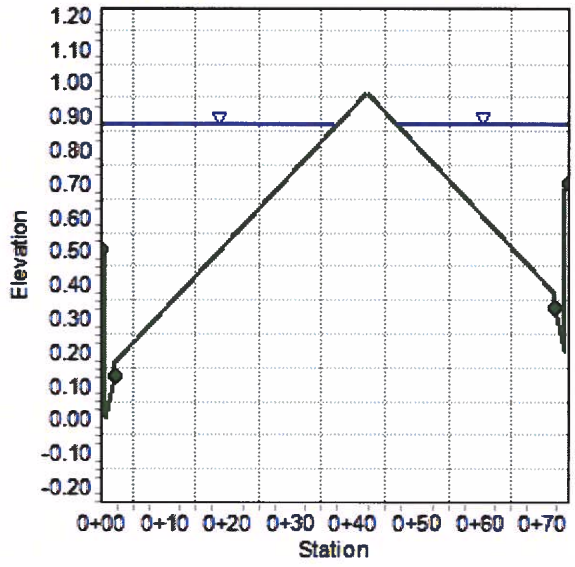
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.82	%
Normal Depth	0.87	ft
Discharge	155.00	ft³/s

Cross Section Image



Worksheet for Deer Springs - Overbank at DSM

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	2.82	%
Normal Depth	0.37	ft

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.00
0+00.00	0.66
0+05.00	0.56
0+08.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.00)	(0+05.00, 0.56)	0.013
(0+05.00, 0.56)	(0+08.00, 0.50)	0.022

Options

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

Results

Discharge	14.15	ft^3/s
Elevation Range	0.50 to 1.00 ft	
Flow Area	2.32	ft^2
Wetted Perimeter	8.58	ft
Hydraulic Radius	0.27	ft
Top Width	8.00	ft
Normal Depth	0.37	ft
Critical Depth	0.54	ft

Worksheet for Deer Springs - Overbank at DSM

Results

Critical Slope		0.00639	ft/ft
Velocity		6.10	ft/s
Velocity Head		0.58	ft
Specific Energy		0.95	ft
Froude Number		2.00	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.37	ft
Critical Depth	0.54	ft
Channel Slope	2.82	%
Critical Slope	0.00639	ft/ft

Cross Section for Deer Springs - Overbank at DSM

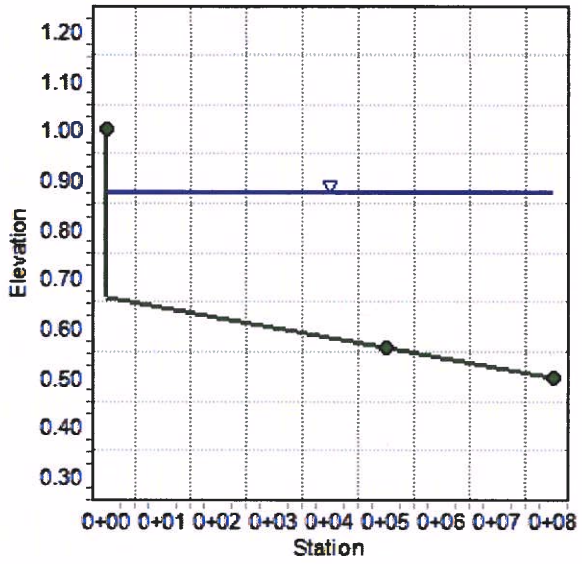
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	2.82	%
Normal Depth	0.37	ft
Discharge	14.15	ft³/s

Cross Section Image



100-YR Street Flow Computations – Ultimate Condition

Worksheet for Section 1 - Interior 35' ROW

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.63	%
Discharge	30.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.17	0.36
0+00.98	0.13
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.00	0.00
0+34.02	0.13
0+34.83	0.36
0+35.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.00, 0.13)	0.013
(0+02.00, 0.13)	(0+33.00, 0.13)	0.016
(0+33.00, 0.13)	(0+35.00, 0.38)	0.013

Options

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

Worksheet for Section 1 - Interior 35' ROW

Results

Normal Depth		0.51	ft
Elevation Range	0.00 to 0.48 ft		
Flow Area		7.19	ft²
Wetted Perimeter		35.66	ft
Hydraulic Radius		0.20	ft
Top Width		35.00	ft
Normal Depth		0.51	ft
Critical Depth		0.59	ft
Critical Slope		0.00560	ft/ft
Velocity		4.17	ft/s
Velocity Head		0.27	ft
Specific Energy		0.78	ft
Froude Number		1.62	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.51	ft
Critical Depth	0.59	ft
Channel Slope	1.63	%
Critical Slope	0.00560	ft/ft

Cross Section for Section 1 - Interior 35' ROW

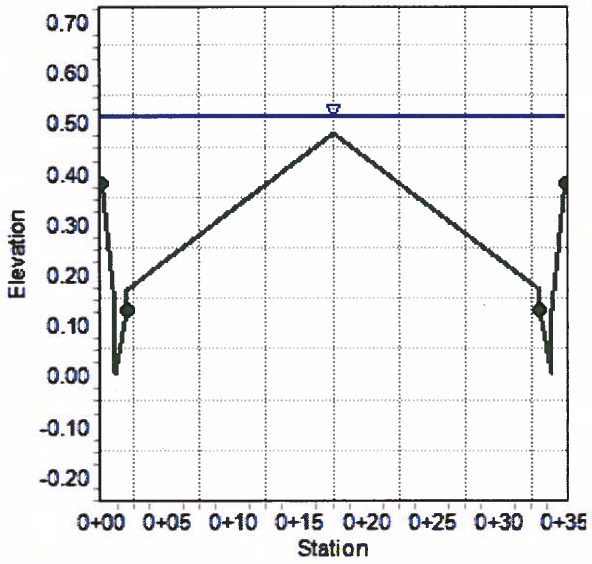
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.63	%
Normal Depth	0.51	ft
Discharge	30.00	ft³/s

Cross Section Image



Worksheet for Section 2 - Interior 40' ROW (Min%)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.60	%
Discharge	30.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.17	0.36
0+00.98	0.13
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.00	0.00
0+34.02	0.13
0+34.83	0.36
0+35.00	0.38
0+40.00	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.00, 0.13)	0.013
(0+02.00, 0.13)	(0+33.00, 0.13)	0.016
(0+33.00, 0.13)	(0+40.00, 0.48)	0.013

Options

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

Worksheet for Section 2 - Interior 40' ROW (Min%)

Options

Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.57	ft
Elevation Range	0.00 to 0.48 ft		
Flow Area		10.11	ft²
Wetted Perimeter		40.68	ft
Hydraulic Radius		0.25	ft
Top Width		40.00	ft
Normal Depth		0.57	ft
Critical Depth		0.58	ft
Critical Slope		0.00550	ft/ft
Velocity		2.97	ft/s
Velocity Head		0.14	ft
Specific Energy		0.71	ft
Froude Number		1.04	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.57	ft
Critical Depth	0.58	ft
Channel Slope	0.60	%
Critical Slope	0.00550	ft/ft

Cross Section for Section 2 - Interior 40' ROW (Min%)

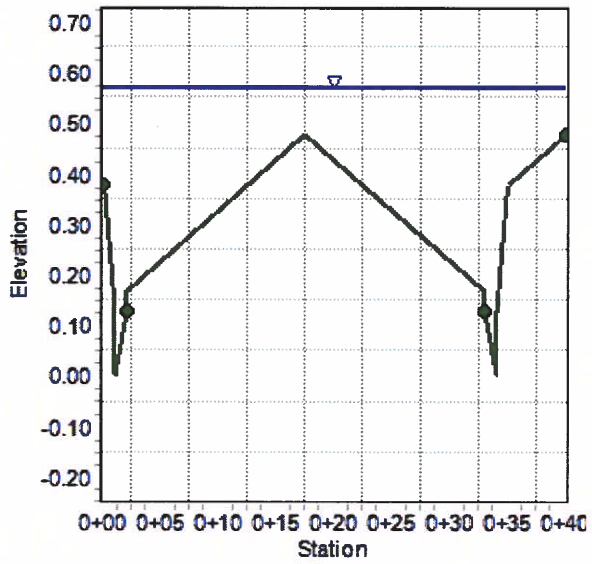
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.60	%
Normal Depth	0.57	ft
Discharge	30.00	ft³/s

Cross Section Image



Worksheet for Section 2 - Interior 40' ROW (Max%)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.75	%
Discharge	30.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.17	0.36
0+00.98	0.13
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.00	0.00
0+34.02	0.13
0+34.83	0.36
0+35.00	0.38
0+40.00	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.00, 0.13)	0.013
(0+02.00, 0.13)	(0+33.00, 0.13)	0.016
(0+33.00, 0.13)	(0+40.00, 0.48)	0.013

Options

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

Worksheet for Section 2 - Interior 40' ROW (Max%)

Options

Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.51	ft
Elevation Range	0.00 to 0.48 ft		
Flow Area		7.32	ft²
Wetted Perimeter		40.54	ft
Hydraulic Radius		0.18	ft
Top Width		40.00	ft
Normal Depth		0.51	ft
Critical Depth		0.58	ft
Critical Slope		0.00551	ft/ft
Velocity		4.10	ft/s
Velocity Head		0.26	ft
Specific Energy		0.77	ft
Froude Number		1.69	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.51	ft
Critical Depth	0.58	ft
Channel Slope	1.75	%
Critical Slope	0.00551	ft/ft

Cross Section for Section 2 - Interior 40' ROW (Max%)

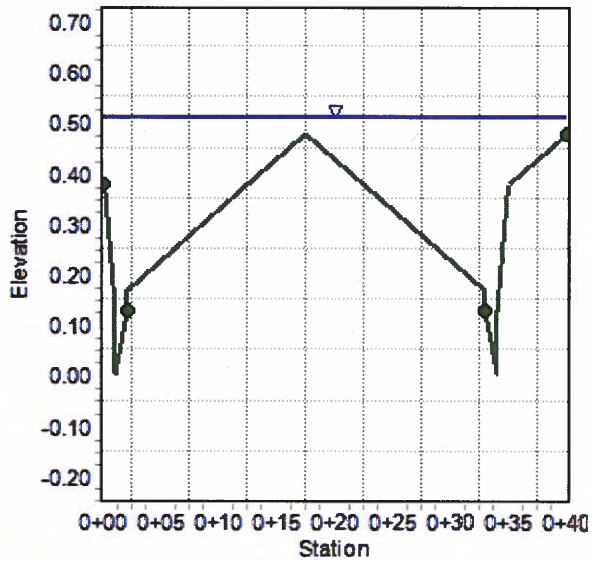
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.75	%
Normal Depth	0.51	ft
Discharge	30.00	ft³/s

Cross Section Image



Worksheet for Section N - Perimeter 64' ROW

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00	%
Discharge	34.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.70
0+05.00	0.60
0+10.00	0.50
0+10.00	0.50
0+10.50	0.48
0+10.50	0.00
0+12.00	0.13
0+12.00	0.17
0+32.00	0.57
0+32.00	0.57
0+52.00	0.17
0+52.00	0.13
0+53.50	0.00
0+53.50	0.48
0+54.00	0.50
0+54.00	0.50
0+59.00	0.60
0+64.00	0.70

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.70)	(0+05.00, 0.60)	0.013
(0+05.00, 0.60)	(0+10.00, 0.50)	0.022
(0+10.00, 0.50)	(0+12.00, 0.13)	0.013

Worksheet for Section N - Perimeter 64' ROW

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+12.00, 0.13)	(0+52.00, 0.13)	0.016
(0+52.00, 0.13)	(0+54.00, 0.50)	0.013
(0+54.00, 0.50)	(0+59.00, 0.60)	0.022
(0+59.00, 0.60)	(0+64.00, 0.70)	0.013

Options

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

Results

Normal Depth		0.60	ft
Elevation Range	0.00 to 0.70 ft		
Flow Area		11.18	ft²
Wetted Perimeter		54.63	ft
Hydraulic Radius		0.20	ft
Top Width		53.57	ft
Normal Depth		0.60	ft
Critical Depth		0.62	ft
Critical Slope		0.00708	ft/ft
Velocity		3.04	ft/s
Velocity Head		0.14	ft
Specific Energy		0.74	ft
Froude Number		1.17	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft

Worksheet for Section N - Perimeter 64' ROW

GVF Output Data

Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.60	ft
Critical Depth	0.62	ft
Channel Slope	1.00	%
Critical Slope	0.00708	ft/ft

Cross Section for Section N - Perimeter 64' ROW

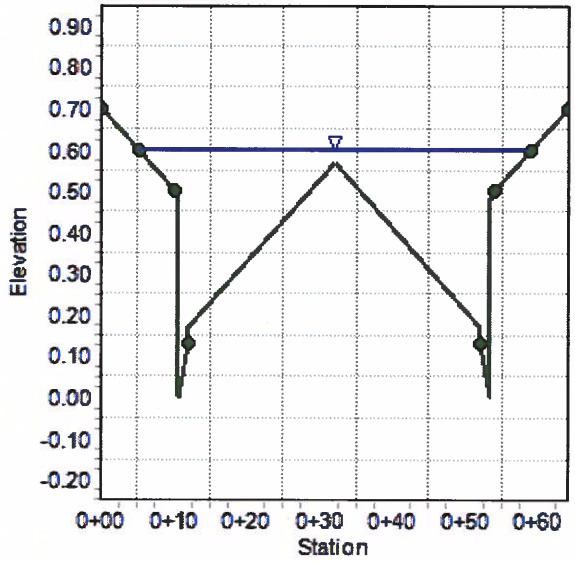
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00	%
Normal Depth	0.60	ft
Discharge	34.00	ft^3/s

Cross Section Image



Worksheet for Section GM1 - Perimeter 90' ROW

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.16	%
Discharge	32.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+48.50	1.10
0+48.50	1.51
0+53.50	1.41
0+53.50	1.00
0+80.00	0.17
0+80.00	0.13
0+81.50	0.00
0+81.50	0.48
0+82.00	0.50
0+82.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+02.00, 0.13)	0.013
(0+02.00, 0.13)	(0+48.50, 1.10)	0.016
(0+48.50, 1.10)	(0+53.50, 1.00)	0.013
(0+53.50, 1.00)	(0+80.00, 0.13)	0.016
(0+80.00, 0.13)	(0+82.00, 0.50)	0.013

Worksheet for Section GM1 - Perimeter 90' ROW

Options

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

Results

Normal Depth		0.58	ft
Elevation Range	0.00 to 1.51 ft		
Flow Area		8.57	ft²
Wetted Perimeter		38.93	ft
Hydraulic Radius		0.22	ft
Top Width		37.71	ft
Normal Depth		0.58	ft
Critical Depth		0.64	ft
Critical Slope		0.00583	ft/ft
Velocity		3.73	ft/s
Velocity Head		0.22	ft
Specific Energy		0.80	ft
Froude Number		1.38	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.58	ft
Critical Depth	0.64	ft
Channel Slope	1.16	%
Critical Slope	0.00583	ft/ft

Cross Section for Section GM1 - Perimeter 90' ROW

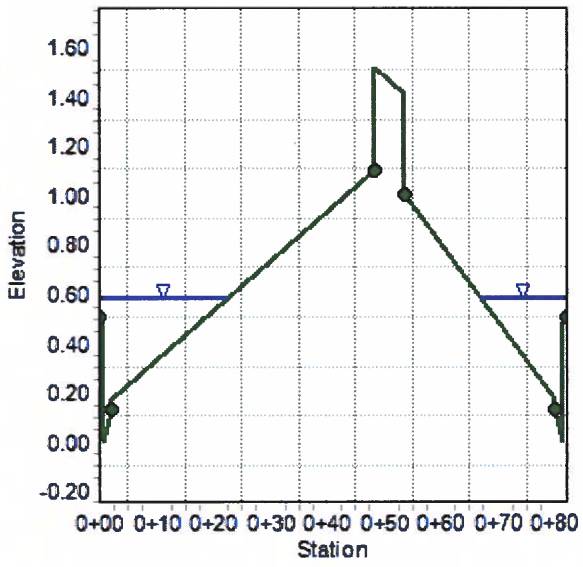
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.16	%
Normal Depth	0.58	ft
Discharge	32.00	ft³/s

Cross Section Image



Worksheet for Section DS1 - Perimeter 90' ROW

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.48	%
Discharge	117.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+42.00	0.97
0+42.00	0.97
0+72.00	0.37
0+72.00	0.33
0+73.50	0.20
0+73.50	0.68
0+74.00	0.70

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+02.00, 0.13)	0.013
(0+02.00, 0.13)	(0+72.00, 0.33)	0.016
(0+72.00, 0.33)	(0+74.00, 0.70)	0.013

Options

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

Worksheet for Section DS1 - Perimeter 90' ROW

Results

Normal Depth		1.03	ft
Elevation Range	0.00 to 0.97 ft		
Flow Area		31.95	ft²
Wetted Perimeter		75.92	ft
Hydraulic Radius		0.42	ft
Top Width		74.00	ft
Normal Depth		1.03	ft
Critical Depth		1.02	ft
Critical Slope		0.00499	ft/ft
Velocity		3.66	ft/s
Velocity Head		0.21	ft
Specific Energy		1.23	ft
Froude Number		0.98	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.03	ft
Critical Depth	1.02	ft
Channel Slope	0.48	%
Critical Slope	0.00499	ft/ft

Cross Section for Section DS1 - Perimeter 90' ROW

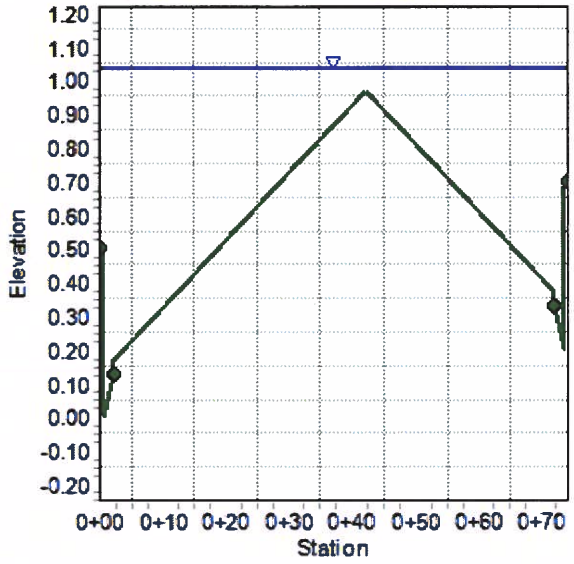
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.48	%
Normal Depth	1.03	ft
Discharge	117.00	ft³/s

Cross Section Image



Hydraulic Swale and Channel Computations

Worksheet for Section TR1 - Trail Section

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.50	%
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	2.00	ft^3/s

Results

Normal Depth	0.60	ft
Flow Area	1.09	ft^2
Wetted Perimeter	3.82	ft
Hydraulic Radius	0.29	ft
Top Width	3.62	ft
Critical Depth	0.49	ft
Critical Slope	0.01564	ft/ft
Velocity	1.83	ft/s
Velocity Head	0.05	ft
Specific Energy	0.66	ft
Froude Number	0.59	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.60	ft
Critical Depth	0.49	ft
Channel Slope	0.50	%
Critical Slope	0.01564	ft/ft

Cross Section for Section TR1 - Trail Section

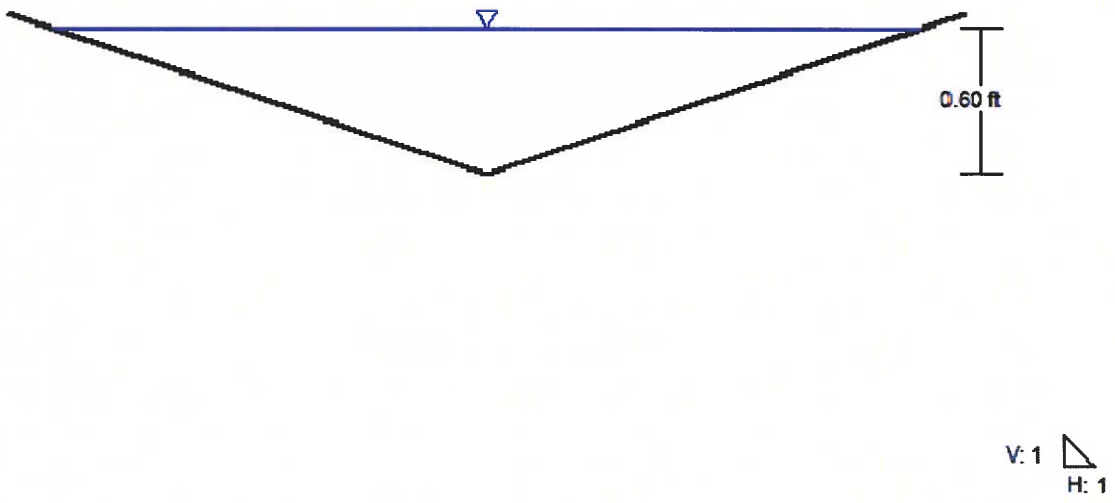
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.50	%
Normal Depth	0.60	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	2.00	ft^3/s

Cross Section Image



Worksheet for Section T1 - Perimeter Channel (Min%)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.92	%
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	12.00	ft^3/s

Results

Normal Depth	0.55	ft
Flow Area	3.68	ft^2
Wetted Perimeter	8.49	ft
Hydraulic Radius	0.43	ft
Top Width	8.31	ft
Critical Depth	0.51	ft
Critical Slope	0.01259	ft/ft
Velocity	3.26	ft/s
Velocity Head	0.17	ft
Specific Energy	0.72	ft
Froude Number	0.87	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.55	ft
Critical Depth	0.51	ft
Channel Slope	0.92	%

Worksheet for Section T1 - Perimeter Channel (Min%)

GVF Output Data

Critical Slope	0.01259	ft/ft

Cross Section for Section T1 - Perimeter Channel (Min%)

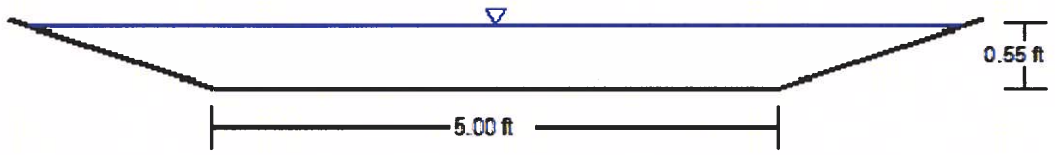
Project Description

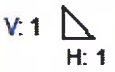
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.92	%
Normal Depth	0.55	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	12.00	ft³/s

Cross Section Image





Worksheet for Section T1 - Perimeter Channel (Max%)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	1.16	%
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	12.00	ft^3/s

Results

Normal Depth	0.52	ft
Flow Area	3.40	ft^2
Wetted Perimeter	8.28	ft
Hydraulic Radius	0.41	ft
Top Width	8.11	ft
Critical Depth	0.51	ft
Critical Slope	0.01259	ft/ft
Velocity	3.53	ft/s
Velocity Head	0.19	ft
Specific Energy	0.71	ft
Froude Number	0.96	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.52	ft
Critical Depth	0.51	ft
Channel Slope	1.16	%

Worksheet for Section T1 - Perimeter Channel (Max%)

GVF Output Data

Critical Slope	0.01259	ft/ft

Cross Section for Section T1 - Perimeter Channel (Max%)

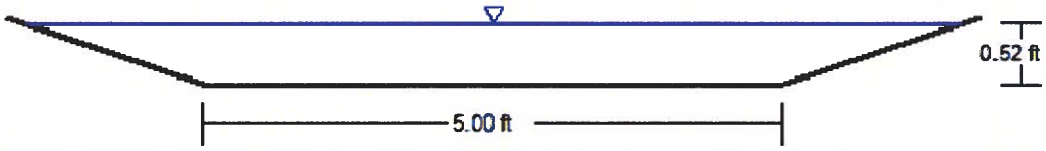
Project Description

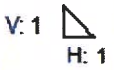
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	1.16	%
Normal Depth	0.52	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	12.00	ft³/s

Cross Section Image





Worksheet for Trapezoidal Channel - T3

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	2.00	%
Left Side Slope	5.00	ft/ft (H:V)
Right Side Slope	5.00	ft/ft (H:V)
Bottom Width	110.00	ft
Discharge	259.00	ft^3/s

Results

Normal Depth	0.46	ft
Flow Area	52.15	ft^2
Wetted Perimeter	114.73	ft
Hydraulic Radius	0.45	ft
Top Width	114.64	ft
Critical Depth	0.55	ft
Critical Slope	0.01121	ft/ft
Velocity	4.97	ft/s
Velocity Head	0.38	ft
Specific Energy	0.85	ft
Froude Number	1.30	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.46	ft
Critical Depth	0.55	ft
Channel Slope	2.00	%

Worksheet for Trapezoidal Channel - T3

GVF Output Data

Critical Slope	0.01121	ft/ft

Cross Section for Trapezoidal Channel - T3

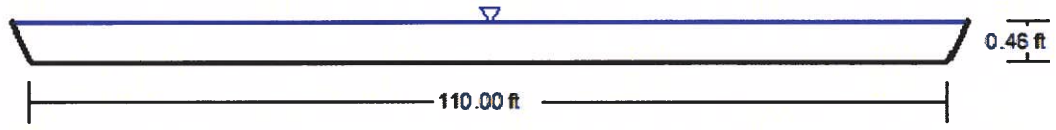
Project Description

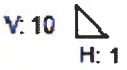
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	2.00	%
Normal Depth	0.46	ft
Left Side Slope	5.00	ft/ft (H:V)
Right Side Slope	5.00	ft/ft (H:V)
Bottom Width	110.00	ft
Discharge	259.00	ft³/s

Cross Section Image





Worksheet for Trapezoidal Channel - T4 (Min%)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	1.16	%
Left Side Slope	5.00	ft/ft (H:V)
Right Side Slope	5.00	ft/ft (H:V)
Bottom Width	60.00	ft
Discharge	74.00	ft^3/s

Results

Normal Depth	0.37	ft
Flow Area	22.89	ft^2
Wetted Perimeter	63.77	ft
Hydraulic Radius	0.36	ft
Top Width	63.70	ft
Critical Depth	0.36	ft
Critical Slope	0.01297	ft/ft
Velocity	3.23	ft/s
Velocity Head	0.16	ft
Specific Energy	0.53	ft
Froude Number	0.95	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.37	ft
Critical Depth	0.36	ft
Channel Slope	1.16	%

Worksheet for Trapezoidal Channel - T4 (Min%)

GVF Output Data

Critical Slope	0.01297	ft/ft

Cross Section for Trapezoidal Channel - T4 (Min%)

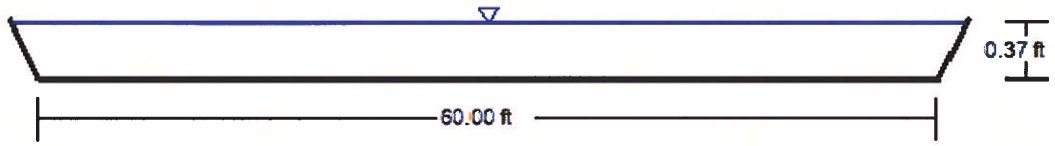
Project Description

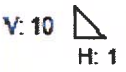
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	1.16	%
Normal Depth	0.37	ft
Left Side Slope	5.00	ft/ft (H:V)
Right Side Slope	5.00	ft/ft (H:V)
Bottom Width	60.00	ft
Discharge	74.00	ft³/s

Cross Section Image





Worksheet for Trapezoidal Channel - T4 (Max%)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	2.00	%
Left Side Slope	5.00	ft/ft (H:V)
Right Side Slope	5.00	ft/ft (H:V)
Bottom Width	60.00	ft
Discharge	74.00	ft^3/s

Results

Normal Depth	0.31	ft
Flow Area	19.37	ft^2
Wetted Perimeter	63.21	ft
Hydraulic Radius	0.31	ft
Top Width	63.15	ft
Critical Depth	0.36	ft
Critical Slope	0.01297	ft/ft
Velocity	3.82	ft/s
Velocity Head	0.23	ft
Specific Energy	0.54	ft
Froude Number	1.22	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.31	ft
Critical Depth	0.36	ft
Channel Slope	2.00	%

Worksheet for Trapezoidal Channel - T4 (Max%)

GVF Output Data

Critical Slope	0.01297	ft/ft

Cross Section for Trapezoidal Channel - T4 (Max%)

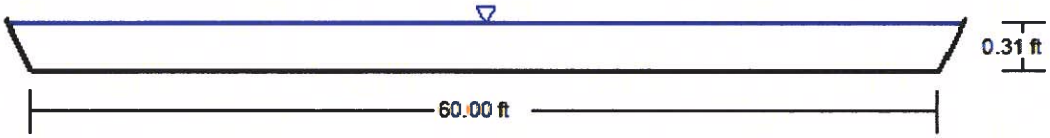
Project Description

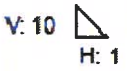
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	2.00	%
Normal Depth	0.31	ft
Left Side Slope	5.00	ft/ft (H:V)
Right Side Slope	5.00	ft/ft (H:V)
Bottom Width	60.00	ft
Discharge	74.00	ft^3/s

Cross Section Image





Drop Inlet Sizing Computations

Curb Inlet Sizing Computation

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Project Name & Number:	**KBH1805.001 Montecito 60 Unit 1**
Date:	**2/27/2019**
By:	**J. Rocha**

Notes:		
Facility ID:	SDDI#1	
Drainage Condition	Proposed	
Source of Flow	Q100 = Basin NWBB3-B(A)	
Design Flow (cfs)	30.0	
Inlet Type:	Type CM2 (Sump)	
Inlet Length:	12.5-ft	
Number of Grates:	4	
Input:	**Variable:**	**Input:**
Depth at Inlet (ft)	D	0.83
Grate Width (ft)	W	1.50
Length of Grate (ft)	L_g	10.00
Length of Curb Opening (ft)	L_c	12.50
Height of Curb Opening (ft)	H	0.50
Weir Coef. - Curb Opening	W_c	2.3
Weir Coef. - Grate	W_g	3.0
Orifice Coef.	O_c	0.67
Grate Coef.	G_c	0.60
Clogging Factor - Grate (%)	CF_g	50
Clogging Factor - Curb (%)	CF_c	50
Output (Grate):	**Equation:**	**Output (Grate):**
Effective Weir Length (ft)	$2*W+L_g$	13.00
Adjusted Effective Weir Length (ft)	$2*(1-CF_g/100)*W+(1-CF_g/100)*L_g$	6.50
Grate Open Area (sf)	$W*L_g$	15.00
Adjusted Grate Open Area (sf)	Grate Open Area * $G_c*(1-CF_g/100)$	4.50
Controlling Flow Type (weir/orifice)	If D<1.792*(Adj. Grate Open Area/Adj. Eff. Length)	weir
	use weir, else orifice	
Intercepted Flow (cfs)	weir: $W_g*(\text{Adj. Eff. Weir Length})*D^{1.5}$	14.7
	orifice: $O_c*(\text{Adj. Grate Open Area})*(64.4*D)^{0.5}$	
Output (Curb):	**Equation:**	**Output (Curb):**
Effective Weir Length (ft)	L+1.8*W	15.20
Adjusted Effective Weir Length (ft)	$L+1.8(1-CF_c/100)*W$	13.91
Curb Open Area (sf)	L*H	6.25
Adjusted Curb Open Area (sf)	Curb Open Area * $(1-CF_c/100)$	3.13
Controlling Flow Type (weir/orifice)	If D<H, weir, else orifice	orifice
Intercepted Flow (cfs)	weir: $W_c*(\text{Adj. Eff. Weir Length})*D^{1.5}$	15.27
	orifice: $O_c*(\text{Adj. Curb Open Area})*(64.4*(D-H/2))^{0.5}$	
Output (Total):	**Equation:**	**Output (Total):**
Capacity Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	**30.0**

WSPGW Storm Drain Computations

```
T1 KBH1805.001 MONTECITO 60 - UNIT 1 TDS
T2 PROPOSED STORM DRAIN SYSTEM TO CONNECTION TO EX. SD
T3 STARTING WSE PER EX. SDMH
SO   1000.0002504.210 36      .013                2507.210
R    1118.0002506.480 36      .013                                    -49.0 1
JX   1118.0002506.480 36 24   .013   30.0           2507.480        90.0
R    1146.5202506.830 36      .013                                     48.0 1
R    1428.6702511.060 36      .013                                    -28.0 1
R    1479.7802511.430 36      .013                                      0.0 1
SH   1479.7802511.430 36      .013
CD  24  4    0   0.000   2.000    0.000 0.000 0.000  0.000
CD  36  4    0   0.000   3.000    0.000 0.000 0.000  0.000
Q            32.000
```

FILE: SD1.WSW W S P G W - EDIT LISTING - Version 14.10 Date: 3-17-2019 Time:12:29: 2

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	24	4	0		2.000														
CD	36	4	0		3.000														

W S P G W PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

KBH1805.001 MONTECITO 60 - UNIT 1 TDS

HEADING LINE NO 2 IS -

PROPOSED STORM DRAIN SYSTEM TO CONNECTION TO EX. SD

HEADING LINE NO 3 IS -

STARTING WSE PER EX. SDMH

W S P G W PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1000.000	2504.210	36	2507.210

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1118.000	2506.480	36	.013	.000	.000	-49.000	1

ELEMENT NO 3 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1118.000	2506.480	36	24	0	.013	30.000	.000	2507.480	.000	90.000	.000

RADIUS	ANGLE
.000	.000

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1146.520	2506.830	36	.013	.000	.000	48.000	1

ELEMENT NO 5 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1428.670	2511.060	36	.013	.000	.000	-28.000	1

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1479.780	2511.430	36	.013	.000	.000	.000	1

ELEMENT NO 7 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1479.780	2511.430	36	.000

Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 3-17-2019 Time:12:29: 3

KBH1805.001 MONTECITO 60 - UNIT 1 TDS
PROPOSED STORM DRAIN SYSTEM TO CONNECTION TO EX. SD
STARTING WSE PER EX. SDMH

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	2504.210	1.880	2506.090	62.00	13.30	2.75	2508.84	.00	2.54	2.90	3.000	.000	.00	0 .0
33.071	.0192					.0163	.54	1.88	1.85	1.80	.013	.00	.00	PIPE
1033.071	2504.846	1.923	2506.769	62.00	12.95	2.60	2509.37	.00	2.54	2.88	3.000	.000	.00	0 .0
35.214	.0192					.0148	.52	1.92	1.77	1.80	.013	.00	.00	PIPE
1068.285	2505.523	2.005	2507.529	62.00	12.35	2.37	2509.90	.00	2.54	2.82	3.000	.000	.00	0 .0
21.112	.0192					.0132	.28	2.01	1.63	1.80	.013	.00	.00	PIPE
1089.397	2505.930	2.093	2508.023	62.00	11.77	2.15	2510.18	.00	2.54	2.76	3.000	.000	.00	0 .0
13.534	.0192					.0118	.16	2.09	1.50	1.80	.013	.00	.00	PIPE
1102.931	2506.190	2.188	2508.377	62.00	11.23	1.96	2510.33	.00	2.54	2.67	3.000	.000	.00	0 .0
8.581	.0192					.0105	.09	2.19	1.37	1.80	.013	.00	.00	PIPE
1111.513	2506.355	2.291	2508.646	62.00	10.70	1.78	2510.43	.00	2.54	2.55	3.000	.000	.00	0 .0
4.856	.0192					.0095	.05	2.29	1.25	1.80	.013	.00	.00	PIPE
1116.369	2506.448	2.405	2508.854	62.00	10.21	1.62	2510.47	.00	2.54	2.39	3.000	.000	.00	0 .0
1.631	.0192					.0086	.01	2.41	1.13	1.80	.013	.00	.00	PIPE
1118.000	2506.480	2.536	2509.016	62.00	9.73	1.47	2510.49	.00	2.54	2.17	3.000	.000	.00	0 .0
JUNCT STR	.0000					.0053	.00	2.54	1.00		.013	.00	.00	PIPE
1118.000	2506.480	4.653	2511.134	32.00	4.53	.32	2511.45	.00	1.83	.00	3.000	.000	.00	0 .0
28.520	.0123					.0023	.07	4.65	.00	1.38	.013	.00	.00	PIPE

KBH1805.001 MONTECITO 60 - UNIT 1 TDS
PROPOSED STORM DRAIN SYSTEM TO CONNECTION TO EX. SD
STARTING WSE PER EX. SDMH

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1146.520	2506.830	4.435	2511.266	32.00	4.53	.32	2511.58	.00	1.83	.00	3.000	.000	.00	0 .0
115.947	.0150					.0023	.26	4.44	.00	1.30	.013	.00	.00	PIPE
1262.467	2508.568	3.000	2511.568	32.00	4.53	.32	2511.89	.00	1.83	.00	3.000	.000	.00	0 .0
19.084	.0150					.0021	.04	3.00	.00	1.30	.013	.00	.00	PIPE
1281.551	2508.854	2.722	2511.576	32.00	4.75	.35	2511.93	.00	1.83	1.74	3.000	.000	.00	0 .0
9.800	.0150					.0021	.02	2.72	.43	1.30	.013	.00	.00	PIPE
1291.351	2509.001	2.560	2511.562	32.00	4.98	.39	2511.95	.00	1.83	2.12	3.000	.000	.00	0 .0
4.711	.0150					.0022	.01	2.56	.50	1.30	.013	.00	.00	PIPE
1296.062	2509.072	2.478	2511.550	32.00	5.12	.41	2511.96	.00	1.83	2.27	3.000	.000	.00	0 .0
HYDRAULIC JUMP														
1296.062	2509.072	1.330	2510.402	32.00	10.58	1.74	2512.14	.00	1.83	2.98	3.000	.000	.00	0 .0
52.206	.0150					.0135	.70	1.33	1.85	1.30	.013	.00	.00	PIPE
1348.267	2509.855	1.358	2511.213	32.00	10.29	1.64	2512.86	.00	1.83	2.99	3.000	.000	.00	0 .0
35.343	.0150					.0122	.43	1.36	1.78	1.30	.013	.00	.00	PIPE
1383.610	2510.385	1.409	2511.794	32.00	9.81	1.49	2513.29	.00	1.83	2.99	3.000	.000	.00	0 .0
19.432	.0150					.0107	.21	1.41	1.66	1.30	.013	.00	.00	PIPE
1403.042	2510.676	1.462	2512.138	32.00	9.35	1.36	2513.50	.00	1.83	3.00	3.000	.000	.00	0 .0
12.231	.0150					.0094	.12	1.46	1.54	1.30	.013	.00	.00	PIPE

KBH1805.001 MONTECITO 60 - UNIT 1 TDS
PROPOSED STORM DRAIN SYSTEM TO CONNECTION TO EX. SD
STARTING WSE PER EX. SDMH

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1415.273	2510.859	1.518	2512.377	32.00	8.92	1.24	2513.61	.00	1.83	3.00	3.000	.000	.00	0 .0
8.080	.0150					.0083	.07	1.52	1.44	1.30	.013	.00	.00	PIPE
1423.353	2510.980	1.576	2512.557	32.00	8.50	1.12	2513.68	.00	1.83	3.00	3.000	.000	.00	0 .0
5.317	.0150					.0073	.04	1.58	1.34	1.30	.013	.00	.00	PIPE
1428.670	2511.060	1.638	2512.698	32.00	8.11	1.02	2513.72	.00	1.83	2.99	3.000	.000	.00	0 .0
36.071	.0072					.0065	.24	1.64	1.24	1.61	.013	.00	.00	PIPE
1464.741	2511.321	1.694	2513.015	32.00	7.78	.94	2513.95	.00	1.83	2.97	3.000	.000	.00	0 .0
12.242	.0072					.0058	.07	1.69	1.16	1.61	.013	.00	.00	PIPE
1476.983	2511.410	1.762	2513.172	32.00	7.41	.85	2514.03	.00	1.83	2.95	3.000	.000	.00	0 .0
2.797	.0072					.0051	.01	1.76	1.08	1.61	.013	.00	.00	PIPE
1479.780	2511.430	1.835	2513.265	32.00	7.06	.77	2514.04	.00	1.83	2.92	3.000	.000	.00	0 .0

```
T1 KBH1805.001 MONTECITO 60 - UNIT 1 TDS
T2 PROPOSED STORM DRAIN SYSTEM TO CONNECTION TO PROP DI (FAC.DI1)
T3 STARTING WSE PER SD1 MODEL
SO   1118.0002507.480 24                          2511.130
R    1226.3302510.030 24      .013                                    -90.0 1
R    1287.4802511.700 24      .013                                      0.0 1
SH   1287.4802511.700 24
CD  24  4    0   0.000   2.000    0.000 0.000 0.000  0.000
Q           30.000
```

FILE: SD1-L.WSW W S P G W - EDIT LISTING - Version 14.10 Date: 3-17-2019 Time: 4:50: 4

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	24	4	0		2.000														

W S P G W PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

KBH1805.001 MONTECITO 60 - UNIT 1 TDS

HEADING LINE NO 2 IS -

PROPOSED STORM DRAIN SYSTEM TO CONNECTION TO PROP DI (FAC.DI1)

HEADING LINE NO 3 IS -

STARTING WSE PER SD1 MODEL

W S P G W PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1118.000	2507.480	24	2511.130

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1226.330	2510.030	24	.013	.000	.000	-90.000	1

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1287.480	2511.700	24	.013	.000	.000	.000	1

ELEMENT NO 4 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1287.480	2511.700	24	.000

Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 3-17-2019 Time: 4:50: 4

KBH1805.001 MONTECITO 60 - UNIT 1 TDS

PROPOSED STORM DRAIN SYSTEM TO CONNECTION TO PROP DI (FAC.DI1)

STARTING WSE PER SD1 MODEL

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
L/Elem	Ch Slope													
1118.000	2507.480	3.650	2511.130	30.00	9.55	1.42	2512.55	.00	1.86	.00	2.000	.000	.00	0 .0
108.330	.0235					.0176	1.91	3.65	.00	1.44	.013	.00	.00	PIPE
1226.330	2510.030	3.496	2513.526	30.00	9.55	1.42	2514.94	.00	1.86	.00	2.000	.000	.00	0 .0
61.150	.0273					.0176	1.08	3.50	.00	1.36	.013	.00	.00	PIPE
1287.480	2511.700	2.973	2514.673	30.00	9.55	1.42	2516.09	.00	1.86	.00	2.000	.000	.00	0 .0

Emergency Overflow Computations

Worksheet for Section E1 - Easement for Emergency Overflow

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.50	%
Bottom Width	35.00	ft
Discharge	30.00	ft^3/s

Results

Normal Depth	0.26	ft
Flow Area	9.16	ft^2
Wetted Perimeter	35.52	ft
Hydraulic Radius	0.26	ft
Top Width	35.00	ft
Critical Depth	0.28	ft
Critical Slope	0.00383	ft/ft
Velocity	3.27	ft/s
Velocity Head	0.17	ft
Specific Energy	0.43	ft
Froude Number	1.13	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.26	ft
Critical Depth	0.28	ft
Channel Slope	0.50	%
Critical Slope	0.00383	ft/ft

Cross Section for Section E1 - Easement for Emergency Overflow

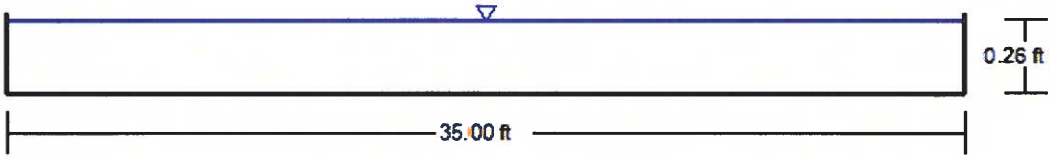
Project Description

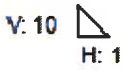
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.50	%
Normal Depth	0.26	ft
Bottom Width	35.00	ft
Discharge	30.00	ft³/s

Cross Section Image





Worksheet for Broad Crested Weir - 1

Project Description

Solve For	Headwater Elevation

Input Data

Discharge		30.00	ft³/s
Crest Elevation		2515.20	ft
Tailwater Elevation		0.26	ft
Crest Surface Type	Paved		
Crest Breadth		5.00	ft
Crest Length		35.00	ft

Results

Headwater Elevation	2515.63	ft
Headwater Height Above Crest	0.43	ft
Tailwater Height Above Crest	-2514.94	ft
Weir Coefficient	3.00	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	3.00	US
Flow Area	15.19	ft²
Velocity	1.98	ft/s
Wetted Perimeter	35.87	ft
Top Width	35.00	ft

Cross Section for Broad Crested Weir - 1

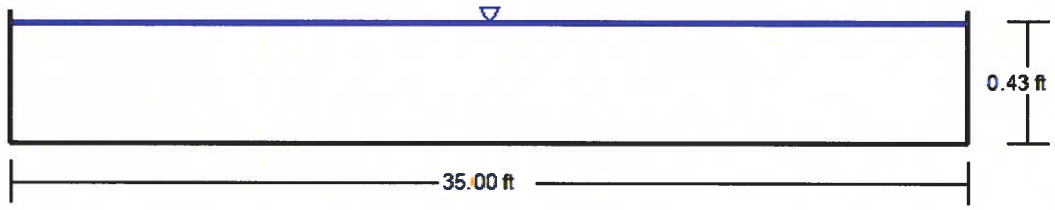
Project Description

Solve For	Headwater Elevation

Input Data

Discharge		30.00	ft³/s
Headwater Elevation		2515.63	ft
Crest Elevation		2515.20	ft
Tailwater Elevation		0.26	ft
Crest Surface Type	Paved		
Crest Breadth		5.00	ft
Crest Length		35.00	ft

Cross Section Image



V: 10
H: 1

APPENDIX D

Finish Floor Analysis

KBH1805.001 MONTECITO UNIT 1
FINISH FLOOR - CITY OF LAS VEGAS JURISDICTION

INPUT INFORMATION					FINISHED FLOORS					NOTES
Lot Number	Hydraulic Section Utilized	T/C[1] (ft)	F/L[2] (ft)	D_{100} (ft)	Flowline $F.F._{min}$[3] (ft)	T/C + 6" $F.F._{min}$[4] (ft)	$F.F._{Design}$ (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
1	2	2524.82	2524.44	0.57	2525.58	2525.32	2526.5	OK	OK	
2	2	2524.55	2524.17	0.57	2525.31	2525.05	2526.3	OK	OK	
3	2	2524.29	2523.91	0.57	2525.05	2524.79	2526.0	OK	OK	
4	2	2524.03	2523.65	0.57	2524.79	2524.53	2525.7	OK	OK	
5	2	2523.77	2523.39	0.57	2524.53	2524.27	2525.5	OK	OK	
6	2	2523.52	2523.14	0.57	2524.28	2524.02	2525.2	OK	OK	
7	2	2523.26	2522.88	0.57	2524.02	2523.76	2525.0	OK	OK	
8	2	2523.00	2522.62	0.57	2523.76	2523.50	2524.7	OK	OK	
9	2	2522.74	2522.36	0.57	2523.50	2523.24	2524.4	OK	OK	
10	2	2522.48	2522.10	0.57	2523.24	2522.98	2524.2	OK	OK	
11	2	2522.23	2521.85	0.57	2522.99	2522.73	2523.9	OK	OK	
12	2	2521.97	2521.59	0.57	2522.73	2522.47	2523.7	OK	OK	
13	2	2521.45	2521.07	0.57	2522.21	2521.95	2523.3	OK	OK	
14	2	2521.26	2520.88	0.57	2522.02	2521.76	2523.1	OK	OK	
15	2	2521.07	2520.69	0.57	2521.83	2521.57	2522.9	OK	OK	
16	2	2520.86	2520.48	0.57	2521.62	2521.36	2522.6	OK	OK	
17	2	2520.87	2520.49	0.57	2521.63	2521.37	2522.6	OK	OK	
18	2	2520.53	2520.15	0.57	2521.29	2521.03	2522.2	OK	OK	
19	2	2520.13	2519.75	0.57	2520.89	2520.63	2521.8	OK	OK	
20	2	2519.74	2519.36	0.57	2520.50	2520.24	2521.4	OK	OK	
21	2	2519.35	2518.97	0.57	2520.11	2519.85	2521.1	OK	OK	
22	2	2518.96	2518.58	0.57	2519.72	2519.46	2520.7	OK	OK	
23	2	2518.56	2518.18	0.57	2519.32	2519.06	2520.3	OK	OK	
24	2	2518.17	2517.79	0.57	2518.93	2518.67	2519.9	OK	OK	
25	2	2517.78	2517.40	0.57	2518.54	2518.28	2519.5	OK	OK	
26	2	2517.24	2516.86	0.57	2518.00	2517.74	2518.9	OK	OK	
27	1	2515.76	2515.38	0.51	2516.40	2516.26	2517.4	OK	OK	
28	1	2516.12	2515.74	0.51	2516.76	2516.62	2517.7	OK	OK	
29	1	2516.69	2516.31	0.51	2517.33	2517.19	2518.3	OK	OK	
30	2	2517.27	2516.89	0.57	2518.03	2517.77	2518.9	OK	OK	
31	2	2517.84	2517.46	0.57	2518.60	2518.34	2519.4	OK	OK	
32	2	2518.41	2518.03	0.57	2519.17	2518.91	2520.0	OK	OK	
33	2	2518.98	2518.60	0.57	2519.74	2519.48	2520.6	OK	OK	

KBH1805.001 MONTECITO UNIT 1 FINISH FLOOR - CITY OF LAS VEGAS JURISDICTION										
INPUT INFORMATION					FINISHED FLOORS					NOTES
Lot Number	Hydraulic Section Utilized	T/C[1] (ft)	F/L[2] (ft)	D_{100} (ft)	Flowline $F.F._{min}$[3] (ft)	T/C + 6" $F.F._{min}$[4] (ft)	$F.F._{Design}$ (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
34	2	2519.56	2519.18	0.57	2520.32	2520.06	2521.2	OK	OK	
35	2	2520.13	2519.75	0.57	2520.89	2520.63	2521.7	OK	OK	
36	2	2520.77	2520.39	0.57	2521.53	2521.27	2522.4	OK	OK	
37	2	2521.55	2521.17	0.57	2522.31	2522.05	2523.2	OK	OK	
38	2	2522.48	2522.10	0.57	2523.24	2522.98	2524.1	OK	OK	
39	2	2523.45	2523.07	0.57	2524.21	2523.95	2525.1	OK	OK	
40	2	2524.42	2524.04	0.57	2525.18	2524.92	2526.0	OK	OK	
41	2	2525.45	2525.07	0.57	2526.21	2525.95	2527.1	OK	OK	
42	2	2526.59	2526.21	0.57	2527.35	2527.09	2528.2	OK	OK	
43	2	2524.82	2524.44	0.57	2525.58	2525.32	2526.5	OK	OK	
44	2	2525.10	2524.72	0.57	2525.86	2525.60	2526.8	OK	OK	
45	2	2525.35	2524.97	0.57	2526.11	2525.85	2527.1	OK	OK	
46	2	2525.60	2525.22	0.57	2526.36	2526.10	2527.4	OK	OK	
47	2	2525.85	2525.47	0.57	2526.61	2526.35	2527.6	OK	OK	
48	2	2526.11	2525.73	0.57	2526.87	2526.61	2527.9	OK	OK	
49	2	2526.36	2525.98	0.57	2527.12	2526.86	2528.1	OK	OK	
50	2	2526.61	2526.23	0.57	2527.37	2527.11	2528.4	OK	OK	
51	2	2526.87	2526.49	0.57	2527.63	2527.37	2528.6	OK	OK	
52	2	2527.12	2526.74	0.57	2527.88	2527.62	2528.9	OK	OK	
53	2	2527.37	2526.99	0.57	2528.13	2527.87	2529.1	OK	OK	
54	2	2527.63	2527.25	0.57	2528.39	2528.13	2529.4	OK	OK	
55	2	2527.71	2527.33	0.57	2528.47	2528.21	2529.6	OK	OK	
56	2	2526.93	2526.55	0.57	2527.69	2527.43	2528.6	OK	OK	
57	2	2526.60	2526.22	0.57	2527.36	2527.10	2528.3	OK	OK	
58	2	2526.27	2525.89	0.57	2527.03	2526.77	2528.0	OK	OK	
59	2	2526.76	2526.38	0.57	2527.52	2527.26	2528.4	OK	OK	
60	2	2526.24	2525.86	0.57	2527.00	2526.74	2527.9	OK	OK	
61	2	2525.49	2525.11	0.57	2526.25	2525.99	2527.2	OK	OK	
62	2	2524.72	2524.34	0.57	2525.48	2525.22	2526.4	OK	OK	
63	2	2524.36	2523.98	0.57	2525.12	2524.86	2526.1	OK	OK	
64	2	2523.99	2523.61	0.57	2524.75	2524.49	2525.7	OK	OK	
65	2	2523.63	2523.25	0.57	2524.39	2524.13	2525.3	OK	OK	
66	2	2523.26	2522.88	0.57	2524.02	2523.76	2525.0	OK	OK	

KBH1805.001 MONTECITO UNIT 1 FINISH FLOOR - CITY OF LAS VEGAS JURISDICTION										
INPUT INFORMATION					FINISHED FLOORS					NOTES
Lot Number	Hydraulic Section Utilized	T/C[1] (ft)	F/L[2] (ft)	D_{100} (ft)	Flowline $F.F._{min}$[3] (ft)	T/C + 6" $F.F._{min}$[4] (ft)	$F.F._{Design}$ (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
67	2	2522.90	2522.52	0.57	2523.66	2523.40	2524.5	OK	OK	
68	2	2522.54	2522.16	0.57	2523.30	2523.04	2524.1	OK	OK	
69	2	2522.22	2521.84	0.57	2522.98	2522.72	2523.8	OK	OK	
70	2	2521.05	2520.67	0.57	2521.81	2521.55	2522.7	OK	OK	
71	2	2520.77	2520.39	0.57	2521.53	2521.27	2522.4	OK	OK	
72	2	2519.76	2519.38	0.57	2520.52	2520.26	2521.5	OK	OK	
73	2	2520.08	2519.70	0.57	2520.84	2520.58	2521.8	OK	OK	
74	2	2520.46	2520.08	0.57	2521.22	2520.96	2522.2	OK	OK	
75	2	2521.00	2520.62	0.57	2521.76	2521.50	2522.7	OK	OK	
76	2	2522.78	2522.40	0.57	2523.54	2523.28	2524.4	OK	OK	
77	2	2523.42	2523.04	0.57	2524.18	2523.92	2524.9	OK	OK	
78	2	2523.42	2523.04	0.57	2524.18	2523.92	2525.2	OK	OK	
79	2	2523.06	2522.68	0.57	2523.82	2523.56	2524.7	OK	OK	
80	2	2522.69	2522.31	0.57	2523.45	2523.19	2524.3	OK	OK	
81	2	2522.30	2521.92	0.57	2523.06	2522.80	2523.9	OK	OK	
82	2	2521.86	2521.48	0.57	2522.62	2522.36	2523.5	OK	OK	
83	2	2521.42	2521.04	0.57	2522.18	2521.92	2523.0	OK	OK	
84	2	2521.16	2520.78	0.57	2521.92	2521.66	2522.8	OK	OK	
85	2	2520.93	2520.55	0.57	2521.69	2521.43	2522.5	OK	OK	
86	2	2520.66	2520.28	0.57	2521.42	2521.16	2522.3	OK	OK	
87	2	2519.28	2518.90	0.57	2520.04	2519.78	2520.5	OK	OK	
88	2	2518.50	2518.12	0.57	2519.26	2519.00	2520.1	OK	OK	
89	2	2518.10	2517.72	0.57	2518.86	2518.60	2519.7	OK	OK	
90	2	2517.73	2517.35	0.57	2518.49	2518.23	2519.3	OK	OK	
91	2	2517.41	2517.03	0.57	2518.17	2517.91	2519.0	OK	OK	
92	2	2519.07	2518.69	0.57	2519.83	2519.57	2520.8	OK	OK	
93	2	2519.64	2519.26	0.57	2520.40	2520.14	2521.3	OK	OK	
94	2	2520.22	2519.84	0.57	2520.98	2520.72	2521.9	OK	OK	
95	2	2520.90	2520.52	0.57	2521.66	2521.40	2522.6	OK	OK	
96	2	2524.11	2523.73	0.57	2524.87	2524.61	2525.8	OK	OK	
97	2	2524.68	2524.30	0.57	2525.44	2525.18	2526.4	OK	OK	
98	2	2525.05	2524.67	0.57	2525.81	2525.55	2526.8	OK	OK	
99	2	2525.25	2524.87	0.57	2526.01	2525.75	2527.1	OK	OK	

KBH1805.001 MONTECITO UNIT 1
FINISH FLOOR - CITY OF LAS VEGAS JURISDICTION

INPUT INFORMATION					FINISHED FLOORS					NOTES
Lot Number	Hydraulic Section Utilized	T/C[1] (ft)	F/L[2] (ft)	D_{100} (ft)	Flowline F.F.$_{min}$[3] (ft)	T/C + 6" F.F.$_{min}$[4] (ft)	F.F.$_{Design}$ (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
100	2	2525.45	2525.07	0.57	2526.21	2525.95	2527.3	OK	OK	
101	2	2525.64	2525.26	0.57	2526.40	2526.14	2527.5	OK	OK	
102	2	2525.84	2525.46	0.57	2526.60	2526.34	2527.6	OK	OK	
103	2	2526.04	2525.66	0.57	2526.80	2526.54	2527.8	OK	OK	
104	2	2526.24	2525.86	0.57	2527.00	2526.74	2528.0	OK	OK	
105	2	2526.45	2526.07	0.57	2527.21	2526.95	2528.2	OK	OK	

Where:

1: Top of Curb at High Side of Lot

2: TC-0.38 (For Roll Curb), TC-0.5 (For L Curb)

3: Minimum Allowable Finished Floor Elevation above flowline elevation @ high side of lot = (2 x D_{100}) + F/L

4: City of Las Vegas minimum allowable finished floor elevation = T.C. @ high side of lot + 6-inches

5: These lots have an adjacent solid grouted wall that protects the FF.

City of Las Vegas Finished Floor Criteria:

-The finished floor shall be set a vertical distance above the gutter flowline of at least twice the depth of flow in the gutter flowline up to a maximum of 18 inches above the WSEL in the street.

-The finished floor shall be set a vertical distance of at least 6-inches above the highest adjacent top of curb.

Supplemental Finish Floor Checks

Adjacent/Perimeter Street Check									
Lot Number	Street	High TC[1]	High FL[2]	Section	Flow Depth[3]	Min FF[4]	Design FF	Check	Solid Grout
1	CENTER	2524.00	2523.50	N	0.60	2524.70	2526.5	OK	No
2	CENTER	2523.93	2523.43	N	0.60	2524.63	2526.3	OK	No
3	CENTER	2523.40	2522.90	N	0.60	2524.10	2526.0	OK	No
4	CENTER	2522.96	2522.46	N	0.60	2523.66	2525.7	OK	No
5	CENTER	2522.54	2522.04	N	0.60	2523.24	2525.5	OK	No
6	CENTER	2522.11	2521.61	N	0.60	2522.81	2525.2	OK	No
7	CENTER	2521.69	2521.19	N	0.60	2522.39	2525.0	OK	No
8	CENTER	2521.27	2520.77	N	0.60	2521.97	2524.7	OK	No
9	CENTER	2520.85	2520.35	N	0.60	2521.55	2524.4	OK	No
10	CENTER	2520.42	2519.92	N	0.60	2521.12	2524.2	OK	No
11	CENTER	2520.00	2519.50	N	0.60	2520.70	2523.9	OK	No
12	CENTER	2519.58	2519.08	N	0.60	2520.28	2523.7	OK	No
13	CENTER	2519.17	2518.67	N	0.60	2519.87	2523.3	OK	No
26	INTERIOR	2516.08	2515.70	1	0.51	2516.72	2518.9	OK	No
27	DEER SPRINGS	2512.77	2512.27	DS1	0.48	2513.23	2517.4	OK	No
28	DEER SPRINGS	2512.77	2512.27	DS1	0.48	2513.23	2517.7	OK	No
29	DEER SPRINGS	2513.74	2513.24	DS1	0.48	2514.20	2518.3	OK	No
30	DEER SPRINGS	2515.04	2514.54	DS1	0.48	2515.50	2518.9	OK	No
31	DEER SPRINGS	2515.04	2514.54	DS1	0.48	2515.50	2519.4	OK	No
32	DEER SPRINGS	2516.56	2516.06	DS1	0.48	2517.02	2520.0	OK	No
33	DEER SPRINGS	2519.61	2519.11	DS1	0.48	2520.07	2520.6	OK	No
34	DEER SPRINGS	2519.61	2519.11	DS1	0.48	2520.07	2521.2	OK	No
35	DEER SPRINGS	2519.61	2519.11	DS1	0.48	2520.07	2521.7	OK	No
36	DEER SPRINGS	2521.14	2520.64	DS1	0.48	2521.60	2522.4	OK	No
37	DEER SPRINGS	2521.14	2520.64	DS1	0.48	2521.60	2523.2	OK	No
38	DEER SPRINGS	2523.02	2522.52	DS1	0.48	2523.48	2524.1	OK	No
39	DEER SPRINGS	2524.23	2523.73	DS1	0.48	2524.69	2525.1	OK	No
40	DEER SPRINGS	2524.81	2524.31	DS1	0.48	2525.27	2526.0	OK	No
41	DEER SPRINGS	2525.45	2524.95	DS1	0.48	2525.91	2527.1	OK	No
42	DEER SPRINGS	2526.26	2525.76	DS1	0.48	2526.72	2528.2	OK	No
42	GRAND MONTECITO	2527.37	2526.87	GM1	0.58	2528.03	2528.2	OK	No
43	GRAND MONTECITO	2527.65	2527.15	GM1	0.58	2528.31	2526.5	CHECK	Yes
44	GRAND MONTECITO	2527.37	2526.87	GM1	0.58	2528.03	2526.8	CHECK	Yes
45	GRAND MONTECITO	2527.33	2526.83	GM1	0.58	2527.99	2527.1	CHECK	Yes

46	GRAND MONTECITO	2526.36	2525.86	GM1	0.58	2527.02	2527.4	OK	No
47	GRAND MONTECITO	2526.25	2525.75	GM1	0.58	2526.91	2527.6	OK	No
48	GRAND MONTECITO	2525.39	2524.89	GM1	0.58	2526.05	2527.9	OK	No
49	GRAND MONTECITO	2525.39	2524.89	GM1	0.58	2526.05	2528.1	OK	No
50	GRAND MONTECITO	2525.33	2524.83	GM1	0.58	2525.99	2528.4	OK	No
51	GRAND MONTECITO	2525.20	2524.70	GM1	0.58	2525.86	2528.6	OK	No
52	GRAND MONTECITO	2525.04	2524.54	GM1	0.58	2525.70	2528.9	OK	No
53	GRAND MONTECITO	2524.91	2524.41	GM1	0.58	2525.57	2529.1	OK	No
54	GRAND MONTECITO	2525.12	2524.62	GM1	0.58	2525.78	2529.4	OK	No
55	GRAND MONTECITO	2525.33	2524.83	GM1	0.58	2525.99	2529.6	OK	No
55	CENTER	2526.84	2526.34	N	0.60	2527.54	2529.6	OK	No
56	CENTER	2527.32	2526.82	N	0.60	2528.02	2528.6	OK	No
57	CENTER	2526.77	2526.27	N	0.60	2527.47	2528.3	OK	No
58	CENTER	2526.22	2525.72	N	0.60	2526.92	2528.0	OK	No
59	INTERIOR	2526.76	2526.38	2	0.57	2527.52	2528.4	OK	No
69	INTERIOR	2521.93	2521.55	2	0.57	2522.69	2523.8	OK	No
72	INTERIOR	2520.39	2520.01	2	0.57	2521.15	2521.5	OK	No
75	INTERIOR	2522.21	2521.83	2	0.57	2522.97	2522.7	CHECK	Yes
87	INTERIOR	2520.27	2519.89	2	0.57	2521.03	2520.5	CHECK	Yes
91	INTERIOR	2518.50	2518.12	2	0.57	2519.26	2519.0	CHECK	Yes
96	INTERIOR	2522.77	2522.39	2	0.57	2523.53	2525.8	OK	No

1: High TC is the elevation at the high side of the adjacent perimeter street

2: 0.38-ft is subtracted from the High TC to obain the High FL elevation for roll curb; 0.50-ft for L-curb

3: Flow depth is the normal depth in adjacent perimeter street

4: Min FF is the High FL plus twice the depth of flow.

Specific Energy Check							
Lot Number	High TC[1]	High FL[2]	Section	Specific Energy[3]	Min FF[4]	Design FF	Check
29	2516.69	2516.31	2	0.77	2517.08	2518.30	OK
30	2516.69	2516.31	2	0.77	2517.08	2518.90	OK
39	2523.45	2523.07	2	0.77	2523.84	2525.10	OK
40	2523.45	2523.07	2	0.77	2523.84	2526.00	OK

1: High TC is the elevation at the high side of the adjacent perimeter street

2: 0.38-ft is subtracted from the High TC to obain the High FL elevation

2: Specific energy depth is taken from FlowMaster calculation for street directing flow toward lot.

3: Min FF is the High FL plus the specific energy depth.

Emergency Overflow Finish Floor Checks

Drainage Easements Check - Emergency Overflow							
Lot Number	High TC/FL[1]	Section	Flow Depth[2]	Min FF[3]	Design FF	Check	Solid Grout
26	2515.20	E1	0.43	2515.63	2518.90	OK	No
27	2515.20	E1	0.43	2515.63	2517.40	OK	No

1: High TC/FL is at the high side of the drainage easement flowline or the highest TC adjacent to the easement if flow is weiring over the curb.

2: Flow depth is either normal depth or weir depth (whichever is higher) of the emergency overflow.

3: Min FF is the High TC/FL plus the emergency overflow depth.

APPENDIX E

Reference Material

Technical Drainage Study for Montecito Storm Drain Infrastructure

Referenced Report Excerpt

TECHNICAL DRAINAGE STUDY

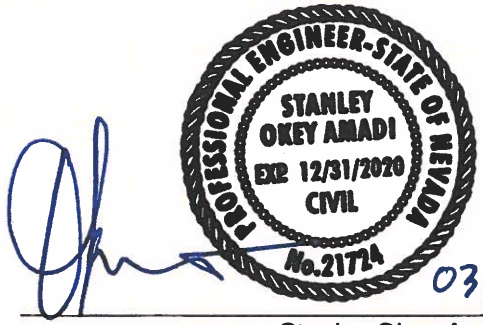
Montecito Storm Drain Infrastructure

City of Las Vegas, Nevada

Job No.: KBH1805.004
Date: March 2019

Prepared For:
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03/06/19

Stanley Okey Amadi, P.E.
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D'Amato Hyche

Centennial Parkway Channel. Refer to the Existing Condition Drainage Map (Exhibit F) provided Appendix A for the drainage pattern and basins described above.

3.3 Summary of Existing Drainage Condition Flows

A summary of existing condition flow rates has been provided in a table on Exhibit F, provided in Appendix A. The associated HEC-1 analysis utilized to determine the flow rates identified on Exhibit F has been included in Appendix B. It should also be noted that the existing site generates significantly less flow in the existing condition in comparison to the ultimate condition. Therefore, the design of the storm drain facilities will based on the ultimate condition peak flows discussed in Section 5 of this report.

4 PROPOSED CONDITION

4.1 Definition of Proposed Drainage Condition

The proposed condition of this project is defined as the condition with the proposed storm drain infrastructures described in Section 1.1 of this report. The northern mainline storm drain connection to the existing 20'x7' RCB (CN95 0000 CCRFCD Facility) will be installed. Likewise, the central and southern stubs will be installed. No other onsite or offsite improvements are proposed other than the storm drain facilities with minor grading to direct flows to the intended interception points.

4.2 Discussion of Proposed Drainage Condition

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

No onsite improvements other than storm drain installations are proposed. Thus, the onsite peak flows and drainage pattern will generally remain the same as in the existing condition following the natural ground slope. The northern mainline will comprise of a 54" Cast-In-Place Concrete Pipe (CIPCP) storm drain. The storm drain will be installed with a structural concrete cap connection to the existing 8'x5' RCBC in Grand Montecito Parkway. The storm drain will capture the offsite flows from the 8'x5' RCBC and discharge directly into the existing 20'x7' RCB (CN95 0000). Two (2) lateral stubs (18" & 30" RCP) with field inlets are proposed to capture the interim localized offsite flows from the adjacent Mountain Ridge Park and the flows within the roadside swale in Oso Blanca Road respectively.

The central stub will comprise of a 36" RCP storm drain. The storm drain will extend from the site and continue south along Oso Blanca Road to tie into the existing 36" RCP lateral for the aforementioned field inlet that the discharges into the 8'x5' RCB stub at the southeast corner of the site. The upstream end of the proposed 36" RCP will be caped onsite for future connection upon the ultimate subdivision improvements of the site. The stub will be constructed in the alignment of the future private street that will connect Grand Montecito Parkway to Oso Blanca Road. The future development of the onsite subdivisions will provide the drop inlets and any required laterals that will be necessary to capture onsite flows and ensure that surface flows from the site do not discharge into Oso Blanca Road.

The southern storm drain stub will comprise of a 48" RCP that will connect directly to the existing 8'x5' RCB stub at the southwest corner of the site. The entrance of the existing 8'x5' RCB will also be capped with a concrete wall that will be penetrated with the 48" RCP. The inlet of the 48" RCP will comprise of an open sump in the proposed condition pending future tie-in and extension upon the ultimate subdivision improvements for the site. Note that all the onsite flows as well as the offsite flow from the existing 36" RCP storm drain that daylights into the site from Montecito Parkway will be captured by the proposed 48" RCP sump in the proposed condition. Refer to the Proposed Condition Drainage Map (Exhibit G) provided Appendix A for the drainage pattern described above.

4.3 Summary of Proposed Drainage Condition Flows

A summary of proposed condition flow rates has been provided in a table on Exhibit G, provided in Appendix A. The associated HEC-1 analysis utilized to determine the flow rates identified on Exhibit G has been included in Appendix B. Note that the onsite and offsite basins and peak flows remains the same as in the existing condition as no onsite improvements other the storm drains are proposed. Therefore, a separate proposed condition HEC-1 model is not necessary. As previously state, the existing site generates significantly less flow in the existing and proposed condition in comparison to the ultimate condition. Therefore, the design of the storm drain facilities will based on the ultimate condition peak flows discussed in Section 5 of this report.

5 ULTIMATE CONDITION

5.1 Definition of Ultimate Drainage Condition

The ultimate drainage condition is defined as the fully developed onsite and offsite watershed. Specifically, the project site will be developed into three units of residential subdivisions located at the southwest, northwest and southeast quadrants of the site with a multi-family complex located at the northeast quadrant. All the tributary offsite areas are assumed to be fully developed as analyzed in the Centennial Channel Study. Although, the subject study only addresses construction of the storm drain infrastructure, a conceptual layout and analysis of the future facilities contributing to the proposed storm drain systems will be addressed to ensure that the systems are adequately sized.

5.2 Discussion of Ultimate Drainage Condition

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

As previously mentioned, the conceptual ultimate developed condition of the site and its tributary watershed has already been analyzed by the Centennial Channel Study. A curve number analysis of the site based on the planned land use of single family and multi-family development yields a curve number of 86.90 whereas the Centennial Channel Study estimated a higher curve number of 93.372 which is more conservative. Therefore, the hydrologic analysis for the ultimate development of the site has been referenced from the Centennial Channel Study. The site was analyzed as basin NWBB3-B which generates a 100-year flow of 135 cfs. Based on the future site plan and layout, the referenced basin

Referenced Drainage Exhibits



LEGEND

- BASIN BOUNDARY
- PRO-RATED SUBBASIN BOUNDARY
- EXISTING DRAINAGE FACILITIES
- PROPOSED DRAINAGE FACILITIES
- FUTURE DRAINAGE FACILITIES
- ID — BASIN ID
- ID — PRO-RATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID

Proposed Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
NWBB3-B	53.0	17	1
NWBB1-4*	33.0	30	(17)
OSO	6.3	18	10
CNWBB1-1 Q = REF*	N/A	227	(125)
CNBB1-4 Q = REF*	N/A	3334	(1834)
2CNWBB3-B* Q = REF*	N/A	3579	(1968)

(Q10) VALUES DENOTED IN PARENTHESIS HAVE BEEN
* DENOTES REFERENCED FROM CENTENNIAL CHANNEL STUDY

Existing/Proposed Prorated Flow Summary

Basin ID	Q_{100} (cfs)	Q_{10} (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)	10-yr Unit Flow (cfs/acre)
NWBB1-4	30	17	33.0	0.9	0.5
OSO	18	10	6.3	2.9	1.6
Subbasin ID	Q_{100} (cfs)	Q_{10} (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)	10-yr Unit Flow (cfs/acre)
NWBB1-4(A)	22	13	24.5	0.9	0.5
NWBB1-4(B)	8	4	8.6	0.9	0.5
TOTAL	*30*	*17*	*33.0*		
OSO(A)	7	4	2.5	2.9	1.6
OSO(B)	3	2	1.0	2.9	1.6
OSO(C)	4	2	1.5	2.9	1.6
OSO(D)	4	2	1.3	2.9	1.6
TOTAL	*18.0*	*10.0*	*6.3*		

Hydraulic Section Summary

Section ID	Section Description	Q_{100} (cfs)	Slope (%)	Depth (ft)	Velocity (fps)
Section T1 Q = NWBB1-4(A)	Eathern Trap. Channel, 3:1 SS, 10' BW	22.0	2.20	0.42	4.60
Section T2 Q = 32-cfs + NWBB3-B	Earthen Trap Channel, 3:1 SS, 20' BW w/ flowline	49.0	0.61	1.19	3.50

PROPOSED IMPROVEMENT FOR
FUTURE ULTIMATE CONDITION

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP'R DATE	APP

CITY OF LAS VEGAS, NV

KB HOMES

MONTECITO STORM DRAIN INFRASTRUCTURE
PROPOSED CONDITION DRAINAGE MAP

6-21
T-19S
R-60E

DATE: MARCH 2019
DRAFTER: JSR
DESIGNER: JSR
CHECKED: SOA

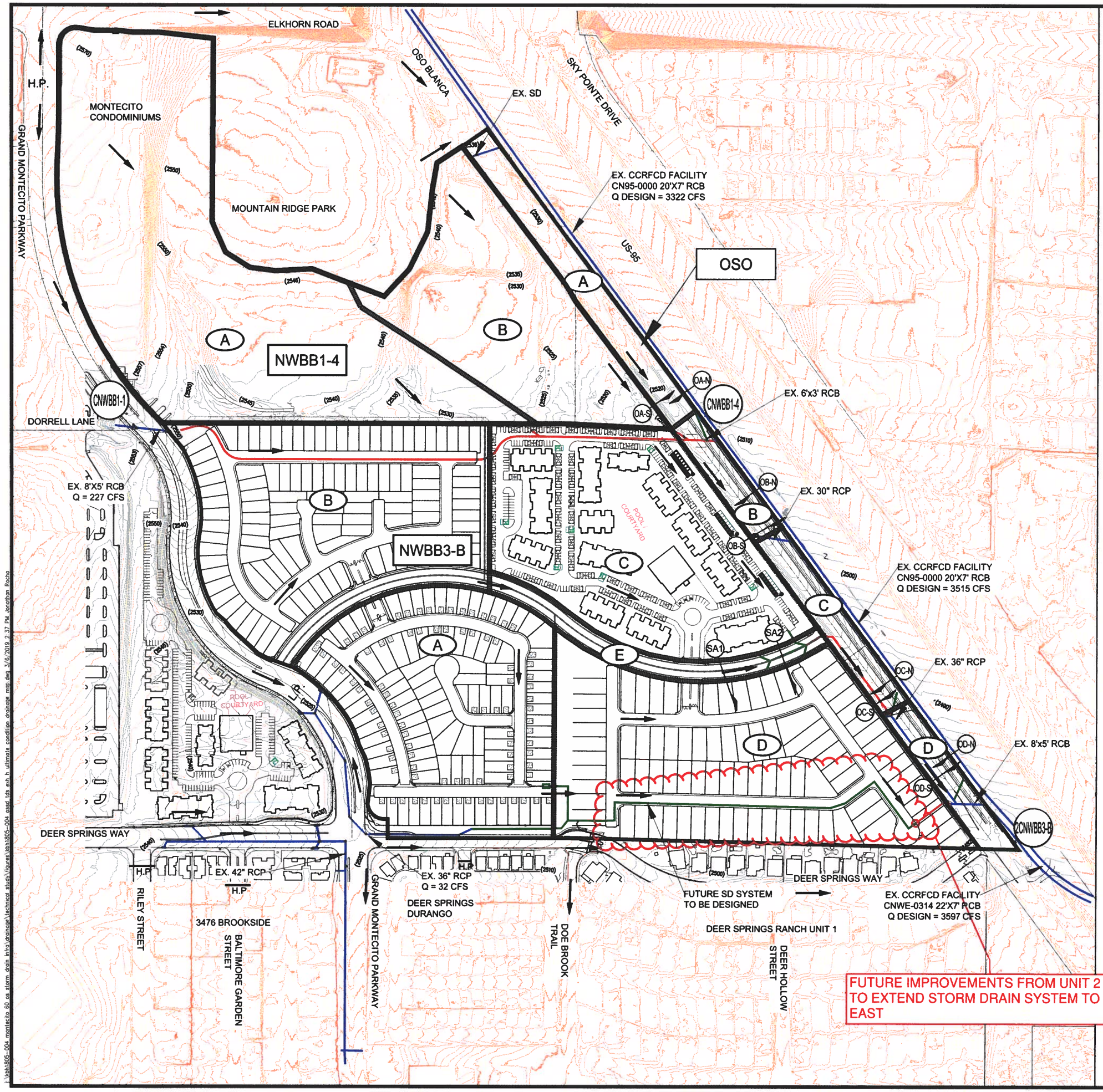
PROJECT NO.
KBH1805.004

EXHIBIT G
SHEET 1 OF 1

N

0 150 300
SCALE - 1"=150' FEET

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N

0 150 300
SCALE – 1"=150' FEET

LEGEND

- BASIN BOUNDARY
- PRO-RATED SUBBASIN BOUNDARY
- EXISTING DRAINAGE FACILITIES
- PROPOSED DRAINAGE FACILITIES
- FUTURE DRAINAGE FACILITIES
- ID — BASIN ID
- ID — PRO-RATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID

Ultimate Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
NWBB3-B*	53 0	135	(74)
NWBB1-4*	33 0	30	(17)
ROFF1	7 9	23	9
RON1	2 7	10	5
OSO	6 3	18	10
CNWBB1-1 Q = REF*	N/A	227	(125)
CNBB1-4 Q = REF*	N/A	3334	(1834)
2CNWBB3-B* Q = REF*	N/A	3579	(1968)

(Q10) VALUES DENOTED IN PARENTHESIS HAVE BEEN
* DENOTES REFERENCED FROM CENTENNIAL CHANNEL STUDY

Ultimate Condition Prorated Flow Summary

Basin ID	Q_{100} (cfs)	Q_{10} (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)	10-yr Unit Flow (cfs/acre)
NWBB1-4	30	17	33.0	0.9	0.5
NWBB3-B	135	74	53.0	2.5	1 4
OSO	18	10	6.3	2.9	1 6
Subbasin ID	**Q_{100} (cfs)**	**Q_{10} (cfs)**	**Area (acres)**	**100-yr Unit Flow (cfs/acre)**	**10-yr Unit Flow (cfs/acre)**
NWBB1-4(A)	22	13	24.5	0.9	0.5
NWBB1-4(B)	8	4	8.6	0.9	0.5
TOTAL	*30*	*17*	*33.0*		
NWBB3-B(A)	30	16	11.6	2.5	1.4
NWBB3-B(B)	33	18	13.0	2.5	1.4
NWBB3-B(C)	31	17	12.2	2.5	1.4
NWBB3-B(D)	37	20	14.6	2.5	1.4
NWBB3-B(E)	4	2	1.7	2.5	1.4
TOTAL	*135*	*74*	*53.0*		
OSO(A)	7	4	2 5	2.9	1 6
OSO(B)	3	2	1.0	2.9	1.6
OSO(C)	4	2	1.5	2.9	1.6
OSO(D)	4	2	1.3	2.9	1.6
TOTAL	*18*	*10*	*6.3*		

Ultimate Condition 100-Year Street Flow Summary

Section ID	Q_{100} (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV
SA1** Q = NWBB3-B(B+E) + ASSUMED 2-CFS FROM (C)	39	1.00	0.60	3 63	2 2
SA2 Q = DI BYPASS	1.0	1.00	0.22	1.68	0 4
OA-N Q = (1/2)OSO(A)	3.5	2.00	0.34	3.09	1 1
OB-N Q = (1/2)OSO(B)	1.5	2.00	0.27	2 61	0 7
OC-N Q = (1/2)OSO(C)	2.0	2.00	0.29	2 76	0.8
OD-N Q = (1/2)OSO(D)	2.0	2.00	0.29	2.76	0.8
OA-S Q = (1/2)OSO(A)	3.5	2.00	0.34	3.09	1 1
OB-S Q = (1/2)OSO(B)	1.5	2.00	0.27	2 61	0 7
OC-S Q = (1/2)OSO(C)	2.0	2.00	0.29	2 76	0 8
OD-S Q = (1/2)OSO(D)	2.0	2.00	0.29	2 76	0.8

** ASSUMES 2-CFS BYPASS INTO STREET FROM THE FUTURE MULTI-UNIT DEVELOPMENT

Ultimate Condition 10-Year Street Flow Summary

Section ID	Q_{10} (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV	Dry Lane (ft)
OA-N Q = (1/2)OSO(A)	2	2.00	0.29	2.8	0.8	16.5
OB-N Q = (1/2)OSO(B)	1	2.00	0.24	2.5	0.6	19 0
OC-N Q = (1/2)OSO(C)	1	2.00	0.24	2.5	0.6	19.0
OD-N Q = (1/2)OSO(D)	1	2.00	0.24	2.5	0.6	19.0
OA-S Q = (1/2)OSO(A)	2	2.00	0.29	2.8	0.8	16.5
OB-S Q = (1/2)OSO(B)	1	2.00	0.24	2.5	0.6	19.0
OC-S Q = (1/2)OSO(C)	1	2.00	0.24	2.5	0.6	19.0
OD-S Q = (1/2)OSO(D)	1	2.00	0.24	2.5	0.6	19 0

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP

CITY OF LAS VEGAS, NV

KB HOMES

MONTECITO STORM DRAIN INFRASTRUCTURE
ULTIMATE CONDITION DRAINAGE MAP

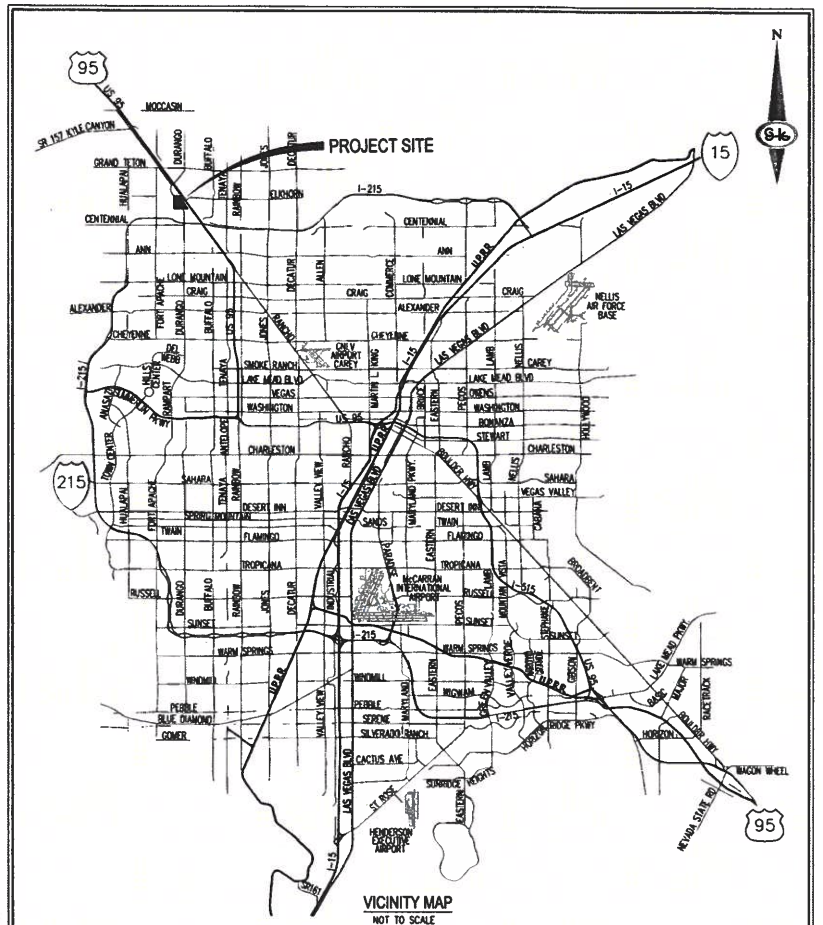
S 21 T 19S R 60E

DATE: MARCH 2019
DRAFTER: JSR
DESIGNER: JSR
CHECKED: SOA
PROJECT NO. KBH1805.004

EXHIBIT H
SHEET 1 OF 1

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Referenced Improvement Plans

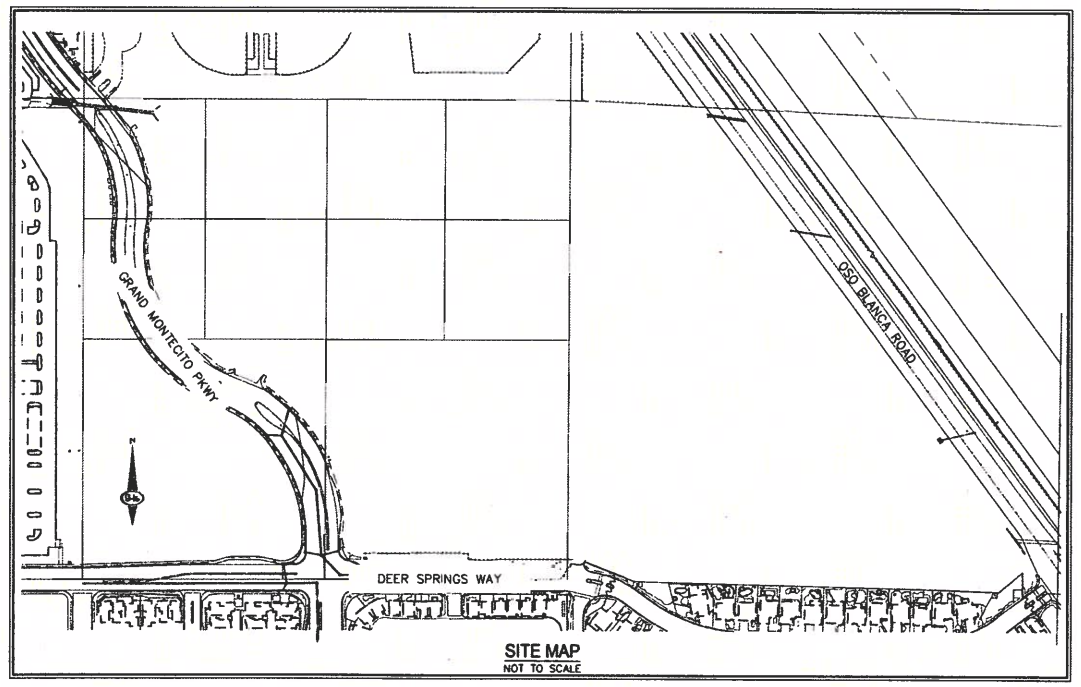


KB HOME

IMPROVEMENT PLANS FOR MONTECITO STORM DRAIN INFRASTRUCTURE

CITY OF LAS VEGAS, NEVADA

APN: 125-20-601-003, -006, 125-20-602-002, -005, -009, -010, 125-20-603-001, -002, -003, -004, 125-21-201-001



SHEET INDEX		
NO.	SHEET	DESCRIPTION
1	C-1	COVER SHEET
2	C-2	GENERAL NOTES
3	C-3	LEGEND, ABBREVIATIONS, AND QUANTITIES
4	PP-1	PLAN & PROFILE - STORM DRAIN STA 25+00 TO 27+52
5	PP-2	PLAN & PROFILE - STORM DRAIN STA 20+00 TO 25+00
6	PP-3	PLAN & PROFILE - STORM DRAIN STA 16+00 TO 20+00
7	PP-4	PLAN & PROFILE - STORM DRAIN STA 12+00 TO 16+00
8	PP-5	PLAN & PROFILE - STORM DRAIN STA 9+00 TO 12+00
9	PP-6	PLAN & PROFILE - OSO BLANCA RD STA 11+50 TO 13+00
10	PP-7	PLAN & PROFILE - OSO BLANCA RD STA 6+50 TO 11+50
11	PP-8	PLAN & PROF - OSO BLANCA RD STA 5+00 TO 6+50 & SD LAT
12	PP-9	PLAN & PROFILE - STORM DRAIN SOUTH SYSTEM
13	D-1	DETAIL SHEET I
14	D-2	DETAIL SHEET II

APPROVALS

CITY ENGINEER-ALLEN PAVELKA PE, #9029 DATE

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

LAS VEGAS FIRE AND RESCUE DATE

CITY OF LAS VEGAS - PLANNING DEPARTMENT DATE

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.

CENTRAL TELEPHONE CO. DBA CENTURYLINK DATE

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

SHEETS: _____

APPROVAL BY THE FIRE DEPARTMENT HAVING JURISDICTION IS REQUIRED PRIOR TO OBTAINING FINAL APPROVAL FROM LAS VEGAS VALLEY WATER DISTRICT.

NV ENERGY DATE

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

SOUTHWEST GAS CORPORATION DATE

COX COMMUNICATIONS LAS VEGAS, INC. DATE

DEVELOPER	ENGINEER
KB HOME 5795 BADURA AVE. SUITE 150 LAS VEGAS, NV 89118 PH: 702-866-8400 CONTACT: PAUL CHAO	SLATER HANIFAN GROUP, INC 5740 S. ARVILLE STREET, SUITE 216 LAS VEGAS, NV 89118 PH: (702) 284-5300 FX: (702) 284-5399 CONTACT: STANLEY OKEY AMADI, P.E.

LEGAL DESCRIPTION

A PORTION OF THE SOUTHEAST QUARTER (SE ¼) OF THE NORTHEAST QUARTER (NE ¼) OF SECTION 20, TOGETHER WITH A PORTION OF THE SOUTHWEST QUARTER (SW ¼) OF THE NORTHWEST QUARTER (NW ¼) OF SECTION 21, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA

BENCHMARK

BENCHMARK NUMBER: 6LV90 17NW5
RIVET AND PLATE IN TOP OF CURB AT SW CORNER
GILCREASE AVENUE AND OSO BLANCA ROAD
(W FRONTAGE ROAD)
ELEVATION = 2631.68 FEET, 802.1998 METERS, N.A.V.D. 88 DATUM

BASIS OF BEARINGS

NORTH 89°56'20" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE ¼) OF THE NORTHEAST QUARTER (NE ¼) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE IN FILE 118, PAGE 89 OF SURVEYS

FEMA FLOOD ZONE INFORMATION

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1745 E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

DEVIATIONS FROM STANDARDS

USE OF CAST-IN-PLACE CONCRETE PIPE - BLUCOR OR CLV APPROVED EQUIVALENT

SWPPP NOTE

NOTE: ALL LAND SURFACE AREA DISTURBANCES OVER 1 ACRE REQUIRE A STORMWATER DISCHARGE PERMIT ISSUED BY THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION (NDEP). A PHASED CONSTRUCTION UNIT IN A CONTIGUOUS SUBDIVISION IS CONSIDERED UNDER CONSTRUCTION UNTIL ALL STRIPPED SURFACE AREAS HAVE BEEN COVERED BY PAVING, BUILDING CONSTRUCTION OR PLANTING. A STORMWATER DISCHARGE PERMIT APPLICATION AND ASSOCIATED INFORMATION MAY BE DOWNLOADED FROM THE WEB SITE: HTTP://WWW.STATE.NV.US/BMPC/STORMDI.HTM PROJECTS THAT DISTURB MORE THAN ONE ACRE OF LAND MUST SUBMIT TO NDEP A "NOTICE OF INTENT" FOR INCLUSION UNDER STORMWATER PERMIT NO. NVR100000 ALONG WITH THE APPROPRIATE FILLING FEE.

GEOTECHNICAL ENGINEER

PREPARED BY: SOUTHWEST GEOTECHNICAL
ADDRESS: 5275 ARVILLE STREET, SUITE 108, LAS VEGAS, NV 89118
PHONE: 702-323-6000
PROJECT No. 182358
DATED: OCT. 17, 2018

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

FAST
Call before you
UnderGround
1-702-432-5300
FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T)

Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call 811
OR
1-800-227-2600

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP DATE	APP

LAS VEGAS, NEVADA

KB HOME

MONTECITO STORM DRAIN INFRASTRUCTURE

COVER SHEET

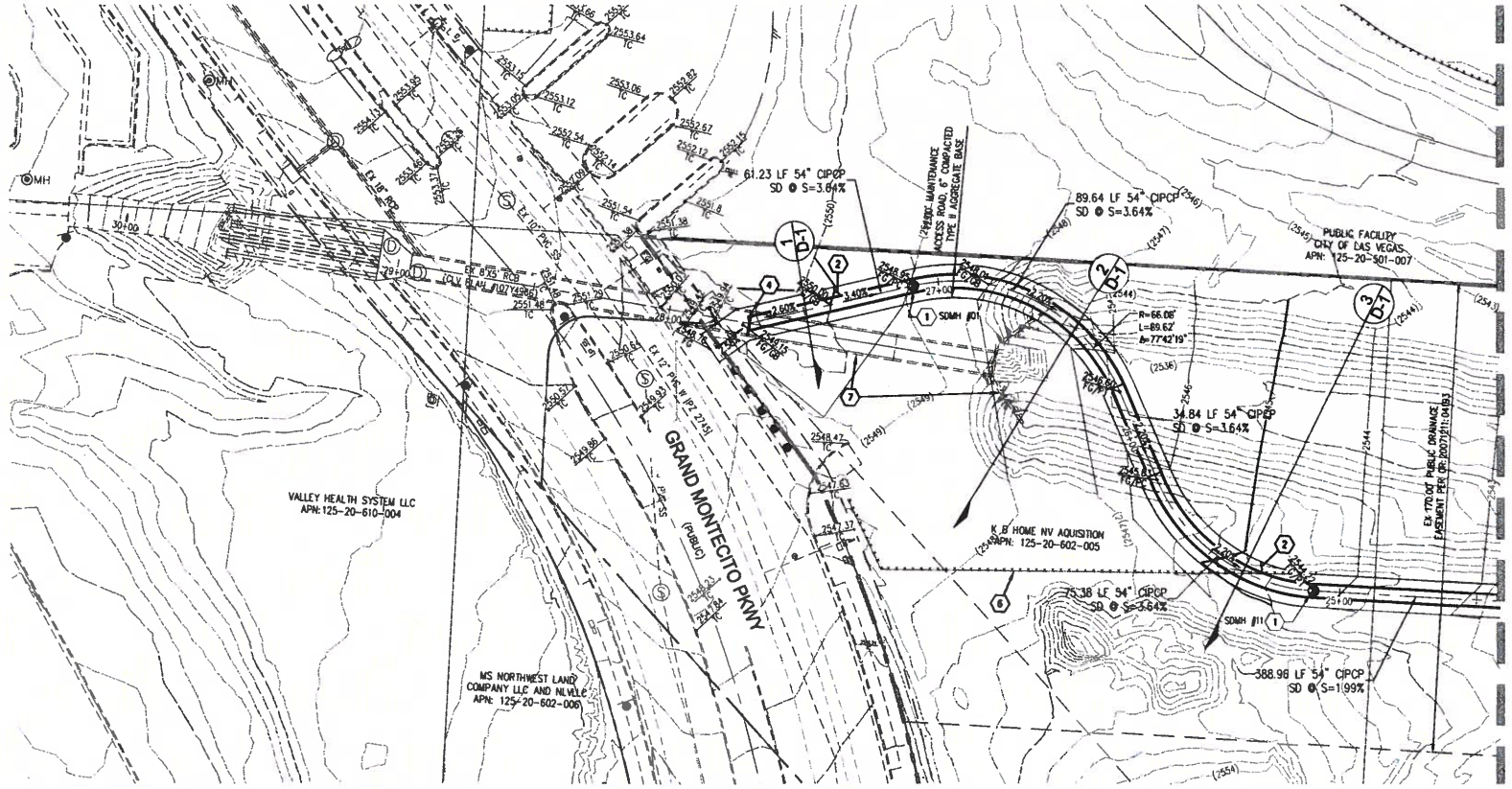
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S 20, 21

DATE: MARCH 2019
DRAFTER: CWB
DESIGNER: CWB
CHECKED: SOA
PROJECT NO.
KBH1805-004

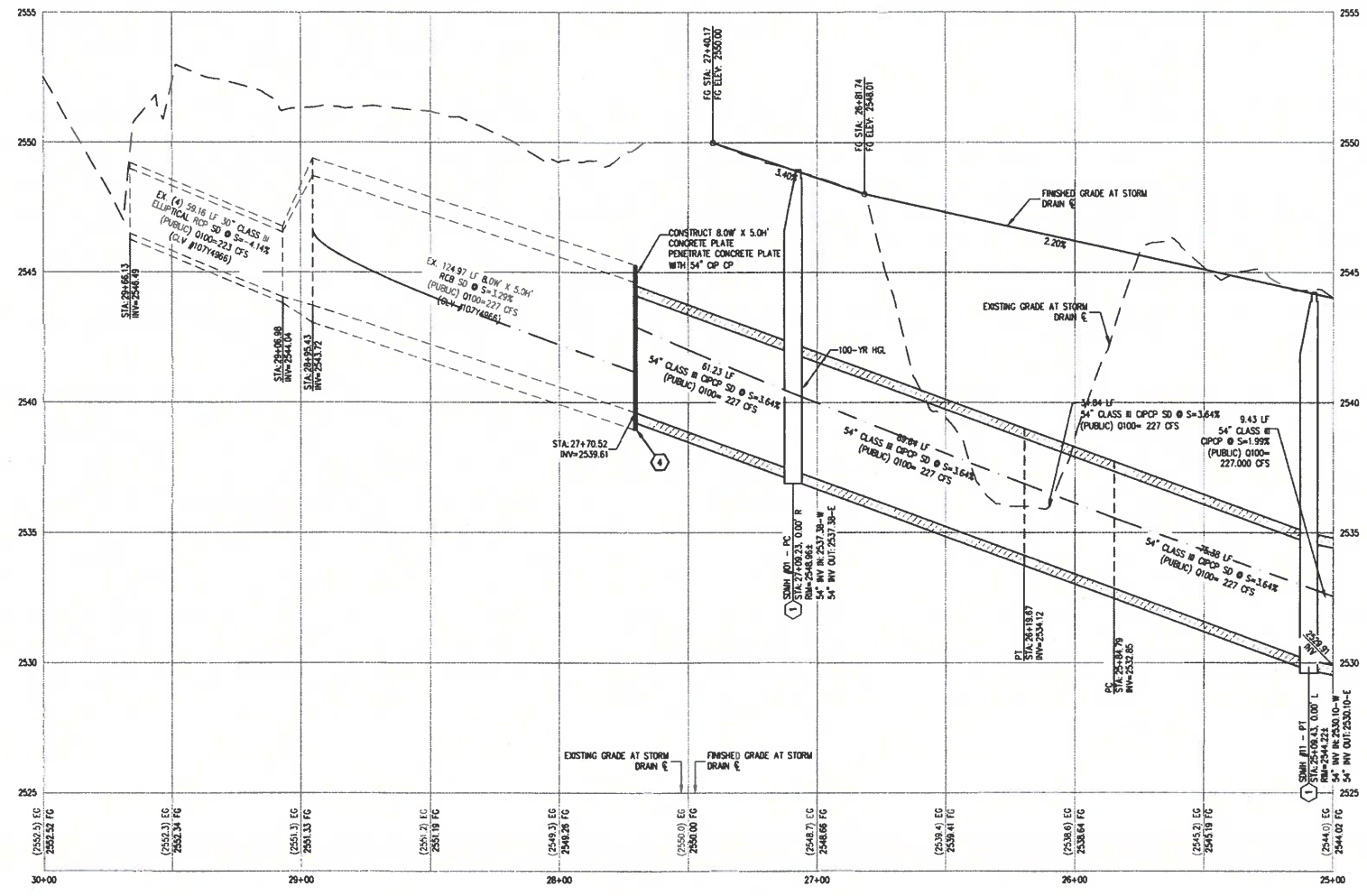
PROFESSIONAL ENGINEER - STATE OF NEVADA
STANLEY OKEY AMADI
Exp. 12/31/2020
CIVIL
No. 21724
03/06/19

C-1
SHEET 1 OF 14

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STORM DRAIN - PLAN VIEW



STORM DRAIN - PROFILE VIEW

HORIZ: 1" = 30'
VERT: 1" = 3'

SCALE - 1"=30' (0, 30, 60 FEET)

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SURVEY NOTE

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

ELEVATION NOTE

ADD 2500 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2501.00)

SOILS REPORT

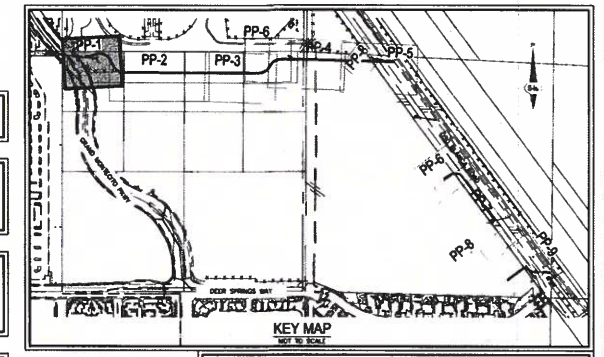
SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358 DATED OCT. 17, 2018

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= _____ CU YDS
FILL= _____ CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.



CONSTRUCTION NOTES

1. INSTALL BLUCOR ECCENTRIC MH - SEE SHEET D-2
2. MAINTENANCE ACCESS ROAD WITH 6" COMPACTED TYPE II AGGREGATE DETAIL 10 ON SHEET D-1
3. INSTALL 48" TYPE II SDMH
4. INSTALL REINFORCED CONCRETE PLATE PER STRUCTURAL DESIGN
5. INSTALL 36" RINKER REINFORCED CONC. SPIGOT PLUG DETAIL - SEE DETAIL 14 ON SHEET D-1
6. EXISTING FENCE TO BE REMOVED
7. EXISTING CULVERT AND HEADWALL TO BE REMOVED
8. SAWCUT REMOVE AND RESTORE AC PAVEMENT
9. INSTALL RIP-RAP SEE PLAN FOR SIZE.
10. INSTALL CONCRETE PAD - SEE DETAIL 15 ON SHEET D-1
11. INSTALL NDOT INLET TYPE II - SEE PLAN FOR SIZE

DISCLAIMER NOTE

1) EXISTING UTILITY LOCATIONS SHOWN HEREON 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.

2) FOR ROADWAY WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF CURB PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

GRADING NOTES

1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2012, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
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9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.

LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ FT))

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2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN CLARK COUNTY TITLE 24.40 AND IN THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER A RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
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FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1745 E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

FLOOD CERTIFICATION

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

STANLEY OKEY AMADI, P.E. 21724 DATE

FAST
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FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
CALL BEFORE YOU DO OVERHEAD
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OR
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SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #210, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP

LAS VEGAS, NEVADA

KB HOME

MONTECITO STORM DRAIN INFRASTRUCTURE

PLAN & PROFILE - STORM DRAIN STA 25+00 TO 27+52

T 19 S
R 60 E
S 20, 21

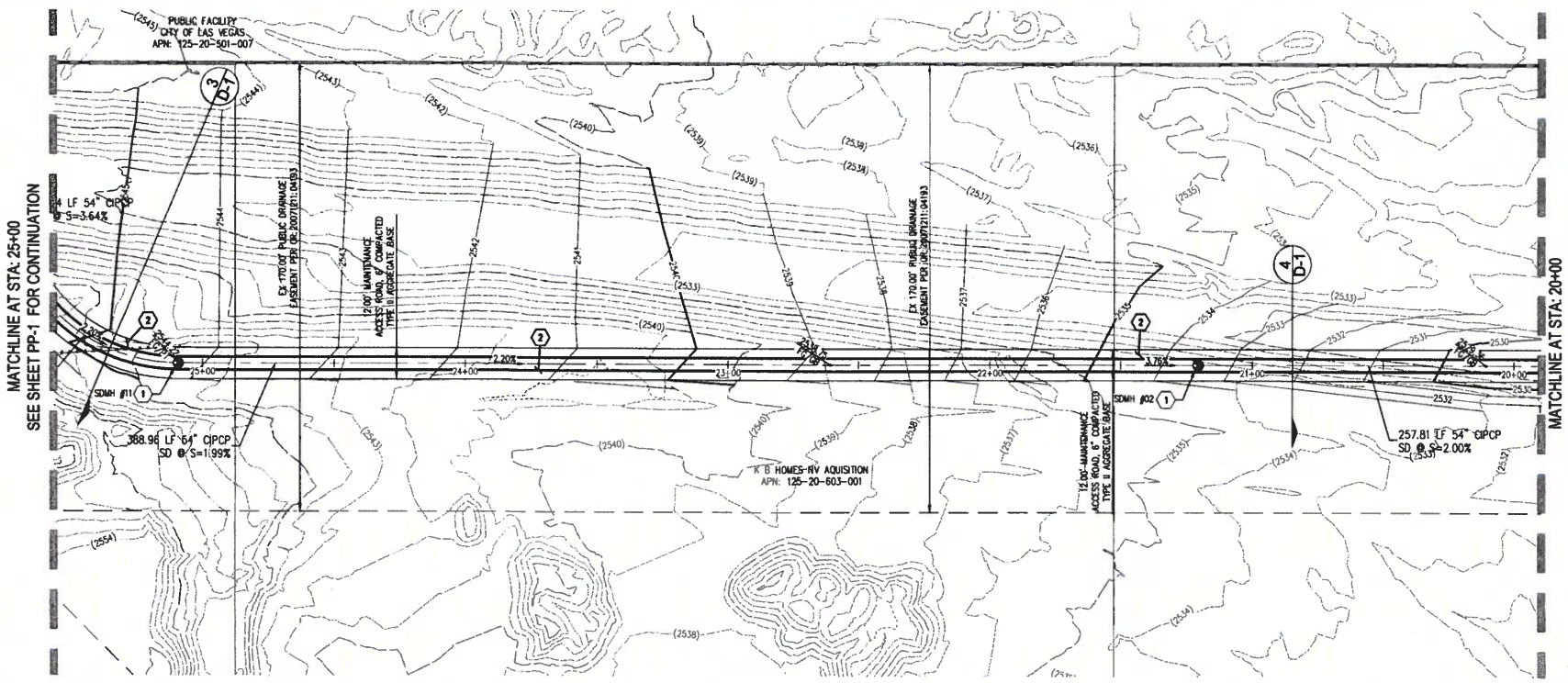
DATE: MARCH 2019
DRAFTER: CWB
DESIGNER: CWB
CHECKED: SOA

PROJECT NO.
KBH1805-004

STATE OF NEVADA
STANLEY OKEY AMADI
No. 21724
Exp. 12/31/2020
CIVIL
PROFESSIONAL ENGINEER
03-14-19

PP-1
SHEET 4 OF 14

\\kbh1805-004 montecito 60 ac storm drain infra\dwg\improv\kbh1805-004 pp1.dwg 3/6/2019 1:19 PM Conrad Bench



STORM DRAIN - PLAN VIEW

STORM DRAIN - PROFILE VIEW

HORIZ: 1" = 30'
VERT: 1" = 3'

SCALE - 1"=30' FEET

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SURVEY NOTE

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

ELEVATION NOTE

ADD 2500 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2501.00)

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358 DATED OCT 17, 2018

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= _____ CU YDS
FILL= _____ CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT

DISCLAIMER NOTE

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GRADING NOTES

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3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
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4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER A RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
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FLOOD CERTIFICATION

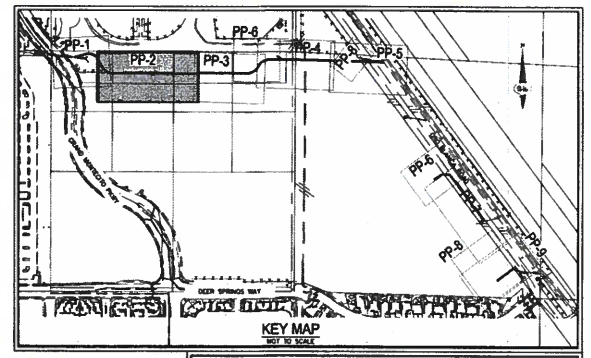
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY _____ ON FILE AT CITY OF LAS VEGAS FOR THE SUBJECT PROJECT.

STANLEY OKEY AMADI, P.E. 21724 DATE









CONSTRUCTION NOTES

1. INSTALL BLUCOR ECCENTRIC MH - SEE SHEET D-2
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11. INSTALL NDOT INLET TYPE II - SEE PLAN FOR SIZE

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP.	APP. DATE

LAS VEGAS, NEVADA

KB HOME

MONTECITO STORM DRAIN INFRASTRUCTURE

PLAN & PROFILE - STORM DRAIN STA 20+00 TO 25+00

T 19S
R 60E
S 20, 21

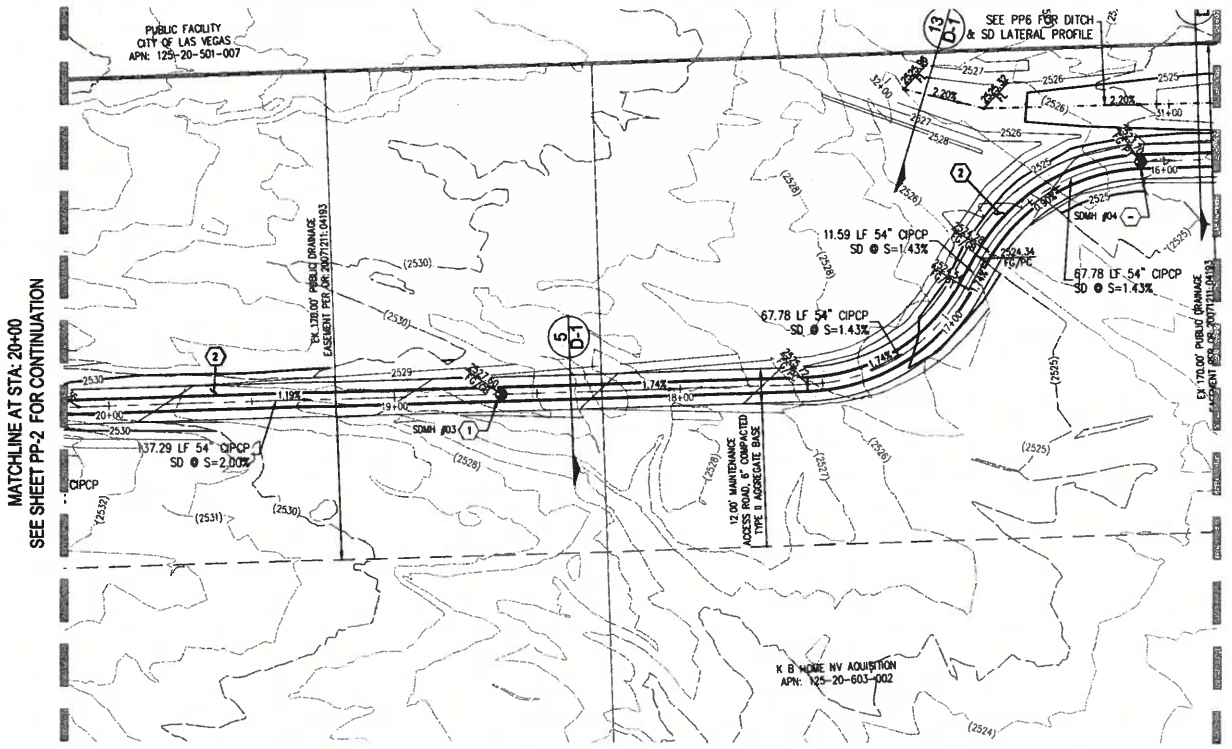
DATE: MARCH 2019
DRAFTER: CWB
DESIGNER: CWB
CHECKED: SOA

PROJECT NO.
KBH1805-004

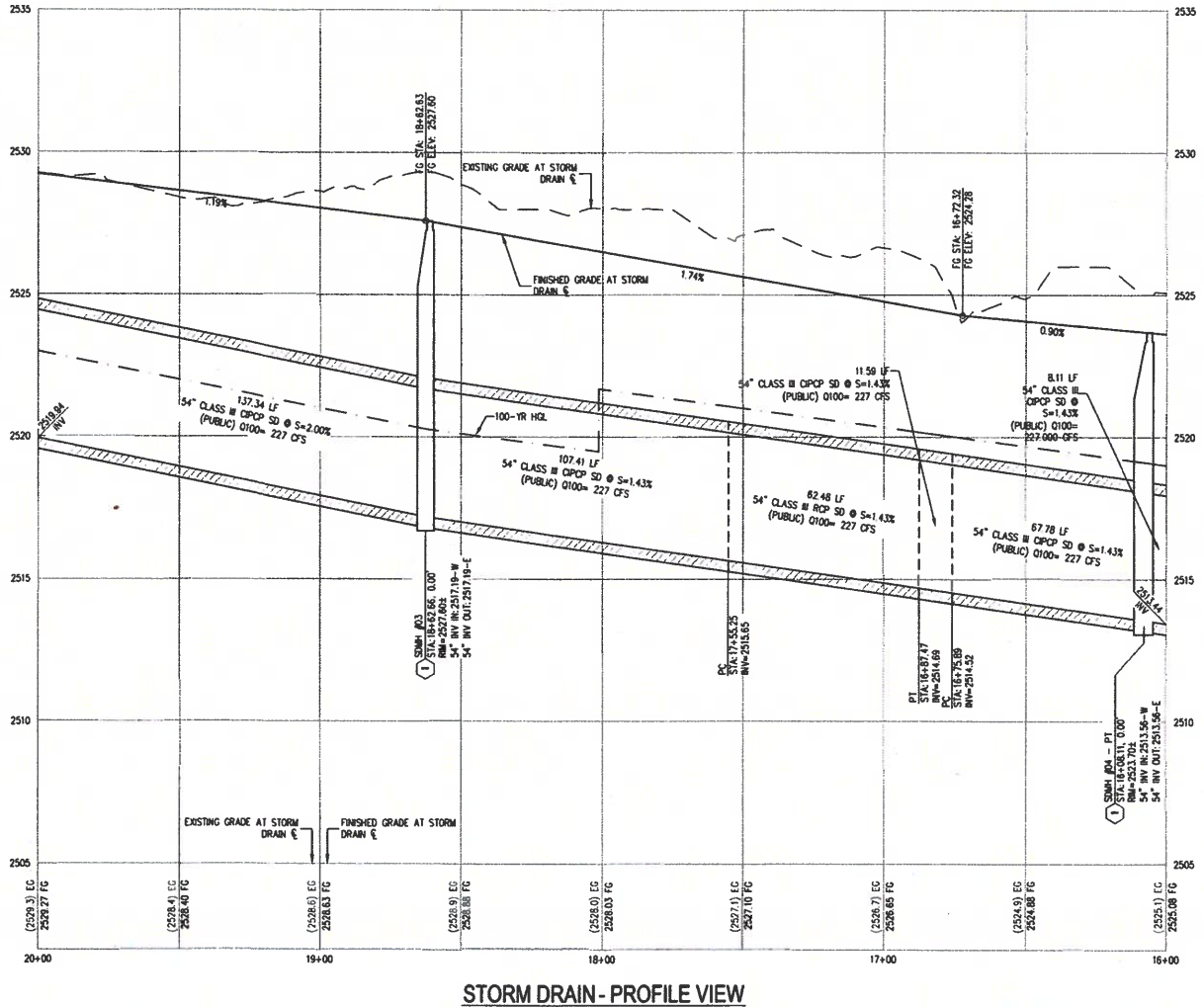
PROFESSIONAL ENGINEER STATE OF NEVADA
STANLEY OKEY AMADI
Exp. 12/31/2020
CIVIL
No. 21724
05/06/19

PP-2
SHEET 5 OF 14

J:\kbh1805-004 montecito 60 ss storm drain intro\dwg\improv\kbh1805-004 strm drain 3/6/2019 1:19 PM Cameron Bancroft



STORM DRAIN - PLAN VIEW



STORM DRAIN - PROFILE VIEW

HORIZ: 1" = 30'
VERT: 1" = 3'

N

SCALE - 1"=30' FEET

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SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358 DATED OCT. 17, 2018

EARTHWORKS

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FILL= ——— CU YDS

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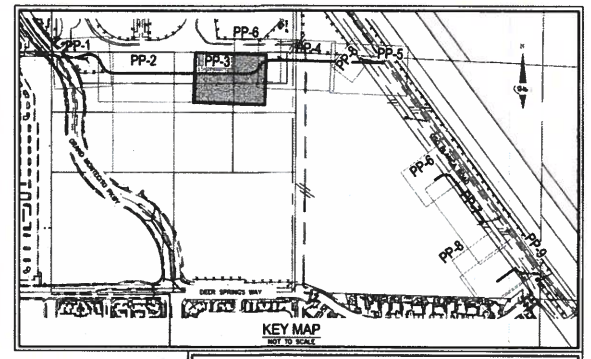
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STANLEY OKEY AMADI, P.E. 21724 DATE



CONSTRUCTION NOTES

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

LAS VEGAS, NEVADA

KB HOME

MONTECITO STORM DRAIN INFRASTRUCTURE

PLAN & PROFILE - STORM DRAIN STA 16+00 TO 20+00

T 19 S.
R 60 E.
S 20, 21

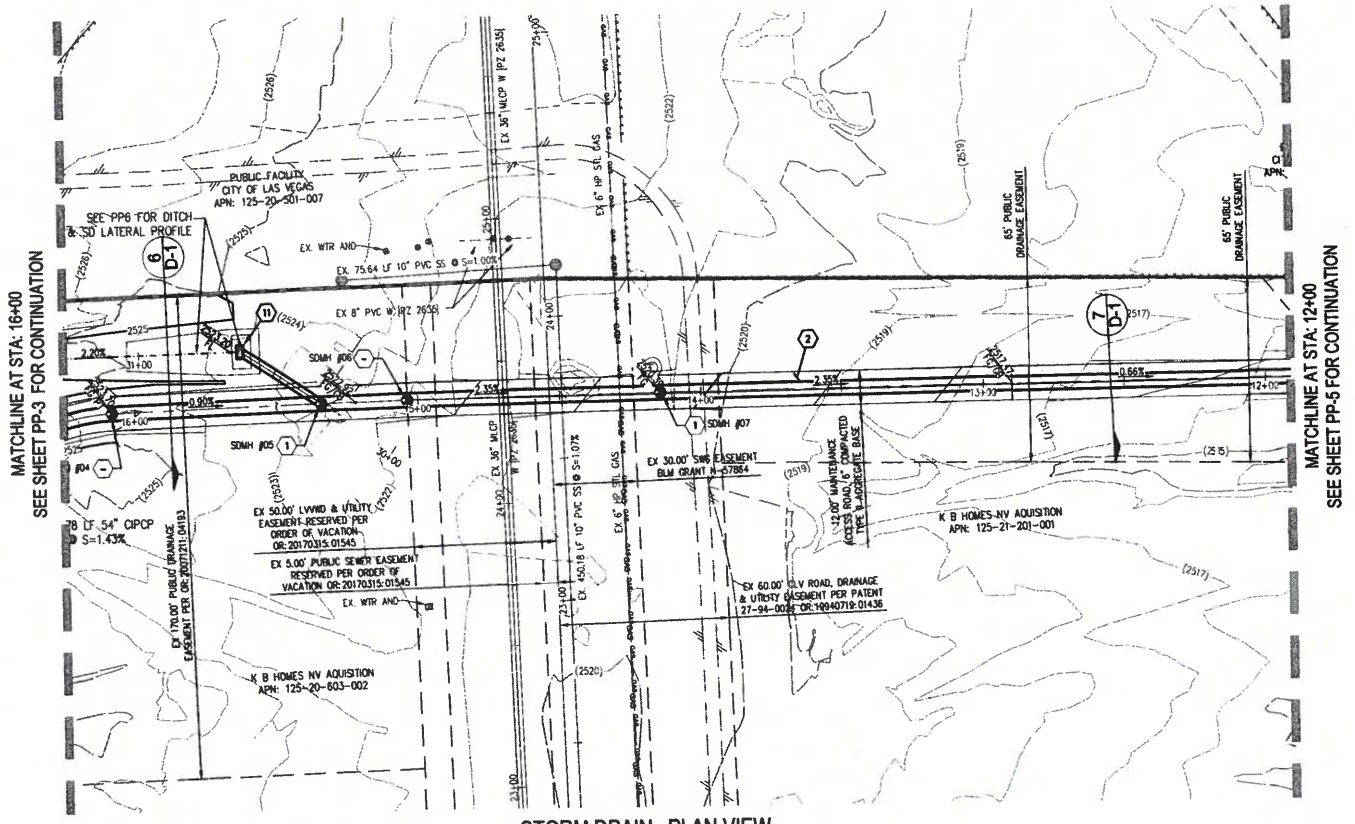
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CHECKED: SOA

PROJECT NO.
KBH1805-004

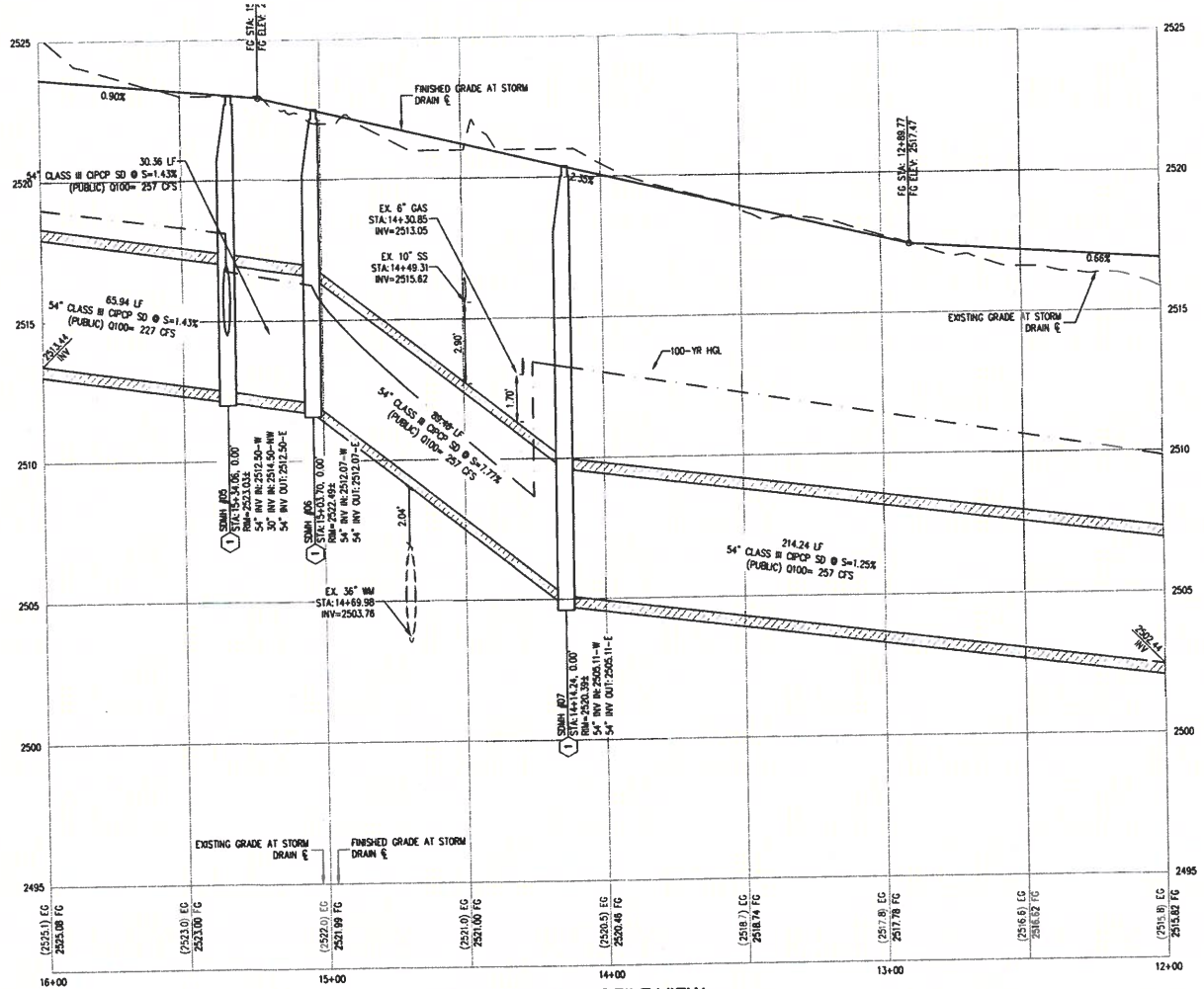
PROFESSIONAL ENGINEER STATE OF NEVADA STANLEY OKEY AMADI Exp. 12/31/2020 CIVIL No. 21724
3/26/19

PP-3
SHEET 6 OF 14

J:\kbh1805-004 montecito 60 ss storm drain ikiva\dwg\improv\kbh1805-004 pop.dwg 3/6/2019 1:19 PM Cameron Benchi



STORM DRAIN - PLAN VIEW



STORM DRAIN - PROFILE VIEW
HORIZ: 1" = 30'
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PROJECT NO. 182358 DATED OCT. 17, 2018

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1) EXISTING UTILITY LOCATIONS SHOWN HEREON 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.

2) FOR ROADWAY WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF CURB PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

GRADING NOTES

1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2012, SECTION 2304.11.2.2.
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3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
8. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLEPING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.

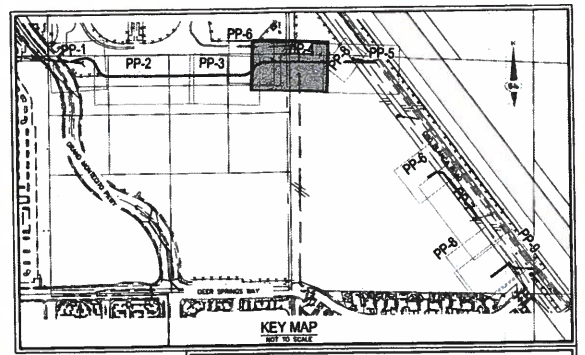
LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

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

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1745 E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.



CONSTRUCTION NOTES

1. INSTALL BLUCOR ECCENTRIC MH - SEE SHEET D-2
2. MAINTENANCE ACCESS ROAD WITH 6" COMPACTED TYPE II AGGREGATE DETAIL 10 ON SHEET D-1
3. INSTALL 48" TYPE II SDMH
4. INSTALL REINFORCED CONCRETE PLATE PER STRUCTURAL DESIGN
5. INSTALL 36" RINKER REINFORCED CONC SPIGOT PLUG DETAIL - SEE DETAIL 14 ON SHEET D-1
6. EXISTING FENCE TO BE REMOVED
7. EXISTING CULVERT AND HEADWALL TO BE REMOVED
8. SAWCUT REMOVE AND RESTORE AC PAVEMENT
9. INSTALL RIP-RAP SEE PLAN FOR SIZE.
10. INSTALL CONCRETE PAD - SEE DETAIL 15 ON SHEET D-1
11. INSTALL NDOT INLET TYPE II - SEE PLAN FOR SIZE

FLOOD CERTIFICATION

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

STANLEY OKEY AMADI, P.E. 21724 DATE

FAST
Call before you UnderGround
1-702-432-5300
FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T)

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

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP

LAS VEGAS, NEVADA

KB HOME

MONTECITO STORM DRAIN INFRASTRUCTURE

PLAN & PROFILE - STORM DRAIN STA 12+00 TO 16+00

T19 S R62 S 20, 21

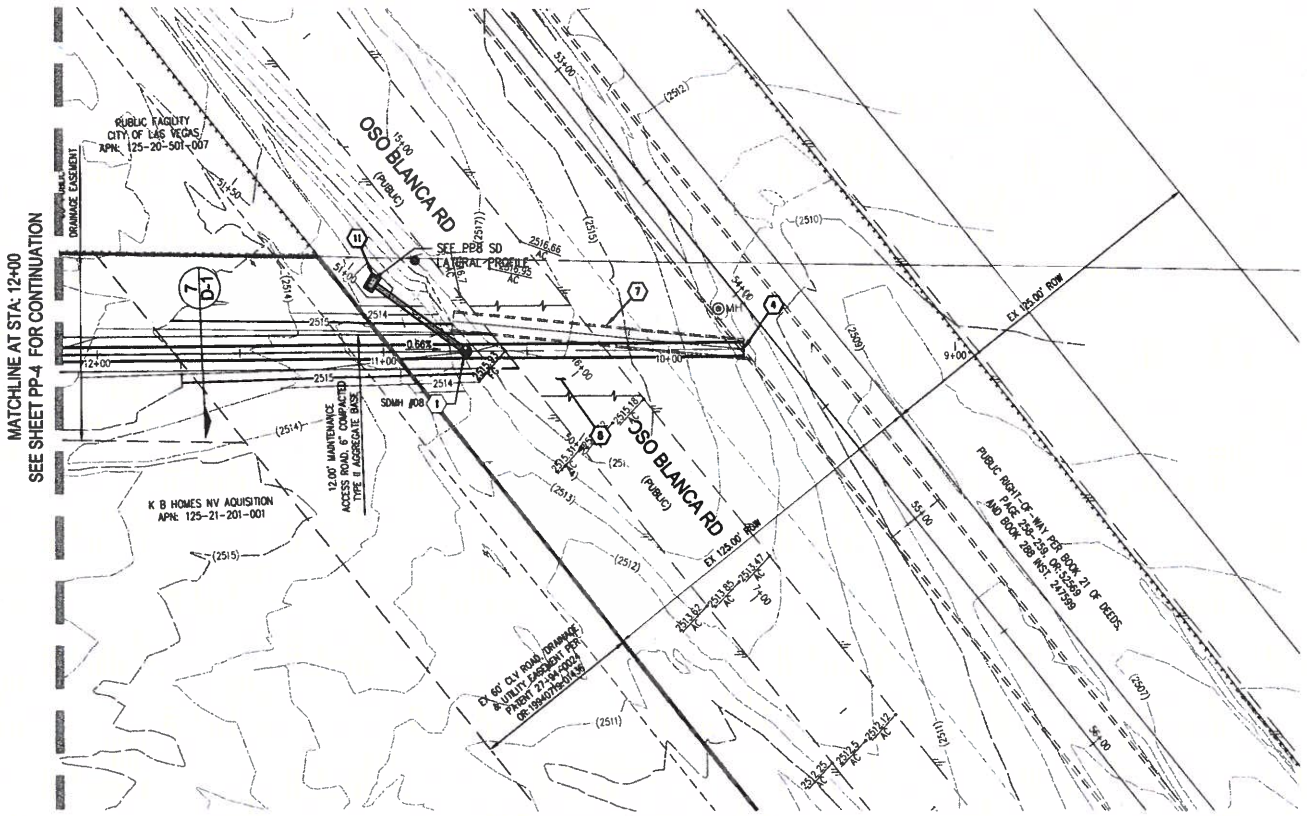
DATE: MARCH 2019
DRAFTER: CWB
DESIGNER: CWB
CHECKED: SOA
PROJECT NO.
KBH1805-004

PROFESSIONAL ENGINEER STANLEY OKEY AMADI Exp. 12/31/2020 CIVIL No. 21724 STATE OF NEVADA

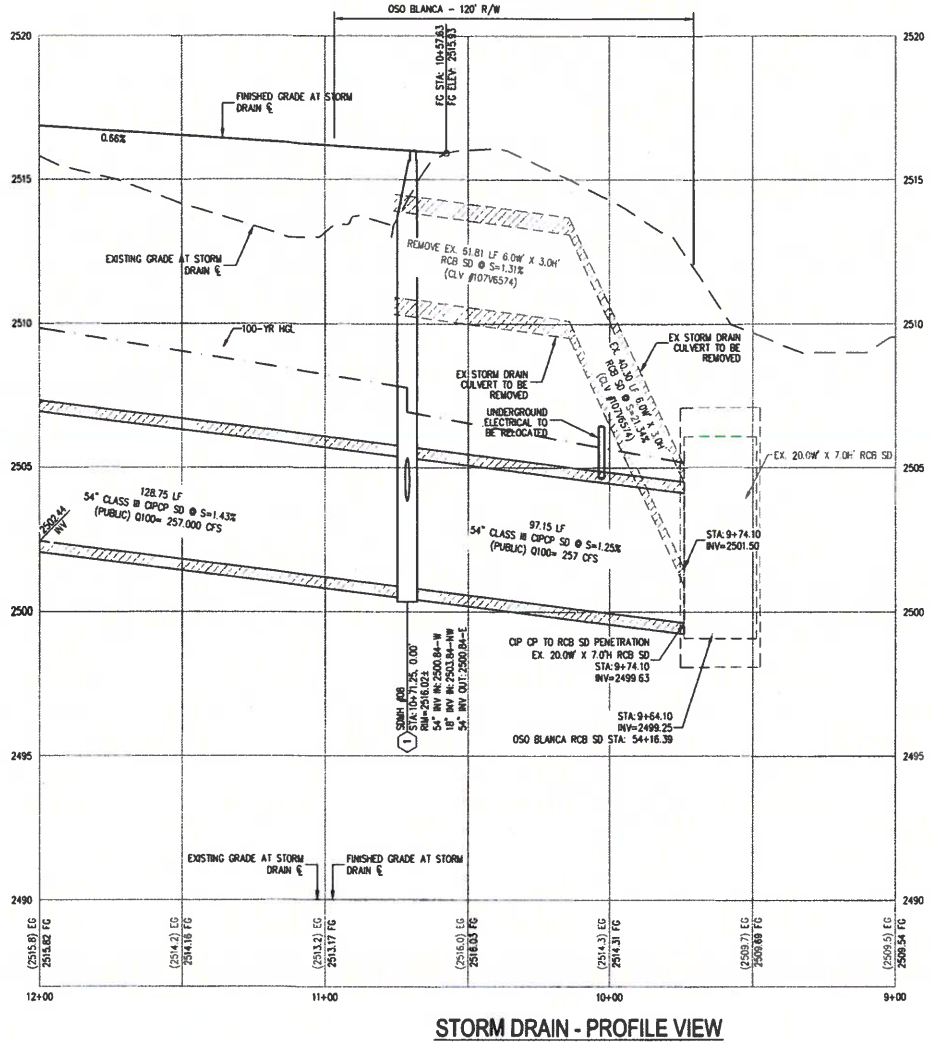
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PP-4
SHEET 7 OF 14

J:\kbh1805-004_montecito 60 ac storm drain infra\civil\engrov\kbh1805-004 proj.dwg 3/6/2019 1:19 PM Cameron Benthin



STORM DRAIN - PLAN VIEW



STORM DRAIN - PROFILE VIEW

HORIZ: 1" = 30'
VERT: 1" = 3'



SCALE - 1"=30' (0, 30, 60 FEET)

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SURVEY NOTE

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

ELEVATION NOTE

ADD 2500 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2501.00)

SOILS REPORT

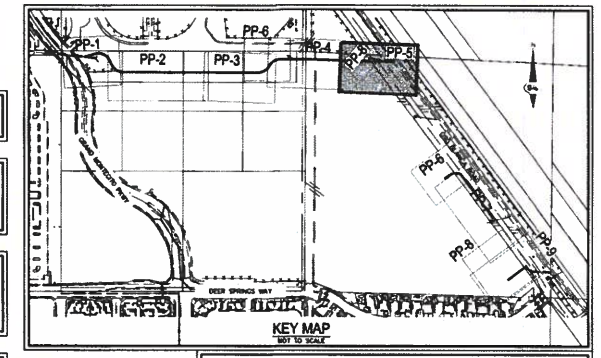
SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358 DATED OCT. 17, 2018

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= _____ CU YDS
FILL= _____ CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.



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FLOOD CERTIFICATION

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

STANLEY OKEY AMADI, P.E. 21724 DATE

FAST Call before you UnderGround 1-702-432-5300 FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.)

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

SLATER HANIFAN GROUP
a Westwood team
8740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

LAS VEGAS, NEVADA

KB HOME

MONTECITO STORM DRAIN INFRASTRUCTURE

PLAN & PROFILE - STORM DRAIN STA 9+00 TO 12+00

T-19 S
R-60 E
S 20, 21

DATE: MARCH 2019
DRAFTER: CWB
DESIGNER: CWB
CHECKED: SOA

PROJECT NO.
KBH1805-004

PROFESSIONAL ENGINEER STATE OF NEVADA STANLEY OKEY AMADI Exp. 12/31/2020 CIVIL No. 21724

PP-5
SHEET 8 OF 14

J:\KBH1805-004 montecito 60 ac storm drain infra\Dwg\Improv\KBH1805-004 psp.dwg, 3/6/2019 1:20 PM Cameron Bendix

KB HOME

MONTECITO STORM DRAIN INFRASTRUCTURE

PLAN & PROFILE - OSO BLANCA RD STA 11+50 TO 13+00

LAS VEGAS, NEVADA

NO	DESCRIPTION	DATE	BY	APP. DATE	APP.

DATE: MARCH 2019

DRAFTER: CMB

DESIGNER: CMB

CHECKED: SOA

PROJECT NO. **KBH1805-004**

PP-6

SHEET 9 OF 14

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5500 FAX (702) 284-5599

STANLEY CNEY AMADI
CIVIL
No. 21724
Exp. 12/31/2020
PROFESSIONAL ENGINEER
STATE OF NEVADA
03/04/19

Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY
Call!
811
OR
1-800-227-2600

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

FAST Call before you Dig Underground
1-702-432-5300
PRIMARY & ARTERIAL SYSTEM OF TRANSPORTATION (FAST)

FLOOD CERTIFICATION

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

STANLEY CNEY AMADI, P.E. 21724 — DATE

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SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL
PROJECT NO. 182368 DATED OCT. 17, 2018

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= ____ CU YDS
FILL= ____ CU YDS
EXPORTED MATERIAL IS TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT

ELEVATION NOTE

ADD 2500 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E 01.00 REPRESENTS 2501.00)

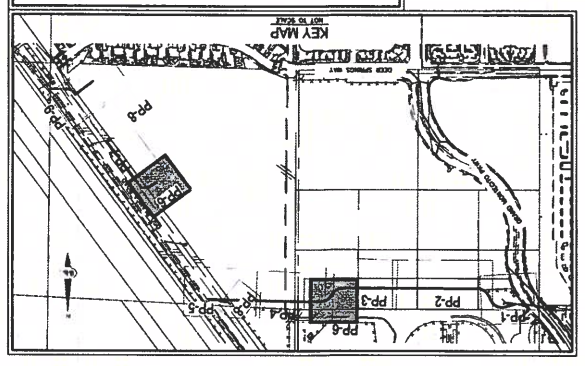
SURVEY NOTE

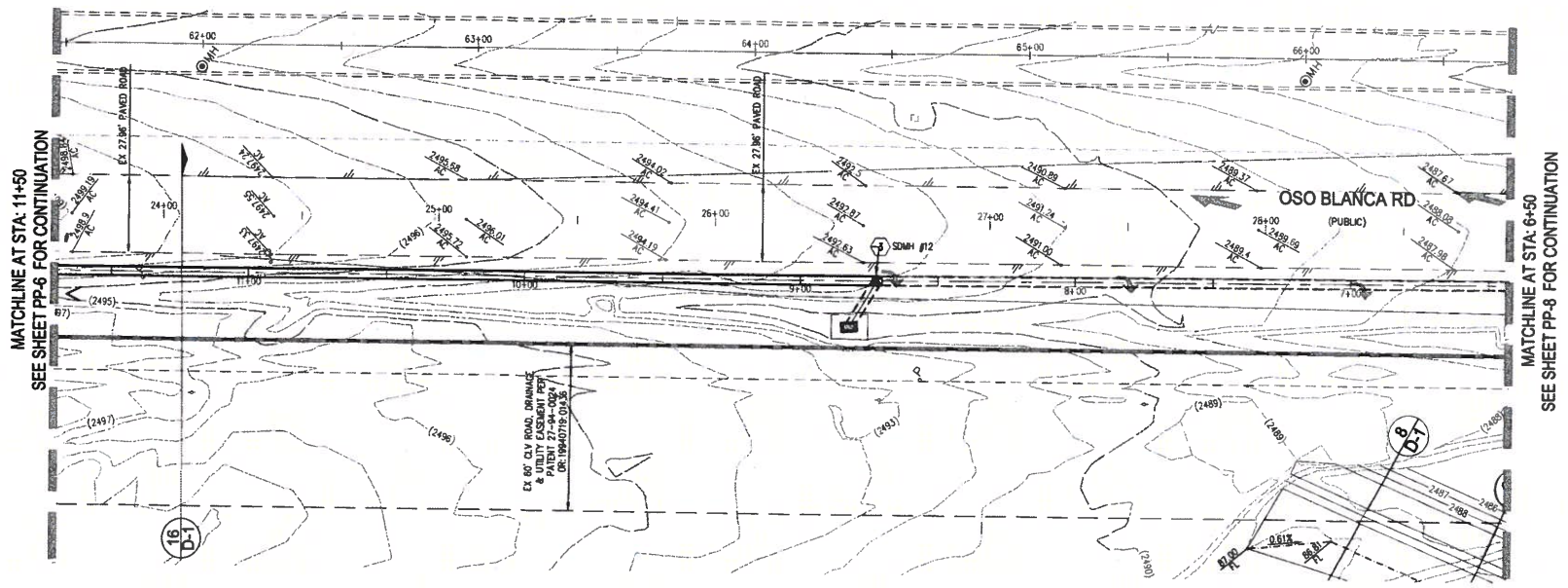
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SCALE - 1"=30' FEET 0 30 60

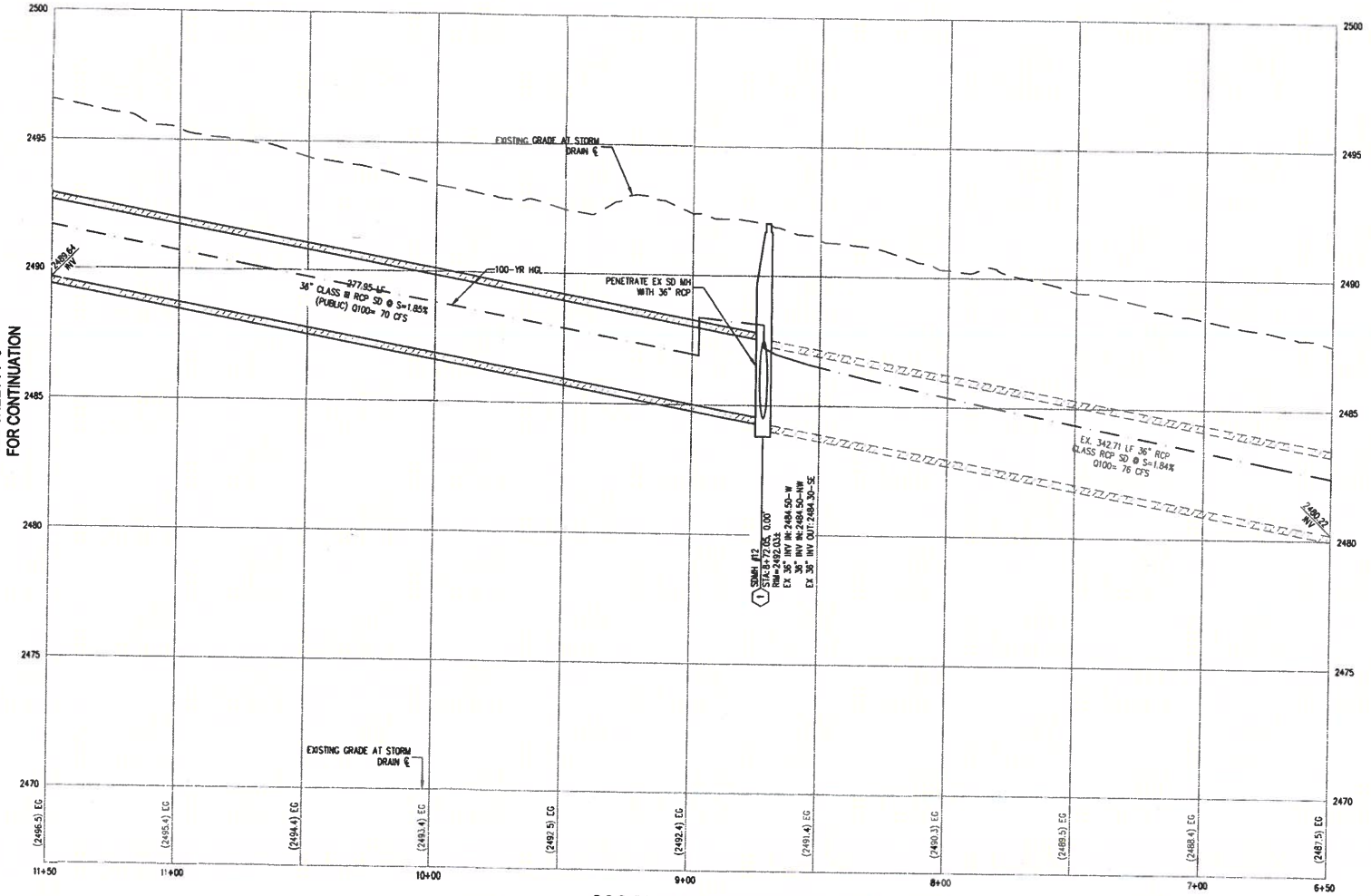
KEY MAP





OSO BLANCA RD - PLAN VIEW
(PUBLIC)

SEE SHEET PP-8
FOR CONTINUATION



OSO BLANCA RD - PROFILE VIEW
HORIZ: 1" = 30'
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SOILS REPORT

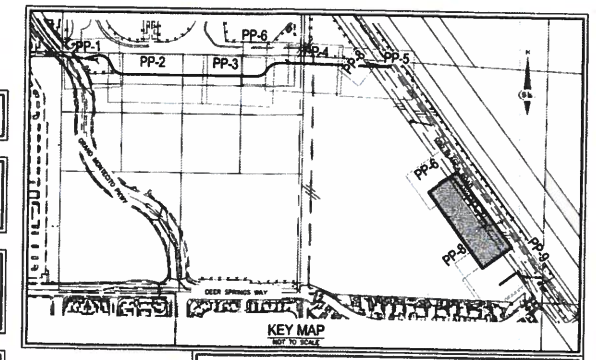
SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358 DATED OCT. 17, 2018

EARTHWORKS

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STANLEY OKEY AMADI, P.E. 21724 DATE

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

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SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP'D	APP'D DATE

LAS VEGAS, NEVADA

KB HOME

MONTECITO STORM DRAIN INFRASTRUCTURE

PLAN & PROFILE - OSO BLANCA RD STA 6+50 TO 11+50

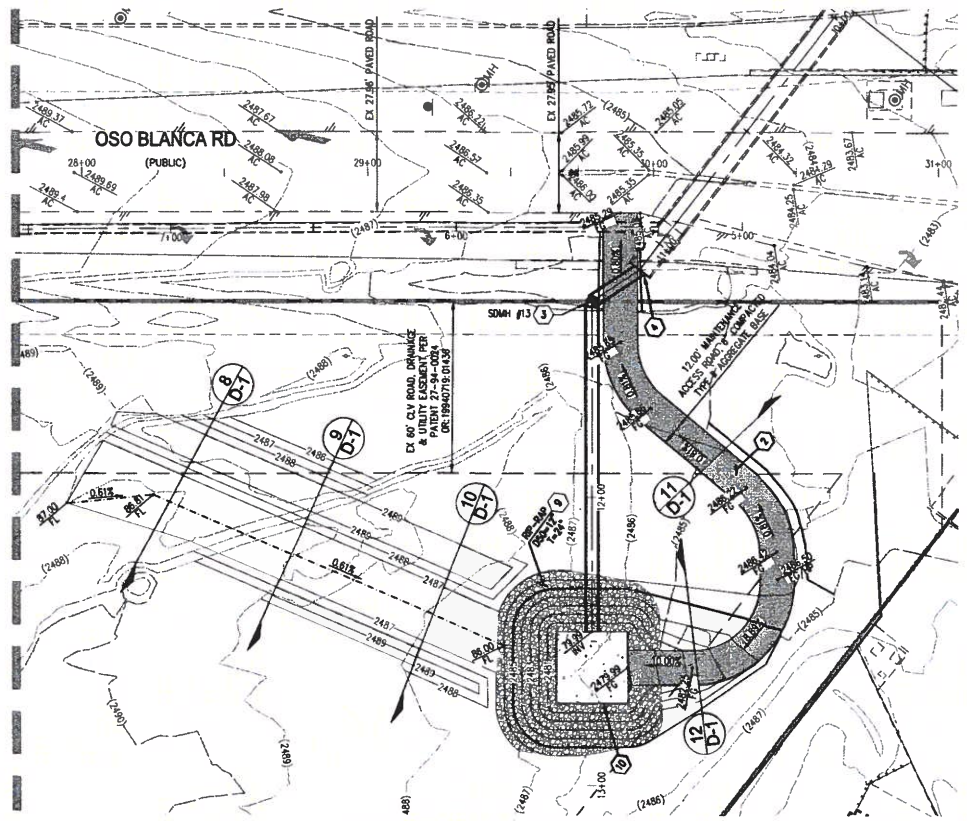
TOPOGRAPHY BY: LOCATION SERVICES, LLC 10/05/21

DATE: MARCH 2019
DRAFTER: CWB
DESIGNER: CWB
CHECKED: SOA
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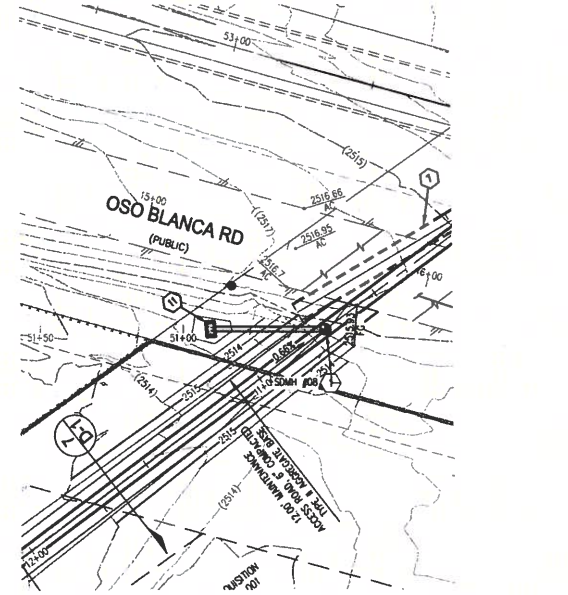
PROFESSIONAL ENGINEER STATE OF NEVADA STANLEY OKEY AMADI Exp. 12/31/2020 CIVIL No. 21724 5/06/19

PP-7
SHEET 10 OF 14

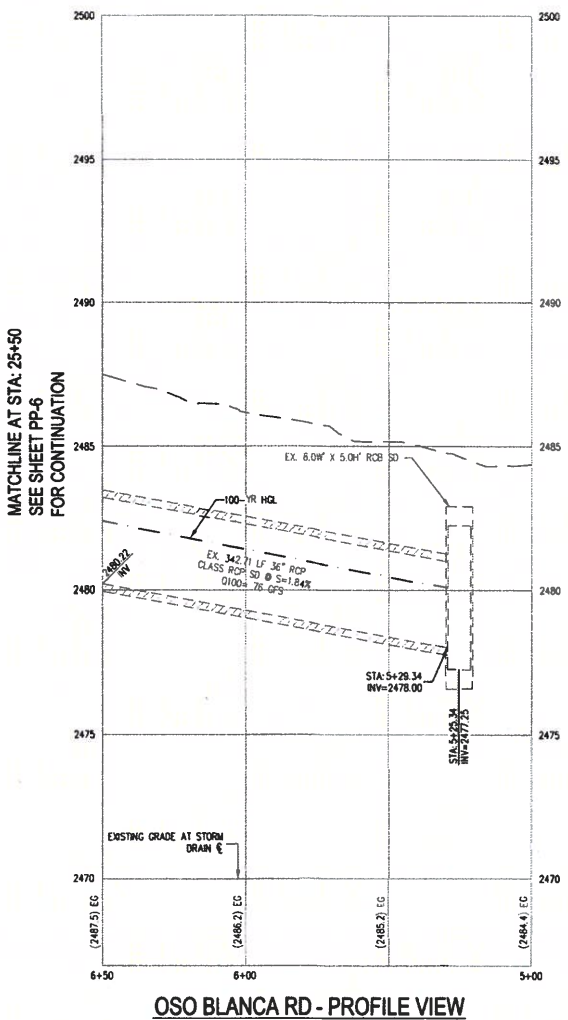
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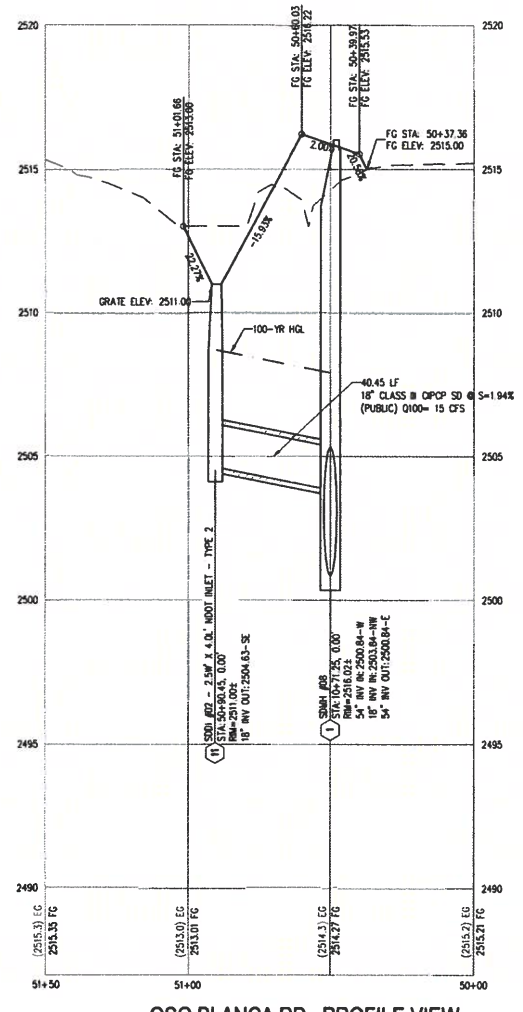
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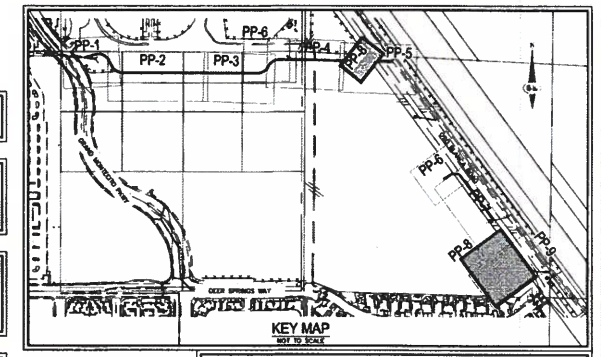
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PROJECT NO. 182358 DATED OCT. 17, 2018

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PHONE (702) 284-5399 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

LAS VEGAS, NEVADA

KB HOME

MONTECITO STORM DRAIN INFRASTRUCTURE

PLAN & PROF - OSO BLANCA RD STA 5+00 TO 6+50 & SD LAT

T-19-S
R-60-E
S-20-21

DATE: MARCH 2019
DRAFTER: CWB
DESIGNER: CWB
CHECKED: SOA

PROJECT NO.
KBH1805-004

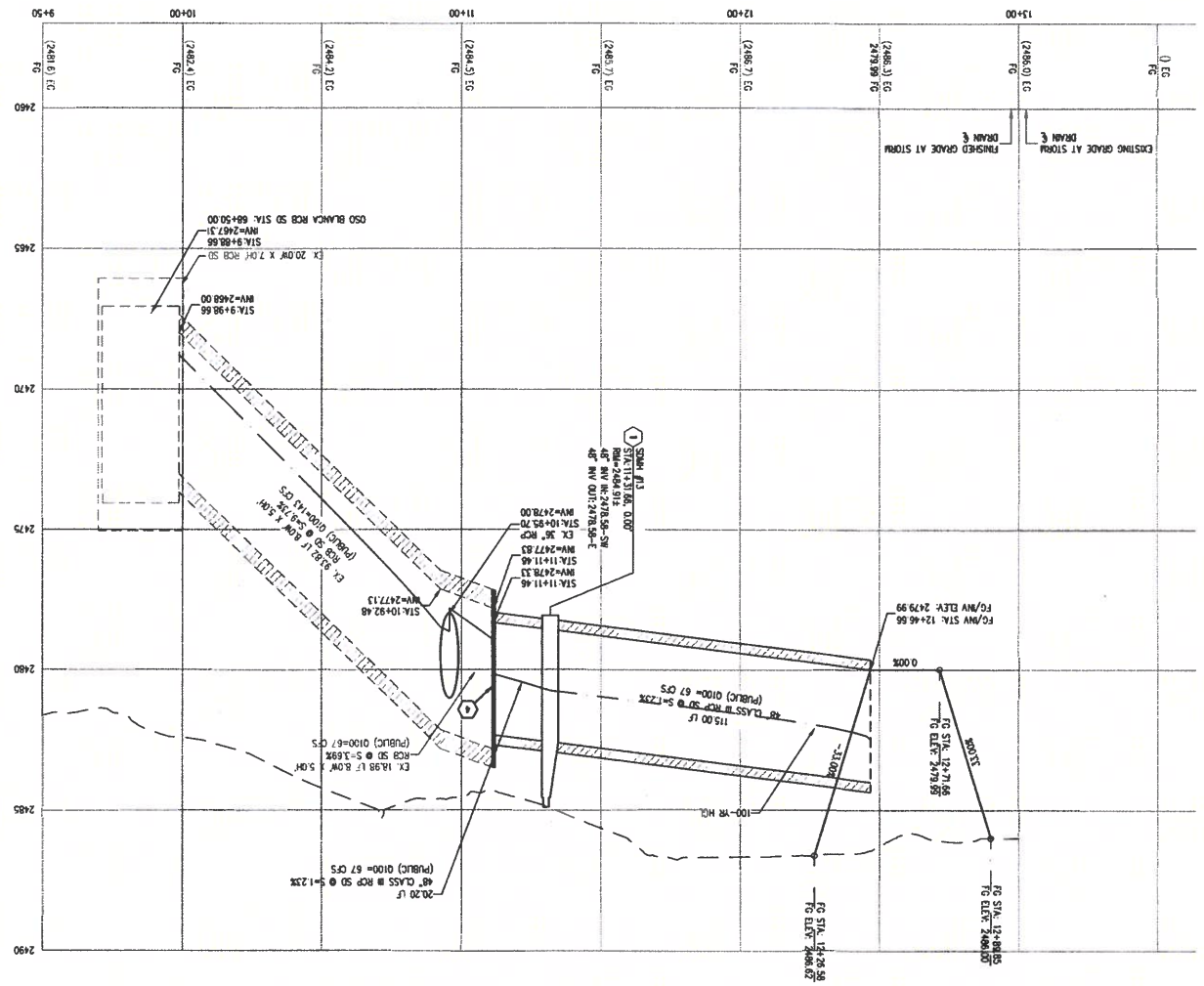
PROFESSIONAL ENGINEER STATE OF NEVADA STANLEY OKEY AMADI Exp. 12/31/2020 CIVIL No. 21724 03/26/19

PP-8
SHEET 11 OF 14

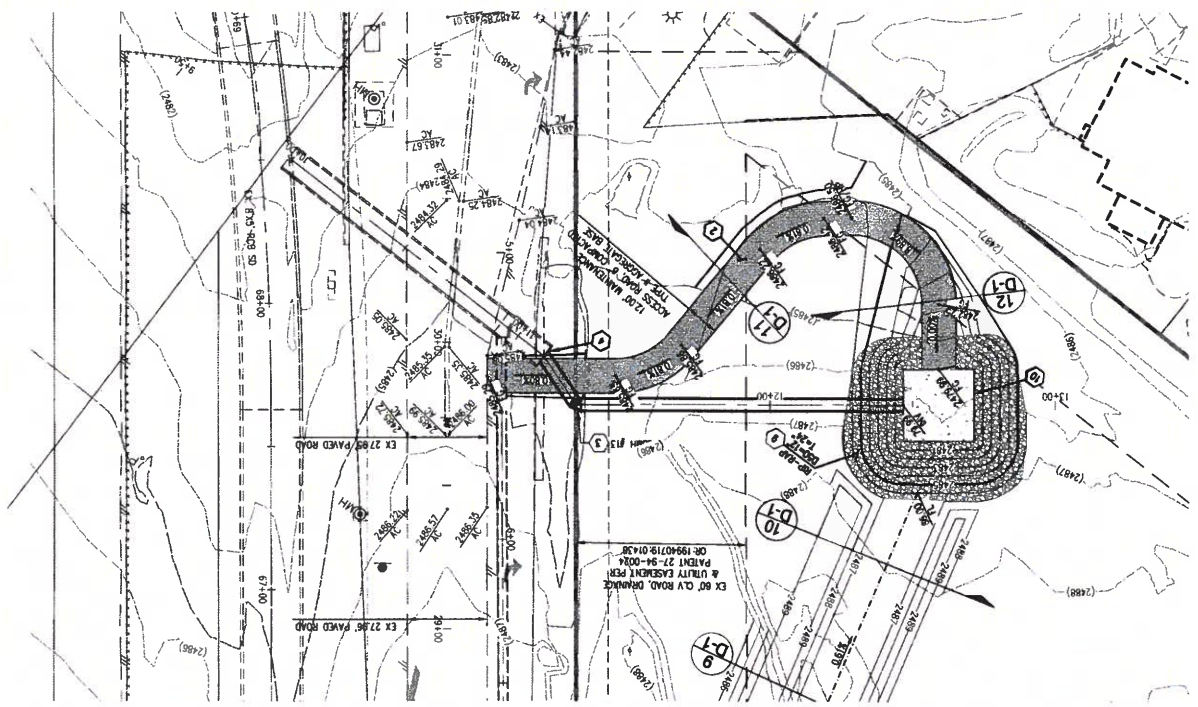
I:\KBH1805-004 monticello 60 cs storm drs\ hfno\Cad\Improv\KBH1805-004 proj.dwg 3/6/2019 1:21 PM Cameron Bencal

STORM DRAIN SOUTH SYSTEM - PROFILE VIEW

HORIZ: 1" = 30'
VERT: 1" = 3'



STORM DRAIN SOUTH SYSTEM - PLAN VIEW
(PUBLIC)



APPENDIX F

Reference Material

Final Design Report for Centennial Parkway Channel West – US95, CC215 to Durango Drive

Referenced Report Excerpt

Centennial Parkway Channel West - US95, CC215 to Durango Drive
Final Design Report



NOVEMBER 2016

WT0504161116LAS

DISCUSSION OF FLOWSPLIT AT DEER SPRINGS INTERSECTIONS

West facility along US 95 at Grand Teton Drive. See Table 3.5 – *Ultimate Condition Mainline Flowrate Summary* for main design points along the channel alignment. See Appendix B-1 – *HEC-1 Flowrates Summary* for a full list of flows in the project tributary area.

TABLE 3.5 – ULTIMATE CONDITION MAINLINE FLOWRATE SUMMARY

Centennial HEC-1 NODE	Location	Area (mi^2)	Flow (cfs)	Flow with Base Flow (cfs)	MPU Flow (cfs)
2CNW89-C	Upstream end of Facility at Durango Drive	2.704	3,054	3,417	2,888
CNW103-1	US 95 Southbound Ramp Infield	2.777	3,125	3,488	-
CDURAN1	Grand Montecito Pkwy and Oso Blanca Rd.	2.795	3,134	3,498	-
CRTC3	Ace Blvd and Oso Blanca Rd.	2.801	3,136	3,501	-
CRTC4	East of Park and Ride	2.806	3,144	3,509	-
2CRTC5	North side of Elkhorn Rd.	3.082	3,309	3,675	3,216
CNWBB1-2	Northeast of Mountain Ridge Park Entrance	3.091	3,312	3,676	-
CBWBB1-3	South of Mountain Ridge Park Entrance	3.103	3,321	3,685	-
CNWBB1-4	Dorrell Lane and Oso Blanca Rd.	3.152	3,334	3,701	3,340
2CNWBB3-B	Deer Springs Way and Oso Blanca Rd.	3.616	3,579	3,947	3,593

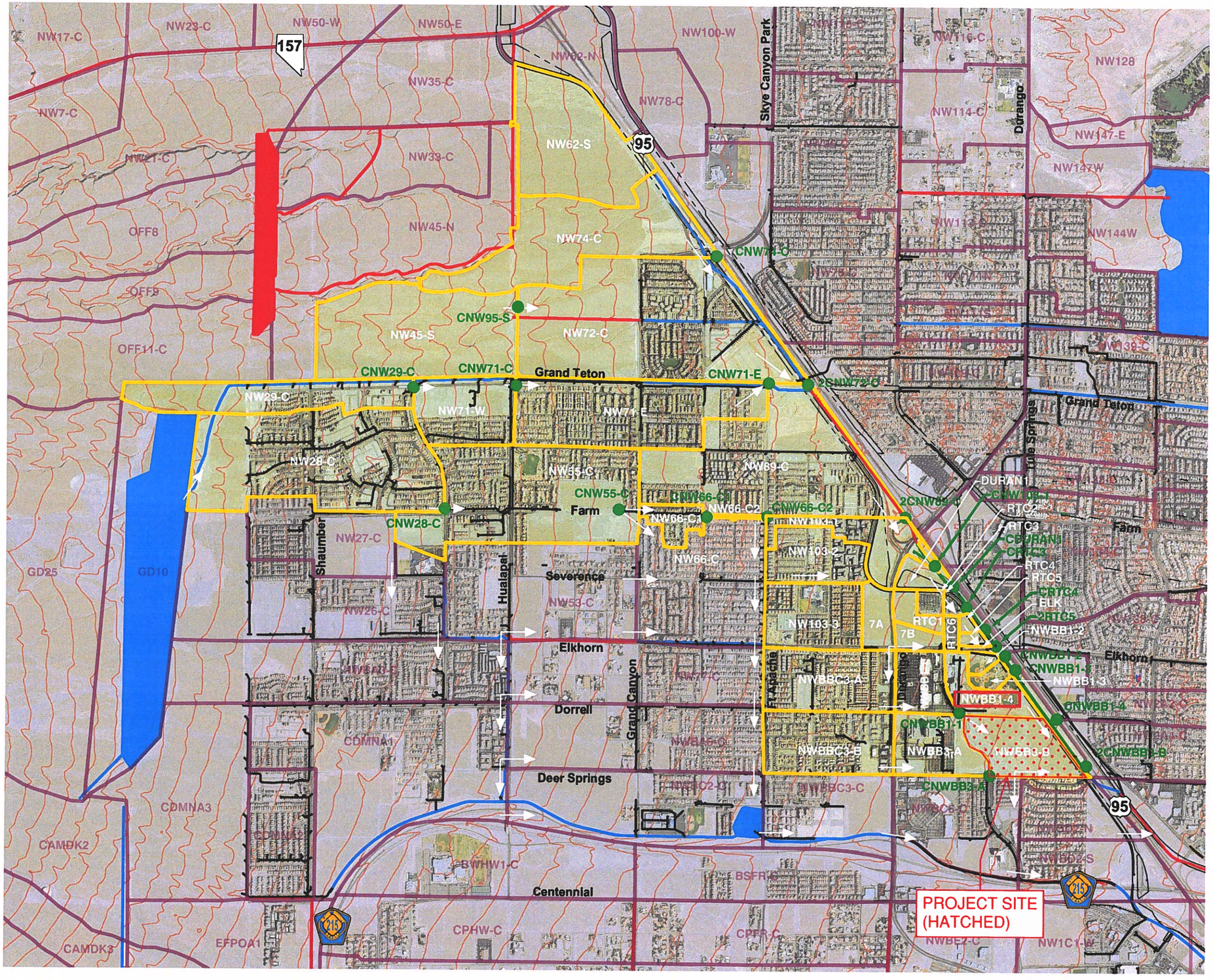
The 100-year flow is mainly conveyed to the east at each intersection within the tributary watershed toward the proposed MPU facility that is aligned along the west side of US 95. The analyses from previously approved drainage reports and the MPU data show flow-split points on Deer Springs Way, Elkhorn Road, and Dorrell Lane. These flow-splits are created by either sheet flow at intersections, collection by local storm drain facilities, or collection by existing MPU facilities. Due to the natural steep grade from west to east and the maximum collection capacity of the existing drainage systems, there is some bypass of the local facilities, which is conveyed east to the proposed Centennial Parkway Channel West facility. The flow-split calculations at the intersections have been incorporated into the hydrologic analysis for this Study. The 100-year storm

DISCUSSION OF FLOWSPLIT AT DEER SPRINGS INTERSECTIONS (CONTINUED)

event HEC-1 models can be found in Appendix B-5. See Appendix B-4 – *Deer Springs Flow Split Calculations.*

An onsite hydrologic analysis was performed to determine the runoff conveyed to the proposed earthen ditch that will be graded above the proposed MPU RCB facility between Oso Blanca Road and Southbound US 95. The tributary area to the proposed ditch is between the crown of Oso Blanca Road and the east edge of the US 95 Southbound pavement. The onsite subbasins in this area have been delineated and analyzed in order to properly size the proposed ditch that will convey the onsite runoff to the south above the proposed MPU RCB facility. There are four proposed onsite field inlets that will collect the flow from the ditch and convey it into the MPU RCB facility. The 100-year storm event HEC-1 models for the onsite subbasins can be found in Appendix B-5.3 – *HEC-1 Model for Onsite Subbasins*. Refer to Figure 3 – *Onsite Subbasin Map.*

Referenced Drainage Exhibits



LEGEND

- EXISTING MPU DRAINAGE FACILITIES
- EXISTING MPU DETENTION BASINS
- EXISTING LOCAL DRAINAGE FACILITIES
- PROPOSED MPU DRAINAGE FACILITIES
- PROPOSED MPU DETENTION BASINS
- MPU SUBBASIN BOUNDARY
- OFF11-C — MPU SUBBASIN ID
- PROJECT SUBBASIN BOUNDARY
- NW89-C — PROJECT SUBBASIN ID
- CENTENNIAL PARKWAY CHANNEL WEST PROJECT LIMITS
- FLOW DIRECTION
- CNW103-1 — DRAINAGE COMBINATION POINT

CENTENNIAL PARKWAY CHANNEL WEST
US95/CC215 TO DURANGO
HEC-1 CENTULT3.OUT FLOW

Basin ID / Combination Point	Area (MI^2)	Flow (cfs)	Flow with Base Flow (cfs)	MPU Flow (cfs)
NW62-S	0.208	333	333	339
CNW45-N	1.040	-	-	368
NW74-C	0.247	367	367	-
CNW74-C	0.465	668	668	653
NW45-S	0.272	452	452	-
NW72-C	0.442	569	569	-
CNW72-C	0.714	1000	1000	-
2CNW72-C	1.179	1634	1634	1423
NW29-C	0.132	198	561	-
NW71-W	0.104	155	155	-
CNW71-W	0.236	349	713	-
NW71-E	0.238	256	256	-
CNW71-E	0.474	595	956	-
2CNW71-E	1.653	2144	2607	2160
NW28-C	0.357	499	499	-
NW55-C	0.325	318	318	-
CNW55-C	0.682	788	788	-
NW66-C1	0.029	36	36	-
NW66-C2	0.003	4	4	-
CNW66-C2	0.714	803	803	-
NW89-C	0.337	393	393	-
CNW89-C	1.051	1109	1109	-
2CNW89-C	2.704	3054	3417	2888
NW103-1	0.073	108	108	-
NDOT-1	0.005	10	10	-
CNW103-1	2.777	3125	3488	-
DURAN1	0.018	38	38	-
CDURAN1	2.795	3134	3498	-
RTC3	0.006	12	12	-
NDOT-2	0.004	8	8	-
CRTC3	2.801	3136	3501	-
NDOT-3	0.004	8	8	-
RTC4	0.004	8	8	-
NDOT-4	0.010	18	18	-
CRTC4	2.810	3144	3509	-
NW103-2	0.078	114	114	-
RTC2	0.011	22	22	-
RTC1	0.019	36	36	-
CRTC1	0.108	152	152	-
NW103-3	0.099	112	112	-
7A	0.032	45	45	-
C7A	0.131	141	141	-
7B	0.017	34	34	-
C7B	0.256	224	224	-
RTC6	0.008	17	17	-
CRTC6	0.264	236	236	-
ELK	0.003	5	5	-
RTC5	0.009	12	12	-
CRTC5	0.274	240	240	-
2CRTC5*	3.082	3309	3675	3216
NWBB1-2	0.008	4	4	-
CNWBB1-2	3.091	3312	3676	-
NWBB1-3	0.012	5	5	-
NDOT-5	0.009	15	15	-
CNWBB1-3	3.103	3321	3685	-
NWBB1-4	0.049	30	30	-
CNWBB1-4**	3.152	3334	3701	3340
NWBC3-A	0.126	147	147	-
NWBB1-1	0.051	92	92	-
CNWBB1-1	0.177	227	227	-
NWBB3-B	0.082	135	135	-
NDOT-6	0.018	29	29	-
CNWBB3-B	0.282	327	327	-
NWBC3-B	0.126	143	143	-
NWBB3-A	0.078	128	128	-
CNWBB3-A	0.202	268	268	-
2CNWBB3-B**	3.616	3579	3947	3593

Note:
** = Combination point CNWBB1-C in the MPU HEC-1 Model
*1 = Combination point CNWBB3-C in the MPU HEC-1 Model
** = Combination point CNW2B2-C in the MPU HEC-1 Model
REFERENCE: The MPU Flow values are referenced from the 2013 LVWFCMPU Facility Inventory Fugures F-12 & F-13

FIGURE 2
OFFSITE SUBBASIN MAP

CENTENNIAL PARKWAY CHANNEL WEST
US95/CC215 TO DURANGO

ch2m:

672279-Subbasin Exhibit.dwg

Referenced Hydrologic Data

2008 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE - COMPOSITE CURVE NUMBER BREAKDOWN

WATERSHED	2008 MPU BASINID	LAND USE INDEX NUMBER	SOIL MAP UNIT #	SUBREGION CN	SUBREGION AREA (SQ FT)	SUBBASIN AREA (SQ FT)	PERCENT OF SUBBASIN	CUMULATIVE PERCENT	AREAL WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
UPPER NORTHERN	NW77-C	6	191	84	2743536	6742086	40.7%	40.8%	34.18	34.23	
UPPER NORTHERN	NW77-C	7	191	88	81007	6742086	1.2%	42.0%	1.06	35.29	
UPPER NORTHERN	NW77-C	14	191	79	3389253	6742086	50.3%	92.2%	39.71	75.00	
UPPER NORTHERN	NW77-C	16	191	87	188818	6742086	2.8%	95.0%	2.44	77.44	
UPPER NORTHERN	NW77-C	17	191	90	295859	6742086	4.4%	99.4%	3.95	81.38	
UPPER NORTHERN	NW77-C	19	191	96	39528	6742086	0.6%	100.0%	0.56	81.95	**81.947**
UPPER NORTHERN	NW89-C	6	191	84	1725459	9403852	18.3%	18.3%	15.41	15.41	
UPPER NORTHERN	NW89-C	7	191	88	5009247	9403852	53.3%	71.6%	46.88	62.29	
UPPER NORTHERN	NW89-C	8	191	93	890589	9403852	9.5%	81.1%	8.81	71.10	
UPPER NORTHERN	NW89-C	9	191	94	1778558	9403852	18.9%	100.0%	17.78	88.87	**88.874**
UPPER NORTHERN	NWBB1-1	9	191	94	1431061	1431061	100.0%	100.0%	94.00	94.00	**94.000**
UPPER NORTHERN	NWBB1-2	2	191	65	205766	252706	81.4%	81.4%	52.93	52.93	
UPPER NORTHERN	NWBB1-2	7	191	88	46940	252706	18.6%	100.0%	16.35	69.27	**69.272**
UPPER NORTHERN	NWBB1-3	2	191	65	303510	360608	84.2%	84.2%	54.71	54.71	
UPPER NORTHERN	NWBB1-3	7	191	88	57098	360608	15.8%	100.0%	13.93	68.64	**68.642**
UPPER NORTHERN	NWBB1-4	2	191	65	862647	1438916	60.0%	60.0%	38.97	38.97	
UPPER NORTHERN	NWBB1-4	7	191	88	333319	1438916	23.2%	83.1%	20.38	59.35	
UPPER NORTHERN	NWBB1-4	9	191	94	242950	1438916	16.9%	100.0%	15.87	75.22	**75.224**
UPPER NORTHERN	NWBB3-A	7	191	88	18339	2119469	0.9%	0.9%	0.76	0.76	
UPPER NORTHERN	NWBB3-A	9	191	94	2101130	2119469	99.1%	100.0%	93.19	93.95	**93.948**
UPPER NORTHERN	NWBB3-B	7	191	88	241489	2307037	10.5%	10.5%	9.21	9.21	
UPPER NORTHERN	NWBB3-B	9	191	94	2065548	2307037	89.5%	100.0%	84.16	93.37	**93.372**
UPPER NORTHERN	NWBC3-A	6	191	84	1040195	3524866	29.5%	29.5%	24.79	24.79	
UPPER NORTHERN	NWBC3-A	7	191	88	1983085	3524866	56.3%	85.8%	49.51	74.30	
UPPER NORTHERN	NWBC3-A	9	191	94	502586	3524866	14.3%	100.0%	13.40	87.70	**87.700**
UPPER NORTHERN	NWBC3-B	6	191	84	2588071	3508669	73.8%	73.8%	61.96	61.96	
UPPER NORTHERN	BWBC3-B	9	191	94	902720	3508669	25.7%	99.5%	24.18	24.18	**86.145**

BASIN NWBB3-B ENCOMPASSING PROJECT SITE

BASIN NWBB1-4 (PARK BASIN)

ONSITE BASIN NWBB3-B ANALYZED CN = 93.3 PER CENTENNIAL STUDY.

LOCAL ANALYSIS OF ONSITE BASIN CN = 86.9.

THEREFORE, THE CONSERVATIVE CN = 93.3 HAS BEEN UTILIZED FOR ONSITE ANALYSIS.

TIME OF CONCENTRATION / LAG TIME DETERMINATION - Less than 1 mi2

ch2m SM

CENTENNIAL PKWY CHANNEL WEST
US95/CC215 TO DURANGO
ULTIMATE OFFSITE BASINS

Project No: 672276
Date: 11/10/16
Calculated by: CB

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)							T_{lag}	REMARKS
Basin ID	DEV./UNDEV. (D or U)	CN	K	AREA Mi^2	INITIAL LENGTH Feet	SLOPE %	Ti Min	TRAVEL LENGTH Feet	SLOPE %	V_1 VELOCITY FPS	V_2 VELOCITY FPS	Tt Min	Tc Min	Tc Check Min	T_{lag} 0.6Tc 60 Hours	RAINFALL INCHES
(1)	(2)	(3)	(4)	(5b)	(6)	(7)	(8)	(9)	(10)	(10a)	(10b)	(11)	(12)	(13)	(14)	(15)
NW62-S	D	95.641	0.872	0.208	100	1.0	4.1	3750	2.10	2.9	4.4	15.1	19.2	31.4	0.192	
NW74-C	D	95.102	0.865	0.247	100	1.0	4.2	6600	3.30	3.7	5.6	20.6	24.8	47.2	0.248	
NW45-S	D	95.912	0.876	0.272	100	1.0	4.0	5300	3.60	3.8	5.8	16.0	20.0	40.0	0.200	
NW72-C	D	94.099	0.852	0.442	100	1.0	4.5	7100	2.70	3.3	5.0	24.4	28.8	50.0	0.288	
NW29-C	D	92.435	0.830	0.132	100	1.0	4.9	5650	3.80	3.9	6.0	16.5	21.4	41.9	0.214	
NW71-W	D	92.520	0.831	0.104	100	1.0	4.8	4200	2.40	3.1	4.7	15.7	20.5	33.9	0.205	
NW71-E	D	88.342	0.776	0.238	100	1.0	5.8	6700	2.60	3.3	4.9	23.5	29.3	47.8	0.293	
NW28-C	D	91.269	0.815	0.357	100	1.0	5.1	6500	3.50	3.8	5.7	19.7	24.8	46.7	0.248	
NW55-C	D	84.383	0.724	0.325	100	1.0	6.8	5800	2.70	3.3	5.0	20.1	26.8	42.8	0.268	
NW66-C1	D	84.000	0.719	0.029	100	2.8	4.9	1729	2.48	3.2	4.8	6.9	11.7	20.2	0.117	
NW66-C2	D	84.000	0.719	0.003	100	2.2	5.2	1196	2.85	3.4	5.2	4.7	9.9	17.2	0.099	
NW89-C	D	88.874	0.783	0.337	100	1.0	5.7	5600	2.90	3.4	5.2	18.7	24.4	41.7	0.244	
NW103-1	D	93.711	0.847	0.073	100	2.9	3.2	3973	1.84	2.7	4.1	17.0	20.2	32.6	0.202	
NW103-2	D	89.776	0.795	0.078	100	2.9	3.8	2820	2.25	3.0	4.6	11.2	15.0	26.2	0.150	
NW103-3	D	88.000	0.772	0.099	100	0.1	11.4	3187	2.09	2.9	4.4	13.0	24.4	28.3	0.244	
DURAN1	D	94.488	0.8572	0.0183	100	5.19	2.5	1056	3.85	4.0	6.0	3.6	6.2	16.4	0.062	
RTC1	D	94.000	0.8508	0.0189	100	4.57	2.7	1371	2.61	3.3	4.9	5.5	8.2	18.2	0.082	
RTC2	D	94.000	0.8508	0.0106	100	2.55	3.3	674	2.41	3.1	4.8	3.3	6.5	14.3	0.065	
RTC3	D	93.638	0.8460	0.0059	100	2.26	3.5	540	2.48	3.2	4.8	2.8	6.2	13.6	0.062	
RTC4	D	93.413	0.8431	0.0043	100	2.81	3.3	416	2.44	3.2	4.8	2.2	5.5	12.9	0.055	
RTC5	D	93.253	0.8409	0.0059	100	2.61	3.4	493	2.37	3.1	4.7	2.6	6.0	13.3	0.060	
ELK	D	94.000	0.8508	0.0028	100	0.60	5.3	587	1.33	2.3	3.5	4.0	9.3	13.8	0.093	
RTC6	D	94.000	0.8508	0.0083	100	2.46	3.3	613	1.62	2.6	3.9	3.7	7.1	14.0	0.071	
7A	D	88.042	0.7722	0.0321	100	2.61	4.3	1386	1.72	2.6	4.0	6.8	11.1	18.3	0.111	
7B	D	94.000	0.8508	0.0173	100	2.49	3.3	1128	2.61	3.3	4.9	4.7	8.0	16.8	0.080	
NWBB1-1	D	94.000	0.851	0.051	100	2.0	3.6	1908	1.95	2.8	4.3	8.4	12.0	21.2	0.120	
NWBB1-2	D	68.737	0.517	0.009	100	3.0	7.2	619	2.40	3.1	4.7	3.1	10.3	14.0	0.103	
NWBB1-3	D	68.642	0.516	0.012	100	0.8	11.6	826	2.03	2.9	4.4	4.1	15.7	15.1	0.151	
NWBB1-4	D	75.224	0.603	0.049	100	0.7	9.9	2478	1.96	2.8	4.3	10.6	20.5	24.3	0.205	
NWBC3-A	D	87.700	0.768	0.126	100	0.3	8.5	3942	2.19	3.0	4.5	15.5	24.0	32.5	0.240	
NWBC3-B	D	86.145	0.747	0.126	100	1.2	6.0	3806	2.22	3.0	4.6	14.8	20.9	31.7	0.209	
NWBB3-A	D	93.948	0.850	0.076	100	2.4	3.3	2643	2.14	3.0	4.5	10.8	14.1	25.2	0.141	
NWBB3-B	D	93.372	0.843	0.083	100	2.6	3.4	2904	2.27	3.0	4.6	11.4	14.8	26.7	0.148	

BASIN ENCOMPASSING PROJECT SITE

NOTE:

(1) Subbasin Name
(2) Developed or Undeveloped Subbasin
(3) Curve Number (See Subbasin CN Calculations)
(4) K = 0.0132 (CN) - 0.39
(5a) & (5b) Area
(6) Initial Length
* CN value from CCRFCD MPU

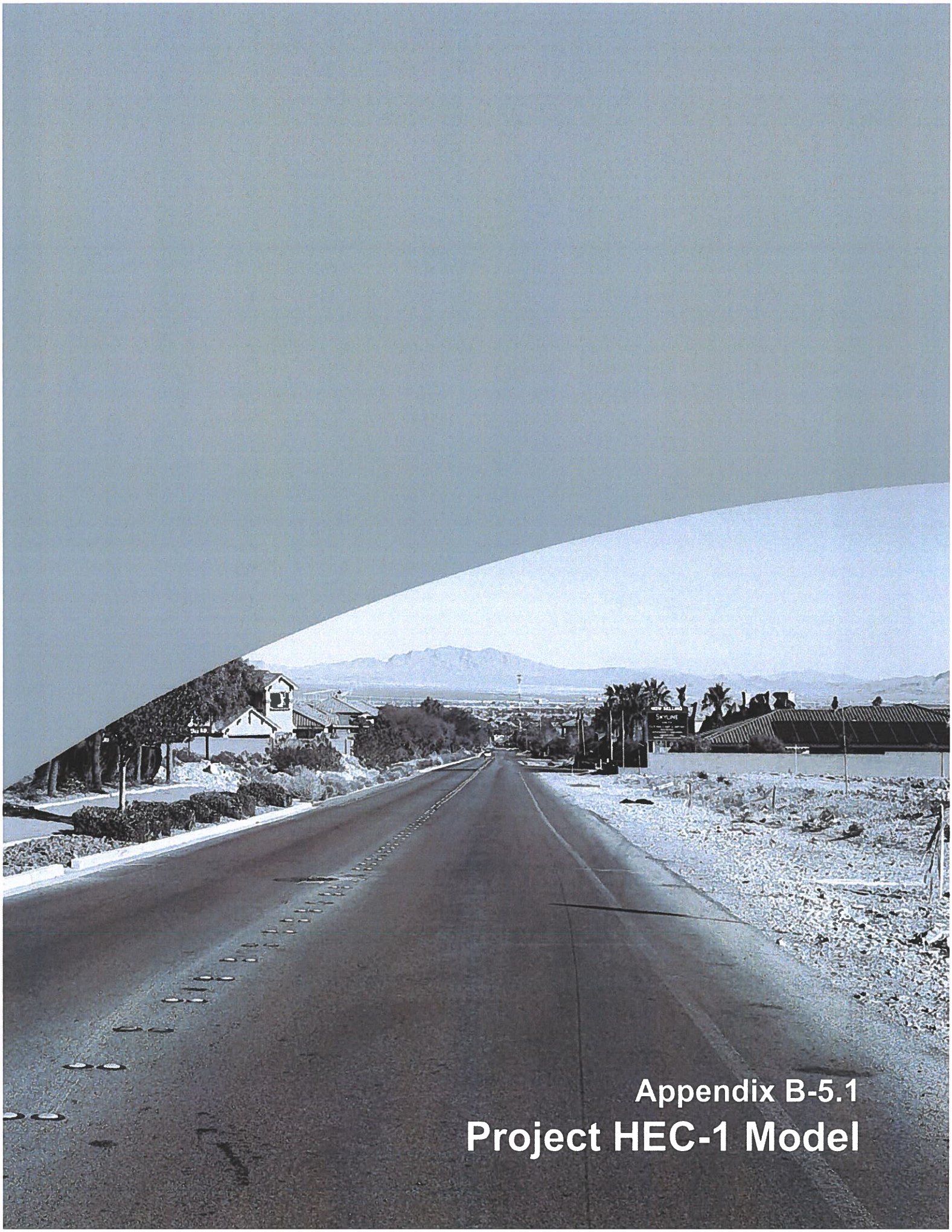
(7) Initial Slope
(8) Ti = 1.8 (1.1 - K) L^1/2 / S^1/3
(9) Travel Length
(10) Slope
(10a) Slope V_1 applies to the first 500 feet of travel distance;
Developed V_1 = 20.2*(S/100)^1/2

(10b) V_2 applies to the remaining travel distance;
Developed V_2 = 30.6*(S/100)^1/2
(11) Tt = 500/(V1*60)+(Travel Length-500)/(V2*60)
(12) Tc = Ti + Tt
(13) Tc Check = L/180+10 (select smaller Tc)
(14) Tlag = 0.6 Tc/60

(15) Rainfall in inches

REFERENCE: Calculations based on the Clark County Regional Flood Control District HCDDM

STANDARD FORM 4



Appendix B-5.1
Project HEC-1 Model

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   13NOV16  TIME  16:57:34   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    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
```

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

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

1 HEC-1 INPUT PAGE 1

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

                        *DIAGRAM
 *** FREE ***
             1          ID    CENTENNIAL PARKWAY CHANNEL WEST
             2          ID    US95/CC215 TO DURANGO
             3          ID    RECOMMENDED DRAINAGE SYSTEM WITH ULTIMATE DEVELOPMENT
             4          ID    INPUT FILE = CENTULT3.DAT
             5          ID    INPUT FILE DATE = FEB 2016
             6          ID    DESIGN STORM = 100-YEAR 6-HOUR STORM
             7          ID    STORM DISTRIBUTION = SDN3
             8          ID    MODELED BY CH2M (MICHAEL SCHWAB, P.E.)
             9          ID    CHECKED BY CH2M (JEFF GRIEST, P.E., CFM)
            10          ID    STORM CENTERING = REMOVED DETENTION BASIN OUTFLOWS
            11          ID    DOWNSTREAM OF THE UPPER LAS VEGAS WASH DETENTION BASIN TO THE MOST
            12          ID    DOWNSTREAM POINT IN THE LOWER NORTHERN LAS VEGAS WASH WATERSHED
            13          ID    COMBINATION POINT DOWNSTREAM OF LOWER LAS VEGAS WASH DETENTION BASIN
            14          ID    WAS MODIFIED TO SIMULATE NECESSARY STORM CENTERINGS
            15          ID
            16          ID
            17          ID    REFERENCED HYDROLOGIC MODELS:
            18          ID    CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT 2008 MASTER PLAN UPDATE
            19          ID    UPPER AND LOWER NORTHERN LAS VEGAS WASH WATERSHEDS
            20          ID    REVISED FINAL DESIGN REPORT FOR THE RANCHO DETENTION BASIN
            21          ID    PHASE II (VTN 2006)
            22          ID    RESPONSE TO COMMENTS ON THE CONCEPTUAL DRAINAGE STUDY FOR
            23          ID    NORTH LAS VEGAS 600-ACRE SITE (GC WALLACE 2006)
            24          ID    SECOND RESPONSE TO COMMENTS OF THE CONCEPTUAL DRAINAGE STUDY
            25          ID    FOR NORTH LAS VEGAS 2074-ACRE SITE (GC WALLACE 2006)
            26          ID    BASIN MAPS FOR SUPPLEMENT #2 TO ADDENDUM #2 TO THE MASTER
            27          ID    DRAINAGE STUDY FOR CLIFF'S EDGE/ PROVIDENCE (VTN 2004)
            28          ID    MASTER DRAINAGE STUDY FOR KYLE CANYON (GC WALLACE 2006)
            29          ID    TECHNICAL DRAINAGE STUDY FOR GRAND TETON DRIVE STROM DRAIN
            30          ID    AND AREA 1 ROADWAY IMPROVEMENTS  (GC WALLACE 2006)
            31          ID    90% FINAL DESIGN REPORT FOR RANCHO ROAD SYSTEM - EL CAMPO
            32          ID    GRANDE STORM DRAIN PROJECT (PBS&J 2007)
            33          ID    MPA FOR RACEL STREET COLLECTOR (LOUIS BERGER JANUARY 2007)
            34          ID    HYDROLOGIC MODEL FOR FLOYD LAMB NORTH AND SOUTH ENVIRONMENTAL
            35          ID    ENHANCEMENT AREAS (LOUIS BERGER  DECEMBER 7, 2007)
            36          ID
            37          ID
            38          ID
            39          ID    JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
            40          ID
            41          ID    AREA (SQUARE MILES)           DARF
            42          ID          0 - 0.5                 0.99
            43          ID          0.5 - 1                 0.975
            44          ID          1 - 2                   0.95
            45          ID          2 - 3                   0.925
            46          ID          3 - 4                   0.915
            47          ID          4 - 5                   0.908
            48          ID          5 - 6                   0.903
            49          ID          6 - 7                   0.895
            50          ID          7 - 8                   0.885
            51          ID
            52          IT       5       0       0     150
            53          IO       5       0       0
```

1 HEC-1 INPUT PAGE 2

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

            54          IN       5       0       0
            55          JR    PREC    0.99   0.975    0.95   0.925   0.915   0.908   0.903   0.895   0.885
                        *
            56          KK  NW62-S
            57          BA   0.208
            58          PB    2.77
            59          PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
            60          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
```

```
 61          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
 62          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
 63          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
 64          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
 65          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
 66          PC   0.998   0.999   1.000
 67          LS      0    95.6
 68          UD   0.190
             *

 69          KK RNW62-S
 70          KM  ROUTE NW62-S TO CNW74-C
 71          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
 72          KM  FACILITY ID-MILE = CN95 0333,0318,0313,0259
 73          KM  LINING = RCB
 74          RD    2100   0.015   0.015       0    TRAP      14       0
             *

 75          KK  NW74-C
 76          BA   0.247
 77          PB    2.80
 78          LS      0    95.1
 79          UD   0.247
             *

 80          KK CNW74-C
 81          KM  COMBINE NW74-C AND RNW62-C
 82          HC       2
             *

 83          KKRCNW74-C
 84          KM  ROUTE CNW74-C TO 2CNW72-C
 85          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
 86          KM  FACILITY ID-MILE = CN95 0259
 87          KM  LINING = RCB
 88          RD    1870   0.021   0.015       0    TRAP      16       0
             *

 89          KK  NW45-S
 90          BA   0.272
 91          PB    2.91
 92          LS      0    95.9
 93          UD   0.200
             *
1                                    HEC-1 INPUT                                        PAGE  3

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

 94          KK RNW45-S
 95          KM  ROUTE NW45-S TO CNW72-C
 96          KM  FACILITY = CENTENNIAL PKWY CHANNEL WEST - KYLE CANYON BRANCH
 97          KM  FACILITY ID-MILE = CNKC 0050,0024,0007,0000
 98          KM  LINING = RCB
 99          RD    5460    0.03   0.015       0    TRAP       6       0
             *

100          KK  NW72-C
101          BA   0.442
102          PB    2.80
103          LS      0    94.1
104          UD   0.290
             *

105          KK CNW72-C
106          KM  COMBINE NW72-C AND RNW45-S
107          KM  RACEL AND US95
108          HC       2
             *

109          KK2CNW72-C
110          KM  COMBINE CNW72-C AND CNW74-C
111          KM  RANCHO ROAD SYSTEM @ RACEL
112          HC       2
             *

113          KK  RC72-C
114          KM  ROUTE 2CNW72-C TO 2CNW71-E
115          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
116          KM  FACILITY ID-MILE = CN95 0257,0218,0199
117          KM  LINING = CONCRETE
118          RD    1670   0.008   0.015       0    TRAP      15       0
             *

119          KK  NW29-C
120          BA   0.132
121          PB    3.00
122          LS      0    92.4
123          UD   0.214
             *

124          KK RNW29-C
125          KM  ROUTE NW29-C TO CNW71-W
126          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/GRAND TETON BRANCH
127          KM  FACILITY ID-MILE = CNGT 0118
128          KM  LINING = ARCH CON
129          RD    2100   0.037   0.015       0    TRAP       6       0
             *
1                                    HEC-1 INPUT                                        PAGE  4

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

130          KK  NW71-W
131          BA   0.104
132          PB    2.92
```

```
133          LS       0    92.5
134          UD   0.206
             *

135          KK CNW71-W
136          KM  COMBINE RDNW29-C AND NW71-W
137          KM  CENTENNIAL PKWY CHANNEL WEST/GRAND TETON BRANCH @ HUALAPAI
138          HC       2
             *

139          KKRCNW71-W
140          KM  ROUTE CNW71-W TO CNW71-E
141          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/GRAND TETON BRANCH
142          KM  FACILITY ID-MILE = CNGT 0000,0043
143          KM  LINING = RCB
144          RD    6270   0.030   0.015       0    TRAP       6       0
             *

145          KK  NW71-E
146          BA   0.238
147          PB    2.85
148          LS       0    88.3
149          UD   0.293
             *

150          KK CNW71-E
151          KM  COMBINE NW71-E AND RCNW71-W
152          KM  CENTENNIAL PKWY CHANNEL WEST/GRAND TETON BRANCH @ US 95
153          HC       2
             *

154          KK2CNW71-E
155          KM  COMBINE 2CNW72-C AND CNW71-E
156          KM  RANCHO ROAD SYSTEM FLOW @ GRAND TETON
157          HC       2
             *

158          KK R2C71-E
159          KM  ROUTE 2CNW71-E TO 2CNW89-C
160          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
161          KM  FACILITY ID-MILE = CN95 0102,0167
162          KM  LINING = RCB
163          RD    3290   0.015   0.015       0    TRAP      20       0
             *

164          KK  NW28-C
165          BA   0.357
166          PB    3.02
167          LS       0    91.3
168          UD   0.249
             *
```

1 HEC-1 INPUT PAGE 5

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

169          KK RNW28-C
170          KM  ROUTE NW28-C TO CNW55-C
171          KM  FARM
172          RD    4000  0.0325   0.016       0    TRAP       0      50
             *

173          KK  NW55-C
174          BA   0.325
175          PB    2.93
176          LS       0    84.4
177          UD   0.270
             *

178          KK CNW55-C
179          KM  COMBINE NW55-C AND RNW28-C
180          KM  FARM AND GRAND CANYON
181          HC       2
             *

182          KKRCNW55-C
183          KM  ROUTE CNW55-C TO CNW66-C1
184          KM  FARM & N TEE PEE LN
185          RD    1365   0.031   0.016       0    TRAP       0      50
             *

186          KK NW66-C1
187          BA   0.029
188          PB    2.88
189          LS       0    84.0
190          UD   0.117
             *

191          KKRNW66C-1
192          KM  ROUTE NW66-C1 TO NW66-C2
193          KM  FARM
194          RD    1300   0.028   0.016       0    TRAP       0      50
             *

195          KK NW66-C2
196          BA   0.003
197          PB    2.88
198          LS       0    84.0
199          UD   0.099
             *

200          KKCNW66-C2
201          KM  COMBINE DNW55-C, NW66-C1 AND NW66-C2
202          KM  FARM AND FORT APACHE
203          HC       3
             *
```

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

  204         KKRCNW66C-2
  205         KM  ROUTE CNW66-C2 TO CNW89-C
  206         KM  FARM
  207         RD    2900    0.03   0.016       0    TRAP       0      50
              *

  208         KK  NW89-C
  209         BA   0.337
  210         PB    2.80
  211         LS       0    88.9
  212         UD   0.244
              *

  213         KK CNW89-C
  214         KM  COMBINE NW89-C AND RCNW66C-2
  215         KM  FARM ROAD FLOW BEFORE US95
  216         HC       2
              *

  217         KK2CNW89-C
  218         KM  COMBINE CNW89-C AND R2C71-E
  219         KM  MPU FACILITY FLOW
  220         HC       2
              *

  221         KK R2C89-C
  222         KM  ROUTE 2CNW89-C TO CNW103-C1
  223         KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
  224         KM  FACILITY ID-MILE = CN95 0068
  225         KM  LINING = RCB
  226         RD    1800   0.017   0.015       0    TRAP      24       0
              *

  227         KK NW103-1
  228         BA   0.073
  229         PB    2.80
  230         LS       0    93.7
  231         UD   0.202
              *

  232         KK  NDOT-1
  233         BA   0.005
  234         PB    2.80
  235         LS       0    94.3
  236         UD   0.077
              *

  237         KKCNW103-1
  238         KM  COMBINE NW103-C1, NDOT-1 AND R2C89-C
  239         KM  RANCHO ROAD SYSTEM @ ELKHORN
  240         HC       3
              *
```



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

  241         KK RC103-1
  242         KM  ROUTE CNW103-1 TO CDURAN1
  243         KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
  244         KM  FACILITY ID-MILE = CN95 0068
  245         KM  LINING = CONCRETE
  246         RD     276   0.035   0.015       0    TRAP      20       0
              *

  247         KK  DURAN1
  248         BA  0.0183
  249         PB    2.80
  250         LS       0    94.5
  251         UD   0.062
              *

  252         KK CDURAN1
  253         KM  COMBINE NW103-1 AND DURAN1
  254         KM  @CENTENNIAL PKWY CHANNEL WEST/U.S 95 BRANCH
  255         HC       2
              *

  256         KKRCDURAN1
  257         KM  ROUTE CDURAN1 TO CRTC3
  258         KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
  259         KM  FACILITY ID-MILE = CN95 0068
  260         KM  LINING = CONCRETE
  261         RD     635   0.024   0.015       0    TRAP      20       0
              *

  262         KK    RTC3
  263         BA   0.006
  264         PB    2.80
  265         LS       0    93.6
  266         UD   0.062
              *

  267         KK  NDOT-2
  268         BA   0.004
  269         PB    2.80
  270         LS       0    93.9
  271         UD   0.068
              *

  272         KK   CRTC3
```

```
273          KM  COMBINE RTC3 AND DURAN1
274          KM  @CENTENNIAL PKWY CHANNEL WEST/U.S 95 BRANCH
275          HC       3
             *
1                                        HEC-1 INPUT                                                    PAGE  8

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

276          KK  RCRTC3
277          KM  ROUTE CRTC3 TO CRTC4
278          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
279          KM  FACILITY ID-MILE = CN95 0068
280          KM  LINING = CONCRETE
281          RD     422  0.0212   0.015       0    TRAP      20       0
             *

282          KK  NDOT-3
283          BA   0.004
284          PB    2.80
285          LS       0    93.6
286          UD   0.060
             *

287          KK    RTC4
288          BA   0.004
289          PB    2.80
290          LS       0    93.4
291          UD   0.055
             *

292          KK  NDOT-4
293          BA   0.010
294          PB    2.80
295          LS       0    92.4
296          UD   0.089
             *

297          KK   CRTC4
298          KM  COMBINE RTC3 AND RTC4
299          KM  @CENTENNIAL PKWY CHANNEL WEST/U.S 95 BRANCH
300          HC       4
             *

301          KK  RCRTC4
302          KM  ROUTE CRTC4 TO 2CRTC5
303          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
304          KM  FACILITY ID-MILE = CN95 0068
305          KM  LINING = CONCRETE
306          RD     591  0.0185   0.015       0    TRAP      20       0
             *

307          KK NW103-2
308          BA   0.078
309          PB    2.80
310          LS       0    89.8
311          UD   0.150
             *
1                                        HEC-1 INPUT                                                    PAGE  9

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

312          KKRNW103-2
313          KM  ROUTE NW103-2 TO CRTC1
314          KM  FACILITY = NATURAL DITCH ACROSS OPEN LOT
315          KM  FACILITY ID-MILE = N/A
316          KM  LINING = DIRT
317          RD    1460  0.0183   0.015       0    TRAP       0      50
             *

318          KK    RTC2
319          BA  0.0106
320          PB    2.80
321          LS       0    94.0
322          UD   0.065
             *

323          KK   RRTC2
324          KM  ROUTE RTC2 TO CRTC1
325          KM  FACILITY = V-DITCH WEST ON GRAND MONTECITO PKWY
326          KM  FACILITY ID-MILE = N/A
327          KM  LINING = DIRT
328          RD     377  0.0079   0.015       0    TRAP       0      50
             *

329          KK    RTC1
330          BA  0.0189
331          PB    2.80
332          LS       0    94.0
333          UD   0.082
             *

334          KK   CRTC1
335          KM  COMBINE NW103-2, RTC2, & RTC1
336          KM  V-DITCH SYSTEM @ GRAND MONTECITO PARKWAY
337          HC       3
             *

338          KK   RRTC1
339          KM  ROUTE CRTC1 TO C7B
340          KM  FACILITY = TWILIGHT @ ELKHORN ROAD
341          KM  FACILITY ID-MILE = CN95 0068
342          KM  LINING = CONCRETE
343          RD     388  0.0123   0.015       0    TRAP      20       0
             *
```

```
 344          KK NW103-3
 345          BA   0.099
 346          PB    2.80
 347          LS       0    88.0
 348          UD   0.244
              *
1                                        HEC-1 INPUT                                                    PAGE 10

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

 349          KK RC103-3
 350          KM  ROUTE NW103-3 TO C7A
 351          KM  FACILITY = TWILIGHT AT ELKHORN RANCH
 352          KM  LINING = CONCRETE
 353          RD     714  0.0283   0.015       0    TRAP       0      50
              *

 354          KK       7A
 355          BA  0.0321
 356          PB    2.80
 357          LS       0   88.04
 358          UD   0.111
              *

 359          KK      C7A
 360          KM  COMBINE NW103-3, 7A
 361          KM  RANCHO ROAD SYSTEM @ ELKHORN
 362          HC       2
              *

 363          KK      D7A
 364          KM  DIVERT OUT 31 CFS FROM 7A TO NWBB3C-A
 365          KM  REFERENCED FROM "TECHNICAL DRAINAGE STUDY FOR -
 366          KM  CENTENNIAL PARK" PREPARED BY SOUTHWEST ENGINEERING (JUNE 2003)
 367          KM  REFERENCE NODE: RTC7
 368          DTDDURANGO
 369          DI       0      48
 370          DQ       0      31
              *

 371          KK    RC7A
 372          KM  ROUTE C7A TO C7B
 373          KM  FACILITY = TWILIGHT AT ELKHORN RANCH
 374          KM  LINING = CONCRETE
 375          RD    1008  0.0248   0.015       0    TRAP       0      50
              *

 376          KK       7B
 377          BA  0.0173
 378          PB    2.80
 379          LS       0   94.00
 380          UD   0.080
              *

 381          KK      C7B
 382          KM  COMBINE CTA, 7B, & CRTC1
 383          KM  RANCHO ROAD SYSTEM @ ELKHORN
 384          HC       3
              *
1                                        HEC-1 INPUT                                                    PAGE 11

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

 385          KK    RTC6
 386          BA  0.0083
 387          PB    2.80
 388          LS       0    94.0
 389          UD   0.071
              *

 390          KK   CRTC6
 391          KM  COMBINE RTC6 & C7B
 392          KM  RANCHO ROAD SYSTEM @ ELKHORN
 393          HC       2
              *

 394          KK   RRTC6
 395          KM  ROUTE CRTC6 TO ELK
 396          KM  FACILITY = TWILIGHT AT ELKHORN RANCH
 397          KM  LINING = CONCRETE
 398          RD     782  0.0247   0.015       0    TRAP       0      50
              *

 399          KK      ELK
 400          BA  0.0028
 401          PB    2.80
 402          LS       0   94.00
 403          UD   0.093
              *

 404          KK    CELK
 405          KM  COMBINE RTC6 & CELK
 406          KM  SYSTEM @ ELKHORN
 407          HC       2
              *

 408          KK   RCELK
 409          KM  ROUTE CRTC6 TO CRTC5
 410          KM  FACILITY = TWILIGHT AT ELKHORN RANCH
 411          KM  LINING = CONCRETE
 412          RD     500  0.0247   0.015       0    TRAP       0      50
              *
```

```
 413          KK    RTC5
 414          BA  0.0059
 415          PB    2.80
 416          LS       0   93.25
 417          UD   0.060
              *

 418          KK   CRTC5
 419          KM  COMBINE RTC5 & CRTC6
 420          KM  RANCHO ROAD SYSTEM @ ELKHORN
 421          HC       2
              *
```



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

 422          KK  2CRTC5
 423          KM  COMBINE CRTC5 & CRTC4
 424          KM  RANCHO ROAD SYSTEM @ ELKHORN
 425          HC       2
              *

 426          KK NWBB1-2
 427          BA   0.009
 428          PB    2.79
 429          LS       0    68.7
 430          UD   0.103
              *

 431          KKCNWBB1-2
 432          KM  COMBINE 2CRTC5 AND NWBB1-2
 433          KM  RANCHO ROAD SYSTEM @ DORRELL
 434          HC       2
              *
 435          *KKRCWBB1-       2  MROUTECNWBB1-2      TOCNWBB1-3MFACILIT       Y       =CENTENNI
 436          *K       AL PARKWAY CHANNELWEST/U.S       .       95FACILITYMFACILIT       Y ID-MILE
 437          *K        =    CN95   0000;    CNWE    0304 MLINING       =CONCRETE
 438          *R    D400  0.0175   0.015       0    TRAP       22       0
              *

 439          KK NWBB1-3
 440          BA   0.012
 441          PB    2.79
 442          LS       0  68.642
 443          UD   0.151
              *

 444          KK  NDOT-5
 445          BA   0.009
 446          PB    2.79
 447          LS       0    92.0
 448          UD   0.095
              *

 449          KKCNWBB1-3
 450          KM  COMBINE CNWBB1-2 AND NWBB1-3
 451          KM  RANCHO ROAD SYSTEM @ DORRELL
 452          HC       3
              *

 453          KKRCWBB1-3
 454          KM  ROUTE CNWBB1-3 TO CNWBB1-4
 455          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
 456          KM  FACILITY ID-MILE = CN95 0000; CNWE 0304
 457          KM  LINING = CONCRETE
 458          RD    1000   0.021   0.015       0    TRAP      22       0
              *
```



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

 459          KK NWBB1-4
 460          BA   0.049
 461          PB    2.79
 462          LS       0    75.2
 463          UD   0.205
              *

 464          KKCNWBB1-4
 465          KM  COMBINE NWBB1-3 AND NWBB1-4
 466          KM  RANCHO ROAD SYSTEM @ DORRELL
 467          HC       2
              *

 468          KKRCWBB1-4
 469          KM  ROUTE CNWBB1-4 TO 2CNWBB3-B
 470          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
 471          KM  FACILITY ID-MILE = CN95 0000; CNWE 0304
 472          KM  LINING = CONCRETE
 473          RD    1600   0.021   0.015       0    TRAP      22       0
              *

 474          KK NWBC3-A
 475          BA   0.126
 476          PB    2.87
 477          LS       0    87.7
 478          UD   0.240
              *

 479          KK NWBB1-1
 480          BA   0.051
 481          PB    2.79
 482          LS       0    94.0
 483          UD   0.120
```

```
                    *
          484       KKCNWBB1-1
          485       KM  COMBINE NWBC3-A AND NWBB1-1
          486       KM  DORRELL AND GRAND MONTECITO
          487       HC       2
                    *
          488       KKRCWBB1-1
          489       KM  ROUTE CNWBB1-1 TO CNWBB3-B
          490       KM  FACILITY = GRAND MONTECITO PKWY ACROSS THE OPEN LOT
          491       KM  LINING = CONCRETE
          492       RD    2934   0.021   0.015       0    TRAP       0      50
                    *
          493       KK NWBB3-B
          494       BA   0.083
          495       PB    2.80
          496       LS       0    93.4
          497       UD   0.148
                    *
1                                          HEC-1 INPUT                                          PAGE 14

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

          498       KK  NDOT-6
          499       BA   0.018
          500       PB    2.79
          501       LS       0    92.4
          502       UD   0.135
                    *
          503       KKCNWBB3-B
          504       KM  COMBINE RCNWBB1-1 AND NWBB3-B
          505       KM  DEER SPRINGS & OSO BLANCA
          506       HC       3
                    *
          507       KK NWBC3-B
          508       BA   0.126
          509       PB    2.87
          510       LS       0    86.1
          511       UD   0.209
                    *
          512       KK NWBB3-A
          513       BA   0.076
          514       PB    2.80
          515       LS       0    93.9
          516       UD   0.141
                    *
          517       KKCNWBB3-A
          518       KM  COMBINE NWBB3-A AND NWBC3-B
          519       KM  DEER SPRINGS & GRAND MONTECITO
          520       HC       2
                    *
          521       KKDNWBB3-C
          522       KM  DIVERT 135 CFS SOUTH IN DEER SPRINGS/GRAND MONTECITO SYSTEM
          523       KM  AND 111 CFS SOUTH IN GRAND MONTECITO FROM FLOW SPLIT
          524       KM  AND 36 CFS SOUTH IN DOE BROOK FROM FLOW SPLIT
          525       KM  FOR A TOTAL DIVERSION OF 282 CFS SOUTH
          526       DT     OUT
          527       DI       0     100     200     500    1000    5000
          528       DQ       0     282     282     282     282     282
          529
                    *
          530       KKRCNBB3-A
          531       KM  ROUTE CNBB3-A TO 2CNWBB3-B
          532       KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST
          533       KM  FACILITY ID-MILE = CNWE 0304
          534       KM  LINING = RCB
          535       RD    1640   0.017   0.015       0    TRAP      32       0
                    *
1                                          HEC-1 INPUT                                          PAGE 15

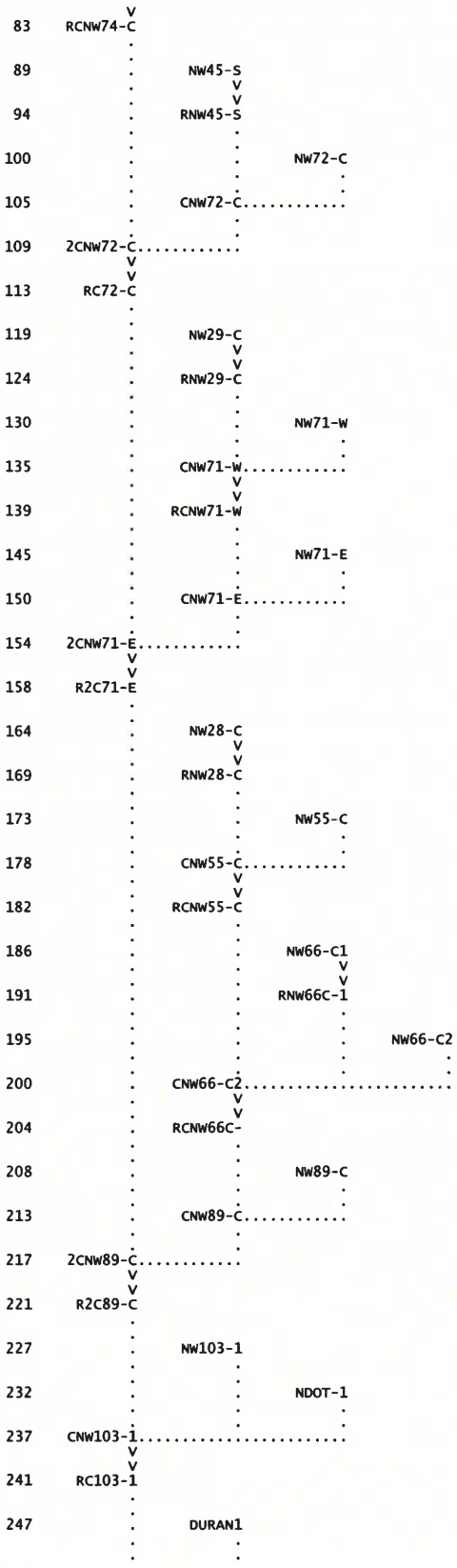
        LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

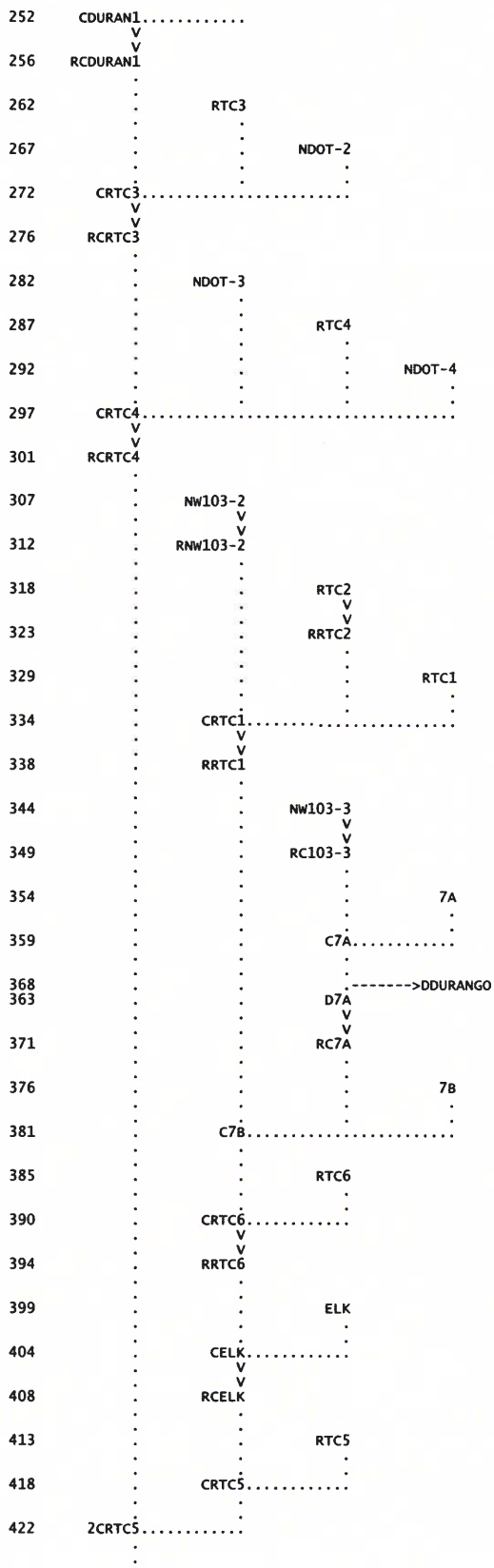
          536       KK2CNWBB3-B
          537       KM  COMBINE CNBB3-A, CNWBB3-B AND RCWBB1-4
          538       KM  DEER SPRINGS - CENTENNIAL PKWY CHANNEL WEST JUNCTION
          539       HC       3
                    *
          540       ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK

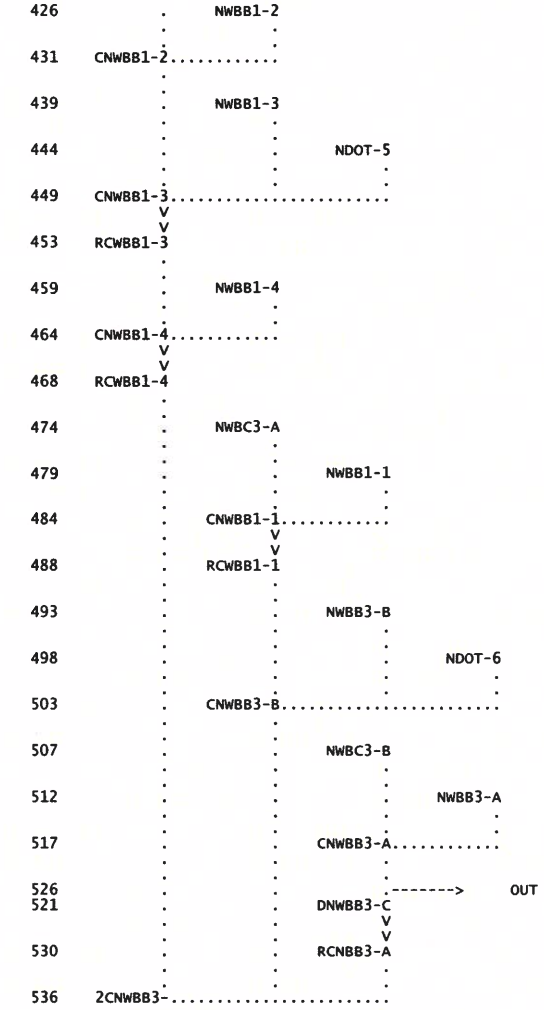
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    56      NW62-S
                 V
                 V
    69      RNW62-S
                 .
                 .
    75           .      NW74-C
                 .           .
                 .           .
    80      CNW74-C.............
                 V
```


RCNW74-C
NW45-S
RNW45-S
NW72-C
CNW72-C
2CNW72-C
RC72-C
NW29-C
RNW29-C
NW71-W
CNW71-W
RCNW71-W
NW71-E
CNW71-E
2CNW71-E
R2C71-E
NW28-C
RNW28-C
NW55-C
CNW55-C
RCNW55-C
NW66-C1
RNW66C-1
NW66-C2
CNW66-C2
RCNW66C-
NW89-C
CNW89-C
2CNW89-C
R2C89-C
NW103-1
NDOT-1
CNW103-1
RC103-1
DURAN1


252 CDURAN1
256 RCDURAN1
262 RTC3
267 NDOT-2
272 CRTC3
276 RCRTC3
282 NDOT-3
287 RTC4
292 NDOT-4
297 CRTC4
301 RCRTC4
307 NW103-2
312 RNW103-2
318 RTC2
323 RRTC2
329 RTC1
334 CRTC1
338 RRTC1
344 NW103-3
349 RC103-3
354 7A
359 C7A
368 ->DDURANGO
363 D7A
371 RC7A
376 7B
381 C7B
385 RTC6
390 CRTC6
394 RRTC6
399 ELK
404 CELK
408 RCELK
413 RTC5
418 CRTC5
422 2CRTC5



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   13NOV16  TIME  16:57:34   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
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CENTENNIAL PARKWAY CHANNEL WEST
US95/CC215 TO DURANGO
RECOMMENDED DRAINAGE SYSTEM WITH ULTIMATE DEVELOPMENT
INPUT FILE = CENTULT3.DAT
INPUT FILE DATE = FEB 2016
DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN3
MODELED BY CH2M (MICHAEL SCHWAB, P.E.)
CHECKED BY CH2M (JEFF GRIEST, P.E., CFM)
STORM CENTERING = REMOVED DETENTION BASIN OUTFLOWS
DOWNSTREAM OF THE UPPER LAS VEGAS WASH DETENTION BASIN TO THE MOST
DOWNSTREAM POINT IN THE LOWER NORTHERN LAS VEGAS WASH WATERSHED
COMBINATION POINT DOWNSTREAM OF LOWER LAS VEGAS WASH DETENTION BASIN
WAS MODIFIED TO SIMULATE NECESSARY STORM CENTERINGS

REFERENCED HYDROLOGIC MODELS:
CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT 2008 MASTER PLAN UPDATE
UPPER AND LOWER NORTHERN LAS VEGAS WASH WATERSHEDS
REVISED FINAL DESIGN REPORT FOR THE RANCHO DETENTION BASIN
PHASE II (VTN 2006)
RESPONSE TO COMMENTS ON THE CONCEPTUAL DRAINAGE STUDY FOR
NORTH LAS VEGAS 600-ACRE SITE (GC WALLACE 2006)
SECOND RESPONSE TO COMMENTS OF THE CONCEPTUAL DRAINAGE STUDY
FOR NORTH LAS VEGAS 2074-ACRE SITE (GC WALLACE 2006)

BASIN MAPS FOR SUPPLEMENT #2 TO ADDENDUM #2 TO THE MASTER
DRAINAGE STUDY FOR CLIFF'S EDGE/ PROVIDENCE (VTN 2004)
MASTER DRAINAGE STUDY FOR KYLE CANYON (GC WALLACE 2006)
TECHNICAL DRAINAGE STUDY FOR GRAND TETON DRIVE STROM DRAIN
AND AREA 1 ROADWAY IMPROVEMENTS (GC WALLACE 2006)
90% FINAL DESIGN REPORT FOR RANCHO ROAD SYSTEM - EL CAMPO
GRANDE STORM DRAIN PROJECT (PBS&J 2007)
MPA FOR RACEL STREET COLLECTOR (LOUIS BERGER JANUARY 2007)
HYDROLOGIC MODEL FOR FLOYD LAMB NORTH AND SOUTH ENVIRONMENTAL
ENHANCEMENT AREAS (LOUIS BERGER DECEMBER 7, 2007)

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

AREA (SQUARE MILES)	DARF
0 - 0.5	0.99
0.5 - 1	0.975
1 - 2	0.95
2 - 3	0.925
3 - 4	0.915
4 - 5	0.908
5 - 6	0.903
6 - 7	0.895
7 - 8	0.885

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  53 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         150  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      1   0  ENDING DATE
                    NDTIME       1225  ENDING TIME
                     ICENT         19  CENTURY MARK

                   COMPUTATION INTERVAL      .08 HOURS
                        TOTAL TIME BASE    12.42 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
                     .99       .98       .95       .93       .92       .91       .90       .89       .88

 *** HEC-1 ERROR 1 *** INVALID CARD IDENTIFICATION CODE OR CARD OUT OF SEQUENCE
      CARD NO.  435     *KKRCWBB1-       2  MROUTECNWBB1-2      TOCNWBB1-3MFACILIT       Y       =CENTENNI

 *** HEC-1 ERROR 1 *** INVALID CARD IDENTIFICATION CODE OR CARD OUT OF SEQUENCE
      CARD NO.  436     *K      AL PARKWAY CHANNELWEST/U.S       .      95FACILITYMFACILIT       Y ID-MILE

 *** HEC-1 ERROR 1 *** INVALID CARD IDENTIFICATION CODE OR CARD OUT OF SEQUENCE
      CARD NO.  437     *K       =    CN95   0000;    CNWE    0304 MLINING       =CONCRETE

 *** HEC-1 ERROR 1 *** INVALID CARD IDENTIFICATION CODE OR CARD OUT OF SEQUENCE
      CARD NO.  438     *R    D400  0.0175   0.015       0    TRAP      22       0

 *** HEC-1 ERROR 1 *** INVALID CARD IDENTIFICATION CODE OR CARD OUT OF SEQUENCE
      CARD NO.  529
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 .99	RATIO 2 .98	RATIO 3 .95	RATIO 4 .93	RATIO 5 .92	RATIO 6 .91	RATIO 7 .90	RATIO 8 .89	RATIO 9 .88
HYDROGRAPH AT													
+	NW62-S	.21	1	FLOW	333.	327.	318.	308.	305.	302.	300.	297.	293.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RNW62-S	.21	1	FLOW	318.	313.	304.	294.	291.	288.	286.	284.	280.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	NW74-C	.25	1	FLOW	357.	351.	341.	331.	327.	324.	322.	319.	314.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CNW74-C	.45	1	FLOW	674.	663.	643.	625.	616.	612.	608.	601.	594.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RCNW74-C	.45	1	FLOW	670.	659.	639.	621.	613.	607.	604.	597.	590.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													

+	NW45-S	.27	1	FLOW	452.	444.	432.	419.	414.	411.	408.	404.	399.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RNW45-S	.27	1	FLOW	441.	435.	424.	413.	404.	402.	402.	395.	391.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NW72-C	.44	1	FLOW	574.	564.	547.	530.	523.	518.	514.	509.	502.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CNW72-C	.71	1	FLOW	1015.	999.	971.	942.	927.	920.	917.	904.	893.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	2CNW72-C	1.17	1	FLOW	1685.	1657.	1609.	1563.	1540.	1527.	1521.	1501.	1483.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RC72-C	1.17	1	FLOW	1666.	1639.	1590.	1543.	1522.	1508.	1503.	1482.	1463.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NW29-C	.13	1	FLOW	198.	194.	188.	182.	180.	178.	177.	175.	172.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RNW29-C	.13	1	FLOW	197.	194.	188.	182.	179.	178.	176.	174.	172.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NW71-W	.10	1	FLOW	155.	152.	147.	142.	140.	139.	138.	136.	134.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CNW71-W	.24	1	FLOW	349.	343.	333.	322.	317.	315.	312.	309.	304.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RCNW71-W	.24	1	FLOW	348.	344.	332.	321.	316.	313.	310.	308.	303.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NW71-E	.24	1	FLOW	256.	250.	241.	232.	229.	226.	224.	221.	218.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CNW71-E	.47	1	FLOW	600.	591.	570.	549.	541.	535.	530.	525.	517.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	2CNW71-E	1.64	1	FLOW	2266.	2230.	2160.	2093.	2063.	2042.	2034.	2007.	1980.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	R2C71-E	1.64	1	FLOW	2208.	2171.	2104.	2037.	2009.	1986.	1976.	1951.	1925.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NW28-C	.36	1	FLOW	502.	492.	476.	460.	454.	449.	446.	441.	435.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RNW28-C	.36	1	FLOW	488.	478.	463.	447.	441.	436.	433.	439.	422.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NW55-C	.32	1	FLOW	319.	312.	299.	286.	281.	277.	275.	271.	266.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CNW55-C	.68	1	FLOW	803.	786.	758.	731.	719.	712.	706.	708.	686.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RCNW55-C	.68	1	FLOW	791.	775.	747.	718.	707.	700.	693.	693.	674.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NW66-C1	.03	1	FLOW	36.	35.	34.	32.	32.	31.	31.	31.	30.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RNW66C-1	.03	1	FLOW	35.	34.	33.	31.	31.	30.	30.	29.	28.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	NW66-C2	.00	1	FLOW	4.	4.	4.	3.	3.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT													
+	CNW66-C2	.71	1	FLOW	818.	802.	772.	743.	732.	724.	717.	717.	697.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RCNW66C-	.71	1	FLOW	807.	784.	763.	726.	719.	716.	710.	710.	682.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	NW89-C	.34	1	FLOW	395.	387.	373.	359.	354.	350.	347.	343.	337.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CNW89-C	1.05	1	FLOW	1145.	1120.	1082.	1039.	1025.	1015.	1001.	992.	970.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75

2 COMBINED AT													
+	2CNW89-C	2.69	1	FLOW	3334.	3274.	3171.	3063.	3017.	2994.	2968.	2939.	2888.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	R2C89-C	2.69	1	FLOW	3325.	3263.	3159.	3051.	3006.	2981.	2956.	2926.	2876.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NW103-1	.07	1	FLOW	108.	107.	103.	100.	99.	98.	97.	96.	95.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	NDOT-1	.00	1	FLOW	10.	10.	9.	9.	9.	9.	9.	9.	9.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT													
+	CNW103-1	2.77	1	FLOW	3418.	3355.	3248.	3137.	3091.	3065.	3040.	3008.	2958.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RC103-1	2.77	1	FLOW	3416.	3353.	3246.	3136.	3089.	3063.	3038.	3006.	2956.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	DURAN1	.02	1	FLOW	38.	38.	37.	35.	35.	35.	35.	34.	34.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT													
+	CDURAN1	2.79	1	FLOW	3429.	3366.	3259.	3148.	3101.	3075.	3050.	3018.	2968.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RCDURAN1	2.79	1	FLOW	3425.	3362.	3255.	3143.	3097.	3070.	3046.	3014.	2964.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	RTC3	.01	1	FLOW	12.	12.	12.	11.	11.	11.	11.	11.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT													
+	NDOT-2	.00	1	FLOW	8.	8.	8.	7.	7.	7.	7.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT													
+	CRTC3	2.80	1	FLOW	3433.	3369.	3262.	3150.	3104.	3077.	3052.	3020.	2970.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RCRTC3	2.80	1	FLOW	3430.	3366.	3258.	3147.	3100.	3073.	3049.	3017.	2967.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NDOT-3	.00	1	FLOW	8.	8.	8.	8.	8.	7.	7.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT													
+	RTC4	.00	1	FLOW	8.	8.	8.	8.	8.	8.	7.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT													
+	NDOT-4	.01	1	FLOW	18.	18.	17.	16.	16.	16.	16.	16.	16.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT													
+	CRTC4	2.82	1	FLOW	3444.	3379.	3271.	3159.	3113.	3086.	3061.	3029.	2979.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RCRTC4	2.82	1	FLOW	3439.	3374.	3266.	3154.	3108.	3080.	3056.	3023.	2974.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NW103-2	.08	1	FLOW	114.	111.	107.	104.	102.	101.	100.	99.	97.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RNW103-2	.08	1	FLOW	106.	105.	101.	98.	97.	96.	94.	92.	92.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	RTC2	.01	1	FLOW	22.	21.	21.	20.	20.	20.	19.	19.	19.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO													
+	RRTC2	.01	1	FLOW	20.	20.	19.	19.	18.	18.	18.	18.	18.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT													
+	RTC1	.02	1	FLOW	36.	36.	35.	34.	33.	33.	33.	32.	32.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT													
+	CRTC1	.11	1	FLOW	152.	150.	144.	140.	137.	135.	134.	133.	131.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RRTC1	.11	1	FLOW	151.	148.	143.	138.	136.	134.	133.	132.	130.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	NW103-3	.10	1	FLOW	112.	109.	105.	101.	100.	99.	98.	97.	95.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													

+	RC103-3	.10	1	FLOW	109.	107.	103.	99.	97.	96.	95.	94.	92.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	7A	.03	1	FLOW	45.	44.	43.	41.	40.	40.	40.	39.	38.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	C7A	.13	1	FLOW	141.	139.	133.	128.	126.	125.	124.	122.	120.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO													
+	DDURANGO	.13	1	FLOW	91.	89.	86.	83.	81.	81.	80.	79.	78.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	D7A	.13	1	FLOW	50.	49.	47.	45.	45.	44.	44.	43.	43.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RC7A	.13	1	FLOW	51.	49.	47.	46.	45.	44.	44.	44.	42.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	7B	.02	1	FLOW	34.	33.	32.	31.	31.	30.	30.	30.	29.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT													
+	C7B	.26	1	FLOW	224.	220.	211.	205.	201.	198.	197.	195.	192.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	RTC6	.01	1	FLOW	17.	16.	16.	15.	15.	15.	15.	15.	15.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT													
+	CRTC6	.26	1	FLOW	236.	232.	223.	216.	212.	209.	208.	206.	203.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RRTC6	.26	1	FLOW	232.	228.	219.	211.	208.	205.	204.	202.	199.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	ELK	.00	1	FLOW	5.	5.	5.	5.	5.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT													
+	CELK	.27	1	FLOW	237.	232.	223.	216.	212.	209.	208.	206.	203.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RCELK	.27	1	FLOW	232.	228.	219.	211.	208.	205.	204.	202.	199.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	RTC5	.01	1	FLOW	12.	12.	11.	11.	11.	11.	11.	11.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT													
+	CRTC5	.27	1	FLOW	240.	235.	226.	219.	215.	212.	211.	209.	206.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	2CRTC5	3.09	1	FLOW	3640.	3570.	3457.	3338.	3289.	3260.	3235.	3200.	3147.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NWBB1-2	.01	1	FLOW	4.	4.	4.	4.	4.	3.	3.	3.	3.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CNWBB1-2	3.10	1	FLOW	3643.	3573.	3460.	3341.	3292.	3262.	3237.	3202.	3150.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NWBB1-3	.01	1	FLOW	5.	5.	5.	4.	4.	4.	4.	4.	4.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	NDOT-5	.01	1	FLOW	15.	15.	15.	14.	14.	14.	14.	14.	13.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT													
+	CNWBB1-3	3.12	1	FLOW	3654.	3584.	3470.	3351.	3302.	3272.	3246.	3212.	3159.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RCWBB1-3	3.12	1	FLOW	3647.	3578.	3462.	3343.	3295.	3264.	3239.	3204.	3152.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NWBB1-4	.05	1	FLOW	30.	29.	28.	26.	26.	25.	25.	24.	24.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CNWBB1-4	3.17	1	FLOW	3675.	3604.	3488.	3367.	3318.	3287.	3261.	3227.	3173.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RCWBB1-4	3.17	1	FLOW	3663.	3592.	3473.	3354.	3304.	3273.	3248.	3212.	3159.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NWBC3-A	.13	1	FLOW	147.	144.	138.	133.	131.	129.	128.	127.	124.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67

HYDROGRAPH AT														
+	NWBB1-1	.05	1	FLOW	87.	85.	83.	80.	79.	78.	78.	77.	76.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT														
+	CNWBB1-1	.18	1	FLOW	222.	218.	210.	203.	199.	197.	196.	193.	190.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO														
+	RCWBB1-1	.18	1	FLOW	214.	210.	202.	195.	192.	190.	188.	186.	183.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT														
+	NWBB3-B	.08	1	FLOW	137.	134.	130.	126.	125.	123.	123.	121.	120.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT														
+	NDOT-6	.02	1	FLOW	29.	29.	28.	27.	26.	26.	26.	26.	25.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT														
+	CNWBB3-B	.28	1	FLOW	350.	344.	332.	321.	316.	313.	311.	307.	302.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT														
+	NWBC3-B	.13	1	FLOW	143.	139.	134.	129.	127.	125.	124.	122.	120.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT														
+	NWBB3-A	.08	1	FLOW	128.	126.	122.	118.	117.	116.	115.	114.	112.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT														
+	CNWBB3-A	.20	1	FLOW	268.	263.	254.	244.	241.	238.	236.	233.	230.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO														
+	OUT	.20	1	FLOW	268.	263.	254.	244.	241.	238.	236.	233.	230.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT														
+	DNWBB3-C	.20	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00	.00
ROUTED TO														
+	RCNBB3-A	.20	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00	.00
3 COMBINED AT														
+	2CNWBB3-	3.65	1	FLOW	3974.	3897.	3768.	3640.	3586.	3552.	3525.	3485.	3429.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
RNW62-S	MANE	1.74	328.68	217.81	2.26	5.00	318.20	215.00	2.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2505E+02 EXCESS= .0000E+00 OUTFLOW= .2505E+02 BASIN STORAGE= .2359E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RNW62-S	MANE	1.75	324.18	217.54	2.22	5.00	312.63	215.00	2.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2459E+02 EXCESS= .0000E+00 OUTFLOW= .2460E+02 BASIN STORAGE= .2030E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RNW62-S	MANE	1.77	315.28	216.53	2.15	5.00	303.91	215.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2385E+02 EXCESS= .0000E+00 OUTFLOW= .2386E+02 BASIN STORAGE= .2095E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RNW62-S	MANE	1.80	306.59	217.33	2.08	5.00	294.26	215.00	2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2310E+02 EXCESS= .0000E+00 OUTFLOW= .2310E+02 BASIN STORAGE= .2145E-02 PERCENT ERROR= .0

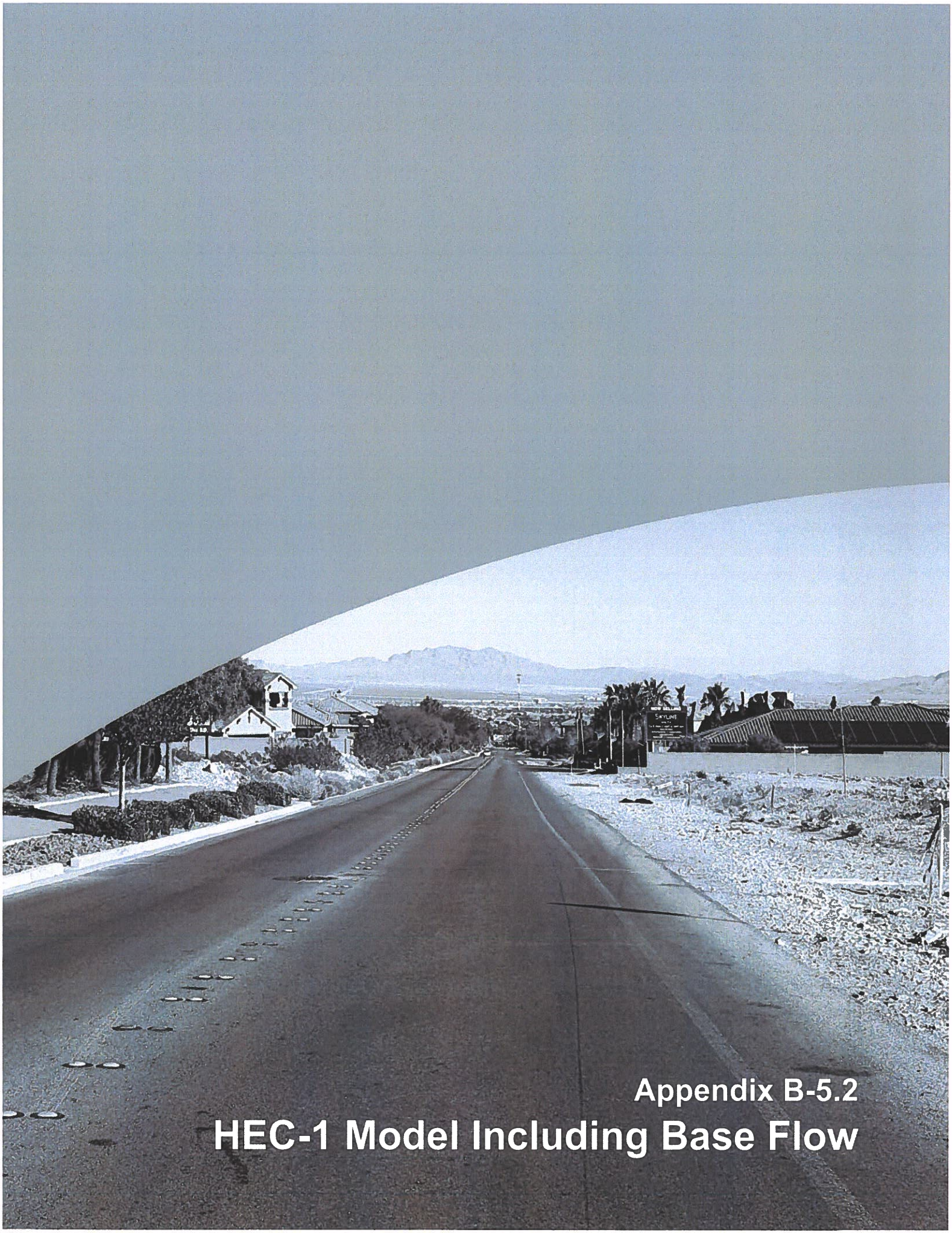
FOR PLAN = 1 RATIO= .00									
RNW62-S	MANE	1.80	302.48	216.59	2.06	5.00	291.21	215.00	2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2280E+02 EXCESS= .0000E+00 OUTFLOW= .2281E+02 BASIN STORAGE= .2085E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RNW62-S	MANE	1.81	300.32	217.34	2.04	5.00	288.03	215.00	2.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2259E+02 EXCESS= .0000E+00 OUTFLOW= .2260E+02 BASIN STORAGE= .2153E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RNW62-S	MANE	1.82	296.75	217.88	2.02	5.00	286.42	215.00	2.02



Appendix B-5.2
HEC-1 Model Including Base Flow

```
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *             JUN   1998               *
 *          VERSION 4.1                 *
 *                                      *
 *  RUN DATE   14NOV16  TIME  08:14:16  *
 *                                      *
 ****************************************
```

```
****************************************
*                                      *
*    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

                        *DIAGRAM
 *** FREE ***
             1          ID    CENTENNIAL PARKWAY CHANNEL WEST
             2          ID    US95/CC215 TO DURANGO
             3          ID    RECOMMENDED DRAINAGE SYSTEM WITH ULTIMATE DEVELOPMENT
             4          ID    INPUT FILE = CENTULT3.DAT
             5          ID    INPUT FILE DATE = FEB 2016
             6          ID    DESIGN STORM = 100-YEAR 6-HOUR STORM
             7          ID    STORM DISTRIBUTION = SDN3
             8          ID    MODELED BY CH2M (MICHAEL SCHWAB, P.E.)
             9          ID    CHECKED BY CH2M (JEFF GRIEST, P.E., CFM)
            10          ID    STORM CENTERING = REMOVED DETENTION BASIN OUTFLOWS
            11          ID    DOWNSTREAM OF THE UPPER LAS VEGAS WASH DETENTION BASIN TO THE MOST
            12          ID    DOWNSTREAM POINT IN THE LOWER NORTHERN LAS VEGAS WASH WATERSHED
            13          ID    COMBINATION POINT DOWNSTREAM OF LOWER LAS VEGAS WASH DETENTION BASIN
            14          ID    WAS MODIFIED TO SIMULATE NECESSARY STORM CENTERINGS
            15          ID
            16          ID
            17          ID    REFERENCED HYDROLOGIC MODELS:
            18          ID    CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT 2008 MASTER PLAN UPDATE
            19          ID    UPPER AND LOWER NORTHERN LAS VEGAS WASH WATERSHEDS
            20          ID    REVISED FINAL DESIGN REPORT FOR THE RANCHO DETENTION BASIN
            21          ID    PHASE II (VTN 2006)
            22          ID    RESPONSE TO COMMENTS ON THE CONCEPTUAL DRAINAGE STUDY FOR
            23          ID    NORTH LAS VEGAS 600-ACRE SITE (GC WALLACE 2006)
            24          ID    SECOND RESPONSE TO COMMENTS OF THE CONCEPTUAL DRAINAGE STUDY
            25          ID    FOR NORTH LAS VEGAS 2074-ACRE SITE (GC WALLACE 2006)
            26          ID    BASIN MAPS FOR SUPPLEMENT #2 TO ADDENDUM #2 TO THE MASTER
            27          ID    DRAINAGE STUDY FOR CLIFF'S EDGE/ PROVIDENCE (VTN 2004)
            28          ID    MASTER DRAINAGE STUDY FOR KYLE CANYON (GC WALLACE 2006)
            29          ID    TECHNICAL DRAINAGE STUDY FOR GRAND TETON DRIVE STROM DRAIN
            30          ID    AND AREA 1 ROADWAY IMPROVEMENTS  (GC WALLACE 2006)
            31          ID    90% FINAL DESIGN REPORT FOR RANCHO ROAD SYSTEM - EL CAMPO
            32          ID    GRANDE STORM DRAIN PROJECT (PBS&J 2007)
            33          ID    MPA FOR RACEL STREET COLLECTOR (LOUIS BERGER JANUARY 2007)
            34          ID    HYDROLOGIC MODEL FOR FLOYD LAMB NORTH AND SOUTH ENVIRONMENTAL
            35          ID    ENHANCEMENT AREAS (LOUIS BERGER  DECEMBER 7, 2007)
            36          ID
            37          ID
            38          ID
            39          ID    JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
            40          ID
            41          ID    AREA (SQUARE MILES)           DARF
            42          ID          0 - 0.5                 0.99
            43          ID          0.5 - 1                 0.975
            44          ID          1 - 2                   0.95
            45          ID          2 - 3                   0.925
            46          ID          3 - 4                   0.915
            47          ID          4 - 5                   0.908
            48          ID          5 - 6                   0.903
            49          ID          6 - 7                   0.895
            50          ID          7 - 8                   0.885
            51          ID
            52          IT       5       0       0     150
            53          IO       5       0       0
```



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

            54          IN       5       0       0
            55          JR     PREC    0.99   0.975    0.95   0.925   0.915   0.908   0.903   0.895   0.885
                        *
            56          KK   NW62-S
            57          BA    0.208
            58          PB     2.77
            59          PC    0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
            60          PC    0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
```

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 61          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
 62          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
 63          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
 64          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
 65          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
 66          PC   0.998   0.999   1.000
 67          LS      0    95.6
 68          UD   0.190
             *

 69          KK RNW62-S
 70          KM  ROUTE NW62-S TO CNW74-C
 71          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
 72          KM  FACILITY ID-MILE = CN95 0333,0318,0313,0259
 73          KM  LINING = RCB
 74          RD    2100   0.015   0.015       0    TRAP      14       0
             *

 75          KK  NW74-C
 76          BA   0.247
 77          PB    2.80
 78          LS       0    95.1
 79          UD   0.247
             *

 80          KK CNW74-C
 81          KM  COMBINE NW74-C AND RNW62-C
 82          HC       2
             *

 83          KKRCNW74-C
 84          KM  ROUTE CNW74-C TO 2CNW72-C
 85          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
 86          KM  FACILITY ID-MILE = CN95 0259
 87          KM  LINING = RCB
 88          RD    1870   0.021   0.015       0    TRAP      16       0
             *

 89          KK  NW45-S
 90          BA   0.272
 91          PB    2.91
 92          LS       0    95.9
 93          UD   0.200
             *
```



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

 94          KK RNW45-S
 95          KM  ROUTE NW45-S TO CNW72-C
 96          KM  FACILITY = CENTENNIAL PKWY CHANNEL WEST - KYLE CANYON BRANCH
 97          KM  FACILITY ID-MILE = CNKC 0050,0024,0007,0000
 98          KM  LINING = RCB
 99          RD    5460    0.03   0.015       0    TRAP       6       0
             *

100          KK  NW72-C
101          BA   0.442
102          PB    2.80
103          LS       0    94.1
104          UD   0.290
             *

105          KK CNW72-C
106          KM  COMBINE NW72-C AND RNW45-S
107          KM  RACEL AND US95
108          HC       2
             *

109          KK2CNW72-C
110          KM  COMBINE CNW72-C AND CNW74-C
111          KM  RANCHO ROAD SYSTEM @ RACEL
112          HC       2
             *

113          KK  RC72-C
114          KM  ROUTE 2CNW72-C TO 2CNW71-E
115          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
116          KM  FACILITY ID-MILE = CN95 0257,0218,0199
117          KM  LINING = CONCRETE
118          RD    1670   0.008   0.015       0    TRAP      15       0
             *

119          KK  NW29-C
120          BA   0.132
121          BF     363
122          PB    3.00
123          LS       0    92.4
124          UD   0.214
             *

125          KK RNW29-C
126          KM  ROUTE NW29-C TO CNW71-W
127          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/GRAND TETON BRANCH
128          KM  FACILITY ID-MILE = CNGT 0118
129          KM  LINING = ARCH CON
130          RD    2100   0.037   0.015       0    TRAP       6       0
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

131          KK  NW71-W
132          BA   0.104
```

```
133          BF       0
134          PB    2.92
135          LS       0    92.5
136          UD   0.206
             *

137          KK CNW71-W
138          KM  COMBINE RDNW29-C AND NW71-W
139          KM  CENTENNIAL PKWY CHANNEL WEST/GRAND TETON BRANCH @ HUALAPAI
140          HC       2
             *

141          KKRCNW71-W
142          KM  ROUTE CNW71-W TO CNW71-E
143          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/GRAND TETON BRANCH
144          KM  FACILITY ID-MILE = CNGT 0000,0043
145          KM  LINING = RCB
146          RD    6270   0.030   0.015       0    TRAP       6       0
             *

147          KK  NW71-E
148          BA   0.238
149          PB    2.85
150          LS       0    88.3
151          UD   0.293
             *

152          KK CNW71-E
153          KM  COMBINE NW71-E AND RCNW71-W
154          KM  CENTENNIAL PKWY CHANNEL WEST/GRAND TETON BRANCH @ US 95
155          HC       2
             *

156          KK2CNW71-E
157          KM  COMBINE 2CNW72-C AND CNW71-E
158          KM  RANCHO ROAD SYSTEM FLOW @ GRAND TETON
159          HC       2
             *

160          KK R2C71-E
161          KM  ROUTE 2CNW71-E TO 2CNW89-C
162          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
163          KM  FACILITY ID-MILE = CN95 0102,0167
164          KM  LINING = RCB
165          RD    3290   0.015   0.015       0    TRAP      20       0
             *
```



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

166          KK  NW28-C
167          BA   0.357
168          PB    3.02
169          LS       0    91.3
170          UD   0.249
             *

171          KK RNW28-C
172          KM  ROUTE NW28-C TO CNW55-C
173          KM  FARM
174          RD    4000  0.0325   0.016       0    TRAP       0      50
             *

175          KK  NW55-C
176          BA   0.325
177          PB    2.93
178          LS       0    84.4
179          UD   0.270
             *

180          KK CNW55-C
181          KM  COMBINE NW55-C AND RNW28-C
182          KM  FARM AND GRAND CANYON
183          HC       2
             *

184          KKRCNW55-C
185          KM  ROUTE CNW55-C TO CNW66-C1
186          KM  FARM & N TEE PEE LN
187          RD    1365   0.031   0.016       0    TRAP       0      50
             *

188          KK NW66-C1
189          BA   0.029
190          PB    2.88
191          LS       0    84.0
192          UD   0.117
             *

193          KKRNW66C-1
194          KM  ROUTE NW66-C1 TO NW66-C2
195          KM  FARM
196          RD    1300   0.028   0.016       0    TRAP       0      50
             *

197          KK NW66-C2
198          BA   0.003
199          PB    2.88
200          LS       0    84.0
201          UD   0.099
             *
```



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

```
202          KKCNW66-C2
203          KM  COMBINE DNW55-C, NW66-C1 AND NW66-C2
204          KM  FARM AND FORT APACHE
205          HC        3
             *

206          KKRCNW66C-2
207          KM  ROUTE CNW66-C2 TO CNW89-C
208          KM  FARM
209          RD     2900    0.03   0.016       0    TRAP       0      50
             *

210          KK  NW89-C
211          BA   0.337
212          PB    2.80
213          LS       0    88.9
214          UD   0.244
             *

215          KK CNW89-C
216          KM  COMBINE NW89-C AND RCNW66C-2
217          KM  FARM ROAD FLOW BEFORE US95
218          HC        2
             *

219          KK2CNW89-C
220          KM  COMBINE CNW89-C AND R2C71-E
221          KM  MPU FACILITY FLOW
222          HC        2
             *

223          KK R2C89-C
224          KM  ROUTE 2CNW89-C TO CNW103-C1
225          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
226          KM  FACILITY ID-MILE = CN95 0068
227          KM  LINING = RCB
228          RD     1800   0.017   0.015       0    TRAP      24       0
             *

229          KK NW103-1
230          BA   0.073
231          PB    2.80
232          LS       0    93.7
233          UD   0.202
             *

234          KK  NDOT-1
235          BA   0.005
236          PB    2.80
237          LS       0    94.3
238          UD   0.077
             *
```



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

239          KKCNW103-1
240          KM  COMBINE NW103-C1, NDOT-1 AND R2C89-C
241          KM  RANCHO ROAD SYSTEM @ ELKHORN
242          HC        3
             *

243          KK RC103-1
244          KM  ROUTE CNW103-1 TO CDURAN1
245          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
246          KM  FACILITY ID-MILE = CN95 0068
247          KM  LINING = CONCRETE
248          RD      276   0.035   0.015       0    TRAP      20       0
             *

249          KK  DURAN1
250          BA  0.0183
251          PB    2.80
252          LS       0    94.5
253          UD   0.062
             *

254          KK CDURAN1
255          KM  COMBINE NW103-1 AND DURAN1
256          KM  @CENTENNIAL PKWY CHANNEL WEST/U.S 95 BRANCH
257          HC        2
             *

258          KKRCDURAN1
259          KM  ROUTE CDURAN1 TO CRTC3
260          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
261          KM  FACILITY ID-MILE = CN95 0068
262          KM  LINING = CONCRETE
263          RD      635   0.024   0.015       0    TRAP      20       0
             *

264          KK    RTC3
265          BA   0.006
266          PB    2.80
267          LS       0    93.6
268          UD   0.062
             *

269          KK  NDOT-2
270          BA   0.004
271          PB    2.80
272          LS       0    93.9
273          UD   0.068
             *
```

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

  274         KK   CRTC3
  275         KM  COMBINE RTC3 AND DURAN1
  276         KM  @CENTENNIAL PKWY CHANNEL WEST/U.S 95 BRANCH
  277         HC       3
              *
  278         KK  RCRTC3
  279         KM  ROUTE CRTC3 TO CRTC4
  280         KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
  281         KM  FACILITY ID-MILE = CN95 0068
  282         KM  LINING = CONCRETE
  283         RD     422  0.0212   0.015       0    TRAP      20       0
              *
  284         KK  NDOT-3
  285         BA   0.004
  286         PB    2.80
  287         LS       0    93.6
  288         UD   0.060
              *
  289         KK    RTC4
  290         BA   0.004
  291         PB    2.80
  292         LS       0    93.4
  293         UD   0.055
              *
  294         KK  NDOT-4
  295         BA   0.010
  296         PB    2.80
  297         LS       0    92.4
  298         UD   0.089
              *
  299         KK   CRTC4
  300         KM  COMBINE RTC3 AND RTC4
  301         KM  @CENTENNIAL PKWY CHANNEL WEST/U.S 95 BRANCH
  302         HC       4
              *
  303         KK  RCRTC4
  304         KM  ROUTE CRTC4 TO 2CRTC5
  305         KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
  306         KM  FACILITY ID-MILE = CN95 0068
  307         KM  LINING = CONCRETE
  308         RD     591  0.0185   0.015       0    TRAP      20       0
              *
```



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

  309         KK NW103-2
  310         BA   0.078
  311         PB    2.80
  312         LS       0    89.8
  313         UD   0.150
              *
  314         KKRNW103-2
  315         KM  ROUTE NW103-2 TO CRTC1
  316         KM  FACILITY = NATURAL DITCH ACROSS OPEN LOT
  317         KM  FACILITY ID-MILE = N/A
  318         KM  LINING = DIRT
  319         RD    1460  0.0183   0.015       0    TRAP       0      50
              *
  320         KK    RTC2
  321         BA  0.0106
  322         PB    2.80
  323         LS       0    94.0
  324         UD   0.065
              *
  325         KK   RRTC2
  326         KM  ROUTE RTC2 TO CRTC1
  327         KM  FACILITY = V-DITCH WEST ON GRAND MONTECITO PKWY
  328         KM  FACILITY ID-MILE = N/A
  329         KM  LINING = DIRT
  330         RD     377  0.0079   0.015       0    TRAP       0      50
              *
  331         KK    RTC1
  332         BA  0.0189
  333         PB    2.80
  334         LS       0    94.0
  335         UD   0.082
              *
  336         KK   CRTC1
  337         KM  COMBINE NW103-2, RTC2, & RTC1
  338         KM  V-DITCH SYSTEM @ GRAND MONTECITO PARKWAY
  339         HC       3
              *
  340         KK   RRTC1
  341         KM  ROUTE CRTC1 TO C7B
  342         KM  FACILITY = TWILIGHT @ ELKHORN ROAD
  343         KM  FACILITY ID-MILE = CN95 0068
  344         KM  LINING = CONCRETE
```

```
345          RD     388  0.0123   0.015       0    TRAP       20       0
             *
```



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

346          KK NW103-3
347          BA   0.099
348          PB    2.80
349          LS       0    88.0
350          UD   0.244
             *

351          KK RC103-3
352          KM  ROUTE NW103-3 TO C7A
353          KM  FACILITY = TWILIGHT AT ELKHORN RANCH
354          KM  LINING = CONCRETE
355          RD     714  0.0283   0.015       0    TRAP       0      50
             *

356          KK      7A
357          BA  0.0321
358          PB    2.80
359          LS       0   88.04
360          UD   0.111
             *

361          KK     C7A
362          KM  COMBINE NW103-3, 7A
363          KM  RANCHO ROAD SYSTEM @ ELKHORN
364          HC       2
             *

365          KK     D7A
366          KM  DIVERT OUT 31 CFS FROM 7A TO NWBB3C-A
367          KM  REFERENCED FROM "TECHNICAL DRAINAGE STUDY FOR -
368          KM  CENTENNIAL PARK" PREPARED BY SOUTHWEST ENGINEERING (JUNE 2003)
369          KM  REFERENCE NODE: RTC7
370          DTDDURANGO
371          DI       0      48
372          DQ       0      31
             *

373          KK    RC7A
374          KM  ROUTE C7A TO C7B
375          KM  FACILITY = TWILIGHT AT ELKHORN RANCH
376          KM  LINING = CONCRETE
377          RD    1008  0.0248   0.015       0    TRAP       0      50
             *

378          KK      7B
379          BA  0.0173
380          PB    2.80
381          LS       0   94.00
382          UD   0.080
             *
```



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

383          KK     C7B
384          KM  COMBINE CTA, 7B, & CRTC1
385          KM  RANCHO ROAD SYSTEM @ ELKHORN
386          HC       3
             *

387          KK    RTC6
388          BA  0.0083
389          PB    2.80
390          LS       0    94.0
391          UD   0.071
             *

392          KK   CRTC6
393          KM  COMBINE RTC6 & C7B
394          KM  RANCHO ROAD SYSTEM @ ELKHORN
395          HC       2
             *

396          KK   RRTC6
397          KM  ROUTE CRTC6 TO ELK
398          KM  FACILITY = TWILIGHT AT ELKHORN RANCH
399          KM  LINING = CONCRETE
400          RD     782  0.0247   0.015       0    TRAP       0      50
             *

401          KK     ELK
402          BA  0.0028
403          PB    2.80
404          LS       0   94.00
405          UD   0.093
             *

406          KK    CELK
407          KM  COMBINE RTC6 & CELK
408          KM  SYSTEM @ ELKHORN
409          HC       2
             *

410          KK   RCELK
411          KM  ROUTE CRTC6 TO CRTC5
412          KM  FACILITY = TWILIGHT AT ELKHORN RANCH
413          KM  LINING = CONCRETE
414          RD     500  0.0247   0.015       0    TRAP       0      50
```

```
                *

          415   KK    RTC5
          416   BA  0.0059
          417   PB    2.80
          418   LS       0   93.25
          419   UD   0.060
                *
1                                        HEC-1 INPUT                                                    PAGE 12

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

          420   KK   CRTC5
          421   KM  COMBINE RTC5 & CRTC6
          422   KM  RANCHO ROAD SYSTEM @ ELKHORN
          423   HC       2
                *

          424   KK  2CRTC5
          425   KM  COMBINE cRTC5 & CRTC4
          426   KM  RANCHO ROAD SYSTEM @ ELKHORN
          427   HC       2
                *

          428   KK NWBB1-2
          429   BA   0.009
          430   PB    2.79
          431   LS       0    68.7
          432   UD   0.103
                *

          433   KKCNWBB1-2
          434   KM  COMBINE 2CRTC5 AND NWBB1-2
          435   KM  RANCHO ROAD SYSTEM @ DORRELL
          436   HC       2
                *
          437   *KKRCWBB1-       2  MROUTECNWBB1-2      TOCNWBB1-3MFACILIT       Y       =CENTENNI
          438   *K       AL PARKWAY CHANNELWEST/U.S       .      95FACILITYMFACILIT       Y ID-MILE
          439   *K        =    CN95   0000;    CNWE    0304 MLINING       =CONCRETE
          440   *R    D400  0.0175   0.015       0    TRAP      22       0
                *

          441   KK NWBB1-3
          442   BA   0.012
          443   PB    2.79
          444   LS       0  68.642
          445   UD   0.151
                *

          446   KK  NDOT-5
          447   BA   0.009
          448   PB    2.79
          449   LS       0    92.0
          450   UD   0.095
                *

          451   KKCNWBB1-3
          452   KM  COMBINE CNWBB1-2 AND NWBB1-3
          453   KM  RANCHO ROAD SYSTEM @ DORRELL
          454   HC       3
                *
1                                        HEC-1 INPUT                                                    PAGE 13

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

          455   KKRCWBB1-3
          456   KM  ROUTE CNWBB1-3 TO CNWBB1-4
          457   KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
          458   KM  FACILITY ID-MILE = CN95 0000; CNWE 0304
          459   KM  LINING = CONCRETE
          460   RD    1000   0.021   0.015       0    TRAP      22       0
                *

          461   KK NWBB1-4
          462   BA   0.049
          463   PB    2.79
          464   LS       0    75.2
          465   UD   0.205
                *

          466   KKCNWBB1-4
          467   KM  COMBINE NWBB1-3 AND NWBB1-4
          468   KM  RANCHO ROAD SYSTEM @ DORRELL
          469   HC       2
                *

          470   KKRCWBB1-4
          471   KM  ROUTE CNWBB1-4 TO 2CNWBB3-B
          472   KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/U.S. 95 FACILITY
          473   KM  FACILITY ID-MILE = CN95 0000; CNWE 0304
          474   KM  LINING = CONCRETE
          475   RD    1600   0.021   0.015       0    TRAP      22       0
                *

          476   KK NWBC3-A
          477   BA   0.126
          478   PB    2.87
          479   LS       0    87.7
          480   UD   0.240
                *

          481   KK NWBB1-1
          482   BA   0.051
          483   PB    2.79
```

```
 484          LS       0    94.0
 485          UD   0.120
              *

 486          KKCNWBB1-1
 487          KM  COMBINE NWBC3-A AND NWBB1-1
 488          KM  DORRELL AND GRAND MONTECITO
 489          HC       2
              *
1                                        HEC-1 INPUT                                                    PAGE 14

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

 490          KKRCWBB1-1
 491          KM  ROUTE CNWBB1-1 TO CNWBB3-B
 492          KM  FACILITY = GRAND MONTECITO PKWY ACROSS THE OPEN LOT
 493          KM  LINING = CONCRETE
 494          RD    2934   0.021   0.015       0    TRAP       0      50
              *

 495          KK NWBB3-B
 496          BA   0.083
 497          PB    2.80
 498          LS       0    93.4
 499          UD   0.148
              *

 500          KK  NDOT-6
 501          BA   0.018
 502          PB    2.79
 503          LS       0    92.4
 504          UD   0.135
              *

 505          KKCNWBB3-B
 506          KM  COMBINE RCNWBB1-1 AND NWBB3-B
 507          KM  DEER SPRINGS & OSO BLANCA
 508          HC       3
              *

 509          KK NWBC3-B
 510          BA   0.126
 511          PB    2.87
 512          LS       0    86.1
 513          UD   0.209
              *

 514          KK NWBB3-A
 515          BA   0.076
 516          PB    2.80
 517          LS       0    93.9
 518          UD   0.141
              *

 519          KKCNWBB3-A
 520          KM  COMBINE NWBB3-A AND NWBC3-B
 521          KM  DEER SPRINGS & GRAND MONTECITO
 522          HC       2
              *

 523          KKDNWBB3-C
 524          KM  DIVERT 135 CFS SOUTH IN DEER SPRINGS/GRAND MONTECITO SYSTEM
 525          KM  AND 111 CFS SOUTH IN GRAND MONTECITO FROM FLOW SPLIT
 526          KM  AND 36 CFS SOUTH IN DOE BROOK FROM FLOW SPLIT
 527          KM  FOR A TOTAL DIVERSION OF 282 CFS SOUTH
 528          DT     OUT
 529          DI       0     100     200     500    1000    5000
1                                        HEC-1 INPUT                                                    PAGE 15

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

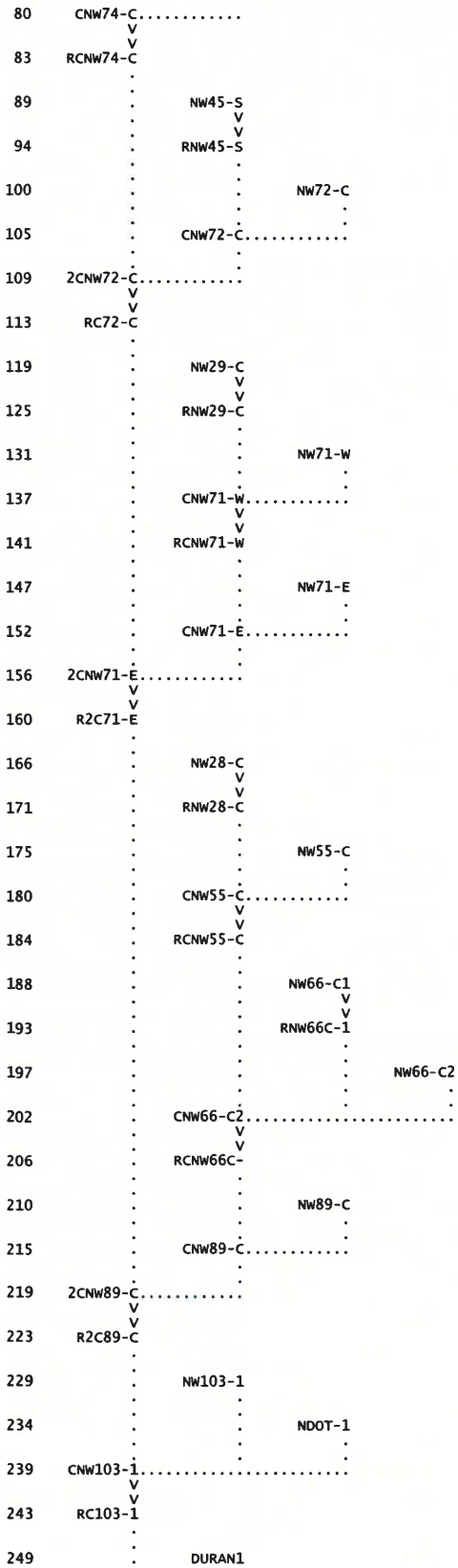
 530          DQ       0     282     282     282     282     282
 531
              *

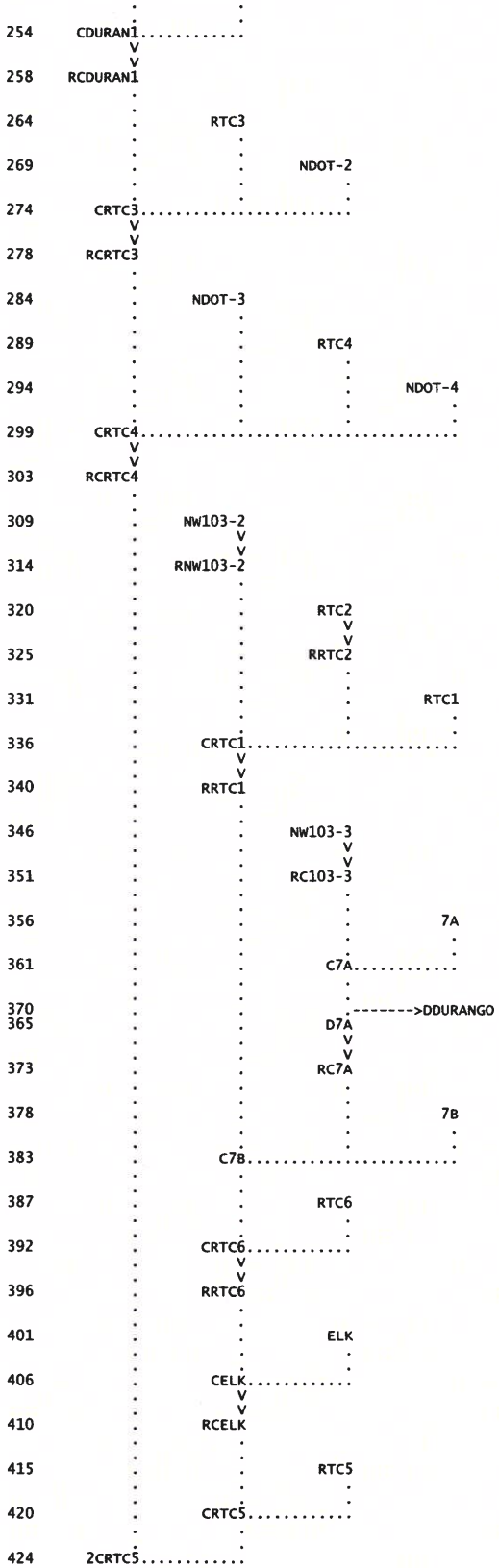
 532          KKRCNBB3-A
 533          KM  ROUTE CNBB3-A TO 2CNWBB3-B
 534          KM  FACILITY = CENTENNIAL PARKWAY CHANNEL WEST
 535          KM  FACILITY ID-MILE = CNWE 0304
 536          KM  LINING = RCB
 537          RD    1640   0.017   0.015       0    TRAP      32       0
              *

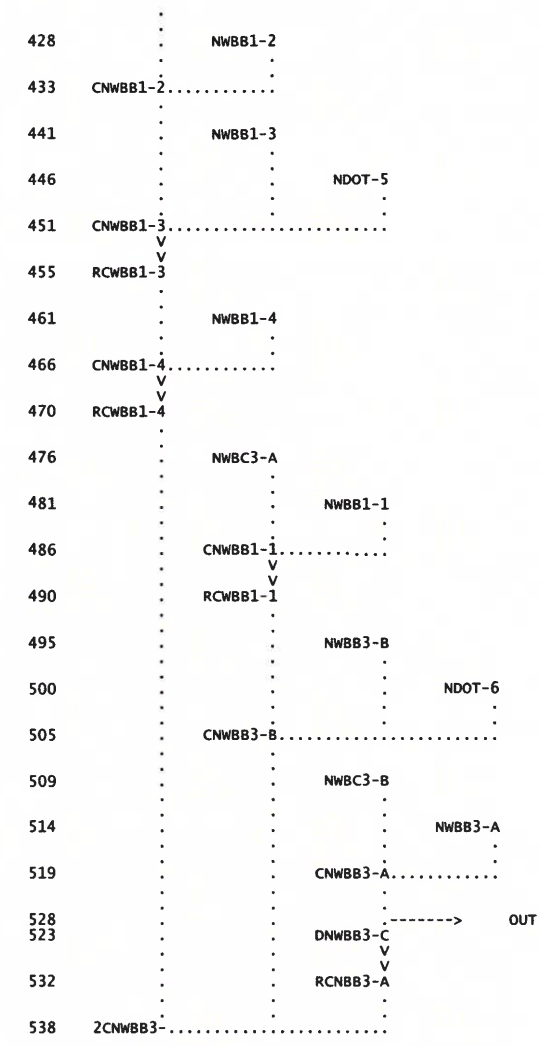
 538          KK2CNWBB3-B
 539          KM  COMBINE CNBB3-A, CNWBB3-B AND RCWBB1-4
 540          KM  DEER SPRINGS - CENTENNIAL PKWY CHANNEL WEST JUNCTION
 541          HC       3
              *
 542          ZZ
1
          SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

     56     NW62-S
              V
              V
     69     RNW62-S
              .
              .
     75       .      NW74-C
              .           .
              .           .
```


80 CNW74-C
83 RCNW74-C
89 NW45-S
94 RNW45-S
100 NW72-C
105 CNW72-C
109 2CNW72-C
113 RC72-C
119 NW29-C
125 RNW29-C
131 NW71-W
137 CNW71-W
141 RCNW71-W
147 NW71-E
152 CNW71-E
156 2CNW71-E
160 R2C71-E
166 NW28-C
171 RNW28-C
175 NW55-C
180 CNW55-C
184 RCNW55-C
188 NW66-C1
193 RNW66C-1
197 NW66-C2
202 CNW66-C2
206 RCNW66C-
210 NW89-C
215 CNW89-C
219 2CNW89-C
223 R2C89-C
229 NW103-1
234 NDOT-1
239 CNW103-1
243 RC103-1
249 DURAN1


254 CDURAN1
258 RCDURAN1
264 RTC3
269 NDOT-2
274 CRTC3
278 RCRTC3
284 NDOT-3
289 RTC4
294 NDOT-4
299 CRTC4
303 RCRTC4
309 NW103-2
314 RNW103-2
320 RTC2
325 RRTC2
331 RTC1
336 CRTC1
340 RRTC1
346 NW103-3
351 RC103-3
356 7A
361 C7A
370 ->DDURANGO
365 D7A
373 RC7A
378 7B
383 C7B
387 RTC6
392 CRTC6
396 RRTC6
401 ELK
406 CELK
410 RCELK
415 RTC5
420 CRTC5
424 2CRTC5



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN   1998               *
 *           VERSION 4.1                 *
 *                                       *
 *  RUN DATE   14NOV16  TIME  08:14:16   *
 *                                       *
 *****************************************
```

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

CENTENNIAL PARKWAY CHANNEL WEST
US95/CC215 TO DURANGO
RECOMMENDED DRAINAGE SYSTEM WITH ULTIMATE DEVELOPMENT
INPUT FILE = CENTULT3.DAT
INPUT FILE DATE = FEB 2016
DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN3
MODELED BY CH2M (MICHAEL SCHWAB, P.E.)
CHECKED BY CH2M (JEFF GRIEST, P.E., CFM)
STORM CENTERING = REMOVED DETENTION BASIN OUTFLOWS
DOWNSTREAM OF THE UPPER LAS VEGAS WASH DETENTION BASIN TO THE MOST
DOWNSTREAM POINT IN THE LOWER NORTHERN LAS VEGAS WASH WATERSHED
COMBINATION POINT DOWNSTREAM OF LOWER LAS VEGAS WASH DETENTION BASIN
WAS MODIFIED TO SIMULATE NECESSARY STORM CENTERINGS

REFERENCED HYDROLOGIC MODELS:
CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT 2008 MASTER PLAN UPDATE
UPPER AND LOWER NORTHERN LAS VEGAS WASH WATERSHEDS
REVISED FINAL DESIGN REPORT FOR THE RANCHO DETENTION BASIN
PHASE II (VTN 2006)
RESPONSE TO COMMENTS ON THE CONCEPTUAL DRAINAGE STUDY FOR
NORTH LAS VEGAS 600-ACRE SITE (GC WALLACE 2006)

SECOND RESPONSE TO COMMENTS OF THE CONCEPTUAL DRAINAGE STUDY
FOR NORTH LAS VEGAS 2074-ACRE SITE (GC WALLACE 2006)
BASIN MAPS FOR SUPPLEMENT #2 TO ADDENDUM #2 TO THE MASTER
DRAINAGE STUDY FOR CLIFF'S EDGE/ PROVIDENCE (VTN 2004)
MASTER DRAINAGE STUDY FOR KYLE CANYON (GC WALLACE 2006)
TECHNICAL DRAINAGE STUDY FOR GRAND TETON DRIVE STROM DRAIN
AND AREA 1 ROADWAY IMPROVEMENTS (GC WALLACE 2006)
90% FINAL DESIGN REPORT FOR RANCHO ROAD SYSTEM - EL CAMPO
GRANDE STORM DRAIN PROJECT (PBS&J 2007)
MPA FOR RACEL STREET COLLECTOR (LOUIS BERGER JANUARY 2007)
HYDROLOGIC MODEL FOR FLOYD LAMB NORTH AND SOUTH ENVIRONMENTAL
ENHANCEMENT AREAS (LOUIS BERGER DECEMBER 7, 2007)

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

AREA (SQUARE MILES)	DARF
0 - 0.5	0.99
0.5 - 1	0.975
1 - 2	0.95
2 - 3	0.925
3 - 4	0.915
4 - 5	0.908
5 - 6	0.903
6 - 7	0.895
7 - 8	0.885

```
  53 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          150  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      1    0  ENDING DATE
                      NDTIME        1225  ENDING TIME
                      ICENT           19  CENTURY MARK

                    COMPUTATION INTERVAL      .08 HOURS
                       TOTAL TIME BASE   12.42 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
                  .99       .98       .95       .93       .92       .91       .90       .89       .88

 *** HEC-1 ERROR 1 *** INVALID CARD IDENTIFICATION CODE OR CARD OUT OF SEQUENCE
      CARD NO.  437     *KKRCWBB1-       2  MROUTECNWBB1-2      TOCNWBB1-3MFACILIT       Y       =CENTENNI

 *** HEC-1 ERROR 1 *** INVALID CARD IDENTIFICATION CODE OR CARD OUT OF SEQUENCE
      CARD NO.  438     *K      AL PARKWAY CHANNELWEST/U.S       .      95FACILITYMFACILIT       Y ID-MILE

 *** HEC-1 ERROR 1 *** INVALID CARD IDENTIFICATION CODE OR CARD OUT OF SEQUENCE
      CARD NO.  439     *K       =    CN95   0000;    CNWE    0304 MLINING       =CONCRETE

 *** HEC-1 ERROR 1 *** INVALID CARD IDENTIFICATION CODE OR CARD OUT OF SEQUENCE
      CARD NO.  440     *R    D400  0.0175   0.015       0    TRAP      22       0

 *** HEC-1 ERROR 1 *** INVALID CARD IDENTIFICATION CODE OR CARD OUT OF SEQUENCE
      CARD NO.  531
1
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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 .99	RATIO 2 .98	RATIO 3 .95	RATIO 4 .93	RATIO 5 .92	RATIO 6 .91	RATIO 7 .90	RATIO 8 .89	RATIO 9 .88
HYDROGRAPH AT													
+	NW62-S	.21	1	FLOW	333.	327.	318.	308.	305.	302.	300.	297.	293.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RNW62-S	.21	1	FLOW	318.	313.	304.	294.	291.	288.	286.	284.	280.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	NW74-C	.25	1	FLOW	357.	351.	341.	331.	327.	324.	322.	319.	314.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CNW74-C	.45	1	FLOW	674.	663.	643.	625.	616.	612.	608.	601.	594.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RCNW74-C	.45	1	FLOW	670.	659.	639.	621.	613.	607.	604.	597.	590.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67

HYDROGRAPH AT													
+	NW45-S	.27	1	FLOW	452.	444.	432.	419.	414.	411.	408.	404.	399.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RNW45-S	.27	1	FLOW	441.	435.	424.	413.	404.	402.	402.	395.	391.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NW72-C	.44	1	FLOW	574.	564.	547.	530.	523.	518.	514.	509.	502.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CNW72-C	.71	1	FLOW	1015.	999.	971.	942.	927.	920.	917.	904.	893.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	2CNW72-C	1.17	1	FLOW	1685.	1657.	1609.	1563.	1540.	1527.	1521.	1501.	1483.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RC72-C	1.17	1	FLOW	1666.	1639.	1590.	1543.	1522.	1508.	1503.	1482.	1463.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NW29-C	.13	1	FLOW	561.	557.	551.	545.	543.	541.	540.	538.	535.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RNW29-C	.13	1	FLOW	561.	557.	551.	545.	542.	541.	540.	538.	535.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NW71-W	.10	1	FLOW	155.	152.	147.	142.	140.	139.	138.	136.	134.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CNW71-W	.24	1	FLOW	713.	706.	696.	685.	681.	677.	675.	672.	668.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RCNW71-W	.24	1	FLOW	711.	705.	695.	683.	680.	677.	675.	671.	666.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NW71-E	.24	1	FLOW	256.	250.	241.	232.	229.	226.	224.	221.	218.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CNW71-E	.47	1	FLOW	963.	952.	932.	911.	904.	899.	895.	888.	880.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	2CNW71-E	1.64	1	FLOW	2628.	2590.	2522.	2455.	2426.	2406.	2398.	2370.	2343.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	R2C71-E	1.64	1	FLOW	2579.	2539.	2475.	2406.	2376.	2360.	2352.	2322.	2295.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NW28-C	.36	1	FLOW	502.	492.	476.	460.	454.	449.	446.	441.	435.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RNW28-C	.36	1	FLOW	488.	478.	463.	447.	441.	436.	433.	439.	422.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NW55-C	.32	1	FLOW	319.	312.	299.	286.	281.	277.	275.	271.	266.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CNW55-C	.68	1	FLOW	803.	786.	758.	731.	719.	712.	706.	708.	686.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RCNW55-C	.68	1	FLOW	791.	775.	747.	718.	707.	700.	693.	693.	674.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NW66-C1	.03	1	FLOW	36.	35.	34.	32.	32.	31.	31.	31.	30.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RNW66C-1	.03	1	FLOW	35.	34.	33.	31.	31.	30.	30.	29.	28.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	NW66-C2	.00	1	FLOW	4.	4.	4.	3.	3.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT													
+	CNW66-C2	.71	1	FLOW	818.	802.	772.	743.	732.	724.	717.	717.	697.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RCNW66C-	.71	1	FLOW	807.	784.	763.	726.	719.	716.	710.	710.	682.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	NW89-C	.34	1	FLOW	395.	387.	373.	359.	354.	350.	347.	343.	337.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													

+	CNW89-C	1.05	1	FLOW	1145.	1120.	1082.	1039.	1025.	1015.	1001.	992.	970.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	2 COMBINED AT												
+	2CNW89-C	2.69	1	FLOW	3696.	3631.	3527.	3426.	3378.	3354.	3327.	3298.	3247.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	ROUTED TO												
+	R2C89-C	2.69	1	FLOW	3688.	3622.	3518.	3415.	3369.	3345.	3319.	3289.	3237.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	HYDROGRAPH AT												
+	NW103-1	.07	1	FLOW	108.	107.	103.	100.	99.	98.	97.	96.	95.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
	HYDROGRAPH AT												
+	NDOT-1	.00	1	FLOW	10.	10.	9.	9.	9.	9.	9.	9.	9.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	3 COMBINED AT												
+	CNW103-1	2.77	1	FLOW	3781.	3713.	3607.	3501.	3454.	3429.	3402.	3371.	3319.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	ROUTED TO												
+	RC103-1	2.77	1	FLOW	3779.	3712.	3606.	3500.	3453.	3428.	3401.	3370.	3317.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	HYDROGRAPH AT												
+	DURAN1	.02	1	FLOW	38.	38.	37.	35.	35.	35.	35.	34.	34.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	2 COMBINED AT												
+	CDURAN1	2.79	1	FLOW	3793.	3725.	3619.	3512.	3465.	3440.	3413.	3382.	3329.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	ROUTED TO												
+	RCDURAN1	2.79	1	FLOW	3789.	3721.	3615.	3508.	3461.	3435.	3409.	3377.	3325.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	HYDROGRAPH AT												
+	RTC3	.01	1	FLOW	12.	12.	12.	11.	11.	11.	11.	11.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	HYDROGRAPH AT												
+	NDOT-2	.00	1	FLOW	8.	8.	8.	7.	7.	7.	7.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	3 COMBINED AT												
+	CRTC3	2.80	1	FLOW	3796.	3729.	3622.	3515.	3467.	3442.	3416.	3384.	3332.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	ROUTED TO												
+	RCRTC3	2.80	1	FLOW	3793.	3726.	3619.	3512.	3464.	3439.	3412.	3381.	3329.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	HYDROGRAPH AT												
+	NDOT-3	.00	1	FLOW	8.	8.	8.	8.	8.	7.	7.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	HYDROGRAPH AT												
+	RTC4	.00	1	FLOW	8.	8.	8.	8.	8.	8.	7.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	HYDROGRAPH AT												
+	NDOT-4	.01	1	FLOW	18.	18.	17.	16.	16.	16.	16.	16.	16.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	4 COMBINED AT												
+	CRTC4	2.82	1	FLOW	3806.	3739.	3632.	3524.	3477.	3451.	3425.	3393.	3341.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	ROUTED TO												
+	RCRTC4	2.82	1	FLOW	3802.	3735.	3628.	3519.	3472.	3447.	3420.	3389.	3337.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	HYDROGRAPH AT												
+	NW103-2	.08	1	FLOW	114.	111.	107.	104.	102.	101.	100.	99.	97.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
	ROUTED TO												
+	RNW103-2	.08	1	FLOW	106.	105.	101.	98.	97.	96.	94.	92.	92.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
	HYDROGRAPH AT												
+	RTC2	.01	1	FLOW	22.	21.	21.	20.	20.	20.	19.	19.	19.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	ROUTED TO												
+	RRTC2	.01	1	FLOW	20.	20.	19.	19.	18.	18.	18.	18.	18.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	HYDROGRAPH AT												
+	RTC1	.02	1	FLOW	36.	36.	35.	34.	33.	33.	33.	32.	32.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	3 COMBINED AT												
+	CRTC1	.11	1	FLOW	152.	150.	144.	140.	137.	135.	134.	133.	131.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
	ROUTED TO												
+	RRTC1	.11	1	FLOW	151.	148.	143.	138.	136.	134.	133.	132.	130.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
	HYDROGRAPH AT												
+	NW103-3	.10	1	FLOW	112.	109.	105.	101.	100.	99.	98.	97.	95.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67

ROUTED TO													
+	RC103-3	.10	1	FLOW	109.	107.	103.	99.	97.	96.	95.	94.	92.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	7A	.03	1	FLOW	45.	44.	43.	41.	40.	40.	40.	39.	38.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	C7A	.13	1	FLOW	141.	139.	133.	128.	126.	125.	124.	122.	120.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO													
+	DDURANGO	.13	1	FLOW	91.	89.	86.	83.	81.	81.	80.	79.	78.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	D7A	.13	1	FLOW	50.	49.	47.	45.	45.	44.	44.	43.	43.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RC7A	.13	1	FLOW	51.	49.	47.	46.	45.	44.	44.	44.	42.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	7B	.02	1	FLOW	34.	33.	32.	31.	31.	30.	30.	30.	29.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT													
+	C7B	.26	1	FLOW	224.	220.	211.	205.	201.	198.	197.	195.	192.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	RTC6	.01	1	FLOW	17.	16.	16.	15.	15.	15.	15.	15.	15.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT													
+	CRTC6	.26	1	FLOW	236.	232.	223.	216.	212.	209.	208.	206.	203.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RRTC6	.26	1	FLOW	232.	228.	219.	211.	208.	205.	204.	202.	199.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	ELK	.00	1	FLOW	5.	5.	5.	5.	5.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT													
+	CELK	.27	1	FLOW	237.	232.	223.	216.	212.	209.	208.	206.	203.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RCELK	.27	1	FLOW	232.	228.	219.	211.	208.	205.	204.	202.	199.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	RTC5	.01	1	FLOW	12.	12.	11.	11.	11.	11.	11.	11.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT													
+	CRTC5	.27	1	FLOW	240.	235.	226.	219.	215.	212.	211.	209.	206.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	2CRTC5	3.09	1	FLOW	4003.	3932.	3818.	3704.	3654.	3627.	3599.	3565.	3510.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NWBB1-2	.01	1	FLOW	4.	4.	4.	4.	4.	3.	3.	3.	3.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CNWBB1-2	3.10	1	FLOW	4006.	3934.	3821.	3706.	3656.	3630.	3602.	3568.	3512.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NWBB1-3	.01	1	FLOW	5.	5.	5.	4.	4.	4.	4.	4.	4.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	NDOT-5	.01	1	FLOW	15.	15.	15.	14.	14.	14.	14.	14.	13.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT													
+	CNWBB1-3	3.12	1	FLOW	4017.	3945.	3832.	3716.	3666.	3640.	3611.	3577.	3522.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RCWBB1-3	3.12	1	FLOW	4012.	3939.	3826.	3710.	3660.	3633.	3605.	3570.	3516.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	NWBB1-4	.05	1	FLOW	30.	29.	28.	26.	26.	25.	25.	24.	24.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CNWBB1-4	3.17	1	FLOW	4039.	3966.	3851.	3734.	3684.	3656.	3628.	3593.	3538.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RCWBB1-4	3.17	1	FLOW	4028.	3955.	3841.	3723.	3673.	3645.	3616.	3580.	3526.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													

+	NWBC3-A	.13	1	FLOW	147.	144.	138.	133.	131.	129.	128.	127.	124.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NWBB1-1	.05	1	FLOW	87.	85.	83.	80.	79.	78.	78.	77.	76.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CNWBB1-1	.18	1	FLOW	222.	218.	210.	203.	199.	197.	196.	193.	190.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RCWBB1-1	.18	1	FLOW	214.	210.	202.	195.	192.	190.	188.	186.	183.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NWBB3-B	.08	1	FLOW	137.	134.	130.	126.	125.	123.	123.	121.	120.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	NDOT-6	.02	1	FLOW	29.	29.	28.	27.	26.	26.	26.	26.	25.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT													
+	CNWBB3-B	.28	1	FLOW	350.	344.	332.	321.	316.	313.	311.	307.	302.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NWBC3-B	.13	1	FLOW	143.	139.	134.	129.	127.	125.	124.	122.	120.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	NWBB3-A	.08	1	FLOW	128.	126.	122.	118.	117.	116.	115.	114.	112.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CNWBB3-A	.20	1	FLOW	268.	263.	254.	244.	241.	238.	236.	233.	230.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO													
+	OUT	.20	1	FLOW	268.	263.	254.	244.	241.	238.	236.	233.	230.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	DNWBB3-C	.20	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00	.00
ROUTED TO													
+	RCNBB3-A	.20	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00	.00
3 COMBINED AT													
+	2CNWBB3-	3.65	1	FLOW	4339.	4260.	4137.	4008.	3954.	3923.	3892.	3854.	3796.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
RNW62-S	MANE	1.74	328.68	217.81	2.26	5.00	318.20	215.00	2.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2505E+02 EXCESS= .0000E+00 OUTFLOW= .2505E+02 BASIN STORAGE= .2359E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RNW62-S	MANE	1.75	324.18	217.54	2.22	5.00	312.63	215.00	2.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2459E+02 EXCESS= .0000E+00 OUTFLOW= .2460E+02 BASIN STORAGE= .2030E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RNW62-S	MANE	1.77	315.28	216.53	2.15	5.00	303.91	215.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2385E+02 EXCESS= .0000E+00 OUTFLOW= .2386E+02 BASIN STORAGE= .2095E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RNW62-S	MANE	1.80	306.59	217.33	2.08	5.00	294.26	215.00	2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2310E+02 EXCESS= .0000E+00 OUTFLOW= .2310E+02 BASIN STORAGE= .2145E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RNW62-S	MANE	1.80	302.48	216.59	2.06	5.00	291.21	215.00	2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2280E+02 EXCESS= .0000E+00 OUTFLOW= .2281E+02 BASIN STORAGE= .2085E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RNW62-S	MANE	1.81	300.32	217.34	2.04	5.00	288.03	215.00	2.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2259E+02 EXCESS= .0000E+00 OUTFLOW= .2260E+02 BASIN STORAGE= .2153E-02 PERCENT ERROR= .0

Referenced Hydraulic Data

CENTENNIAL PKWY CHANNEL WEST
US95/CC215 TO DURANGO
FLOW SPLITS ON DEER SPRINGS

Project No: 672276
Date: 3/8/16
Calculated by: SDP

FLOW SPLITS AT INTERSECTIONS ARE BASED ON THE METHOD USED BY PIMA COUNTY, ARIZONA USING THE FOLLOWING EQUATION:

$$Q_L = 0.042\left[\frac{(Q_M)^{0.93}\,(W_{SS})^{0.85}}{(S_M)^{0.41}\,(W_M)^{0.79}}\right]$$

Q_L = LATERAL FLOW IN THE SIDE STREET (CFS)
Q_M = MAIN STREET FLOW BETWEEN CURBS (CFS)
S_M = LONGITUDINAL SLOPE OF MAIN STREET (FT/FT)
W_M = WIDTH OF MAIN STREET (FT)
W_{SS} = WIDTH OF SIDE STREET (FT)

* FOR COMPUTATIONAL PURPOSES, THE ROADWAY WITH THE GREATER SLOPE IS ASSUMED TO BE THE "MAIN STREET" WITH THE STREET WIDTH MEASURED BETWEEN CURBS

$$Q_o = 46.8 * y_o * W_{ss} * S_s^{0.5} - Q_L$$

Q_o = OVERBANK FLOW INTERCEPTED BY THE SIDE STREET (CFS)
y_o = AVERAGE DEPTH OF OVERBANK FLOW INTERCEPTED BY THE SIDE STREET (FT)
S_S = LONGITUDINAL SLOPE OF SIDE STREET (FT/FT)

DEER SPRINGS / GRAND MONTECITO - EXISTING CONDITIONS

100-YEAR

Q100=289 CFS @ INTERSECTION

$$Q_L = 0.042\left[\frac{(289)^{0.93}\,(70)^{0.85}}{(0.0112)^{0.41}\,(85)^{0.79}}\right] = \underline{57}\ \underline{CFS}$$

$Q_o = 46.8*0.57*70*(0.0073)^{0.5}-57 =$ **103** **CFS** <----- EAST IN DEER SPRINGS

DEER SPRINGS / DOE BROOK - EXISTING CONDITIONS

100-YEAR

$$Q_L = 0.042\left[\frac{(103)^{0.93}\,(30)^{0.85}}{(0.0293)^{0.41}\,(24)^{0.79}}\right] = \underline{19}\ \underline{CFS}$$

$Q_o = 46.8*0.49*30*(0.00899)^{0.5}-19 =$ **45.8** **CFS** <----- EAST IN DEER SPRINGS

Referenced Improvement Plans

DEPARTMENT OF PUBLIC WORKS

Mayor:
CAROLYN G. GOODMAN

City Council:
STEVEN D. ROSS (Mayor Pro-Tem)
LOIS TARKANIAN
RICKI Y. BARLOW
STAVROS S. ANTHONY
BOB COFFIN
BOB BEERS

City Manager:
ELIZABETH N. FRETWELL

Director of Public Works:
DAVID N. BOWERS, P.E., P.T.O.E.

City Engineer:
ALLEN E. PAVELKA, P.E.

CENTENNIAL PARKWAY CHANNEL WEST
US95, 215 TO DURANGO

FUNDED BY:

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

Reviewed By:

CLV CITY ENGINEER — DATE 6-26-17

CLV PROJECT MANAGER — DATE 6/26/17

CLV CITY TRAFFIC ENGINEER — DATE 6.26.17

CLV CONSTRUCTION MANAGER — DATE 6/26/17

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT — DATE 06/22/2017

N/A
REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA — DATE

SOUTHWEST GAS CORPORATION — DATE 06/15/17

CENTRAL TELEPHONE COMPANY d/b/a CENTURYLINK — DATE 5/11/17

THE AFFIXED CENTURYLINK NEVADA APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUTES AND/OR PUBLIC UTILITY COMMISSION STANDARD REGULATIONS.

COX COMMUNICATIONS LAS VEGAS, INC. — DATE 5-9-17

NV ENERGY – DISTRIBUTION — DATE 5-9-17

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

NV ENERGY - TRANSMISSION — DATE 5-9-17

APPROVED FOR CONSTRUCTION
LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER — DATE 6/26/17
PROJECT # 124874
SHEETS: CHG1, CHG2, CHG3, CHG4, CHRP2, CHRP5, CHRP6, CHSD2, CHSD5, CHSD6, CHGR2, CHGR5, CHGR6, CHRD2, CHRD5 & CHRD6

THE SIGNATURE ABOVE ACKNOWLEDGES THAT THE UTILITY COMPANY REPRESENTATIVE HAS REVIEWED THE PLANS, AND THAT TO THE BEST OF HIS OR HER KNOWLEDGE THE UTILITY LINES ARE SHOWN IN THE CORRECT LOCATIONS AND ARE THE CORRECT SIZES. WHILE SUCH DATA HAS BEEN COLLECTED WITH REASONABLE CARE, THERE IS NO EXPRESSED OR IMPLIED GUARANTEE THAT THE LOCATIONS ARE EXACT. THE CONTRACTOR SHALL BEAR THE RESPONSIBILITY OF OBTAINING THE ACTUAL FIELD LOCATIONS.

THE SIGNATURE ABOVE FURTHER ACKNOWLEDGES THAT THE UTILITY COMPANY DOES NOT ANTICIPATE CONSTRUCTION OR MAINTENANCE IN THE PROJECT AREA FOR FIVE (5) YEARS IN CONFORMANCE WITH THE CLV NO-CUT POLICY.

NO.	DATE	REVISIONS
1		
2		
3		
4		
5		

PREPARED BY: ch2m
2485 VILLAGE VIEW DRIVE, SUITE 350
HENDERSON, NEVADA 89074
PHONE: 702-369-4175
FAX: 702-369-1107

PREPARED FOR: CITY OF LAS VEGAS

BID# —
DATE: May 9, 2017
SUBMITTAL STAGE: FINAL PLANS
DESIGNED BY:
DRAWN BY: B. MAHAN
CHECKED BY: J. GRIEST

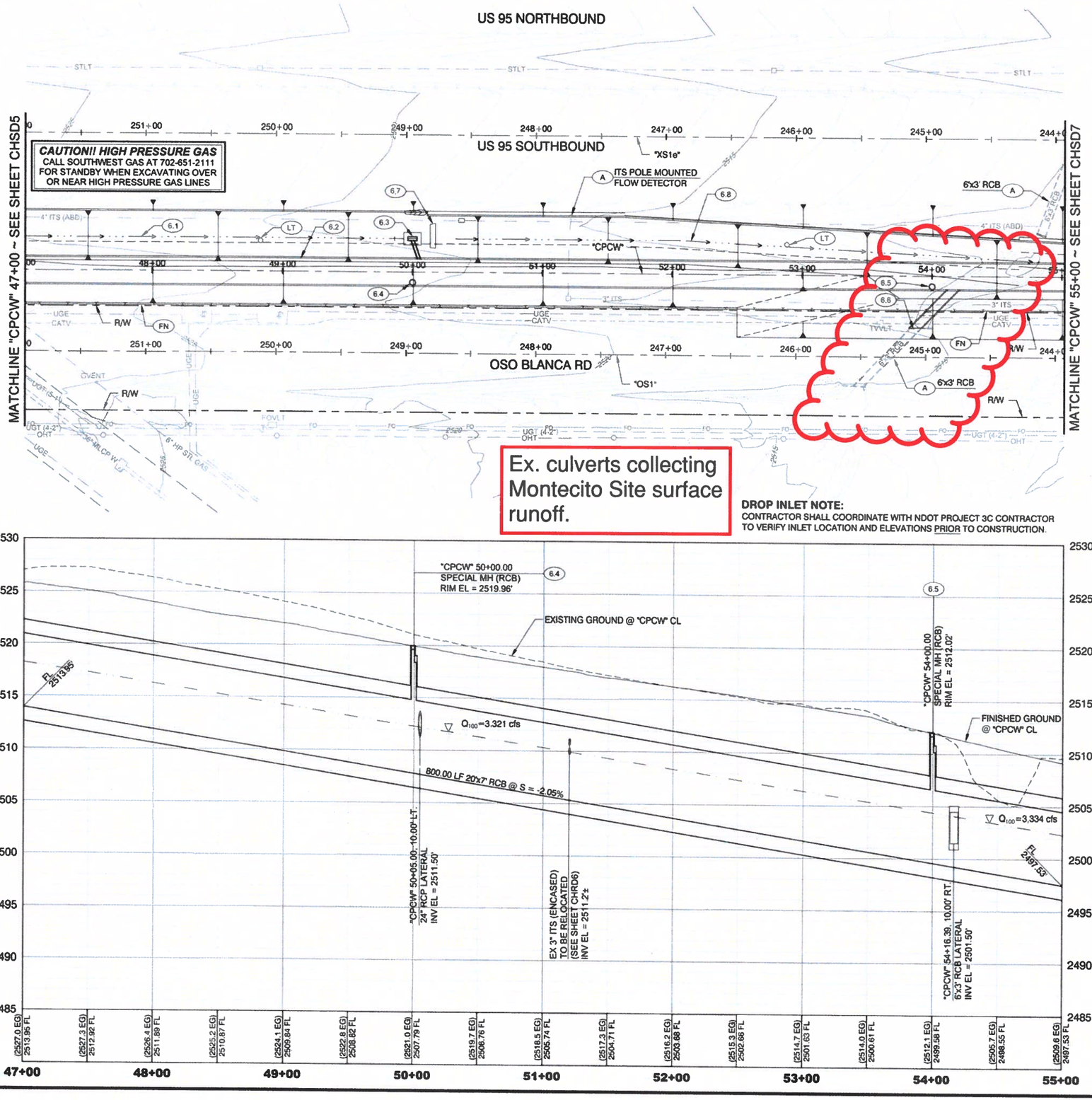
TITLE: CENTENNIAL PARKWAY CHANNEL WEST US95, 215 TO DURANGO

SHEET: COVER SHEET

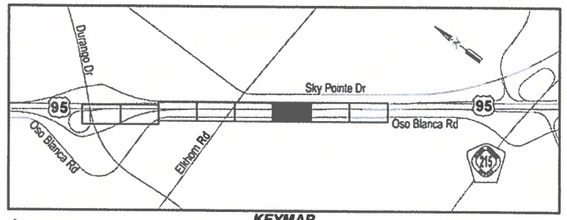
PROFESSIONAL ENGINEER-STATE OF NEVADA — JEFFREY N. GRIEST — EXP. 06/30/19 — CIVIL — No. 17758 — 5-9-17

SHEET CHG1
1 OF 87
DRAWING NO. 107v6574

672279-Cover Sheet-01.dwg



DROP INLET NOTE:
CONTRACTOR SHALL COORDINATE WITH NDOT PROJECT 3C CONTRACTOR TO VERIFY INLET LOCATION AND ELEVATIONS PRIOR TO CONSTRUCTION.



KEYMAP

40' 0 20' 40' 80'
Scale In Feet

CONSTRUCTION NOTES

A		PROTECT IN PLACE
FN		SEE SHEET CHRD6 FOR FENCE RELOCATION NOTES
LT		HIGH MAST LIGHT FOUNDATION, SEE NDOT HOV PLANS FOR DETAILS
6.1	"CPCW" 47+00	CONSTRUCT V-DITCH FROM "CPCW" 47+00, 25.5' LT TO "CPCW" 50+00, 25.5' LT (LT SIDE SLOPE = 10:1, RT SIDE SLOPE = 6:1, H=2.0' (UIE = 2522.76', LIE = 2517.00') (SEE DETAILS ON SHEET CHDT5)
6.2	"CPCW" 47+00	INSTALL 20'x7' x 800 LF RCB CPCW 47+00 TO "CPCW" 55+00 (SEE DETAILS ON SHEET CHS6)
6.3	"CPCW" 50+00	CONSTRUCT TYPE 7 DROP INLET W/CONCRETE APRON 25.5' LT (PER NDOT STD. DWG. R-4.2.4 & R-4.2.7) (GRATE ELEV. = 2517.00', H=3.6') INSTALL 24"x16.29' RCP (UIE=2513.42', LIE=2511.50') CONNECT TO 20'x7' RCB AT "CPCW" 50+05.0, 10.0' LT (SEE PROFILE ON SHEET CHSD11)
6.4	"CPCW" 50+00	CONSTRUCT SPECIAL MANHOLE (RCB), 8.75' RT (PER NDOT STD. DWG. R-4.3.1) (COVER EL. = 2519.96', H = 3.9') CONNECT TO RCB (SEE DETAILS ON SHEET CHS4)
6.5	"CPCW" 54+00	CONSTRUCT SPECIAL MANHOLE (RCB), 8.75' RT (PER NDOT STD. DWG. R-4.3.1) (COVER EL. = 2512.02', H = 4.2') CONNECT TO RCB (SEE DETAILS ON SHEET CHS4)
6.6	"CPCW" 53+87	EXISTING 6'x3' RCB 39.6' RT EXTEND 41.47' RT ON EXISTING SKEW (UIE = 2510.10', LIE 2501.50') CONNECT TO 20'x7' RCB AT "CPCW" 54+16.39, 10.0' RT (SEE PROFILE ON SHEET CHSD11)
6.7	"CPCW" 50+16	CONSTRUCT DIKE 27.7' LT (PER NDOT STD. DWG. R-1.4.1) (H = 1.0', W = 4.0', SS = 10:1)
6.8	"CPCW" 50+33	CONSTRUCT V-DITCH FROM "CPCW" 50+33, 25.5' LT TO "CPCW" 55+00, 10.5' LT (LT SIDE SLOPE = 10:1, RT SIDE SLOPE = 6:1, H=1.5' (UIE = 2516.48', LIE = 2507.57') (SEE DETAILS ON SHEET CHDT5)

APPROVED FOR CONSTRUCTION
Las Vegas Valley Water District Engineering Services Manager
Date 4/20/17 Project No. 124874

FOR REMOVAL PLAN SEE SHEET CHRP6

FOR ROADWAY & UTILITY PLAN SEE SHEET CHRD6

FOR GRADING PLAN SEE SHEET CHGR6

FOR STRIPING & SIGNING PLAN SEE SHEET CHST6

CALL BEFORE CONSTRUCTION

BEFORE YOU DIG	USA NORTH	811 OR 800-227-2600
BEFORE YOU UNDERGROUND	F.A.S.T.	702-432-5300
	CLARK COUNTY TRAFFIC OPERATIONS	702-455-7511
	CITY OF LAS VEGAS T.E.F.O.	702 229-6811
BEFORE YOU OVERHEAD	NV ENERGY	702-227-2929

NO.	DATE	REVISIONS
1		
2		
3		
4		
5		

PREPARED BY:
ch2m: BU
2485 VILLAGE VIEW DRIVE, SUITE 350
HENDERSON, NEVADA 89074
PHONE: 702-369-6175
FAX: 702-369-1107

PREPARED FOR
CITY OF LAS VEGAS

H# 60222 | BID# . | DESIGNED BY: | DRAWN BY: G. SHEARER | CHECKED BY: J. GRIEST

DATE: November 14, 2016 | SUBMITTAL STAGE: FINAL PLANS

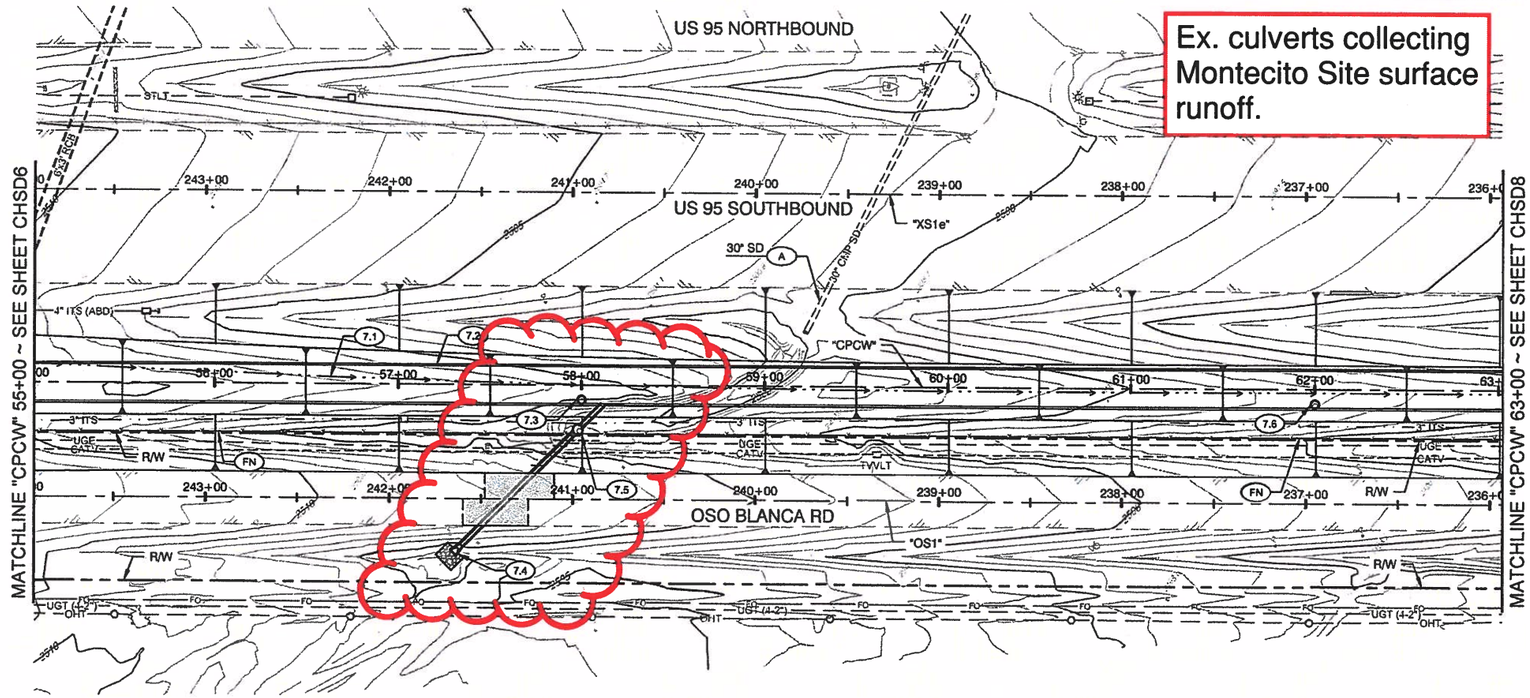
TITLE
CENTENNIAL PARKWAY CHANNEL WEST
US95, 215 TO DURANGO

SHEET
DRAINAGE PLAN & PROFILE
"CPCW" 47+00 TO "CPCW" 55+00

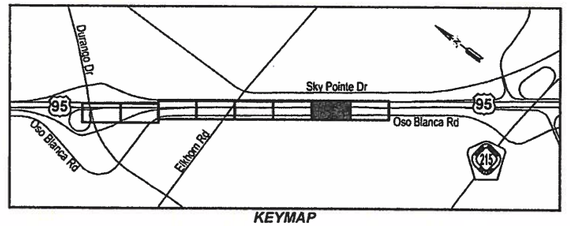
PROFESSIONAL ENGINEER - STATE OF NEVADA
JEFFREY N. GRIEST
EXP. 06/30/19
CIVIL
No. 17166

SHEET
CHSD6
26 OF 87
DRAWING NO.
107v6574

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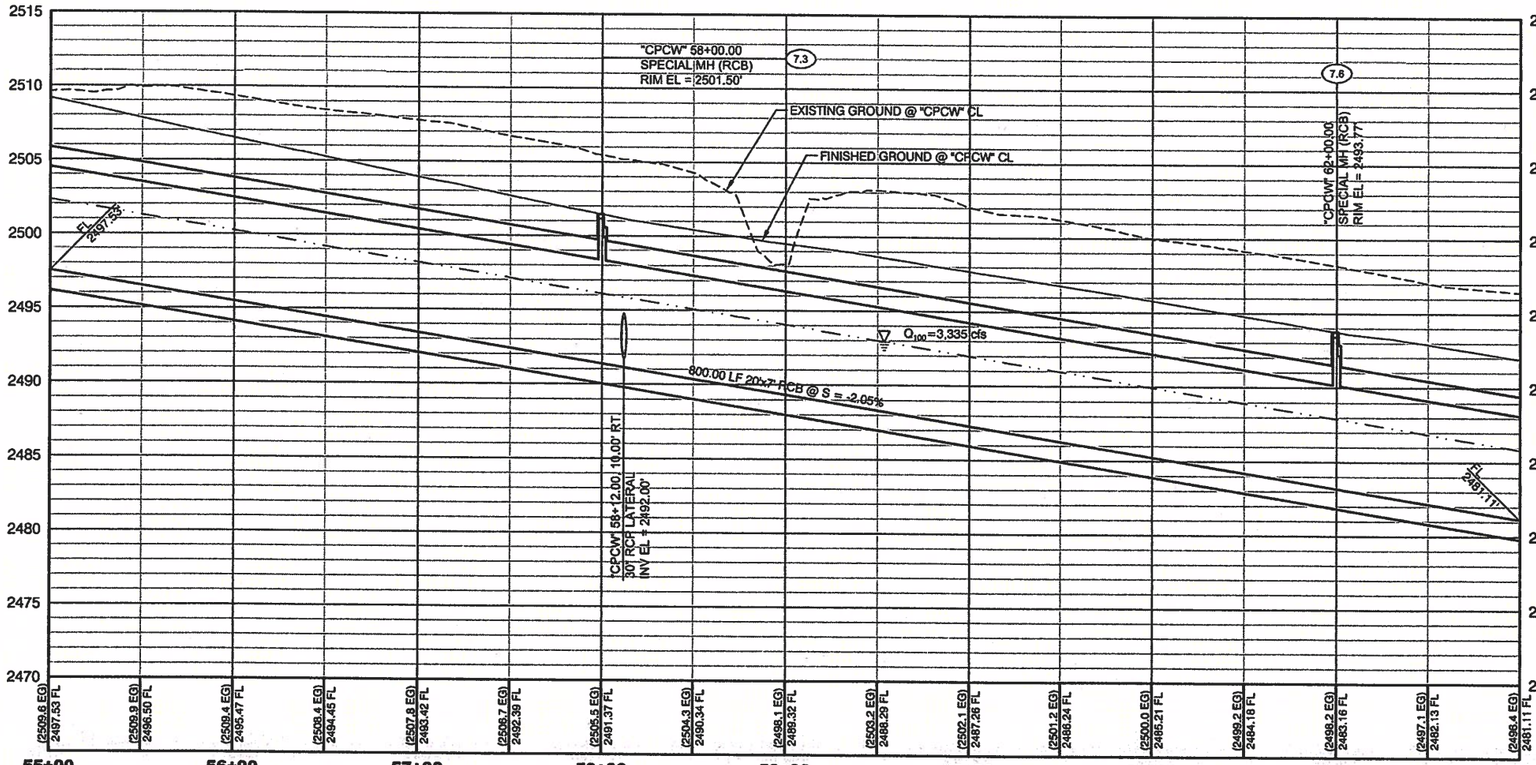


Ex. culverts collecting Montecito Site surface runoff.



KEYMAP

40' 0 20' 40' 80'
Scale In Feet



CONSTRUCTION NOTES

(A) PROTECT IN PLACE

(FN) SEE SHEET CHRD7 FOR FENCE RELOCATION NOTES

(7.1) "CPCW" 55+00 CONSTRUCT V-DITCH FROM
"CPCW" 55+00, 10.5' LT TO "CPCW" 63+00, 2.0' RT
(LT SIDE SLOPE = 10:1, RT SIDE SLOPE = 6:1, H=1.5'
(UIE = 2507.57', LIE = 2491.75')
(SEE DETAILS ON SHEET CHDT5)

(7.2) "CPCW" 55+00 INSTALL 20'x7' x 800 LF RCB
CPCW 55+00.00 TO "CPCW" 63+00.00
(SEE DETAILS ON SHEET CHS6)

(7.3) "CPCW" 58+00 CONSTRUCT SPECIAL MANHOLE (RCB), 8.75' RT
(PER NDOT STD. DWG. R-4.3.1)
(COVER EL. = 2501.50', H = 1.9')
CONNECT TO RCB
(SEE DETAILS ON SHEET CHS4)

(7.4) "CPCW" 57+30 INSTALL 30"x89.50' RCP FROM
"CPCW" 57+30.0', 91.0' RT. (UIE=2503.00') TO
"CPCW" 57+98.0, 23.8' RT. (LIE = 2501.50')
INSTALL PRECAST END SECTIONS RT.
INSTALL CLASS 300 RIPRAP APRON RT (H = 1.25')
CONNECT TO TYPE 2 MODIFIED MANHOLE AT "CPCW" 57+98.0, 23.8' RT.
(SEE PROFILE ON SHEET CHSD11)
(SEE DETAILS ON SHEET CHDT5)

(7.5) "CPCW" 57+98 CONSTRUCT TYPE 2 MODIFIED MANHOLE, 23.8' RT (PER NDOT STD. DWG. R-4.3.1)
(COVER EL. = 2504.62', H=11.6')
INSTALL 30"x19.68' RCP (UIE = 2493.00', LIE = 2492.00')
CONNECT TO 20'x7' RCB AT "CPCW" 58+12.0, 10.0' RT
(SEE PROFILE ON SHEET CHSD11)

(7.6) "CPCW" 62+00 CONSTRUCT SPECIAL MANHOLE (RCB), 8.75' RT
(PER NDOT STD. DWG. R-4.3.1)
(COVER EL. = 2493.77', H = 2.3')
CONNECT TO RCB
(SEE DETAILS ON SHEET CHS4)

FOR REMOVAL PLAN SEE SHEET CHRP7

FOR ROADWAY & UTILITY PLAN SEE SHEET CHRD7

FOR GRADING PLAN SEE SHEET CHGR7

FOR STRIPING & SIGNING PLAN SEE SHEET CHST7

CALL BEFORE CONSTRUCTION ⚠

BEFORE YOU DIG	USA NORTH	811 OR 800-227-2600
BEFORE YOU UNDERGROUND	F.A.S.T.	702-432-5300
	CLARK COUNTY TRAFFIC OPERATIONS	702-455-7511
	CITY OF LAS VEGAS T.E.F.O.	702-229-6011
BEFORE YOU OVERHEAD	NV ENERGY	702-227-2929

NO.	DATE	REVISIONS
1		
2		
3		
4		
5		

PREPARED BY:
ch2m:
2465 VILLAGE VIEW DRIVE, SUITE 350
HENDERSON, NEVADA 89074
PHONE: 702-369-6175
FAX: 702-369-1107

PREPARED FOR
CITY OF LAS VEGAS

H# 60222

DATE: November 14, 2016

SUBMITTAL STAGE: FINAL PLANS

DESIGNED BY:

DRAWN BY: G. SHEARER

CHECKED BY: J. GRIEST

TITLE
CENTENNIAL PARKWAY CHANNEL WEST
US95, 215 TO DURANGO

SHEET
DRAINAGE PLAN & PROFILE
"CPCW" 55+00 TO "CPCW" 63+00

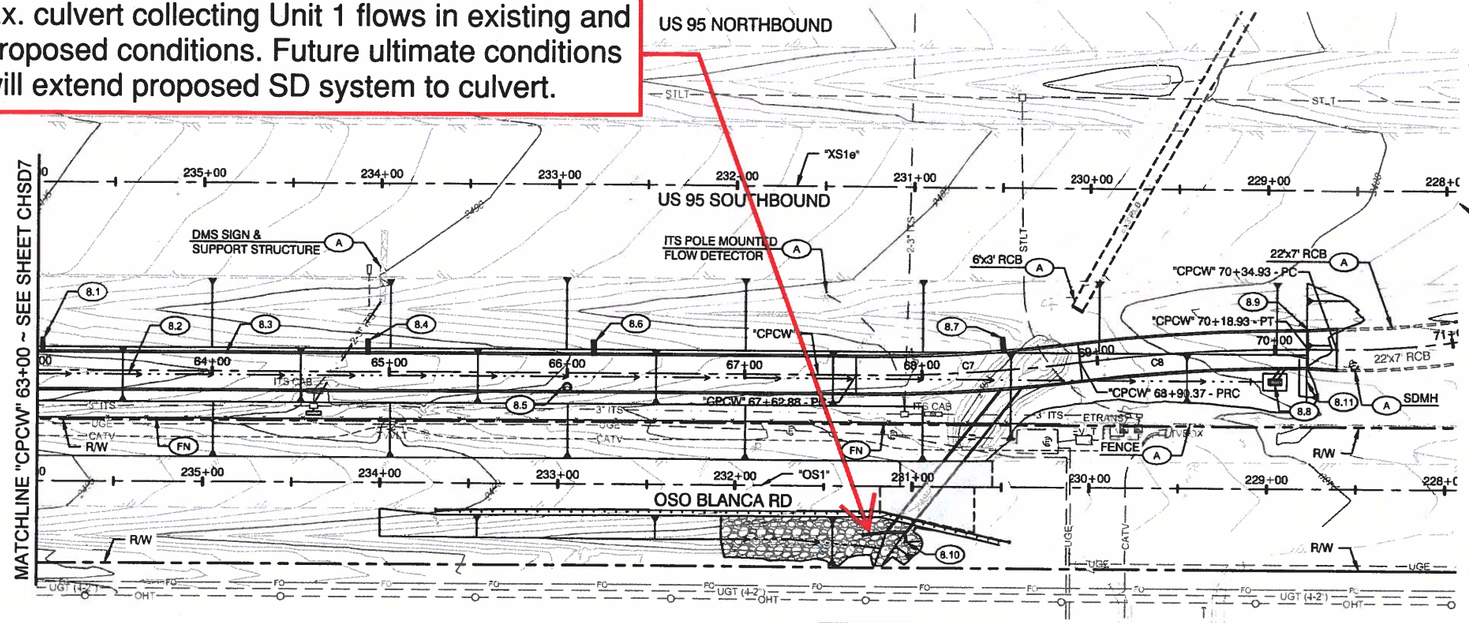
PROFESSIONAL ENGINEER-STATE OF NEVADA
JEFFREY N. GRIEST
EXP. 06/30/19
CIVIL
No. 17758

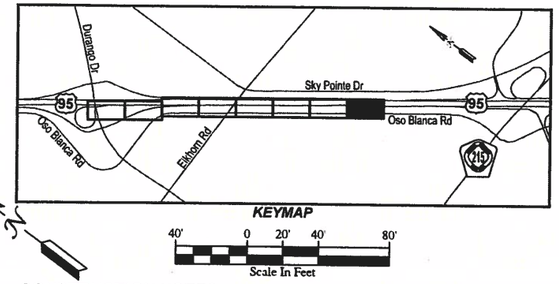
SHEET
CHSD7
27 OF 87

DRAWING NO
107v6574

072276-Drainage_Plans.dwg

Ex. culvert collecting Unit 1 flows in existing and proposed conditions. Future ultimate conditions will extend proposed SD system to culvert.

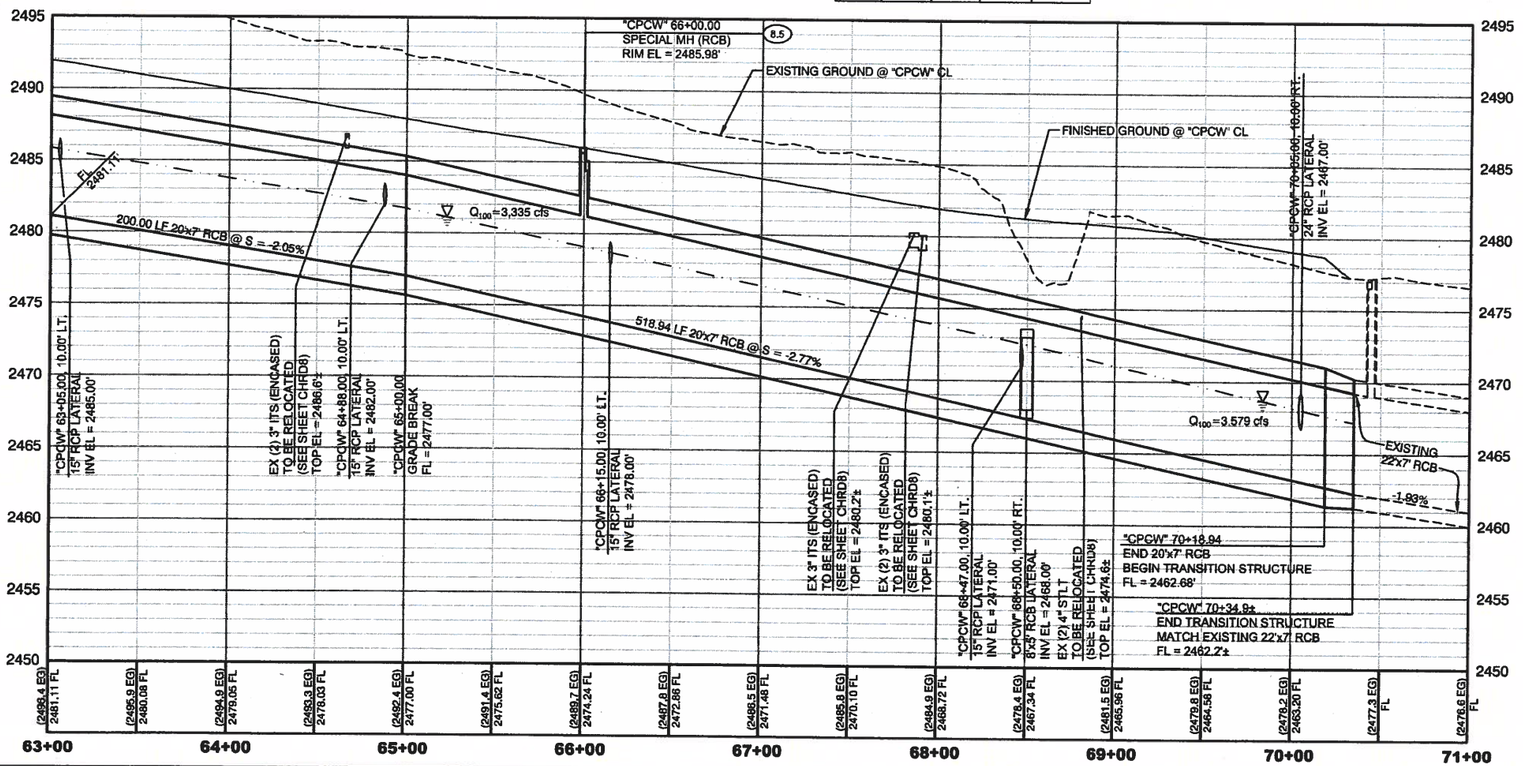




DROP INLET NOTE:
CONTRACTOR SHALL COORDINATE WITH NDOT PROJECT 3C CONTRACTOR TO VERIFY INLET LOCATION AND ELEVATIONS PRIOR TO CONSTRUCTION.

CURVE TABLE

CURVE	RADIUS	DELTA	LENGTH	TANGENT
C7	1000.00'	7°18'17"	127.49'	63.83
C8	1000.00'	7°21'58"	128.56'	64.37'



CONSTRUCTION NOTES

- (A) PROTECT IN PLACE
- (FN) SEE SHEET CHRD8 FOR FENCE RELOCATION NOTES
- (8.1) "CPCW" 63+05 — INSTALL 15"x8' RCP LATERAL STUB, 10.0' LT (UIE = 2485.16', LIE = 2485.00') INSTALL 15" RCP PLUG (FOR FUTURE CONNECTION)
- (8.2) "CPCW" 63+00 — CONSTRUCT V-DITCH FROM "CPCW" 63+00, 2.0' RT TO "CPCW" 70+00, 18.1' RT (LT SIDE SLOPE = 10:1, RT SIDE SLOPE = 6:1, H=1.5' (UIE = 2491.75', LIE = 2477.50') (SEE DETAILS ON SHEET CHDT5)
- (8.3) "CPCW" 63+00 — INSTALL 20'x7' x 718.94 LF RCB "CPCW" 63+00 TO "CPCW" 70+18.94 (SEE DETAILS ON SHEET CHS6)
- (8.4) "CPCW" 64+88 — INSTALL 15"x8' RCP LATERAL STUB, 10.0' LT (UIE = 2482.16', LIE = 2482.00') INSTALL 15" RCP PLUG (FOR FUTURE CONNECTION)
- (8.5) "CPCW" 66+00 — CONSTRUCT SPECIAL MANHOLE (RCB), 8.75' RT (PER NDOT STD. DWG. R-4.3.1) (COVER EL. = 2485.98', H = 3.5') CONNECT TO RCB (SEE DETAILS ON SHEET CHS4)
- (8.6) "CPCW" 66+15 — INSTALL 15"x8' RCP LATERAL STUB, 10.0' LT (UIE = 2478.16', LIE = 2478.00') INSTALL 15" RCP PLUG (FOR FUTURE CONNECTION)
- (8.7) "CPCW" 68+47 — INSTALL 15"x8' RCP LATERAL STUB, 10.0' LT (UIE = 2471.16', LIE = 2471.00') INSTALL 15" RCP PLUG (FOR FUTURE CONNECTION)
- (8.8) "CPCW" 70+00 — CONSTRUCT TYPE 7 DROP INLET W/CONCRETE APRON 18.1' RT (PER NDOT STD. DWG. R-4.2.4 & R-4.2.7) (GRATE ELEV. = 2477.50', H=8.0') INSTALL 24"x9.46' RCP (UIE=2469.50', LIE=2467.00') CONNECT TO 20'x7' RCB AT "CPCW" 70+05.00, 10.0' RT (SEE PROFILE ON SHEET CHSD11)
- (8.9) "CPCW" 70+18 — CONSTRUCT TRANSITION STRUCTURE FROM "CPCW" 70+18.94 TO "CPCW" 70+34.9± MATCH EXISTING 22'x7' RCB (SEE DETAILS ON SHEETS CHS4, CHS5 & CHS6)
- (8.10) "CPCW" 67+83 — CONSTRUCT MODIFIED TYPE 1 HEADWALL (45° SKEW) RT WITH PEDESTRIAN RAIL, TYPE R (PER NDOT STD. DWG. B-25.1.5) INSTALL 8'x5'x104' RCB FROM "CPCW" 67+83.73, 88.03' RT (UIE = 2478.00') TO "CPCW" 68+50.00, 10.0' RT (LIE = 2468.00') CONNECT TO 20'x7' RCB AT "CPCW" 68+50.00, 10.0' RT INSTALL CLASS 300 RIPRAP APRON AT INLET (H = 4.0') (SEE PROFILE ON SHEET CHSD11) (SEE DETAILS ON SHEETS CHDT2, CHDT5, CHS4 & CHS8)
- (8.11) "CPCW" 70+16 — CONSTRUCT DIKE 15.6' RT (PER NDOT STD. DWG. R-1.4.1) (H = 1.0', W = 4.0', SS = 10:1)

FOR REMOVAL PLAN SEE SHEET CHRP8

FOR GRADING PLAN SEE SHEET CHGR8

FOR STRIPING & SIGNING PLAN SEE SHEET CHST8

FOR ROADWAY & UTILITY PLAN SEE SHEET CHRD8

CALL BEFORE CONSTRUCTION

BEFORE YOU DIG	USA NORTH	811 OR 800-227-2600
BEFORE YOU UNDERGROUND	F.A.S.T.	702-432-5300
	CLARK COUNTY TRAFFIC OPERATIONS	702-455-7511
	CITY OF LAS VEGAS T.E.F.O.	702-229-6811
BEFORE YOU OVERHEAD	NV ENERGY	702-227-2929

NO.	DATE	REVISIONS
1		
2		
3		
4		
5		

PREPARED BY:
ch2m.
2485 VILLAGE VIEW DRIVE, SUITE 350
HENDERSON, NEVADA 89074
PHONE: 702-369-5175
FAX: 702-369-1107

PREPARED FOR: CITY OF LAS VEGAS

BID#

DESIGNED BY:

DRAWN BY: G. SHEARER

CHECKED BY: J. GRIEST

DATE: November 14, 2016

SUBMITTAL STAGE: FINAL PLANS

TITLE: CENTENNIAL PARKWAY CHANNEL WEST US95, 215 TO DURANGO

SHEET: DRAINAGE PLAN & PROFILE "CPCW" 63+00 TO "CPCW" 71+00

PROFESSIONAL ENGINEER - STATE OF NEVADA - JEFFREY N. GRIEST Exp. 06/30/19 CIVIL No. 17791 - 6-17

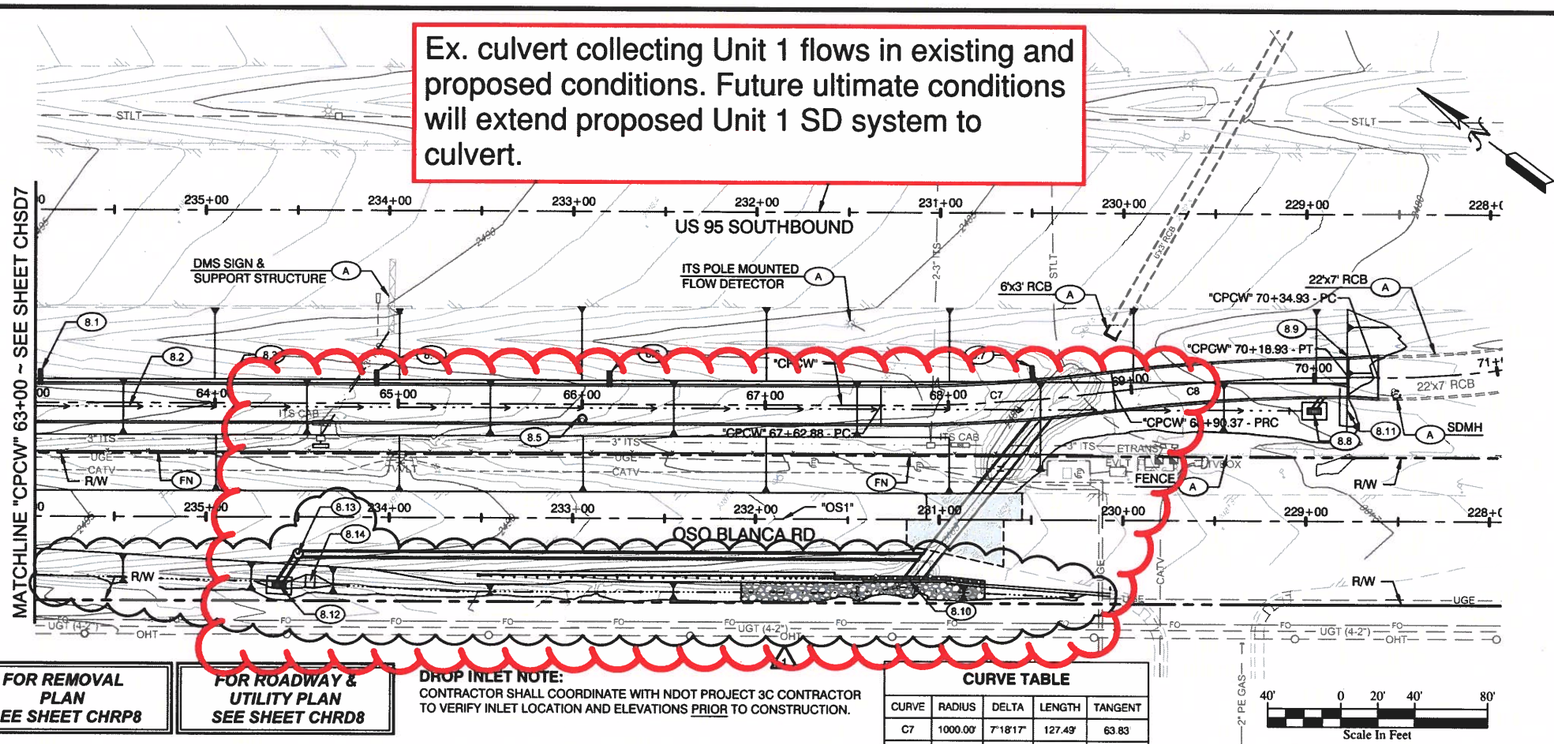
SHEET CHSD8

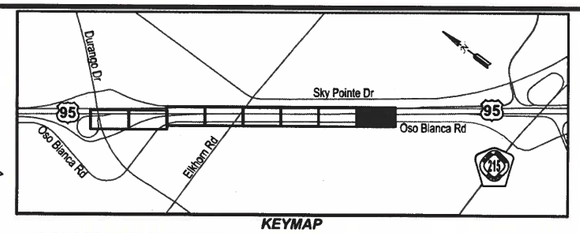
28 OF 87

DRAWING NO. 107v6574

672174-Drainage_Plans.dwg

Ex. culvert collecting Unit 1 flows in existing and proposed conditions. Future ultimate conditions will extend proposed Unit 1 SD system to culvert.





KEYMAP

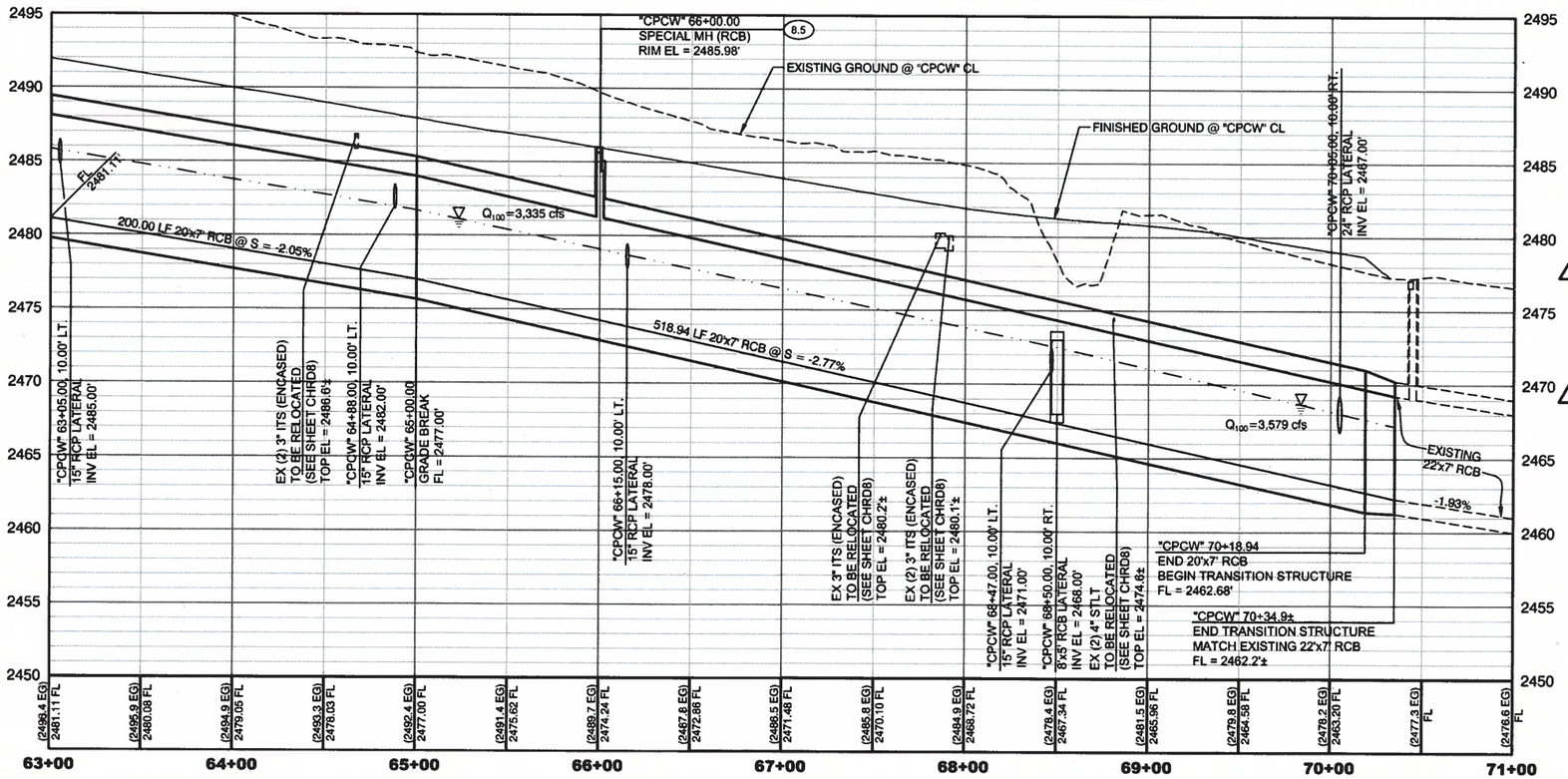
FOR REMOVAL PLAN SEE SHEET CHRP8

FOR ROADWAY & UTILITY PLAN SEE SHEET CHRD8

DROP INLET NOTE:
CONTRACTOR SHALL COORDINATE WITH NDOT PROJECT 3C CONTRACTOR TO VERIFY INLET LOCATION AND ELEVATIONS PRIOR TO CONSTRUCTION.

CURVE TABLE

CURVE	RADIUS	DELTA	LENGTH	TANGENT
C7	1000.00'	7°18'17"	127.49'	63.83
C8	1000.00'	7°21'58"	128.56'	64.37



CONSTRUCTION NOTES

A		PROTECT IN PLACE
FN		SEE SHEET CHRD8 FOR FENCE RELOCATION NOTES
8.1	"CPCW" 63+05	INSTALL 15"x8' RCP LATERAL STUB, 10.0' LT (UIE = 2485.16', LIE = 2485.00') INSTALL 15" RCP PLUG (FOR FUTURE CONNECTION)
8.2	"CPCW" 63+00	CONSTRUCT V-DITCH FROM "CPCW" 63+00, 2.0' RT TO "CPCW" 70+00, 18.1' RT (LT SIDE SLOPE = 10:1, RT SIDE SLOPE = 6:1, H=1.5' (UIE = 2491.75', LIE = 2477.50') (SEE DETAILS ON SHEET CHDT5)
8.3	"CPCW" 63+00	INSTALL 20'x7' x 718.94 LF RCB "CPCW" 63+00 TO "CPCW" 70+18.94 (SEE DETAILS ON SHEET CHS6)
8.4	"CPCW" 64+88	INSTALL 15"x8' RCP LATERAL STUB, 10.0' LT (UIE = 2482.16', LIE = 2482.00') INSTALL 15" RCP PLUG (FOR FUTURE CONNECTION)
8.5	"CPCW" 66+00	CONSTRUCT SPECIAL MANHOLE (RCB), 8.75' RT (PER NDOT STD. DWG. R-4.3.1) (COVER EL. = 2485.98', H = 3.5') CONNECT TO RCB (SEE DETAILS ON SHEET CHS4)
8.6	"CPCW" 66+15	INSTALL 15"x8' RCP LATERAL STUB, 10.0' LT (UIE = 2478.16', LIE = 2478.00') INSTALL 15" RCP PLUG (FOR FUTURE CONNECTION)
8.7	"CPCW" 68+47	INSTALL 15"x8' RCP LATERAL STUB, 10.0' LT (UIE = 2471.16', LIE = 2471.00') INSTALL 15" RCP PLUG (FOR FUTURE CONNECTION)
8.8	"CPCW" 70+00	CONSTRUCT TYPE 7 DROP INLET W/CONCRETE APRON 18.1' RT (PER NDOT STD. DWG. R-4.2.4 & R-4.2.7) (GRATE ELEV. = 2477.50', H=8.0') INSTALL 24"x9.46' RCP (UIE=2469.50', LIE=2467.00') CONNECT TO 20'x7' RCB AT "CPCW" 70+05.00, 10.0' RT (SEE PROFILE ON SHEET CHSD11)
8.9	"CPCW" 70+18	CONSTRUCT TRANSITION STRUCTURE FROM "CPCW" 70+18.94 TO "CPCW" 70+34.9± MATCH EXISTING 22'x7' RCB (SEE DETAILS ON SHEETS CHS4, CHS5 & CHS6)
8.10	"CPCW" 67+78	CONSTRUCT TYPE II HEADWALL (51° SKEW) (PER 2017 NDOT STD. DWG. B-20.1.6) INSTALL 8'x5'x113.98' RCB FROM "CPCW" 67+77.96, 95.63' RT (UIE = 2478.55') TO "CPCW" 68+50.00, 10.0' RT (LIE = 2468.00') CONNECT TO 20'x7' RCB AT "CPCW" 68+50.00, 10.0' RT INSTALL CLASS 300 RIPRAP APRON AT INLET (H = 4.0') (SEE PROFILE ON SHEET CHSD11) (SEE DETAILS ON SHEETS CHDT2, CHDT5)
8.11	"CPCW" 70+16	CONSTRUCT DIKE 15.6' RT (PER NDOT STD. DWG. R-1.4.1) (H = 1.0', W = 4.0', SS = 10:1)
8.12	"OS1" 234+60	CONSTRUCT TYPE 7 DROP INLET W/ CONCRETE APRON, 37.0' LT (PER NDOT STD. DWG. R-4.2.4 & R-4.2.7) (GRATE ELEV. = 2489.60', H = 4.67') INSTALL 36"x19.73' RCP (UIE = 2484.93', LIE = 2484.30') CONNECT TO TYPE 2 MOD MANHOLE AT "OS1" 234+50, 20.0' LT (SEE PROFILE ON SHEET CHSD12)
8.13	"OS1" 234+50	CONSTRUCT TYPE 2 MOD MANHOLE, 20.0' LT (PER NDOT STD. DWG. R-4.3.1) (COVER EL. = 2491.97', H=7.67') INSTALL 36"x340.04' RCP (UIE = 2484.30', LIE = 2478.00') CONNECT TO 8'x5' RCB AT "CPCW" 67+84, 82.0' RT (SEE PROFILE ON SHEET CHSD12)
8.14	"OS1" 234+44	CONSTRUCT DIKE 34.7' LT (PER NODOT STD. DWG. R-1.4.1) (H = 1.0', W = 5.0', SS = 8:1 TO 10:1)

FOR GRADING PLAN SEE SHEET CHGR8

FOR STRIPING & SIGNING PLAN SEE SHEET CHST8

CALL BEFORE CONSTRUCTION

BEFORE YOU DIG	USA NORTH	811 OR 800-227-2600
BEFORE YOU UNDERGROUND	F.A.S.T.	702-432-5300
	CLARK COUNTY TRAFFIC OPERATIONS	702-455-7511
	CITY OF LAS VEGAS T.E.F.O.	702-229-6611
BEFORE YOU OVERHEAD	NV ENERGY	702-227-2929

NO.	DATE	REVISIONS
1	8/14/18	REVISED 8'x5' AND ADD DI
2		
3		
4		
5		

PREPARED BY: CH2M
2485 VILLAGE VIEW DRIVE, SUITE 350
HENDERSON, NEVADA 89074
PHONE: 702-369-6175
FAX: 702-369-1107

PREPARED FOR: CITY OF LAS VEGAS
H# 60222
DATE: June 14, 2018
SUBMITTAL STAGE: CONST. REVS
BID# .
DESIGNED BY:
DRAWN BY: G. SHEARER
CHECKED BY: J. GRIEST

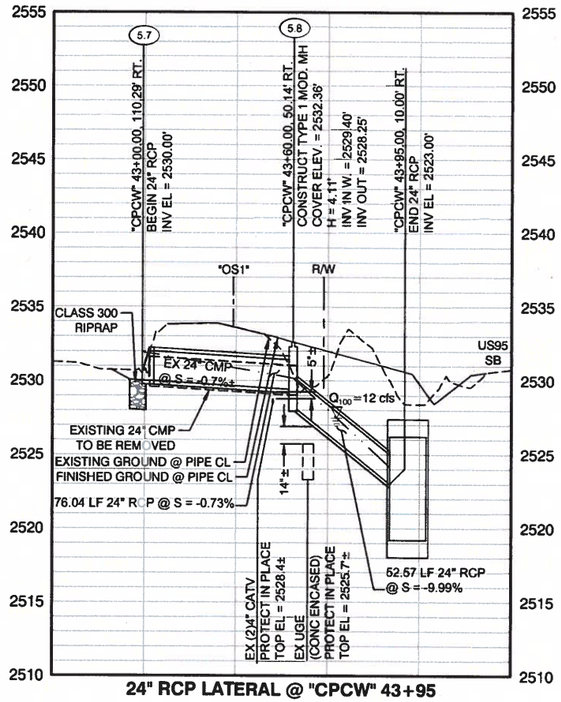
TITLE: CENTENNIAL PARKWAY CHANNEL WEST
US95, 215 TO DURANGO

SHEET: DRAINAGE PLAN & PROFILE
"CPCW" 63+00 TO "CPCW" 71+00

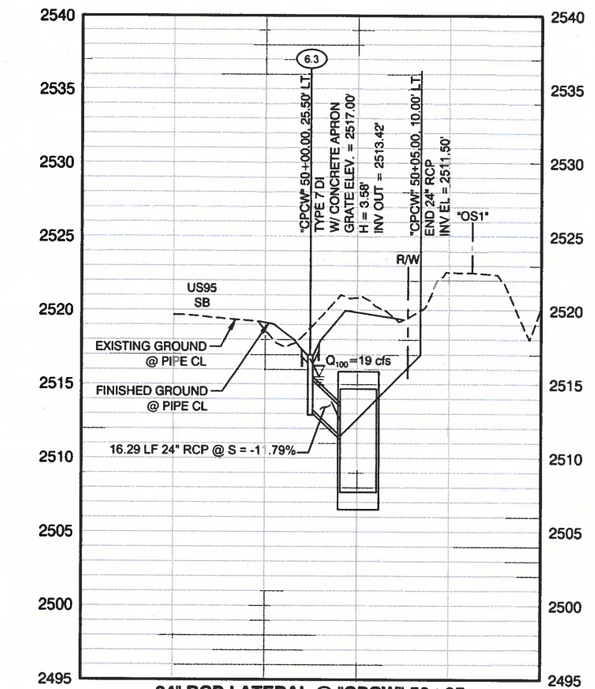
PROFESSIONAL ENGINEER - STATE OF NEVADA
JEFFREY N. GRIEST
EXP. 06/30/19
CIVIL
No. 17169

SHEET CHSD8
28 OF 87
DRAWING NO. 107v6574

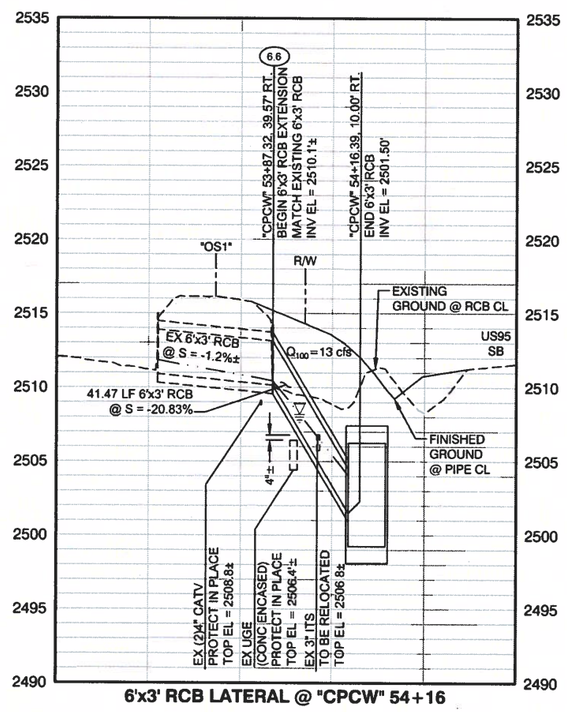
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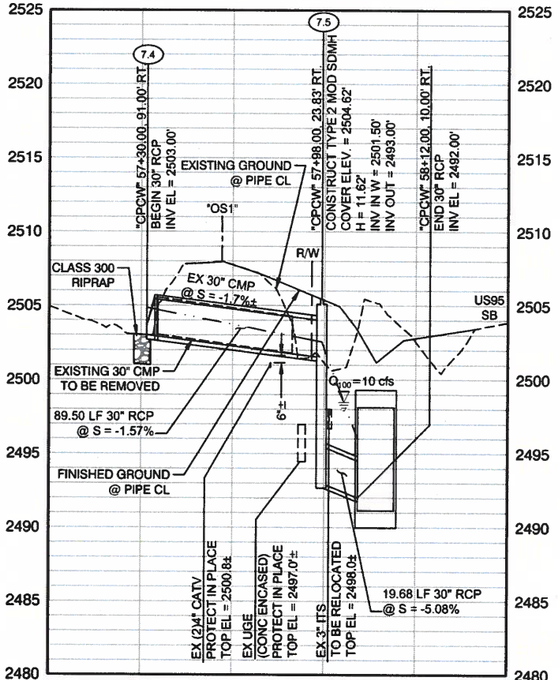
24" RCP LATERAL @ "CPCW" 43+95



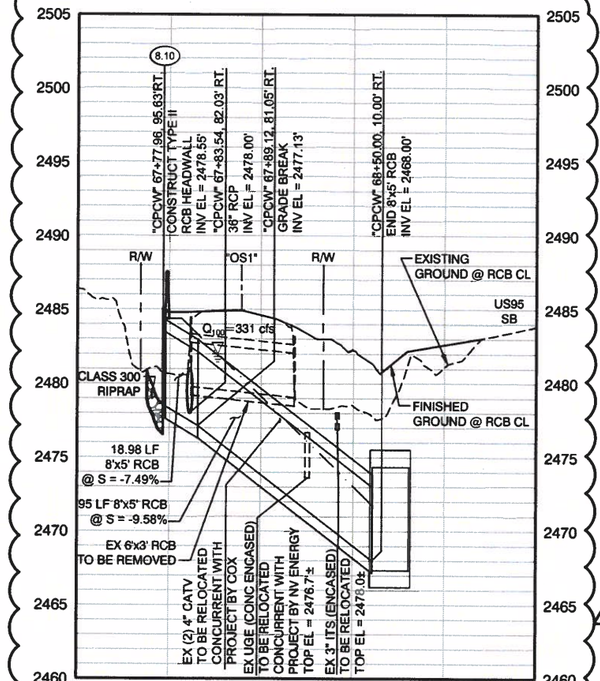
24" RCP LATERAL @ "CPCW" 50+05



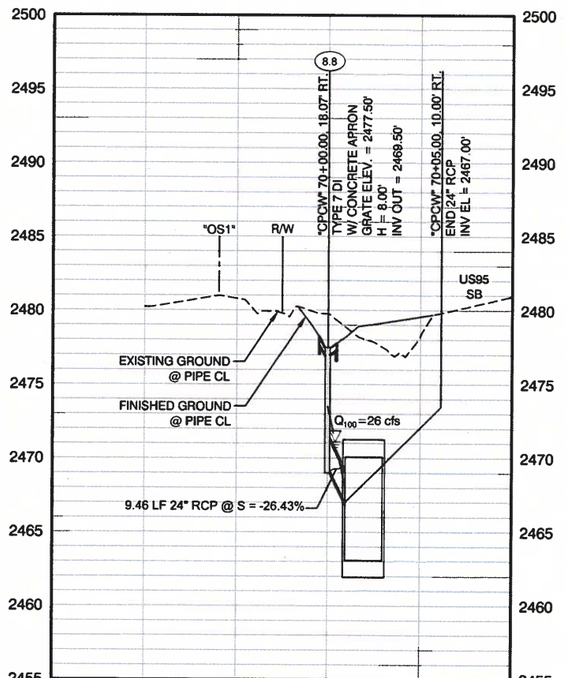
6'x3' RCB LATERAL @ "CPCW" 54+16



30" RCP LATERAL @ "CPCW" 58+12



8'x5' RCB LATERAL @ "CPCW" 68+50



24" RCP LATERAL @ "CPCW" 70+05

CALL BEFORE CONSTRUCTION ⚠		
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BEFORE YOU UNDERGROUND	F.A.S.T.	702-432-5300
	CLARK COUNTY TRAFFIC OPERATIONS	702-455-7511
	CITY OF LAS VEGAS T.E.F.O.	702-229-6611
BEFORE YOU OVERHEAD	NV ENERGY	702-227-2929

NO.	DATE	REVISIONS
1	8/14/18	REVISED 8'x5' RCB
2		
3		
4		
5		

PREPARED BY:
ch2m:
2485 VILLAGE VIEW DRIVE, SUITE 350
HENDERSON, NEVADA 89074
PHONE: 702-369-6175
FAX: 702-369-1107

PREPARED FOR
CITY OF LAS VEGAS

H# 60222 BID# .
DATE: June 14, 2018 DESIGNED BY: B. MAHAN
SUBMITTAL STAGE: CONST. REVS DRAWN BY: G. SHEARER
CHECKED BY: J. GRIEST

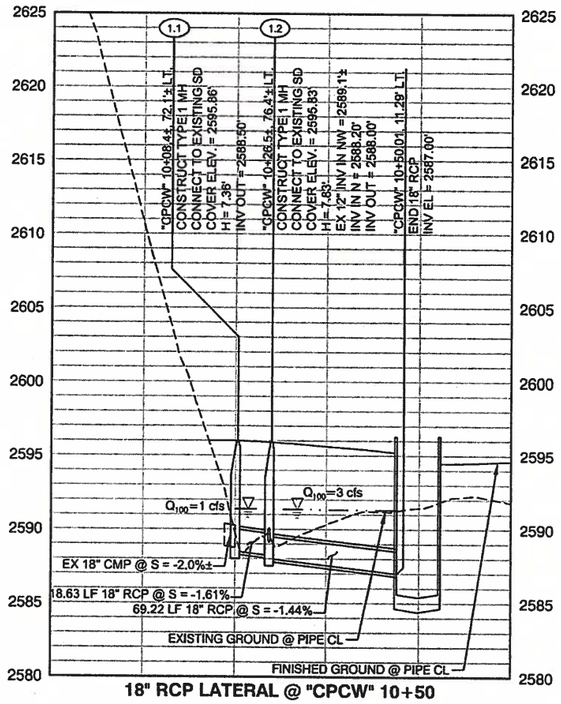
TITLE
CENTENNIAL PARKWAY CHANNEL WEST
US95, 215 TO DURANGO

SHEET
DRAINAGE LATERAL PROFILES

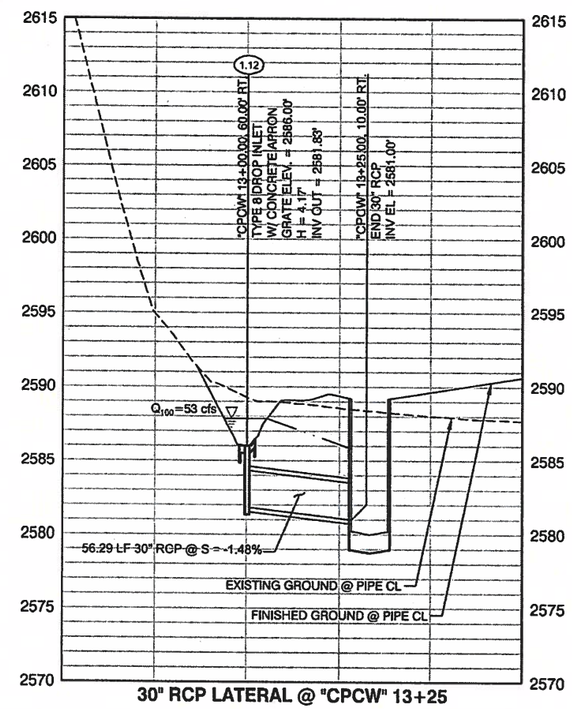
PROFESSIONAL ENGINEER - STATE OF NEVADA
JEFFREY N. GRIEST
EXP. 06/30/19
CIVIL
No. 17758

SHEET
CHSD11
31 OF 87
DRAWING NO.
107v6574

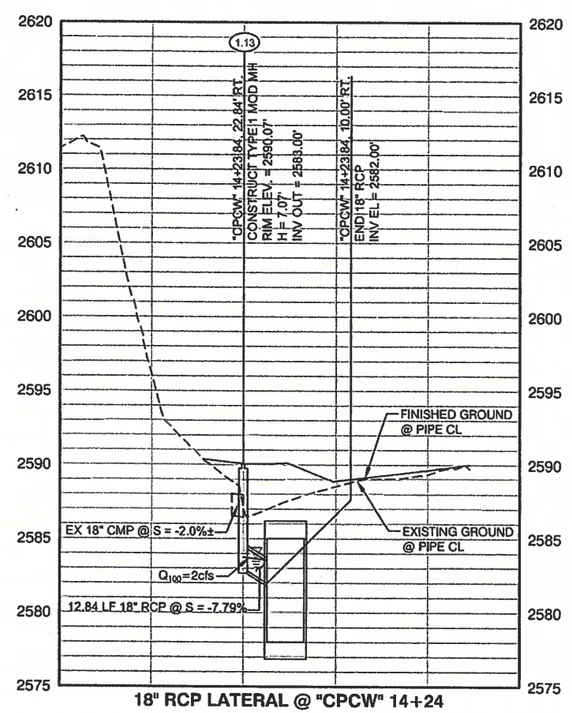
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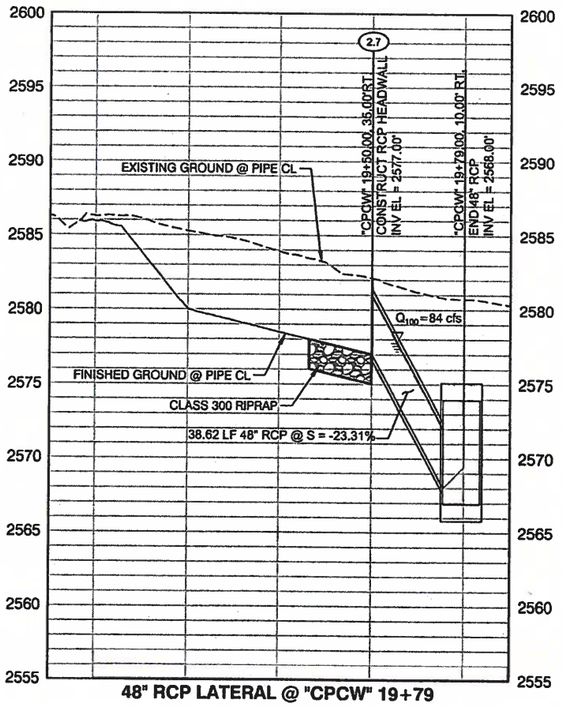
18" RCP LATERAL @ "CPCW" 10+50



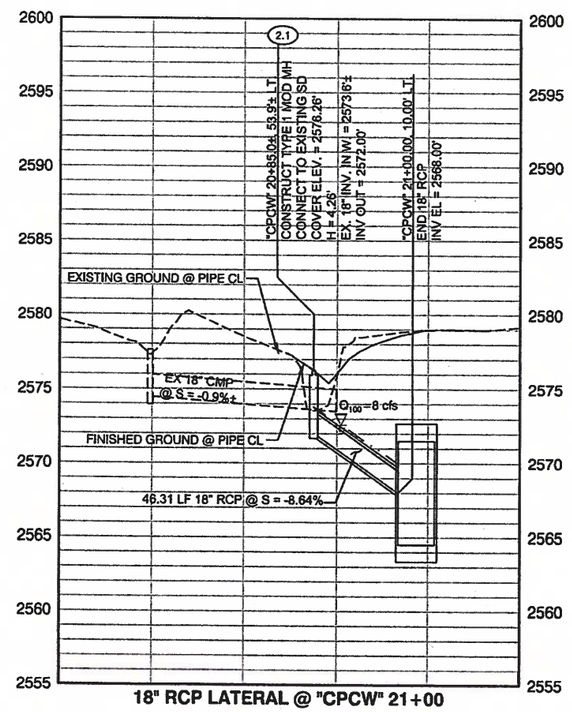
30" RCP LATERAL @ "CPCW" 13+25



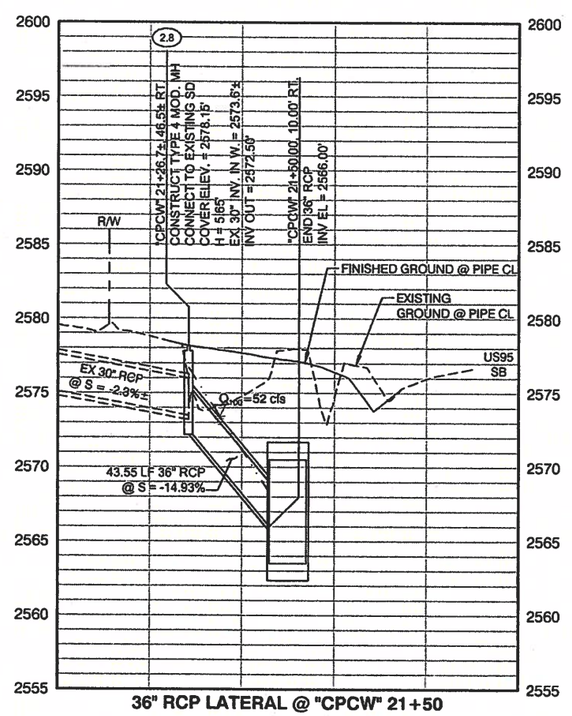
18" RCP LATERAL @ "CPCW" 14+24



48" RCP LATERAL @ "CPCW" 19+79



18" RCP LATERAL @ "CPCW" 21+00



36" RCP LATERAL @ "CPCW" 21+50

CALL BEFORE CONSTRUCTION

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BEFORE YOU UNDERGROUND	F.A.S.T.	702-432-5300
	CLARK COUNTY TRAFFIC OPERATIONS	702-455-7511
	CITY OF LAS VEGAS T.E.F.O.	702-229-6311
BEFORE YOU OVERHEAD	NV ENERGY	702-227-2929

NO.	DATE	REVISIONS
5		
4		
3		
2		
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PREPARED BY:
ch2m.
2485 VILLAGE VIEW DRIVE, SUITE 350
HENDERSON, NEVADA 89074
PHONE: 702-369-6175
FAX: 702-369-1107

PREPARED FOR
CITY OF LAS VEGAS

H# 60222 | BID# -
DATE: November 14, 2016 | DESIGNED BY: B. MAHAN
SUBMITTAL STAGE: FINAL PLANS | DRAWN BY: G. SHEARER
CHECKED BY: J. GRIEST

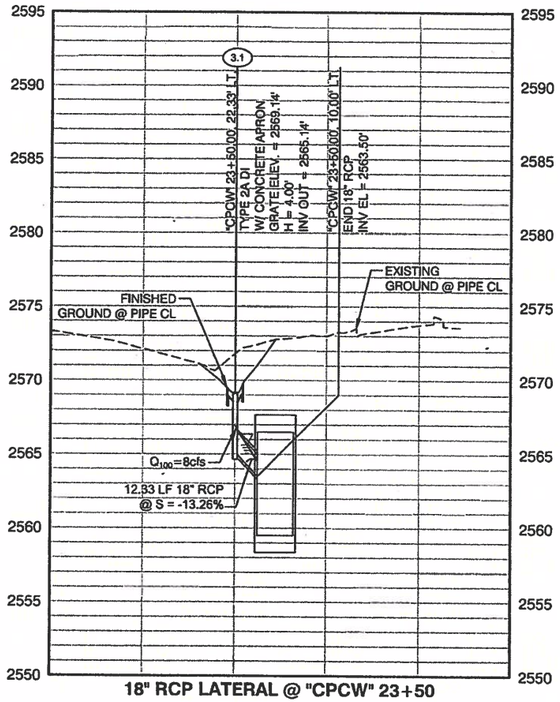
TITLE
CENTENNIAL PARKWAY CHANNEL WEST
US95, 215 TO DURANGO

SHEET
DRAINAGE LATERAL PROFILES

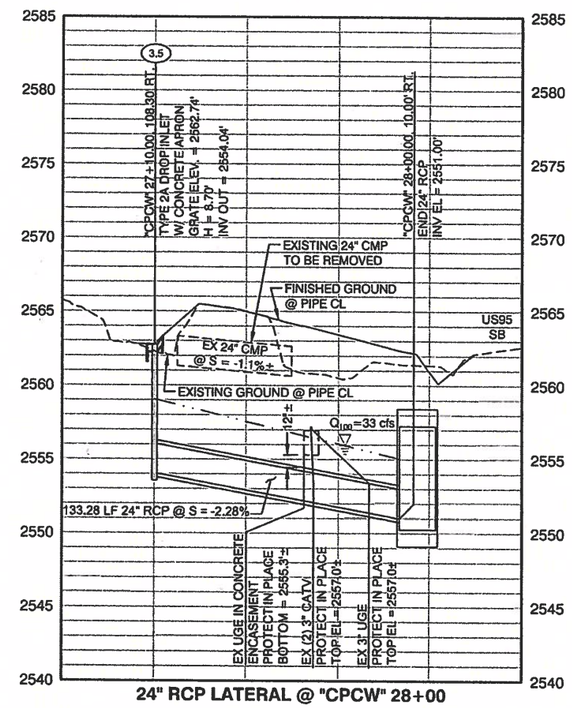
PROFESSIONAL ENGINEER - STATE OF NEVADA
JEFFREY N. GRIEST
EXP. 06/30/19
CIVIL
No. 17758

SHEET
CHSD9
29 OF 87
DRAWING NO
107v6574

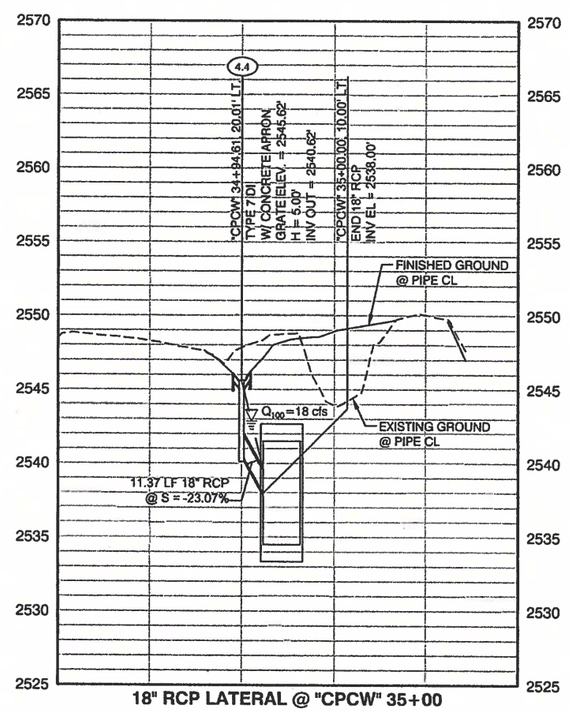
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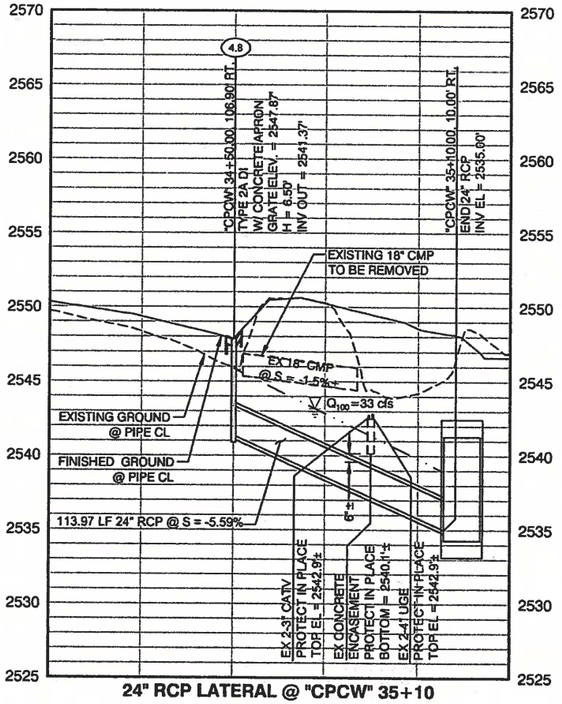
18" RCP LATERAL @ "CPCW" 23+50



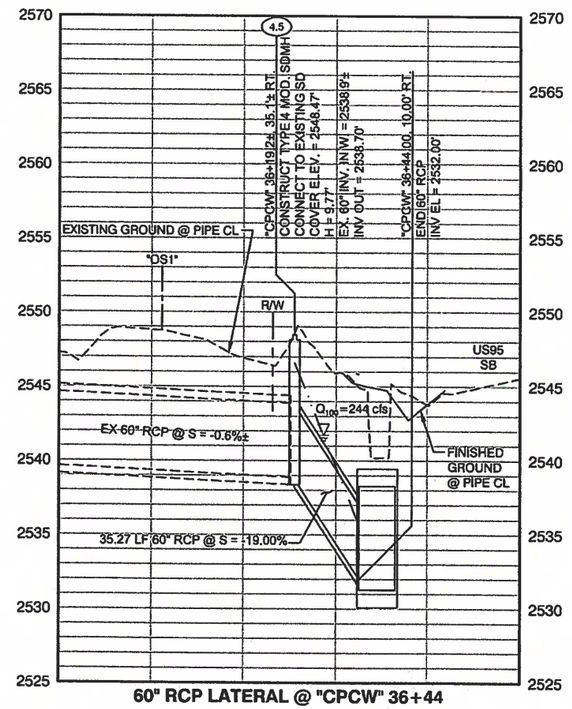
24" RCP LATERAL @ "CPCW" 28+00



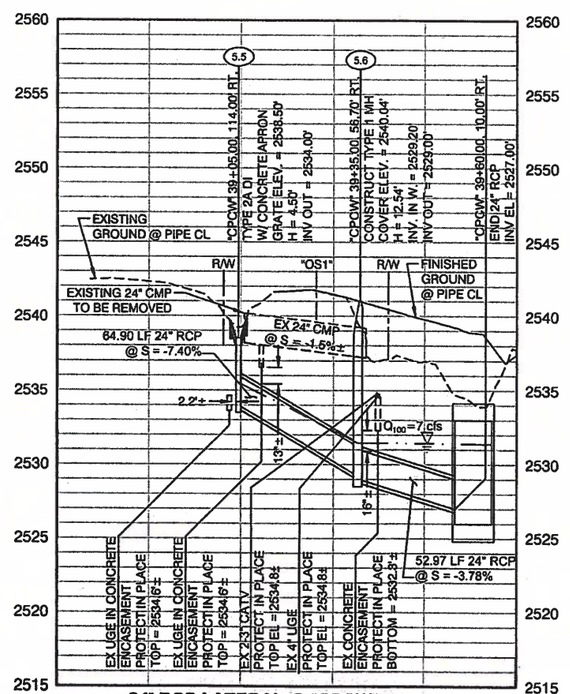
18" RCP LATERAL @ "CPCW" 35+00



24" RCP LATERAL @ "CPCW" 35+10



60" RCP LATERAL @ "CPCW" 36+44



24" RCP LATERAL @ "CPCW" 39+60

CALL BEFORE CONSTRUCTION

BEFORE YOU DIG	USA NORTH	811 OR 800-227-2600
BEFORE YOU UNDERGROUND	F.A.S.T.	702-432-5300
	CLARK COUNTY TRAFFIC OPERATIONS	702-455-7511
	CITY OF LAS VEGAS T.E.F.O.	702-229-6011
BEFORE YOU OVERHEAD	NV ENERGY	702-227-2929

NO.	DATE	REVISIONS
5		
4		
3		
2		
1		

PREPARED BY:
ch2m.
2485 VILLAGE VIEW DRIVE, SUITE 350
HENDERSON, NEVADA 89074
PHONE: 702-369-6175
FAX: 702-369-1107

PREPARED FOR
CITY OF LAS VEGAS

H# 60222 | BID# .
DATE: November 14, 2016 | DESIGNED BY: B. MAHAN
SUBMITTAL STAGE: FINAL PLANS | DRAWN BY: G. SHEARER
CHECKED BY: J. GRIEST

TITLE
CENTENNIAL PARKWAY CHANNEL WEST
US95, 215 TO DURANGO

SHEET
DRAINAGE LATERAL PROFILES

SHEET
CHSD10
30 OF 87
DRAWING NO.
107v6574

07227f-Drainage_Plans.dwg

APPENDIX G

Reference Material

Technical Drainage Study for Grand Montecito Parkway

Approval Letter

#6385

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM	DATE: June 29, 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: Grand Montecito Parkway	COPIES TO: VTN Nevada, Inc.
Cross Streets: Grand Montecito Parkway (Between Deer Springs & Dorrell)	Triple Five Nevada Development
File Number: F:\Depot\DSMemos\DS4133B.doc	Bart Anderson, P.E., DevCo
Parcel Number: 125-20-699-007 & more	
Zoning Action: N/A	
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	2/15/2007 & 2/28/2007	3/12/2007	Not Approved	$400.00	63174: $400
2nd Submittal	4/25/2007, 6/8/2007 & 6/14/2007	6/28/2007	See Comments Below	$400.00	67775: $400
			TOTAL FEES (LDDRS):	$800.00	--

REMARKS:

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

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

1. Sheet SD2:

   (a) The right-of-way in *Deer Springs Way* must be dedicated prior to the final approval of improvement plans.

2. Sheet SD3:

   (a) The proposed 8'X5' box must be reviewed and approved by *City of Las Vegas Building Department*. Provide structural calculations to *Building Department* prior to the final approval of the set of improvement plans.

   (b) The proposed 170'-public drainage easement (privately maintained) must be dedicated and recorded prior to the final approval of improvement plans. Submit legal description and an exhibit delineating the easement to Carolyn Caviness (229-6312) of *City Right of Way Section* for the recordation.

DISTRIBUTED
7-2-07

(c) All Flood Control Facilities such as but not limited to storm drains, manholes, headwalls and riprap etc. that are outside public right-of-way are to be privately maintained.

(e) Provide a storm drain manhole in the 8'x5' box at approximately *Station 10+74.13* where the 18" storm drain ties to the RCB box.

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 Storm water 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/20
AREA G-20

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: July 31, 2008
TO: **Land Development Services** Department of Public Works				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:			COPIES TO:
Grand Montecito Parkway – Update #3				VTN Nevada, Inc.
Cross Streets:	Grand Montecito Parkway (Between Deer Springs & Dorrell)			Triple Five Nevada Development
File Number:	F:\Depot\DSMemos\DS4133G.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-20-699-007 & more			
Zoning Action:	N/A			
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	2/15/2007 & 2/28/2007	3/12/2007	Not Approved	$400.00	63174: $400
2nd Submittal	4/25/2007, 5/9/2007 & 6/14/2007	6/28/2007	Approved	$400.00	67775: $400
3rd Submittal	11/26/2007	12/7/2007	Approved	N/C	N/C
4th Submittal	5/13/2008	5/27/2008	Not Approved	$100.00	94792: $100
5th Submittal (Supplement)	6/5/2008	6/18/2008	Approved	N/C	N/C
6th Submittal (Supplement)	6/20/2008	6/20/2008	Approved	N/C	N/C
7th Submittal	7/2/2008, 7/18/2008 & 7/31/2008	7/31/2008	See Comments Below	$100.00	98862: $100
			TOTAL FEES (LDDRS):	**$1,000.00**	---

REMARKS:

7th Submittal: Update to revise portion of the 8'x5' box to 4#-45"x29" HERCP due to utility conflict

6th Submittal: Supplement to previous Update to remove SDMH #12 and the associated laterals instead of to be abandoned and to be left in place

4th & 5th Submittals: Update to remove two nuisance drop inlets at the northwest and northeast corners of the intersection of *Deer Springs Way* and *Grand Montecito Parkway*

3rd Submittal: Update to relocate a proposed storm drain from Sta. 10+25.89 to Sta. 11+49.94 in *Deer Springs Way*

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

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

1. The proposed 4#-45"x29" HERCP and the 8'x5' box must be reviewed and approved by the *City of Las Vegas Building Department*. Provide structural calculations to *Building Department* prior to the final approval of the improvement plans.

The following comments are repeated until they are complete:

1. *Sheet SD2:*

   (a) The right-of-way in Deer Springs Way must be dedicated prior to the final approval of improvement plans.

2. *Sheet SD3:*

   (a) The proposed 170'-public drainage easement (privately maintained) must be dedicated and recorded prior to the final approval of improvement plans. Submit legal description and an exhibit delineating the easement to Carolyn Caviness (229-6342) of City Right of Way Section for the recordation.

   (b) All Flood Control Facilities such as but not limited to storm drains, manholes, headwalls and riprap etc. that are outside public right-of-way are to be privately maintained.

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

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

END OF REMARKS
ays

T/R/S: T19S/R60E/20
AREA G-20

Referenced Report Excerpt

D54133
2/14/07
G-20
$400

TECHNICAL DRAINAGE STUDY

FOR

GRAND MONTECITO PARKWAY

CITY OF LAS VEGAS, NEVADA

W.O. #6385

Prepared for:
TRIPLE FIVE NEV. DEV., INC.

Submitted to:
CITY OF LAS VEGAS
DEPARTMENT OF PUBLIC WORKS
LAS VEGAS, NEVADA



nevada

FEB 08 2007

EXPIRES 6/30/07

DEFINITION OF EXISTING CONDITION DISCUSSION

C. RUNOFF COMPUTATION

The site and tributary offsite basins are located within soil number 191 (see Figure 4, *Soils Map*, in the Appendix). Curve numbers were calculated for the soil group based on existing and developed conditions. Existing condition curve numbers were taken from Table 602, Sheet 4 of 4, utilizing a cover description of Desert Shrub in poor hydrologic condition. Developed condition curve numbers were taken from Table 602 sheet 1 of 4, for Urban Districts: Commercial and Business, and Roadways. Calculations for the curve numbers are included in the Appendix.

Travel Time velocities have been calculated based on the equation $V = CS^{½}$ from section 602.1 of the Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual (Manual). For basins analyzed in this study, the first 500 feet of the Travel Time Length uses the V1 set of C coefficients from the Manual and the remaining Travel Time Length uses the larger V2 set of coefficients. The Standard Form 4 computes the Travel Time separately for the V1 and V2 portions of the basin and adds them together to give the total Travel Time for the basin. Based on the hydrologic properties and land usages of the basins within this study, we feel that the 500-foot break point provides a conservative but representative assumption to where enough flow can be generated within the basin to warrant the use of the higher velocity coefficients.

D. PEAK FLOWS

The following table summarizes the peak flow generated by each offsite and onsite basin for the listed conditions.

TABLE 1. HEC-1 ANALYSIS PEAK FLOW SUMMARY

GRAND MONTECITO			
BASIN NAME	BASIN FLOW (10yr/100yr)		
	EXISTING	INTERIM	DEVELOPED
ON1	(1/4)	(5/10)	(5/10)
ON2	(0/1)	(2/3)	(2/3)
OFF1	(2/11)	(2/11)	(9/23)
CP-1	(3/15)	(6/19)	(14/32)

III. ONSITE & OFFSITE BASIN ANALYSIS

(Refer to Figure 5: *Basin Map*)

A. EXISTING CONDITION ANALYSIS

In the existing condition, the offsite and onsite areas were analyzed as undeveloped. All flows tributary to the site from west of the Riley alignment were referenced from the approved Technical Drainage Study for Centennial Hills Hospital (CHH) which

DEFINITION OF EXISTING/INTERIM CONDITION DISCUSSION

corresponds to the existing condition from the City of Las Vegas Northwest Neighborhood Study. The referenced study shows that 109cfs/374cfs (10-year/100-year) is tributary to the northwest corner of the site at the Wittig Avenue and Riley Street alignment intersection and is routed southeasterly through existing washes toward US-95. The reference study also shows that 48cfs/190cfs (10-year/100-year) is tributary to the Riley Street / Deer Springs Way intersection and is routed easterly within the Deer Springs Way alignment.

One offsite basin, OFF1, was delineated for the tributary area between the Centennial Hills Hospital property (Riley Street alignment) and the Grand Montecito right-of-way. Two onsite basins, ON1 and ON2, were delineated for the onsite area (ON1 represents Grand Montecito, while ON2 represents the north half of Deer Springs Way). The flows generated within OFF1 drain southeasterly combining with the flows generated within basin ON1. This flow continues southeasterly toward US-95.

Flows generated within ON2 combine with the offsite flows referenced from the CHH study and drain easterly along the Deer Springs Way alignment. A portion of the flow in Deer Springs Way is intercepted by an existing storm drain system that has been constructed with the Brookside development (located on the south side of Deer Springs Way) and routed south along Grand Montecito.

B. INTERIM CONDITION ANALYSIS

In the interim condition, the onsite area was analyzed as developed, while offsite basin OFF1 remains undeveloped. As in the existing condition, basin OFF1 drains southeasterly to basin ON1. Basin ON1 (Grand Montecito) and the runoff generated by basin OFF1 drain to a proposed low point in Grand Montecito. A proposed storm drain system will route the flows from the low point, north to Deer Springs Way. The storm drain system will discharge the flows along the Deer Springs Way alignment where they will continue east toward US-95.

The tributary flows from west of the Riley Street alignment were again referenced from the approved Technical Drainage Study for CHH. The CHH study shows that 92cfs/291cfs (10-year/100-year) is tributary to the northwest corner of the site at the Wittig Avenue and Riley Street alignment intersection. This flow will be intercepted by a proposed 10' x 4' RCB at the Wittig / Grand Montecito intersection that will route the flows beneath Grand Montecito and discharge it to an existing wash east of the right-of-way. The flow will continue east toward US-95 via existing washes, conforming to the drainage pattern established in the Northwest Neighborhood Study.

The referenced CHH study also shows that 77cfs/249cfs (10-year/100-year) is tributary to the Riley Street / Deer Springs Way intersection and is routed easterly within the Deer Springs Way alignment. As described in the existing condition, this flow combines with the flows generated by basin ON2. A portion of the flow will be intercepted by an existing storm drain system in Deer Springs Way and routed south along Grand Montecito. Two additional drop inlets will be constructed in the north half of the Deer

DEFINITION OF INTERIM/DEVELOP CONDITION DISCUSSION

Springs right-of-way and will connect to the existing storm drain system. The remaining flow that exceeds the capacity of the storm drain system will be routed east along Deer Springs Way toward US-95.

C. DEVELOPED CONDITION ANALYSIS

The developed condition is the same as described in the interim condition, except that basin OFF1 was analyzed using developed condition curve numbers, and the referenced flows from the CHH study that are tributary to the Wittig / Grand Montecito and Riley / Deer Springs intersections are 56cfs/92cfs and 56cfs/186cfs (10-year/100-year), respectively. All flow patterns remain the same.

IV. FACILITY DESIGN CALCULATIONS

A. STREET FLOW

In order to determine the extent of flood protection needed to protect the roadways, the depth of flow within the streets adjacent to and within the site were determined. The program FlowMaster, by Haestad Methods, has been utilized to determine the normal depth and velocity of the anticipated storm flows within the streets. The following table shows the results of these street flow analyses. The product D x V shown in Table 2 has been calculated to show that the flow within the streets meets the 2002 Clark County Regional Flood Control District (CCRFCD) Master Plan Update requirement to be less than 6 in the 10-year storm event and less than 8 in the 100-year storm event.

TABLE 2. STREET FLOW CALCULATIONS SUMMARY

FLOWMASTER SECTION	DISCHARGE (CFS)	SLOPE (%)	VELOCITY (FT/S)	DEPTH (FT)	D x V
*Grand Montecito 10-year min slope	14	0.5	2.13	0.49	1.04
*Grand Montecito 100-year min slope	32	0.5	2.22	0.65	1.44
*Grand Montecito 10-year max slope	14	4.88	5.11	0.36	1.84
*Grand Montecito 100-year max slope	32	4.88	6.19	0.45	2.79

* Flow calculations based on developed condition which represents the worst case.

The street improvements proposed with this study have been designed to meet D x V and Dry Lane Criteria. Normal depth calculations have been included in the Appendix. Note that the normal depth calculations for Deer Springs Way were referenced from the approved Conceptual Drainage Study for Montecito Town Center East and are included in the reference section of the Appendix. Also, it should be noted that the street calculations for Grand Montecito were based on the developed condition as it represents the worst case. Since the D x V and dry lane criteria are met in the developed condition for Grand Montecito, interim condition calculations were not provided.

EXISTING SD DISCUSSION FOR DEER SPRINGS

B. EXISTING STORM DRAIN SYSTEM IN DEER SPRINGS WAY

The existing storm drain system in Deer Springs Way was initially proposed in the approved Conceptual Drainage Study for Montecito Town Center East (MTCE). The MTCE study sized the storm drain and two corresponding drop inlets (one 30-foot type CM and one 15-foot type CM) on the north half of Deer Springs Way to intercept the developed condition 10-year flows.

Since the approval of the MTCE study a Technical Drainage Study for Brookside was approved, which added two additional drop inlets (one 12-foot type CM and one 18-foot type CM) to the storm drain system on the south side of the Deer Springs Way right-of-way. These drop inlets were sized to pick up the remaining 10-year flows that bypass the inlets on the north half of the right-of-way and any additional flow the Brookside development contributed to the Deer Springs Way right-of-way.

This study assumes that the storm drain system described above was constructed with the Brookside development. This project proposes to construct the drop inlets and corresponding laterals on the north half of Deer Springs Way as designed and approved in the MTCE study. Since the amount of flow tributary to Deer Springs Way has not changed since the approval of the MTCE study, the drop inlet sizing calculations, and standard form 6 analysis for the storm drain have been referenced from that study and included in the Appendix.

Due to a utility conflict, it was necessary to revise the upstream lateral in Deer Springs to an elliptical 24" x 38" RCP (previously specified as a 24" RCP). Normal depth calculations for the lateral have been included in the Appendix.

C. GRAND MONTECITO / WITTIG INTERSECTION - 10' x 4' RCB

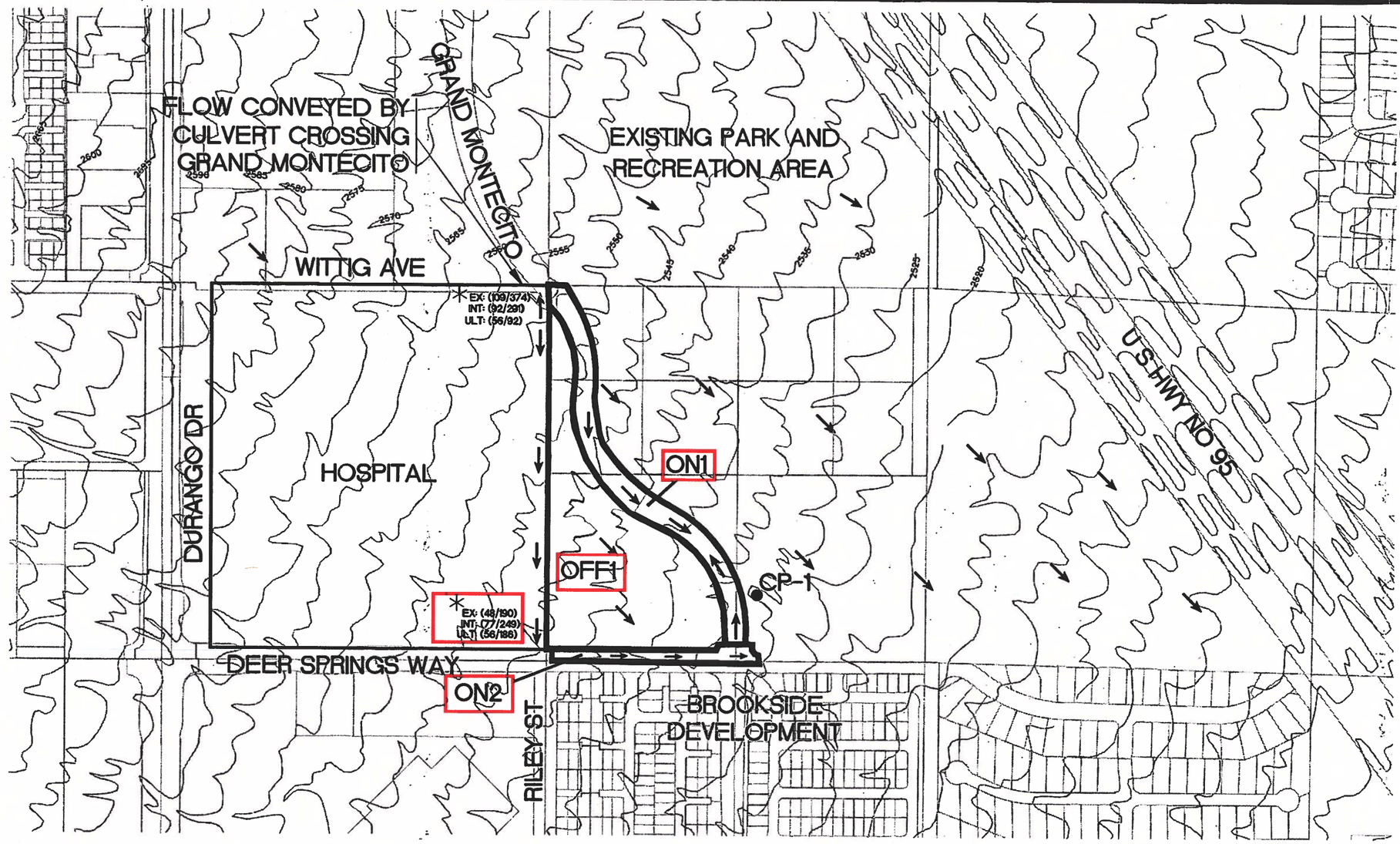
A 10' x 4' RCB culvert is proposed beneath Grand Montecito at the Wittig Avenue alignment. The proposed culvert will be utilized to maintain the flow pattern set forth in the City of Las Vegas Northwest Neighborhood Study. The culvert has been designed to convey the existing condition flow (374-cfs worst case). A HY-8 analysis of the culvert has been included in the Appendix, as well as calculations for the corresponding daylight channel.

100-YR

D. PROPOSED STORM DRAIN SYSTEM IN GRAND MONTECITO

To drain the proposed low point in Grand Montecito, a storm drain system has been designed to intercept all of the tributary 100-year flow (32-cfs developed condition – worst case). Two 12.5 foot type CM drop inlets (one on each side of the road) connect to a 36-inch RCP via 30-inch RCP laterals. The 36-inch RCP extends south to Deer Springs Way, and then east in the Deer Springs Way alignment to the east side of the old Durango Drive alignment. A daylight channel ties into an existing wash that directs the flow east

Referenced Drainage Exhibits



LEGEND

OFF1 - BASIN NAME

(40/225) - Q10/Q100

CP1 - COMBINATION POINT

→ - DIRECTION OF FLOW

▬ - BASIN DELINEATION

— - 5-FT CONTOUR

* EXISTING, INTERIM, AND DEVELOPED FLOWS ARE REFERENCED FROM THE APPROVED CENTENNIAL HILLS HOSPITAL DRAINAGE STUDY.

BASIN NAME	BASIN FLOW (10yr/100yr)		
	EXISTING	INTERIM	DEVELOPED
ON1	(1/4)	(5/10)	(5/10)
ON2	(0/1)	(2/3)	(2/3)
OFF1	(2/11)	(2/11)	(9/23)
CP-1	(3/15)	(6/19)	(14/32)

GRAPHIC SCALE

400 0 200 400 800

1" = 400'

NORTH

W.O.#: 6385-1
DATE: OCT 2006
BY: JRT
SCALE: 1"=400'
SHEET OF

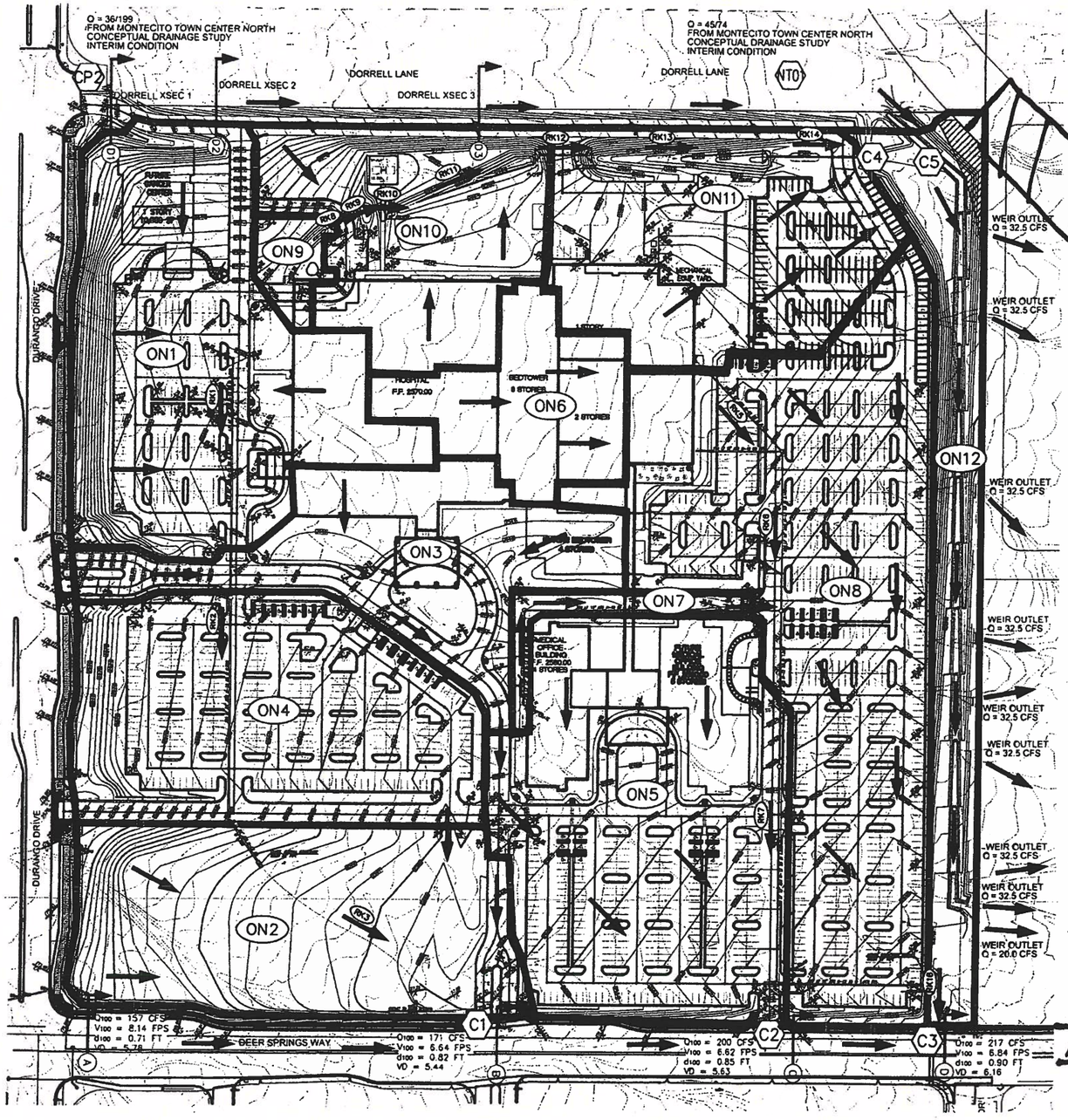
GRAND MONTECITO PARKWAY

EXISTING, INTERIM, AND DEVELOPED CONDITION

BASIN MAP

vtn nevada

FIGURE 5



PROPOSED CONDITION			
BASIN	AREA (ACRES)	Q10 (CFS)	Q100 (CFS)
ON1	4.3	8	15
ON2	N/A	7	14
ON3	N/A	7	14
ON4	N/A	7	14
ON5	3.6	8	14
ON6	N/A	12	23
ON7	3.8	7	13
ON8	N/A	16	34
ON9	2.7	6	11
ON10	4.9	11	19
ON11	N/A	16	29
ON12	1.4	3	5
ON13	N/A	3	5
ON14	N/A	3	5
ON15	0.4	<1	<1
ON16	N/A	2	3
ON17	N/A	2	3
ON18	6.4	13	24
ON19	N/A	9	17
ON20	N/A	9	17
ON21	N/A	9	17
ON22	0.3	<1	<1
ON23	N/A	<1	<1
ON24	N/A	<1	<1
ON25	N/A	<1	<1
ON26	N/A	<1	<1
ON27	2.4	1	4
ON28	N/A	2	4
ON29	N/A	2	4
ON30	N/A	2	4
ON31	3.2	3	6
ON32	N/A	4	9
ON33	N/A	4	9
ON34	N/A	4	9
ON35	N/A	85	282
ON36	2.2	1	3

LEGEND	
ON1	BASIN LABEL / ROUTING LABEL
→	FLOW DIRECTION
—	BASIN BOUNDARY
C	CONCENTRATION POINT
Q100/Q10	100 YEAR/10 YEAR FLOW RATES

NORTH

GRAPHIC SCALE

This grading plan is a part of drainage study #3822 which was received on 8/22/05 and approved on 9/16/05. Page 1 of 22

REV:	DESCRIPTION:	DATE:	BY:

Nevada By Design
ENGINEERING CONSULTANTS
3315 East Harmon Avenue
Las Vegas, Nevada 89121
Fax (702) 435-7520 Tel (702) 435-7501
www.nevadadesign.com

DRAWN BY:	JDA	SCALE:	1"=80'
DESIGNED BY:	JDA	JOB NUMBER:	04324
CHECK BY:	CLN	DATE	08/02/05

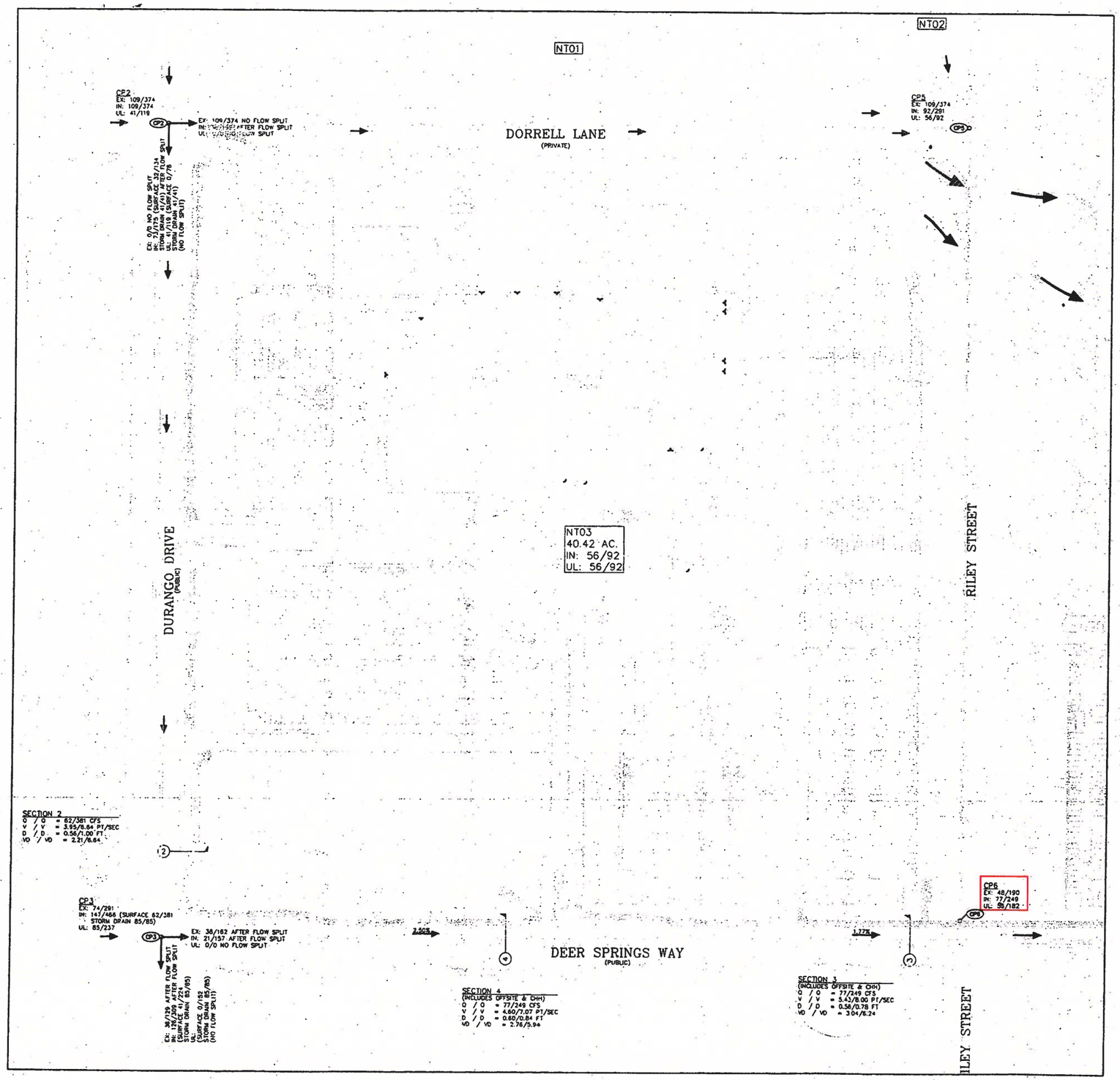
PROJECT: CENTENNIAL HILLS HOSPITAL

DRAWING TITLE: DEVELOPED CONDITION BASIN MAP

SEAL:

SHEET NO.: FIG 8

©2005



NORTH

GRAPHIC SCALE

(IN FEET)
1 inch = 80 ft.

LEGEND	
CP	COMBINATION POINT
EX	EXISTING CONDITION Q_{10}/Q_{100}, CFS
IN	INTERIM CONDITION Q_{10}/Q_{100}, CFS
UL	ULTIMATE CONDITION Q_{10}/Q_{100}, CFS

NOTE:
COMBINATION POINTS, BASIN BOUNDARIES, FLOW QUANTITIES, AND HYDRAULIC SECTIONS OBTAINED FROM "CONCEPTUAL DRAINAGE STUDY FOR MONTECITO TOWN CENTER NORTH" DATED JANUARY 31, 2003.

REV'S | DESCRIPTION: | DATE: | BY:

Nevada By Design
ENGINEERING CONSULTANTS
5130 Riggins Court, Suite 201
Reno, Nevada 89502
Phone (775) 858-1438 Fax (775) 858-1439
www.nevadabydesign.com

DRAWN BY: MDL | SCALE: 1"=80'
DESIGNED BY: MDL | JOB NUMBER: 04324
CHECK BY: MDL | DATE: 05/20/05

PROJECT: CENTENNIAL HILLS HOSPITAL

DRAWING TITLE: OFFSITE DRAINAGE MAP

SEAL:

SHEET NO:

©2006

Referenced Hydrologic Data

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1*****************************************
*                                       *
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*             SEPTEMBER 1990            *
*              VERSION 4.0              *
*                                       *
*  RUN DATE  10/20/2006  TIME  09:59:51 *
*                                       *
*****************************************
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*****************************************
*                                       *
*     U.S. ARMY CORPS OF ENGINEERS      *
*     HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*            (916) 756-1104             *
*                                       *
*****************************************
```

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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
              *DIAGRAM
    1         ID    Grand Montecito
    2         ID    Existing Condition
    3         ID    FILE: 6385-EXI.DAT
    4         ID    10/100 YR STORM EVENT
    5         ID
    6         IT       5       0       0     300
    7         IN       5       0       0
    8         IO       5       0       0
    9         JR    PREC    .500   1.000

   10         KK    OFF1E
   11         KM    EXISTING OFFSITE BASIN
   12         BA    .0124
   13         PB    3.00
   14         PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
   15         PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
   16         PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
   17         PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
   18         PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
   19         PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
   20         PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
   21         PC    .998    .999   1.00
   22         LS               78
   23         UD    0.181
              *

   24         KK    ON1E
   25         KM    EXISTING ONSITE BASIN
   26         BA    .0042
   27         LS                78
   28         UD     .186
              *

   29         KK     CP-1
   30         KM    COMBINE ON1E AND OFF1E
   31         HC        2
              *

   32         KK    ON2E
   33         KM    EXISTING ONSITE BASIN
   34         BA    .0013
   35         LS                78
   36         UD     .111
   37         ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   10       OFF1E
                .
                .
   24           .       ON1E
                .          .
                .          .
   29        CP-1.............
                .
                .
   32           .       ON2E
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION


```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             SEPTEMBER 1990            *
```

```
*****************************************
*                                       *
*     U.S. ARMY CORPS OF ENGINEERS      *
*     HYDROLOGIC ENGINEERING CENTER     *
```

```
*            VERSION 4.0              *
*                                     *
*  RUN DATE  10/20/2006  TIME  09:59:51 *
*                                     *
***************************************
```


```
*          609 SECOND STREET          *
*       DAVIS, CALIFORNIA 95616       *
*            (916) 756-1104           *
*                                     *
***************************************
```


Grand Montecito
Existing Condition
FILE: 6385-EXI.DAT
10/100 YR STORM EVENT

```
   8 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
                      .50      1.00
1
                PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                                TIME TO PEAK IN HOURS

                                                                  RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION      AREA     PLAN                    RATIO 1  RATIO 2
                                                                   .50      1.00

 HYDROGRAPH AT
+                OFF1E         .01      1   FLOW                   2.       11.
                                           TIME                3.67     3.58

 HYDROGRAPH AT
+                ON1E          .00      1   FLOW                   1.        4.
                                           TIME                3.67     3.58

   2 COMBINED AT
+                 CP-1         .02      1   FLOW                   3.       15.
                                           TIME                3.67     3.58

 HYDROGRAPH AT
+                ON2E          .00      1   FLOW                   0.        1.
                                           TIME                3.58     3.58


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

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             SEPTEMBER 1990            *
*              VERSION 4.0              *
*                                       *
*  RUN DATE  10/20/2006  TIME  09:59:42 *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*     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

1 HEC-1 INPUT PAGE 1

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

              *DIAGRAM
    1         ID    Grand Montecito
    2         ID    Interim Condition
    3         ID    FILE: 6385-INT.DAT
    4         ID    10/100 YR STORM EVENT
    5         ID
    6         IT       5       0       0     300
    7         IN       5       0       0
    8         IO       5       0       0
    9         JR    PREC    .500   1.000

   10         KK   OFF1E
   11         KM   EXISTING OFFSITE BASIN
   12         BA   .0124
   13         PB   3.00
   14         PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
   15         PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
   16         PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
   17         PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
   18         PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
   19         PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
   20         PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
   21         PC    .998    .999   1.00
   22         LS              78
   23         UD   0.181
              *

   24         KK   ON1D
   25         KM   DEVELOPED ROAD
   26         BA   .0042
   27         LS              98
   28         UD    .055
              *

   29         KK    CP-1
   30         KM   COMBINE ON1D AND OFF1E
   31         HC       2
              *

   32         KK   ON2D
   33         KM   DEVELOPED ROAD
   34         BA   .0013
   35         LS              98
   36         UD    .050
              *

   37         ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   10       OFF1E
              .
              .
   24         .        ON1D
              .          .
              .          .
   29        CP-1.............
              .
              .
   32         .        ON2D
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
```

```
*****************************************
*                                       *
*     U.S. ARMY CORPS OF ENGINEERS      *
```

```
*                                        *
*          SEPTEMBER 1990                *
*           VERSION 4.0                  *
*                                        *
*  RUN DATE  10/20/2006  TIME  09:59:42  *
*                                        *
******************************************
```


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


Grand Montecito
Interim Condition
FILE: 6385-INT.DAT
10/100 YR STORM EVENT

```
  8 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
                      .50     1.00
1

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

                                                                RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN                  RATIO 1  RATIO 2
                                                              .50     1.00

 HYDROGRAPH AT
+                 OFF1E       .01     1   FLOW              2.      11.
                                           TIME            3.67     3.58

 HYDROGRAPH AT
+                 ON1D        .00     1   FLOW              5.      10.
                                           TIME            3.50     3.50

   2 COMBINED AT
+                  CP-1       .02     1   FLOW              6.      19.
                                           TIME            3.50     3.50

 HYDROGRAPH AT
+                 ON2D        .00     1   FLOW              2.      3.
                                           TIME            3.50     3.50


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

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*         SEPTEMBER 1990                *
*           VERSION 4.0                 *
*                                       *
*  RUN DATE  10/20/2006  TIME  09:59:30 *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    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

1 HEC-1 INPUT PAGE 1

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

              *DIAGRAM
    1         ID    Grand Montecito
    2         ID    Develeoped Condition
    3         ID    FILE: 6385-DEV.DAT
    4         ID    10/100 YR STORM EVENT
    5         ID
    6         IT       5       0       0     300
    7         IN       5       0       0
    8         IO       5       0       0
    9         JR    PREC    .500   1.000

   10         KK   OFF1D
   11         KM   DEVELOPED OFFSITE BASIN
   12         BA   .0124
   13         PB   3.00
   14         PC   .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
   15         PC   .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
   16         PC   .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
   17         PC   .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
   18         PC   .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
   19         PC   .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
   20         PC   .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
   21         PC   .998    .999   1.00
   22         LS              93
   23         UD   0.123
              *

   24         KK   ON1D
   25         KM   DEVELOPED ROAD
   26         BA   .0042
   27         LS             98
   28         UD    .055
              *

   29         KK    CP-1
   30         KM   COMBINE ON1D AND OFF1D
   31         HC       2
              *

   32         KK   ON2D
   33         KM   DEVELOPED ROAD
   34         BA   .0013
   35         LS             98
   36         UD    .050
              *

   37         ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    10      OFF1D
              .
              .
    24        .        ON1D
              .          .
              .          .
    29      CP-1.........
              .
              .
    32        .        ON2D
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
```

```
*          SEPTEMBER 1990           *
*           VERSION 4.0             *
*                                   *
*  RUN DATE  10/20/2006  TIME  09:59:30 *
*                                   *
*************************************
```


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


Grand Montecito
Develeoped Condition
FILE: 6385-DEV.DAT
10/100 YR STORM EVENT

```
  8 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
                     .50      1.00
1
              PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                          FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                       TIME TO PEAK IN HOURS
```

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .50	RATIO 2 1.00
HYDROGRAPH AT						
+	OFF1D	.01	1	FLOW	9.	23.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	ON1D	.00	1	FLOW	5.	10.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP-1	.02	1	FLOW	14.	32.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ON2D	.00	1	FLOW	2.	3.
				TIME	3.50	3.50

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

Referenced Hydraulic Data

Drop Inlet Calculations

Drop Inlet Design
30' Modified Type C Drop Inlet

Grate Portion of the inlet

Use 50% Clogging Factor to Determine Length
Grate L= 30 L*0.5= 15

T=	28.64 ft	water spread
n=	0.016	manning's roughness
Sx=	0.02	Street tansverse slope
So=	0.0197	Street longitudinal slope
W=	1.5 ft	
L=	15 ft	Grate length in feet

Qs= Qx+Qw= 55.5

Qx= 48.1

Eo= Qw/Qs= (Qs-Qx)/Qs= 0.13

Vs=	6.8	flow velocity
Vo=	6.8	Splash over velocity
Rf=	1.00	Rf=1-.09(Vs-Vo) or 1 if Vo>Vs
Rs=	0.68	Rs=1/[1+(0.15Vs^1.8)/(Sx*L^2.3)

Qi= Rf*Qw+Rs*Qx 40.20 cfs

Curb Opening Portion of the inlet

Use 50% Clogging Factor to Determine Length
L=30' L/2= 15 ft

T=	28.64 ft	water spread
n=	0.016	manning's roughness
Sx=	0.02	Street tansverse slope
So=	0.0197	Street longitudinal slope
Sw=	0.05	Gutter Cross Slope
Lt=	104.89 ft	
Qi=	13.46	

Qi tot= 53.66 cfs Total Intercepted by inlet.

Qc= 2.34 cfs Total Flow By

Drop Inlet Design
15' Modified Type C Drop Inlet

Grate Portion of the inlet

Use 50% Clogging Factor to Determine Length

Grate L=	2.5	L*0.5=	7.5

T=	15.55 ft	water spread
n=	0.016	manning's roughness
Sx=	0.02	Street tansverse slope
So=	0.083	Street longitudinal slope
W=	1.5 ft	
L=	7.5 ft	Grate length in feet

Qs=	Qx+Qw=	22.3	
Qx=	17.0		
Eo=	Qw/Qs=	(Qs-Qx)/Qs	0.24

Vs=	6.8	flow velocity
Vo=	6.8	Splash over velocity
Rf=	1.00	Rf=1-.09(Vs-Vo) or 1 if Vo>Vs
Rs=	0.30	Rs=1/[1+(0.15Vs^1.8)/(Sx*L^2.3)

Qi=	Rf*Qw+Rs*Qx	10.45 cfs

Curb Opening Portion of the inlet

Use 50% Clogging Factor to Determine Length

L=15	L/2=	7.5 ft	

T=	20.69 ft	water spread
n=	0.016	manning's roughness
Sx=	0.02	Street tansverse slope
So=	0.0083	Street longitudinal slope
Sw=	0.05	Gutter Cross Slope
Lt=	49.62 ft	
Qi=	5.70	

Qi tot=	**16.15 cfs**	**Total Intercepted by inlet.**
Qc=	**6.19 cfs**	**Total Flow By**

APPENDIX J

Drop Inlet Calculations

DROP INLET #1 (Proposed)

Grate Inlet Capacity with Continuous Grade (ref. CCRFCD HC&DM)

$Q_i = [R_f E_o + R_s (1-E_o)]Q_s$

Where:

$R_f = 1$

$R_s = 1 / [1 + 0.15 V_s^{1.8}/S_x L^{2.3}]$

$E_o = Q_w / Q_s = Q_s - Q_x / Q_s$

$Q_s = (0.56/n) S_x^{1.67} T^{2.67} S_o^{0.5}$

Q_i = Ideal inlet capacity

Q_w = Frontal flow

Q_s = Street capacity

V_s = Flow velocity

L = Grate inlet length in ft

n = Manning's roughness

S_x = Street transverse slope in ft/ft

S_o = Street longitudinal slope in ft/ft

T = Water spread on street

Input data:

S_x =	0.02	L =	9	S_o =	0.0282	n =	0.015

Q_s = 8

T =	12.3
V_s =	5.31
R_s =	0.51
Q_x =	5.2
E_o =	0.35
Q_i =	5.4

Curb Opening Capacity with Continuous Grade (ref. CCRFCD HC&DM)

$Q_i = [1 - (1 - (L_c/L_t)^{1.8})]Q_s$

Where:

$Qs = (0.56/n) S_x^{1.67} T^{2.67} S_o^{0.5}$

$L_t = 0.60 Q_s^{0.42} S_o^{0.30} (1/nS_e)^{0.6}$

$S_e = S_x + (S_w * E_o)$

$E_o = Qw / Qs$

Q_i = Ideal inlet capacity

Q_w = Frontal flow

Q_s = Street capacity

L_t = Required curb opening length in ft

L_c = Designed curb opening length in ft

n = Manning's roughness

S_x = Street transverse slope in ft/ft

S_w = Gutter cross slope in ft/ft

So = Street longitudinal slope in ft/ft

T = Water spread on street

Input data:

S_x =	0.02	L_c =	9	Q_s =	8	S_o =	0.0282	n =	0.015

S_w = 0.0866

T =	12.3
Q_s =	4.6
L_t =	0.43
S_e =	0.0570
L_c =	34.2
Q_i =	3
Total Q_i =	9 cfs

DI Capacity = 9-cfs, therefore all 8-cfs in street is collected by DI

L_t (Length Required for 50% Clogging = 18

DROP INLET #2 (Proposed)

Grate Inlet Capacity with Continuous Grade (ref. CCRFCD HC&DM)

$Q_i = [R_f E_o + R_s (1-E_o)]Q_s$

Where:

$R_f = 1$

$R_s = 1 / [1 + 0.15 V_s^{1.8}/S_x L^{2.3}]$

$E_o = Q_w / Q_s = Q_s - Q_x / Q_s$

$Q_s = (0.56/n) S_x^{1.67} T^{2.67} S_o^{0.5}$

Q_i = Ideal inlet capacity

Q_p = Frontal flow

Q_s = Street capacity

V_s = Flow velocity

L = Grate inlet length in ft

n = Manning's roughness

S_x = Street transverse slope in ft/ft

S_o = Street longitudinal slope in ft/ft

T = Water spread on street

Input data:

S_x = 0.02 L = 6 S_o = 0.0282 n = 0.015 Q_s = 3

T =	8.5
V_s =	4.12
R_s =	0.39
Q_w =	1.7
E_o =	0.44
Q_i =	2.0

Curb Opening Capacity with Continuous Grade (ref. CCRFCD HC&DM)

$Q_i = [1 - (1 - (L_c/L_t)^{1.8})]Q_s$

Where:

$Q_s = (0.56/n) S_x^{1.67} T^{2.67} S_o^{0.5}$

$L_t = 0.60 Q_s^{0.42} S_o^{0.30} (1/nS_e)^{0.6}$

$S_e = S_x + (S_w * E_o)$

$E_o = Ow / Qs$

Q_i = Ideal inlet capacity

Q_p = Frontal flow

Q_s = Street capacity

L_t = Required curb opening length in ft

L_c = Designed curb opening length in ft

n = Manning's roughness

S_x = Street transverse slope in ft/ft

S_w = Gutter cross slope in ft/ft

So = Street longitudinal slope in ft/ft

T = Water spread on street

Input data:

S_x = 0.02 L_c = 6 Q_s = 3 S_o = 0.0282 n = 0.015 S_w = 0.0866

T =	8.5
Q_w =	1.4
E_o =	0.54
S_e =	0.0670
L_t =	20.5
Q_i =	1
Total Q_i =	3.4 cfs

DI Capacity = 3.4-cfs, therefore all 3-cfs in street is collected by DI

Length Required for 50% Clogging = 12

Referenced Improvement Plans

IMPROVEMENT PLANS

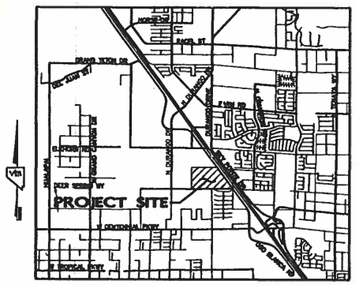
FOR

THE GREAT MALL GRAND MONTECITO & DEER SPRINGS IMPROVEMENTS

CITY OF LAS VEGAS
STATE OF NEVADA

APN NOS.

125-20-601-003
125-20-601-005
125-20-601-006
125-20-602-002
125-20-602-003
125-20-602-005
125-20-602-006
125-20-602-007
125-20-602-008
125-20-603-001
125-20-603-002
125-20-603-003
125-20-603-004



SHEET INDEX

SHEET#	SHEET	DESCRIPTION
1	C1	COVER SHEET
2	C2	GENERAL NOTES SHEET
3	C3	MANHOLE SCHEDULE & QUANTITY ESTIMATE
4	ST1	STREET PLAN & PROFILE – DEER SPRINGS WAY STA: 9+40.05 TO STA: 12+90.63
5	ST2	STREET PLAN & PROFILE – DEER SPRINGS WAY STA: 12+90.63 TO STA: 17+37.33
6	ST3	STREET PLAN & PROFILE – GRAND MONTECITO PKWY STA: 9+23.98 TO STA: 14+00.00
7	ST4	STREET PLAN & PROFILE – GRAND MONTECITO PKWY STA: 14+00.00 TO STA: 19+42.30
8	ST5	STREET PLAN & PROFILE – GRAND MONTECITO PKWY STA: 19+42.30 TO STA: 25+77.07
9	DT1	DETAIL SHEET – SECTIONS AND DETAILS
10	UT1	MASTER UTILITY PLAN I
11	UT2	MASTER UTILITY PLAN II
12	UT3	MASTER UTILITY PLAN III
13	SS1	SEWER PLAN & PROFILE GRAND MONTECITO PARKWAY STA: 21+23.27 TO STA: 25+33.83
14	SS2	SEWER PLAN & PROFILE GRAND MONTECITO PARKWAY STA: 14+55.88 TO STA: 21+23.27
15	SS3	SEWER PLAN & PROFILE GRAND MONTECITO PARKWAY STA: 11+47.53 TO STA: 14+55.88
16	SS4	SEWER PLAN & PROFILE GRAND MONTECITO PARKWAY STA: 8+87.42 TO STA: 11+47.53
17	SS5	SEWER STUBS PLAN & PROFILE GRAND MONTECITO PARKWAY STA:9+16.27 TO 10+36.49 & STA: 10+00.00 TO 10+47.48
18	SD1	STORM DRAIN PLAN & PROFILE – GRAND MONTECITO PKWY (SOUTH) STA: 9+49.97 TO 14+28.74 & STA: 9+27.10 TO 10+00.00
19	SD2	SOUTH STORM DRAIN PLAN AND PROFILE – DEER SPRINGS WAY STA: 14+28.74 TO STA: 23+99.16
20	SD3	NORTH STORM DRAIN PLAN AND PROFILE STA: 9+19.05 TO STA: 16+50.00
21	SD4	NORTH STORM DRAIN PLAN AND PROFILE STA: 16+50.00 TO STA: 21+78.51
22	SD5	STORM DRAIN PLAN AND PROFILE – DEER SPRINGS WAY DI #3 & DI #4 & GRAND MONTECITO PKWY N.
23	TR1	TRAFFIC, SIGNAGE, STRIPING & STREET LIGHTING PLAN
24	TR2	TRAFFIC, SIGNAGE, STRIPING & STREET LIGHTING PLAN
25	TR3	TRAFFIC, SIGNAGE, STRIPING & STREET LIGHTING PLAN
26	WT1	12" WATER PLAN & PROFILE – GRAND MONTECITO PKWY (SOUTH)
27	WT2	12" WATER PLAN & PROFILE – GRAND MONTECITO PKWY (MID)
28	WT3	12" WATER PLAN & PROFILE – GRAND MONTECITO PKWY (NORTH)
29	L1.1-3	IRRIGATION PLAN – BY OTHERS
30	L2.1-3	HARDSCAPE PLAN – BY OTHERS
31	L3.1-3	PLANTING PLAN – BY OTHERS

TRIPLE FIVE NEVADA DEVELOPMENT CP.

9510 W. SAHARA AVE.
LAS VEGAS, NV 89117
PH# (702) 242-6937

LEGAL DESCRIPTION:

THE SOUTHEAST (SE ¼) QUARTER OF THE NORTHEAST (NE ¼) OF SECTION 20 & PORTION OF THE SOUTHWEST QUARTHER (SW ¼) OF THE NORTHWEST QUARTER (NW ¼) OF SECTION 21, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

BENCHMARK:

PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988
BENCHMARK: CITY OF LAS VEGAS BENCH BLV90 20E8
ELEVATION: 775.1977 METERS (2543.29) RIVET AND PLATE IN CONCRETE CYLINDER NW CORNER DEER SPRINGS AND RILEY

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 89°56'20" EAST, BEING THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN ON A RECORD OF SURVEY RECORDED IN THE CLARK COUNTY, NEVADA, RECORDER'S OFFICE IN FILE 118 AT PAGE 89.

110515 112182 RGM 112702

REVISION #	REVISION DESCRIPTION	SHEET(S)	APPROVED BY	DATE APPROVED

ENGINEER DISCLAIMER 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 AND OVERHEAD UTILITIES AND NOTIFY THE DESIGN ENGINEER IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO COMMENCING CONSTRUCTION.
NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HERON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

PROJECT NAME: THE GREAT MALL EXPANSION IMP.

This project water plan complies with the Las Vegas Valley Water District's technical requirements. However, this water plan is

NOT APPROVED FOR CONSTRUCTION

at this time and this signature does not provide or imply a water commitment.

LVVWD Proj. 114220 WT1-WT3 9/7/07 DATE
SHTS C1,C2,ST1-ST3, SD4,SD5 ESN.052

Avoid cutting underground utility lines. It's costly. Call before you Dig 1-800-227-2600

Avoid overhead power line contact. It's costly. Call before you Overhead 1-702-227-2929

Call before you Underground 1-702-385-7011 1-702-259-3011

APPROVALS

CITY ENGINEER — DATE 4/25/07

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

CITY PLANNING Doug Rankin, AICP, Planning Manager — DATE 10.17.07

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING AND DEVELOPMENT DEPARTMENT

CITY FIRE MARSHAL — DATE 9/25/07

LAS VEGAS VALLEY WATER DISTRICT PROJ. #114220 — DATE 12-10-07

SHTS. C1, C2, UT1–UT3, SD1, SD2, SD5 & WT1–WT3

SOUTHWEST GAS CORPORATION — DATE 9-6-07

NEVADA POWER COMPANY — DATE 9-6-07

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

COX COMMUNICATIONS LAS VEGAS, INC. — DATE 9/6/07

EMBARQ — DATE 9.6.07

"THE AFFIXED EMBARQ APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUTES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS."

H-23960

REV	DATE	BY	REVISION
2	8-12-08	RMM	ADD ELLIPTICAL PIPE TO SD SYSTEM, SHTS 3, 8, 18, 4, 22 — MS STAMP 10-8-08
1	7-11-08	RMM	REMOVE ZOMMFDS SHEETS 3, 8, 18, 4, 22 — 7/14/08

TRIPLE FIVE NEVADA DEVEL. CP.
9510 W. SAHARA AVE. SUITE 240
LAS VEGAS, NV 89117
PH# (702) 430-5800

CITY OF LAS VEGAS

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH (702) 873-7220 FAX (702) 362-2987 WEB WWW.VHANN.COM
CONSULTING ENGINEERS ● PLANNERS ● LAND SURVEYORS

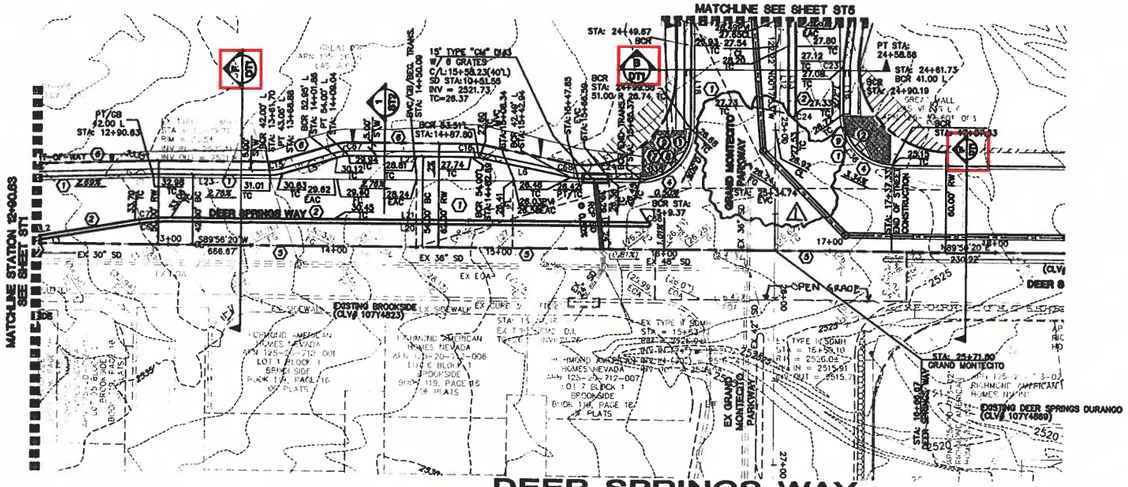
DRAWN BY: RMM
DESIGNED BY: RMM/AAM
CHECKED BY: MAW
PROJECT NO: 4360-1
SCALE: N/A HORIZ. N/A VERT.
1/29/07

COVER SHEET

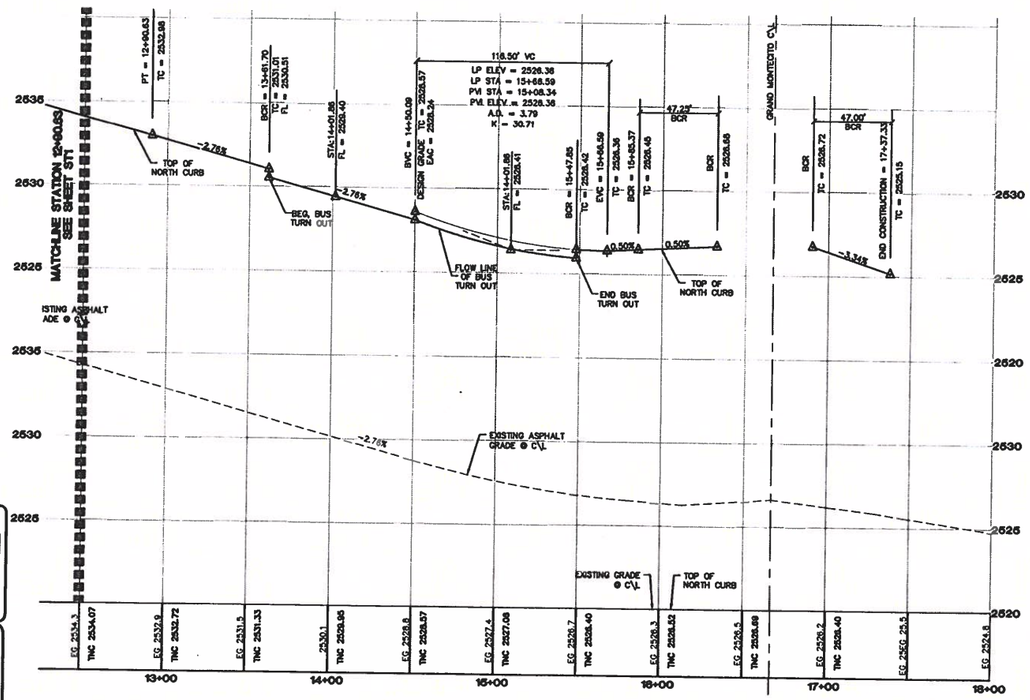
THE GREAT MALL GRAND MONTECITO & DEER SPRINGS IMPROVEMENTS

SHEET C1 1 OF 31 SHEETS
DRAWING NO. 1077 4966-05

H:\0360\OFFSITE\0360-C1.dwg, 9/5/2007 8:56:41 AM, rathmann, 1:40



DEER SPRINGS WAY
(PUBLIC)



Call before you Overhead 1-702-227-2929
Call before you Dig 1-800-227-2600
Call before you Underground
1-702-455-7511
CLARK COUNTY TRAFFIC OPERATIONS
AND
1-702-229-6811
FREEWAY AND INTERSTATE SYSTEM OF TRANSPORTATION

110519 112183

LEGAL DESCRIPTION:

THE SOUTHEAST (SE ¼) QUARTER OF THE NORTHEAST (NE ¼) OF SECTION 20 & PORTION OF THE SOUTHWEST QUARTER (SW ¼) OF THE NORTHWEST QUARTER (NW ¼) OF SECTION 21, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

BENCHMARK:

PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988
BENCHMARK: CITY OF LAS VEGAS BENCH 8LV90 20E6
ELEVATION: 775.1977 METERS (2543.29) RIVET AND PLATE IN CONCRETE CYLINDER NW CORNER DEER SPRINGS AND RILEY

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THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 89°56'20" EAST, BEING THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN ON A RECORD OF SURVEY RECORDED IN THE CLARK COUNTY, NEVADA, RECORDER'S OFFICE IN FILE 118 AT PAGE 89.

NORTH

GRAPHIC SCALE
40 0 20 40 80
1" = 40'

PROFILE SCALES:
HORZ. = 1"=40'
VERT. = 1"=4'

HANDICAP RAMP CHART

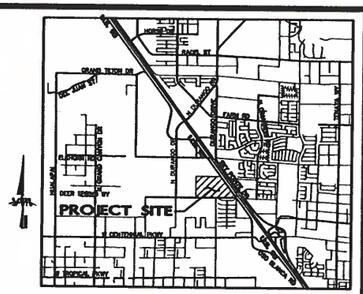
NO.	"A"	"B"	CASE
①	6.0'	8.0'	II
②	4.5'	12.0'	II

BACK OF CURB CURVE TABLE

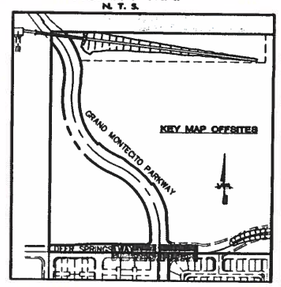
CURVE	LENGTH	RADIUS	DELTA	TANGENT
C15	7.29'	25.00'	16°41'57"	3.67'
C16	4.93'	25.00'	11°18'36"	2.48'
C23	3.08'	25.00'	7°03'48"	1.54'
C24	6.28'	2.00'	180°00'00"	INFINITE'
C35	47.25'	30.00'	90°14'13"	30.12'
C36	47.00'	30.00'	89°45'47"	29.88'
C66	3.14'	1.00'	180°00'00"	INFINITE'
C67	7.29'	25.00'	16°41'57"	3.67'
C68	4.93'	25.00'	11°18'36"	2.48'

BACK OF CURB LINE TABLE

LINE	LENGTH	BEARING
L5	34.42'	S73°14'22"W
L6	56.24'	N78°45'05"W
L12	40.87'	N00°17'53"W
L13	60.87'	N00°17'53"W
L18	49.89'	N00°17'53"W
L19	28.46'	N00°17'53"W
L20	289.21'	S89°56'20"W
L21	289.05'	S89°56'20"W
L22	73.86'	S89°56'20"W
L23	71.33'	S89°56'20"W
L24	37.52'	S89°56'20"W

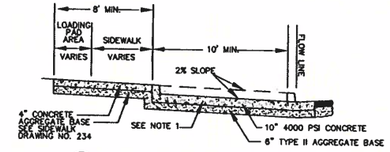


VICINITY MAP
N. T. S.



CONSTRUCTION ITEMS

1. CONSTRUCT 24" TYPE "L" CURB & GUTTER PER STD. DWG. NO. 216.
2. CONSTRUCT TYPE "A" ISLAND CURB PER STD. DWG. NO. 219.
3. CONSTRUCT 8 FOOT WIDE CROSS GUTTER PER STD. DWG. NO. 223.
4. CONSTRUCT PUBLIC R.O.W. CURB RETURN, SIDEWALKS PER STD. DWG. NO'S., 216, 234 & 235.
5. SAWCUT AND REMOVE ASPHALT PAVING. MATCH EXISTING EDGE WITH NEW PAVING.
6. CONSTRUCT 5' SIDEWALK PER STD. DWG. NO. 234
7. R1-1 STOP SIGN
8. (2) STREET SIGNS PER DWG. NO. 250.
9. CONSTRUCT H/C RAMP PER STD. DWG #235
10. CONSTRUCT BUS TURN OUT PER STD. DWG NO. 234.1 (SEE DETAIL SHEET ST2)



1 TYPICAL BUS TURN OUT DETAIL

NOTES:
1. CONCRETE BUS PAD SHALL BE MONOLITHIC. TRANSVERSE WEAKENED PLANE JOINTS SHALL BE INSTALLED AT 10' INTERVALS AND AS DETAILED IN STANDARD DRAWING NO. 233, TYPE "C".
2. BUS ROUTE SIGN SHALL BE INSTALLED AT THE DOWNSTREAM END OF BUS STOP LOADING PAD.
3. A MINIMUM OF ONE SET OF PAVEMENT MARKINGS CONTAINING THE "BUSES ONLY" SYMBOL SHALL BE PLACED IN THE TURN-OUT AREA. EXACT LOCATION TO BE DETERMINED BY THE ENGINEER.
4. ADDITIONAL STORAGE AREA WILL BE REQUIRED WHEN MORE THAN ONE BUS IS EXPECTED TO OCCUPY THE TURN-OUT AT THE SAME TIME.
5. ALTERNATE CONCRETE AND BASE THICKNESSES MAY BE SUBSTITUTED, BUT MUST BE SUPPORTED BY ENGINEERING ANALYSIS AND APPROVED BY THE ENGINEER.
6. TURN-OUT SURFACE SHALL BE TEXTURED IN ACCORDANCE WITH UNIFORM STANDARD SPECIFICATION NO. 409.03.08. FLOW LINE SHALL NOT BE TEXTURED, BUT SHALL BE A TROWELED SURFACE.

LEGEND

FG	FINISH GRADE	2400	EX. CONTOUR(5' INTERVAL)
FL	FLOW LINE		EX. CONTOUR(1' INTERVAL)
TC	TOP OF CURB		PROPOSED CONTOUR
EAC	EDGE OF ASPHALT PAVEMENT	42.1	PROPOSED PAD GRADE
FUT.	FUTURE		FUT./EXIST. PAD GRADE
EXIST	EXISTING (EX.)	0.50%	SLOPE AND FLOW DIRECTION
NG	NATURAL GROUND		SAW CUT & MATCH A.C.
H.P.	HIGH POINT	TCS OR ATA	SIDEWALK RAMP
L.P.	LOW POINT		SCARP AREA
C/L	CENTER LINE	27	LOT NUMBER
BC	BACK OF CURB		SIGHT VISIBILITY ZONES
BCR	BEGIN CURB RETURN		PROJECT BOUNDARY LINE
VPI	VERTICAL POINT OF INTERSECTION		SETBACK LINE
GB	GRADE BREAK		R/W OR P/L
TOP	TOP OF CHANNEL/SCARP		CENTER LINE
TOE	TOE OF CHANNEL/SCARP		BACK OF CURB
TOB	TOP OF BOX		FACE OF CURB
PP	POWER POLE		LIP OF GUTTER
TRANS.	TRANSITION		EXIST. IMPROVEMENTS
RET.	RETAINMENT		FUTURE IMPROVEMENTS
INT.	INTERSECTION		EXIST. DIRT ROAD
D.G.	DESIGN GRADE		EXIST. AC
BFE=	BASE FLOOD ELEVATION		CONSTRUCTION PHASE LINE OR UNIT BOUNDARY LINE
RCP	REINFORCED CONCRETE PIPE		MATCHLINE
SD	STORM DRAIN		
DI	DROP INLET		
R/W, ROW	RIGHT-OF-WAY		
S/W	SIDEWALK		
BCL	BACK OF CURB LENGTH		

FOR ALL GRADING & STREET SECTIONS SEE DTL SHT 9 OF 28.

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NOTE:
ALL SIDEWALK/AMENITY ZONES TO BE BUILT TO MONTECITO/TOWN CENTER STANDARDS.

H 23960

NO	DATE	BY	REVISION
1	7-14-06	RWM	REMOVE BASIC DET. & SHOW H.C. RAMP DET.

TRIPLE FIVE NEVADA DEVEL CP.
9440 W. SAHARA AVE., SUITE 240
LAS VEGAS, NV 89117
PH# (702) 430-5800

CITY OF LAS VEGAS
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH. (702) 873-7553 FAX (702) 362-2567 WEB WWW.FVMH.COM
CONSULTING ENGINEERS & PLANNERS & LAND SURVEYORS

STREET PLAN & PROFILE DEER SPRINGS WAY STA: 12+90.63 TO STA: 17+37.33

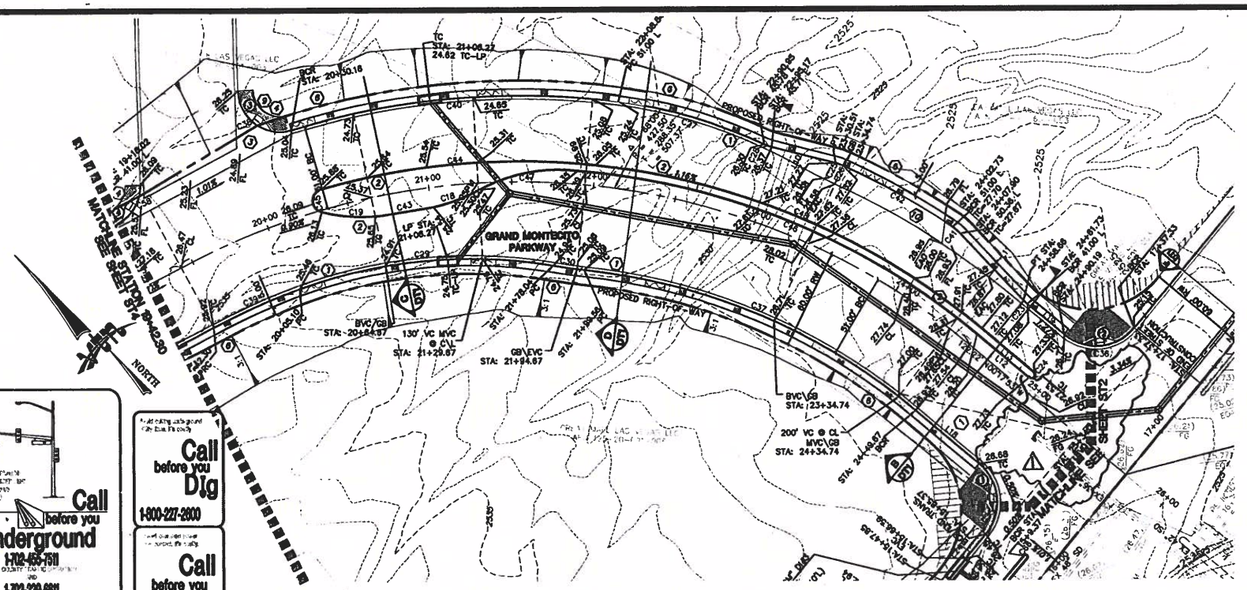
THE GREAT MALL GRAND MONTECITO & DEER SPRINGS IMPROVEMENTS

DRAWN BY: RWM — APRIL, 2007
DESIGNED BY: RWM/RWM — APRIL, 2007
CHECKED BY: MAW — JUNE, 2007
PROJECT NO: 0305 — SCALE: 1"=40' HORIZ. 1"=4' VERT.



SHEET ST2
6 OF 31 SHEETS
DRAWING NO. 107Y4966-05

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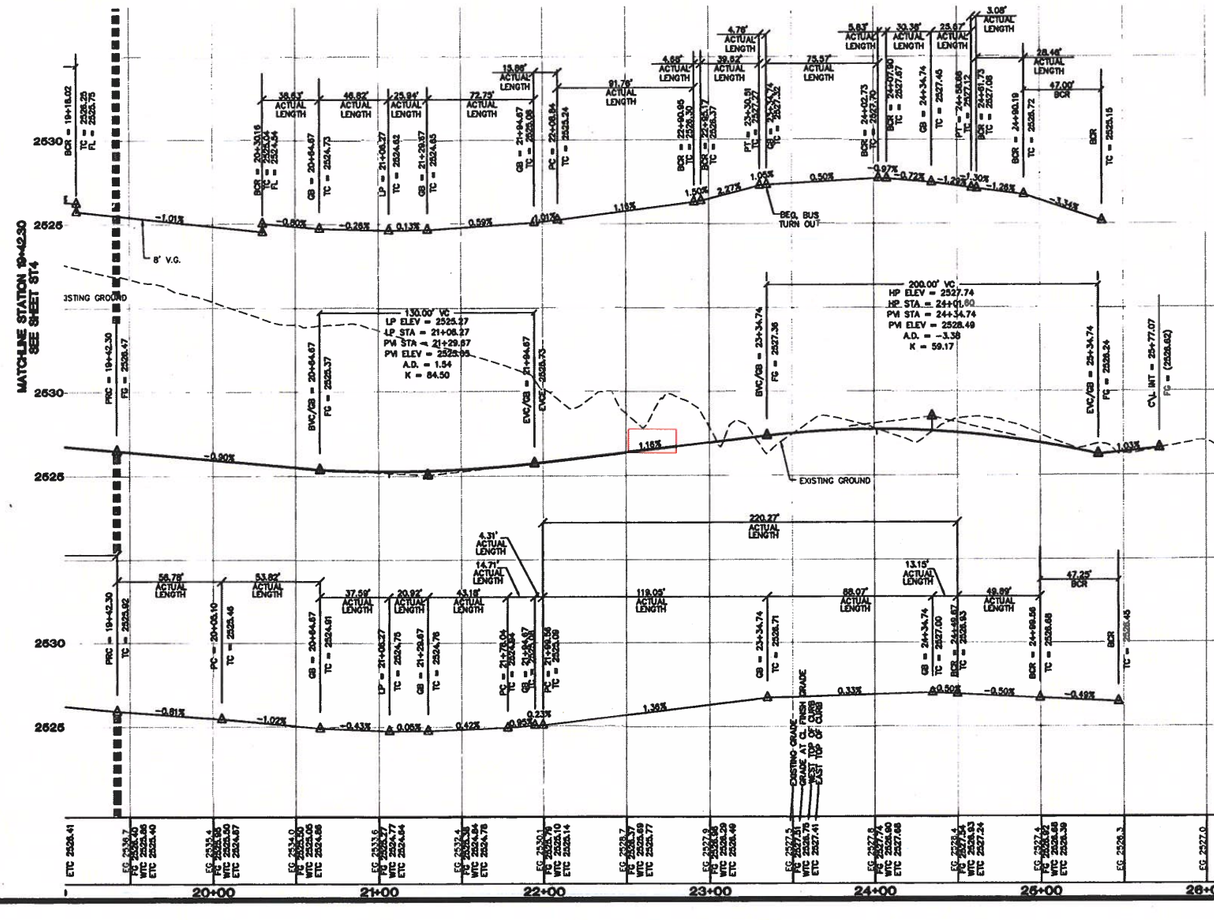


Call before you Underground 1-702-455-7611

Call before you Dig 1-800-227-2600

Call before you Overhead 1-702-227-2929

GRAND MONTECITO PARKWAY (PUBLIC)



LEGAL DESCRIPTION:

THE SOUTHEAST (SE ¼) QUARTER OF THE NORTHEAST (NE ¼) OF SECTION 20 & PORTION OF THE SOUTHWEST QUARTHER (SW ¼) OF THE NORTHWEST QUARTER (NW ¼) OF SECTION 21, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

BENCHMARK:

PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988
BENCHMARK: CITY OF LAS VEGAS BENCH BLVD0 20C8
ELEVATION: 775.1977 METERS (2543.29) RIVET AND PLATE IN CONCRETE CYLINDER NW CORNER DEER SPRINGS AND RILEY

BASIS OF BEARINGS:

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BACK OF CURB CURVE TABLE

CURVE	LENGTH	RADIUS	DELTA	TANGENT
C18	35.65'	99.50'	20°31'48"	18.02'
C19	42.48'	99.50'	24°27'31"	21.57'
C23	3.08'	25.00'	7°03'48"	1.54'
C24	6.28'	2.00'	180°00'00"	INFINITE
C25	4.50'	25.00'	10°18'12"	2.25'
C26	0.79'	290.00'	0°09'25"	0.40'
C27	91.78'	300.00'	17°31'30"	46.24'
C28	4.68'	25.00'	10°44'03"	2.35'
C29	155.47'	300.00'	29°41'36"	79.52'
C30	18.01'	300.00'	3°37'53"	9.01'
C35	47.25'	30.00'	90°14'13"	30.12'
C36	47.00'	30.00'	89°45'47"	29.88'
C37	220.27'	376.50'	33°31'19"	113.39'
C38	43.82'	25.00'	104°33'50"	32.33'
C39	56.78'	386.50'	8°25'01"	28.44'
C40	200.00'	478.50'	23°56'53"	101.48'
C41	5.83'	25.00'	13°21'15"	2.93'
C42	75.37'	478.50'	9°02'57"	37.88'
C43	18.62'	415.50'	2°34'04"	9.31'
C44	167.14'	439.50'	21°47'20"	84.59'
C45	18.38'	7.00'	150°27'40"	28.55'
C58	29.20'	25.00'	66°54'59"	16.52'
C56	3.14'	1.00'	180°00'00"	INFINITE

BACK OF CURB LINE TABLE

LINE	LENGTH	BEARING
L10	39.62'	N25°47'03"W
L11	56.03'	N08°45'55"E
L12	40.67'	N00°17'53"W
L13	40.67'	N00°17'53"W
L18	49.89'	N00°17'53"W
L19	28.46'	N00°17'53"W
L24	37.52'	S89°56'20"W

GRAPHIC SCALE

40 0 20 40 80

1" = 40'

PROFILE SCALES:
HORZ. = 1"=40'
VERT. = 1"=4'

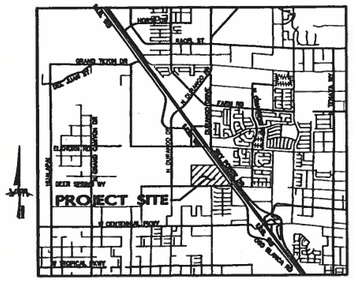
HANDICAP RAMP CHART

NO.	"A"	"B"	CASE
1	8.0'	8.0'	II
2	4.5'	12.0'	II
3	4.5'	9.5'	III
4	8.0'	8.0'	III

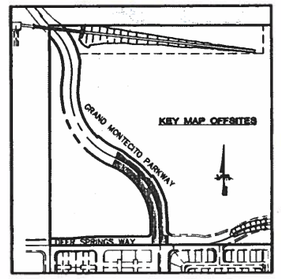
LEGEND

FG	FINISH GRADE
FL	FLOW LINE
TC	TOP OF CURB
EAC	EDGE OF ASPHALT PAVEMENT
FUT.	FUTURE
EXIST	EXISTING (EX.)
NG	NATURAL GROUND
H.P.	HIGH POINT
L.P.	LOW POINT
C/L	CENTER LINE
BC	BACK OF CURB
BCR	BEGIN CURB RETURN
VPI	VERTICAL POINT OF INTERSECTION
GB	GRADE BREAK
TOP	TOP OF CHANNEL/SCARP
TOE	TOE OF CHANNEL/SCARP
TOB	TOP OF BOX
PP	POWER POLE
TRANS.	TRANSITION
RET.	RETAINMENT
INT.	INTERSECTION
D.G.	DESIGN GRADE
BFE=	BASE FLOOD ELEVATION
RCP	REINFORCED CONCRETE PIPE
SD	STORM DRAIN
DI	DROP INLET
R/W, ROW	RIGHT-OF-WAY
S/W	SIDEWALK
BCL	BACK OF CURB LENGTH

2400 EX. CONTOUR(5' INTERVAL)
EX. CONTOUR(1' INTERVAL)
PROPOSED CONTOUR
42.1 PROPOSED PAD GRADE
42 FUT./EXST. PAD GRADE
0.50% SLOPE AND FLOW DIRECTION
SAW CUT & MATCH A.C.
SIDEWALK RAMP
27 LOT NUMBER
SIGHT VISIBILITY ZONES
PROJECT BOUNDARY LINE
SETBACK LINE
R/W OR P/L
CENTER LINE
BACK OF CURB
FACE OF CURB
LIP OF GUTTER
EXIST. IMPROVEMENTS
FUTURE IMPROVEMENTS
EXIST. DIRT ROAD
EXIST. AC
CONSTRUCTION PHASE LINE OR UNIT BOUNDARY LINE
MATCHLINE



VICINITY MAP
N. T. S.



CONSTRUCTION ITEMS

1. CONSTRUCT 24" TYPE "L" CURB & GUTTER PER STD. DWG. NO. 216.
2. CONSTRUCT TYPE "A" ISLAND CURB PER STD. DWG. NO. 219.
3. CONSTRUCT 8 FOOT WIDE CROSS GUTTER PER STD. DWG. NO. 228.
4. CONSTRUCT PUBLIC R.O.W. CURB RETURN, SIDEWALKS PER STD. DWG. NO'S., 216, 234 & 235.
5. SAWCUT AND REMOVE ASPHALT PAVING. MATCH EXISTING EDGE WITH NEW PAVING.
6. CONSTRUCT 5' SIDEWALK PER STD. DWG. NO. 234
7. R1-1 STOP SIGN
8. (2) STREET SIGNS PER DWG. NO. 250.
9. CONSTRUCT H/C RAMP PER STD. DWG #235
10. CONSTRUCT BUS TURN OUT PER STD. DWG NO. 234.1 (SEE DETAIL SHEET ST2)

ENGINEER DISCLAIMER NOTE:

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

FOR ALL GRADING & STREET SECTIONS SEE DT1, SHT 9 OF 28.

NOTE :
ALL SIDEWALK/AMENITY ZONES TO BE BUILT TO MONTECITO/TOWN CENTER STANDARDS.

H 23960

1105322 112184

TRIPLE FIVE NEVADA DEVEL CP.
9440 W. SAHARA AVE., SUITE 240
LAS VEGAS, NEVADA 89117
PH: (702) 430-6800
CITY OF LAS VEGAS
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH. (702) 873-7500 FAX (702) 362-2987 WEB WWW.LVNN.COM
CONSULTING ENGINEERS & PLANNERS & LAND SURVEYORS

REV	DATE	BY	REVISION
1	7/11/06	TMJA	REMOVE EX. R.C.P. D'S + ESQMN. C&G P.C.P.
2	9/19/06		

STREET PLAN & PROFILE
GRAND MONTECITO PKWY
STA: 19+42.30 TO STA: 25+77.07

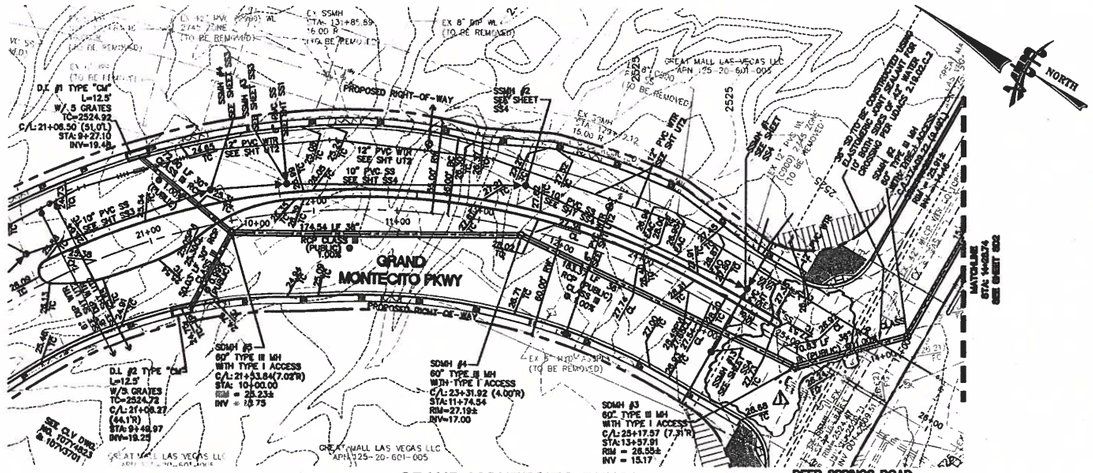
THE GREAT MALL
GRAND MONTECITO &
DEER SPRINGS IMPROVEMENTS

DRAWN BY: RNM — APRIL 2007
DESIGNED BY: MAW/RNM — APRIL 2007
CHECKED BY: MAW — JUNE 2007
PROJECT NO: 5365 — SCALE: 1"=40' HORIZ. 1"= 4' VERT.

12/31/08
110307

SHEET ST5
8 OF 31 SHEETS
DRAWING NO. 1074966-05

H:\LAND\OFFSITE\LAYOUTS.dwg

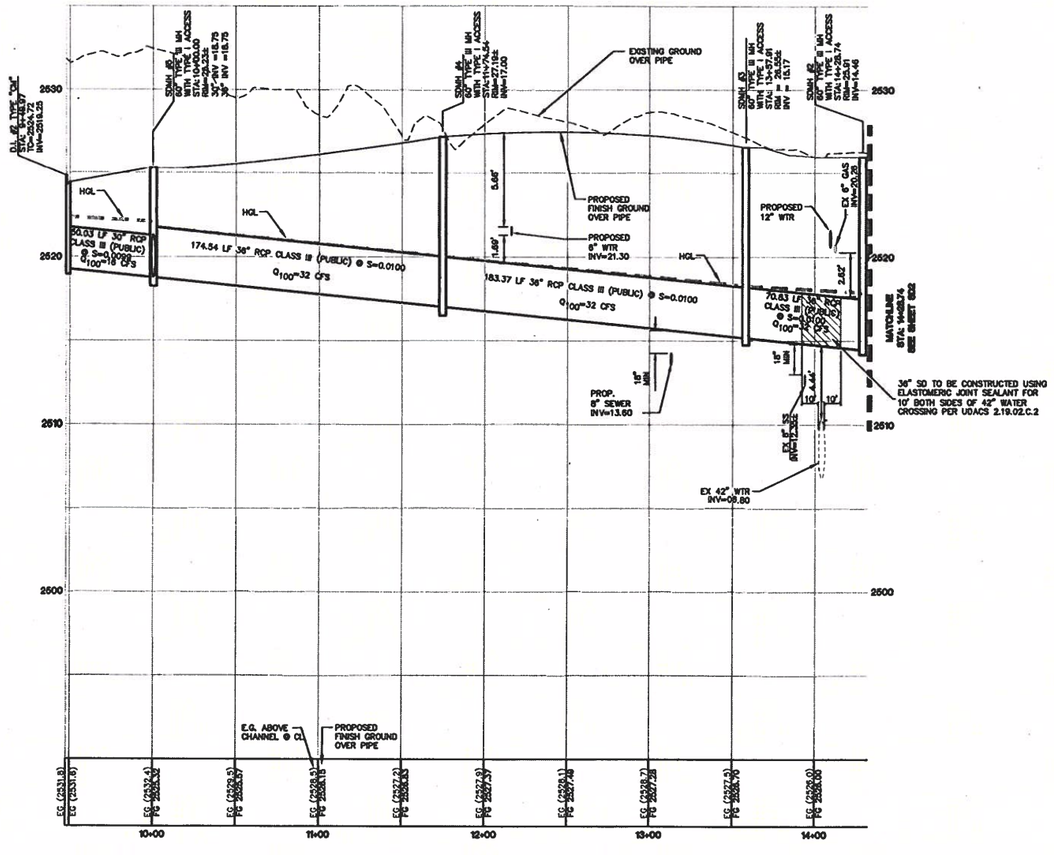


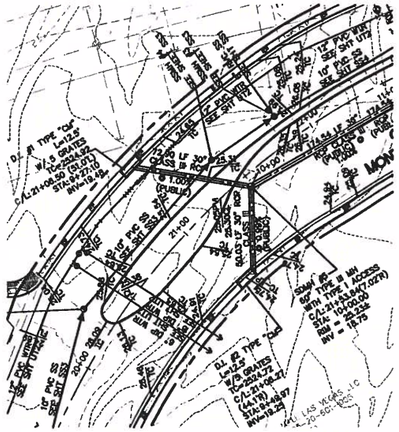
GRAND MONTECITO PKWY SOUTH STORM DRAIN (PUBLIC)

STA: 9+47.87 TO 14+28.74

HORIZONTAL 1"=40'

(SEE SHEETS WT1, UT1 & UT2)



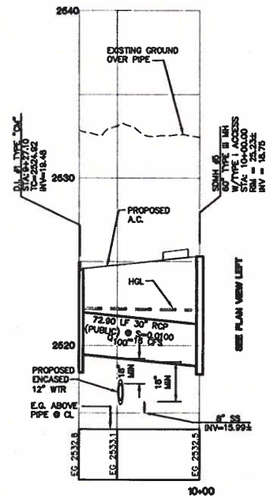


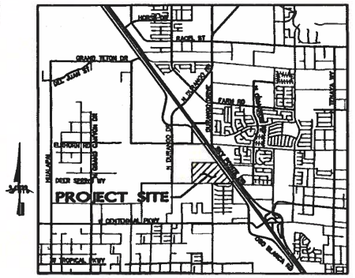
GRAND MONTECITO PKWY SOUTH STORM DRAIN (PUBLIC)

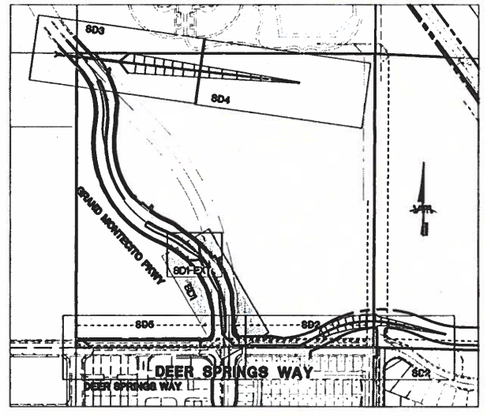
STA: 9+38.84 TO 10+00.00

HORIZONTAL 1"=40'

(SEE SHEETS WT2, UT2)







STORM DRAIN NOTE:

1. ALL STORM DRAIN STATIONING IS BASED ON CENTER OF PIPE LENGTHS FROM MANHOLE TO MANHOLE AND IS NOT RELATIVE IN ANY WAY TO STREET CENTERLINE STATIONING. STREET CENTERLINE STATIONING IS SHOWN ON PLAN FOR ROAD REFERENCE ONLY.
2. ALL MANHOLES ARE 60" SIZED MANHOLES PER STD. DWG# SD-1, UNLESS OTHERWISE NOTED ON PLAN.
3. ALL FLOOD CONTROL FACILITIES OUTSIDE OF PUBLIC RIGHT-OF-WAY, ARE TO BE PRIVATELY MAINTAINED.

PRIVATE FLOOD CONTROL IMPROVEMENT	QUANTITY
18" STORM DRAIN	52 LF
24" STORM DRAIN	104 LF
30" STORM DRAIN	123 LF
36" STORM DRAIN	841 LF
4' TYPE "C" DROP INLET	4 EA
8' X 5' RCB	285 LF
RIP RAP	69 CY
GROUTED RIP RAP	79 CY
60" TYPE III STORM DRAIN MAN HOLES	5 EA
N.D.O.T. RCP END SECTION R=2.3.1	1 EA

ALL DRAINAGE IMPROVEMENTS WITH PUBLIC DRAINAGE EASEMENT MUST BE BONDED AND INSPECTED. SEE STRUCTURAL PLANS FOR HEADWALL AND ADDITIONAL QUANTITIES.

GRAPHIC SCALE

40 0 20 40 80

1" = 40'

FLOOD ZONE NOTE

SITE IS LOCATED IN A ZONE X AS SHOWN IN FIRM MAP 32003C1745E DATED: SEPTEMBER 27, 2002
A ZONE X IS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CITY OF LAS VEGAS, #DS#133

DAVID L. EDWARDS, P.E. NO. 17853 — 11/08/07 DATE

BENCHMARK:

PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988
BENCHMARK: CITY OF LAS VEGAS BENCH BLV90 20E6
ELEVATION: 775.1977 METERS (2543.29) RIVET AND PLATE IN CONCRETE CYLINDER NW CORNER DEER SPRINGS AND RILEY

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 89°56'20" EAST, BEING THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN ON A RECORD OF SURVEY RECORDED IN THE CLARK COUNTY, NEVADA, RECORDER'S OFFICE IN FILE 118 AT PAGE 89.

CONTRACTOR NOTE:

CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES AND NOTIFY THE DESIGN ENGINEER IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.



LAS VEGAS VALLEY WATER DISTRICT APPROVAL

APPROVED BY: _____ 12-12-07

LAS VEGAS VALLEY WATER DISTRICT — DATE

PROJECT# 114220

H 23460

11/08/07

TRIPLE FIVE NEVADA DEVEL CP.
9440 W. SAHARA AVE., SUITE 240
LAS VEGAS, NEVADA 89117
(702) 430-8600

CITY OF LAS VEGAS

LVRR CONSULTING
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-0149
PH. (702) 873-7500 FAX (702) 362-2997 WEB WWW.LVRHV.COM
CONSULTING ENGINEERS ● PLANNERS ● LAND SURVEYORS

REV	DATE	BY	REVISION
1	7-11-08	RHM	KERNAGE, EX. D.I.'s & SDMH, CASE #
2	9/14/08	RHM	

STORM DRAIN PLAN & PROFILE GRAND MONTECITO PKWY (SOUTH) STA:9+49.87+44.2874 & STA:9+27.10-10+00.00

THE GREAT MALL GRAND MONTECITO & DEER SPRINGS IMPROVEMENTS

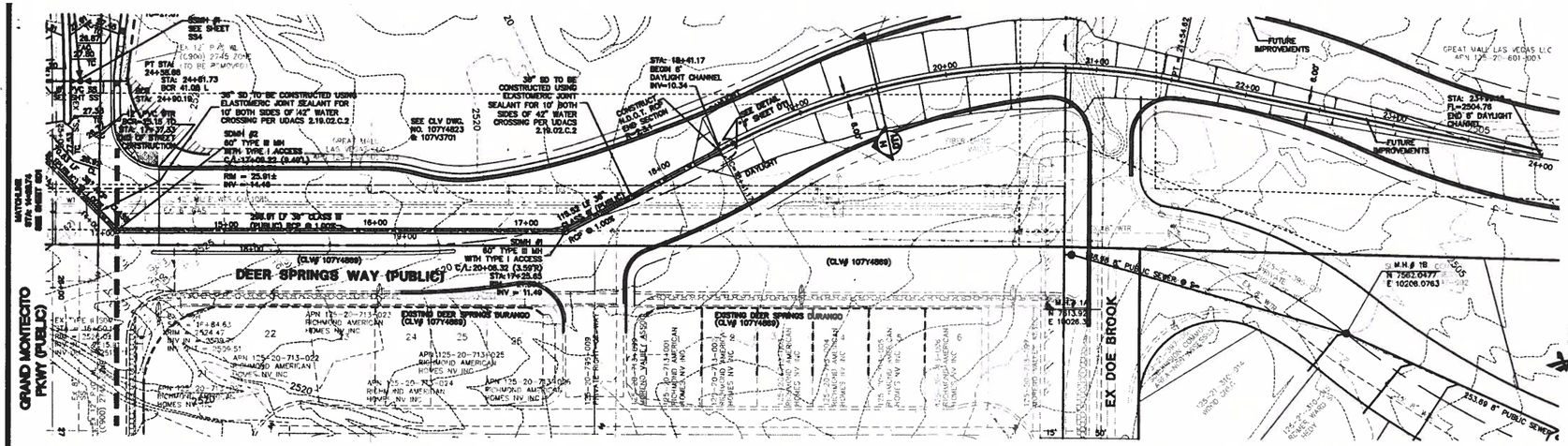
DRAWN BY: RHM — APRIL 2007
DESIGNED BY: MAW/RHM — APRIL 2007
CHECKED BY: MAW — JUNE 2007
PROJECT NO: 6365 — SCALE: 1"=40' HORIZ. 1"=4' VERT.

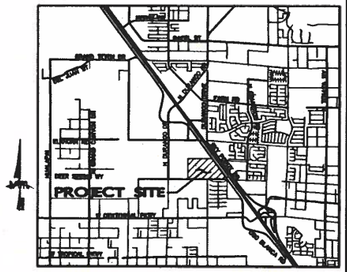
SHEET SD1
18 OF 31 SHEETS

DRAWING NO. 1074966-05

H:\6365\CP\SITE\6365SD.dwg

110532 U2185





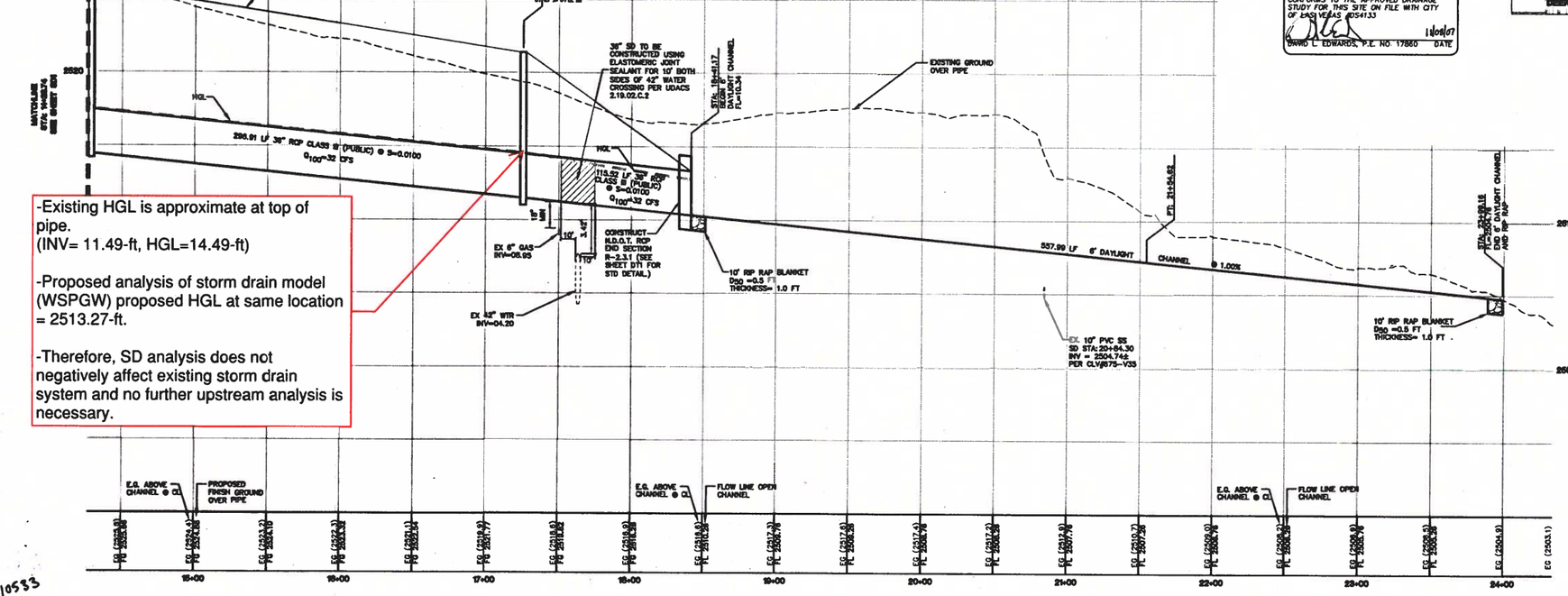
GRAPHIC SCALE

40 0 20 40 80

1" = 40'

DEER SPRINGS WAY (PUBLIC) SOUTH STORM DRAIN

HORIZONTAL 1"=40'



-Existing HGL is approximate at top of pipe.
(INV= 11.49-ft, HGL=14.49-ft)

-Proposed analysis of storm drain model (WSPGW) proposed HGL at same location = 2513.27-ft.

-Therefore, SD analysis does not negatively affect existing storm drain system and no further upstream analysis is necessary.

STORM DRAIN NOTE:

1. ALL STORM DRAIN STATIONING IS BASED ON CENTER OF PIPE LENGTHS FROM MANHOLE TO MANHOLE AND IS NOT RELATIVE IN ANY WAY TO STREET CENTERLINE STATIONING. STREET CENTERLINE STATIONING IS SHOWN ON PLAN FOR ROAD REFERENCE ONLY.
2. ALL MANHOLES ARE 60" SIZED MANHOLES PER STD. DWG# SD-1, UNLESS OTHERWISE NOTED ON PLAN.
3. ALL FLOOD CONTROL FACILITIES OUTSIDE OF PUBLIC RIGHT-OF-WAY, ARE TO BE PRIVATELY MAINTAINED.

PRIVATE FLOOD CONTROL IMPROVEMENT	QUANTITY
18" STORM DRAIN	52 LF
24" STORM DRAIN	104 LF
30" STORM DRAIN	123 LF
36" STORM DRAIN	841 LF
4' TYPE "C" DROP INLET	4 EA
6' X 3' RCB	265 LF
RIP RAP	69 CY
GROUTED RIP RAP	78 CY
60" TYPE III STORM DRAIN MAN HOLES	5 EA
N.D.O.T. RCP END SECTION R=2.3.1	1 EA

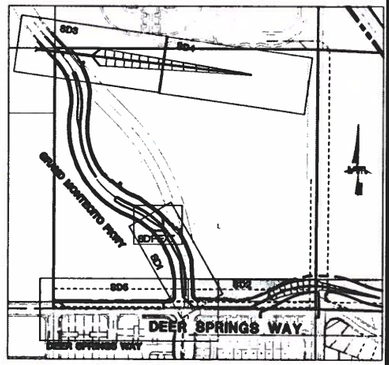
ALL DRAINAGE IMPROVEMENTS WITH PUBLIC DRAINAGE EASEMENT MUST BE BONDED AND INSPECTED. SEE STRUCTURAL PLANS FOR HEADWALL AND ADDITIONAL QUANTITIES.

FLOOD ZONE NOTE

SITE IS LOCATED IN A ZONE X AS SHOWN IN FIRM MAP 32003C1745E DATED: SEPTEMBER 27, 2002
A ZONE X IS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CITY OF LAS VEGAS #DS41.33

DAVID L. EDWARDS, P.E. NO. 17860 — DATE 11/08/07



KEY MAP
N. T. S.

BENCHMARK:

PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988
BENCHMARK: CITY OF LAS VEGAS BLV90 2005
ELEVATION: 775.1977 METERS (2543.29) RIVET AND PLATE IN CONCRETE CYLINDER NW CORNER DEER SPRINGS AND RILEY

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 89°58'00" EAST, BEING THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN ON A RECORD OF SURVEY RECORDED IN THE CLARK COUNTY, NEVADA, RECORDER'S OFFICE IN FILE 118 AT PAGE 89.

CONTRACTOR NOTE:

CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES AND NOTIFY THE DESIGN ENGINEER IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.



LAS VEGAS VALLEY WATER DISTRICT APPROVAL

APPROVED BY: [signature] — DATE 12-10-07

LAS VEGAS VALLEY WATER DISTRICT
PROJECT # 114270

REV	DATE	BY	REVISION

TRIPLE FIVE NEVADA DEVEL CP.
9440 W. SAHARA AVE., SUITE 240
LAS VEGAS, NEVADA 89117
(702) 430-5600

CITY OF LAS VEGAS

CONSULTING ENGINEERS & PLANNERS & LAND SURVEYORS
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH. (702) 873-7500 FAX (702) 362-2867 WEB WWW.VTNNV.COM

SOUTH STORM DRAIN PLAN & PROFILE DEER SPRINGS WAY STA: 14+28.74 TO STA: 23+99.16

THE GREAT MALL GRAND MONTECITO & DEER SPRINGS IMPROVEMENTS

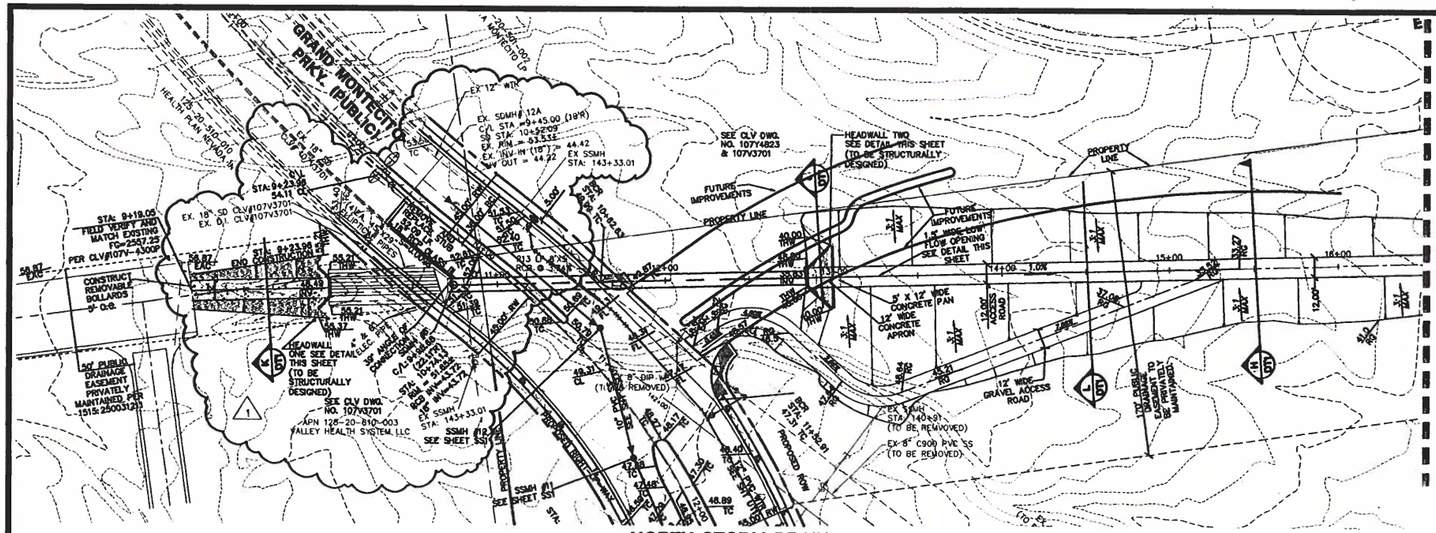
DRAWN BY: RMM — APRIL, 2007
DESIGNED BY: MAR/RMM — APRIL, 2007
CHECKED BY: MAR — JUNE, 2007
PROJECT NO: 6.380
SCALE: 1"=40' HORZ., 1"=4' VERT.

PROFESSIONAL ENGINEER STATE OF NEVADA — CIVIL — No. 17860 — 11/08/07

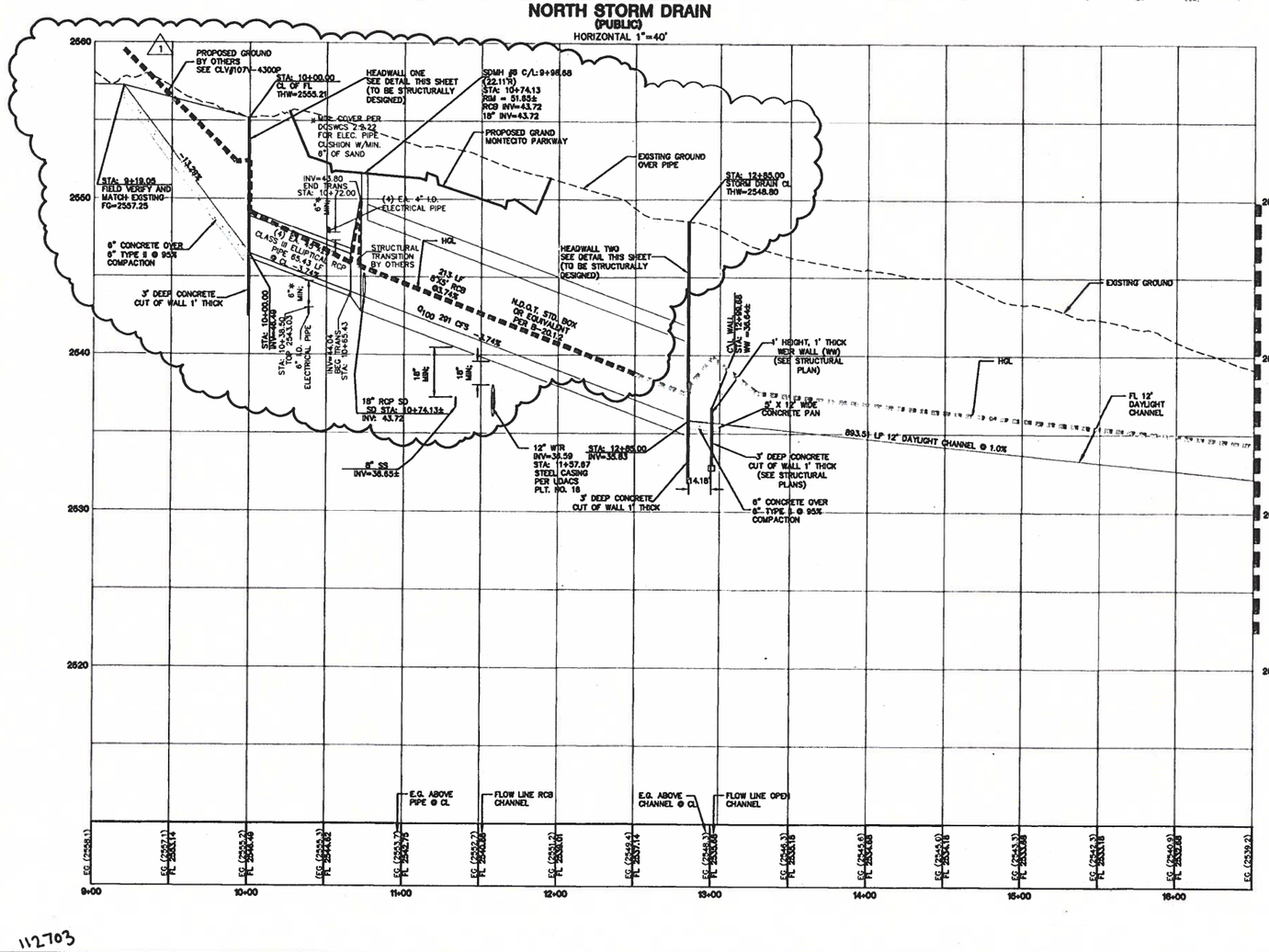
SHEET SD2
19 OF 31 SHEETS
DRAWING NO.

110533

V:\6380\OFFSITE\V6380D.dwg

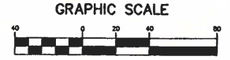


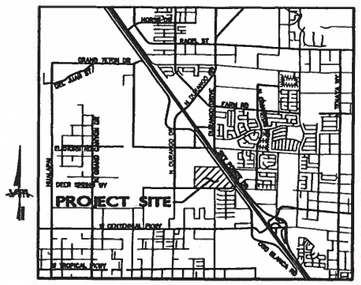
NORTH STORM DRAIN
(PUBLIC)
HORIZONTAL 1"=40'





GRAPHIC SCALE





VICINITY MAP
N. T. S.

STORM DRAIN NOTE

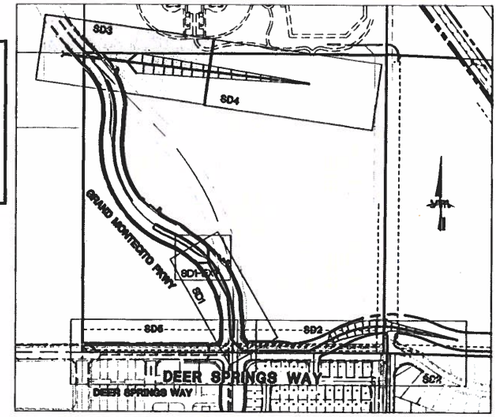
1. ALL STORM DRAIN STATIONING IS BASED ON CENTER OF PIPE LENGTHS FROM MANHOLE TO MANHOLE AND IS NOT RELATIVE IN ANY WAY TO STREET CENTERLINE STATIONING. STREET CENTERLINE STATIONING IS SHOWN ON PLAN FOR ROAD REFERENCE ONLY.
2. ALL MANHOLES ARE 60" SIZED MANHOLES PER STD. DWG# SD-1, UNLESS OTHERWISE NOTED ON PLAN.
3. ALL FLOOD CONTROL FACILITIES OUTSIDE OF PUBLIC RIGHT-OF-WAY, ARE TO BE PRIVATELY MAINTIANED.

FLOOD ZONE NOTE

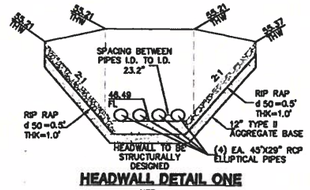
SITE IS LOCATED IN A ZONE X AS SHOWN IN FIRM MAP 32003C1745E DATED: SEPTEMBER 27, 2002
A ZONE X IS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CITY OF LAS VEGAS #DS4133

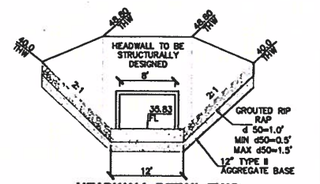
DAVID L. EDWARDS, P.E. NO. 17860 DATE



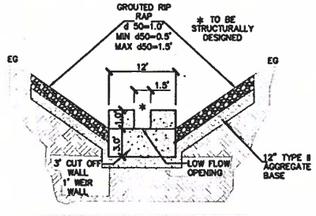
KEY MAP
N. T. S.



HEADWALL DETAIL ONE
NTS



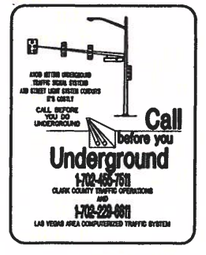
HEADWALL DETAIL TWO
NTS



1@ WIDE LOW FLOW OPENING
NTS

PRIVATE FLOOD CONTROL IMPROVEMENT	QUANTITY
18" STORM DRAIN	52 LF
24" STORM DRAIN	104 LF
30" STORM DRAIN	123 LF
36" STORM DRAIN	841 LF
45" X 29" ELLIPTICAL STORM DRAIN	261 EA
4' TYPE "C" DROP INLET	4 EA
8' X 3' RCB	213 LF
RIP RAP	59 CY
GROUTED RIP RAP	78 CY
60" TYPE III STORM DRAIN MAN HOLES	5 EA
H.D.O.T. RCP END SECTION R-2.3.1	1 EA

ALL DRAINAGE IMPROVEMENTS WITH PUBLIC DRAINAGE EASEMENT MUST BE BONDED AND INSPECTED. SEE STRUCTURAL PLANS FOR HEADWALL AND ADDITIONAL QUANTITIES.





BENCHMARK:

PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988
BENCHMARK: CITY OF LAS VEGAS BENCH 8LV90 2OE6
ELEVATION: 775.1977 METERS (2543.29) RIVET AND PLATE IN CONCRETE CYLINDER NW CORNER DEER SPRINGS AND RILEY

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 89°36'20" EAST, BEING THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN ON A RECORD OF SURVEY RECORDED IN THE CLARK COUNTY, NEVADA, RECORDER'S OFFICE IN FILE 118 AT PAGE 89.

CONTRACTOR NOTE:

CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES AND NOTIFY THE DESIGN ENGINEER IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.

REV	DATE	BY	REVISION
1	9-12-08	RMM	ADD ELLIPTICAL PIPE TO SD SYSTEM REPLOT

H:\60360\OFFSITE\60360SD-opt.dwg, 9/12/2008 3:43:30 PM, roberm, TDS600WMYLAR.pc3

TRIPLE FIVE NEVADA DEVEL CP.
9440 W. SAHARA AVE., SUITE 240
LAS VEGAS, NEVADA 89117
(702) 360-4600

CITY OF LAS VEGAS

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH. (702) 873-7500 FAX (702) 362-2597 WEB WWW.VTNNV.COM
CONSULTING ENGINEERS ◆ PLANNERS ◆ LAND SURVEYORS

NORTH STORM DRAIN
PLAN & PROFILE
STA: 9+19.05 TO STA: 16+50.00

THE GREAT MALL
GRAND MONTECITO &
DEER SPRINGS IMPROVEMENTS

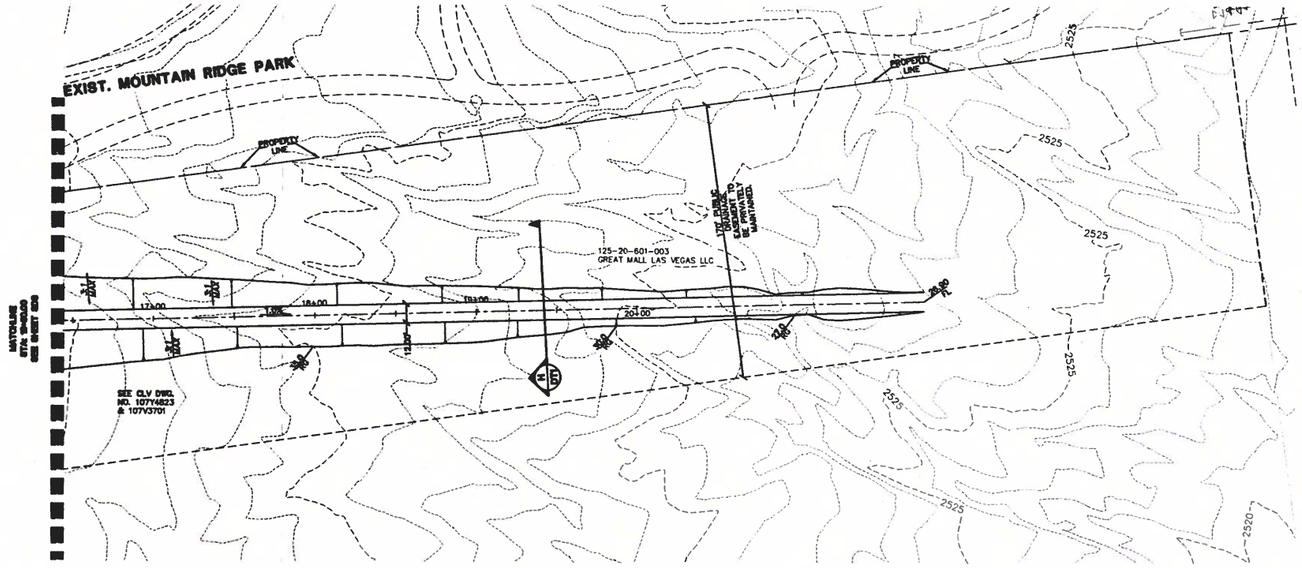
DRAWN BY: RMM — APRIL, 2007
DESIGNED BY: MAW/RMM — APRIL, 2007
CHECKED BY: MAW — JUNE, 2007
PROJECT NO: 6360 — SCALE: 1"=40' HORIZ. 1"=4' VERT.

EXPIRES 12-31-08

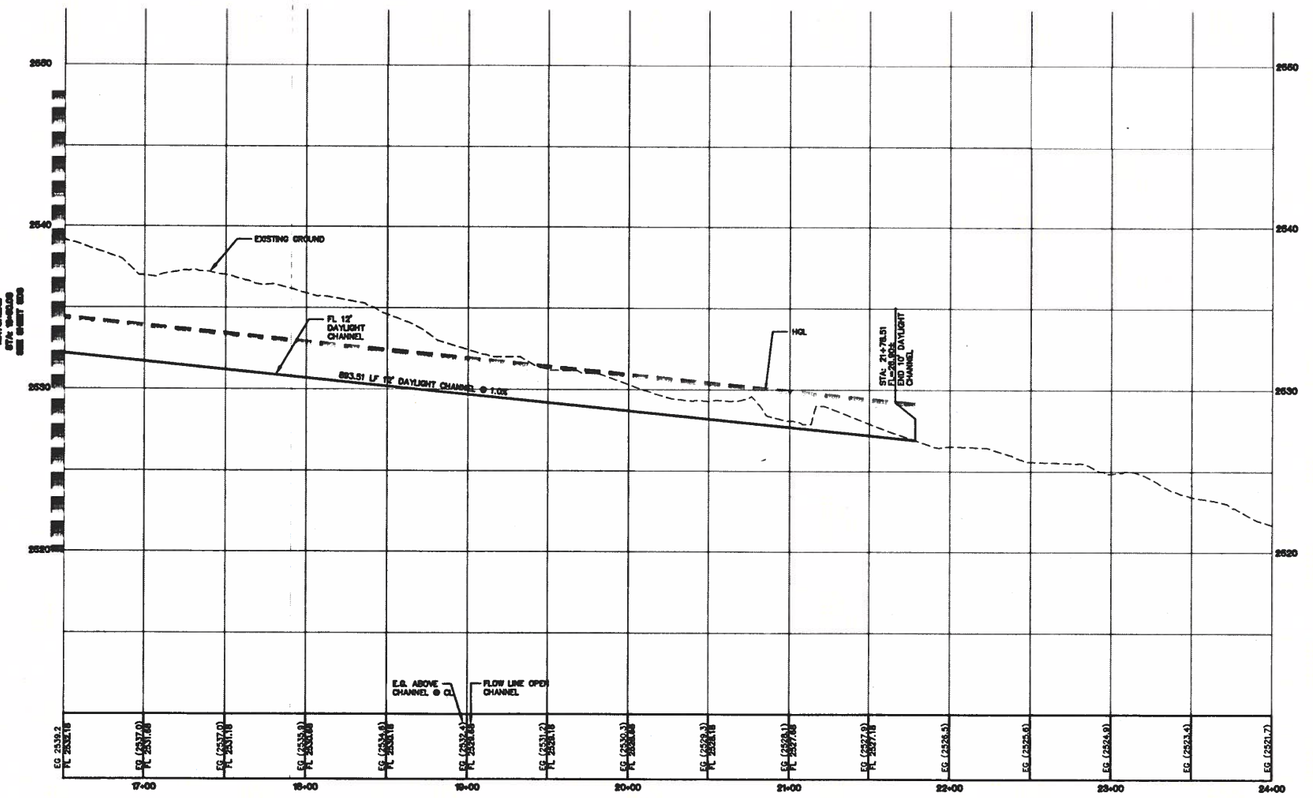
SHEET
SD3
20 OF 31 SHEETS
DRAWING NO.

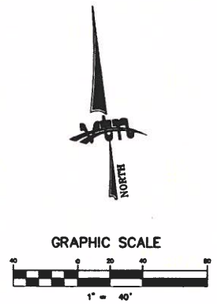
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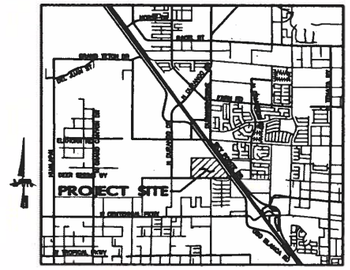
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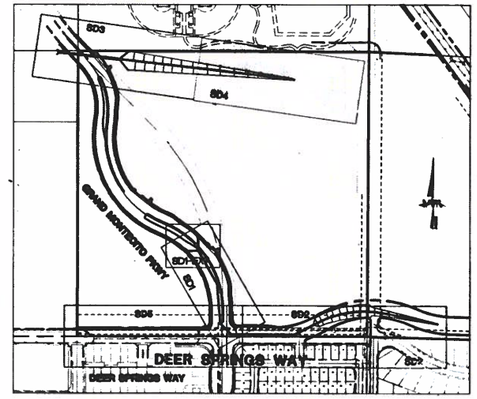


NORTH STORM DRAIN
HORIZONTAL 1"=40'









STORM DRAIN NOTE:

1. ALL STORM DRAIN STATIONING IS BASED ON CENTER OF PIPE LENGTHS FROM MANHOLE TO MANHOLE AND IS NOT RELATIVE IN ANY WAY TO STREET CENTERLINE STATIONING. STREET CENTERLINE STATIONING IS SHOWN ON PLAN FOR ROAD REFERENCE ONLY.
2. ALL MANHOLES ARE 60" SIZED MANHOLES PER STD. DWG# SD-1, UNLESS OTHERWISE NOTED ON PLAN.
3. ALL FLOOD CONTROL FACILITIES OUTSIDE OF PUBLIC RIGHT-OF-WAY, ARE TO BE PRIVATELY MAINTAINED.

PRIVATE FLOOD CONTROL IMPROVEMENT	QUANTITY
18" STORM DRAIN	52 LF
24" STORM DRAIN	104 LF
30" STORM DRAIN	123 LF
36" STORM DRAIN	841 LF
4' TYPE "C" DROP INLET	4 EA
8' X 5' RCB	285 LF
RIP RAP	69 CY
GROUTED RIP RAP	78 CY
60" TYPE III STORM DRAIN MAN HOLES	5 EA
N.D.O.T RCP END SECTION R-2.3.1	1 EA

ALL DRAINAGE IMPROVEMENTS WITH PUBLIC DRAINAGE EASEMENT MUST BE BONDED AND INSPECTED. SEE STRUCTURAL PLANS FOR HEADWALL AND ADDITIONAL QUANTITIES.

FLOOD ZONE NOTE

SITE IS LOCATED IN A ZONE X AS SHOWN IN FIRM MAP 32003C1745E DATED: SEPTEMBER 27, 2002
A ZONE X IS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CITY OF LAS VEGAS #054133

9/06/07
DAVID L. EDWARDS, P.E. NO. 17860 DATE

BENCHMARK:

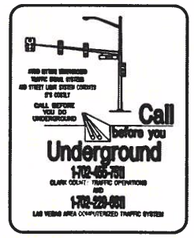
PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988
BENCHMARK: CITY OF LAS VEGAS BENCH BLY90 2068
ELEVATION: 775.1977 METERS (2543.29) RIVET AND PLATE IN CONCRETE CYLINDER NW CORNER DEER SPRINGS AND RILEY

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 89°56'20" EAST, BEING THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN ON A RECORD OF SURVEY RECORDED IN THE CLARK COUNTY, NEVADA, RECORDER'S OFFICE IN FILE 118 AT PAGE 89.

CONTRACTOR NOTE:

CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES AND NOTIFY THE DESIGN ENGINEER IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.





TRIPLE FIVE NEVADA DEVEL CP.
8440 W. SAHARA AVE., SUITE 240
LAS VEGAS, NEVADA 89117
(702) 430-3600

CITY OF LAS VEGAS

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH. (702) 873-7500 FAX (702) 362-2597 WEB WWW.VTNNV.COM
CONSULTING CONSULTING ENGINEERS ● PLANNERS ● LAND SURVEYORS

REV	DATE	BY	REVISION

H:\8385\OFFSITE\8385SD.dwg

NORTH STORM DRAIN PLAN AND PROFILE
STA: 16+50.00 TO STA: 21+78.51

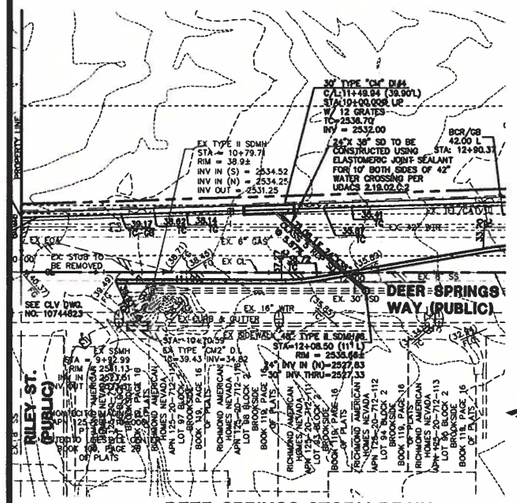
THE GREAT MALL
GRAND MONTECITO &
DEER SPRINGS IMPROVEMENTS

DRAWN BY: rmd — APRIL 2007
DESIGNED BY: MAS/RMd — APRIL 2007
CHECKED BY: MAS — APRIL 2007
PROJECT NO: 8385 — SCALE: 1"=40' HORIZ. 1"=4' VERT.

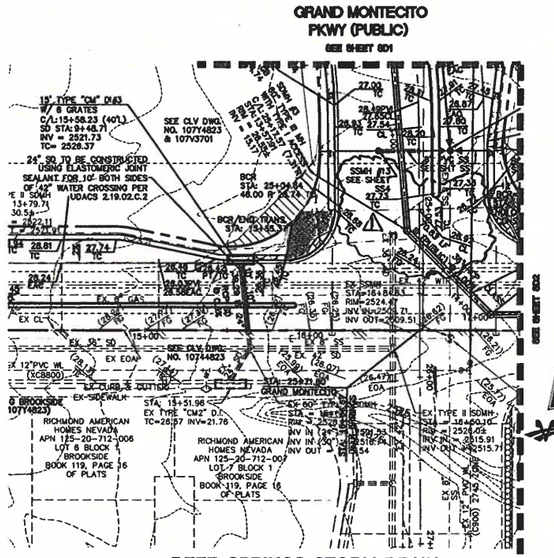
PROFESSIONAL ENGINEER — STATE OF NEVADA — DAVID L. EDWARDS — NO. 17860
9/06/07
EXPIRES 12-31-08

SHEET
SD4
21 OF 31 SHEETS
DRAWING NO.

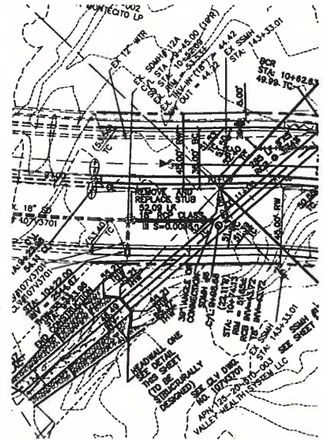
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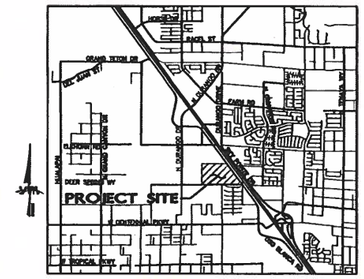
DEER SPRINGS STORM DRAIN
HORIZONTAL 1"=40'
(SEE SHEET UT3)



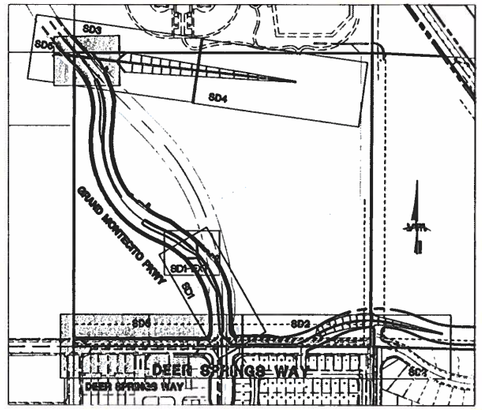
DEER SPRINGS STORM DRAIN
HORIZONTAL 1"=40'
(SEE SHEET UT3)



GRAND MONTECITO N. STORM DRAIN
HORIZONTAL 1"=40'

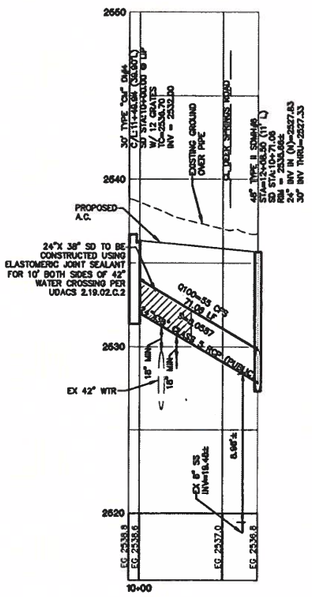


VICINITY MAP
N. T. S.

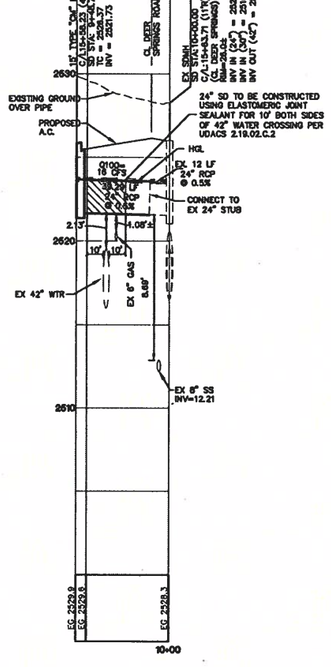


KEY MAP
N. T. S.

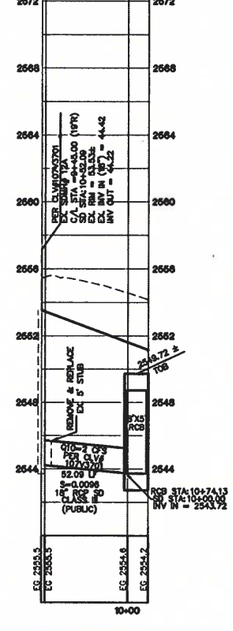
GRAPHIC SCALE
40 0 20 40 80
1" = 40'



DI# 4



DI# 3



18" RCP STUB

STORM DRAIN NOTE:

1. ALL STORM DRAIN STATIONING IS BASED ON CENTER OF PIPE LENGTHS FROM MANHOLE TO MANHOLE AND IS NOT RELATIVE IN ANY WAY TO STREET CENTERLINE STATIONING. STREET CENTERLINE STATIONING IS SHOWN ON PLAN FOR ROAD REFERENCE ONLY.

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PRIVATE FLOOD CONTROL IMPROVEMENT	QUANTITY
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24" STORM DRAIN	104 LF
30" STORM DRAIN	123 LF
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60" TYPE III STORM DRAIN MAN HOLES	5 EA
M.D.O.T. RCP END SECTION R=2.3.1	1 EA

ALL DRAINAGE IMPROVEMENTS WITH PUBLIC DRAINAGE EASEMENT MUST BE BONDED AND INSPECTED. SEE STRUCTURAL PLANS FOR HEADWALL AND ADDITIONAL QUANTITIES.

FLOOD ZONE NOTE

SITE IS LOCATED IN A ZONE X AS SHOWN IN FIRM MAP 32003C1745E DATED: SEPTEMBER 27, 2002
A ZONE X IS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CITY OF LAS VEGAS #DS4133

12/10/07
DAVID L. EDWARDS, P.E. NO. 17880 DATE

BENCHMARK:

PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988
BENCHMARK: CITY OF LAS VEGAS BENCH BLV90 20E8
ELEVATION: 775.1977 METERS (2543.29) RIVET AND PLATE IN CONCRETE CYLINDER NW CORNER DEER SPRINGS AND RILEY

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 89°54'20" EAST, BEING THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN ON A RECORD OF SURVEY RECORDED IN THE CLARK COUNTY, NEVADA, RECORDER'S OFFICE IN FILE 118 AT PAGE 89.

CONTRACTOR NOTE:

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LAS VEGAS VALLEY WATER DISTRICT APPROVAL

APPROVED BY: _____ 12-10-07
LAS VEGAS VALLEY WATER DISTRICT DATE
PROJECT# 114220

H23960

110536 112186

DRAWN BY:	APRIL 2007
DESIGNED BY:	APRIL 2007
CHECKED BY:	JUNE 2007
PROJECT NO.	SCALE: 1"=40' HORZ. 1"=4' VERT.

DAVID L. EDWARDS — No. 17880 — PROFESSIONAL ENGINEER — STATE OF NEVADA — CIVIL
12/10/07
EXPIRES 12-31-08

SHEET
8D5
22 OF 31 SHEETS
DRAWING NO.
107V4966-05

TRIPLE FIVE NEVADA DEVEL CP.
9440 W. SAHARA AVE., SUITE 240
LAS VEGAS, NEVADA 89117
(702) 430-5600

CITY OF LAS VEGAS

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-6148
PH. (702) 870-7550 FAX (702) 362-2987 WEB WWW.VTNVN.COM
CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS

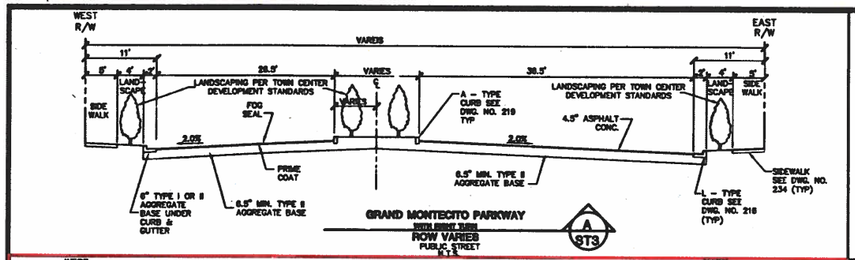
REV	DATE	BY	REMARKS
1	7-11-08	RJM	REMOVE EX 8"x8" & 12"x12" & ADD 8"x8" & 12"x12"

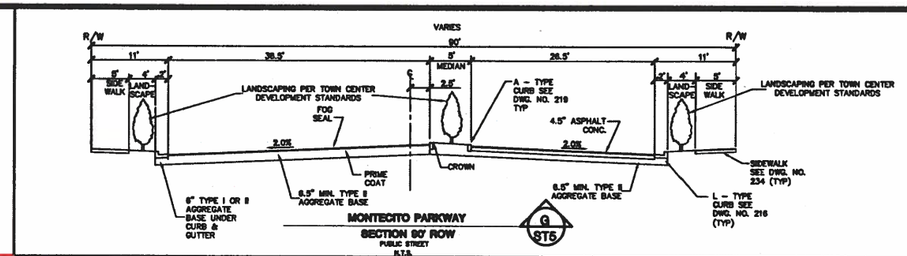
STORM DRAIN PLAN & PROFILE
DEER SPRINGS WAY DI#3 & DI#4
& GRAND MONTECITO PKWY N.

THE GREAT MALL
GRAND MONTECITO &
DEER SPRINGS IMPROVEMENTS

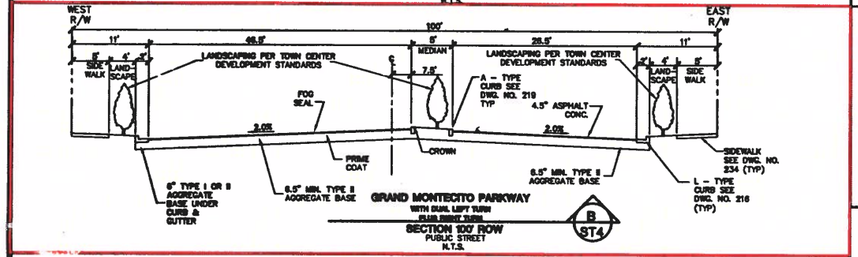
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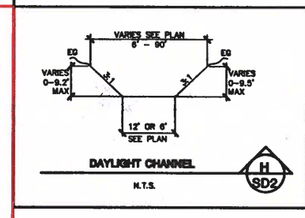
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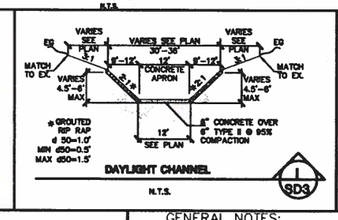


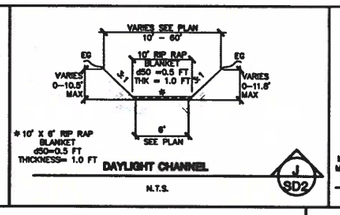


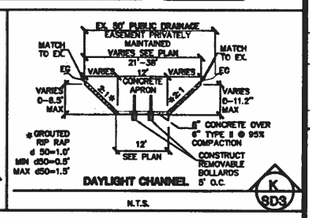


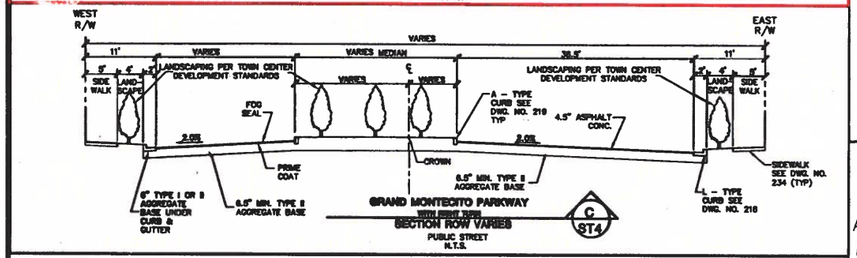


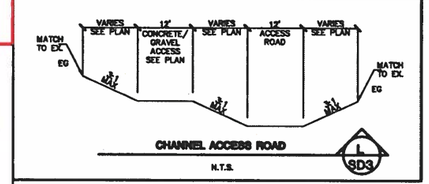










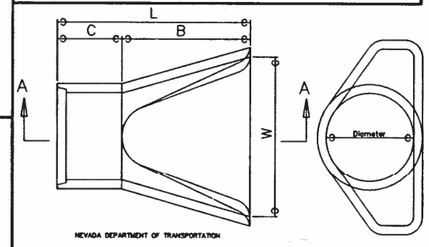


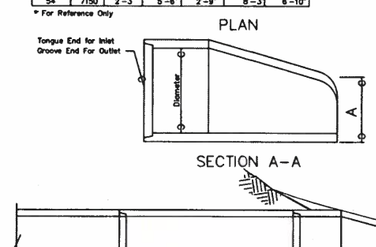
GENERAL NOTES:

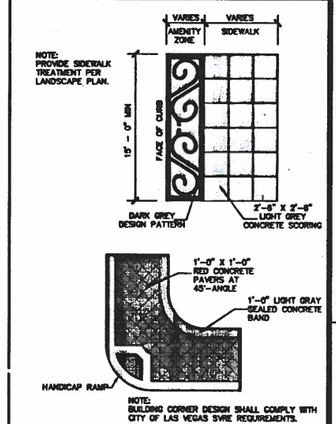
1. CLASS AND TYPE OF CONCRETE SHALL BE AS SPECIFIED FOR STANDARD REINFORCED CONCRETE PIPE.
2. STRUCTURAL DESIGN OF END SECTION SHALL CONFORM TO THAT OF STANDARD REINFORCED CONCRETE CULVERT PIPE.
3. LENGTH OF PIPE SHOWN ON THE DESIGN PLANS DOES NOT INCLUDE CONNECTOR SECTION (LENGTH C).
4. CONTACT HYDRAULICS ENGINEER FOR SIZES NOT LISTED.

DIAMETER	WEIGHT	A	B	C *	L	W
18"	670	6"	2'-1"	2'-1"	4'-2"	3"
24"	1300	9"	2'-5"	2'-5"	5'-0"	4"
30"	1850	1'-0"	2'-8"	2'-8"	5'-11"	5"
36"	3500	1'-3"	2'-11"	2'-11"	6'-1"	6"
42"	4830	1'-6"	2'-11"	2'-11"	6'-2"	6'-2"
48"	6700	2'-0"	3'-0"	3'-0"	6'-2"	8"
54"	7150	2'-3"	3'-6"	2'-9"	8'-3"	6'-10"

* For Reference Only

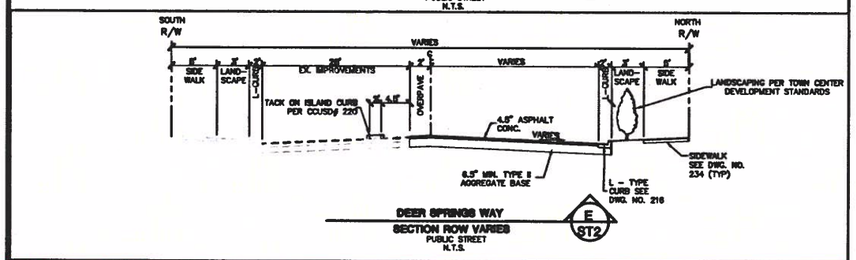


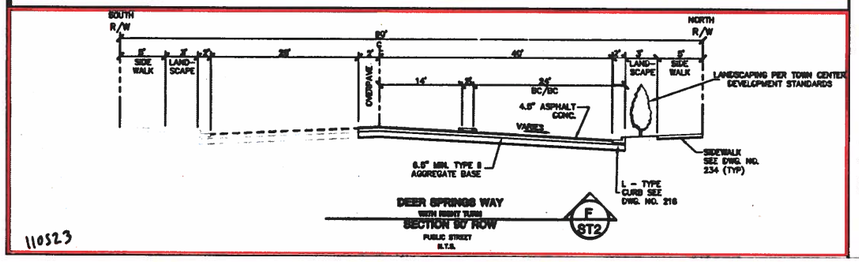




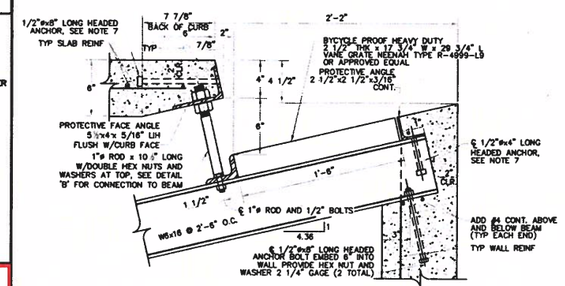
AMENITY ZONE AND SIDEWALK TREATMENT
PER TOWN CENTER DEVELOPMENT STANDARDS FIGURE 14
N.T.S.

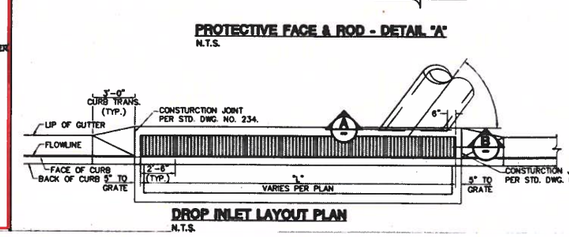
NOTE: SEE LANDSCAPE ARCHITECT PLANS FOR FINAL DESIGN SPECIFICATIONS.

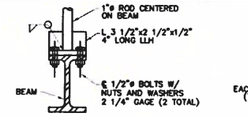


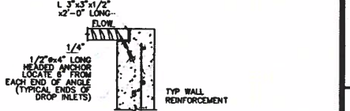


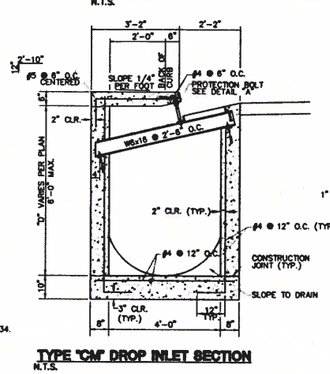
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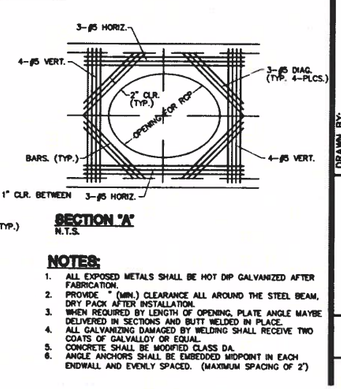












NOTES:

1. ALL EXPOSED METALS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
2. PROVIDE " (MIN.) CLEARANCE ALL AROUND THE STEEL BEAM, DRY PACK AFTER INSTALLATION.
3. WHEN REQUIRED BY LENGTH OF OPENING, PLATE ANGLE MAYBE DELIVERED IN SECTIONS AND BUTT WELDED IN PLACE.
4. ALL GALVANIZING DAMAGED BY WELDING SHALL RECEIVE TWO COATS OF GALVALLOY OR EQUAL.
5. CONCRETE SHALL BE MODIFIED CLASS 0A.
6. ANGLE ANCHORS SHALL BE EMBEDDED MIDPOINT IN EACH ENDWALL AND EVENLY SPACED. (MAXIMUM SPACING OF 2')

TRIPLE FIVE NEVADA DEVEL CP.
5440 S. SAMARA AVE., SUITE 240
LAS VEGAS, NV 89113
PH# (702) 430-3800

CITY OF LAS VEGAS

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH. (702) 873-7500 FAX (702) 362-2597 WEB WWW.KYNHY.COM
CONSULTING ENGINEERS ● PLANNERS ● LAND SURVEYORS

REV	DATE	REVISION

H:\6388\OFFSITE\6388SDT1.dwg, 9/5/2007 10:52:25 AM, mattherw, 1:40

DETAIL SHEET
SECTIONS AND DETAILS

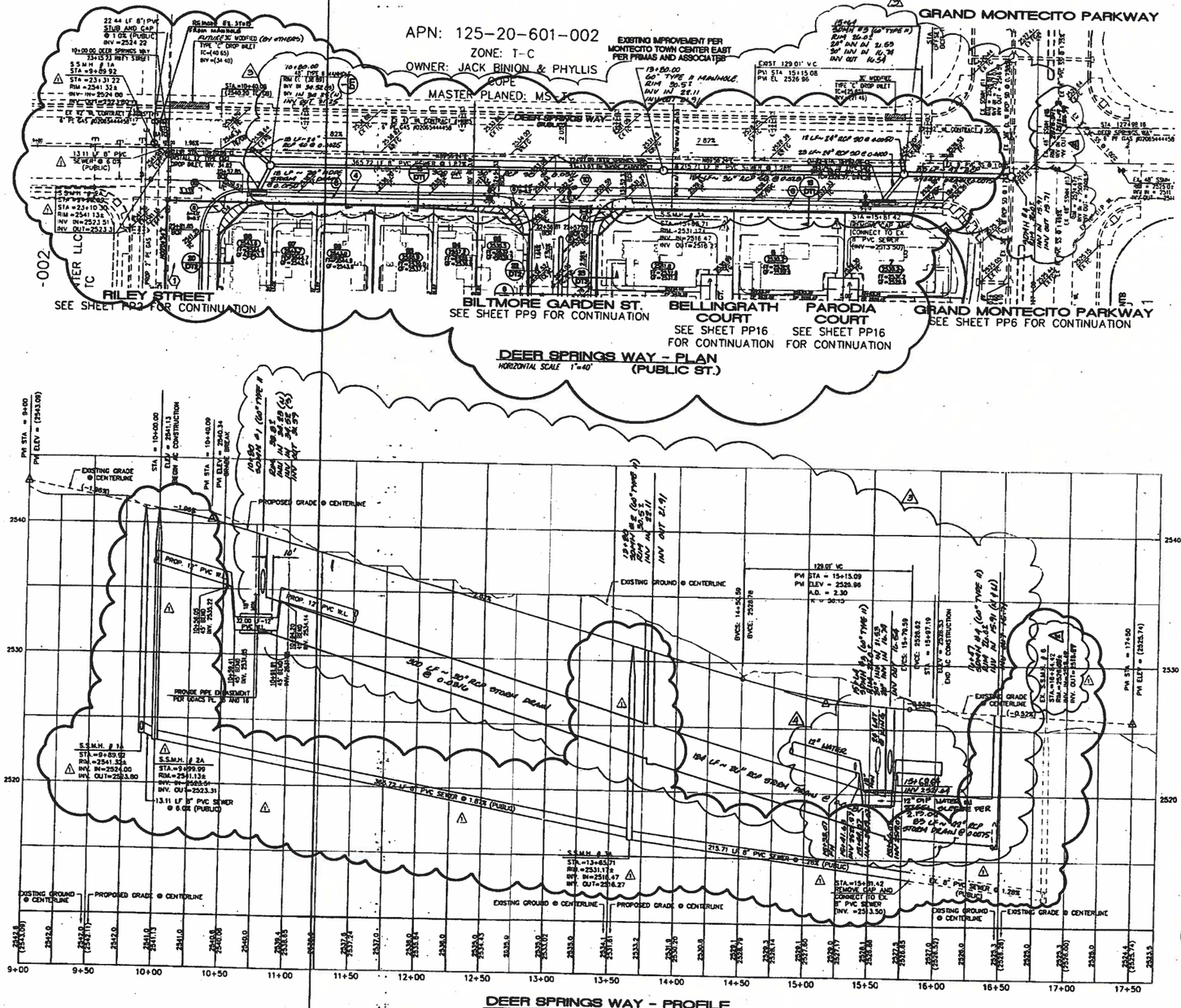
THE GREAT MALL
GRAND MONTECITO &
DEER SPRINGS IMPROVEMENTS

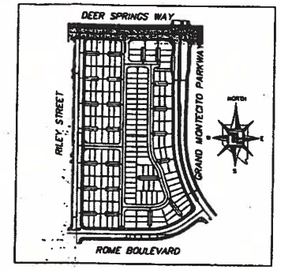
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DESIGNED BY: RSH	1/29/07	
CHECKED BY: MJ	1/29/07	
PROJECT NO: 6388-1	SCALE:	N/A HORIZ. N/A VERT.

12/3/07

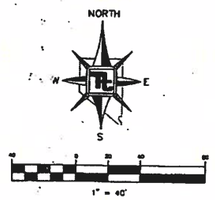
SHEET
DT1
9 OF 31 SHEETS
DRAWING NO.

\\6388\OFFSITE\6388SDT1





KEY MAP
NOT TO SCALE



LEGEND

- PROPERTY LINE / RIGHT-OF-WAY
- "L" TYPE CURB AND GUTTER
- "A" TYPE CURB
- EXISTING CURB AND GUTTER
- PROPOSED WATER LINE (SIZE AS SHOWN)
- PROPOSED SEWER LINE (SIZE AS SHOWN)
- EXISTING UTILITY (AS SHOWN)
- CROSS GUTTER
- WHEELCHAIR RAMP
- CUT OR FILL SLOPE
- PROPOSED PAVEMENT AREA
- PROPOSED ELEVATION (DESCRIPTION AS SHOWN)
- EXISTING ELEVATION (DESCRIPTION AS SHOWN)
- FUTURE DESIGN ELEVATION (DESCRIPTION AS SHOWN)
- LOT NUMBER
- PAD ELEVATION
- FF = 2815 FINISHED FLOOR ELEVATION

NOTE:
ALL PRIVATE STREETS / PRIVATE DRIVE ARE P.U.E.'S, PUBLIC SEWER EASEMENT AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOME OWNERS ASSOCIATION.

NOTE:
INSTALL WATERLINE IN STEEL CASING PER UDACS PLATES NO. 15 AND 18. MINIMUM 18-INCH CLEARANCE IS REQUIRED ABOVE THE TOP OF THE CASING FROM THE UPPER BENDS THROUGHOUT THE LOWERED SECTION OF PIPE. DUCTILE IRON PIPE WITH RESTRAINED JOINTS IS REQUIRED. 8" ADDITIONAL THRUST BLOCKS ARE TO BE INSTALLED AT THE UPPER BENDS.

CONSTRUCTION NOTES

1. CONSTRUCT 4" AC PAVING OVER 4" TYPE II BASE AND 9" TYPE I BASE. SEE DETAILS 1/DT1 AND 2/DT1.
2. CONSTRUCT 2" AC PAVING OVER 4" TYPE II BASE AND 6" TYPE I BASE. SEE DETAILS 5/DT1 AND 6/DT1.
3. CONSTRUCT 4" CONCRETE DRIVEWAY PER DETAIL 7/DT1
4. CONSTRUCT "L" TYPE CURB AND GUTTER PER STD. DWG. 216
5. CONSTRUCT "A" TYPE CURB PER STD.DWG 219.
6. CONSTRUCT CONCRETE SIDEWALK PER STD. DWG. 234
7. CONSTRUCT DEPRESSED CURB WITH 0" LIP PER STD. DWG. 227
8. CONSTRUCT SIDEWALK RAMP PER STD. DWG. 235 CASE II AND PER TOWN CENTER STANDARD.
9. CONSTRUCT UNDERSIDEWALK DRAIN PER STD. DWG. 236
10. CONSTRUCT 8' CROSS GUTTER PER STD. DWG. 228
11. INSTALL WROUGHT IRON FENCE
12. INSTALL REMOVABLE BOLLARDS PER DETAIL 18/DT1
13. CONSTRUCT DROP INLET PER NDOT TYPE II, DWG. NO. R-4.2.1 WITH PEDESTRIAN RATED GRATE.
14. CONSTRUCT DRIVEWAY PER STD. DWG. 223 AND DETAIL 25/DT2
15. CONSTRUCT HANDICAPPED RAMP PER DETAIL 26/DT2
16. REMOVE EXISTING CURB AND GUTTER AND SIDEWALK AFFECTED BY NEW CONSTRUCTION.

JOSEPH D THOMASON — PROFESSIONAL ENGINEER — STATE OF NEVADA — No. 11907 — CIVIL — Exp. 6-30-08 — 5-4-07

JOSEPH D THOMASON — PROFESSIONAL ENGINEER — STATE OF NEVADA — No. 11907 — CIVIL — Exp. 6-30-08 — 5/4/07

EDWARD M. HROVICH — PROFESSIONAL ENGINEER — STATE OF NEVADA — No. 10149 — CIVIL — 5-4-07

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

Avoid overhead power line contact. Call before you Overhead 1-702-227-2929 NEVADA POWER EMERGENCY SAFETY SERVICES DEPARTMENT

Call before you UnderGround 1-702-257-7777 1-702-385-2161

73349 90357 12 942199 95411

BENCHMARK

BL.V90 20-C4
RIVET & PLATE IN CONCRETE CYLINDER AT SOUTHEAST CORNER OF DEER SPRINGS AND EL CAPITAN. NAVD '88 DATUM.

ELEVATION: 2572.38 FEET
784.0642 METERS

BASIS OF BEARINGS

NORTH 89°56'24" EAST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHEAST QUARTER (NE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY A MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE IN BOOK 107 OF SURVEYS, AT PAGE 31.

APPROVED FOR CONSTRUCTION
Las Vegas Valley Water District — Date 10/23/06

REPLOT

NO.	DATE	BY	DESCRIPTION
1	3/24/06	RC	ADD 12" WATER, EXP 16" PAVING
2	4/24/06	RC	REVISE 30 IN HGL & ELEV
3	5/4/07	RC	CHANGE INLET & REVISE HGL
4	8/16/07	RC	ADD TREE WELL
REV.	DATE	BY	DESCRIPTION

P:\Land\PROJ\A0018\Engineering\MP\PLANS\PP1-5.mp 09/15/2006 04:13:11 PM PDT

RICHMOND AMERICAN
7230 WEST PEAK DRIVE, SUITE 212
LAS VEGAS, NEVADA
(702) 240-5676

TETRA TECH, INC.
INFRASTRUCTURE SERVICES GROUP
401 N. Buffalo Dr. Suite 100, Las Vegas, Nevada 89145 (702) 243-4800

BROOKSIDE
CITY OF LAS VEGAS

PLAN AND PROFILE
DEER SPRINGS WAY

SHEET
TITLE

DRAWN BY
DESIGNED BY
QUALITY CONTROL BY
QUALITY CONTROL BY
CHECKED BY
SCALE 1"=40' 1"=4'
PROJECT NO P02243-0018

SEAL
REGISTERED PROFESSIONAL ENGINEER — STATE OF NEVADA — KENNETH T. YAMADA — No. 14664 — CIVIL — 5-4-07

SHEET PP1
13 OF 36
DRAWING NO 107Y4823

LEGEND

- PROPERTY LINE / RIGHT-OF-WAY
- "L" TYPE CURB AND GUTTER
- PROPOSED RETAINING WALL
- STEM WALL
- EXISTING IMPROVEMENT
- CROSS GUTTER
- WHEELCHAIR RAMP
- CUT OR FILL SLOPE
- PROPOSED PAVEMENT AREA
- PROPOSED ELEVATION (DESCRIPTION AS SHOWN)
- EXISTING ELEVATION (DESCRIPTION AS SHOWN)
- FUTURE DESIGN ELEVATION (DESCRIPTION AS SHOWN)
- LOT NUMBER
- PAD ELEVATION
- FF=2721.6 FINISHED FLOOR ELEVATION
- GF=2721.6 FINISHED FLOOR ELEVATION
- TC TOP OF CURB
- TDC TOP OF DEPRESSED CURB
- EP EDGE OF PAVEMENT
- FG FINISH GRADE

UTILITY NOTE

1. NOTIFY TETRA TECH, INC. IMMEDIATELY OF ANY DISCREPANCIES IN THE PLANS OR CONDITIONS IN THE FIELD.
2. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL LOCATE AND VERIFY SIZE, MATERIAL DEPTH, CONDITION, PRESSURE AND LOCATION OF ALL EXISTING UTILITY LINES WITHIN THE CONSTRUCTION AREA. TETRA TECH, INC. SHALL BE CONTACTED ONCE THE UTILITY IS LOCATED.
3. PLANS MAY NOT INDICATE ALL EXISTING UTILITY LINES. CONTRACTOR IS TO EXERCISE EXTREME CAUTION DURING EXCAVATION IN ORDER TO AVOID DAMAGING ANY EXISTING UTILITY LINES. IF THE UTILITY LINES ARE DAMAGED BY THE CONTRACTOR, SUCH DAMAGE SHALL BE REPAIRED TO THE SATISFACTION OF THE OWNER AT THE CONTRACTOR'S EXPENSE.
4. CONTRACTOR TO SAWCUT AND REMOVE EXISTING ASPHALT AND CONCRETE AS NECESSARY FOR UTILITY TRENCHES. BACKFILL AND PATCH ALL TRENCHES ACCORDING TO CITY OF LAS VEGAS STANDARDS.
5. ALL WATER SERVICE LINES AND METERS SHALL BE INSTALLED PER LAS VEGAS VALLEY WATER DISTRICT STANDARDS AND SPECIFICATIONS.
6. CONTRACTOR TO FIELD VERIFY LOCATION AND INVERT OF MANHOLE PRIOR TO CONSTRUCTION. TETRA TECH, INC. SHALL BE CONTACTED ONCE THIS INFORMATION HAS BEEN OBTAINED.

DUAL METERBOX-ARMORCAST
BOX - 6000460
LID - 6000461

WATER QUANTITIES AND KEY NOTES

A	FIRE HYDRANT ASSEMBLY PER UDACS STD. PLATE NO. 7	15 EA
B	6" GATE VALVE PER UDACS STD. PLATE NO. 8 AND 3	5 EA
C	6" TEE PER UDACS PLATE #5	5 EA
D	6" 5° BEND W/ MECHANICAL RESTAINT	1 EA
E	8" 11.25° BEND PER UDACS PLATE #5	3 EA
F	8" 22.5° BEND PER UDACS PLATE #5	3 EA
G	6" 90° BEND PER UDACS PLATE #5	1 EA
H	12" CAP AND 3" BLOWOFF ASSEMBLY PER UDACS STD. PLATE NO. 4A	1 EA
I	8" x 6" REDUCER PER UDACS PLATE #3	5 EA
J	6" x 6" TEE PER UDACS PLATE #5	14 EA
K	6" CAP AND 3" BLOWOFF ASSEMBLY PER UDACS STD. PLATE NO. 4A	24 EA
V	3/4" IRRIGATION METER, W/ 1" FRP2A PER UDACS PLATE NO.10 AND 11A	5 EA
L	6" GATE VALVE PER UDACS STD. PLATE NO. 8 AND 3	0 EA
M	5/8" METER AND 1" TYPE K COPPER LATERAL PER UDACS STD. PLATE NO. 18	192 EA
N	10" x 8" M.J. TAPPING TEE W// 8" TAPPING VALVE	1 EA
O	10" x 6" TAPPING TEE W/ 6" TAPPING VALVE	3 EA
P	6" 11.25° BEND PER UDACS PLATE #5	1 EA
Q	6" 22.5° BEND PER UDACS PLATE #5	1 EA
R	12" TEE PER UDACS PLATE #5	1 EA
S	12" GATE VALVE PER UDACS STD. PLATE NO. 8 AND 3	2 EA
T	12" x 8" REDUCER PER UDACS PLATE #5	1 EA
U	6" 45° BEND PER UDACS PLATE #5	4 EA
	12" PVC WATERLINE	615 LF
	8" PVC WATERLINE	2749 LF
	6" PVC WATERLINE	2915 LF

SEWER QUANTITIES AND KEY NOTES

A	CONSTRUCT STANDARD ECCENTRIC MANHOLE PER DCSWCS PLATE SD-11	56 EA
B	INSTALL 8" SEWER CAP	00 EA
C	INSTALL SEWER LATERAL PER DCSWCS PLATE SD-17	192 EA
	8" PVC SEWER	5588 LF

NORTH

1" = 30'

DEER SPRINGS WAY

RILEY STREET

GRAND MONTECITO PARKWAY

ROME BOULEVARD

KEY MAP
NOT TO SCALE

VICINITY MAP
NOT TO SCALE

PROJECT SITE

APN: 125-20-601-002

ZONE: T-C

OWNER: JACK BINION & PHYLLIS COPE

MASTER PLANED: MS-TC

EXISTING IMPROVEMENT PER MONTECITO TOWN CENTER EAST PER PRIMAS AND ASSOCIATES

APN: 125-20-710-002
ZONE: T-C
OWNER: MONTECTIO TOWN CENTER LLC
MASTER PLANED: MS-TC

EXISTING IMPROVEMENT PER MONTECITO LIFESTYLE CENTER CLV # 1071-4742

APN: 125-20-702-001
ZONE: T-C
OWNER: JAMES TUCKER FAMILY TRUST
MASTER PLANED: MS-TC

EXISTING IMPROVEMENT PER MONTECITO PARKWAY IMPROVEMENTS DETAIL #21(97)(3770) BY PBGU

REDUCED PRESSURE PRINCIPLE ASSEMBLY (S) ⚠

APPROVED REDUCED PRESSURE PRINCIPLE ASSEMBLY(S) SHALL BE INSTALLED PER THE UDACS PLATE No. 11A AND WATER SHALL BE TAKEN FROM A SERVICE REQUIRING BACKFLOW PREVENTION UNITS. THE REDUCED PRESSURE PRINCIPLE ASSEMBLY HAS BEEN SUCCESSFULLY TESTED BY THE LVVWD AND BLOCK WALL OR OTHER FENCE MATERIAL SHALL BE DESIGNED AND CONSTRUCTED AROUND THE OUTSIDE OF THE EASEMENT(S) TO ALLOW THE DISTRICT DIRECT ACCESS FROM THE ADJACENT RIGHT-OF-WAY. EASEMENTS SHALL BE CLEARLY MARKED OR STAKED PRIOR TO THE START OF INSPECTION.

DEER SPRINGS WAY (PUBLIC)

GRAND MONTECITO PARKWAY (PUBLIC)

RILEY STREET (PUBLIC)

LAVATERA MEADOWS AVENUE (PRIVATE)

BELLMOUTH COURT

PARDINA COURT

RHAMUS COURT

ZELKOVA COURT

PRIMUS COURT

ALDABRA COURT

BILTMORE GARDEN STREET (PRIVATE)

BUBBLE GARDEN STREET (PRIVATE)

CALADIUM COURT

365.72 LF 8" PVC SEWER @ 1.61% (PUBLIC)

315.71 LF 8" PVC SEWER @ 1.25% (PUBLIC)

300 LF - 30" RCP STORM DRAIN @ 0.035%

184 LF - 30" RCP STORM DRAIN @ 0.035%

2.82%

SEE SHEET UT2 FOR CONTINUATION

BENCHMARK
BLVD0 20-C4
RIVET & PLATE IN CONCRETE CYLINDER AT SOUTHEAST CORNER OF DEER SPRINGS AND EL CAPITAN. NAVD '88 DATUM.
ELEVATION: 2572.36 FEET
784.0642 METERS

BASIS OF BEARINGS
NORTH 89°36'24" EAST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHEAST QUARTER (NE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.B.&M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY A MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE IN BOOK 107 OF SURVEYS, AT PAGE 31.

NOTE:
ALL PRIVATE STREETS / PRIVATE DRIVE ARE P.U.E.'S, PUBLIC SEWER EASEMENT AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOME OWNERS.

LOT# ____ BROOKSIDE

The property may have static pressure in excess of 80 psi. The uniform plumbing code requires that individual, on-site (private), pressure reducing valves be installed wherever the pressure exceeds 80 psi. PRV's are the Developer's responsibility, and will not be inspected or included in the acceptance of L.V.V.W.D. facilities.

APPROVALS

LAS VEGAS VALLEY WATER DISTRICT — DATE 7/6/04
PROJECT # 20030

CITY OF LAS VEGAS FIRE DEPARTMENT — DATE 9/24/04

PROJECT NAME BROOKSIDE
SHTS. 1 thru 8

This project water plan complies with the Las Vegas Valley Water District's technical requirements. However, this water plan is

NOT APPROVED FOR CONSTRUCTION

at this time and this signature does not provide or imply a water commitment

LVVWD — DATE — ESH 052

Call before you Dig 1-800-227-2600

Call before you Overhead 1-702-227-2929

Call UnderGround

70809 20923 Rem 7334886 T6794U3 80366 JJ. 942/84 95410

NO	DESCRIPTION	BY	DATE
1	1ST SUBMITTAL	RP	1/21/04
2	2ND SUBMITTAL	RP	4/5/04
3	3RD SUBMITTAL	RP	5/19/04
4	4TH SUBMITTAL	RP	6/24/04
5	5TH SUBMITTAL	RP	7/15/04
6	6TH SUBMITTAL	RP	8/24/04
7	7TH SUBMITTAL	RP	9/24/04
8	8TH SUBMITTAL	RP	10/5/04

Revised Eng. Lead Sewer, Lines, Fonted, Dimensions

Revised Water Meter Pit Detail

Revised Sewer Manhole Detail

Revised Water Meter Pit Detail

Revised Eng. Lead Water Lines, Fonted, Dimensions

Revised Eng. Lead Water Lines, Fonted, Dimensions

Revised Eng. Lead Water Lines, Fonted, Dimensions

Revised Eng. Lead Water Lines, Fonted, Dimensions

REVISIONS

P:\Land\P0224\DWG\Engineering\PLANS\UT1.dwg 04/05/2004 02:04:57 PM PST

TETRA TECH, INC.
INFRASTRUCTURE SERVICES GROUP
420 N. Stephanie Dr., Suite 100, Las Vegas, Nevada 89145 (702) 243-4300

RICHMOND AMERICAN
7250 WEST PEAK DRIVE, SUITE 212
LAS VEGAS, NEVADA
(702) 240-5676

SEAL — JOSEPH D. THOMASON, Exp 8-30-08, CIVIL, STATE OF NEVADA, No. 11907

SEAL — KENNETH T. YAMADA, Exp 6-30-06, CIVIL, STATE OF NEVADA, No. 10149

SEAL — JOSEPH D. THOMASON, Exp 6-30-08, CIVIL, STATE OF NEVADA, No. 11907

SHEET: UTILITY PLAN
TITLE: BROOKSIDE
CITY OF LAS VEGAS

DRAWN BY
DESIGNED BY
CHECKED BY
QUALITY CONTROL BY
QUALITY CONTROL BY
SCALE 1" = 30'
PROJECT NO P02243-0018

SHEET UT1
5 OF 36
DRAWING NO 10794123

APPENDIX H

Improvement Plans


N
PROJECT SITE
95
15
US 95
SR 157 KYLE CANYON
MOCCASIN
GRAND TETON
CENTENNIAL
ANN
LONE MOUNTAIN
ALEXANDER
CHEYENNE
SMOKE RANCH
LAKE MEAD BLVD
VEGAS
WASHINGTON
CHARLESTON
SAHARA
DESERT INN
SPRING MOUNTAIN
FLAMINGO
TROPICANA
RUSSELL
SUNSET
WARM SPRINGS
WINDMILL
PEBBLE
BLUE DIAMOND
GOWER
SILVERADO RANCH
CACTUS AVE
SUNRIDGE HEIGHTS
HORIZON RIDGE PKWY
WACON WHEEL
I-215
I-15
LAS VEGAS BLVD
UPRR
CRAIG
ELKHORN
CHEYENNE
CLARK
CARSON
BONANZA
STEWART
VEGAS VALLEY
TWAIN
MARYLAND PKWY
EASTERN
PECOS
BOULDER HWY
NELLIS
CRAIG
CAREY
HOLLYWOOD
OWENS
LAKE MEAD PKWY
VALLEY VIEW
RACETRACK
HORIZON
NEVADA STATE RD
HENDERSON EXECUTIVE AIRPORT
McCARRAN INTERNATIONAL AIRPORT
CNLV AIRPORT CAREY
TOWN CENTER
ANTELOPE
RAINBOW
JONES
DECATUR
ALLEN
DURANGO
BUFFALO
TENAYA
HUALAPAI
FORT APACHE
GRAND CANYON
ARVILLE
DURANGO
SPRING MOUNTAIN
ROCKY GAP
CIMARRON
SPENCER
JONES
DECATUR
RAINBOW
TENAYA
BUFFALO
DURANGO
HUALAPAI
FORT APACHE

STORMWATER RUNOFF MANAGEMENT

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

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

LEGAL DESCRIPTION

A PORTION OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOGETHER WITH A PORTION OF THE SOUTHWEST QUARTER (SW 1/4) OF THE NORTHWEST QUARTER (NW 1/4) OF SECTION 21, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5L9D 2OE6

RIVET & PLATE IN TOP OF CURB AT SW CORNER OF RILEY ST. & DEER SPRINGS.

ELEVATION=774.781 METERS (NAVD'88)
ELEVATION=2541.93 US SURVEY FEET (NAVD'88)

BASIS OF BEARINGS

NORTH 89°56'20" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE IN FILE 118, PAGE 89 OF SURVEYS.

SOUTHERN NEVADA - SOUTHWEST GAS CORPORATION GENERAL NOTES

1. IN THE EVENT OF NATURAL GAS EMERGENCIES CALL 911 AND 1-877-860-6020
2. THERE SHALL BE A MINIMUM HORIZONTAL AND VERTICAL CLEARANCE OF 12-INCHES BETWEEN NATURAL GAS FACILITIES AND ANY UNDERGROUND FACILITIES AND/OR STRUCTURES, INCLUDING BUT NOT LIMITED TO WATER, SEWER, STORM DRAIN, COMMUNICATIONS, AND ELECTRIC
3. FOR VALVE ADJUSTMENT CONTACT 702-668-6107 48 HOURS PRIOR TO CONSTRUCTION.
4. IN THE EVENT OF NATURAL GAS CONFLICT WITH PROPOSED UTILITIES AND/OR STRUCTURES CONTACT 702-365-2099

CAUTION: HIGH PRESSURE GAS

CALL SOUTHWEST GAS AT 702-400-1789 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES 48 HOURS PRIOR TO CONSTRUCTION

SOUTHWEST GAS APPROVAL

SOUTHWEST GAS CORPORATION DATE

2.2 CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" 'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

LVVWD PROJECT # ###### (REVISED 08/01/2017)

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE 2010 EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). THE LATEST EDITION OF UDACS SHALL SUPERSEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS.
9. ALL WATER FACILITIES AND APPURTENANCES SHALL BE DISINFECTED, PRESSURE TESTED, AND HAVE AN ACCEPTABLE PASSING HEALTH WATER SAMPLE OBTAINED, PRIOR TO OPERATION AND USE.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD APPROVED PRODUCT'S LIST FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS BY SUBMITTING SHOP DRAWINGS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LVVWD MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.

    ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.

IS NO LEAD COMPLIANCE NOTE
TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER WORKS BRASS PRODUCTS PROPOSED TO BE RELOCATED, OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

GRADING NOTES

1. INDICATED GRADES OTHER THAN T.C., F.G. & GUTTER F.L. ARE ROUGH GRADES.
2. THE ROUGH GRADING PLANS SHALL BE ON THE JOB SITE AT ALL TIMES. THE ROUGH GRADING SHALL BE FINISHED IN CONFORMANCE WITH THE LINES AND GRADES SHOWN ON THE PLANS. THE GRADING QUANTITIES ARE BASED ON THE ELEVATION AND DETAILS SHOWN ON THE PLANS. ANY DEVIATIONS FROM THE PLANS WILL RESULT IN QUANTITY CHANGES.
3. CARE SHALL BE EXERCISED IN GRADING CORNER LOTS.
4. ROUGH PAD ELEVATIONS SHALL BE GRADED TO WITHIN 0.1' OF THE PAD ELEVATIONS SHOWN ON THE PLANS. WHEN GRADING IS COMPLETE PER THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE LOTS CAN BE INSPECTED. AT THAT TIME THE ENGINEER SHALL ALSO DECIDE IF ANY ADDITIONAL DITCHES OR BERMS ARE REQUIRED. THE CONTRACTOR IS REQUESTED NOT TO REMOVE ANY OF HIS ROUGH GRADING EQUIPMENT UNTIL HE RECEIVES GRADING APPROVAL FROM THE ENGINEER.
5. SOILS REPORT PREPARED BY SOUTHWEST GEOTECHNICAL, PROJECT NO. 182358, DATED 10/17/18.
6. EARTHWORK QUANTITIES (RAW):
   -CUT = ##,### CUBIC YARDS.
   -FILL = ##,### CUBIC YARDS

   A) THE ABOVE QUANTITIES DO NOT REFLECT LOSSES DUE TO SUBSIDENCE OR SHRINKAGE.
   B) THE ABOVE QUANTITIES DO REFLECT USING NATIVE MATERIAL IN LIEU OF TYPE I GRAVEL BASE MATERIAL FOR STREET SECTIONS.
   C) THE ABOVE QUANTITIES DO NOT REFLECT ANY EARTHWORK WHICH MAY BE REQUIRED BY THE ENGINEER TO CONSTRUCT ADDITIONAL PROTECTIVE DITCHES OR BERMS NOT SHOWN ON THESE DRAWINGS.

CITY OF LAS VEGAS FIRE AND RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE # 6325, FOR HYDRANT SPECIFICATIONS, AND HYDRANT INSTALLATION SPECIFICATIONS
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S – **APPROVED PRODUCTS LIST** ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR ALL INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK [IFC 105.7.12]
4. ON ANT RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [IFC 3310, 3312]
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [IFC 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC 106.3]
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [IFC 507.2.1, NFPA 24]
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [IFC 507]
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. [IFC 507.5.7.1]
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [IFC 507]
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: [IFC C102]
    - RESIDENTIAL- 500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
    - COMMERCIAL- 300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE NEW WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1,000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. [IFC C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FEET OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC C102.12]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC C102.7]
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [IFC C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE ARE 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [IFC C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [IFC 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FEET PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. [IFC 503.2.7, 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FEET OUTSIDE AND 28 FEET INSIDE TURNING RADIUS. [IFC 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13 FT 6 INS. [IFC 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FT FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FT WIDE, FLOW LINE TO FLOW LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD. NOT LESS THAN 24 FT WIDE, FLOW LINE TO FLOW LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. [IFC 503.2.1.1]
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. THE DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS SPRINKLERED. [IFC 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR EXCEEDING 62,000 SQUARE FEET IN AREA. [IFC 503.1.2]
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. [IFC 503.2.5]
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FEET ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. [IFC 503.3]
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE IFC 503.6 AND IFC APPENDIX M.

2.5 CITY OF LAS VEGAS GRADING NOTES

1. IN THE EVENT THAT ANY UNFORESEEN CONDITIONS NOT COVERED BY THESE NOTES ARE ENCOUNTERED DURING GRADING OPERATIONS, THE OWNER/ENGINEER SHALL BE IMMEDIATELY NOTIFIED FOR DIRECTION.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM ALL NECESSARY CUTS AND FILLS WITHIN THE LIMITS OF THIS PROJECT AND THE RELATED OFF-SITE WORK, SO AS TO GENERATE THE DESIRED SUBGRADE, FINISH GRADES AND SLOPES SHOWN.
3. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ALL EXCAVATION ,ADEQUATE SHORING SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR TO PREVENT UNDERMINING OF ANY ADJACENT FEATURES OR FACILITIES AND/OR CAVING OF THE EXCAVATION.
4. THE CONTRACTOR IS WARNED THAT AN EARTHWORK BALANCE WAS NOT NECESSARILY THE INTENT OF THIS PROJECT. ANY ADDITIONAL MATERIAL REQUIRED OR LEFTOVER MATERIAL FOLLOWING EARTHWORK OPERATIONS BECOMES THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE GRADING CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE OWNER TO PROVIDE FOR THE REQUIREMENTS OF THE PROJECT STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND ASSOCIATED PERMIT.
6. CONTRACTOR SHALL GRADE TO THE LINES AND ELEVATIONS SHOWN ON THE PLANS WITHIN THE FOLLOWING HORIZONTAL AND VERTICAL TOLERANCES AND DEGREES OF COMPACTION, IN THE AREAS INDICATED:

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

COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.

7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
8. THE USE OF POTABLE WATER WITHOUT A SPECIAL PERMIT FOR BUILDING OR CONSTRUCTION PURPOSES INCLUDING CONSOLIDATION OF BACKFILL OR DUST CONTROL IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.
9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT-OF-WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. ALL ADJACENT PROPERTY, PRIVATE OR PUBLIC SHALL BE MAINTAINED IN A CLEAN, SAFE AND USABLE CONDITION.
10. IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.

UTILITY LOCATION NOTE TO CONTRACTOR

EXISTING UTILITY LOCATIONS SHOWN HEREIN 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 OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS. CALL BEFORE YOU DIG: 1 (800) 227-2600, SOUTHWEST GAS CORPORATION: 702-400-1789 (STANDBY CONTACT NUMBER)

2.1 CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS. CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS"FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE'S WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300'IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY SOUTHWEST GEOTECHNICAL

ABBREVIATIONS

AC	ASPHALTIC CONCRETE OR ACRE	FL	FLOWLINE	PVI	POINT OF VERTICAL INTERSECTION
AGG	AGGREGATE BASE	FT	FEET OR FOOT	QTY	QUANTITY
APN	ASSESSORS PARCEL NUMBER	FUT	FUTURE	R	RADIUS
APPROX OR ~	APPROXIMATE	GRD	GRADE OR GROUND	RCA	REINFORCED CONCRETE ARCH
AVE	AVENUE	GB	GRADE BREAK OR GRADE CHANGE	RCB	REINFORCED CONCRETE BOX
@	AT	GV	GATE VALVE	RCP	REINFORCED CONCRETE PIPE
BC	BEGIN CURVE OR BACK OF CURB	HDPE	HIGH DENSITY POLYETHYLENE	RD	RD
BCR	BEGINNING OF CURB RETURN	HOA	HOME OWNERS ASSOCIATION	ROWY ESMT	ROADWAY EASEMENT
BHW	BOTTOM OF HEADWALL	HORZ	HORIZONTAL	REQD	REQUIRED
BLDG	BUILDING	HP	HIGH POINT	REV	REVISION
BLVD	BOULEVARD	HWL	HIGH WATER LEVEL	RG	ROUGH GRADE
BM	BENCHMARK	HDWL OR HW	HEADWALL	RT OR R	
BVC	BEGIN VERTICAL CURVE	HYD	HYDRAULIC OR HYDRANT	R/W, ROW	RIGHT OF WAY
BWV	BACK WATER VALVE	ID	INSIDE DIAMETER	S	SLOPE
CC	CLARK COUNTY	IN	INCH	SCH	SCHEDULE
CCAUSD	CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS	INT	INTERSECTION	SD	STORM DRAIN
CCPW	CLARK COUNTY PUBLIC WORKS	INV	INVERT ELEVATION	SDDI	STORM DRAIN DROP INLET
CCRFCD	CLARK COUNTY REGIONAL FLOOD DISTRICT	IP	IRON PIPE	SDMH	STORM DRAIN MANHOLE
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT	IRRG	IRRIGATION	SEC	SECTION
CE	COMMON ELEMENT	LF	LINEAR FEET	SF	SQUARE FEET
CL,C/L,C	CENTERLINE	LMC	LANDSCAPE MAINTENANCE CORPORATION	SHT	SHEET
CLR	CLEAR OR CLEARANCE	LP	LOW POINT	SLTC	STREET LIGHT & TRAFFIC CONTROL ESMT
CLSM	CONTROLLED LOW STRENGTH MATERIAL	LT OR L	LEFT	SNWA	SOUTHERN NEVADA WATER AUTHORITY
CLV	CITY OF LAS VEGAS	LVVWD	LAS VEGAS VALLEY WATER DISTRICT	SPECS	SPECIFICATIONS
CMLAC	CEMENT MORTAR LINED AND COATED	LWL	LOW WATER LEVEL	ST	STREET
CMU	CONCRETE MASONRY UNIT	MAX	MAXIMUM	SSMH	SANITARY SEWER MANHOLE
CNLV	CITY OF NORTH LAS VEGAS	MECH	MECHANICAL	STA	STATION
COH	CITY OF HENDERSON	MH	MANHOLE	STD	STANDARD
CONC	CONCRETE	MIN	MINIMUM	STL	STEEL
CT	COURT	MISC	MISCELLANEOUS	STLT	STREET LIGHT
CY OR CU YD	CUBIC YARD	MUE	MUNICIPAL UTILITY EASEMENT	SW	SIDEWALK
DCWCS	DESIGN AND CONSTRUCTION FOR WASTEWATER COLLECTION SYSTEMS	NDOT	NEVADA DEPARTMENT OF TRANSPORTATION	SWG	SOUTHWEST GAS
		NTS	NOT TO SCALE	SWR OR SS	SANITARY SEWER
DET	DETAIL	NUE	NONEXCLUSIVE UTILITY EASEMENT	SY	SQUARE YARD
DI	DUCTILE IRON OR DRAIN INLET	NVE	NV ENERGY	TAN	TANGENT
DIA, ø	DIAMETER	OC	ON CENTER	TC	TOP OF CURB
DIP	DUCTILE IRON PIPE	OD	OUTSIDE DIAMETER OR OVERALL DIMENSION	TF	TOP OF FLOOR OR TOP OF FOOTING
DR	DRIVE	OFFT	OFFSET	TG	TOP OF GRATE
DWG(S)	DRAWING	ORIG	ORIGINAL	THRU	THROUGH
DWY	DRIVEWAY	PAE	PUBLIC OR PEDESTRIAN ACCESS EASEMENT	THW	TOP OF HEADWALL
EA	EACH	PB	PULL BOX	TP	TOP OF PIPE
ECR	END CURB RETURN	PC	POINT OF CURVE	TW	TOP OF WALL
EG	EXISTING GROUND	PCC	POINT OF COMPOUND CURVE	TRW	TOP OF RETAINING WALL
ELEV	ELEVATION	PDE	PUBLIC DRAINAGE EASEMENT	TSW	TOP OF SCREEN WALL
ESMT	EASEMENT	℄ OR PL	PROPERTY LINE	TYP	TYPICAL
EP	EDGE OF PAVEMENT	POB	POINT OF BEGINNING	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
ERU	EQUIVALENT RESIDENTIAL UNIT	POC	POINT OF CURVATURE		
EVC	END VERTICAL CURVE	POE	POINT OF ENDING	VC	VERTICAL CURVE
EX OR EXIST	EXISTING	PRC	POINT OF REVERSE CURVATURE	VERT	VERTICAL
FC	FACE OF CURB	PRELIM	PRELIMINARY	VG	VALLEY GUTTER
FF	FINISHED FLOOR	PROP	PROPOSED	W	WROUGHT IRON
FG	FINISHED GRADE	PRV	PRESSURE REDUCING VALVE	WL	WATER LINE
FGH	FINISHED GRADE, HIGH SIDE	PUE	PUBLIC UTILITY EASEMENT	WPZ	WATER PRESSURE ZONE
FGL	FINISHED GRADE, LOW SIDE	PT	POINT OF TANGENT OR POINT	WT	WEIGHT
FH	FIRE HYDRANT	PVC	POLYVINYL CHLORIDE	WTR	WATER LINE

SPECIAL NOTE

IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED WHICH IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY OF LAS VEGAS DEPT. OF PUBLIC WORKS. TEMPORARY CONSTRUCTION ITEMS INCLUDE: PAVEMENT TRANSITIONS, PROTECTIVE DITCHES AND BERMS, ROAD SIGNS AND BARRICADES, ETC.

NOTICE TO CONTRACTOR

-QUANTITIES SHOWN ARE ESTIMATES ONLY AND ARE INTENDED TO ILLUSTRATE SCOPE OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXACT QUANTITIES INVOLVED.

-EXISTING UTILITY LOCATIONS SHOWN HEREIN 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 OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS. CALL BEFORE YOU DIG: (800) 227-2600

LEGEND

EXISTING	PROPOSED	DESCRIPTION
(1900)	1900	5' CONTOUR
		1' CONTOUR
		STRIPING
		SEWER MANHOLE
		CURB AND GUTTER
EX 8" PVC SS	8" PVC SS	SANITARY SEWER PIPE AND FLOW ARROW
EX 8" PVC WTR	8" PVC WTR	WATER PIPE
		WATER GATE VALVE
		FIRE HYDRANT
		WATER BLOW-OFF
		WATER LATERAL W/ METER
		SANITARY SEWER LATERAL
		STREETLIGHT
		EDGE OF PAVEMENT
		TRAFFIC SIGN
PAD= XXX.X FF = XXX.X	PAD= XXX.X FF = XXX.X	PAD ELEVATION FINISHED FLOOR ELEVATION
(00.00) TC	00.00 TC	ELEVATION
		RETAINING WALL
		STORM DRAIN W/ MANHOLE

	EXISTING GAS GATE VALVE
@MH	EXISTING UNKNOWN MANHOLE
GAS	EXISTING GAS, SIZE PER PLAN
	EXISTING POWER POLE
	EXISTING TRAFFIC SIGNAL
	EXISTING WALL
	WATER PIPE FITTING
POC	WATER POINT OF CONNECTION
POC	SEWER POINT OF CONNECTION
	DAYLIGHT LINE
	STREET CENTERLINE
	RIGHT-OF-WAY
	MATCHLINE
	BOUNDARY LINE
	PHASE LINE
	PROPERTY LINE
	FLOWLINE
	SAWCUT
FILL / CUT	CUT/FILL TRANSITION LINE
	SIDEWALK
	EX STRIPING TO BE OBLITERATED
	GRADE BREAK LINE
	REFLECTIVE RAISED PAVEMENT MARKERS
BWV	BACK WATER VALVE
	WROUGHT IRON FENCE
	PONY WALL
	DECORATIVE PERIMETER WALL
	DECORATIVE PERIMETER RETAINING WALL
	PROPOSED CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB
	EXISTING CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB
	FUTURE CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB

	PROPOSED SCARP AREA
	DRIVEWAY
	PROPOSED RIP RAP
	SIGHT VISIBILITY ZONE PER STD DWG NO. 201.2
	HANDICAP RAMP

QUANTITIES

			PRIVATE	PUBLIC
DRAINAGE				
1.	48" TYPE III STORM DRAIN MANHOLE	EA	–	4
2.	5.0' TYPE "CM2" DROP INLET	EA	–	–
3.	10.0' TYPE "CM2" DROP INLET	EA	–	–
4.	12.5' TYPE "CM2" DROP INLET	EA	–	1
5.	20.0' TYPE "CM2" DROP INLET	EA	–	–
6.	18" RCP CLASS IV STORM DRAIN	LF	–	–
7.	24" RCP CLASS IV STORM DRAIN	LF	–	170
8.	30" RCP CLASS IV STORM DRAIN	LF	–	–
9.	36" RCP CLASS IV STORM DRAIN	LF	–	429
10.	RIPRAP D50=14", THK=28"	SF	1,200	–
11.	8' WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	5,271	–
12.	SIDEWALK UNDER DRAIN	SF	–	–
13.	36" FLARED END SECTION PER NDOT R-2.3.1	SF	1	–
SEWER SYSTEM				
1.	4" PVC SEWER LATERAL (PRIVATE)	LF	–	–
2.	8" PVC SEWER PIPE (PUBLIC)	LF	–	–
3.	STANDARD 48" SEWER MANHOLE (PUBLIC)	EA	–	–
4.	8" SEWER PIPE CAP	EA	–	–
5.	BACK WATER VALVE	EA	–	–
6.	8" C-900 WATER QUALITY SEWER PIPE (PUBLIC)	LF	–	–
7.				
WATER SYSTEM				
1.	FIRE HYDRANT ASSEMBLY W/6" GATE VALVE PER UDACS PLATE NO. 40	EA	–	–
2.	6" PVC WATER PIPE (CLASS 150)	LF	–	–
3.	8" PVC WATER PIPE (CLASS 150)	LF	–	–
4.	8" DIP WATER PIPE (CLASS 53)	LF	–	–
5.	8" GATE VALVE WITH VALVE BOX PER UDACS PLATE NO. 30 & 39	EA	–	–
6.	8" X 6" TEE PER UDACS PLATE NO. 31	EA	–	–
7.	8" X 8" TEE PER UDACS PLATE NO. 31	EA	–	–
8.	8" 5 DEGREE BEND WITH RESTRAINED JOINTS	EA	–	–
9.	8" 11.25 DEGREE BEND PER UDACS PLATE NO. 31	EA	–	–
10.	8" 22.5 DEGREE BEND PER UDACS PLATE NO. 31	EA	–	–
11.	8" 45 DEGREE BEND PER UDACS PLATE NO. 31	EA	–	–
12.	8" 90 DEGREE BEND PER UDACS PLATE NO. 31	EA	–	–
13.	CAP AND 2" BLOW-OFF ASSEMBLY W/CAP PER UDACS PLATE NO. 36	EA	–	–
14.	1" COPPER SERVICE W/ 3/4" METER PER UDACS PLATE NO. 2	EA	–	–
15.	1" COPPER SERVICE W/ 1" METER PER UDACS PLATE NO. 4	EA	–	–
16.	1" COPPER SERVICE W/ 3/4" METER & 1" RPPA PER UDACS PLATE NO. 4 & 8	EA	–	–
		EA	–	
STREET IMPROVEMENTS				
1.	2" A.C. PAVEMENT W/ 4" TYPE II OVER 6" TYPE I AGGREGATE BASE	SY	17,490	–
2.	STANDARD 24" TYPE "L" CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	3,762	–
3.	STANDARD 8" TYPE "A" ISLAND CURB W/6" TYPE I AGGREGATE BASE	LF	115	–
4.	STANDARD 24" TYPE "R" CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	4,950	–
5.	5' WIDE CONCRETE SIDEWALK W/4" TYPE II AGGREGATE BASE	SF	29,525	–
6.				–
7.				
TRAFFIC SIGNALS				
1.	30" STOP SIGN WITH POST (R1-1)	EA	–	–
2.	9" STREET NAME SIGN (D-3, BROWN W/ WHITE LETTERS)(6 POLES x 2 PER POLE=12)	EA	–	–
3.	BLUE COLORED REFLECTIVE RAISED PAVEMENT MARKER	EA	–	–
4.	CROSSWALK MARKINGS	LF	–	–
5.				
6.				
7.				
8.				
DRY UTILITIES				
1.	100W H.P.S. LUMINAIRE STREET LIGHT W/DECORATIVE POLE	EA	–	–
2.	1-1/4" PVC STREET LIGHT CONDUIT WITH (2) #4 AND (1) #8 CONDUCTORS	LF	–	–
3.	NO. 3-1/2 PULL BOX W/METAL COVER	EA	–	–
4.	150 AMP SERVICE PEDESTAL (IRR)	EA	–	–
5.	200 AMP SERVICE PEDESTAL (STLT)	EA	–	–
6.				

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. ###### FIRST APPROVED DATE:







SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

KB HOME

MONTECITO 60 - UNIT 1

LEGEND, ABBREVIATIONS, & QUANTITIES

20 19S 60E

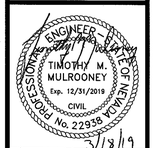
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DRAFTER: BCS

DESIGNER: HN

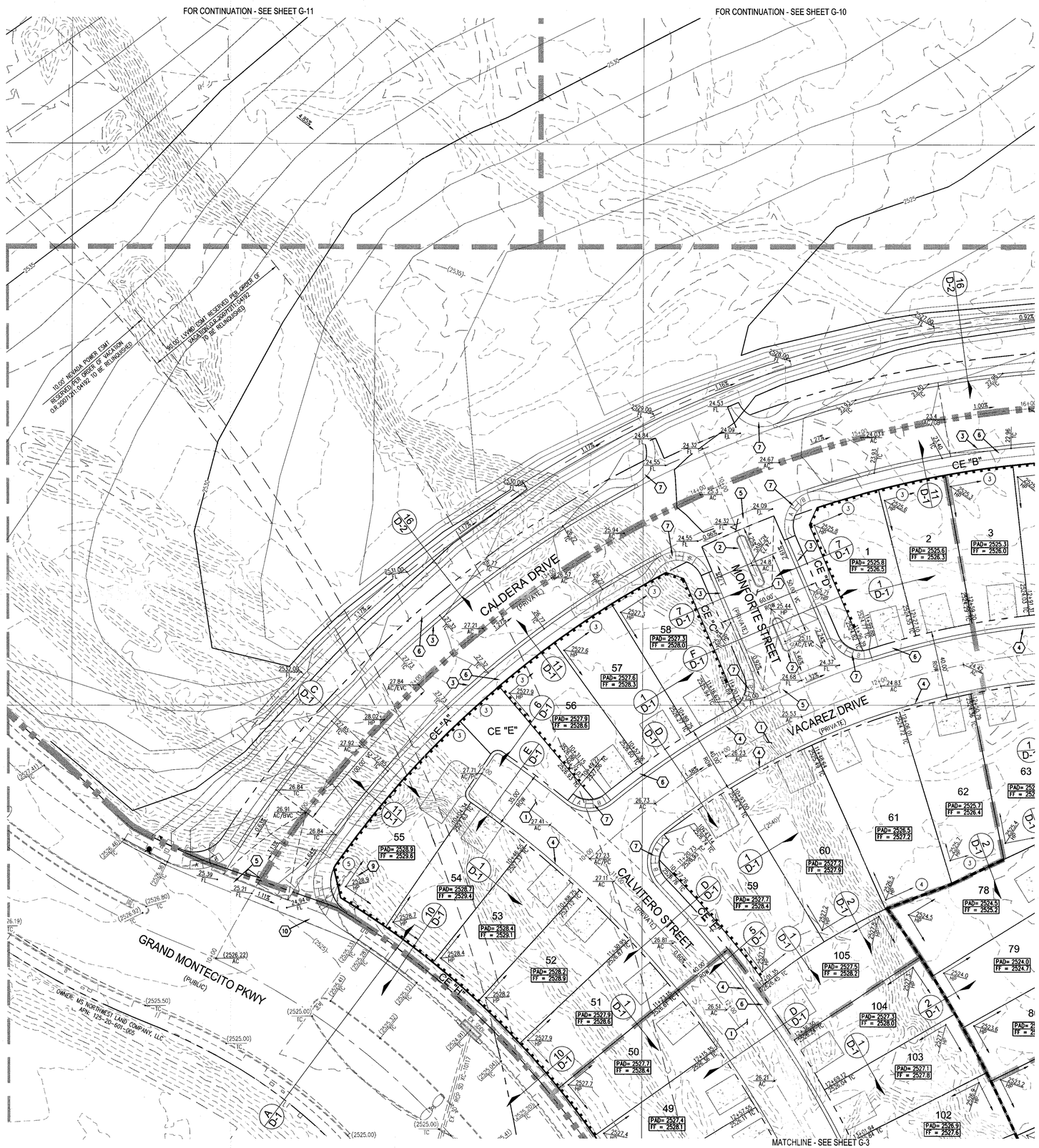
CHECKED: MAK

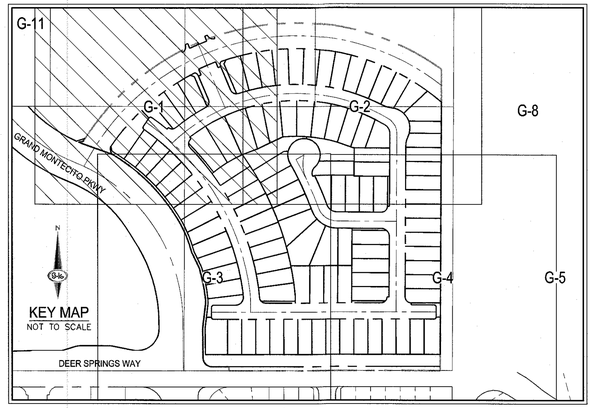
PROJECT NO.
KBH1805-001



C-3
SHEET 3 OF 18

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BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5LV90 2OE6

RIVET & PLATE IN TOP OF CURB AT SW CORNER OF RILEY ST. & DEER SPRINGS.

ELEVATION=774.781 METERS (NAVD'88)
ELEVATION=2541.93 US SURVEY FEET (NAVD'88)

BASIS OF BEARINGS

NORTH 89°56'20" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE IN FILE 118, PAGE 89 OF SURVEYS.

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358
DATED 10/17/18

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= ##### CU YDS
FILL= ##### CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT

SURVEY NOTE

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

DISCLAIMER NOTE

1) EXISTING UTILITY LOCATIONS SHOWN HEREON 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.

2) FOR ROADWAY WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF GUTTER PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

CONSTRUCTION NOTES

1. INSTALL 2" ASPHALT PAVEMENT OVER 4" TYPE II AGGREGATE BASE
2. INSTALL A TYPE CURB PER CCAUSD NO. 219
3. INSTALL L TYPE CURB PER CCAUSD NO. 216
4. INSTALL R-TYPE CURB & GUTTER PER CCAUSD NO. 217.3.S1
5. INSTALL 8' VALLEY GUTTER PER CCAUSD NO. 228
6. INSTALL 5' WIDE SIDEWALK PER CCAUSD NO. 234
7. INSTALL SIDEWALK RAMP PER CCAUSD NO. 235, CASE I AND CCAUSD NO. 235.1
8. INSTALL 5' CURB TRANSITION PER DETAIL ON SHEET D-2
9. EXISTING IMPROVEMENTS TO BE REMOVED
10. EXISTING VALLEY GUTTER TO BE REMOVED
11. REMOVE EXISTING 36" SD FROM PROPOSED MANHOLE
12. INSTALL 12.5' DROP INLET TYPE "CM2" PER CCAUSD NO. 412.1 AND 421
13. INSTALL 48" TYPE III STORM DRAIN MANHOLE PER CCAUSD NO. 406
14. INSTALL 36" FLARED END SECTION
15. INSTALL 60'X20' RIPRAP PAD, D50=14", THICKNESS = 28"
16. INSTALL 12' WIDE MAINTENANCE ACCESS GATE
17. REMOVE & RELOCATE EXISTING UTILITY BOXES

DRAINAGE QUANTITIES

			PRIV.
1.	48" TYPE III STORM DRAIN MANHOLE	EA	4
2.	12.5' TYPE "CM2" DROP INLET	EA	1
3.	24" RCP CLASS IV STORM DRAIN	LF	170
4.	36" RCP CLASS IV STORM DRAIN	LF	429
5.	RIPRAP D50=14", THK=28"	SF	1200
6.	36" FLARED END SECTION PER NDOT R-2.3.1	LF	1
7.	8' WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	5,271

GRADING NOTES

1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2018, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
8. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLEPING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.

LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

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

ELEVATION NOTE

ADD 2500 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2501.00)

DRAINAGE EASEMENT NOTE

ALL PRIVATE STREETS, DRAINAGE EASEMENTS AND COMMON LOTS ARE PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE HOA

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1750E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY ??????? ON FILE AT CITY OF LAS VEGAS AND CCFW HTE #??-????? FOR THE SUBJECT PROJECT.

TIMOTHY M. MULROONEY, P.E. 22938 — DATE

N

S-16

0 30 60
SCALE - 1"=30' FEET

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

FAST
Call before you UnderGround
1-702-432-5300
FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.)

Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call 811 OR 1-800-227-2600

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

KB HOME

MONTECITO 60 - UNIT 1

GRADING PLAN I

20 19S 60E

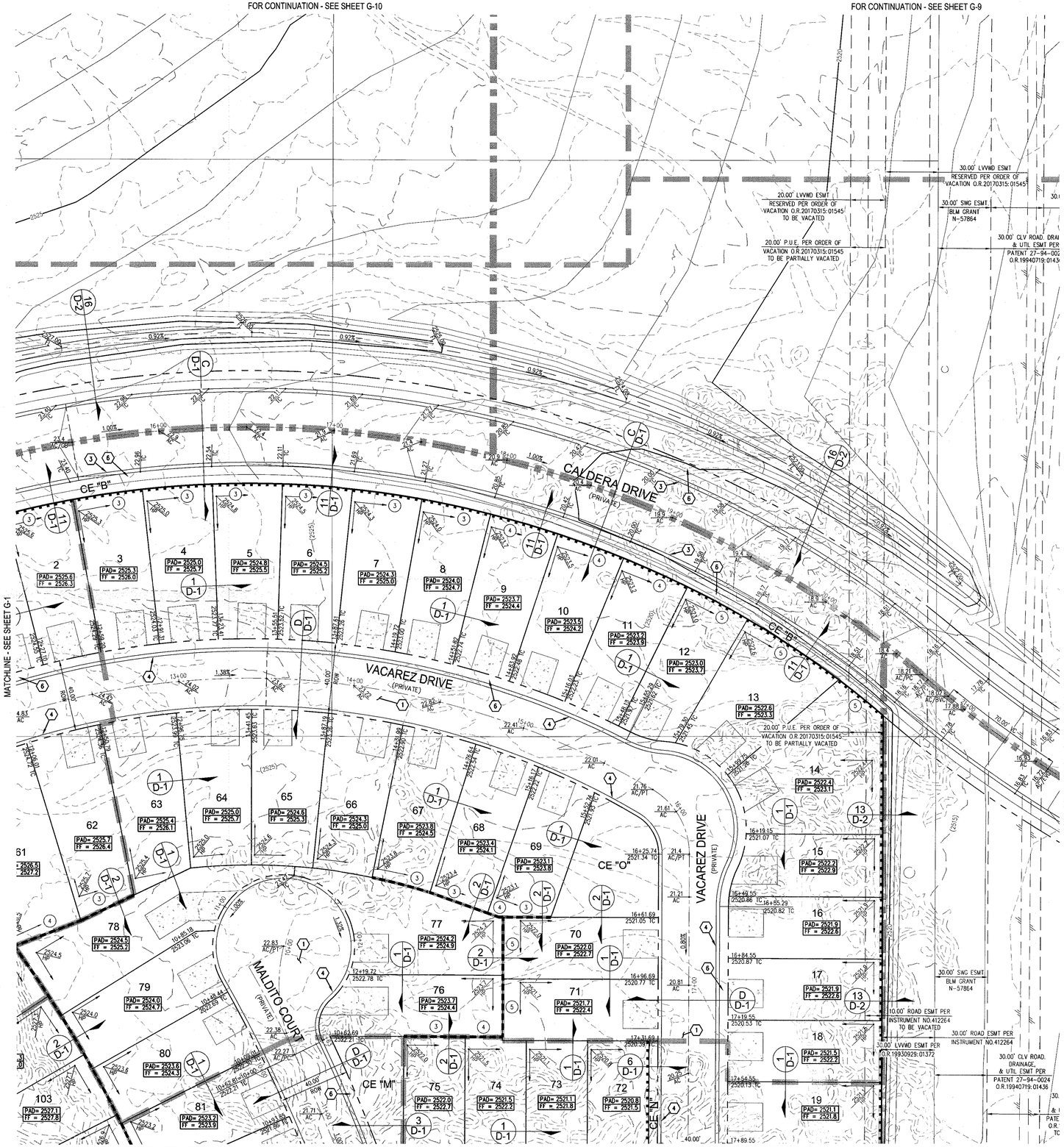
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DRAFTER: BCS
DESIGNER: HIN
CHECKED: MAK

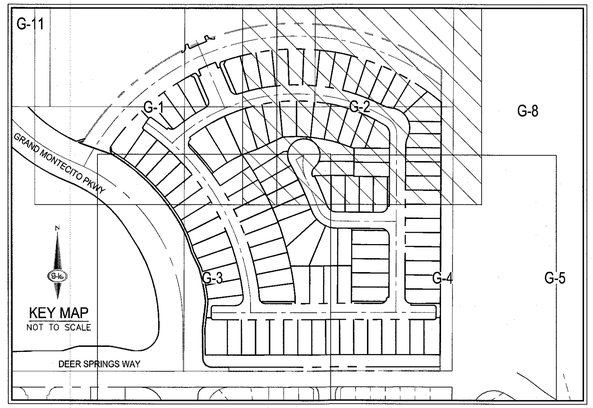
PROJECT NO.
KBH1805-001

PROFESSIONAL ENGINEER - STATE OF NEVADA
TIMOTHY M. MULROONEY
Exp. 12/31/2019
CIVIL
No. 22938
3/18/19

G-1
SHEET 4 OF 18

J:\kbh1805-001 montecito 60 unit 1\dwg\engrcv\kbh1805-001 grd.dwg, 3/18/2019 12:36 PM, Bryan Sorrentino





BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5LV90 2OE6

RIVET & PLATE IN TOP OF CURB AT SW CORNER OF RILEY ST. & DEER SPRINGS.

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ELEVATION=2541.93 US SURVEY FEET (NAVD'88)

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2) FOR ROADWAY WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF CURB PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

CONSTRUCTION NOTES

1. INSTALL 2" ASPHALT PAVEMENT OVER 4" TYPE II AGGREGATE BASE
2. INSTALL A TYPE CURB PER CCAUSD NO. 219
3. INSTALL L TYPE CURB PER CCAUSD NO. 216
4. INSTALL R-TYPE CURB & GUTTER PER CCAUSD NO. 217.3.S1
5. INSTALL 8' VALLEY GUTTER PER CCAUSD NO. 228
6. INSTALL 5' WIDE SIDEWALK PER CCAUSD NO. 234
7. INSTALL SIDEWALK RAMP PER CCAUSD NO. 235, CASE I AND CCAUSD NO. 235.1
8. INSTALL 5' CURB TRANSITION PER DETAIL ON SHEET D-2
9. EXISTING IMPROVEMENTS TO BE REMOVED
10. EXISTING VALLEY GUTTER TO BE REMOVED
11. REMOVE EXISTING 36" SD FROM PROPOSED MANHOLE
12. INSTALL 12.5' DROP INLET TYPE "CM2" PER CCAUSD NO. 412.1 AND 421
13. INSTALL 48" TYPE III STORM DRAIN MANHOLE PER CCAUSD NO. 406
14. INSTALL 36" FLARED END SECTION
15. INSTALL 60'X20' RIPRAP PAD, D50=14", THICKNESS = 28"
16. INSTALL 12' WDE MAINTENANCE ACCESS GATE
17. REMOVE & RELOCATE EXISTING UTILITY BOXES

DRAINAGE QUANTITIES		PRIV.	
1.	48" TYPE III STORM DRAIN MANHOLE	EA	4
2.	12.5' TYPE "CM2" DROP INLET	EA	1
3.	24" RCP CLASS IV STORM DRAIN	LF	170
4.	36" RCP CLASS IV STORM DRAIN	LF	429
5.	RIPRAP D50=14", THK=28"	SF	1200
6.	36" FLARED END SECTION PER NDOT R-2.3.1	LF	1
7.	8' WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	5,271

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL.

PROJECT NO. 182358
DATED 10/17/18

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= ##,### CU YDS
FILL= ##,### CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.

GRADING NOTES

1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2018, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
8. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLEPING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.

LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

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

ELEVATION NOTE

ADD 2500 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2501.00)

DRAINAGE EASEMENT NOTE

ALL PRIVATE STREETS, DRAINAGE EASEMENTS AND COMMON LOTS ARE PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE HOA

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 3200C1750E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY ??????? ON FILE AT CITY OF LAS VEGAS AND CCPW HTE #??-????? FOR THE SUBJECT PROJECT.

TIMOTHY M. MULROONEY, P.E. 22938 — DATE

N

SCALE - 1"=30' (0, 30, 60 FEET)







SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

KB HOME
MONTECITO 60 - UNIT 1
GRADING PLAN II

20 10S 60E

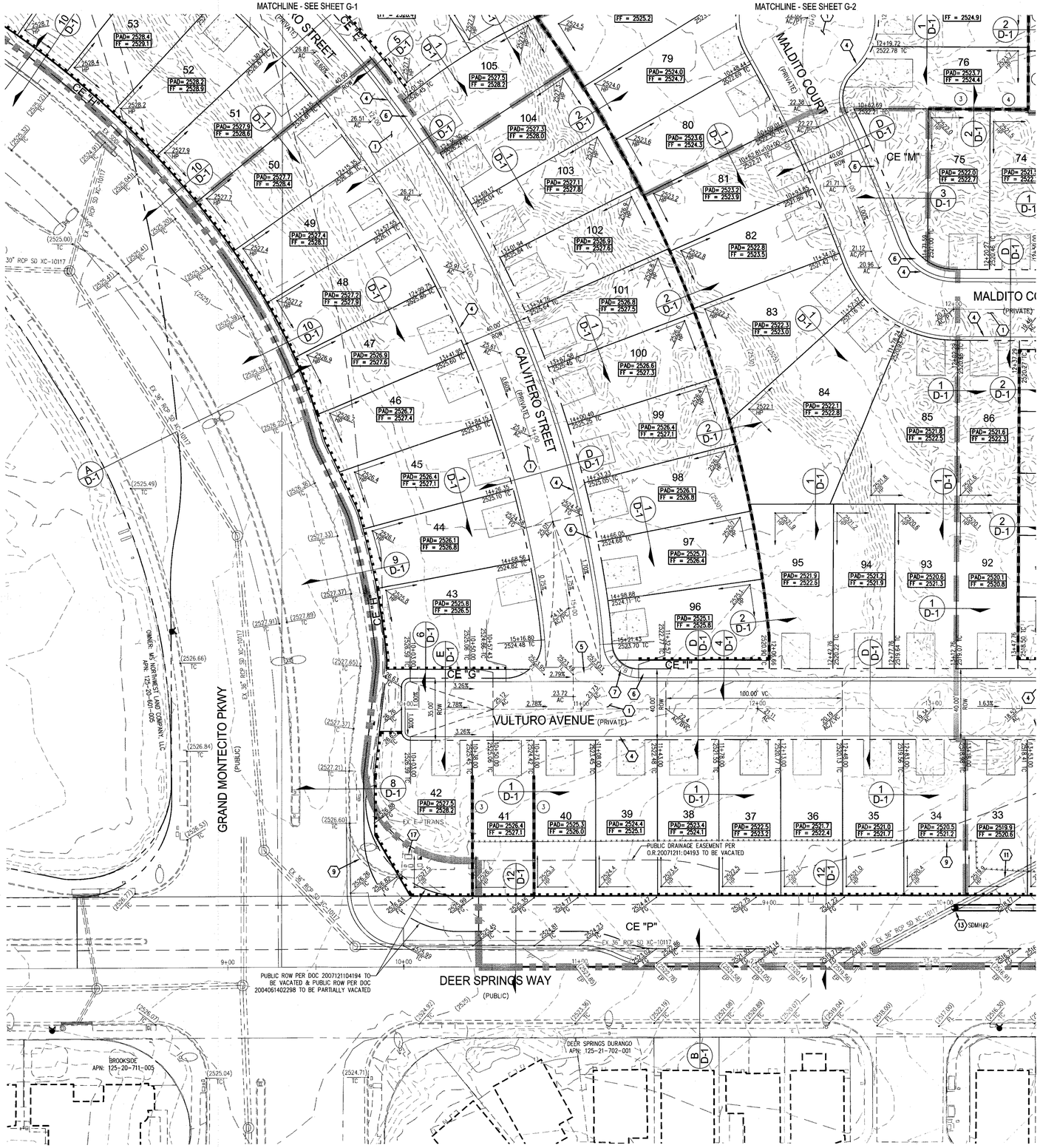
DATE: 3/11/19
DRAFTER: BCS
DESIGNER: HN
CHECKED: MAK

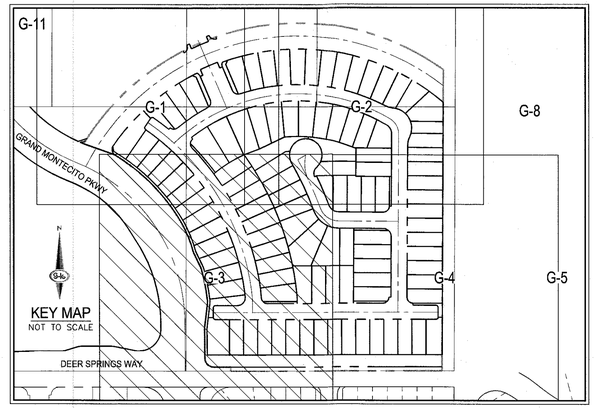
PROJECT NO.
KBH1805-001

PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY M. MULROONEY — Exp. 12/31/2019 — CIVIL — NO. 22938 — 3/18/19

G-2
SHEET 5 OF 18

J:\kbh1805-001 montecito 60 unit 1\dwg\micro\kbh1805-001 grd.dwg 3/18/2019 12:37 PM Bryan Sarmiento





BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5LV90 2OE6

RIVET & PLATE IN TOP OF CURB AT SW CORNER OF RILEY ST. & DEER SPRINGS.

ELEVATION=774.781 METERS (NAVD'88)
ELEVATION=2541.93 US SURVEY FEET (NAVD'88)

BASIS OF BEARINGS

NORTH 89°56'20" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE IN FILE 118, PAGE 89 OF SURVEYS.

SURVEY NOTE

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SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358
DATED 10/17/18

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= ##,### CU YDS
FILL= ##,### CU YDS

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ELEVATION NOTE

ADD 2500 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2501.00)

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FLOOD CERTIFICATION

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TIMOTHY M. MULROONEY, P.E. 22938 — DATE







SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

CITY OF LAS VEGAS, NV

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

KB HOME

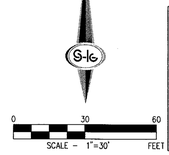
MONTECITO 60 - UNIT 1

GRADING PLAN III

20 19S 60E

DATE: 3/11/19
DRAFTER: BCS
DESIGNER: HN
CHECKED: MAK

PROJECT NO.
KBH1805-001



G-3
SHEET 6 OF 18

J:\Kbh1805-001 montecito 60 unit 1\dwg\Vertico\Kbh1805-001 grd.dwg 3/18/2019 12:37 PM Bryan Sarmiento

MATCHLINE - SEE SHEET G-2

FOR CONTINUATION - SEE SHEET G-8

MATCHLINE - SEE SHEET G-3

FOR CONTINUATION - SEE SHEET G-5

MALDITO COURT (PRIVATE)

VACAREZ DRIVE (PRIVATE)

VULTURO AVENUE (PRIVATE)

DEER SPRINGS WAY (PUBLIC)

CE "I"

CE "J"

CE "K"

CE "P"

DEER SPRINGS DURANGO APN: 125-21-702-001

30.00' SWG ESMT BLM GRANT N-57864

10.00' ROAD ESMT PER INSTRUMENT NO.412264 TO BE VACATED

30.00' ROAD ESMT PER INSTRUMENT NO.412264

30.00' LVVWD ESMT PER O.R.19930929:01372

30.00' CLV ROAD. DRAINAGE, & UTIL ESMT PER PATENT 27-94-0024 O.R.19940719:01436

30.00' CLV ROAD. DRAINAGE, & UTIL ESMT PER PATENT 27-94-0024 O.R.19940719:01436 TO BE VACATED

80.00' PUBLIC DRAINAGE EASEMENT TO BE ABANDONED BY THIS MAP

42.00' WIDE PUBLIC DRAINAGE EASEMENT TO BE PRIVATELY OWNED AND MAINTAINED BY THE HOA

PRIVATE ROAD & LANDSCAPE ESMT PER O.R.19960801:00381 TO BE PARTIALLY RELINQUISHED

61.15 LF 24" RCP SD @ S=-2.72%

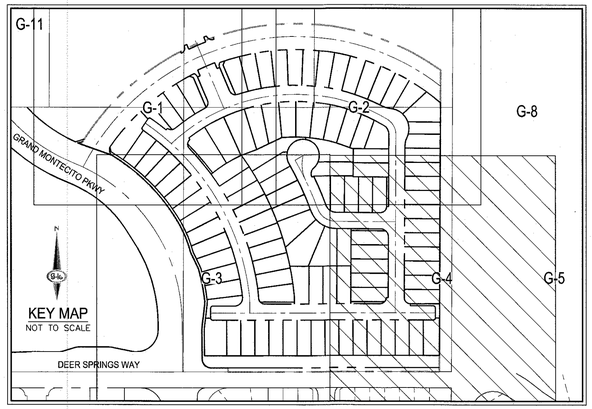
108.33 LF 24" RCP SD @ S=-2.35%

28.52 LF 36" RCP SD @ S=1.20%

118.00 LF 36" RCP SD @ S=2.00%

282.15 LF 36" RCP SD @ S=1.50%

SDMH#1 SDMH#2 SDMH#3 SDMH#4



BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5LV90 20E6

RIVET & PLATE IN TOP OF CURB AT SW CORNER OF RILEY ST. & DEER SPRINGS.

ELEVATION=774.781 METERS (NAVD'88)
ELEVATION=2541.93 US SURVEY FEET (NAVD'88)

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N

0 30 60

SCALE - 1"=30' FEET







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SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358
DATED 10/17/18

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FILL= #,### CU YDS

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TIMOTHY M. MULROONEY, P.E. 22938 — DATE

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

KB HOME

MONTECITO 60 - UNIT 1

GRADING PLAN IV

20 695 60E

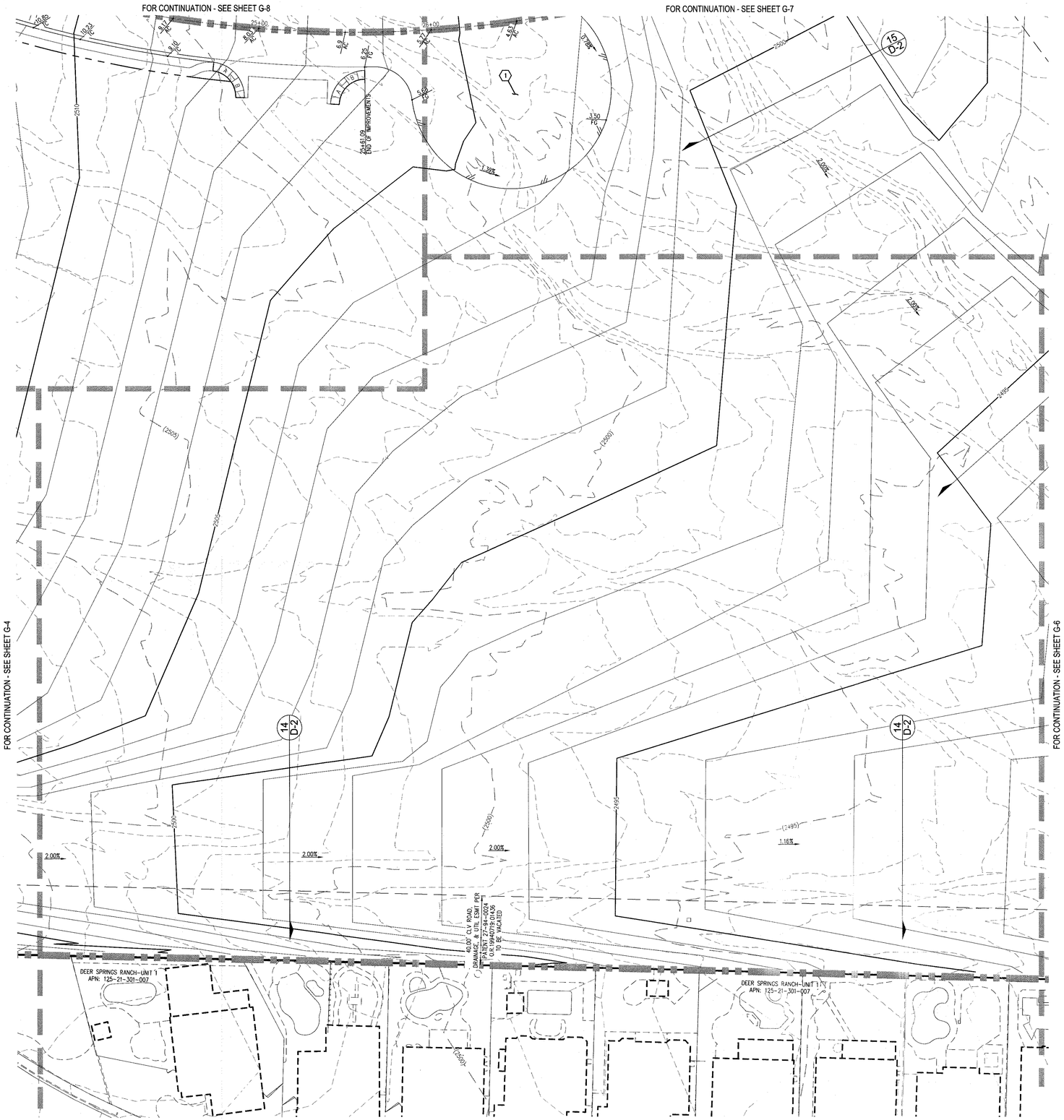
DATE: 3/11/19
DRAFTER: BCS
DESIGNER: HN
CHECKED: MAK

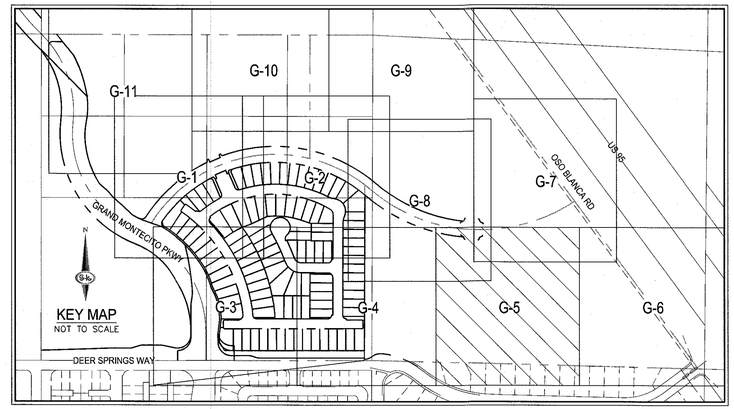
PROJECT NO.
KBH1805-001

ENGINEER — STATE OF NEVADA — TIMOTHY M. MULROONEY — Exp. 12/31/2019 — CIVIL — No. 22938 — PROFESSIONAL ENGINEER — 3/18/19

G-4
SHEET 7 OF 18

J:\Kbh1805-001 montecito 60 unit 1\dwg\vespa\Kbh1805-001 grd.dwg 3/18/2019 12:37 PM Bryan Sorrentino





BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5LV90 20E6

RIVET & PLATE IN TOP OF CURB AT SW CORNER OF RILEY ST. & DEER SPRINGS.

ELEVATION=774.781 METERS (NAVD'88)
ELEVATION=2541.93 US SURVEY FEET (NAVD'88)

BASIS OF BEARINGS

NORTH 89°56'20" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE IN FILE 118, PAGE 89 OF SURVEYS.

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358
DATED 10/17/18

EARTHWORKS

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CONSTRUCTION NOTES

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3. INSTALL L TYPE CURB PER CCAUSD NO. 216
4. INSTALL R-TYPE CURB & GUTTER PER CCAUSD NO. 217.3\S1
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16. INSTALL 12' WIDE MAINTENANCE ACCESS GATE
17. REMOVE & RELOCATE EXISTING UTILITY BOXES

DRAINAGE QUANTITIES		PRIV.
1. 48" TYPE III STORM DRAIN MANHOLE	EA	4
2. 12.5' TYPE "CM2" DROP INLET	EA	1
3. 24" RCP CLASS IV STORM DRAIN	LF	170
4. 36" RCP CLASS IV STORM DRAIN	LF	429
5. RIPRAP D50=14", THK=28"	SF	1200
6. 36" FLARED END SECTION PER NDOT R-2.3.1	LF	1
7. 8" WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	5,271

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TIMOTHY M. MULROONEY, P.E. 22938 — DATE

N

0 30 60
SCALE - 1"=30' FEET

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

FAST
Call before you UnderGround
1-702-432-5300
FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.)

Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call 811 OR 1-800-227-2600

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

KB HOME

MONTECITO 60 - UNIT 1

GRADING PLAN V

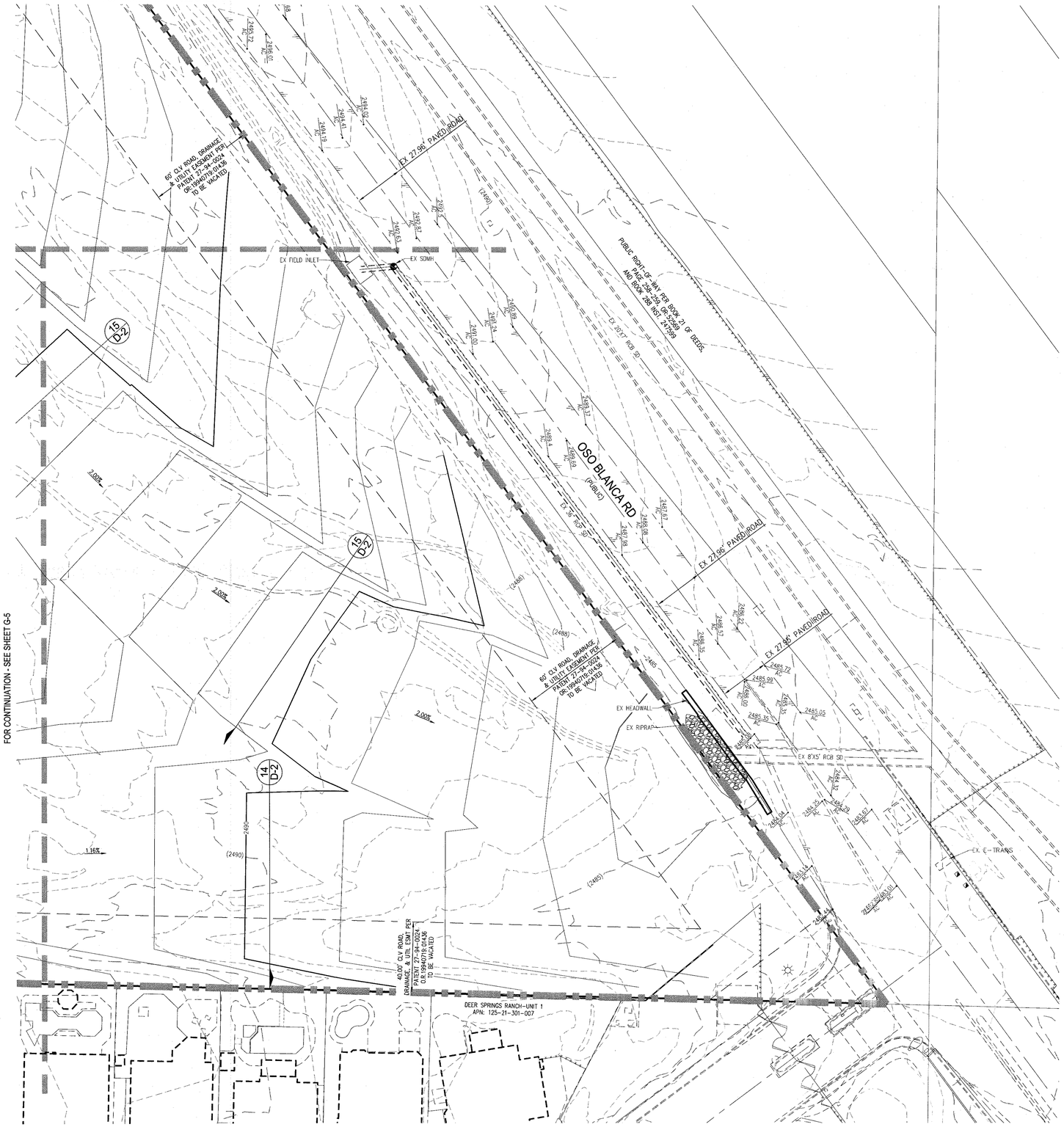
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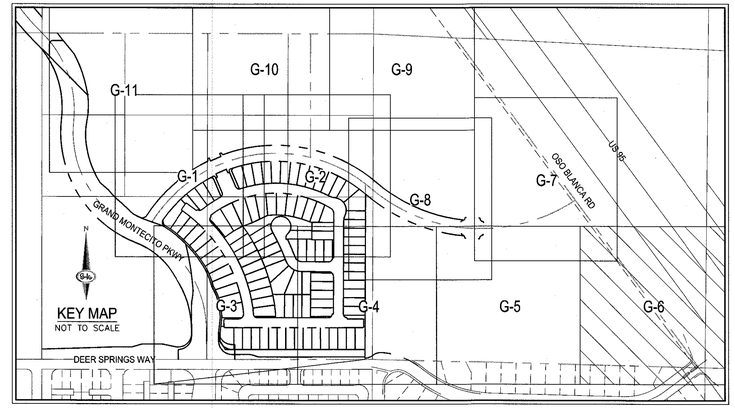
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DRAFTER: BCS
DESIGNER: HN
CHECKED: MAK
PROJECT NO.
KBH1805-001

TIMOTHY M. MULROONEY
Exp. 12/31/2019
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No. 22938
STATE OF NEVADA
PROFESSIONAL ENGINEER
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G-5
SHEET 8 OF 18

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BENCHMARK

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SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358
DATED 10/17/18

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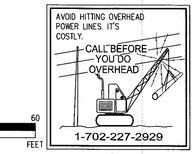
TIMOTHY M. MULROONEY, P.E. 22938 — DATE

DRAINAGE QUANTITIES			PRIV.
1.	48" TYPE III STORM DRAIN MANHOLE	EA	4
2.	12.5' TYPE "CM2" DROP INLET	EA	1
3.	24" RCP CLASS IV STORM DRAIN	LF	170
4.	36" RCP CLASS IV STORM DRAIN	LF	429
5.	RIPRAP D50=14", THK=28"	SF	1200
6.	36" FLARED END SECTION PER NDOT R-2.3.1	LF	1
7.	8' WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	5,271

N

S-16

0 30 60
SCALE - 1"=30' FEET







SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP DATE	APP

CITY OF LAS VEGAS, NV

KB HOME

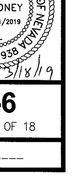
MONTECITO 60 - UNIT 1

GRADING PLAN VI

20 19S 60E

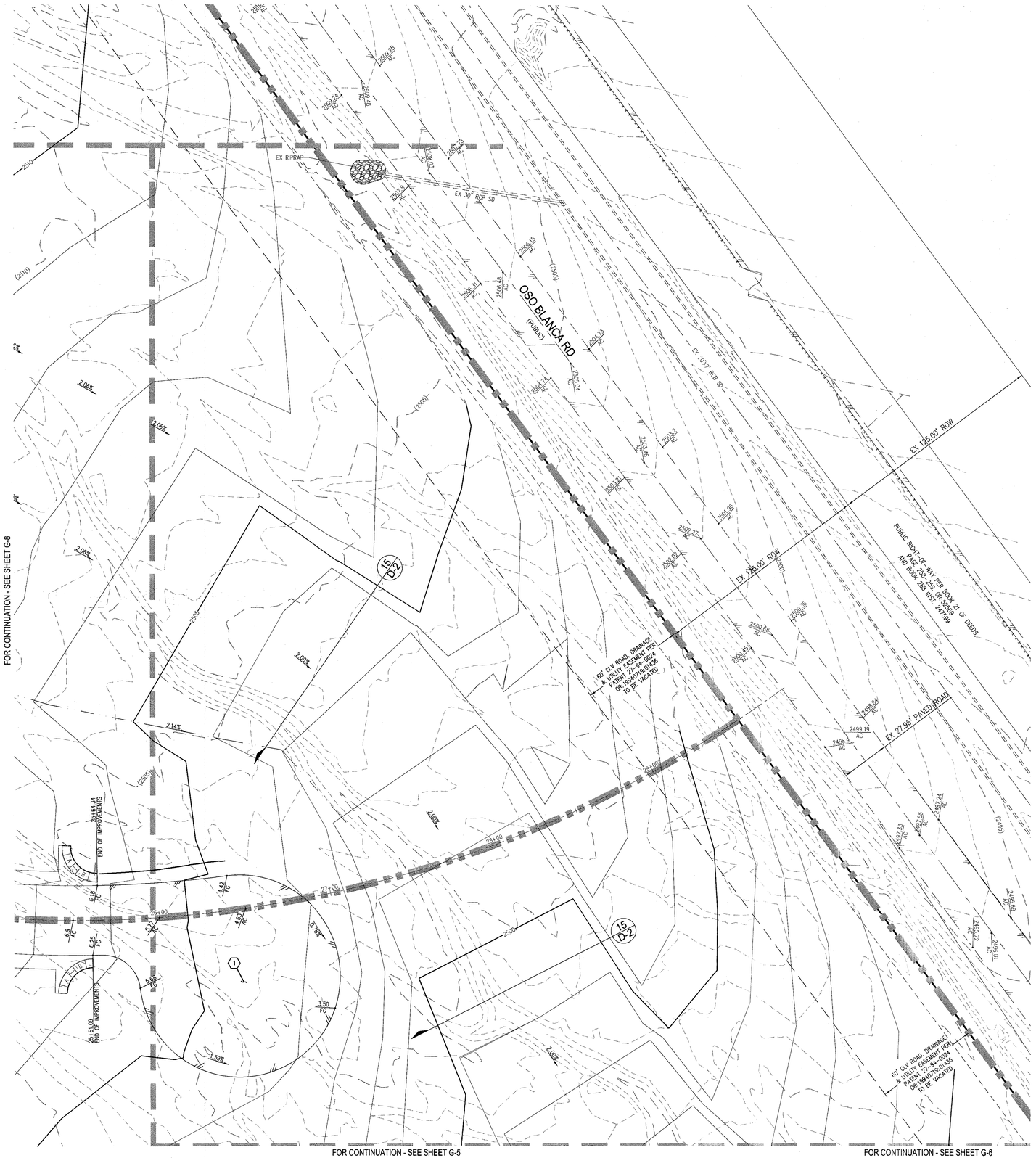
DATE: 3/11/19
DRAFTER: BCS
DESIGNER: HN
CHECKED: MAK

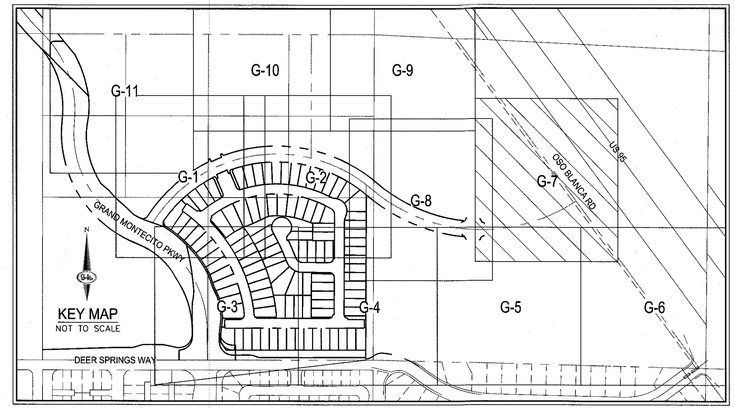
PROJECT NO.
KBH1805-001



G-6
SHEET 9 OF 18

J:\Kbh1805_001 montecito, 60 unit 1\dwg\Vernon\Kbh1805_001 grd.dwg 3/18/2019 12:17 PM Bryan Sannier





BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5LV90 20E6

RIVET & PLATE IN TOP OF CURB AT SW CORNER OF RILEY ST. & DEER SPRINGS.

ELEVATION=774.781 METERS (NAVD'88)
ELEVATION=2541.93 US SURVEY FEET (NAVD'88)

BASIS OF BEARINGS

NORTH 89°56'20" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE IN FILE 118, PAGE 89 OF SURVEYS.

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358
DATED 10/17/18

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= ##### CU YDS
FILL= ##### CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.

SURVEY NOTE

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

DISCLAIMER NOTE

1) EXISTING UTILITY LOCATIONS SHOWN HEREON 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.

2) FOR ROADWAY WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF CURB PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

CONSTRUCTION NOTES

1. INSTALL 2" ASPHALT PAVEMENT OVER 4" TYPE II AGGREGATE BASE
2. INSTALL A TYPE CURB PER CCAUSD NO. 219
3. INSTALL L TYPE CURB PER CCAUSD NO. 216
4. INSTALL R-TYPE CURB & GUTTER PER CCAUSD NO. 217.3.S1
5. INSTALL 8' VALLEY GUTTER PER CCAUSD NO. 228
6. INSTALL 5' WIDE SIDEWALK PER CCAUSD NO. 234
7. INSTALL SIDEWALK RAMP PER CCAUSD NO. 235, CASE I AND CCAUSD NO. 235.1
8. INSTALL 5' CURB TRANSITION PER DETAIL ON SHEET D-2
9. EXISTING IMPROVEMENTS TO BE REMOVED
10. EXISTING VALLEY GUTTER TO BE REMOVED
11. REMOVE EXISTING 36" SD FROM PROPOSED MANHOLE
12. INSTALL 12.5' DROP INLET TYPE "CM2" PER CCAUSD NO. 412.1 AND 421
13. INSTALL 48" TYPE III STORM DRAIN MANHOLE PER CCAUSD NO. 406
14. INSTALL 36" FLARED END SECTION
15. INSTALL 60'X20' RIPRAP PAD, D50=14", THICKNESS = 28"
16. INSTALL 12' WIDE MAINTENANCE ACCESS GATE
17. REMOVE & RELOCATE EXISTING UTILITY BOXES

DRAINAGE QUANTITIES		PRIV.
1. 48" TYPE III STORM DRAIN MANHOLE	EA	4
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GRADING NOTES

1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2018, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
8. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLEPING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.

LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

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

ELEVATION NOTE

ADD 2500 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2501.00)

DRAINAGE EASEMENT NOTE

ALL PRIVATE STREETS, DRAINAGE EASEMENTS AND COMMON LOTS ARE PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE HOA

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1750E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

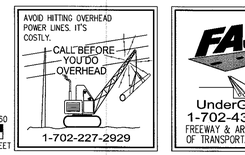
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TIMOTHY M. MULROONEY, P.E. 22938 — DATE

N

SCALE - 1"=30' (0, 30, 60 FEET)





SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

KB HOME

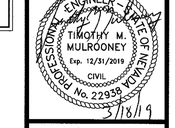
MONTECITO 60 - UNIT 1

GRADING PLAN VII

20
19S
60E

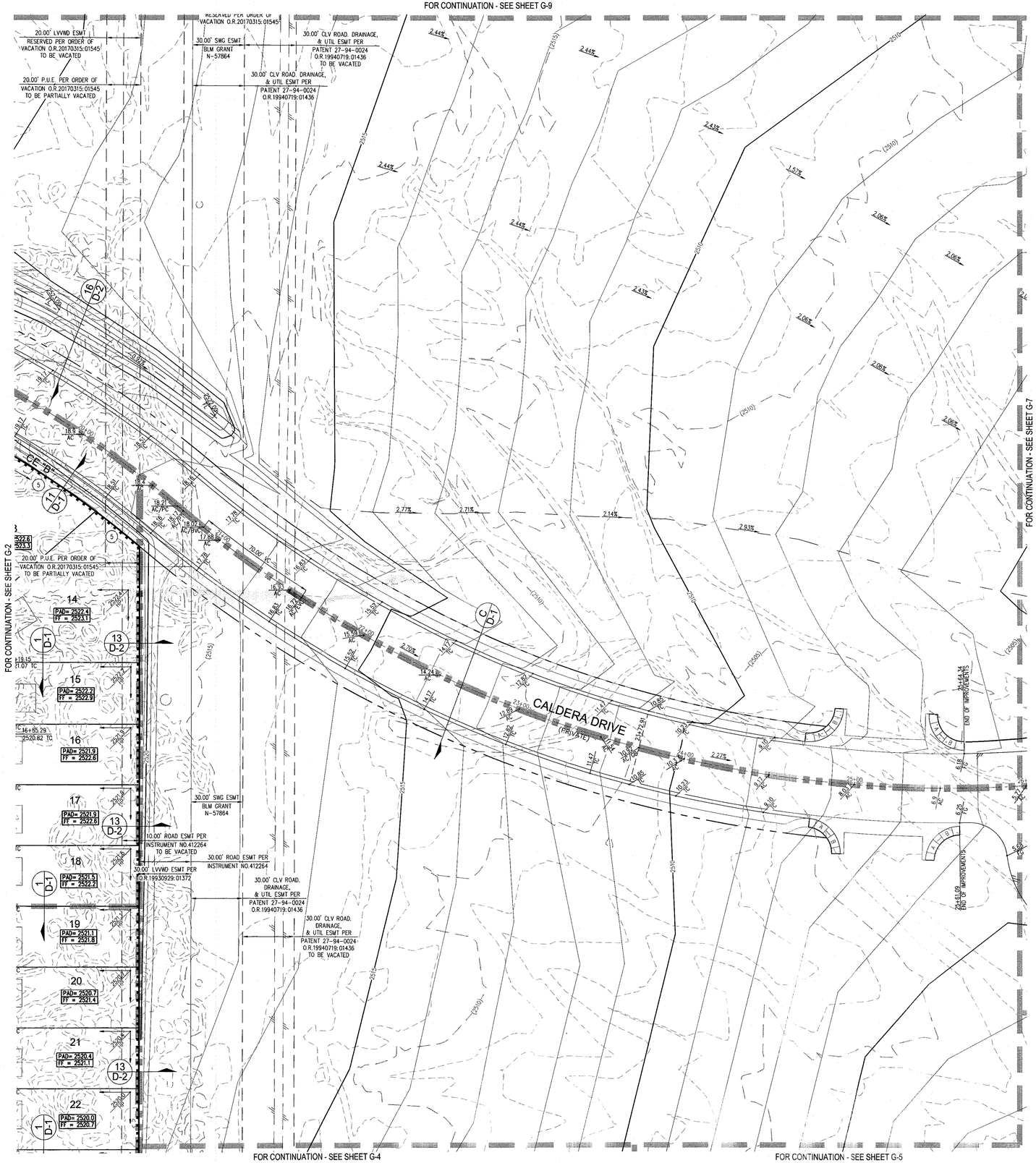
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DRAFTER: BCS
DESIGNER: HN
CHECKED: MAK

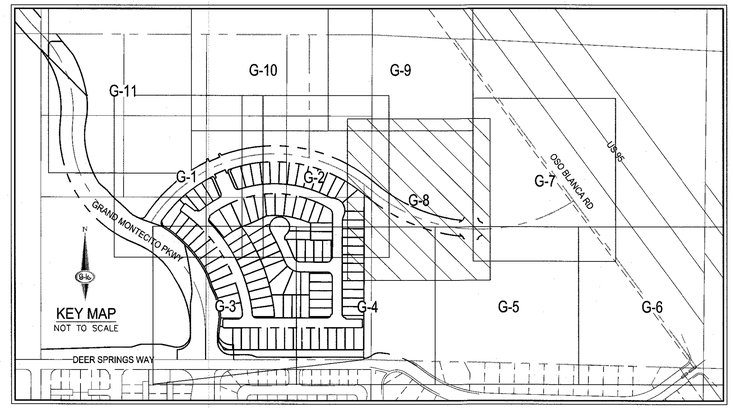
PROJECT NO.
KBH1805-001



G-7
SHEET 10 OF 18

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BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5LV90 2OE6

RIVET & PLATE IN TOP OF CURB AT SW CORNER OF RILEY ST. & DEER SPRINGS.

ELEVATION=774.781 METERS (NAVD'88)
ELEVATION=2541.93 US SURVEY FEET (NAVD'88)

BASIS OF BEARINGS

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SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358
DATED 10/17/18

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= ##,### CU YDS
FILL= ##,### CU YDS

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CONSTRUCTION NOTES

1. INSTALL 2" ASPHALT PAVEMENT OVER 4" TYPE II AGGREGATE BASE
2. INSTALL A TYPE CURB PER CCAUSD NO. 219
3. INSTALL L TYPE CURB PER CCAUSD NO. 216
4. INSTALL R-TYPE CURB & GUTTER PER CCAUSD NO. 217.3.S1
5. INSTALL 8' VALLEY GUTTER PER CCAUSD NO. 228
6. INSTALL 5' WIDE SIDEWALK PER CCAUSD NO. 234
7. INSTALL SIDEWALK RAMP PER CCAUSD NO. 235, CASE I AND CCAUSD NO. 235.1
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13. INSTALL 48" TYPE III STORM DRAIN MANHOLE PER CCAUSD NO. 406
14. INSTALL 36" FLARED END SECTION
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DRAINAGE QUANTITIES

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6.	36" FLARED END SECTION PER NDOT R-2.3.1	LF	1
7.	8' WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	5,271

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1750E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY ??????? ON FILE AT CITY OF LAS VEGAS AND CCPW HTE #??-????? FOR THE SUBJECT PROJECT.

TIMOTHY M. MULROONEY, P.E. 22938 — DATE

N

0 30 60
SCALE - 1"=30' FEET

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

FAST
Call before you UnderGround
1-702-432-5300
FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.)

Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call 811 OR 1-800-227-2600

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

KB HOME

MONTECITO 60 - UNIT 1

GRADING PLAN VIII

20 19S 60E

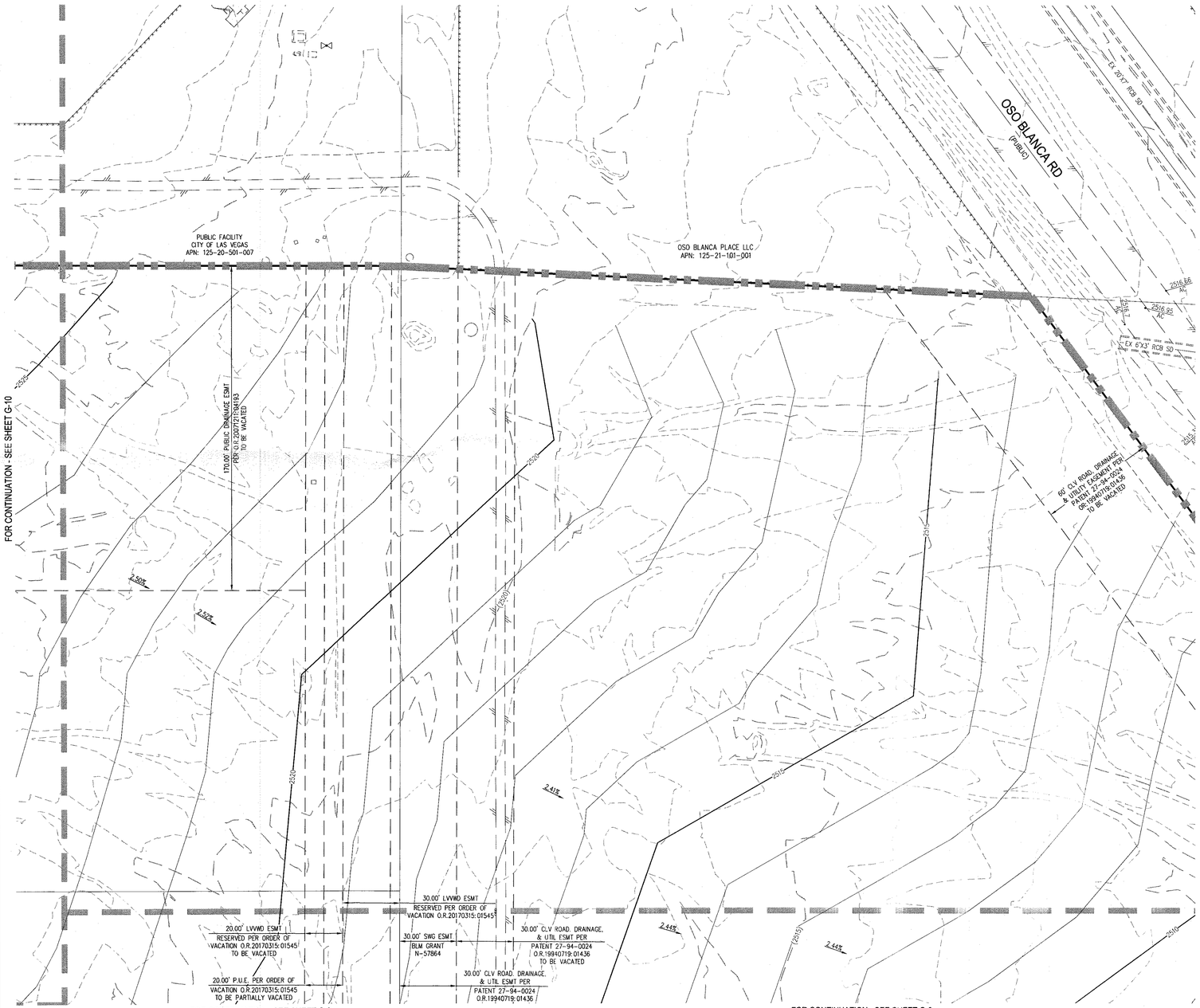
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DESIGNER: HN
CHECKED: MAK

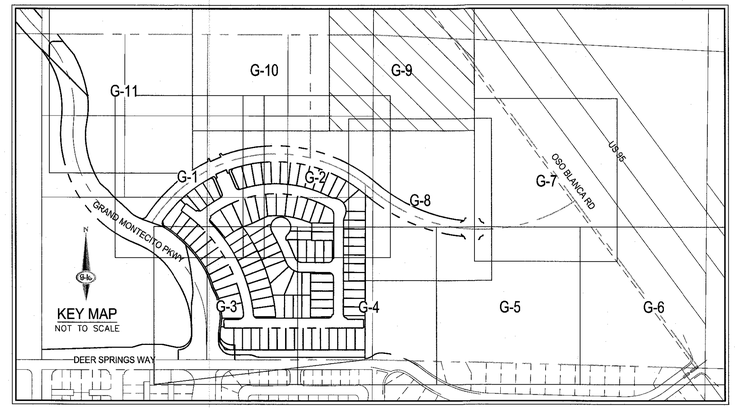
PROJECT NO.
KBH1805-001

PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY M. MULROONEY Exp. 12/31/2019 CIVIL No. 22938
3/11/19

G-8
SHEET 11 OF 18

\\Ghh1805-001 montecito 60 unit 1\Cad\Xrefs\Xbh1805-001 refs.dwg 3/18/2019 12:38 PM Bryon Sorrentino





BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5LV90 20E6

RIVET & PLATE IN TOP OF CURB AT SW CORNER OF RILEY ST. & DEER SPRINGS.

ELEVATION=774.781 METERS (NAVD'88)
ELEVATION=2541.93 US SURVEY FEET (NAVD'88)

BASIS OF BEARINGS

NORTH 89°56'20" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE IN FILE 118, PAGE 89 OF SURVEYS.

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL.

PROJECT NO. 182358
DATED 10/17/18

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= #,### CU YDS
FILL= #,### CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.

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2) FOR ROADWAY WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF CURB PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

CONSTRUCTION NOTES

1. INSTALL 2" ASPHALT PAVEMENT OVER 4" TYPE II AGGREGATE BASE
2. INSTALL A TYPE CURB PER CCAUSD NO. 219
3. INSTALL L TYPE CURB PER CCAUSD NO. 216
4. INSTALL R-TYPE CURB & GUTTER PER CCAUSD NO. 217.3.S1
5. INSTALL 8' VALLEY GUTTER PER CCAUSD NO. 228
6. INSTALL 5' WIDE SIDEWALK PER CCAUSD NO. 234
7. INSTALL SIDEWALK RAMP PER CCAUSD NO. 235, CASE I AND CCAUSD NO. 235.1
8. INSTALL 5' CURB TRANSITION PER DETAIL ON SHEET D-2
9. EXISTING IMPROVEMENTS TO BE REMOVED
10. EXISTING VALLEY GUTTER TO BE REMOVED
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12. INSTALL 12.5' DROP INLET TYPE "CM2" PER CCAUSD NO. 412.1 AND 421
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16. INSTALL 12' WIDE MAINTENANCE ACCESS GATE
17. REMOVE & RELOCATE EXISTING UTILITY BOXES

DRAINAGE QUANTITIES

			PRIV.
1.	48" TYPE III STORM DRAIN MANHOLE	EA	4
2.	12.5' TYPE "CM2" DROP INLET	EA	1
3.	24" RCP CLASS IV STORM DRAIN	LF	170
4.	36" RCP CLASS IV STORM DRAIN	LF	429
5.	RIPRAP D50=14", THK=28"	SF	1200
6.	36" FLARED END SECTION PER NDOT R-2.3.1	LF	1
7.	8' WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	5,271

GRADING NOTES

1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2018, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
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9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.

LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

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2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN CLARK COUNTY TITLE 24.40 AND IN THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
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ELEVATION NOTE

ADD 2500 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2501.00)

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FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY ??????? ON FILE AT CITY OF LAS VEGAS AND CCPW HTE #??-????? FOR THE SUBJECT PROJECT.

TIMOTHY M. MULROONEY, P.E. 22938 — DATE

N

S-16

0 30 60
SCALE - 1"=30' FEET



FAST Call before you UnderGround 1-702-432-5300 FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.)

Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call 811 OR 1-800-227-2600

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

KB HOME

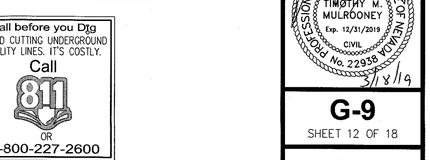
MONTECITO 60 - UNIT 1

GRADING PLAN IX

20 19S 60E

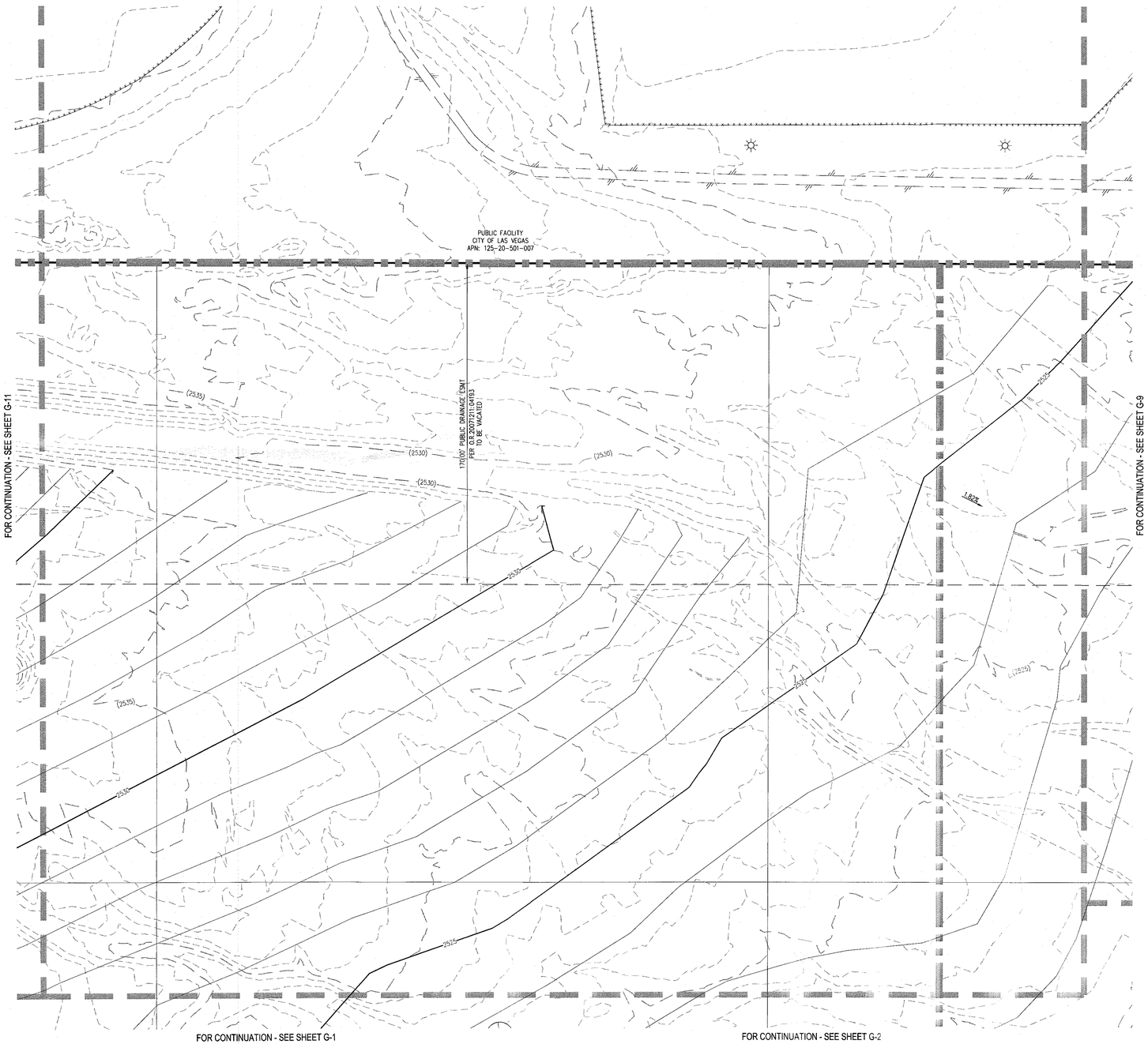
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DRAFTER: BCS
DESIGNER: HN
CHECKED: MAK

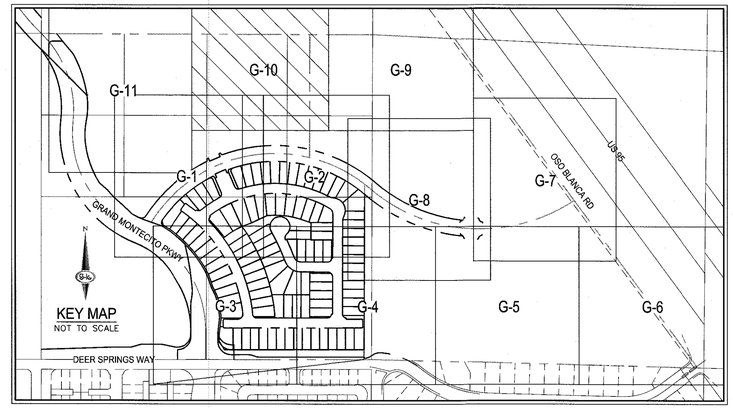
PROJECT NO.
KBH1805-001



G-9
SHEET 12 OF 18

J:\Jobs\1805-001 montecito 60 unit 1\Dwg\Interior\Kbh1805-001 grd.dwg 3/18/2019 12:38 PM Bryan Sarmiento





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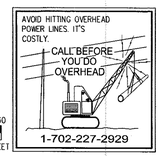
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TIMOTHY M. MULROONEY, P.E. 22938 — DATE

N

0 30 60
SCALE = 1"=30' FEET







SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

KB HOME

MONTECITO 60 - UNIT 1

GRADING PLAN X

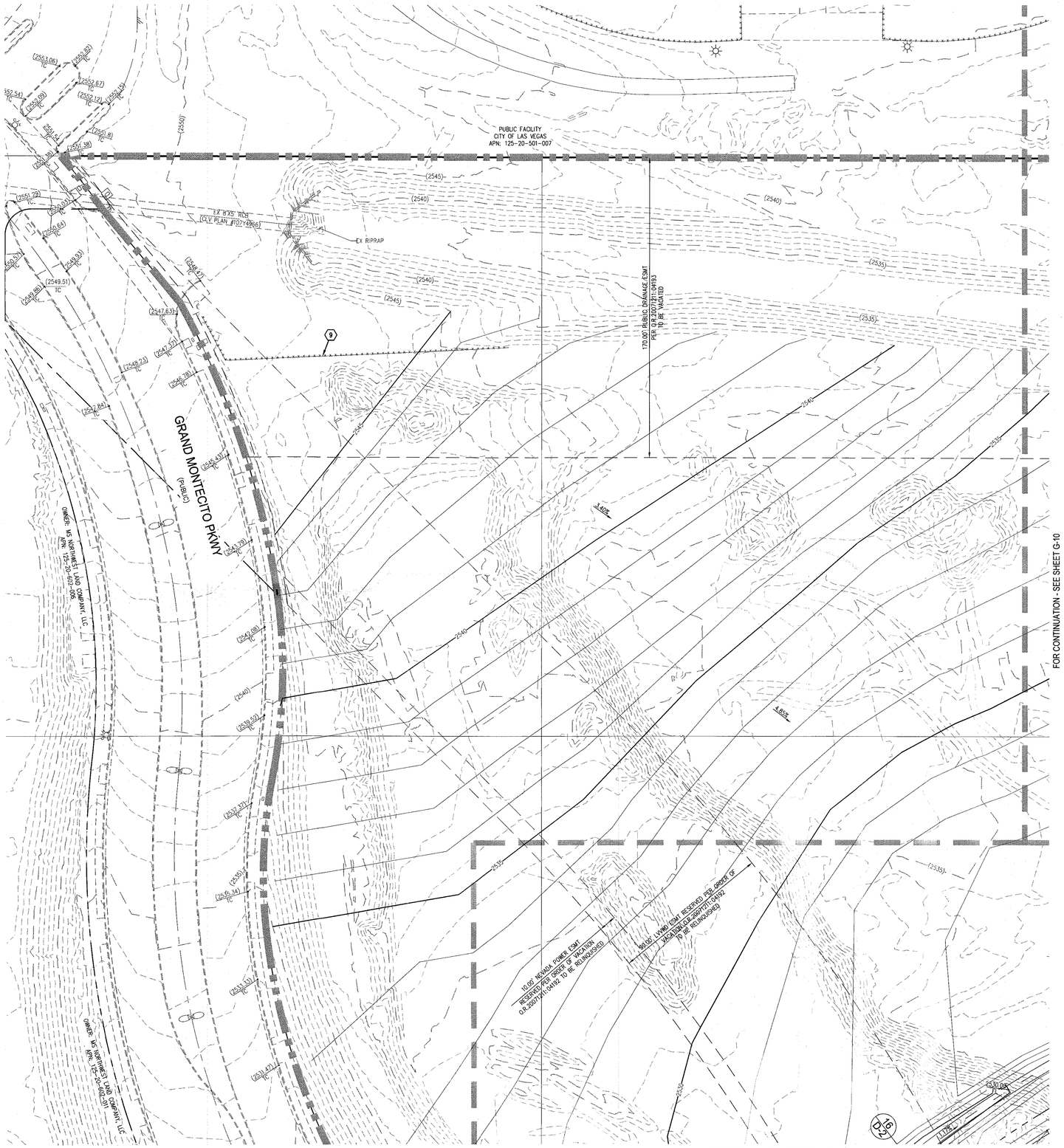
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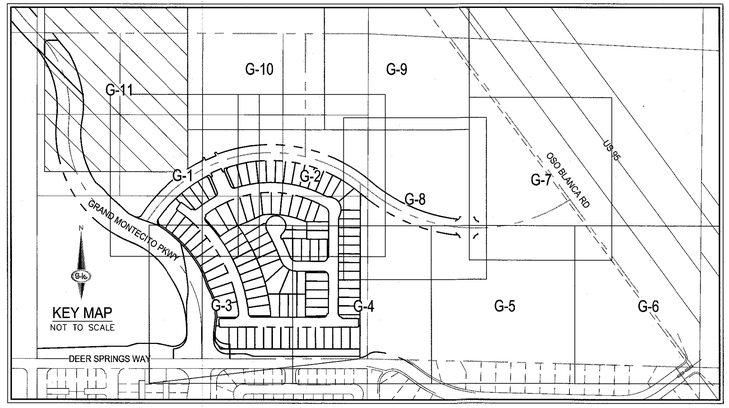
DATE: 3/11/19
DRAFTER: BCS
DESIGNER: HN
CHECKED: MAK
PROJECT NO.
KBH1805-001

PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY M. MULROONEY — Exp. 12/31/2019 — CIVIL — No. 22938 — 3/18/19

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SHEET 13 OF 18

J:\Active\1805-001 montecito 60 unit 1\Data\Engineering\Active\1805-001 grading 3/18/2019 12:38 PM Bryan Summers





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1.	48" TYPE III STORM DRAIN MANHOLE	EA	4
2.	12.5' TYPE "CM2" DROP INLET	EA	1
3.	24" RCP CLASS IV STORM DRAIN	LF	170
4.	36" RCP CLASS IV STORM DRAIN	LF	429
5.	RIPRAP D50=14", THK=28"	SF	1200
6.	36" FLARED END SECTION PER NDOT R-2.3.1	LF	1
7.	8' WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	5,271

GRADING NOTES

1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2018, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
8. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLEPING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.

LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

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

ELEVATION NOTE

ADD 2500 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2501.00)

DRAINAGE EASEMENT NOTE

ALL PRIVATE STREETS, DRAINAGE EASEMENTS AND COMMON LOTS ARE PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE HOA

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1750E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY ??????? ON FILE AT CITY OF LAS VEGAS AND CCPW HTE #??-????? FOR THE SUBJECT PROJECT.

TIMOTHY M. MULROONEY, P.E. 22938 — DATE

N
S-16
0 30 60
SCALE - 1"=30' FEET







SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

KB HOME
MONTECITO 60 - UNIT 1
GRADING PLAN XI

20 09S 60E

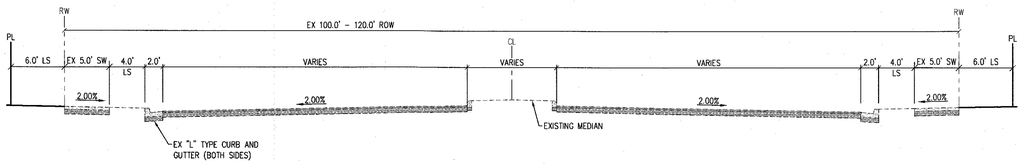
DATE: 3/11/19
DRAFTER: BCS
DESIGNER: HN
CHECKED: MAK

PROJECT NO.
KBH1805-001

PROFESSIONAL ENGINEER — STATE OF NEVADA — TIMOTHY M. MULROONEY — Exp. 12/31/2019 — CIVIL — No. 22938
3/15/19

G-11
SHEET 14 OF 18

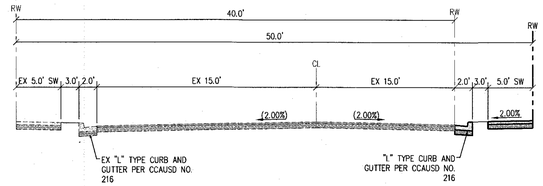
J:\KBH1805-001 montecito 60 unit 1\dwg\xmrcv\KBH1805-001 grd.dwg 3/8/2019 12:38 PM Bryan Sumlardo



A. 100'-120' PUBLIC STREET SECTION

NOT TO SCALE

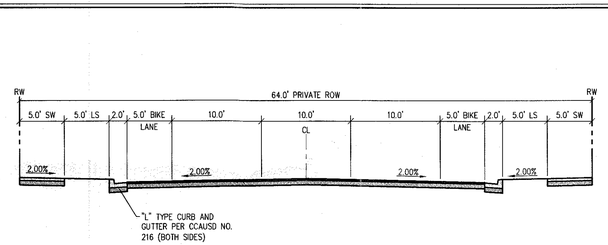
GRAND MONTECITO PKWY



B. 40' PUBLIC STREET SECTION

NOT TO SCALE

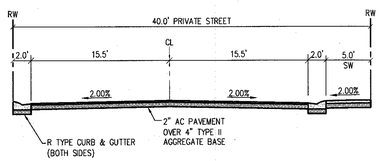
DEER SPRINGS WAY



C. PRIVATE STREET SECTION

NOT TO SCALE

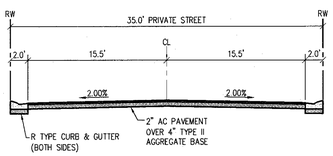
CENTER STREET
NO PARKING (BOTH SIDES)



D. PRIVATE STREET SECTION

NOT TO SCALE

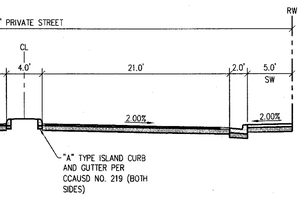
INTERNAL STREET
PARKING ALLOWED (BOTH SIDES)



E. PRIVATE STUB STREET SECTION

NOT TO SCALE

INTERNAL STREET

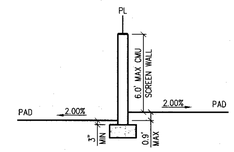


F. PRIVATE STREET SECTION

NOT TO SCALE

INTERNAL ENTRY

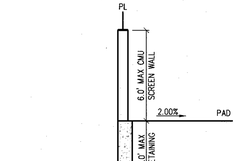
THIS DETAIL IS FOR REFERENCE ONLY AND DOES NOT CONSTITUTE A STRUCTURAL DESIGN



1. WALL SECTION

NOT TO SCALE

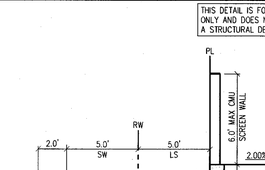
THIS DETAIL IS FOR REFERENCE ONLY AND DOES NOT CONSTITUTE A STRUCTURAL DESIGN



2. WALL SECTION

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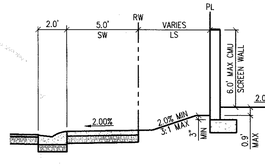
THIS DETAIL IS FOR REFERENCE ONLY AND DOES NOT CONSTITUTE A STRUCTURAL DESIGN



3. WALL SECTION

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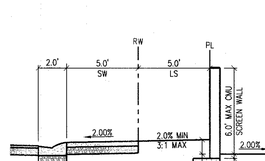
THIS DETAIL IS FOR REFERENCE ONLY AND DOES NOT CONSTITUTE A STRUCTURAL DESIGN



4. WALL SECTION

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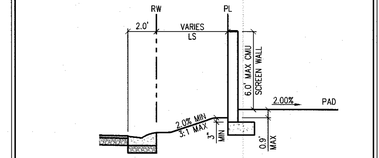
THIS DETAIL IS FOR REFERENCE ONLY AND DOES NOT CONSTITUTE A STRUCTURAL DESIGN



5. WALL SECTION

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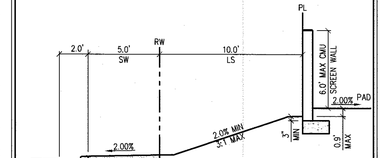
THIS DETAIL IS FOR REFERENCE ONLY AND DOES NOT CONSTITUTE A STRUCTURAL DESIGN



6. WALL SECTION

NOT TO SCALE

THIS DETAIL IS FOR REFERENCE ONLY AND DOES NOT CONSTITUTE A STRUCTURAL DESIGN



7. WALL SECTION

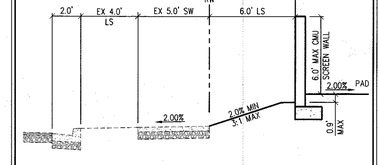
NOT TO SCALE

THIS DETAIL IS FOR REFERENCE ONLY AND DOES NOT CONSTITUTE A STRUCTURAL DESIGN

8. PERIMTER WALL SECTION

NOT TO SCALE

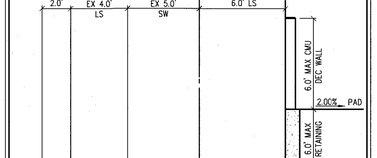
THIS DETAIL IS FOR REFERENCE ONLY AND DOES NOT CONSTITUTE A STRUCTURAL DESIGN



9. PERIMTER WALL SECTION

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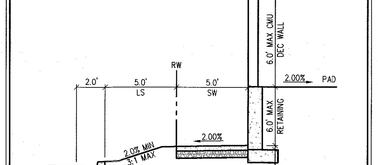
THIS DETAIL IS FOR REFERENCE ONLY AND DOES NOT CONSTITUTE A STRUCTURAL DESIGN



10. PERIMTER WALL SECTION

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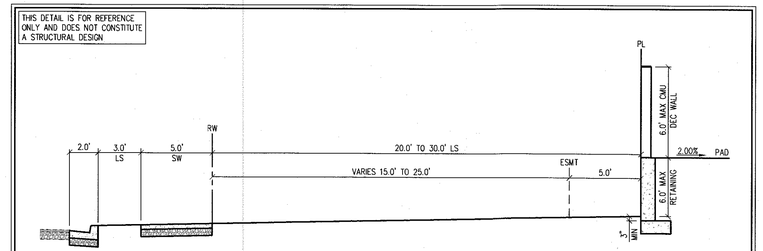
THIS DETAIL IS FOR REFERENCE ONLY AND DOES NOT CONSTITUTE A STRUCTURAL DESIGN



11. PERIMTER WALL SECTION

NOT TO SCALE

THIS DETAIL IS FOR REFERENCE ONLY AND DOES NOT CONSTITUTE A STRUCTURAL DESIGN



12. PERIMTER WALL SECTION

NOT TO SCALE







SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

KB HOME

MONTECITO 60 - UNIT 1

STREET SECTIONS AND GRADING DETAILS I

20 19S 60E

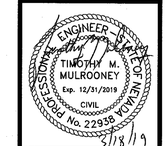
DATE: 3/11/19

DRAFTER: BCS

DESIGNER: HN

CHECKED: MAK

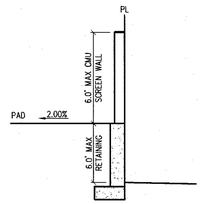
PROJECT NO.
KBH1805-001



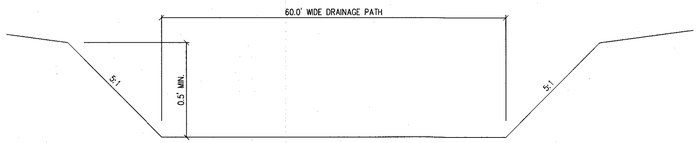
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SHEET 15 OF 18

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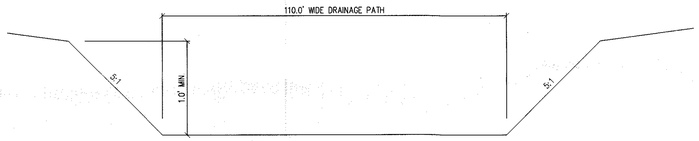
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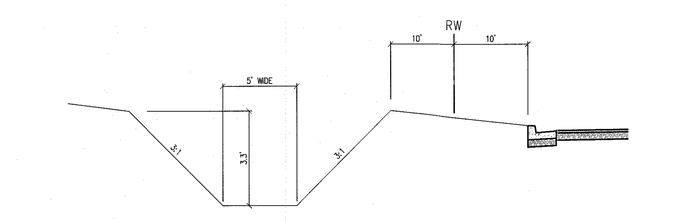
13. PERIMTER WALL SECTION
NOT TO SCALE



14. GRADING SECTION
NOT TO SCALE



15. GRADING SECTION
NOT TO SCALE



16. GRADING SECTION
NOT TO SCALE







SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

KB HOME

MONTECITO 60 - UNIT 1

GRADING DETAILS II

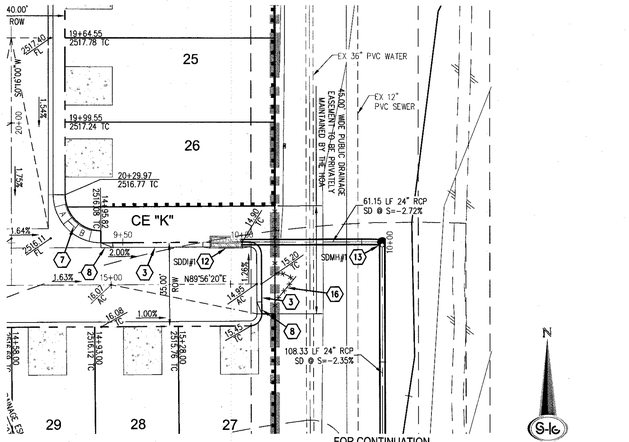
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60E

DATE: 3/11/19
DRAFTER: BCS
DESIGNER: HN
CHECKED: MAK
PROJECT NO.
KBH1805-001

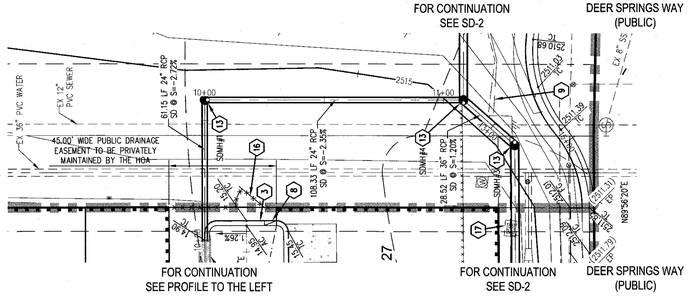
PROFESSIONAL ENGINEER STATE OF NEVADA
TIMOTHY M. MULROONEY
Exp. 12/31/2019
CIVIL
No. 22938
3/18/19

D-2
SHEET 16 OF 18

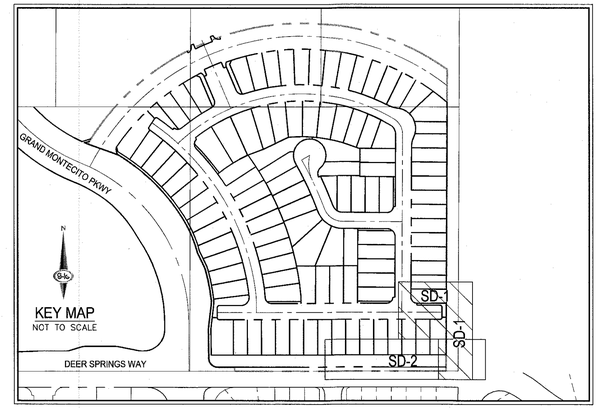
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STORM DRAIN LAT 1 - PLAN VIEW



STORM DRAIN LAT 2 - PLAN VIEW



BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5LV90 2OE6

RIVET & PLATE IN TOP OF CURB AT SW CORNER OF RILEY ST. & DEER SPRINGS.

ELEVATION=774.781 METERS (NAVD'88)
ELEVATION=2541.93 US SURVEY FEET (NAVD'88)

BASIS OF BEARINGS

NORTH 89°56'20" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE IN FILE 118, PAGE 89 OF SURVEYS.

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358
DATED 10/17/18

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= ##,### CU YDS
FILL= ##,### CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.

GRADING NOTES

1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2018, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
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9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.

SURVEY NOTE

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

DISCLAIMER NOTE

1) EXISTING UTILITY LOCATIONS SHOWN HEREON 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.
2) FOR ROADWAY WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF CURB PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

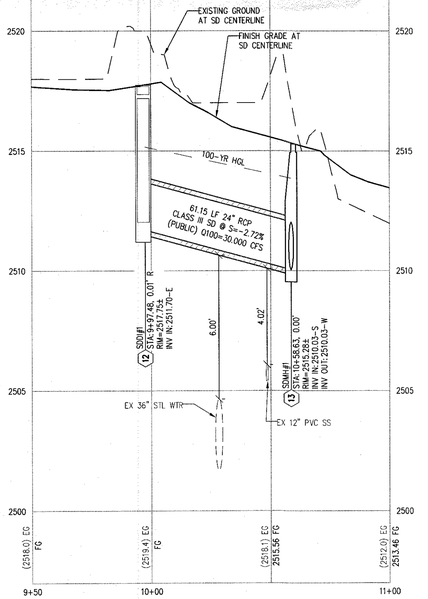
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2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN CLARK COUNTY TITLE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

ELEVATION NOTE

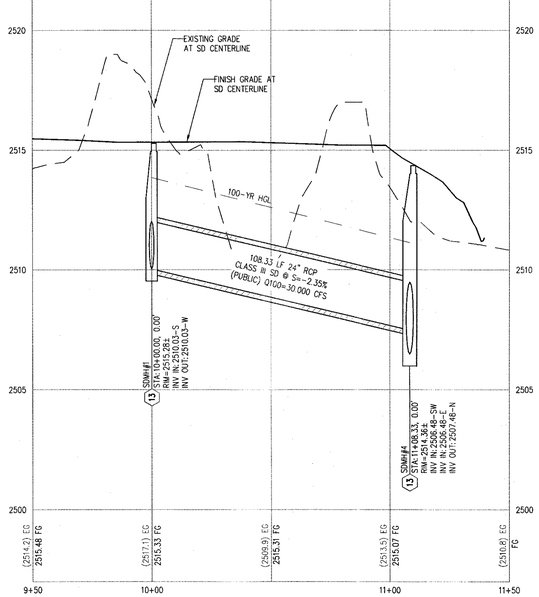
ADD 2500 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2501.00)

DRAINAGE EASEMENT NOTE

ALL PRIVATE STREETS, DRAINAGE EASEMENTS AND COMMON LOTS ARE PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE HOA



STORM DRAIN LAT 1 - PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 3'



STORM DRAIN LAT 2 - PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 3'

DRAINAGE QUANTITIES			PRIV.
1.	48" TYPE III STORM DRAIN MANHOLE	EA	4
2.	12.5' TYPE "CM2" DROP INLET	EA	1
3.	24" RCP CLASS IV STORM DRAIN	LF	170
4.	36" RCP CLASS IV STORM DRAIN	LF	429
5.	RIPRAP D50=14", THK=28"	SF	1200
6.	36" FLARED END SECTION PER NDOT R-2.3.1	LF	1
7.	8' WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	5,271

CONSTRUCTION NOTES

1. INSTALL 2" ASPHALT PAVEMENT OVER 4" TYPE II AGGREGATE BASE
2. INSTALL A TYPE CURB PER CCAUSD NO. 219
3. INSTALL L TYPE CURB PER CCAUSD NO. 216
4. INSTALL R-TYPE CURB & GUTTER PER CCAUSD NO. 217.3.S1
5. INSTALL 8' VALLEY GUTTER PER CCAUSD NO. 228
6. INSTALL 5' WIDE SIDEWALK PER CCAUSD NO. 234
7. INSTALL SIDEWALK RAMP PER CCAUSD NO. 235, CASE I AND CCAUSD NO. 235.1
8. INSTALL 5' CURB TRANSITION PER DETAIL ON SHEET D-2
9. EXISTING IMPROVEMENTS TO BE REMOVED
10. EXISTING VALLEY GUTTER TO BE REMOVED
11. REMOVE EXISTING 36" SD FROM PROPOSED MANHOLE
12. INSTALL 12.5' DROP INLET TYPE "CM2" PER CCAUSD NO. 412.1 AND 421
13. INSTALL 48" TYPE III STORM DRAIN MANHOLE PER CCAUSD NO. 406
14. INSTALL 36" FLARED END SECTION
15. INSTALL 60'X20' RIPRAP PAD, D50=14", THICKNESS = 28"
16. INSTALL 12' WIDE MAINTENANCE ACCESS GATE
17. REMOVE & RELOCATE EXISTING UTILITY BOXES







SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

KB HOME

MONTECITO 60 - UNIT 1

PLAN AND PROFILE - STORM DRAIN LATERALS

20 19S 60E

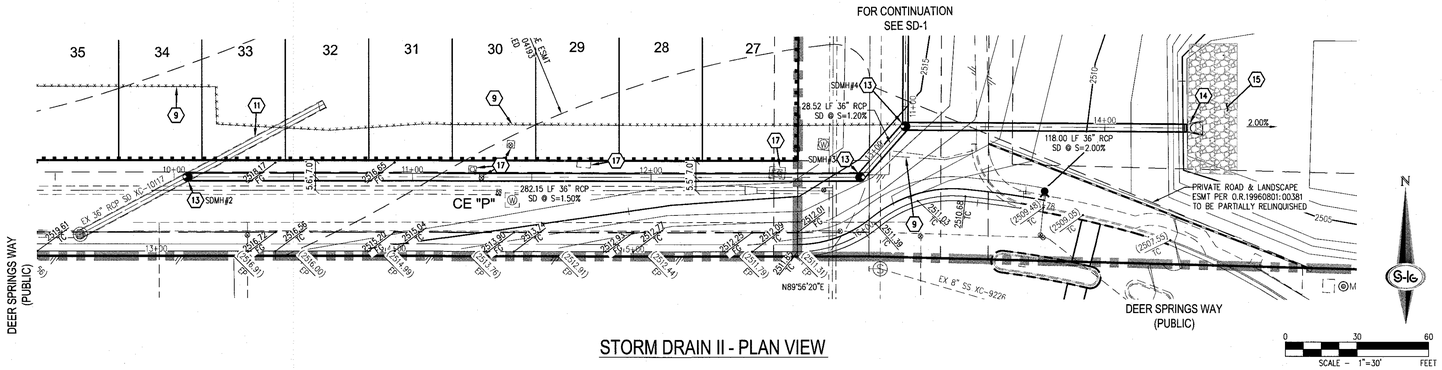
DATE: 3/11/19
DRAFTER: BCS
DESIGNER: HN
CHECKED: MAK

PROJECT NO.
KBH1805-001

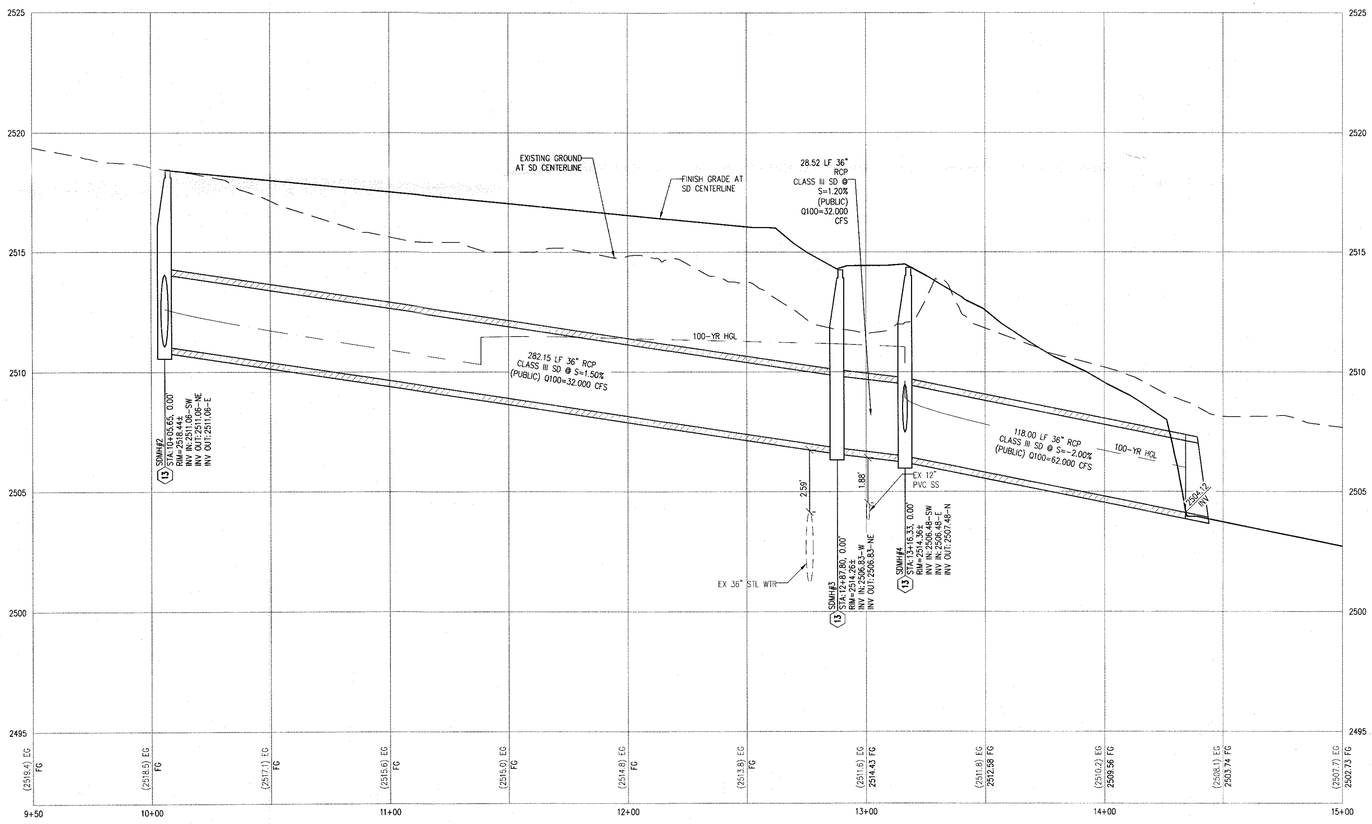


SD-1
SHEET 17 OF 18

J:\KBH1805-001 montecito 60 unit 1\Dwgs\Vegas\KBH1805-001 pnp.dwg 3/18/2019 12:40 PM Bryan Sarmiento

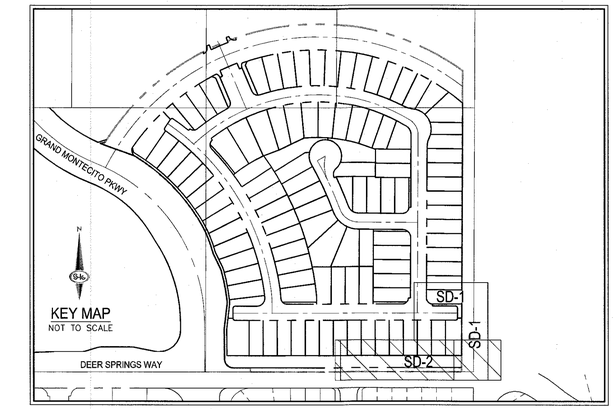


STORM DRAIN II - PLAN VIEW



STORM DRAIN II - PROFILE VIEW

HORIZ: 1" = 30'
VERT: 1" = 3'



BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5LV90 2OE6

RIVET & PLATE IN TOP OF CURB AT SW CORNER OF RILEY ST. & DEER SPRINGS.

ELEVATION=774.791 METERS (NAVD'88)
ELEVATION=2541.93 US SURVEY FEET (NAVD'88)

BASIS OF BEARINGS

NORTH 89°56'20" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 20, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE IN FILE 118, PAGE 89 OF SURVEYS.

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL

PROJECT NO. 182358
DATED 10/17/18

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= #,### CU YDS
FILL= #,### CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.

GRADING NOTES

1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2018, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
8. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLEPING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.

SURVEY NOTE

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

DISCLAIMER NOTE

1) EXISTING UTILITY LOCATIONS SHOWN HEREON 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.
2) FOR ROADWAY WIDENING AND HALF STREET IMPROVEMENTS, THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF CURB PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

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

FAST
Call before you
UnderGround
1-702-432-5300
FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.)

Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call 811
OR
1-800-227-2600

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP DATE	APP

CITY OF LAS VEGAS, NV

KB HOME

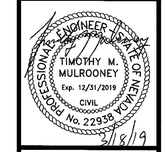
MONTECITO 60 - UNIT 1

PLAN AND PROFILE - STORM DRAIN

20 19S 60E

DATE: 3/11/19
DRAFTER: BCS
DESIGNER: HN
CHECKED: MAK

PROJECT NO.
KBH1805-001



SD-2
SHEET 18 OF 18

J:\Kbh1805-001 montecito 60 unit 1\dwg\morpu\kbh1805-001 pnp.dwg 3/18/2019 12:40 PM Bryan Sarmiento