DS #: 5377

APN: 126-23-610-002 & 126-23-710-001

PROJECT: BLM 270 - Parcel C-2 & C-3

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:

CITY OF LAS VEGAS NEVADA

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM	DATE: November 16, 2020
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:			**COPIES TO:**
BLM 270 – Parcel C-2 & C-3				Westwood Professional Services
Cross Streets:	Puli Drive and Dorrell Lane			Octane FT Partners, LLC
File Number:	F:\Depot\DSMemos\DS05377A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	126-23-610-002 & 126-23-710-001			
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	10/20/2020	11/16/2020	See Comments Below	$400.00	4039147: $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.

The following are comments pertaining to the subject site specific drainage study and grading plans:

1. 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.
2. All drainage easements are public drainage easements to be privately maintained by the HOA. Please revise the callout for the easement through CE-B on Sheet G-1 and Section Detail 19/D-2 of the Phase 1 plans.
3. Show all existing easements including the BLM ROW Grant along the western boundary of the subject site. Call out all proposed vacations.
4. Public drainage easements, including access control, shall be per CCAUSD 425.S1.
5. There is no existing condition evaluation provided. The existing condition in the report references the Master Drainage Study for the BLM 270 and the Technical Drainage Study for the BLM 270, however these only provided Proposed and Ultimate conditions.
6. There is no analysis done for the onsite interim condition undeveloped areas. Develop flows for the interim condition and onsite swales

7. Provide riprap calculations for the pads proposed in the interim condition.
8. The location of section B2 is not shown on Exhibit F.
9. **Sheet G-1 Phase 1:** With a high flow velocity of 22.59 fps exiting at the 20' drainage easement when connecting to proposed street Sweet Bay Street, a possible hydraulic jump will occur. Verify the energy grade at this location and its impacts to downstream lot FF elevations along Sweet Bay Street.
10. **Sheet G-1 Phase 2:** Section 9 D-1 on lot 217 does not match what is shown on the plans.
11. 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	TC	FF Shown	FF Required
217	3067.02	3066.80	3067.52

As an alternate each lot must be discussed in the drainage study, shown to be flood protected, and any necessary flood improvements shown on the grading plan.

12. **Sheet G-7:** Inlets PC1, PC2, PC3 and PC4 are proposed within roll curb. Sheet 10 of Phase 1 plans
13. **Sheet G-7:** Per the grading design, it appears that drainage on the south side of Chipotle Avenue will make two 90-degree turns to the proposed PC5 on the north side of the street. This will create turbulence and inefficient capture of surface flows at the cul-de-sac. Provide one inlet either at the south side of Chipotle Avenue or at the far end curb to improve the flow condition.
14. Add note to the Grading Plans: "All onsite storm drain facilities are privately owned and privately maintained by the HOA."

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
HDR/JKS

T/R/S: T19S/R59E/S14
AREA F-23

TECHNICAL DRAINAGE STUDY

BLM 270 - Parcel C-2 & C-3

OCTOBER 2020

PREPARED FOR:

190 Octane FT Partners, LLC

Las Vegas, Nevada

PREPARED BY:

Westwood

Westwood

BLM 270 - Parcel C-2 & C-3

Technical Drainage Study

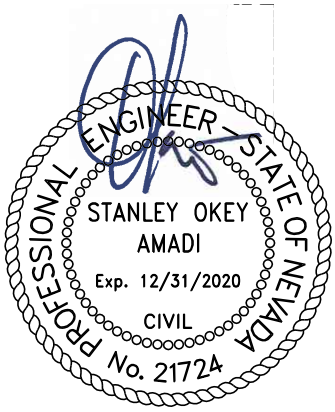
City of Las Vegas, NV

Prepared For:

190 Octane FT Partners, LLC
c/o Mr. Marc Bolduc
11411 Southern Highlands Pkwy, Suite 300
Las Vegas, NV 89141
Phone: 702-220-6565 ▪ Fax: 702-220-6566

Prepared By:

Westwood Professional Services
5740 S. Arville Street, Suite 216
Las Vegas, NV 89118
Phone: (702) 284-5300
Fax: (702) 284-5339



Project Number: BZR2001.000
Date: October 2020

Stanley Okey Amadi, P.E., CFM
NV Professional Engineer No. 21724
Assisted by: Caitlyn Alcantara, E.I.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: BLM 270 - Parcel C-2 & C-3 Date: October 2020

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

East/West: Dorrell Lane

b) Section: 14 Township: 19 South Range: 59 East

c) APN: 126-23-610-002 & 126-23-710-001

Name of Owner: 190 Octane FT Partners, LLC

Telephone No.: 702-220-6565 Fax No.: 702-220-6566 E-mail Address: mbolduc@olympiacompanies.com

Address: 11411 Southern Highlands Parkway, Suite 300 Las Vegas NV 89141

Contact Person – Name: Stanley Okey Amadi, P.E., CFM Telephone No.: (702) 284-5300

*E-mail Address: stanley.amadi@westwoodps.com Fax No.: (702) 284-5399

Firm: Westwood Professional Services

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	☐	

1. Total Owned Land Area: At Site: 265 +/- acres Being Developed/Disturbed: 61 +/- 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: 166 +/- acres

6. Has the site drainage been evaluated in the past? ☒ Yes** ☐ No If yes, please identify documentation:

Master Drainage Study - BLM 270 (DS 5236), BLM 270 Infrastructure - Centennial Parkway (DS5284)

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Flows will be routed southerly into Puli Road ....

.... storm drains.

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

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

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

Westwood

5740 S. Arville St., Suite 216
Las Vegas, NV 89118

Main (702) 284-5300

westwoodps.com
(888) 937-5150

BZR2001.000

October 15, 2020

Jennifer Shinn, P.E.
City of Las Vegas
333 Rancho Drive (7th Floor)
Las Vegas, NV 89101

Subject: Technical Drainage Study for BLM 270 – Parcel C-2 & C-3

Ms. Shinn:

This letter certifies that all items provided on electronic submittal CD matches the *Technical Drainage Study for BLM 270 – Parcel C-2 & C-3* bound paper version.

Respectfully Submitted,
WESTWOOD PROFESSIONAL SERVICES

Caitlyn Alcantara, E.I.
Graduate Engineer – Water Resources Department

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

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

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

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

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

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

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

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
-	N/A	Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
X	-	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: BLM 270 - Parcel C-2 & C-3	Map ID:
Firm Name: Westwood Professional Services	Engineer: Stanley Okey Amadi, P.E., CFM
Address: 5740 S. Arville #216	
City: Las Vegas	State: NV Zip: 89118
Phone Number: (702) 284-5300	Fax Number: (702) 284-5399
Property Owner: 190 Octane FT Partners, LLC	
Address: 11411 Southern Highlands Parkway, Suite 300	
City: Las Vegas	State: NV Zip: 89141

Reviewed By:	Date Received:	Date Accepted for Review:

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

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

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

I. GENERAL REQUIREMENT

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

II. MAPS AND EXHIBITS

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

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
-	N/A	Streets with off-set crowns.
X	-	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X	-	Property lines.
X	-	Right-of-way lines and widths, existing and proposed.
X	-	Existing improvements and their elevations.
X	-	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
X	-	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X	-	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
X	-	Location and cross-section of street capacity calculations.
X	-	Cross-sectional detail for channels, including cutoff wall locations.
X	-	Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
X	-	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
-	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.
X	-	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit.
X	-	Building and/or lot numbers.
X	-	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
-	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.
-	N/A	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.
-	N/A	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.
-	N/A	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	
-	N/A	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
X	-	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. Q_{100} d x v $\leq$ 8. Q_{10} d x v $\leq$ 6 and 12 foot dry lane for rights-of-way $\geq$ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
X	-	A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
-	N/A	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
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

Westwood

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Appendices

Appendix A: Drainage Exhibits

- Exhibit A – Location Map
- Exhibit B – FEMA FIRM Map
- Exhibit C1 – CCRFCD 2008 MPU Hydrologic Map
- Exhibit C2 - CCRFCD 2013 MPU Facilities Map
- Exhibit C3 – CCRFCD 2013 MPU Facilities Inventory
- Exhibit D – Soils Map
- Exhibit E – Phase 1 Interim Condition Drainage Map
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Appendix B: Surface Flow Hydraulic Computations

- Interior Street Sections
- Drainage Easement Sections
- Emergency Overflow Sections

Appendix C: Storm Drain Flow Computations

- Drop Inlet Computations
- WSPGW Model (MAINC)
- Nomographs
- Lateral Loss & Pipe Normal Depth Computations

Appendix D: Finished Floor Computations

Appendix E: Reference Material

Master Drainage Study for the BLM 270;
by Westwood (DS5236; RFCD 20-12469)

- Approval Letters
- Drainage Exhibits
- Hydrologic Computations

Appendix F: Reference Material

Technical Drainage Study for BLM 270 – Centennial Parkway Infrastructure
By Westwood (DS5280)

- Hydraulic Computations
- Drainage Exhibits

Appendix G: CD of Electronic Files & Improvement Plans

1.0 Introduction

1.1 Project Overview & Study Purpose

Olympia Companies is proposing a single-family residential development identified as *BLM 270 - Parcel C-2 & C-3* (hereinafter referred to as the project site or Parcel C2/C3) and located within the jurisdictional boundary of the City of Las Vegas, Nevada (CLV). This technical drainage study addresses the hydrologic and hydraulic design of the project site.

The entire BLM 270 property has been master-planned and the master drainage study was approved by the City of Las Vegas on February 10, 2020. Drainage facilities have been proposed with the BLM 270 Centennial Infrastructure Study in order to protect the site from offsite flows as well as intercept the onsite flows generated by the site. Hydraulic analysis from the Infrastructure Study has been used to establish improvements adjacent to the project site. The existing and proposed storm drain facilities are identified, and this study intends to show conformance to each receiving facility's design. This study provides a detailed hydraulic analysis of the proposed improvements.

The purpose of this study is to provide a hydrologic and hydraulic analysis for the project site to protect the property from onsite and offsite runoff in accordance with local stormwater management criteria. The study addresses offsite drainage impacts to the project site, establishes onsite drainage patterns and accommodates the allowable discharge at appropriate downstream location. The study also assesses the required drainage infrastructures to mitigate onsite flows.

1.2 Site Description

The current condition of the site comprises of undeveloped desert terrain with sparse desert shrub.

The project site is located within Township 19 South, Range 59 East, and Section 23, on Assessor's Parcel Numbers (APNs) 126-23-610-002 and 126-23-710-001. The project site is bound by undeveloped Parcel C-1 to the north, the Puli Road alignment to the east, undeveloped land and the future Sheep Mountain Parkway alignment to the west, and undeveloped Parcel D to the south. A location map identifying the site in relation to the surrounding streets has been prepared as Exhibit A, included in Appendix A.

Parcel C2/C3 is comprised of 250 single family lots with a minimum lot size of 3,560-sq-ft and a maximum lot size of 6,117-sq-ft. Since all perimeter roadways will be constructed prior to the development of Parcel C2/C3, only the onsite roadways and associated utilities will be constructed with the development.

Parcel C2/C3 will be constructed in two phases; however, this study technically addresses both phases of development, inclusive of two separate improvement plan sets, one for each phase of development, entitled *BLM 270 – Parcel C-2 & C-3 Phase 1* and *BLM 270 – Parcel C-2 & C-3 Phase 2*, respectively. Phase 1 will construct the eastern half of the site, inclusive of the site entrance, drainage infrastructure and 74 lots while, and Phase 2 will construct the western half of the site including the remainder 176 lots.

Please note that the parcel entitlement applications have been reviewed and recently approved by staff and the NOFAs will be provided as soon as they are received.

1.3 FEMA Flood Zone Designation

BLM 270 is not located within a FEMA designated Special Flood Hazard Area (SFHA). The site has been identified on the current FEMA FIRM Panel 32003C1750E, dated September 27, 2002. Per the FIRM Panel, the project site is located within a FEMA designated Zone 'X' (unshaded). A Zone 'X' (unshaded) is defined as area located outside the 0.20% annual chance floodplain.

1.4 CCRFCD Facility Information

The current 2018 CCRFCD MPU (Reference 1) facilities in the vicinity of the project site are identified on Exhibit C1, included in Appendix A. Review of Exhibit C1 indicates that the site is adjacent to and will discharge into receiving local facilities and the project parcel is also adjacent to the existing Kyle Canyon Detention Basin (LVMD 3315) at the north west boundary of the site. The project parcel does not contribute to the Kyle Canyon Detention Basin but is protected by it.

1.5 CCRFCD Watershed Information

The current 2018 CCRFCD MPU (Reference 1) subbasins in the vicinity of project site are identified on Exhibit C3, included in Appendix A. Review of Exhibit C3 indicates that Parcel C2/C3 project site is in the Gowan Watershed within subbasin CDMNA3.

1.6 Referenced Studies and Improvement Plans

The following documents have been utilized in preparation of this study. All referenced studies and improvement plans have been reviewed and determined acceptable for reference. Westwood concurs with the referenced and adopted hydrologic and hydraulic analyses from the studies and the results established therein.

- *Master Drainage Study for BLM 270 (DS5236; RFCD 20-12469)* (hereinafter referred to as the MDS) and prepared by Westwood, established allowable ultimate condition flow rates and offsite flowrates for the entire BLM 270 site. Hydrologic basins from the MDS are referenced in this study. Relevant reference material from the MDS has been included in Appendix E.

- *Technical Drainage Study for BLM 270 Infrastructure Centennial Parkway (DS05284)* (hereinafter referred to as the Infra Study) and prepared by Westwood, established allowable ultimate condition flow rates and provided stubs for connection to the mainline receiving facilities. The mainline storm drain hydraulic models from the Infra Study are referenced for comparison and to establish tail water surface elevations and starting Hydraulic Grade Lines for proposed connecting facilities in this study. Relevant reference material from the Infra Study has been included in Appendix F.

2.0 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.

100-year and 10-year Precipitation: Precipitation values in this study are referenced from the MDS. All concentration points within the BLM 270 site and its immediate vicinity are obtained from a watershed that does not exceed 8 square miles; therefore, the SDN3 storm distribution was utilized in the hydrologic models. The SDN3 design storm distribution was selected from Table 503 of the CCRFCD Manual. Relevant tables and figures from the CCRFCD Manual have been included in Appendix G with the referenced precipitation information from the MDS.

Curve Number: The SCS curve number loss rate methodology was utilized to approximate infiltration for the drainage basins. The soils information for the site has been obtained from the NRCS Web Soil Survey of the Las Vegas Valley Area (Soil Survey, Reference 3). Exhibit D included in Appendix A, depicts this study's boundary on a soils map. Per the Soil Survey, the referenced subbasins for this site lie within Soil Type 400. The hydrologic soil group (HSG) for soil type 400 is described below as:

- Soil Type 400 (Tencee, very gravelly fine sandy loam); 100% 'HSG 'D'

Refer to Appendix E for the referenced composite curve number computations for the site in both the rough graded Phase 1 and developed conditions.

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. Since the onsite flows are referenced from the Infra Study, a site-specific Standard Form 4 computation has not been provided with this study.

2.2 Hydraulic Modeling

Street Flow: Street flows have been analyzed utilizing Bentley Flowmaster V8i software. In accordance with the CCRFCD Manual, the depth times velocity factor (D x V) for street flow for the minor 10-year storm event must be less than or equal to 6, with a maximum depth of 1.0-ft. The depth times velocity factor (D x V) for street flow for the major 100-year storm event must be less than or equal to 8, with a maximum depth of 2.0-ft.

Drop Inlets: 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 analysis for the proposed storm drains has been performed utilizing the Water Surface and Pressure Gradient (WSPG) 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 its hydraulic gradient line (HGL) at a minimum of 1.0-ft below finished grade and limit the flow velocities in the facility to less than 25 ft/s. Lateral loss

computations for drop inlet laterals have been assessed with the Standard Form 6 as outlined in the CCRFCD Manual.

3.0 Existing Drainage Condition

3.1 Discussion of Existing Condition

The existing condition for the project site has been addressed with both the MDS and the Infra Study. The MDS established existing condition flow rates and proposed hydrology and facilities to provide for acceptable discharging of flow downstream of the development. The Infra Study designed the drainage facilities that the project site connects to and is protected by. The facilities include a perimeter channel along the western boundary of the site and a 68"x43" HERCP stub to the southeast corner of the site from Puli Road alignment. Refer to Appendix F for relevant reference material.

4.0 Phase 1 Interim Drainage Condition

4.1 Definition of Phase 1 Interim Condition

The Phase 1 interim condition considers the improvements proposed with the Infra Study to be in place, as discussed in Section 3.1 of this report, as well as the eastern portion of the project site (Phase 1) improvements including the residential lots with associated streets and utilities to be in place. The Phase 1 interim condition will also include the rough grading of the remaining western portion of the site to mimic the intended ultimate developed condition drainage pattern. All offsite areas are assumed to remain unchanged from the existing condition with perimeter streets and associated drainage facilities in place and functioning.

4.2 Discussion of Phase 1 Interim Condition

Refer to Exhibit E, included in Appendix A, for a detailed illustration of the Phase 1 Interim Condition drainage patterns. Since the drainage patterns of the interim condition generally match the ultimate condition and the ultimate development of the mass graded and Parcel C-1 area would result in a larger runoff, the Phase 1 interim condition is considered to be less conservative than the ultimate condition for the project site design. Therefore, hydraulic computations and storm drain design are based on the ultimate drainage condition.

4.4 Summary of Phase 1 Interim Condition Flows

A separate Phase 1 interim condition hydrologic computations and HEC-1 model have not been provided as discussed above. However, a summary table of the referenced onsite flows and prorated subbasins flows have been provided on the Phase 1 interim Condition Drainage Map (Exhibit E) included in Appendix A.

5.0 Ultimate Drainage Condition

5.1 Definition of Ultimate Condition

The ultimate condition considers the entire site (Phase 1 & Phase 2) to be fully developed and the proposed onsite and offsite infrastructures and storm drain facilities to be installed and functioning. The adjacent northern Parcel C1 is also considered to be fully developed per the

approved Master Drainage Study. The tributary upstream watershed is also considered fully developed.

5.2 Discussion of Ultimate Condition

Refer to Exhibit F, included in Appendix A, for a detailed illustration of the ultimate condition drainage patterns showing the drainage basins and subbasins impacting the project site.

Referenced basin ON3, designated as 'Parcel C' by the MDS and Infra Study, has been divided into smaller subareas, with two separate areas of development, Parcel C-1 and Parcel C-2 & C-3. All of referenced basin ON3 is intended to impact existing Facility P11 at the southeast corner of the project site. Therefore, flow generated by the Parcel C1 development will be conveyed through the Parcel C2/C3 development and intercepted by proposed storm drain facilities.

The project site generally drains in a southeasterly direction. Subbasins ON3(A) and ON3(H) represent the development of Parcel C1. Subbasin ON3(A) impacts the Parcel C2/C3 development and subbasin ON3(H) is the portion of Dorrell Lane and the Puli Park alignment that will not impact the interior streets of the Parcel C2/C3 development. The remaining subbasins ON3(B) through ON3(G) impact the proposed MAINC storm drain and represent the development of Parcel C2/C3.

Upstream areas generating runoff upstream of the project are collected by ditches redirecting flows away from the project site. The impacting area is referenced from the proposed condition of the Infra Study and the project site Basin ON3, referenced from the MDS.

5.3 Summary of Ultimate Condition Flows

As previously stated, the offsite and onsite flows impacting the site have been referenced from the MDS; thus, a separate ultimate condition hydrologic computations and HEC-1 model have not been provided as discussed above. A summary table of the referenced flows and prorated subbasins flows have been provided on the Ultimate Condition Drainage Map (Exhibit F) included in Appendix A.

6.0 Proposed Drainage Facilities

6.1 Summary of Street & Facility Flows

The 100-year street flow summary tables have been included on Exhibit F, and the supporting FlowMaster street flow computations have been included in Appendix B for reference. Review of the street flow summary tables shows that the criteria set forth in Section 2.3 of this report are satisfied. The interior streets have been designed to maintain erosive flows below curb height and ensure that any flows conveyed above the top-of-curb or sidewalk are non-erosive.

Provided in Appendix A is a landscape exhibit for the design and grading of the future park within the Puli alignment. Review of the exhibit indicates that the project site will be several feet (~10-ft) above the finished grades within the park and above any flows conveyed in the Puli alignment. Even with the addition of five (4) cfs to the Puli alignment from the landscaping of Parcel C1/C2; subbasin ON3(G), it is expected that the project site will be properly elevated above the depth of flow within Puli alignment.

Note that a high point is proposed at the entry way to ensure that flows from the site do not exit towards Puli alignment. The high point elevation has been verified to contain the specific energy of the flows at Section B1 conveyed along Sageview Avenue. In addition, the combined flows from Sageview Avenue and the flows impacting the site from Parcel C1 (thru the proposed 4-ft wide gutter) have also been verified to be contained by the high point per Section B2. Thus, onsite flows will not discharge into Puli alignment thru the site entry.

6.2 Summary of Proposed Inlets & Storm Drain Facilities

Refer to Exhibit F, included in Appendix A, for the location of the proposed flood control facilities. The pertinent storm drain computations have been included in Appendix C.

Five drop inlets and pertinent storm drain main and laterals have been proposed throughout the Parcel C2/C3 site. One storm drain model has been provided for the mainline storm drain (MAINC) in Sweet Bay Street, connecting to existing storm drain stub in Chipotle Avenue from Puli Alignment. The mainline begins with proposed Facility PC1 in the east half of Sweet Bay Street and continues south in Sweet Bay Street, where it junctions with Facilities PC2, PC3, and PC4. The mainline turns east in Chipotle Avenue and junctions with Facility PC5; then connects with an existing 68" x 43" HERCP provided by the Infra Study in the Puli Alignment. The existing storm drain turns south in the Puli Alignment.

The WSPGW model has been provided to analyze the mainline (MAINC) while the remaining storm drain laterals are analyzed with the Standard Form 6 lateral loss computation. The mainline and lateral computations indicate that the storm drain design criteria stipulated in the CCRFCD Manual are satisfied. Refer to Appendix C for the mainline storm drain and lateral computations. A summary table of the recommended facilities have been provided on the Ultimate Condition Drainage Map (Exhibit F) included in Appendix A.

7.0 Finished Floors

A spreadsheet showing the finished floor analysis has been included in Appendix D. Please note that both phases have been analyzed together in the provided finished floor analysis. All 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.

8.0 Conclusions & Recommendations

1. This project is in compliance with the applicable drainage laws as recognized by the state of Nevada. This project is in compliance with the CCRFCD "*Hydrologic Criteria and Drainage Design Manual*" (Reference 1).

2. The project site is not located within a FEMA designated Special Flood Hazard Area (SFHA). The site and the proposed improvements are located within a FEMA flood Zone "X" (unshaded). Therefore, FEMA notification will not be required.

3. The storm flows discharging from Parcel C2/C3 do not exceed allowable discharges established in the Infra Study. Therefore, there are no adverse impacts to downstream property and facilities as a result of the proposed improvements.

4. The finished floor elevations of the proposed lots have also been designed with adequate flood protection from the 100-year flows and any potential emergency overflows. The finished floor elevations are designed to satisfy the criteria stipulated in the HCDDM.

5. The grading plan, storm drain profile and detail sheets for this project have been included with this study. These plans support the drainage patterns and conclusions detailed in this study.

9.0 References

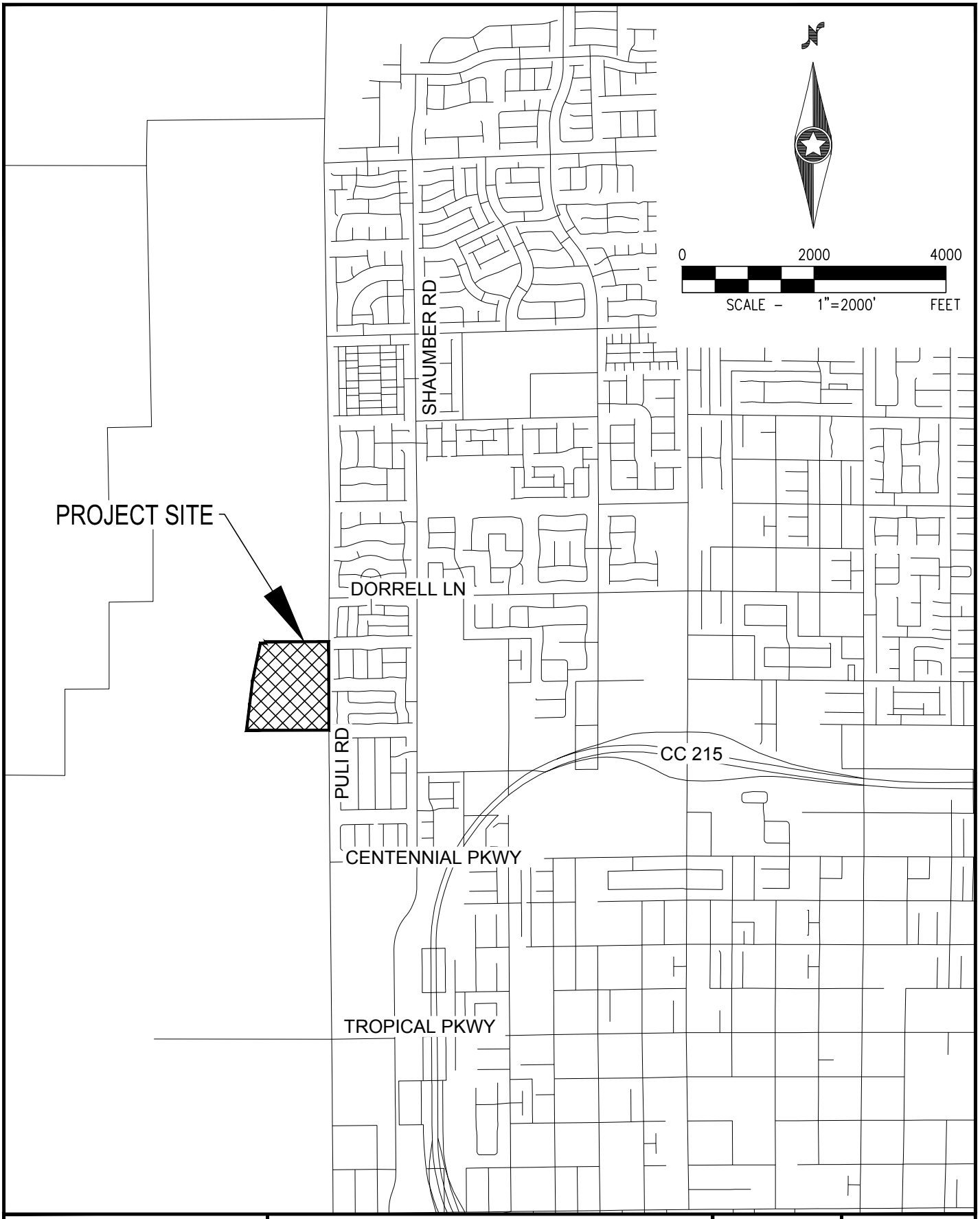
1. Las Vegas Valley Flood Control Master Plan Update. Clark County Regional Flood Control District, 2018.

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

3. Custom Soils Resources Report for Las Vegas Valley Area, Nevada, Part of Clark County. Department of Agriculture, Natural Resources Conservation Services, 2020.

APPENDIX A

Drainage Exhibits



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Westwood Professional Services, Inc.

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3

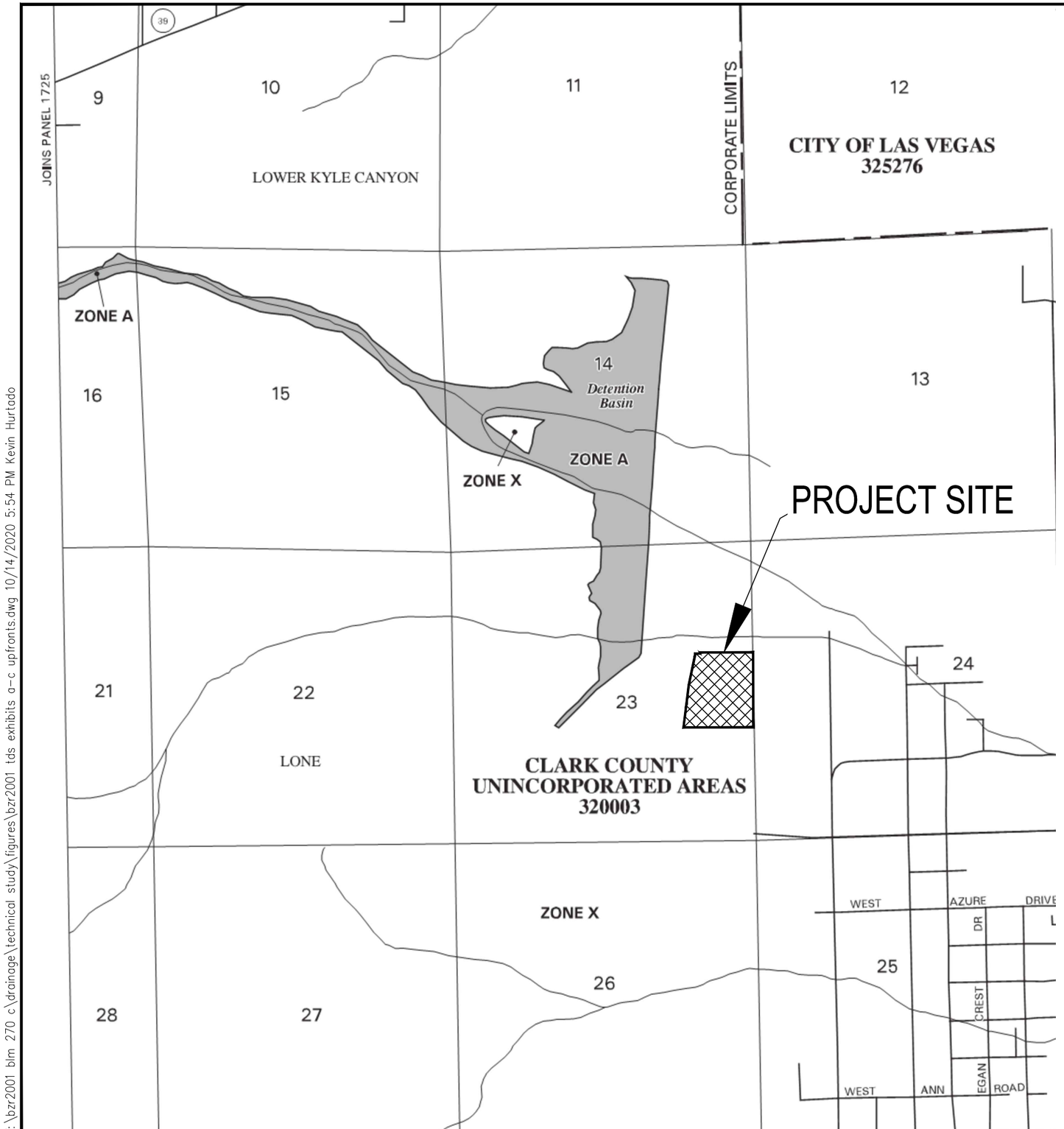
VICINITY MAP

DATE:	OCT 2020
DRAFTER:	CAA
DESIGNER:	CAA
CHECKED:	SOA

PROJECT NO.
BZR2001.000

EXHIBIT A

SHEET 1 OF 1



NFIP

PANEL 1750 E

FIRM
FLOOD INSURANCE RATE MAP

CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 1750 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAS VEGAS, CITY OF	325276	1750	E
CLARK COUNTY, UNINCORPORATED AREAS	320003	1750	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
32003C1750 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

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

97°07'30", 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

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
AUGUST 16, 1995

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 27, 2002: to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to change special flood hazard areas, to delete special flood hazard areas, to change zone designations, to add roads and road names, to incorporate previously issued letters of map revision, to incorporate previously issued letters of map amendment, and to change floodway.

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

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

N

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

600 0 600 1200 METERS

N

0 2000 4000

SCALE – 1"=2000' FEET

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Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3
FEMA FIRM PANEL MAP

DATE: OCT 2020
DRAFTER: CAA
DESIGNER: CAA
CHECKED: SOA

PROJECT NO.
BZR2001.000

EXHIBIT B
SHEET 1 OF 1

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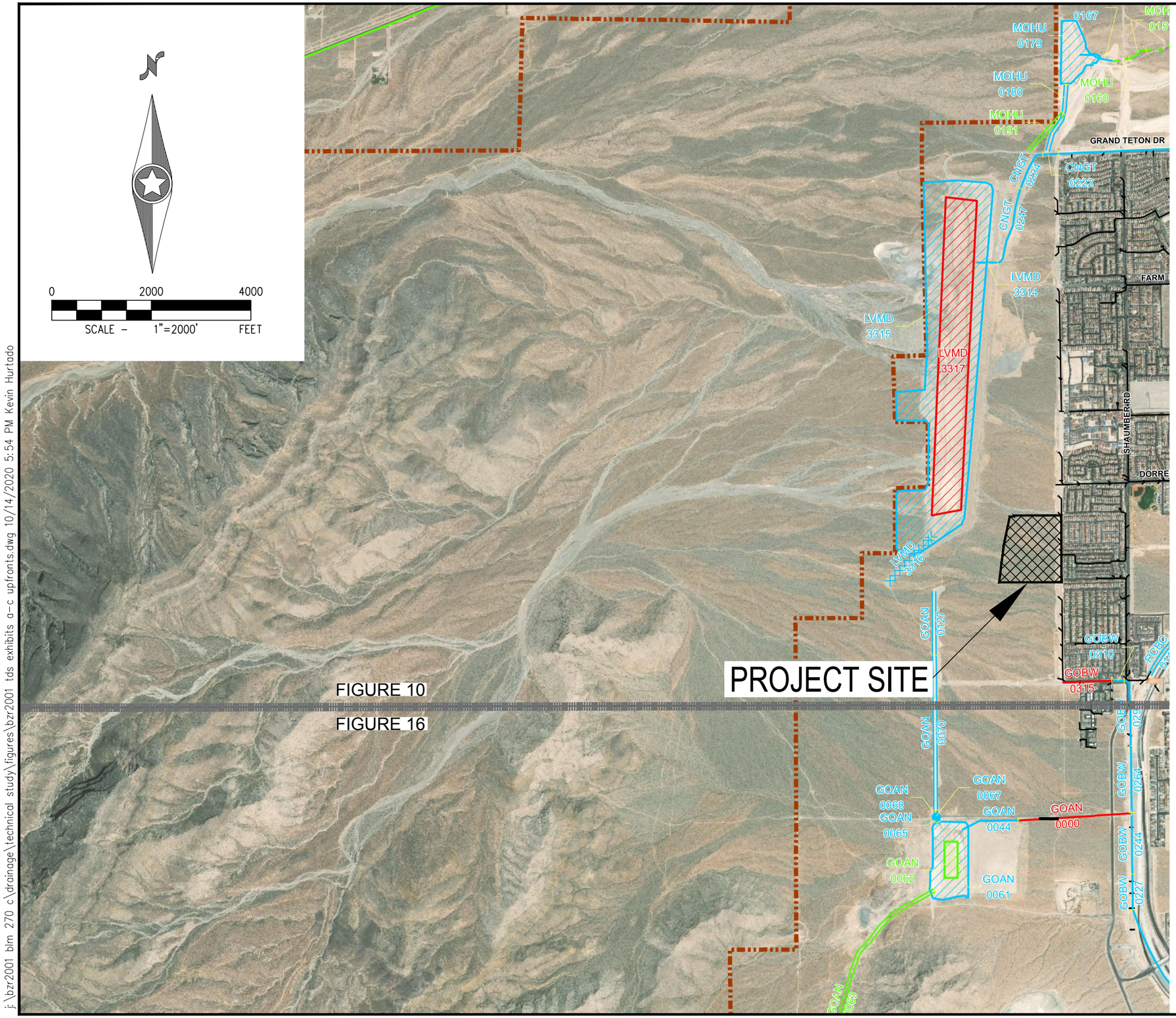

REGIONAL FLOOD CONTROL DISTRICT

2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-10
FIGURE F-16
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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Las Vegas, NV 89118
westwood.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP DATE	APP

190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3
CCRFCD MPU FACILITY MAP

DATE: OCT 2020
DRAFTER: CAA
DESIGNER: CAA
CHECKED: SOA
PROJECT NO. BZR2001.000

EXHIBIT C1
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 (%) **
CNGT		**CENTENNIAL PKWY CHANNEL WEST / GRAND TETON BRANCH**						
0118	E	6' X 5' RCAP	5472	349	KYLEDET	KYLEDB	58.61	3.72
0222	E	6' X 6' RCAP	305	349	KYLEDET	KYLEDB	58.61	1.16
0234	E	6' X 4' RCAP	885	349	KYLEDET	KYLEDB	58.61	4.50
0247	E	6' X 5' RCAP	1600	349	KYLEDET	KYLEDB	58.61	1.63
GOAN		**GOWAN ANN ROAD DETENTION BASIN FACILITIES**						
0070	E	SOIL CEMENT CHNL 10'W 4'-7'D 4:1 SS	3125	1075	CCAMDK3	GOW3A	0.66	3.00
0127	E	SOIL CEMENT CHNL 10'W 2'-6'D 4:1 SS	1292	578	CAMDK2	GOW3A	0.34	1.73
GOBW		**GOWAN BELTWAY WEST**						
0291	E	8' X 6' RCB	1309	783	CMNA2	GOW3A	0.49	1.70
0310	E	54" RCP	250	501	CDMNA3	GOW3A	0.30	4.73
0315	P	54" RCP	976	501	CDMNA3	GOW3A	0.30	4.00
KCUN		**KYLE CANYON AND UNKNOWN**						
0000	P	60" RCP	685	283	NW1-C	LOWER3	0.29	2.20
LVMD		**LAS VEGAS WASH - MIDDLE**						
3313	E	120,000 CFS PMF SPILLWAY		120000	KYLEDB	KYLEDB	58.61	
3314	E	78" RCP OUTLET	385	349	KYLEDET	KYLEDET	58.61	1.00
3315	E	3,200 AC-FT KYLE CANYON DETENTION BASIN		17145	KYLEDB	KYLEDB	58.61	
3316	E	RIPRAP LEVEE (SOUTH) 5'	1250	17145	KYLEDB	KYLEDB	58.61	3.00
3317	P	UPGRADE TO 4,343 AC-FT KYLE CANYON DETENTION BASIN		17145	KYLEDB	KYLEDB	58.61	
MOHU		**MOCCASIN-HUALAPAI BRANCH**						
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
0160	P0	NATURAL WASH	360	72	MODB1	LOWER3	0.86	3.00
0167	E	60" RCP W/ 24" ORIFICE PLATE	695	72	MODB1	LOWER3	0.86	2.60
0178	E	6,052 CFS SPILLWAY		6052	COFF20	LOWER3	0.86	
0179	E	78.7 AC-FT MOCCASIN OUTFALL DETENTION BASIN #1		881	COFF20	LOWER3	0.86	
0180	E	CONC CHNL 12'W 5.5'D 3:1 SS	1454	526	OFF21	LOWER3	0.49	3.00
0191	P0	CONC CHNL 12'W 5'D 3:1 SS	1020	526	OFF21	LOWER3	0.49	1.50
MOIR		**MOCCASIN - IRON MOUNTAIN BRANCH**						
0041	P0	42" RCP	1236	71	MODB2	LOWER3	0.56	5.00
0065	P0	60" RCP	1099	71	MODB2	LOWER3	0.56	0.40
0085	P0	60" RCP OUTLET W/ 24" ORIFICE PLATE	800	71	MODB2	LOWER3	0.56	0.40
0097	P0	6,101 CFS SPILLWAY		6101	COFF16	LOWER3	0.56	
0098	P0	76.3 AC-FT MOCCASIN OUTFALL DETENTION BASIN #2		635	COFF16	LOWER3	0.56	
0099	P0	CONC CHNL 12'W 3'D 3:1 SS	723	205	OFF18	LOWER3	0.17	3.00
MOKC		**MOCCASIN AND KYLE CANYON**						
0000	P0	9' X 6' RCB	6140	1072	CNW35-C	LOWER3	2.69	3.40
0116	P0	8' X 6' RCB	2660	963	CNW21-C	LOWER3	2.35	3.40
0166	P0	8' X 6' RCB W/ 24" x 6' OUTLET	305	931	RDBCNW7	LOWER3	2.19	3.40
0172	P0	22,070 CFS SPILLWAY		22070	CNW-7	LOWER3	2.19	
0173	P0	71 AC-FT KYLE CANYON SEDIMENT BASIN		1839	CNW-7	LOWER3	2.19	
0325	P0	9' X 8' RCB	3035	1839	CNW-7	LOWER3	2.19	3.65
0380	P0	90" RCP	8700	1440	2CNW1-C	LOWER3	1.70	3.73
MOSH		**MOCCASIN AND SHEEP MOUNTAIN**						
0000	P	CONC CHNL 12'W 6'D 0:1 SS	2640	1198	COFF1A-6	SPRING3	3.70	2.71
0053	P	CONC CHNL 12'W 6'D 0:1 SS	2640	1045	COFF2B	SPRING3	3.23	1.39
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

**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-10

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

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3
CCRFCD FACILITY TABLE

DATE: OCT 2020
DRAFTER: CAA
DESIGNER: CAA
CHECKED: SOA

PROJECT NO. BZR2001.000

EXHIBIT C2
SHEET 1 OF 1

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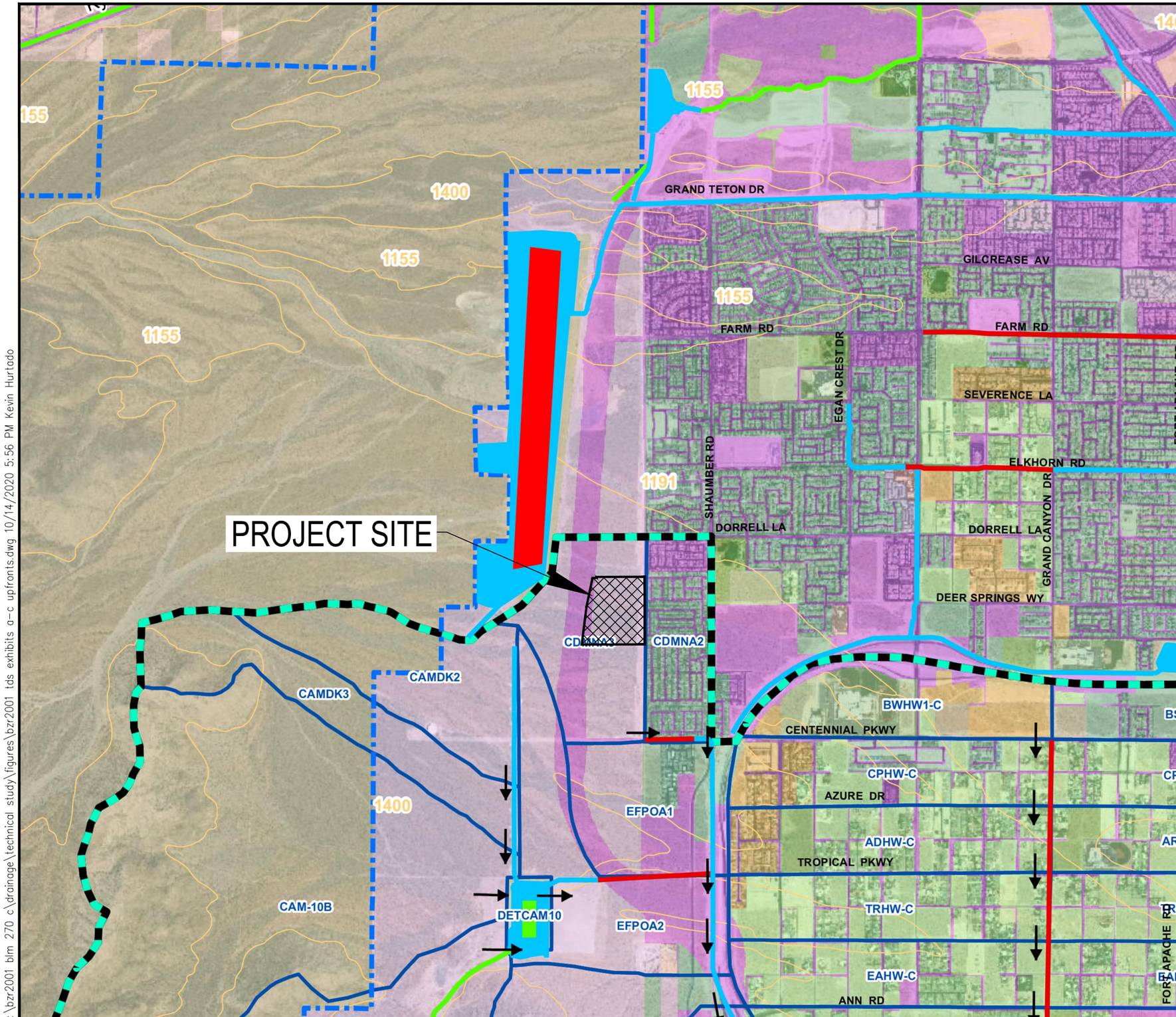


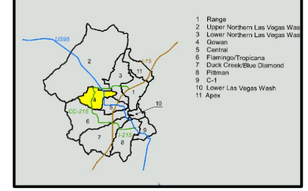
REGIONAL FLOOD CONTROL DISTRICT

2018 Las Vegas Valley Master Plan Update

Figure W-4
Gowan Watershed

Legend

- Flow Arrows
- Node ID 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



N

0 2000 4000
SCALE – 1"=2000' FEET

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190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3
CCRFCD WATERSHED MAP

DATE: OCT 2020
DRAFTER: CAA
DESIGNER: CAA
CHECKED: SOA
PROJECT NO. BZR2001.000

EXHIBIT C3
SHEET 1 OF 1

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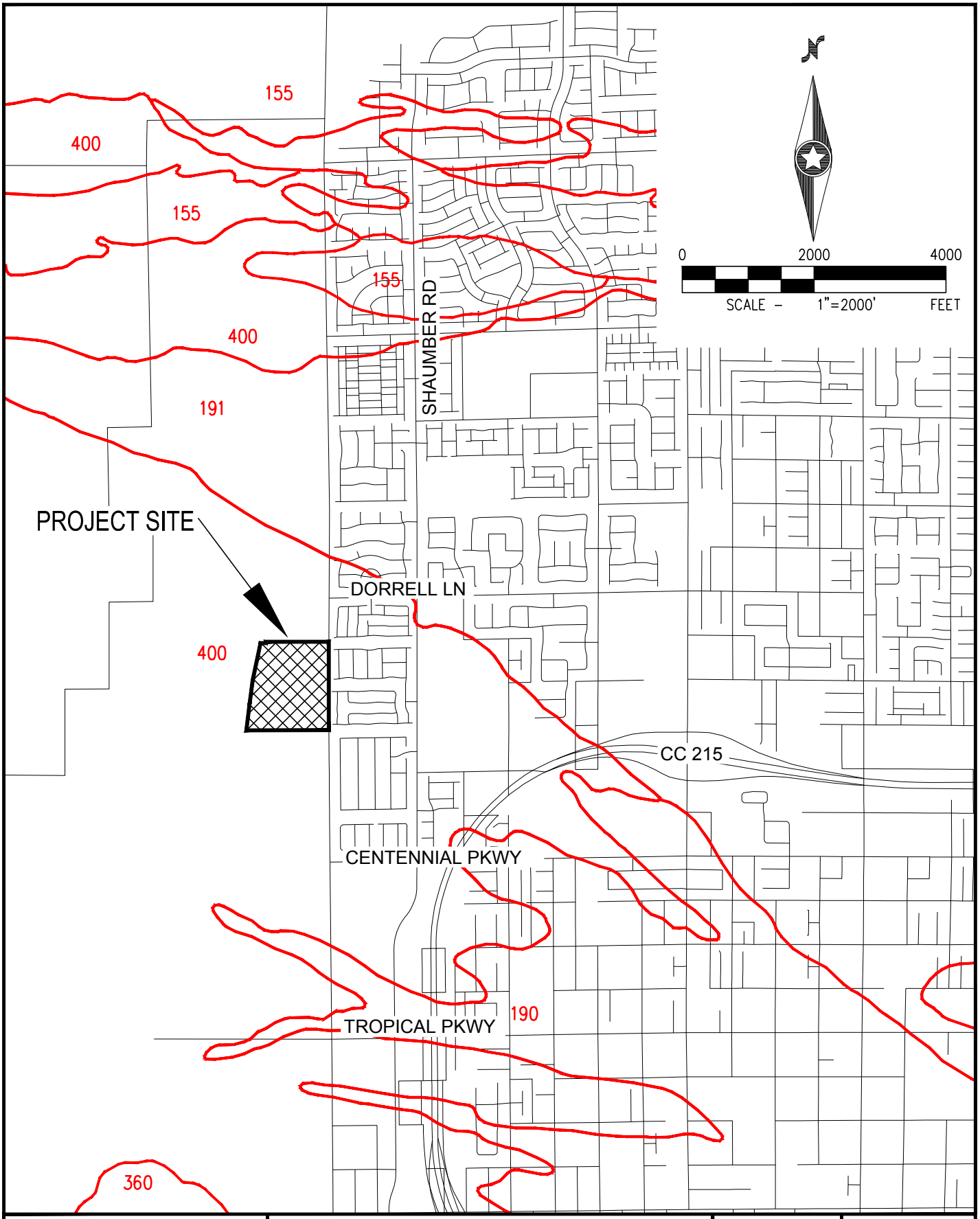

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BLM 270 PARCEL C-2 & C-3

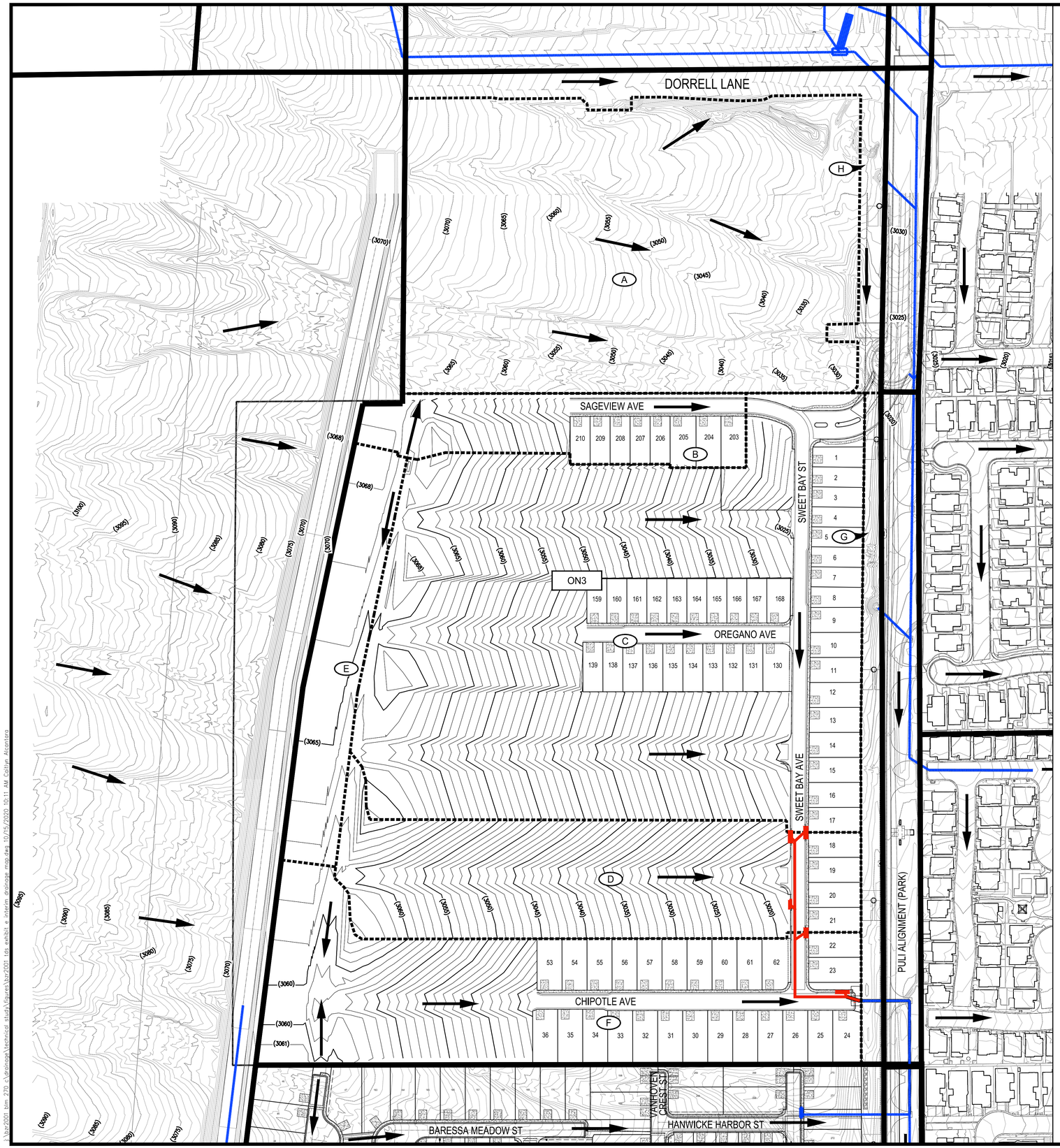
SOILS MAP

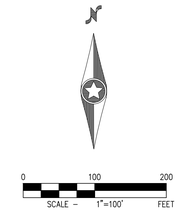
DATE:	OCT 2020
DRAFTER:	CAA
DESIGNER:	CAA
CHECKED:	SOA

PROJECT NO. BZR2001.000

EXHIBIT D

SHEET 1 OF 1





LEGEND

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- EXISTING DRAINAGE FACILITY
- PROPOSED DRAINAGE FACILITY
- ID — BASIN ID
- (ID) — PRORATED SUBBASIN ID
- FLOW DIRECTION

Prorated Proposed Condition Flow Summary

Basin ID	Q_{100} (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)
ON3	155	52.0	3.0
Subbasin ID	**Q_{100} (cfs)**	**Area (acres)**	**100-yr Unit Flow (cfs/acre)**
ON3(A)	38	12.8	3.0
ON3(B)	7	2.5	3.0
ON3(C)	52	17.4	3.0
ON3(D)	18	6.0	3.0
ON3(E)	7	2.2	3.0
ON3(F)	23	7.8	3.0
ON3(G)	4	1.3	3.0
ON3(H)	6	2.1	3.0
TOTAL	***155***	***52.0***	

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190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3
INTERIM CONDITION DRAINAGE MAP

DATE: AUG 2020
DRAFTER: CAA
DESIGNER: CAA
CHECKED: SOA
PROJECT NO. BZR2001.000

EXHIBIT E
SHEET 1 OF 1

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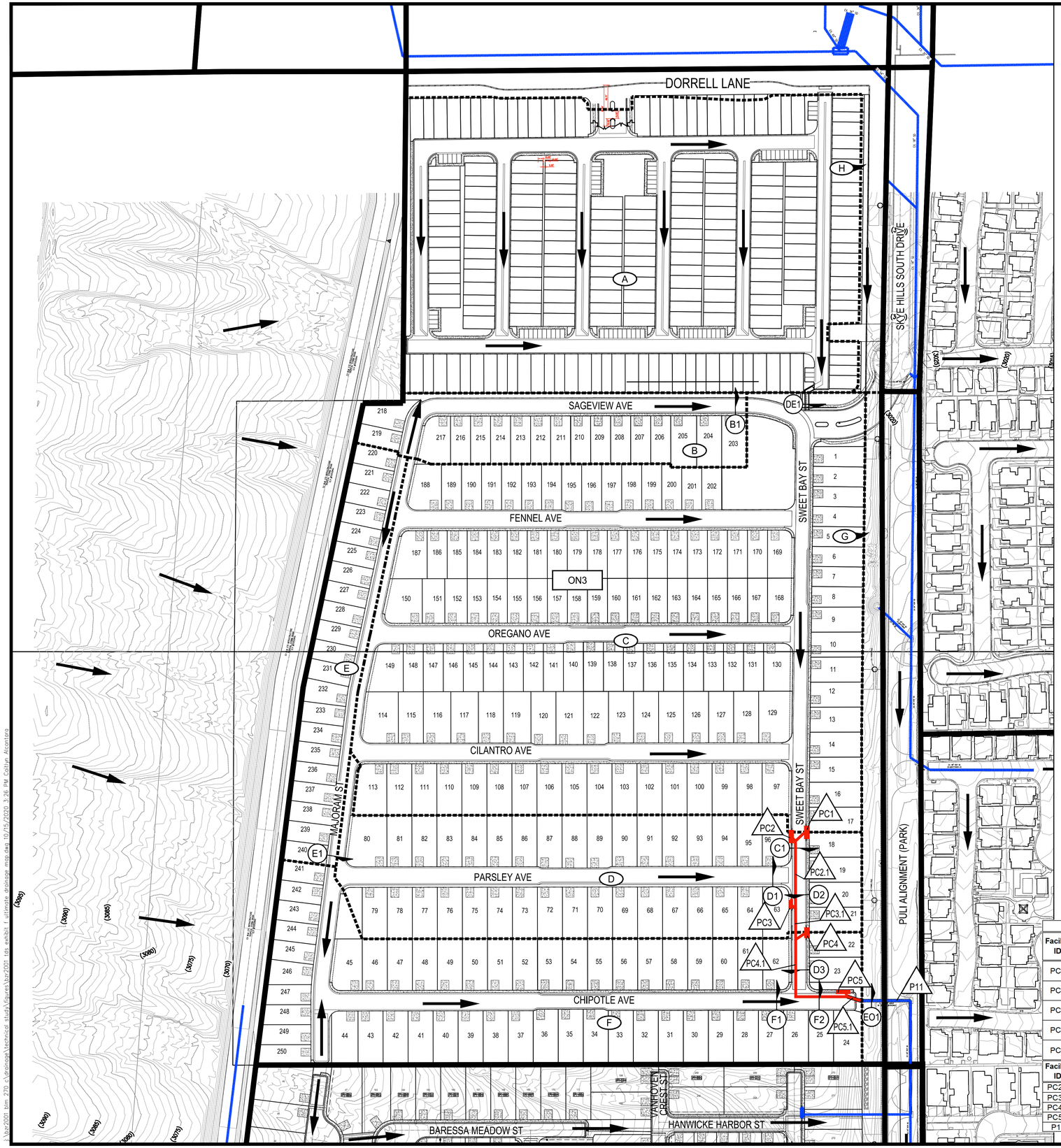

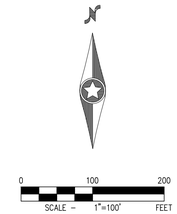

LEGEND

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- EXISTING DRAINAGE FACILITY
- PROPOSED DRAINAGE FACILITY
- ID — BASIN ID
- ID — PRORATED SUBBASIN ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID

Prorated Ultimate Condition Flow Summary

Basin ID	Q_{100} (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)
ON3	155	52.0	3.0
Subbasin ID	**Q_{100} (cfs)**	**Area (acres)**	**100-yr Unit Flow (cfs/acre)**
ON3(A)	38	12.8	3.0
ON3(B)	7	2.5	3.0
ON3(C)	52	17.4	3.0
ON3(D)	18	6.0	3.0
ON3(E)	7	2.2	3.0
ON3(F)	23	7.8	3.0
ON3(G)	4	1.3	3.0
ON3(H)	6	2.1	3.0
TOTAL	***155***	***52.0***	

Ultimate Condition 100-Year Street Flow Summary

Section ID	Slope (%)	Q_{100} (cfs)	Depth (ft)	Velocity (fps)	DxV
Street B1 (Q = ON3(B))	5.53	7	0.26	4.58	1.2
Street B2 (Q = ON3(A+B))	1.88	45	0.43	4.45	1.9
Street C1 (Q = ON3(A+B+C))	0.60	97	0.79	4.70	3.7
Street D1 (Q = ON3(D))	3.50	18	0.36	4.77	1.7
	5.14		0.34	5.52	1.9
Street D2 (Q = Bypass of Facility PC1 & PC2 + ON3(D))	4.56	42	0.45	6.29	2.8
Street D3 (Q = Bypass of Facility PC3 & PC4)	3.56	18	0.36	4.79	1.7
Street E1 (Q = ON3(E))	0.50	7	0.45	2.03	0.9
Street F1 (Q = ON3(E+F))	3.50	30	0.42	5.23	2.2
	4.88		0.40	5.98	2.4
Street F2 (Q = Bypass of Facilities PC3 & PC4 + ON3(E+F))	3.50	48	0.48	6.05	2.9

Ultimate Condition Drainage Easement Section Summary

Section ID	Q_{100} (cfs)	Section Description	Slope (%)	Depth (ft)	Velocity (fps)
DE1 (Q = Basin ON3(A))	38	20' Drainage Easement with 4-ft U-Channel, 0.5-ft Depth	16.00	0.42	22.59

Ultimate Condition Emergency Overflow Section Summary

Section ID	Q_{100} (cfs)	Section Description	Depth (ft)	Velocity (fps)
EO1 (Q = Facility PC5)	48	Weir	0.57	2.33

Ultimate Condition Drainage Facility Summary

Facility ID	Facility Description	Contributing Flows	Total/Approaching Flow (cfs) Q_{100}	Facility Flow (cfs) Q_{100}	Surface/Bypass Flow (cfs) Q_{100}	WSPW Model	Comment
PC1	Proposed 20' Type CM2 Drop Inlet & 30" RCP	Half of ON3(A+B+C)	48.5	36.5	12	MAINC	
PC2	Proposed 20' Type CM2 Drop Inlet & 30" RCP	Half of ON3(A+B+C)	48.5	36.5	12	Lateral Loss	
PC3	Proposed 15' Type CM2 Drop Inlet & 18" RCP	Half of (Bypass of Facilities PC1 & PC2 + ON3(D))	21	12	9	Lateral Loss	
PC4	Proposed 15' Type CM2 Drop Inlet & 18" RCP	Half of (Bypass of Facilities PC1 & PC2 + ON3(D))	21	12	9	Lateral Loss	
PC5	Proposed 20' Type CM2 Drop Inlet & 30" RCP	Bypass of Facilities PC3 & PC4 +ON3(E+F)	48	48	0	Lateral Loss	SUMP INLET

Facility ID	Facility Description	Contributing Flows	Facility Flow (cfs) Q_{100}	WSPW Model	Comment
PC2.1	Proposed 42" RCP	Facility PC1 + PC2	73	MAINC	
PC3.1	Proposed 42" RCP	Facility PC2.1 + PC3	85	MAINC	
PC4.1	Proposed 42" PVC	Facility PC3.1 + PC4	97	MAINC	
PC5.1	Proposed 68" x 43" HERCP	Facility PC4.1 + PC5	145	MAINC	
P11	Existing 68" x 43" HERCP	Facility PC5.1	145	MAINC	

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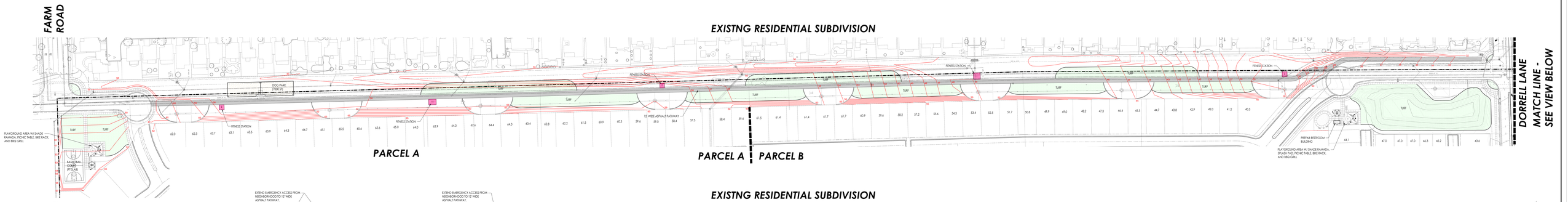
190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3
ULTIMATE CONDITION DRAINAGE MAP

DATE: OCT 2020
DRAFTER: CAA
DESIGNER: CAA
CHECKED: SOA
PROJECT NO. BZR2001.000

EXHIBIT F
SHEET 1 OF 1



BLM 270 Design Development Plan (Centennial to Farm)

SCALE: 1" = 20'

Not for construction unless approved by local government

REV DATE: MAY 22, 2020

DONALD TRAL R.A. NEVADA LICENSE #5259

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811 Know what's below. Call before you dig.

APPENDIX B

Surface Flow Hydraulic Computations

Interior Street Sections

Worksheet for B1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	5.53	%
Discharge	7.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+05.38	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.12
0+23.00	0.44
0+38.50	0.12
0+38.50	0.08
0+39.50	0.00
0+40.62	0.38
0+41.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+07.50, 0.08)	0.013
(0+07.50, 0.08)	(0+38.50, 0.08)	0.016
(0+38.50, 0.08)	(0+41.00, 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 B1

Results

Normal Depth		0.26	ft
Elevation Range	0.00 to 0.48 ft		
Flow Area		1.53	ft²
Wetted Perimeter		16.90	ft
Hydraulic Radius		0.09	ft
Top Width		16.73	ft
Normal Depth		0.26	ft
Critical Depth		0.34	ft
Critical Slope		0.00687	ft/ft
Velocity		4.58	ft/s
Velocity Head		0.33	ft
Specific Energy		0.58	ft
Froude Number		2.67	
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	0.34	ft
Channel Slope	5.53	%
Critical Slope	0.00687	ft/ft

Cross Section for B1

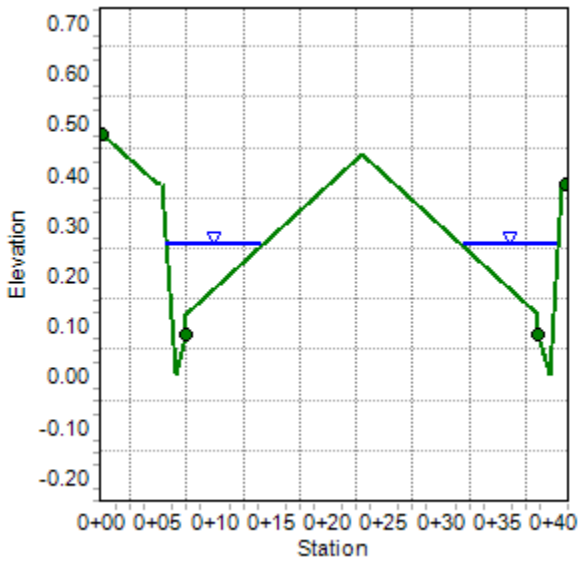
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	5.53	%
Normal Depth	0.26	ft
Discharge	7.00	ft³/s

Cross Section Image



Worksheet for B2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.88	%
Discharge	45.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	3026.99
0+05.00	3026.89
0+05.38	3026.89
0+06.50	3026.51
0+07.50	3026.59
0+07.50	3026.63
0+23.00	3026.89
0+38.50	3026.54
0+38.50	3026.50
0+42.50	3026.44
0+46.50	3026.50
0+49.00	3026.57
0+74.00	3027.33

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 3026.99)	(0+07.50, 3026.59)	0.013
(0+07.50, 3026.59)	(0+38.50, 3026.50)	0.016
(0+38.50, 3026.50)	(0+46.50, 3026.50)	0.013
(0+46.50, 3026.50)	(0+74.00, 3027.33)	0.016

Options

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

Worksheet for B2

Options

Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.43	ft
Elevation Range	3026.44 to 3027.33 ft		
Flow Area		10.10	ft²
Wetted Perimeter		51.36	ft
Hydraulic Radius		0.20	ft
Top Width		51.20	ft
Normal Depth		0.43	ft
Critical Depth		0.53	ft
Critical Slope		0.00549	ft/ft
Velocity		4.45	ft/s
Velocity Head		0.31	ft
Specific Energy		0.74	ft
Froude Number		1.77	
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	0.43	ft
Critical Depth	0.53	ft
Channel Slope	1.88	%
Critical Slope	0.00549	ft/ft

Cross Section for B2

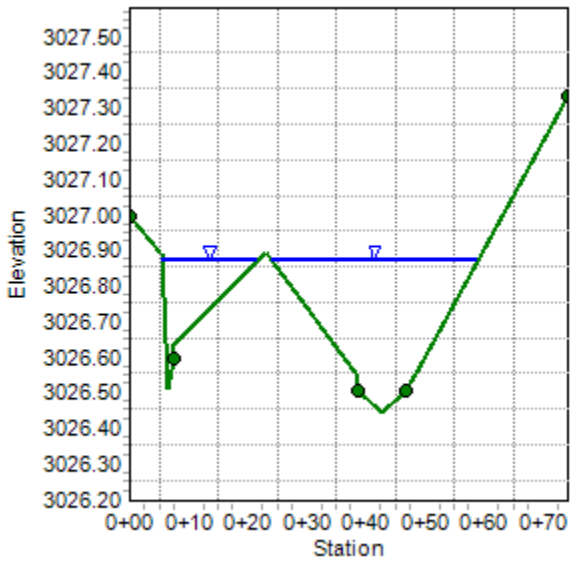
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.88	%
Normal Depth	0.43	ft
Discharge	45.00	ft³/s

Cross Section Image



Worksheet for C1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.60	%
Discharge	97.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+05.38	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.12
0+23.00	0.44
0+38.50	0.12
0+38.50	0.08
0+39.50	0.00
0+40.62	0.38
0+41.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+07.50, 0.08)	0.013
(0+07.50, 0.08)	(0+38.50, 0.08)	0.016
(0+38.50, 0.08)	(0+41.00, 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 C1

Results

Normal Depth		0.79	ft
Elevation Range	0.00 to 0.48 ft		
Flow Area		20.66	ft²
Wetted Perimeter		41.93	ft
Hydraulic Radius		0.49	ft
Top Width		41.00	ft
Normal Depth		0.79	ft
Critical Depth		0.84	ft
Critical Slope		0.00427	ft/ft
Velocity		4.70	ft/s
Velocity Head		0.34	ft
Specific Energy		1.13	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
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.79	ft
Critical Depth	0.84	ft
Channel Slope	0.60	%
Critical Slope	0.00427	ft/ft

Cross Section for C1

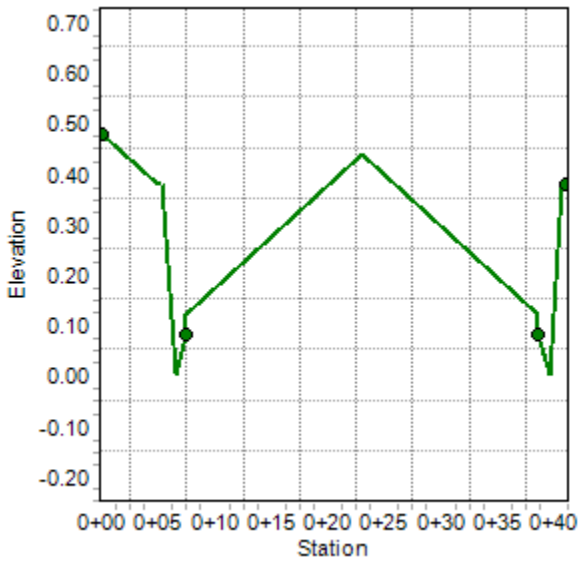
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.60	%
Normal Depth	0.79	ft
Discharge	97.00	ft³/s

Cross Section Image



Worksheet for D1 (Min Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.50	%
Discharge	18.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+05.38	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.12
0+23.00	0.44
0+38.50	0.12
0+38.50	0.08
0+39.50	0.00
0+40.62	0.38
0+41.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+07.50, 0.08)	0.013
(0+07.50, 0.08)	(0+38.50, 0.08)	0.016
(0+38.50, 0.08)	(0+41.00, 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 D1 (Min Slope)

Results

Normal Depth		0.36	ft
Elevation Range	0.00 to 0.48 ft		
Flow Area		3.78	ft²
Wetted Perimeter		27.45	ft
Hydraulic Radius		0.14	ft
Top Width		27.24	ft
Normal Depth		0.36	ft
Critical Depth		0.46	ft
Critical Slope		0.00628	ft/ft
Velocity		4.77	ft/s
Velocity Head		0.35	ft
Specific Energy		0.71	ft
Froude Number		2.26	
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	0.36	ft
Critical Depth	0.46	ft
Channel Slope	3.50	%
Critical Slope	0.00628	ft/ft

Cross Section for D1 (Min Slope)

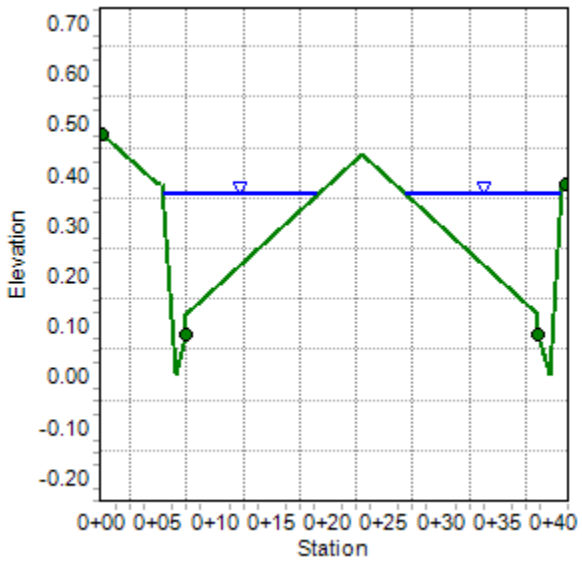
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.50	%
Normal Depth	0.36	ft
Discharge	18.00	ft³/s

Cross Section Image



Worksheet for D1 (Max Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	5.14	%
Discharge	18.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+05.38	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.12
0+23.00	0.44
0+38.50	0.12
0+38.50	0.08
0+39.50	0.00
0+40.62	0.38
0+41.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+07.50, 0.08)	0.013
(0+07.50, 0.08)	(0+38.50, 0.08)	0.016
(0+38.50, 0.08)	(0+41.00, 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 D1 (Max Slope)

Results

Normal Depth		0.34	ft
Elevation Range	0.00 to 0.48 ft		
Flow Area		3.26	ft²
Wetted Perimeter		25.42	ft
Hydraulic Radius		0.13	ft
Top Width		25.22	ft
Normal Depth		0.34	ft
Critical Depth		0.46	ft
Critical Slope		0.00626	ft/ft
Velocity		5.52	ft/s
Velocity Head		0.47	ft
Specific Energy		0.81	ft
Froude Number		2.71	
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	0.34	ft
Critical Depth	0.46	ft
Channel Slope	5.14	%
Critical Slope	0.00626	ft/ft

Cross Section for D1 (Max Slope)

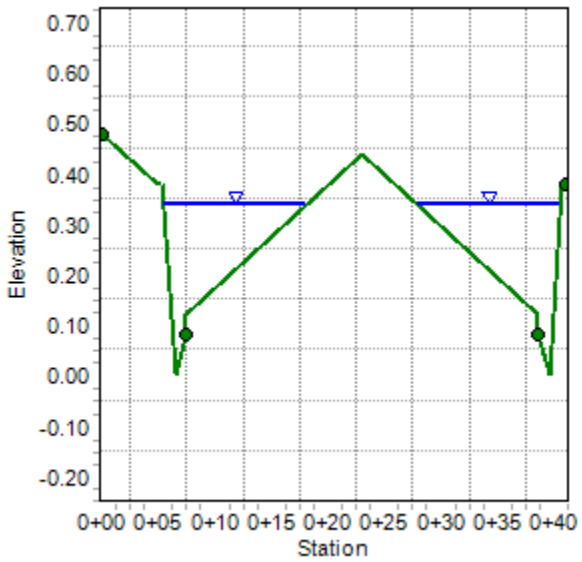
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	5.14	%
Normal Depth	0.34	ft
Discharge	18.00	ft³/s

Cross Section Image



Worksheet for D2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.56	%
Discharge	42.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+05.38	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.12
0+23.00	0.44
0+38.50	0.12
0+38.50	0.08
0+39.50	0.00
0+40.62	0.38
0+41.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+07.50, 0.08)	0.013
(0+07.50, 0.08)	(0+38.50, 0.08)	0.016
(0+38.50, 0.08)	(0+41.00, 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 D2

Results

Normal Depth		0.45	ft
Elevation Range	0.00 to 0.48 ft		
Flow Area		6.68	ft²
Wetted Perimeter		39.57	ft
Hydraulic Radius		0.17	ft
Top Width		39.28	ft
Normal Depth		0.45	ft
Critical Depth		0.60	ft
Critical Slope		0.00515	ft/ft
Velocity		6.29	ft/s
Velocity Head		0.61	ft
Specific Energy		1.06	ft
Froude Number		2.69	
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	0.45	ft
Critical Depth	0.60	ft
Channel Slope	4.56	%
Critical Slope	0.00515	ft/ft

Cross Section for D2

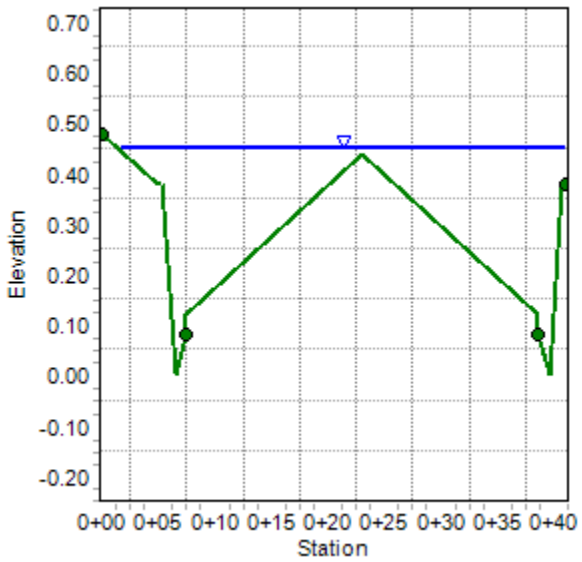
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.56	%
Normal Depth	0.45	ft
Discharge	42.00	ft³/s

Cross Section Image



Worksheet for D3

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.56	%
Discharge	18.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+05.38	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.12
0+23.00	0.44
0+38.50	0.12
0+38.50	0.08
0+39.50	0.00
0+40.62	0.38
0+41.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+07.50, 0.08)	0.013
(0+07.50, 0.08)	(0+38.50, 0.08)	0.016
(0+38.50, 0.08)	(0+41.00, 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 D3

Results

Normal Depth		0.36	ft
Elevation Range	0.00 to 0.48 ft		
Flow Area		3.75	ft²
Wetted Perimeter		27.36	ft
Hydraulic Radius		0.14	ft
Top Width		27.15	ft
Normal Depth		0.36	ft
Critical Depth		0.46	ft
Critical Slope		0.00628	ft/ft
Velocity		4.79	ft/s
Velocity Head		0.36	ft
Specific Energy		0.72	ft
Froude Number		2.27	
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	0.36	ft
Critical Depth	0.46	ft
Channel Slope	3.56	%
Critical Slope	0.00628	ft/ft

Cross Section for D3

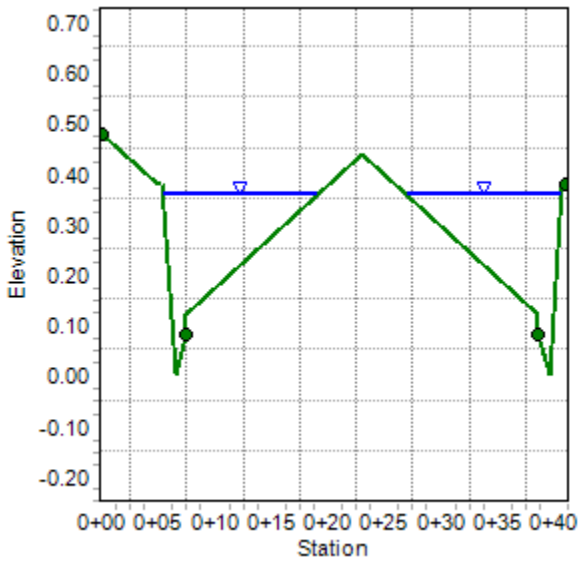
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.56	%
Normal Depth	0.36	ft
Discharge	18.00	ft³/s

Cross Section Image



Worksheet for E1 Half Street

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.50	%
Discharge	7.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+05.38	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.12
0+23.00	0.44

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+07.50, 0.08)	0.013
(0+07.50, 0.08)	(0+23.00, 0.44)	0.016

Options

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

Results

Normal Depth	0.45	ft
Elevation Range	0.00 to 0.48 ft	
Flow Area	3.44	ft²
Wetted Perimeter	21.52	ft
Hydraulic Radius	0.16	ft

Worksheet for E1 Half Street

Results

Top Width		21.41	ft
Normal Depth		0.45	ft
Critical Depth		0.43	ft
Critical Slope		0.00635	ft/ft
Velocity		2.03	ft/s
Velocity Head		0.06	ft
Specific Energy		0.51	ft
Froude Number		0.89	
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	0.45	ft
Critical Depth	0.43	ft
Channel Slope	0.50	%
Critical Slope	0.00635	ft/ft

Cross Section for E1 Half Street

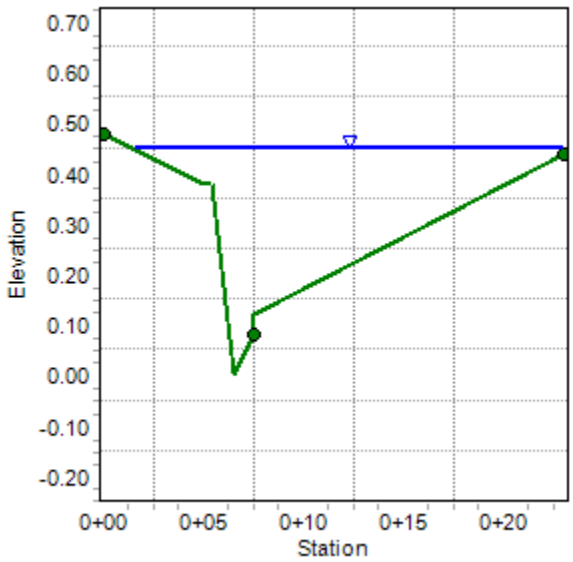
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.50	%
Normal Depth	0.45	ft
Discharge	7.00	ft³/s

Cross Section Image



Worksheet for F1 (Min Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.50	%
Discharge	30.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+05.38	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.12
0+23.00	0.44
0+38.50	0.12
0+38.50	0.08
0+39.50	0.00
0+40.62	0.38
0+41.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+07.50, 0.08)	0.013
(0+07.50, 0.08)	(0+38.50, 0.08)	0.016
(0+38.50, 0.08)	(0+41.00, 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 F1 (Min Slope)

Results

Normal Depth		0.42	ft
Elevation Range	0.00 to 0.48 ft		
Flow Area		5.73	ft²
Wetted Perimeter		36.43	ft
Hydraulic Radius		0.16	ft
Top Width		36.17	ft
Normal Depth		0.42	ft
Critical Depth		0.54	ft
Critical Slope		0.00556	ft/ft
Velocity		5.23	ft/s
Velocity Head		0.43	ft
Specific Energy		0.85	ft
Froude Number		2.32	
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	0.42	ft
Critical Depth	0.54	ft
Channel Slope	3.50	%
Critical Slope	0.00556	ft/ft

Cross Section for F1 (Min Slope)

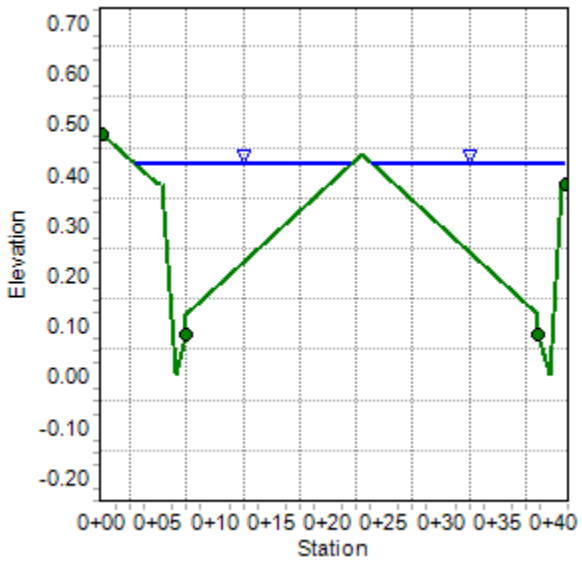
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.50	%
Normal Depth	0.42	ft
Discharge	30.00	ft³/s

Cross Section Image



Worksheet for F1 (Max Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.88	%
Discharge	30.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+05.38	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.12
0+23.00	0.44
0+38.50	0.12
0+38.50	0.08
0+39.50	0.00
0+40.62	0.38
0+41.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+07.50, 0.08)	0.013
(0+07.50, 0.08)	(0+38.50, 0.08)	0.016
(0+38.50, 0.08)	(0+41.00, 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 F1 (Max Slope)

Results

Normal Depth		0.40	ft
Elevation Range	0.00 to 0.48 ft		
Flow Area		5.02	ft²
Wetted Perimeter		33.38	ft
Hydraulic Radius		0.15	ft
Top Width		33.14	ft
Normal Depth		0.40	ft
Critical Depth		0.54	ft
Critical Slope		0.00559	ft/ft
Velocity		5.98	ft/s
Velocity Head		0.56	ft
Specific Energy		0.96	ft
Froude Number		2.71	
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	0.40	ft
Critical Depth	0.54	ft
Channel Slope	4.88	%
Critical Slope	0.00559	ft/ft

Cross Section for F1 (Max Slope)

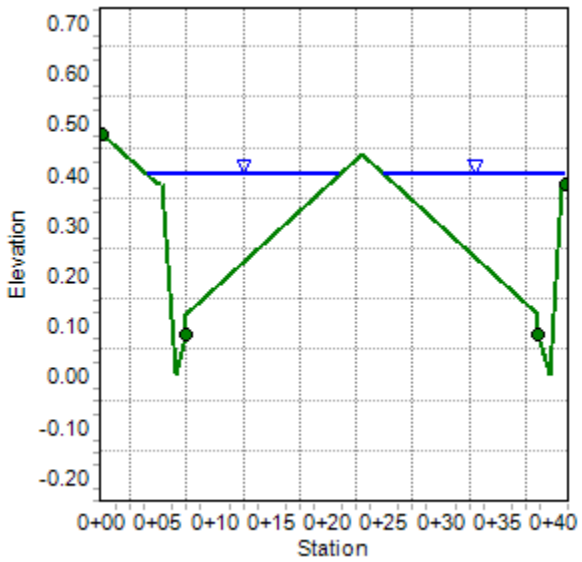
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.88	%
Normal Depth	0.40	ft
Discharge	30.00	ft³/s

Cross Section Image



Worksheet for F2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.50	%
Discharge	48.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+05.38	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.12
0+23.00	0.44
0+38.50	0.12
0+38.50	0.08
0+39.50	0.00
0+40.62	0.38
0+41.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+07.50, 0.08)	0.013
(0+07.50, 0.08)	(0+38.50, 0.08)	0.016
(0+38.50, 0.08)	(0+41.00, 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 F2

Results

Normal Depth		0.48	ft
Elevation Range	0.00 to 0.48 ft		
Flow Area		7.93	ft²
Wetted Perimeter		41.17	ft
Hydraulic Radius		0.19	ft
Top Width		40.85	ft
Normal Depth		0.48	ft
Critical Depth		0.63	ft
Critical Slope		0.00495	ft/ft
Velocity		6.05	ft/s
Velocity Head		0.57	ft
Specific Energy		1.05	ft
Froude Number		2.42	
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	0.48	ft
Critical Depth	0.63	ft
Channel Slope	3.50	%
Critical Slope	0.00495	ft/ft

Cross Section for F2

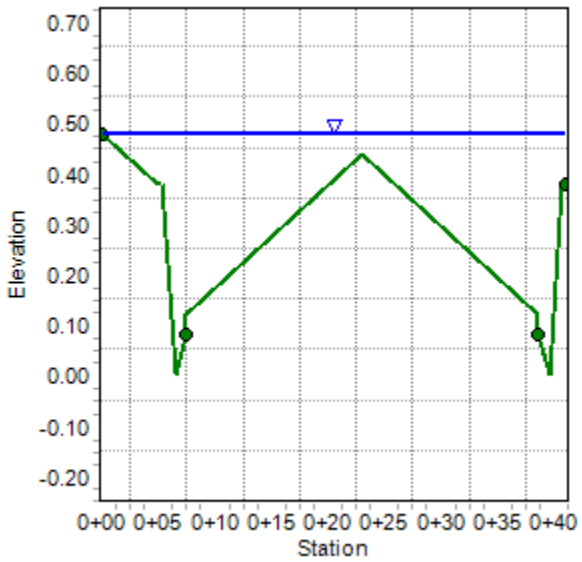
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.50	%
Normal Depth	0.48	ft
Discharge	48.00	ft³/s

Cross Section Image



Drainage Easement Sections

Worksheet for DE1 Drainage Easement (Normal Depth)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	16.00	%
Bottom Width	4.00	ft
Discharge	38.00	ft^3/s

Results

Normal Depth	0.42	ft
Flow Area	1.68	ft^2
Wetted Perimeter	4.84	ft
Hydraulic Radius	0.35	ft
Top Width	4.00	ft
Critical Depth	1.41	ft
Critical Slope	0.00447	ft/ft
Velocity	22.59	ft/s
Velocity Head	7.93	ft
Specific Energy	8.35	ft
Froude Number	6.14	
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	0.42	ft
Critical Depth	1.41	ft
Channel Slope	16.00	%
Critical Slope	0.00447	ft/ft

Cross Section for DE1 Drainage Easement (Normal Depth)

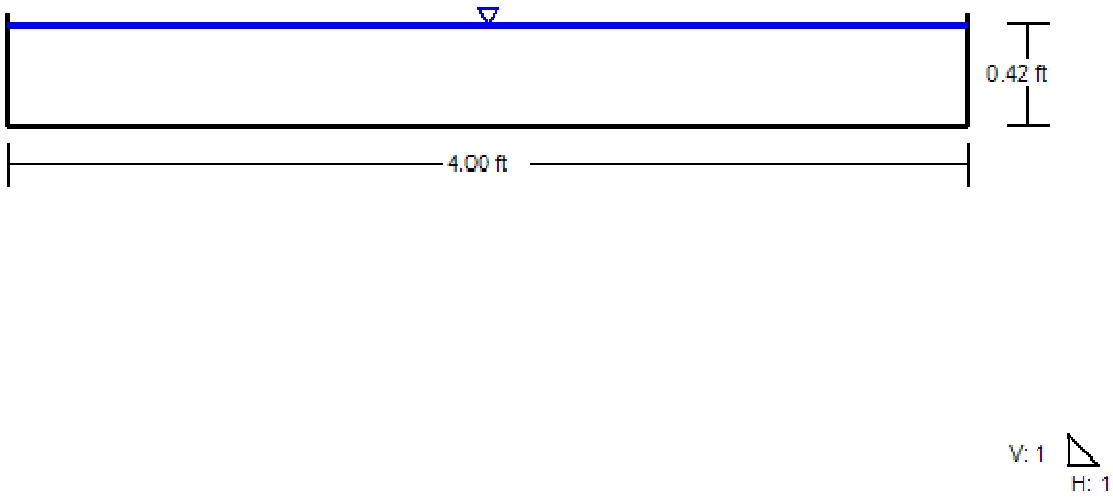
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	16.00	%
Normal Depth	0.42	ft
Bottom Width	4.00	ft
Discharge	38.00	ft³/s

Cross Section Image



Emergency Overflow Sections

Worksheet for EO1 Emergency Overflow

Project Description

Solve For	Headwater Elevation

Input Data

Discharge		48.00	ft^3/s
Crest Elevation		0.00	ft
Tailwater Elevation		0.00	ft
Crest Surface Type	Paved		
Crest Breadth		1.00	ft
Crest Length		36.00	ft

Results

Headwater Elevation	0.57	ft
Headwater Height Above Crest	0.57	ft
Tailwater Height Above Crest	0.00	ft
Weir Coefficient	3.09	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	3.09	US
Flow Area	20.57	ft^2
Velocity	2.33	ft/s
Wetted Perimeter	37.14	ft
Top Width	36.00	ft

Cross Section for EO1 Emergency Overflow

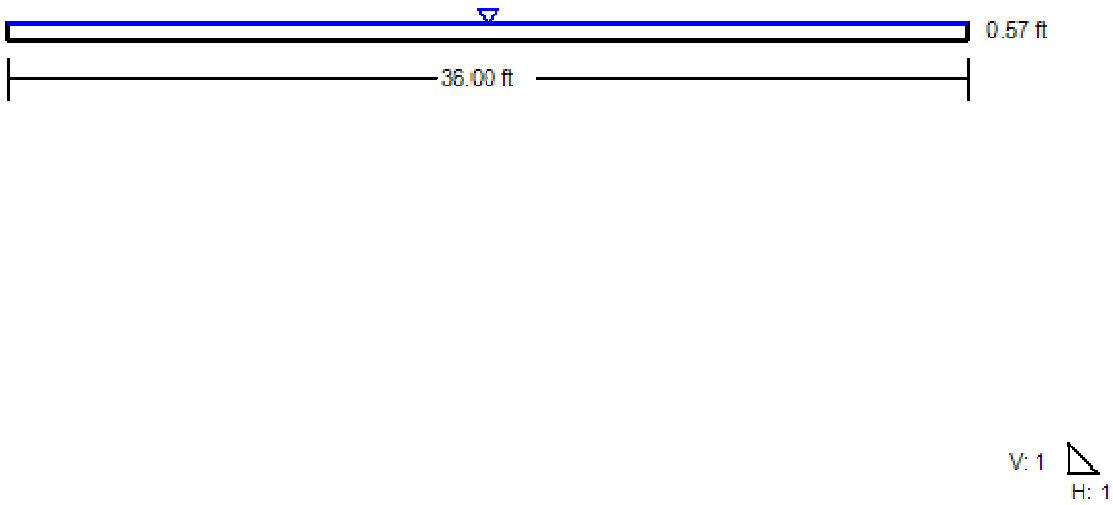
Project Description

Solve For	Headwater Elevation

Input Data

Discharge		48.00	ft³/s
Headwater Elevation		0.57	ft
Crest Elevation		0.00	ft
Tailwater Elevation		0.00	ft
Crest Surface Type	Paved		
Crest Breadth		1.00	ft
Crest Length		36.00	ft

Cross Section Image



APPENDIX C

Storm Drain Flow Computations

Drop Inlet Computations

Curb Inlet Sizing Computation

Project Name & Number:	**BZR2001: BLM270 PARCEL C-2 & C-3**	
Date:	**10/13/2020**	Westwood
By:	**CAA**	

Notes:		
Facility ID:	Facilities PC1 & PC2	
Drainage Condition:	Ultimate	
Source of Flow:	Q100 = ON3(A+B+C)	
Inlet Type:	Type CM2 (Continuous Grade)	
Inlet Length:	20.-ft	
Number of Grates	7	
Input:	**Variable:**	**Input:**
Street Flow (cfs)	Q	48.5
Longitudinal Slope (ft/ft)	S_o	0.0060
Manning's Coefficient	n	0.016
Street Flow Velocity (fps)	V	4.70
Street Flow Depth (ft)	D	0.79
Street Cross Slope (ft/ft)	S_x	0.02
Grate Width (ft)	W	1.5
Grate Depression (in)	D_g	2.0
Length of Grate (ft)	L_g	17.25
Length of Curb Opening (ft)	L_c	19.50
Clogging Factor - Grate (%)	CF_g	50%
Clogging Factor - Curb (%)	CF_c	50%
Effective Grate Length (ft)	L_{ge}	8.6
Effective Curb Opening Length (ft)	L_{ce}	9.75
Output (Grate):	**Equation:**	**Output (Grate):**
[1] R_f - Frontal Flow Factor	$1-0.09*(V-V_x)$ if $V>V_x$; else Frontal Flow Factor=1	1.00
[2] V_o - Splash Over Velocity (fps)	$V_x=p+q*Lg-r*L_{ge}^2+sy*L_{ge}^3$; where	40.92
	p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate)	
[1] E - Grate Flow Ratio	Frontal Flow/Side Flow	0.12
[2] Q_w - Frontal Flow (cfs)	$Q_w = Q[1-(1-(W/T))^{2.67}]$	5.98
[1] Q_s - Side Flow (cfs)	$Q_s = Q-Qw$	42.5
T - Side Flow Spread (ft)	$(D-D_g)/S_x$	31.17
[1] R_s - Side Flow Factor	$1/(1+(0.15*V^{1.8})/(S_x*L_{ge}^{2.3}))$	0.54
[1] Q_{gi} - Intercepted Flow (cfs)	$(R_f*E+R_s*(1-E))*Q$	28.9
Output (Curb):	**Equation:**	**Output (Curb):**
[1] S_e - Equivalent Cross Slope (ft/ft)	S_x+S_g*E	0.034
Q_{sx} - Remaining Flow After Grate Interception (cfs)	$Q-Q_{gi}$	19.611
S_g - Gutter Cross Slope (ft/ft)	D_g/W	0.111
[1] L_t - Effective Interception Length (ft)	$0.60*Q_{sx}^{0.42}*S_o^{0.30}*(1/n*S_e)^{0.6}$	41.24
[1] Q_{ci} - Intercepted Flow (cfs)	$(1-(1-L_{ce}/L_t)^{1.8})*Q_{sx}$	7.5
	or Q_{sx} if L_t is less than L_{ce}	
Output (Combination):	**Equation:**	**Output (Combination):**
Total Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	**36.5**
Bypass Flow (cfs)	Street Flow - Total Intercepted Flow	**12.0**

[1] Formula referenced from the CCRFCD Manual

[2] Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

Curb Inlet Sizing Computation

Project Name & Number:	**BZR2001: BLM270 PARCEL C-2 & C-3**	
Date:	**10/13/2020**	Westwood
By:	**CAA**	

Notes:		
Facility ID:	Facilities PC3 & PC4	
Drainage Condition:	Ultimate	
Source of Flow:	Q100 = Bypass of Facility PC1 & PC2 + ON3(D)	
Inlet Type:	Type CM2 (Continuous Grade)	
Inlet Length:	15.-ft	
Number of Grates	5	
Input:	**Variable:**	**Input:**
Street Flow (cfs)	Q	21.0
Longitudinal Slope (ft/ft)	S_o	0.0456
Manning's Coefficient	n	0.016
Street Flow Velocity (fps)	V	6.29
Street Flow Depth (ft)	D	0.45
Street Cross Slope (ft/ft)	S_x	0.02
Grate Width (ft)	W	1.5
Grate Depression (in)	D_g	2.0
Length of Grate (ft)	L_g	12.25
Length of Curb Opening (ft)	L_c	14.50
Clogging Factor - Grate (%)	CF_g	50%
Clogging Factor - Curb (%)	CF_c	50%
Effective Grate Length (ft)	L_{ge}	6.1
Effective Curb Opening Length (ft)	L_{ce}	7.25
Output (Grate):	**Equation:**	**Output (Grate):**
[1] R_f - Frontal Flow Factor	$1-0.09*(V-V_x)$ if $V>V_x$; else Frontal Flow Factor=1	1.00
[2] V_o - Splash Over Velocity (fps)	$V_x=p+q*Lg-r*L_{ge}^2+sy*L_{ge}^3$; where	15.33
	p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate)	
[1] E - Grate Flow Ratio	Frontal Flow/Side Flow	0.26
[2] Q_w - Frontal Flow (cfs)	$Q_w = Q[1-(1-(W/T))^{2.67}]$	5.42
[1] Q_s - Side Flow (cfs)	$Q_s = Q-Qw$	15.6
T - Side Flow Spread (ft)	$(D-D_g)/S_x$	14.17
[1] R_s - Side Flow Factor	$1/(1+(0.15*V^{1.8})/(S_x*L_{ge}^{2.3}))$	0.24
[1] Q_{gi} - Intercepted Flow (cfs)	$(R_f*E+R_s*(1-E))*Q$	9.2
Output (Curb):	**Equation:**	**Output (Curb):**
[1] S_e - Equivalent Cross Slope (ft/ft)	S_x+S_g*E	0.049
Q_{sx} - Remaining Flow After Grate Interception (cfs)	$Q-Q_{gi}$	11.848
S_g - Gutter Cross Slope (ft/ft)	D_g/W	0.111
[1] L_t - Effective Interception Length (ft)	$0.60*Q_{sx}^{0.42}*S_o^{0.30}*(1/n*S_e)^{0.6}$	49.18
[1] Q_{ci} - Intercepted Flow (cfs)	$(1-(1-L_{ce}/L_t)^{1.8})*Q_{sx}$	3.0
	or Q_{sx} if L_t is less than L_{ce}	
Output (Combination):	**Equation:**	**Output (Combination):**
Total Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	**12.0**
Bypass Flow (cfs)	Street Flow - Total Intercepted Flow	**9.0**

[1] Formula referenced from the CCRFCD Manual

[2] Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

Curb Inlet Sizing Computation

Project Name & Number:	**BZR2001: BLM270 PARCEL C-2 & C-3**
Date:	**10/13/2020**
By:	**CAA**

Westwood

Notes:		
Facility ID:	Facilities PC5	
Drainage Condition	Ultimate	
Source of Flow	Q100 = Bypass of Facilities PC3 & PC4 + ON3(E+F)	
Design Flow (cfs)	48.0	
Inlet Type:	Type CM2 (Sump)	
Inlet Length:	20.-ft	
Number of Grates:	7	
Input:	**Variable:**	**Input:**
Depth at Inlet (ft)	D	0.86
Grate Width (ft)	W	1.50
Length of Grate (ft)	L_g	17.25
Length of Curb Opening (ft)	L_c	19.50
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)	$2*W+L_g$	20.25
Adjusted Effective Weir Length (ft)	$2*(1-CF_g/100)*W+(1-CF_g/100)*L_g$	10.13
Grate Open Area (sf)	$W*L_g$	25.88
Adjusted Grate Open Area (sf)	Grate Open Area * $G_c*(1-CF_g/100)$	7.76
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: $W_g*(\text{Adj. Eff. Weir Length})*D^{1.5}$	24.2
	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	22.20
Adjusted Effective Weir Length (ft)	$L+1.8(1-CF_c/100)*W$	20.91
Curb Open Area (sf)	L*H	9.75
Adjusted Curb Open Area (sf)	Curb Open Area * $(1-CF_c/100)$	4.88
Controlling Flow Type (weir/orifice)	If D<H, weir, else orifice	orifice
Intercepted Flow (cfs)	weir: $W_c*(\text{Adj. Eff. Weir Length})*D^{1.5}$	24.25
	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)	**48.5**

WSPGW Model (MAINC)

Ultimate Condition WSPG Summary

Parcel C-2 & C-3 Main Storm Drain (MAINC.WSW): From Facility PC1 Connecting to Existing Facility P11

WSPG Station	Storm Drain Dimension	Invert Elevation (ft)	Q_{100} (cfs)	WSE (ft)	Velocity (ft/s)	FG Elevation	Facility Description	HGL Check[1]
1000.00	54" RCP	2998.12	145.00	3000.21	20.10	3004.93	Existing 68"x43" HERCP	OK
1097.04	54" RCP	3002.24	145.00	3004.77	15.78	3007.91	Connection to Existing	OK
1099.54	54" RCP	3002.35	145.00	3004.90	15.59	3007.91		OK
1124.18	54" RCP	3003.12	145.00	3005.89	14.13	3009.01		OK
1126.68	54" RCP	3003.20	145.00	3006.00	13.94	3009.01	FACILITY PC5	OK
1129.18	42" RCP	3003.27	97.00	3005.26	17.24	3009.01		OK
1227.74	42" RCP	3006.21	97.00	3008.41	15.23	3011.94		OK
1228.24	42" RCP	3006.22	97.00	3008.42	15.21	3011.94		OK
1228.74	42" RCP	3006.24	97.00	3008.44	15.20	3011.94		OK
1229.24	42" RCP	3006.25	97.00	3008.46	15.18	3011.94		OK
1229.74	42" RCP	3006.27	97.00	3008.47	15.16	3011.94		OK
1230.24	42" RCP	3006.28	97.00	3008.49	15.15	3011.94		OK
1344.52	42" RCP	3008.80	97.00	3011.83	10.95	3014.01	FACILITY PC4	OK
1347.02	42" RCP	3008.85	85.00	3012.75	8.83	3014.01		OK
1405.72	42" RCP	3009.90	85.00	3012.94	9.58	3015.23	FACILITY PC3	OK
1408.22	42" RCP	3009.95	73.00	3013.64	7.59	3015.23		OK
1538.99	42" RCP	3012.42	73.00	3014.91	9.97	3017.65		OK
1539.82	42" RCP	3012.44	73.00	3014.96	9.85	3017.65		OK
1540.66	42" RCP	3012.45	73.00	3015.02	9.67	3017.65		OK
1541.49	42" RCP	3012.47	73.00	3015.15	9.25	3017.65	FACILITY PC2	OK
1543.99	30" RCP	3012.55	36.50	3016.14	7.44	3017.65		OK
1572.35	30" RCP	3013.39	36.50	3016.37	7.44	3017.42		OK
1572.35	30" RCP	3013.39	36.50	3016.37	7.44	3017.42		OK

1 - 'HGL Check' reflects the minimum 1-ft below finished grade.

```
T1 BZR2001: BLM 270 PARCEL C-2 & C-3
T2 MAIN STORM DRAIN FOR PARCEL C-2 & C-3 (MAINC.WSW)
T3 FROM FACILITY PC1 CONNECTING TO EXISTING FACILITY P11
SO   1000.0002998.120 54                          2999.405
R    1097.0403002.244 54      .013                                        9.0   1
R    1099.5403002.350 54      .013                                        8.0
R    1124.1803003.122 54      .013                                        9.0
R    1126.6803003.200 54      .013                                        8.0
JX   1129.1803003.274 42 30   .013   48.0           3004.200         46.0
R    1227.7403006.206 42      .013                                       15.0
R    1228.2403006.221 42      .013                                       15.0
R    1228.7403006.235 42      .013                                       15.0
R    1229.2403006.250 42      .013                                       15.0
R    1229.7403006.265 42      .013                                       15.0
R    1230.2403006.280 42      .013                                       15.0
R    1344.5203008.800 42      .013                                        0.0
JX   1347.0203008.845 42 18   .013   12.0           3009.100         56.0
R    1405.7203009.900 42      .013                                        0.0
JX   1408.2203009.947 42 18   .013   12.0           3010.200         45.0
R    1538.9903012.423 42      .013                                       12.0
R    1539.8233012.438 42      .013                                       12.0
R    1540.6573012.454 42      .013                                       12.0
R    1541.4903012.470 42      .013                                       11.0
JX   1543.9903012.545 30 30   .013   36.5           3012.470         42.0
R    1572.3503013.390 30      .013                                        0.0
SH   1572.3503013.390 30
CD  18  4   1   0.000   1.500    0.000 0.000 0.000  0.0000.00  0.00
CD  24  4   1   0.000   2.000    0.000 0.000 0.000  0.0000.00  0.00
CD  30  4   1   0.000   2.500    0.000 0.000 0.000  0.0000.00  0.00
CD  36  4   1   0.000   3.000    0.000 0.000 0.000  0.0000.00  0.00
CD  42  4   1   0.000   3.500    0.000 0.000 0.000  0.0000.00  0.00
CD  48  4   1   0.000   4.000    0.000 0.000 0.000  0.0000.00  0.00
CD  54  4   1   0.000   4.500    0.000 0.000 0.000  0.0000.00  0.00
Q            36.500
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FILE: MAINC.WSW                          W S P G W  - EDIT LISTING - Version 14.10              Date:10-13-2020  Time: 2:39:44
                                   WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING                                PAGE    1
 CARD  SECT  CHN   NO OF  AVE PIER  HEIGHT 1  BASE    ZL    ZR   INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)  Y(6)  Y(7)  Y(8)  Y(9)  Y(10)
 CODE   NO   TYPE PIER/PIP WIDTH    DIAMETER  WIDTH              DROP

 CD     18    4      1             1.500
 CD     24    4      1             2.000
 CD     30    4      1             2.500
 CD     36    4      1             3.000
 CD     42    4      1             3.500
 CD     48    4      1             4.000
 CD     54    4      1             4.500
                                                W S P G W                                                          PAGE NO   1
                              WATER SURFACE PROFILE - TITLE CARD LISTING
HEADING LINE NO 1 IS -
                                BZR2001: BLM 270 PARCEL C-2 & C-3
HEADING LINE NO 2 IS -
                                MAIN STORM DRAIN FOR PARCEL C-2 & C-3 (MAINC.WSW)
HEADING LINE NO 3 IS -
                                FROM FACILITY PC1 CONNECTING TO EXISTING FACILITY P11
                                                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 2998.120   54                                      2999.405
 ELEMENT NO   2 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                                1097.040 3002.244   54              .013                           .000     .000     9.000     1
 ELEMENT NO   3 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                                1099.540 3002.350   54              .013                           .000     .000     8.000     0
 ELEMENT NO   4 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                                1124.180 3003.122   54              .013                           .000     .000     9.000     0
 ELEMENT NO   5 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                                1126.680 3003.200   54              .013                           .000     .000     8.000     0
 ELEMENT NO   6 IS A JUNCTION          *         *     *     *                 *                  *                *
                     U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                                1129.180 3003.274   42    30     0   .013    48.000      .000  3004.200      .000  46.000     .000
                                                                                                          RADIUS    ANGLE
                                                                                                            .000    .000
 ELEMENT NO   7 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                                1227.740 3006.206   42              .013                           .000     .000    15.000     0
 ELEMENT NO   8 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                                1228.240 3006.221   42              .013                           .000     .000    15.000     0
 ELEMENT NO   9 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                                1228.740 3006.235   42              .013                           .000     .000    15.000     0
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ELEMENT NO  10 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           1229.240 3006.250   42              .013                           .000     .000    15.000     0
ELEMENT NO  11 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           1229.740 3006.265   42              .013                           .000     .000    15.000     0
ELEMENT NO  12 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           1230.240 3006.280   42              .013                           .000     .000    15.000     0
                                                W S P G W                                                                PAGE NO   3
                      WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  13 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           1344.520 3008.800   42              .013                           .000     .000      .000     0
ELEMENT NO  14 IS A JUNCTION         *         *     *     *                *                  *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           1347.020 3008.845   42    18     0   .013    12.000      .000  3009.100      .000  56.000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000    .000
ELEMENT NO  15 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           1405.720 3009.900   42              .013                           .000     .000      .000     0
ELEMENT NO  16 IS A JUNCTION         *         *     *     *                *                  *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           1408.220 3009.947   42    18     0   .013    12.000      .000  3010.200      .000  45.000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000    .000
ELEMENT NO  17 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           1538.990 3012.423   42              .013                           .000     .000    12.000     0
ELEMENT NO  18 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           1539.823 3012.438   42              .013                           .000     .000    12.000     0
ELEMENT NO  19 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           1540.657 3012.454   42              .013                           .000     .000    12.000     0
ELEMENT NO  20 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           1541.490 3012.470   42              .013                           .000     .000    11.000     0
ELEMENT NO  21 IS A JUNCTION         *         *     *     *                *                  *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           1543.990 3012.545   30    30     0   .013    36.500      .000  3012.470      .000  42.000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000    .000
                                                W S P G W                                                                PAGE NO   4
                      WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  22 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           1572.350 3013.390   30              .013                           .000     .000      .000     0
ELEMENT NO  23 IS A SYSTEM HEADWORKS                 *                     *
                U/S DATA   STATION    INVERT  SECT                                W S ELEV
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1572.350 3013.390   30                                        .000
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BZR2001: BLM 270 PARCEL C-2 & C-3
MAIN STORM DRAIN FOR PARCEL C-2 & C-3 (MAINC.WSW)
FROM FACILITY PC1 CONNECTING TO EXISTING FACILITY P11

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
1000.000	2998.120	2.086	3000.206	145.00	20.10	6.27	3006.48	.00	3.54	4.49	4.500	.000	.00	1 .0
2.893	.0425					.0281	.08	2.09	2.79	1.86	.013	.00	.00	PIPE
1002.893	2998.243	2.092	3000.335	145.00	20.02	6.23	3006.56	.00	3.54	4.49	4.500	.000	.00	1 .0
30.055	.0425					.0263	.79	2.09	2.78	1.86	.013	.00	.00	PIPE
1032.949	2999.520	2.170	3001.691	145.00	19.09	5.66	3007.35	.00	3.54	4.50	4.500	.000	.00	1 .0
22.312	.0425					.0231	.52	2.17	2.59	1.86	.013	.00	.00	PIPE
1055.261	3000.469	2.253	3002.721	145.00	18.20	5.15	3007.87	.00	3.54	4.50	4.500	.000	.00	1 .0
17.235	.0425					.0204	.35	2.25	2.41	1.86	.013	.00	.00	PIPE
1072.496	3001.201	2.339	3003.540	145.00	17.36	4.68	3008.22	.00	3.54	4.50	4.500	.000	.00	1 .0
13.627	.0425					.0179	.24	2.34	2.24	1.86	.013	.00	.00	PIPE
1086.123	3001.780	2.430	3004.210	145.00	16.55	4.25	3008.46	.00	3.54	4.49	4.500	.000	.00	1 .0
10.917	.0425					.0158	.17	2.43	2.09	1.86	.013	.00	.00	PIPE
1097.040	3002.244	2.526	3004.770	145.00	15.78	3.87	3008.64	.00	3.54	4.47	4.500	.000	.00	1 .0
2.500	.0425					.0146	.04	2.53	1.94	1.86	.013	.00	.00	PIPE
1099.540	3002.350	2.551	3004.902	145.00	15.59	3.77	3008.67	.00	3.54	4.46	4.500	.000	.00	1 .0
.945	.0313					.0143	.01	2.55	1.90	2.03	.013	.00	.00	PIPE
1100.485	3002.380	2.557	3004.937	145.00	15.54	3.75	3008.69	.00	3.54	4.46	4.500	.000	.00	1 .0
13.328	.0313					.0134	.18	2.56	1.89	2.03	.013	.00	.00	PIPE

BZR2001: BLM 270 PARCEL C-2 & C-3
MAIN STORM DRAIN FOR PARCEL C-2 & C-3 (MAINC.WSW)
FROM FACILITY PC1 CONNECTING TO EXISTING FACILITY P11

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
1113.813	3002.797	2.660	3005.457	145.00	14.82	3.41	3008.87	.00	3.54	4.42	4.500	.000	.00	1 .0
10.367	.0313					.0119	.12	2.66	1.76	2.03	.013	.00	.00	PIPE
1124.180	3003.122	2.768	3005.890	145.00	14.13	3.10	3008.99	.00	3.54	4.38	4.500	.000	.00	1 .0
2.500	.0312					.0110	.03	2.77	1.63	2.03	.013	.00	.00	PIPE
1126.680	3003.200	2.800	3006.000	145.00	13.94	3.02	3009.02	.00	3.54	4.36	4.500	.000	.00	1 .0
JUNCT STR	.0296					.0177	.04	2.80	1.59		.013	.00	.00	PIPE
1129.180	3003.274	1.984	3005.258	97.00	17.24	4.62	3009.87	.00	3.03	3.47	3.500	.000	.00	1 .0
34.984	.0297					.0237	.83	1.98	2.39	1.87	.013	.00	.00	PIPE
1164.164	3004.315	2.031	3006.346	97.00	16.75	4.36	3010.70	.00	3.03	3.45	3.500	.000	.00	1 .0
38.088	.0297					.0215	.82	2.03	2.28	1.87	.013	.00	.00	PIPE
1202.252	3005.448	2.114	3007.561	97.00	15.97	3.96	3011.52	.00	3.03	3.42	3.500	.000	.00	1 .0
25.488	.0297					.0190	.49	2.11	2.11	1.87	.013	.00	.00	PIPE
1227.740	3006.206	2.201	3008.407	97.00	15.23	3.60	3012.01	.00	3.03	3.38	3.500	.000	.00	1 .0
.500	.0298					.0179	.01	2.20	1.96	1.87	.013	.00	.00	PIPE
1228.240	3006.221	2.203	3008.424	97.00	15.21	3.59	3012.02	.00	3.03	3.38	3.500	.000	.00	1 .0
.500	.0283					.0178	.01	2.20	1.95	1.90	.013	.00	.00	PIPE
1228.740	3006.235	2.204	3008.439	97.00	15.20	3.59	3012.03	.00	3.03	3.38	3.500	.000	.00	1 .0
.500	.0298					.0178	.01	2.20	1.95	1.87	.013	.00	.00	PIPE

BZR2001: BLM 270 PARCEL C-2 & C-3
MAIN STORM DRAIN FOR PARCEL C-2 & C-3 (MAINC.WSW)
FROM FACILITY PC1 CONNECTING TO EXISTING FACILITY P11

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
1229.240	3006.250	2.206	3008.457	97.00	15.18	3.58	3012.03	.00	3.03	3.38	3.500	.000	.00	1 .0
.500	.0298					.0177	.01	2.21	1.95	1.87	.013	.00	.00	PIPE
1229.740	3006.265	2.209	3008.473	97.00	15.16	3.57	3012.04	.00	3.03	3.38	3.500	.000	.00	1 .0
.500	.0303					.0177	.01	2.21	1.94	1.86	.013	.00	.00	PIPE
1230.240	3006.280	2.211	3008.491	97.00	15.15	3.56	3012.05	.00	3.03	3.38	3.500	.000	.00	1 .0
36.248	.0221					.0168	.61	2.21	1.94	2.05	.013	.00	.00	PIPE
1266.488	3007.080	2.285	3009.365	97.00	14.58	3.30	3012.66	.00	3.03	3.33	3.500	.000	.00	1 .0
29.223	.0221					.0152	.44	2.29	1.82	2.05	.013	.00	.00	PIPE
1295.711	3007.724	2.384	3010.107	97.00	13.90	3.00	3013.11	.00	3.03	3.26	3.500	.000	.00	1 .0
19.515	.0221					.0135	.26	2.38	1.67	2.05	.013	.00	.00	PIPE
1315.226	3008.154	2.489	3010.644	97.00	13.25	2.73	3013.37	.00	3.03	3.17	3.500	.000	.00	1 .0
13.334	.0221					.0121	.16	2.49	1.54	2.05	.013	.00	.00	PIPE
1328.560	3008.448	2.604	3011.052	97.00	12.64	2.48	3013.53	.00	3.03	3.05	3.500	.000	.00	1 .0
8.877	.0221					.0108	.10	2.60	1.40	2.05	.013	.00	.00	PIPE
1337.437	3008.644	2.730	3011.374	97.00	12.05	2.25	3013.63	.00	3.03	2.90	3.500	.000	.00	1 .0
5.251	.0221					.0098	.05	2.73	1.27	2.05	.013	.00	.00	PIPE
1342.688	3008.760	2.870	3011.630	97.00	11.49	2.05	3013.68	.00	3.03	2.69	3.500	.000	.00	1 .0
1.832	.0221					.0089	.02	2.87	1.14	2.05	.013	.00	.00	PIPE

Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date:10-13-2020 Time: 2:39:46

BZR2001: BLM 270 PARCEL C-2 & C-3
MAIN STORM DRAIN FOR PARCEL C-2 & C-3 (MAINC.WSW)
FROM FACILITY PC1 CONNECTING TO EXISTING FACILITY P11

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

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        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-      -|-      -|-     -|
 L/Elem  |Ch Slope |         |         |         |         SF Ave|    HF    |SE Dpth|Froude N|Norm Dp |  "N"   | X-Fall|  ZR   |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****  |*******
         |         |        |         |         |               |         |       |        |        |       |       |       |
 1344.520  3008.800    3.033  3011.833     97.00   10.95    1.86  3013.70     .00    3.03     2.38    3.500     .000   .00   1   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-      -|-      -|-     -|
JUNCT STR   .0180                                        .0078      .02    3.03    1.00             .013       .00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |       |       |
 1347.020  3008.845    3.901  3012.746     85.00    8.83    1.21  3013.96     .00    2.87      .00    3.500     .000   .00   1   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-      -|-      -|-     -|
   36.992    .0180                                        .0071      .26     3.90     .00    2.02    .013       .00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |       |       |
 1384.012  3009.510    3.500  3013.010     85.00    8.83    1.21  3014.22     .00    2.87      .00    3.500     .000   .00   1   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-      -|-      -|-     -|
   17.844    .0180                                        .0066      .12     3.50     .00    2.02    .013       .00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |       |       |
 1401.856  3009.831    3.176  3013.006     85.00    9.27    1.33  3014.34     .00    2.87     2.03    3.500     .000   .00   1   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-      -|-      -|-     -|
    3.864    .0180                                        .0064      .02     3.18     .77    2.02    .013       .00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |       |       |
 1405.720  3009.900    3.038  3012.938     85.00    9.58    1.43  3014.36     .00    2.87     2.37    3.500     .000   .00   1   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-      -|-      -|-     -|
JUNCT STR   .0188                                        .0059      .01    3.04     .87             .013       .00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |       |       |
 1408.220  3009.947    3.688  3013.635     73.00    7.59     .89  3014.53     .00    2.68      .00    3.500     .000   .00   1   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-      -|-      -|-     -|
    4.749    .0189                                        .0053      .02     3.69     .00    1.81    .013       .00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |       |       |
 1412.969  3010.037    3.632  3013.668     73.00    7.59     .89  3014.56     .00    2.68      .00    3.500     .000   .00   1   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-      -|-      -|-     -|
HYDRAULIC JUMP
         |         |        |         |         |               |         |       |        |        |       |       |       |
 1412.969  3010.037    1.902  3011.939     73.00   13.66    2.90  3014.84     .00    2.68     3.49    3.500     .000   .00   1   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-      -|-      -|-     -|
   34.335    .0189                                        .0154      .53     1.90    1.95    1.81    .013       .00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |       |       |
 1447.303  3010.687    1.948  3012.635     73.00   13.27    2.73  3015.37     .00    2.68     3.48    3.500     .000   .00   1   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-      -|-      -|-     -|
   33.981    .0189                                        .0139      .47     1.95    1.86    1.81    .013       .00   .00  PIPE
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********************************************************************************************************************************** ********
         | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-      -|-      -|-     -|
 L/Elem  |Ch Slope |         |         |         |         SF Ave|    HF    |SE Dpth|Froude N|Norm Dp |  "N"   | X-Fall|  ZR   |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****  |*******
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         |         |        |         |         |              |         |       |        |       |       |       |
 1481.285  3011.330    2.026  3013.356     73.00   12.65    2.48  3015.84     .00    2.68     3.46    3.500     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   21.682    .0189                                        .0123      .27     2.03    1.73    1.81    .013       .00   .00  PIPE
         |         |        |         |         |              |         |       |        |       |       |       |
 1502.967  3011.741    2.107  3013.848     73.00   12.06    2.26  3016.11     .00    2.68     3.43    3.500     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   14.726    .0189                                        .0109      .16     2.11    1.60    1.81    .013       .00   .00  PIPE
         |         |        |         |         |              |         |       |        |       |       |       |
 1517.693  3012.020    2.194  3014.214     73.00   11.50    2.05  3016.27     .00    2.68     3.39    3.500     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   10.158    .0189                                        .0096      .10     2.19    1.48    1.81    .013       .00   .00  PIPE
         |         |        |         |         |              |         |       |        |       |       |       |
 1527.851  3012.212    2.286  3014.499     73.00   10.96    1.87  3016.37     .00    2.68     3.33    3.500     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    6.868    .0189                                        .0086      .06     2.29    1.37    1.81    .013       .00   .00  PIPE
         |         |        |         |         |              |         |       |        |       |       |       |
 1534.719  3012.342    2.385  3014.727     73.00   10.45    1.70  3016.42     .00    2.68     3.26    3.500     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    4.271    .0189                                        .0076      .03     2.38    1.26    1.81    .013       .00   .00  PIPE
         |         |        |         |         |              |         |       |        |       |       |       |
 1538.990  3012.423    2.491  3014.914     73.00    9.97    1.54  3016.46     .00    2.68     3.17    3.500     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
     .833    .0179                                        .0071      .01     2.49    1.16    1.84    .013       .00   .00  PIPE
         |         |        |         |         |              |         |       |        |       |       |       |
 1539.823  3012.438    2.520  3014.958     73.00    9.85    1.51  3016.46     .00    2.68     3.14    3.500     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
     .834    .0193                                        .0068      .01     2.52    1.13    1.80    .013       .00   .00  PIPE
         |         |        |         |         |              |         |       |        |       |       |       |
 1540.657  3012.454    2.563  3015.017     73.00    9.67    1.45  3016.47     .00    2.68     3.10    3.500     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
     .833    .0191                                        .0064      .01     2.56    1.09    1.80    .013       .00   .00  PIPE
         |         |        |         |         |              |         |       |        |       |       |       |
 1541.490  3012.470    2.676  3015.146     73.00    9.25    1.33  3016.47     .00    2.68     2.97    3.500     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
JUNCT STR   .0300                                        .0070      .02     2.68    1.00            .013       .00   .00  PIPE
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********************************************************************************************************************************** ********
         | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
 L/Elem  |Ch Slope |        |         |         |         SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|***** |*******
         |         |        |         |         |              |         |       |        |       |       |       |
 1543.990  3012.545    3.599  3016.144     36.50    7.44     .86  3017.00     .00    2.05      .00    2.500     .000   .00   1   .0
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
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   28.360    .0298                                        .0079      .22     3.60     .00    1.27    .013       .00   .00  PIPE
         |         |        |         |         |              |         |       |        |        |       |       |      |
 1572.350  3013.390    2.978  3016.368     36.50    7.44     .86  3017.23     .00    2.05      .00    2.500     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
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BZR2001: BLM 270 PARCEL C-2 & C-3

MAIN STORM DRAIN FOR PARCEL C-2 & C-3 (MAINC.WSW)

FROM FACILITY PC1 CONNECTING TO EXISTING FACILITY P11

```
   1000.00    .I         W       C    H                  E                                                          .    R

   1006.15    .I          W       C    H                  E                                                          .    R

   1012.31    .                                                                                                       .

   1018.46    .                                                                                                       .

   1024.62    .                                                                                                       .

   1030.77    .                                                                                                       .

   1036.93    .       I          W      C    H                E                                                          .    R

   1043.08    .                                                                                                       .

   1049.23    .                                                                                                       .

   1055.39    .            I           W     C    H               E                                                          .    R

   1061.54    .                                                                                                       .
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1067.70   .                                                                                  .
1073.85   .               I          W     C    H           E                                .   R
1080.01   .                                                                                  .
1086.16   .                  I          W     C    H          E                              .   R
1092.31   .                                                                                  .
1098.47   .                    I           W     C    H        E                              .   R
1104.62   .                     I           W    C    H        E                              .   R
1110.78   .                     I           W    C    H        E                              .   R
1116.93   .                       I            W   C     H       E                             .   R
1123.09   .                                                                                  .
1129.24   .                         I            W   C    H      E                             .   R
1135.39   .                         I             W   C    H      E                            .   JX
1141.55   .                         I         W    C  H              E                         .   R
1147.70   .                                                                                  .
1153.86   .                                                                                  .
1160.01   .                                                                                  .
1166.17   .                              I          W    C H             E                     .   R
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1172.32    .                                                                    .

1178.47    .                                                                    .

1184.63    .                                                                    .

1190.78    .                                                                    .

1196.94    .                                                                    .

1203.09    .                                I         W    C H            E     .    R

1209.25    .                                                                    .

1215.40    .                                                                    .

1221.55    .                                                                    .

1227.71    .                                                                    .

1233.86    .                                     I         W    C H          E     .    R

1240.02    .                                     I         W    C H          E     .    R

1246.17    .                                     I          W   C H          E     .    R

1252.33    .                                     I          W   C H          E     .    R

1258.48    .                                     I          W   C H          E     .    R

1264.63    .                                     I          W   C  H         E     .    R

1270.79    .                                         I          W   C  H         E     .    R
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1276.94    .                                                                  .
1283.10    .                                                                  .
1289.25    .                                                                  .
1295.41    .                                                                  .
1301.56    .                                I           W   C H         E     .    R
1307.72    .                                                                  .
1313.87    .                                                                  .
1320.02    .                                  I           W  C H        E    .    R
1326.18    .                                                                  .
1332.33    .                                    I           W C  H       E   .    R
1338.49    .                                     I            WC  H       E  .    R
1344.64    .                                     I             WC  H      E  .    R
1350.80    .                                     I              W  H      E  .    JX
1356.95    .                                      I             C  H W     E .    R
1363.10    .                                                                  .
1369.26    .                                                                  .
1375.41    .                                                                  .
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1381.57    .                                                                                  .
1387.72    .                                                I             C  H      E         .    R
1393.88    .                                                                                  .
1400.03    .                                                                                  .
1406.18    .                                                  I             CW H    E         .    R
1412.34    .                                                  I             CW H     E        .    JX
1418.49    .                                                  I            C    HW   E        .    R
1424.65    .                                                   I            C   HW    E       .    R
1430.80    .                                                   I         W   C   H      E     .    R
1436.96    .                                                                                  .
1443.11    .                                                                                  .
1449.26    .                                                       I         W   C    H     E .    R
1455.42    .                                                                                  .
1461.57    .                                                                                  .
1467.73    .                                                                                  .
1473.88    .                                                                                  .
1480.04    .                                                                                  .
```

```
1486.19   .                                                   I         W   C   H    E       .    R

1492.34   .                                                                                   .

1498.50   .                                                                                   .

1504.65   .                                                     I         W  C   H    E      .    R

1510.81   .                                                                                   .

1516.96   .                                                                                   .

1523.12   .                                                      I          W C    H  E      .    R

1529.27   .                                                       I          W C    H  E     .    R

1535.42   .                                                        I          W C   H  E     .    R

1541.58   .                                                        I           WC    H E     .    R

1547.73   .                                                        I            W    H  E    .    R

1553.89   .                                                         I           WC   H  E    .    R

1560.04   .                                                         I            W   H  E    .    JX

1566.20   .                                                         I         C H     W   E  .    R

1572.35   .                                                             I         C  H W    E.    R

         2998.120  3000.031  3001.941  3003.852  3005.763  3007.673  3009.584  3011.495  3013.405  3015.316  3017.227
```

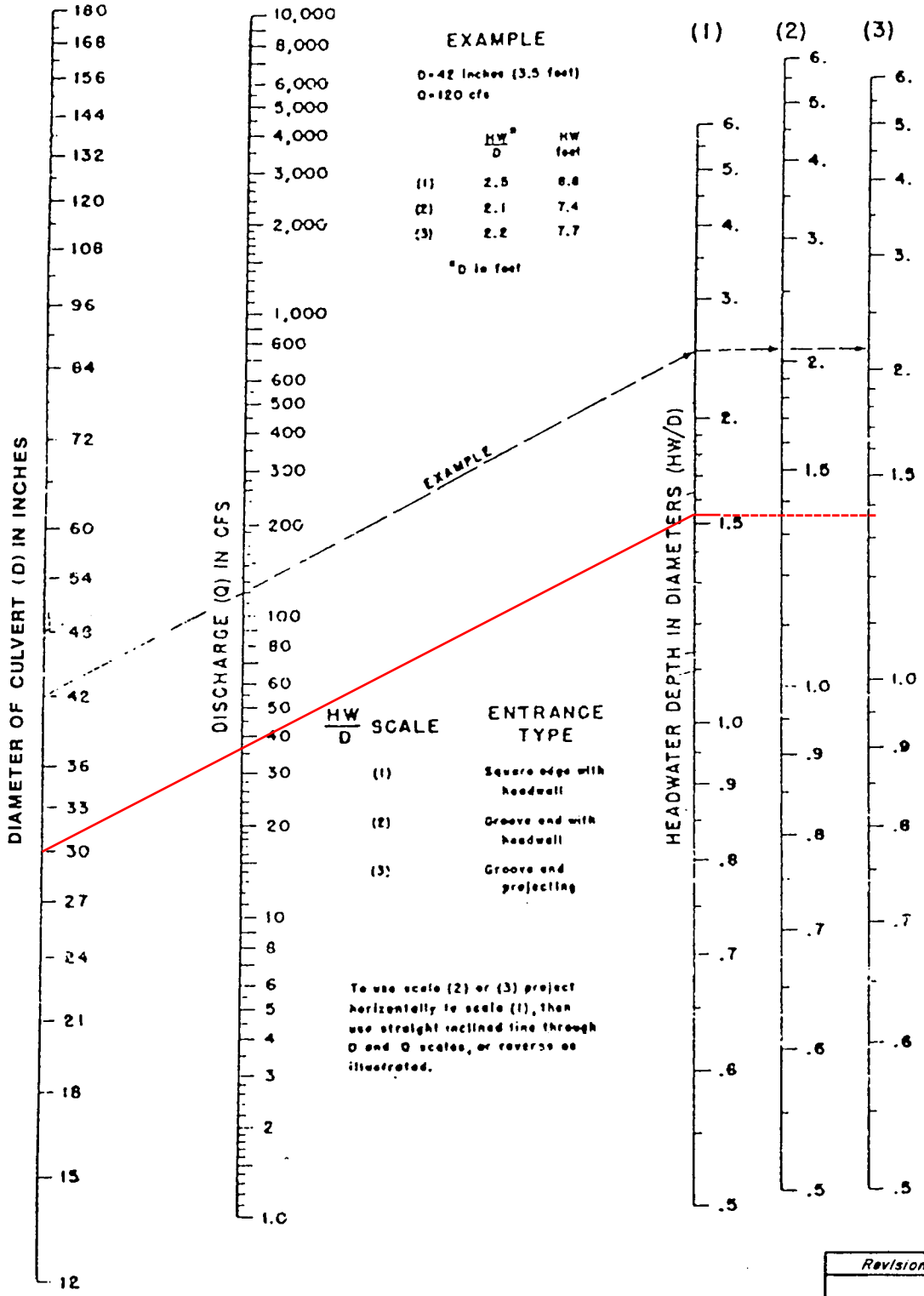
N O T E S

1. GLOSSARY
   I = INVERT ELEVATION
   C = CRITICAL DEPTH
   W = WATER SURFACE ELEVATION
   S = SUPER-ELEVATION
   H = HEIGHT OF CHANNEL
   E = ENERGY GRADE LINE
   X = CURVES CROSSING OVER
   B = BRIDGE ENTRANCE OR EXIT
   Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

Nomographs

NOMOGRAPH – INLET CONTROL RCP

Facilities PC1 & PC2: Q=36.5 CFS



HW/D	1.53
D	30
HW	3.8

Revision	Date

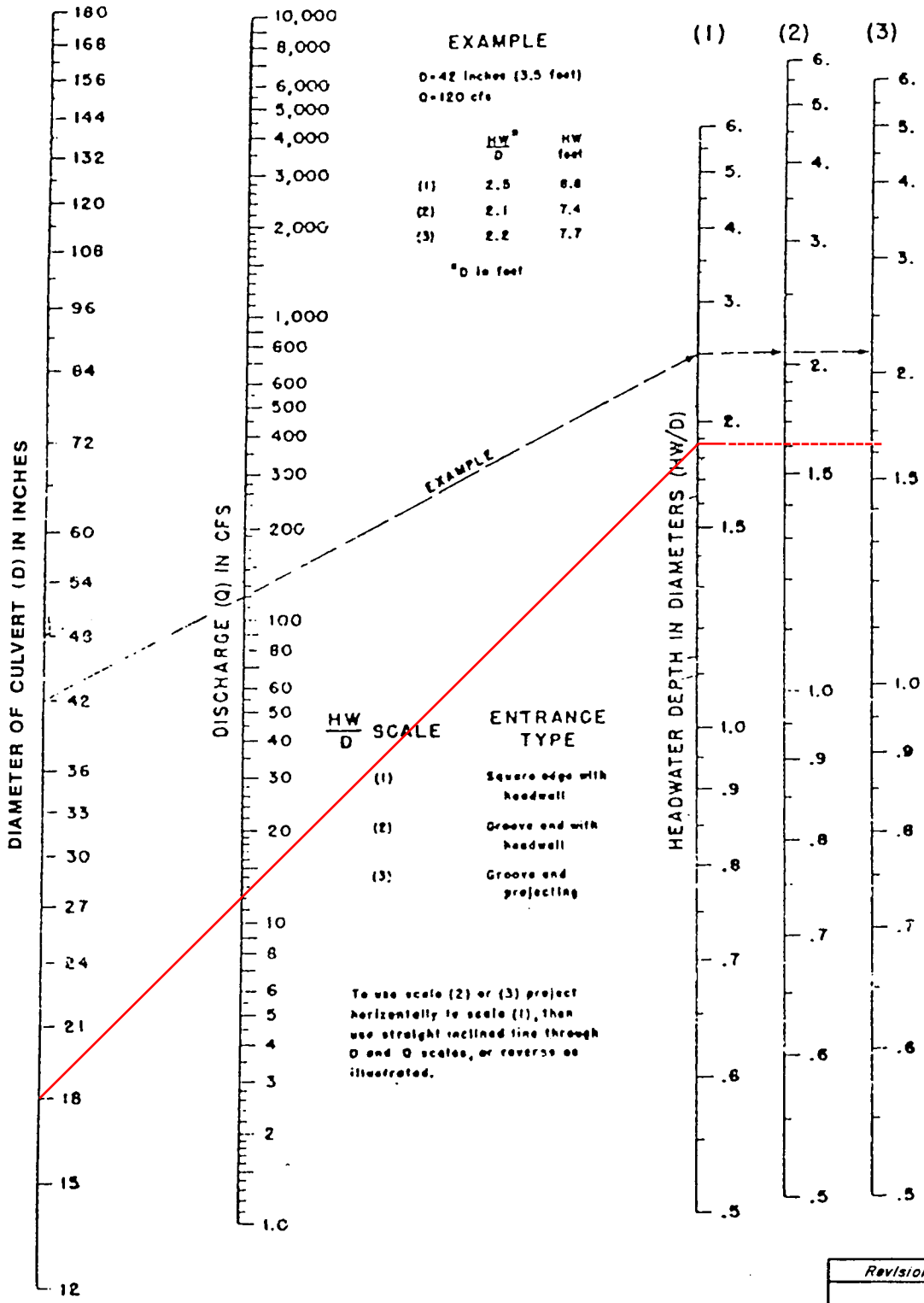
WRC ENGINEERING

REFERENCE:
USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

NOMOGRAPH – INLET CONTROL RCP

Facilities PC3 & PC4: Q=12 CFS



HW/D	1.88
D	18
HW	3.8

Revision	Date

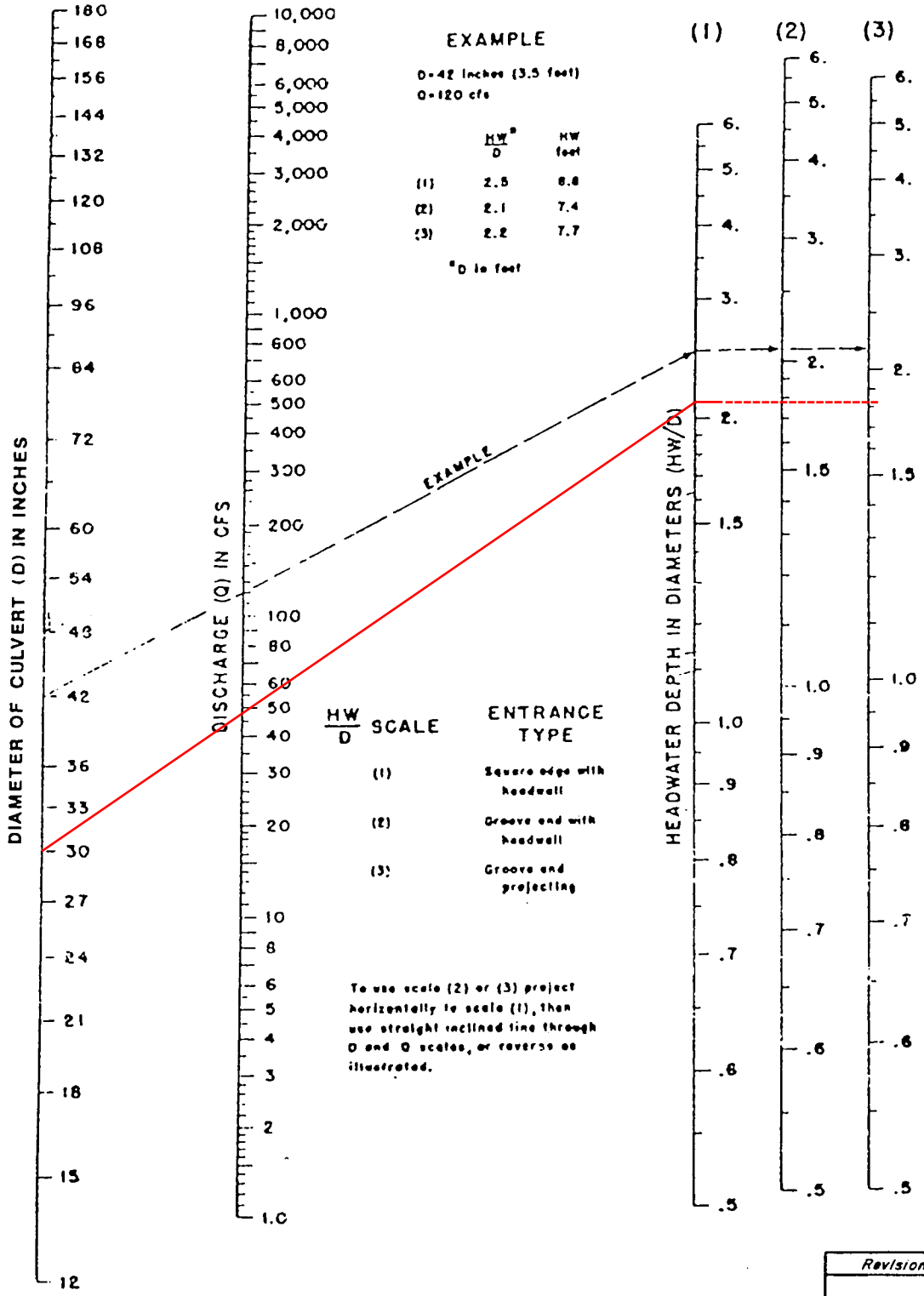
WRC ENGINEERING

REFERENCE:
USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

NOMOGRAPH – INLET CONTROL RCP

LATERAL 1: Q=48 CFS



HW/D	2.1
D	30
HW	3.8

Revision	Date

WRC ENGINEERING

REFERENCE:
USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

Lateral Loss

Project Name:	BLM270 Parcel C-2 & C-3
Project Number:	BZR2001
Date:	10/13/2020
By:	CAA

Westwood

STORM SEWER HYDRAULIC CALCULATIONS

CONDUIT DATA							FLOW DATA							LOSS	HGL		COMMENTS	
STATION		SIZE / TYPE	n	INVERTS		LENGTH	A	R	Φ	Q	V	H_V =	S_f	PIPE	PIPE		PRESS. FLOW?	OTHER
FROM	TO		Manning's Roughness	D / S ELEV.	U / S ELEV.		(FT^2)	(FT)		(CFS)	(FPS)	$V^2/2g$ (FT)	(FT/FT)	H_f (FT)	D/S HGL ELEV.	U/S HGL ELEV.		
1000	1012.84	ROUND 30" RCP	0.013	3012.47	3013.28	12.84	4.908738	0.625	0.004925	36.5	7.435719	0.858539	0.00789987	0.101	3016.14	3016.245	Yes	FACILITY PC2
1000	1012.04	ROUND 18" RCP	0.013	3009.90	3010.8	12.04	1.767146	0.375	0.004925	12	6.790611	0.716031	0.012997222	0.156	3013.64	3013.791	Yes	FACILITY PC3
1000	1027.25	ROUND 18" RCP	0.013	3008.80	3009.92	27.25	1.767146	0.375	0.004925	12	6.790611	0.716031	0.012997222	0.354	3012.746	3013.100	Yes	FACILITY PC4
1000	1010.01	ROUND 30" RCP	0.013	3004.20	3004.37	10.01	4.908738	0.625	0.004925	48	9.77848	1.484762	0.013662076	0.137	3006.00	3006.137	No	FACILITY PC5

$Sf = \Phi Hv / R^{1.33}$

$\Phi = 2g (n^2) / 2.21$

1 - Where pipes are not under pressure, assume U/S HGL is at top of pipe

APPENDIX D

Finished Floor Computations

BLM 270 PARCEL C-2 & C-3 FINISHED 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	C1	3025.83	3025.45	0.79	3027.03	3026.33	3027.7	OK	OK	
2	C1	3025.35	3024.97	0.79	3026.55	3025.85	3027.3	OK	OK	
3	C1	3024.93	3024.55	0.79	3026.13	3025.43	3026.8	OK	OK	
4	C1	3024.53	3024.15	0.79	3025.73	3025.03	3026.4	OK	OK	
5	C1	3024.13	3023.75	0.79	3025.33	3024.63	3026.0	OK	OK	
6	C1	3023.73	3023.35	0.79	3024.93	3024.23	3025.6	OK	OK	
7	C1	3023.33	3022.95	0.79	3024.53	3023.83	3025.2	OK	OK	
8	C1	3022.93	3022.55	0.79	3024.13	3023.43	3024.8	OK	OK	
9	C1	3022.51	3022.13	0.79	3023.71	3023.01	3024.4	OK	OK	
10	C1	3022.01	3021.63	0.79	3023.21	3022.51	3023.9	OK	OK	
11	C1	3021.51	3021.13	0.79	3022.71	3022.01	3023.4	OK	OK	
12	C1	3021.01	3020.63	0.79	3022.21	3021.51	3022.9	OK	OK	
13	C1	3020.51	3020.13	0.79	3021.71	3021.01	3022.4	OK	OK	
14	C1	3020.01	3019.63	0.79	3021.21	3020.51	3021.9	OK	OK	
15	C1	3019.51	3019.13	0.79	3020.71	3020.01	3021.4	OK	OK	
16	C1	3019.01	3018.63	0.79	3020.21	3019.51	3020.9	OK	OK	
17	C1	3018.51	3018.13	0.79	3019.71	3019.01	3020.4	OK	OK	
18	C1	3017.88	3017.50	0.79	3019.08	3018.38	3019.8	OK	OK	
19	D2	3017.24	3016.86	0.45	3017.76	3017.74	3019.1	OK	OK	
20	D2	3016.30	3015.92	0.45	3016.82	3016.80	3018.2	OK	OK	
21	D3	3015.32	3014.94	0.36	3015.66	3015.82	3017.2	OK	OK	
22	D3	3014.32	3013.94	0.36	3014.66	3014.82	3016.2	OK	OK	
23	D3	3013.32	3012.94	0.36	3013.66	3013.82	3015.2	OK	OK	
24	F2	3009.92	3009.54	0.48	3010.50	3010.42	3011.8	OK	OK	
25	F2	3011.10	3010.72	0.48	3011.68	3011.60	3013.0	OK	OK	
26	F2	3012.90	3012.52	0.48	3013.48	3013.40	3014.8	OK	OK	
27	F1	3014.84	3014.46	0.42	3015.30	3015.34	3016.7	OK	OK	
28	F1	3017.19	3016.81	0.42	3017.65	3017.69	3019.1	OK	OK	
29	F1	3019.87	3019.49	0.42	3020.33	3020.37	3021.8	OK	OK	
30	F1	3022.55	3022.17	0.42	3023.01	3023.05	3024.5	OK	OK	
31	F1	3025.23	3024.85	0.42	3025.69	3025.73	3027.1	OK	OK	
32	F1	3027.92	3027.54	0.42	3028.38	3028.42	3029.8	OK	OK	
33	F1	3030.60	3030.22	0.42	3031.06	3031.10	3032.5	OK	OK	
34	F1	3033.34	3032.96	0.42	3033.80	3033.84	3035.2	OK	OK	
35	F1	3036.02	3035.64	0.42	3036.48	3036.52	3037.9	OK	OK	
36	F1	3038.65	3038.27	0.42	3039.11	3039.15	3040.6	OK	OK	
37	F1	3041.33	3040.95	0.42	3041.79	3041.83	3043.2	OK	OK	
38	F1	3044.01	3043.63	0.42	3044.47	3044.51	3045.9	OK	OK	
39	F1	3046.69	3046.31	0.42	3047.15	3047.19	3048.6	OK	OK	
40	F1	3049.37	3048.99	0.42	3049.83	3049.87	3051.3	OK	OK	
41	F1	3052.05	3051.67	0.42	3052.51	3052.55	3054.0	OK	OK	
42	F1	3054.70	3054.32	0.42	3055.16	3055.20	3056.6	OK	OK	
43	F1	3056.67	3056.29	0.42	3057.13	3057.17	3058.6	OK	OK	
44	F1	3057.52	3057.14	0.42	3057.98	3058.02	3059.4	OK	OK	
45	F1	3057.50	3057.12	0.42	3057.96	3058.00	3059.4	OK	OK	
46	F1	3056.39	3056.01	0.42	3056.85	3056.89	3058.3	OK	OK	
47	F1	3054.25	3053.87	0.42	3054.71	3054.75	3056.2	OK	OK	
48	F1	3051.58	3051.20	0.42	3052.04	3052.08	3053.5	OK	OK	
49	F1	3048.90	3048.52	0.42	3049.36	3049.40	3050.8	OK	OK	
50	F1	3046.22	3045.84	0.42	3046.68	3046.72	3048.1	OK	OK	
51	F1	3043.54	3043.16	0.42	3044.00	3044.04	3045.4	OK	OK	
52	F1	3040.86	3040.48	0.42	3041.32	3041.36	3042.8	OK	OK	
53	F1	3038.18	3037.80	0.42	3038.64	3038.68	3040.1	OK	OK	
54	F1	3035.55	3035.17	0.42	3036.01	3036.05	3037.5	OK	OK	
55	F1	3032.87	3032.49	0.42	3033.33	3033.37	3034.8	OK	OK	
56	F1	3030.13	3029.75	0.42	3030.59	3030.63	3032.0	OK	OK	
57	F1	3027.45	3027.07	0.42	3027.91	3027.95	3029.4	OK	OK	
58	F1	3024.76	3024.38	0.42	3025.22	3025.26	3026.7	OK	OK	
59	F1	3022.08	3021.70	0.42	3022.54	3022.58	3024.0	OK	OK	
60	F1	3019.40	3019.02	0.42	3019.86	3019.90	3021.3	OK	OK	
61	F1	3016.72	3016.34	0.42	3017.18	3017.22	3018.6	OK	OK	
62	F1	3014.50	3014.12	0.42	3014.96	3015.00	3016.4	OK	OK	

BLM 270 PARCEL C-2 & C-3 FINISHED 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
63	D1	3018.49	3018.11	0.36	3018.83	3018.99	3020.3	OK	OK	
64	D1	3020.68	3020.30	0.36	3021.02	3021.18	3022.5	OK	OK	
65	D1	3023.26	3022.88	0.36	3023.60	3023.76	3025.1	OK	OK	
66	D1	3026.03	3025.65	0.36	3026.37	3026.53	3027.8	OK	OK	
67	D1	3028.81	3028.43	0.36	3029.15	3029.31	3030.6	OK	OK	
68	D1	3031.58	3031.20	0.36	3031.92	3032.08	3033.4	OK	OK	
69	D1	3034.35	3033.97	0.36	3034.69	3034.85	3036.2	OK	OK	
70	D1	3037.19	3036.81	0.36	3037.53	3037.69	3039.0	OK	OK	
71	D1	3039.96	3039.58	0.36	3040.30	3040.46	3041.8	OK	OK	
72	D1	3042.67	3042.29	0.36	3043.01	3043.17	3044.5	OK	OK	
73	D1	3045.44	3045.06	0.36	3045.78	3045.94	3047.2	OK	OK	
74	D1	3048.22	3047.84	0.36	3048.56	3048.72	3050.0	OK	OK	
75	D1	3050.99	3050.61	0.36	3051.33	3051.49	3052.8	OK	OK	
76	D1	3056.54	3056.16	0.36	3056.88	3057.04	3058.3	OK	OK	
77	D1	3058.80	3058.42	0.36	3059.14	3059.30	3060.6	OK	OK	
78	D1	3060.06	3059.68	0.36	3060.40	3060.56	3061.9	OK	OK	
79	D1	3060.27	3059.89	0.36	3060.61	3060.77	3062.2	OK	OK	
80	D1	3058.82	3058.44	0.36	3059.16	3059.32	3060.7	OK	OK	
81	D1	3056.57	3056.19	0.36	3056.91	3057.07	3058.5	OK	OK	
82	D1	3053.79	3053.41	0.36	3054.13	3054.29	3055.7	OK	OK	
83	D1	3051.02	3050.64	0.36	3051.36	3051.52	3052.9	OK	OK	
84	D1	3048.25	3047.87	0.36	3048.59	3048.75	3050.2	OK	OK	
85	D1	3045.47	3045.09	0.36	3045.81	3045.97	3047.4	OK	OK	
86	D1	3042.70	3042.32	0.36	3043.04	3043.20	3044.6	OK	OK	
87	D1	3039.99	3039.61	0.36	3040.33	3040.49	3041.9	OK	OK	
88	D1	3037.22	3036.84	0.36	3037.56	3037.72	3039.1	OK	OK	
89	D1	3034.38	3034.00	0.36	3034.72	3034.88	3036.3	OK	OK	
90	D1	3031.61	3031.23	0.36	3031.95	3032.11	3033.5	OK	OK	
91	D1	3028.84	3028.46	0.36	3029.18	3029.34	3030.7	OK	OK	
92	D1	3026.07	3025.69	0.36	3026.41	3026.57	3028.0	OK	OK	
93	D1	3023.29	3022.91	0.36	3023.63	3023.79	3025.2	OK	OK	
94	D1	3020.71	3020.33	0.36	3021.05	3021.21	3022.6	OK	OK	
95	D1	3018.52	3018.14	0.36	3018.86	3019.02	3020.4	OK	OK	
96	D1	3021.48	3021.10	0.36	3021.82	3021.98	3023.4	OK	OK	
97	D1	3023.92	3023.54	0.36	3024.26	3024.42	3025.8	OK	OK	
98	D1	3026.78	3026.40	0.36	3027.12	3027.28	3028.7	OK	OK	
99	D1	3029.68	3029.30	0.36	3030.02	3030.18	3031.6	OK	OK	
100	D1	3032.58	3032.20	0.36	3032.92	3033.08	3034.5	OK	OK	
101	D1	3035.48	3035.10	0.36	3035.82	3035.98	3037.4	OK	OK	
102	D1	3038.38	3038.00	0.36	3038.72	3038.88	3040.3	OK	OK	
103	D1	3041.34	3040.96	0.36	3041.68	3041.84	3043.2	OK	OK	
104	D1	3044.24	3043.86	0.36	3044.58	3044.74	3046.1	OK	OK	
105	D1	3047.08	3046.70	0.36	3047.42	3047.58	3049.0	OK	OK	
106	D1	3049.98	3049.60	0.36	3050.32	3050.48	3051.9	OK	OK	
107	D1	3052.88	3052.50	0.36	3053.22	3053.38	3054.8	OK	OK	
108	D1	3055.78	3055.40	0.36	3056.12	3056.28	3057.7	OK	OK	
109	D1	3058.69	3058.31	0.36	3059.03	3059.19	3060.6	OK	OK	
110	D1	3061.05	3060.67	0.36	3061.39	3061.55	3063.0	OK	OK	
111	D1	3062.34	3061.96	0.36	3062.68	3062.84	3064.2	OK	OK	
112	D1	3062.96	3062.58	0.36	3063.30	3063.46	3064.9	OK	OK	
113	D1	3062.82	3062.44	0.36	3063.16	3063.32	3064.6	OK	OK	
114	D1	3061.87	3061.49	0.36	3062.21	3062.37	3063.4	OK	OK	
115	D1	3060.09	3059.71	0.36	3060.43	3060.59	3061.4	OK	OK	
116	D1	3057.05	3056.67	0.36	3057.39	3057.55	3058.6	OK	OK	
117	D1	3053.86	3053.48	0.36	3054.20	3054.36	3055.7	OK	OK	
118	D1	3050.96	3050.58	0.36	3051.30	3051.46	3052.8	OK	OK	
119	D1	3047.77	3047.39	0.36	3048.11	3048.27	3049.9	OK	OK	
120	D1	3044.93	3044.55	0.36	3045.27	3045.43	3047.0	OK	OK	
121	D1	3041.74	3041.36	0.36	3042.08	3042.24	3044.1	OK	OK	
122	D1	3038.78	3038.40	0.36	3039.12	3039.28	3041.2	OK	OK	
123	D1	3035.88	3035.50	0.36	3036.22	3036.38	3038.3	OK	OK	
124	D1	3032.98	3032.60	0.36	3033.32	3033.48	3035.4	OK	OK	

BLM 270 PARCEL C-2 & C-3 FINISHED 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 $F.F._{\cdot min}$[3] (ft)	T/C + 6" $F.F._{\cdot min}$[4] (ft)	$F.F._{\cdot Design}$ (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
125	D1	3030.07	3029.69	0.36	3030.41	3030.57	3032.5	OK	OK	
126	D1	3027.17	3026.79	0.36	3027.51	3027.67	3029.6	OK	OK	
127	D1	3024.30	3023.92	0.36	3024.64	3024.80	3026.7	OK	OK	
128	D1	3021.78	3021.40	0.36	3022.12	3022.28	3024.1	OK	OK	
129	D1	3024.32	3023.94	0.36	3024.66	3024.82	3026.6	OK	OK	
130	D1	3023.78	3023.40	0.36	3024.12	3024.28	3025.6	OK	OK	
131	D1	3025.61	3025.23	0.36	3025.95	3026.11	3027.4	OK	OK	
132	D1	3027.77	3027.39	0.36	3028.11	3028.27	3029.6	OK	OK	
133	D1	3030.13	3029.75	0.36	3030.47	3030.63	3031.9	OK	OK	
134	D1	3032.49	3032.11	0.36	3032.83	3032.99	3034.3	OK	OK	
135	D1	3034.86	3034.48	0.36	3035.20	3035.36	3036.7	OK	OK	
136	D1	3037.22	3036.84	0.36	3037.56	3037.72	3039.0	OK	OK	
137	D1	3039.59	3039.21	0.36	3039.93	3040.09	3041.4	OK	OK	
138	D1	3042.00	3041.62	0.36	3042.34	3042.50	3043.8	OK	OK	
139	D1	3044.36	3043.98	0.36	3044.70	3044.86	3046.2	OK	OK	
140	D1	3046.68	3046.30	0.36	3047.02	3047.18	3048.5	OK	OK	
141	D1	3049.04	3048.66	0.36	3049.38	3049.54	3050.8	OK	OK	
142	D1	3051.41	3051.03	0.36	3051.75	3051.91	3053.2	OK	OK	
143	D1	3053.77	3053.39	0.36	3054.11	3054.27	3055.6	OK	OK	
144	D1	3056.13	3055.75	0.36	3056.47	3056.63	3057.9	OK	OK	
145	D1	3058.50	3058.12	0.36	3058.84	3059.00	3060.3	OK	OK	
146	D1	3060.78	3060.40	0.36	3061.12	3061.28	3062.6	OK	OK	
147	D1	3062.52	3062.14	0.36	3062.86	3063.02	3064.3	OK	OK	
148	D1	3063.63	3063.25	0.36	3063.97	3064.13	3065.4	OK	OK	
149	D1	3064.38	3064.00	0.36	3064.72	3064.88	3066.2	OK	OK	
150	D1	3064.05	3063.67	0.36	3064.39	3064.55	3065.9	OK	OK	
151	D1	3062.21	3061.83	0.36	3062.55	3062.71	3064.0	OK	OK	
152	D1	3060.35	3059.97	0.36	3060.69	3060.85	3062.2	OK	OK	
153	D1	3058.01	3057.63	0.36	3058.35	3058.51	3059.8	OK	OK	
154	D1	3055.65	3055.27	0.36	3055.99	3056.15	3057.5	OK	OK	
155	D1	3053.28	3052.90	0.36	3053.62	3053.78	3055.1	OK	OK	
156	D1	3050.92	3050.54	0.36	3051.26	3051.42	3052.7	OK	OK	
157	D1	3048.56	3048.18	0.36	3048.90	3049.06	3050.4	OK	OK	
158	D1	3046.19	3045.81	0.36	3046.53	3046.69	3048.0	OK	OK	
159	D1	3043.88	3043.50	0.36	3044.22	3044.38	3045.7	OK	OK	
160	D1	3041.51	3041.13	0.36	3041.85	3042.01	3043.3	OK	OK	
161	D1	3039.10	3038.72	0.36	3039.44	3039.60	3040.9	OK	OK	
162	D1	3036.74	3036.36	0.36	3037.08	3037.24	3038.5	OK	OK	
163	D1	3034.37	3033.99	0.36	3034.71	3034.87	3036.2	OK	OK	
164	D1	3032.01	3031.63	0.36	3032.35	3032.51	3033.8	OK	OK	
165	D1	3029.64	3029.26	0.36	3029.98	3030.14	3031.4	OK	OK	
166	D1	3027.30	3026.92	0.36	3027.64	3027.80	3029.1	OK	OK	
167	D1	3025.21	3024.83	0.36	3025.55	3025.71	3027.0	OK	OK	
168	D1	3023.44	3023.06	0.36	3023.78	3023.94	3025.2	OK	OK	
169	D1	3026.07	3025.69	0.36	3026.41	3026.57	3027.9	OK	OK	
170	D1	3028.15	3027.77	0.36	3028.49	3028.65	3030.0	OK	OK	
171	D1	3030.51	3030.13	0.36	3030.85	3031.01	3032.3	OK	OK	
172	D1	3032.91	3032.53	0.36	3033.25	3033.41	3034.7	OK	OK	
173	D1	3035.31	3034.93	0.36	3035.65	3035.81	3037.1	OK	OK	
174	D1	3037.70	3037.32	0.36	3038.04	3038.20	3039.5	OK	OK	
175	D1	3040.10	3039.72	0.36	3040.44	3040.60	3041.9	OK	OK	
176	D1	3042.50	3042.12	0.36	3042.84	3043.00	3044.3	OK	OK	
177	D1	3044.90	3044.52	0.36	3045.24	3045.40	3046.7	OK	OK	
178	D1	3047.30	3046.92	0.36	3047.64	3047.80	3049.1	OK	OK	
179	D1	3049.70	3049.32	0.36	3050.04	3050.20	3051.5	OK	OK	
180	D1	3052.10	3051.72	0.36	3052.44	3052.60	3053.9	OK	OK	
181	D1	3054.50	3054.12	0.36	3054.84	3055.00	3056.3	OK	OK	
182	D1	3056.89	3056.51	0.36	3057.23	3057.39	3058.7	OK	OK	
183	D1	3059.29	3058.91	0.36	3059.63	3059.79	3061.1	OK	OK	
184	D1	3061.62	3061.24	0.36	3061.96	3062.12	3063.4	OK	OK	
185	D1	3063.47	3063.09	0.36	3063.81	3063.97	3065.3	OK	OK	
186	D1	3064.77	3064.39	0.36	3065.11	3065.27	3066.6	OK	OK	

BLM 270 PARCEL C-2 & C-3 FINISHED 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 $F.F._{\cdot min}$[3] (ft)	T/C + 6" $F.F._{\cdot min}$[4] (ft)	$F.F._{\cdot Design}$ (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
187	D1	3065.71	3065.33	0.36	3066.05	3066.21	3067.5	OK	OK	
188	D1	3065.29	3064.91	0.36	3065.63	3065.79	3067.0	OK	OK	
189	D1	3063.89	3063.51	0.36	3064.23	3064.39	3065.6	OK	OK	
190	D1	3062.19	3061.81	0.36	3062.53	3062.69	3063.9	OK	OK	
191	D1	3059.96	3059.58	0.36	3060.30	3060.46	3061.7	OK	OK	
192	D1	3057.56	3057.18	0.36	3057.90	3058.06	3059.3	OK	OK	
193	D1	3055.17	3054.79	0.36	3055.51	3055.67	3056.9	OK	OK	
194	D1	3052.77	3052.39	0.36	3053.11	3053.27	3054.5	OK	OK	
195	D1	3050.37	3049.99	0.36	3050.71	3050.87	3052.1	OK	OK	
196	D1	3047.97	3047.59	0.36	3048.31	3048.47	3049.7	OK	OK	
197	D1	3045.57	3045.19	0.36	3045.91	3046.07	3047.3	OK	OK	
198	D1	3043.17	3042.79	0.36	3043.51	3043.67	3044.9	OK	OK	
199	D1	3040.77	3040.39	0.36	3041.11	3041.27	3042.5	OK	OK	
200	D1	3038.38	3038.00	0.36	3038.72	3038.88	3040.0	OK	OK	
201	D1	3035.98	3035.60	0.36	3036.32	3036.48	3037.6	OK	OK	
202	D1	3033.58	3033.20	0.36	3033.92	3034.08	3035.2	OK	OK	
203	B1	3033.67	3033.29	0.26	3033.81	3034.17	3035.6	OK	OK	
204	B1	3036.53	3036.15	0.26	3036.67	3037.03	3038.4	OK	OK	
205	B1	3039.58	3039.20	0.26	3039.72	3040.08	3041.5	OK	OK	
206	B1	3041.93	3041.55	0.26	3042.07	3042.43	3043.7	OK	OK	
207	B1	3044.29	3043.91	0.26	3044.43	3044.79	3046.1	OK	OK	
208	B1	3046.64	3046.26	0.26	3046.78	3047.14	3048.4	OK	OK	
209	B1	3049.00	3048.62	0.26	3049.14	3049.50	3050.8	OK	OK	
210	B1	3051.35	3050.97	0.26	3051.49	3051.85	3053.2	OK	OK	
211	B1	3053.68	3053.30	0.26	3053.82	3054.18	3055.5	OK	OK	
212	B1	3056.04	3055.66	0.26	3056.18	3056.54	3057.8	OK	OK	
213	B1	3058.40	3058.02	0.26	3058.54	3058.90	3060.2	OK	OK	
214	B1	3060.66	3060.28	0.26	3060.80	3061.16	3062.5	OK	OK	
215	B1	3062.59	3062.21	0.26	3062.73	3063.09	3064.4	OK	OK	
216	B1	3064.17	3063.79	0.26	3064.31	3064.67	3066.0	OK	OK	
217	B1	3065.04	3064.66	0.26	3065.18	3065.54	3066.8	OK	OK	
218	B1	3066.73	3066.35	0.26	3066.87	3067.23	3068.5	OK	OK	
219	B1	3067.01	3066.63	0.26	3067.15	3067.51	3068.8	OK	OK	
220	E1	3067.01	3066.63	0.45	3067.53	3067.51	3069.0	OK	OK	
221	E1	3066.94	3066.56	0.45	3067.46	3067.44	3068.7	OK	OK	
222	E1	3066.70	3066.32	0.45	3067.22	3067.20	3068.5	OK	OK	
223	E1	3066.46	3066.08	0.45	3066.98	3066.96	3068.3	OK	OK	
224	E1	3066.22	3065.84	0.45	3066.74	3066.72	3068.0	OK	OK	
225	E1	3065.98	3065.60	0.45	3066.50	3066.48	3067.8	OK	OK	
226	E1	3065.74	3065.36	0.45	3066.26	3066.24	3067.5	OK	OK	
227	E1	3065.50	3065.12	0.45	3066.02	3066.00	3067.3	OK	OK	
228	E1	3065.26	3064.88	0.45	3065.78	3065.76	3067.1	OK	OK	
229	E1	3065.02	3064.64	0.45	3065.54	3065.52	3066.8	OK	OK	
230	E1	3064.78	3064.40	0.45	3065.30	3065.28	3066.6	OK	OK	
231	E1	3064.54	3064.16	0.45	3065.06	3065.04	3066.3	OK	OK	
232	E1	3064.30	3063.92	0.45	3064.82	3064.80	3066.1	OK	OK	
233	E1	3064.07	3063.69	0.45	3064.59	3064.57	3065.9	OK	OK	
234	E1	3063.83	3063.45	0.45	3064.35	3064.33	3065.6	OK	OK	
235	E1	3063.59	3063.21	0.45	3064.11	3064.09	3065.4	OK	OK	
236	E1	3063.22	3062.84	0.45	3063.74	3063.72	3065.0	OK	OK	
237	E1	3062.82	3062.44	0.45	3063.34	3063.32	3064.6	OK	OK	
238	E1	3062.42	3062.04	0.45	3062.94	3062.92	3064.2	OK	OK	
239	E1	3062.02	3061.64	0.45	3062.54	3062.52	3063.8	OK	OK	
240	E1	3061.62	3061.24	0.45	3062.14	3062.12	3063.4	OK	OK	
241	F1	3061.22	3060.84	0.42	3061.68	3061.72	3063.0	OK	OK	
242	F1	3060.82	3060.44	0.42	3061.28	3061.32	3062.6	OK	OK	
243	F1	3060.42	3060.04	0.42	3060.88	3060.92	3062.2	OK	OK	
244	F1	3060.02	3059.64	0.42	3060.48	3060.52	3061.8	OK	OK	
245	F1	3059.62	3059.24	0.42	3060.08	3060.12	3061.4	OK	OK	
246	F1	3059.22	3058.84	0.42	3059.68	3059.72	3061.0	OK	OK	
247	F1	3058.84	3058.46	0.42	3059.30	3059.34	3060.6	OK	OK	
248	F1	3058.81	3058.43	0.42	3059.27	3059.31	3060.7	OK	OK	

BLM 270 PARCEL C-2 & C-3 FINISHED 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 $F.F._{\cdot min}$[3] (ft)	T/C + 6" $F.F._{\cdot min}$[4] (ft)	$F.F._{\cdot Design}$ (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
249	F1	3059.68	3059.30	0.42	3060.14	3060.18	3061.6	OK	OK	
250	F1	3060.35	3059.97	0.42	3060.81	3060.85	3062.3	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. Per HCDDM, Section 304.4.

-The finished floor shall be set a vertical distance of at least 6-inches above the highest adjacent top of curb. Per HCDDM, Section 1602.

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
44	MARJORAM ST.	3060.35	3059.97	F1	0.42	3060.81	3059.4	CHECK	Yes
45	MARJORAM ST.	3059.79	3059.41	F1	0.42	3060.25	3059.4	CHECK	Yes
62	SWEET BAY ST.	3014.08	3013.70	D2	0.45	3014.60	3016.4	OK	No
63	SWEET BAY ST.	3015.84	3015.46	D2	0.45	3016.36	3020.3	OK	No
79	MARJORAM ST.	3060.65	3060.27	F1	0.42	3061.11	3062.2	OK	No
80	MARJORAM ST.	3062.28	3061.90	F1	0.42	3062.74	3060.7	CHECK	Yes
96	SWEET BAY ST.	3017.78	3017.40	C1	0.79	3018.98	3023.4	OK	No
97	SWEET BAY ST.	3017.78	3017.40	C1	0.79	3018.98	3025.8	OK	No
113	MARJORAM ST.	3063.19	3062.81	E1	0.45	3063.71	3064.6	OK	No
114	MARJORAM ST.	3064.28	3063.90	E1	0.45	3064.80	3063.4	CHECK	Yes
129	SWEET BAY ST.	3020.83	3020.45	C1	0.79	3022.03	3026.6	OK	No
130	SWEET BAY ST.	3021.59	3021.21	C1	0.79	3022.79	3025.6	OK	No
149	MARJORAM ST.	3064.78	3064.40	E1	0.45	3065.30	3066.2	OK	No
150	MARJORAM ST.	3065.67	3065.29	E1	0.45	3066.19	3065.9	CHECK	Yes
168	SWEET BAY ST.	3023.09	3022.71	C1	0.79	3024.29	3025.2	OK	No
169	SWEET BAY ST.	3023.90	3023.52	C1	0.79	3025.10	3027.9	OK	No
187	MARJORAM ST.	3066.19	3065.81	E1	0.45	3066.71	3067.5	OK	No
188	MARJORAM ST.	3067.02	3066.64	E1	0.45	3067.54	3067.0	CHECK	Yes
217	MARJORAM ST.	3033.38	3033.00	B1	0.26	3033.52	3066.8	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

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

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

* Lot is adjacent to high point and does not require solid grouting

Specific Energy Check							
Lot Number	High TC[1]	High FL[2]	Section	Specific Energy[3]	Min FF[4]	Design FF	Check
4	3024.53	3024.15	D1	0.71	3024.86	3026.40	OK
9	3022.01	3021.63	D1	0.71	3022.34	3024.40	OK
10	3022.01	3021.63	D1	0.71	3022.34	3023.90	OK
14	3019.51	3019.13	D1	0.71	3019.84	3021.90	OK
15	3019.51	3019.13	D1	0.71	3019.84	3021.40	OK
19	3016.3	3015.92	D1	0.71	3016.63	3019.10	OK
20	3016.3	3015.92	D1	0.71	3016.63	3018.20	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

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

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

Emergency Overflow Finish Floor Checks

Adjacent/Perimeter Street Check - Emergency Overflow									
Lot Number	Street	High TC[1]	High FL[2]	Section	Flow Depth[3]	Min FF[4]	Design FF	Check	Solid Grout
23	CHIPOTLE AVE.	3008.53	3008.15	EO1	0.57	3008.72	3015.2	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

3: Flow depth is the normal depth of emergency overflow in adjacent perimeter street.

4: Min FF is the High FL plus the depth of emergency overflow.

Finished Floor Check - Emergency Overflow							
Lot Number	High TC[1]	High FL[2]	Section	Flow Depth[3]	Min FF[4]	Design FF	Check
24	3009.15	3008.77	EO1	0.57	3009.34	3011.80	OK

1: High TC is the elevation at the high side of the lot

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

3: Flow depth is the normal depth of the emergency overflow in adjacent street.

4: Min FF is the High FL plus the depth of emergency overflow.

APPENDIX E

Reference Material
Master Drainage Study for the BLM 270
By Westwood (DS5236; RFCD 20-12469)

Approval Letters

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: February 10, 2020
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:			**COPIES TO:**
BLM 270 Master Drainage Study				Westwood
Cross Streets:	SWQ of Farm Road and Puli Road			Olympia Companies
File Number:	F:\Depot\DSMemos\DS5236A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	126-14-000-003, 126-23-000-003, 126-26-000-001			CCRFCD
Zoning Action:	N/A			
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	1/14/2020	2/5/2020	See Comments Below	$400.00	3703984: $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:
	must be resubmitted or supplemented including the following:
X	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. **This drainage study is acceptable in concept;** however, *City of Las Vegas* will not formally accept the study until the *Clark County Regional Flood Control District (CCRFCD)* has issued a letter of concurrence. The engineer should contact the CCRFCD to confirm that they have begun their review.
2. The overall concept presented in the BLM 270 Master Drainage Study appears to satisfy the intent of providing regional connectivity of proposed Master Planned facilities without impacting the downstream neighborhoods and existing flood control facilities. Specific Technical Drainage Studies shall be required to address the specific impacts of each proposed Master Planned facility and the interaction with proposed facilities needed for each phase of development.
3. The BLM 270 Master Drainage Study indicates the CCRFCD Master Plan Facilities to be constructed by the Master Developer:
   a. Future Facility GOAN 0000 - Upsized from a 54-inch RCP to a 78-inch RCP
   b. Future Facility GOBW 0315 - 54-inch RCP
4. It appears that Puli Road will be vacated and will developed as a linear park. The future Technical Drainage Studies shall address and provide Public Drainage Easements to be privately maintained for the facilities conveying flows through multiple parcels.

5. The WSPG models provided indicate there are segments of storm drain with velocities greater than 25 fps. The engineer shall review the velocity impacts and recommend a course of action for City approval with each technical drainage study for the corresponding facilities.
6. The Master Study assumes that Sheep Mountain Parkway acts as a cut off for offsite flows coming from the west, downstream of Kyle Canyon Detention Basin (MPU ID LVMD 3315) and Gowan Ann Road Detention Basin Soil Cement Channel (MPU ID GOAN 0070, 0127). As indicated in the report, a separate Technical Drainage Study shall be provided for the development of Sheep Mountain Parkway. The interim conditions shall be addressed with the technical drainage studies for each pod. The discharge impacts must be accounted for in the interim conditions without negatively impacting the existing downstream neighborhoods.
7. Please note that any future technical drainage study submittals that differ from the Master Drainage Study (i.e. Changes in pods, infrastructure, flows, etc.) will require an update to the Master Drainage Study and this update must be approved by the City of Las Vegas Flood Control Section prior to final approval of the technical drainage study.
8. Please note that the proposed 100-year flood protection facilities identified on Exhibit F must be constructed by the Master Developer as a part of the master planned infrastructure. Technical Drainage Studies are required for each phase of the master planned infrastructure improvements. The technical drainage studies for the infrastructure improvements may be submitted with conditional approval of this Master Drainage Study. However, final approval for the Master Drainage Study must be obtained prior to conditional approval of the infrastructure drainage studies.
9. Technical drainage studies are required for each of the pods. Final approval for the infrastructure drainage study must be obtained prior to conditional approval of the impacted pod drainage studies.
10. Building permits for the homes within the individual pods will not be issued until construction of the street and flood control infrastructure around the pod is substantially complete or interim protection is provided per the approved technical drainage study.
11. Please note that all proposed interim facilities must be maintained by the Master Developer.
12. Continue to coordinate the proposed drainage facilities with Sheep Mountain Parkway project. Please contact Greg McDermott, P.E. at (702) 229-2143 to coordinate the proposed drainage facilities.

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/R59E/14
AREA F-23

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: July 9, 2020
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:			**COPIES TO:**
BLM 270 Master Drainage Study				Westwood
Cross Streets:	SWQ of Farm Road and Puli Road			Olympia Companies
File Number:	F:\Depot\DSMemos\DS5236C.doc			Bart Anderson, P.E., DevCo
Parcel Number:	126-14-000-003, 126-23-000-003, 126-26-000-001			CCRFCD
Zoning Action:	N/A			
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	1/14/2020	2/5/2020	See Comments Below	$400.00	3703984: $400
2nd Submittal	4/1/2020	4/1/2020	Approved	N/C	N/C
3rd Submittal	6/4/2020	7/8/2020		$100.00	3875461: $100
			TOTAL FEES (LDDRS):	**$500.00**	**----**

REMARKS:

3rd Submittal: Update #1 to establish Centennial Parkway as a hydrologic cutoff during Proposed Condition, extended analysis south of Tropical Parkway, Sheep Mountain Parkway considered undeveloped in the Proposed Condition, ultimate Sheep Mountain Parkway flows routed south of Tropical Parkway instead of east in Tropical Parkway.

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

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

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

   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

   Please note that effective April 6, 2020, only electronic submittals to the CCRFCD will be accepted for regional concurrence. Contact cwang@regionalflood.org for direction.

2. The overall concept presented in the BLM 270 Master Drainage Study appears to satisfy the intent of providing regional connectivity of proposed Master Planned facilities without impacting the

downstream neighborhoods and existing flood control facilities. Specific Technical Drainage Studies shall be required to address the specific impacts of each proposed Master Planned facility and the interaction with proposed facilities needed for each phase of development.

3. The BLM 270 Master Drainage Study Update indicates the CCRFCD Master Plan Facilities to be constructed by the Master Developer:
   a. Future Facility GOAN 0000 - Upsized from a 54-inch RCP to a 60-inch RCP
   b. Future Facility GOBW 0315 – Upsized from a 54-inch RCP to a 60-inch RCP
   c. Existing Facility GOBW0310 – Upsized from a 54" RCP to a 60-inch RCP and 5'x5' RCB
4. It appears that Puli Road will be vacated and will developed as a linear park. The future Technical Drainage Studies shall address and provide Public Drainage Easements to be privately maintained for the facilities conveying flows through multiple parcels.
5. The WSPG models provided indicate there are segments of storm drain with velocities greater than 25 fps. The engineer shall review the velocity impacts and recommend a course of action for City approval with each technical drainage study for the corresponding facilities.
6. The Master Study Update assumes that Centennial Parkway acts as a hydrologic cut off for offsite flows coming from the northwest during the Proposed Condition.
7. The Master Study assumes that Sheep Mountain Parkway acts as a cut off for offsite flows coming from the west, downstream of Kyle Canyon Detention Basin (MPU ID LVMD 3315) and Gowan Ann Road Detention Basin Soil Cement Channel (MPU ID GOAN 0070, 0127). As indicated in the report, a separate Technical Drainage Study shall be provided for the development of Sheep Mountain Parkway. The interim conditions shall be addressed with the technical drainage studies for each pod. The discharge impacts must be accounted for in the interim conditions without negatively impacting the existing downstream neighborhoods.
8. Please note that any future technical drainage study submittals that differ from the Master Drainage Study (i.e. Changes in pods, infrastructure, flows, etc.) will require an update to the Master Drainage Study and this update must be approved by the City of Las Vegas Flood Control Section prior to final approval of the technical drainage study.
9. Please note that the proposed 100-year flood protection facilities identified on Exhibit F must be constructed by the Master Developer as a part of the master planned infrastructure. Technical Drainage Studies are required for each phase of the master planned infrastructure improvements. The technical drainage studies for the infrastructure improvements may be submitted with conditional approval of this Master Drainage Study. However, final approval for the Master Drainage Study must be obtained prior to conditional approval of the infrastructure drainage studies.
10. Technical drainage studies are required for each of the pods. Final approval for the infrastructure drainage study must be obtained prior to conditional approval of the impacted pod drainage studies.
11. Building permits for the homes within the individual pods will not be issued until construction of the street and flood control infrastructure around the pod is substantially complete or interim protection is provided per the approved technical drainage study.
12. Please note that all proposed interim facilities must be maintained by the Master Developer.
13. Continue to coordinate the proposed drainage facilities with Sheep Mountain Parkway project. Please contact Greg McDermott, P.E. at (702) 229-2143 to coordinate the proposed drainage facilities.
14. Continue to coordinate the proposed drainage facilities with the Centennial Heights project (DS5232) by Horrocks Engineers.

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/R59E/14
AREA F-23

Hydrologic Computations

Soils Data

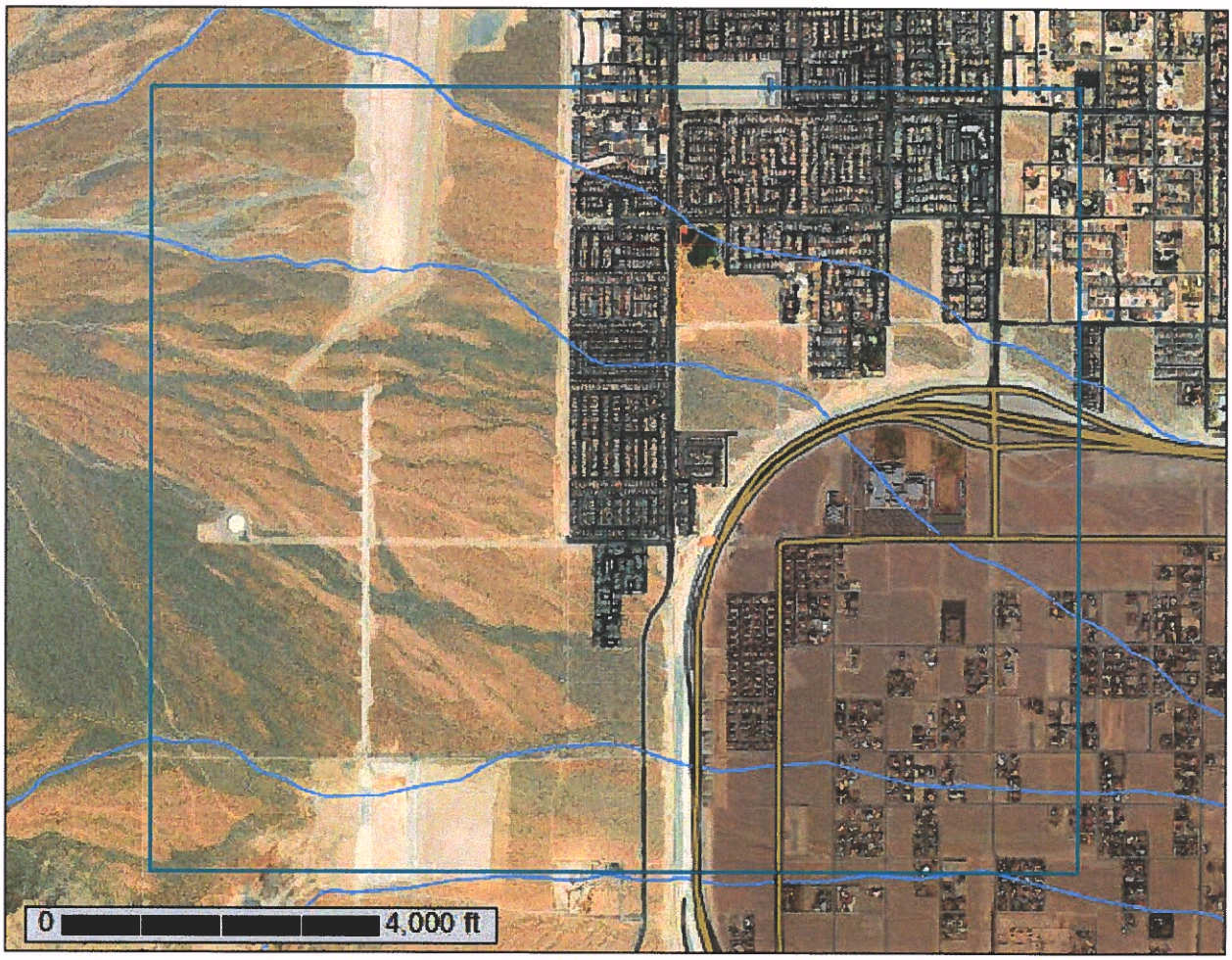
United States Department of Agriculture

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



April 16, 2020

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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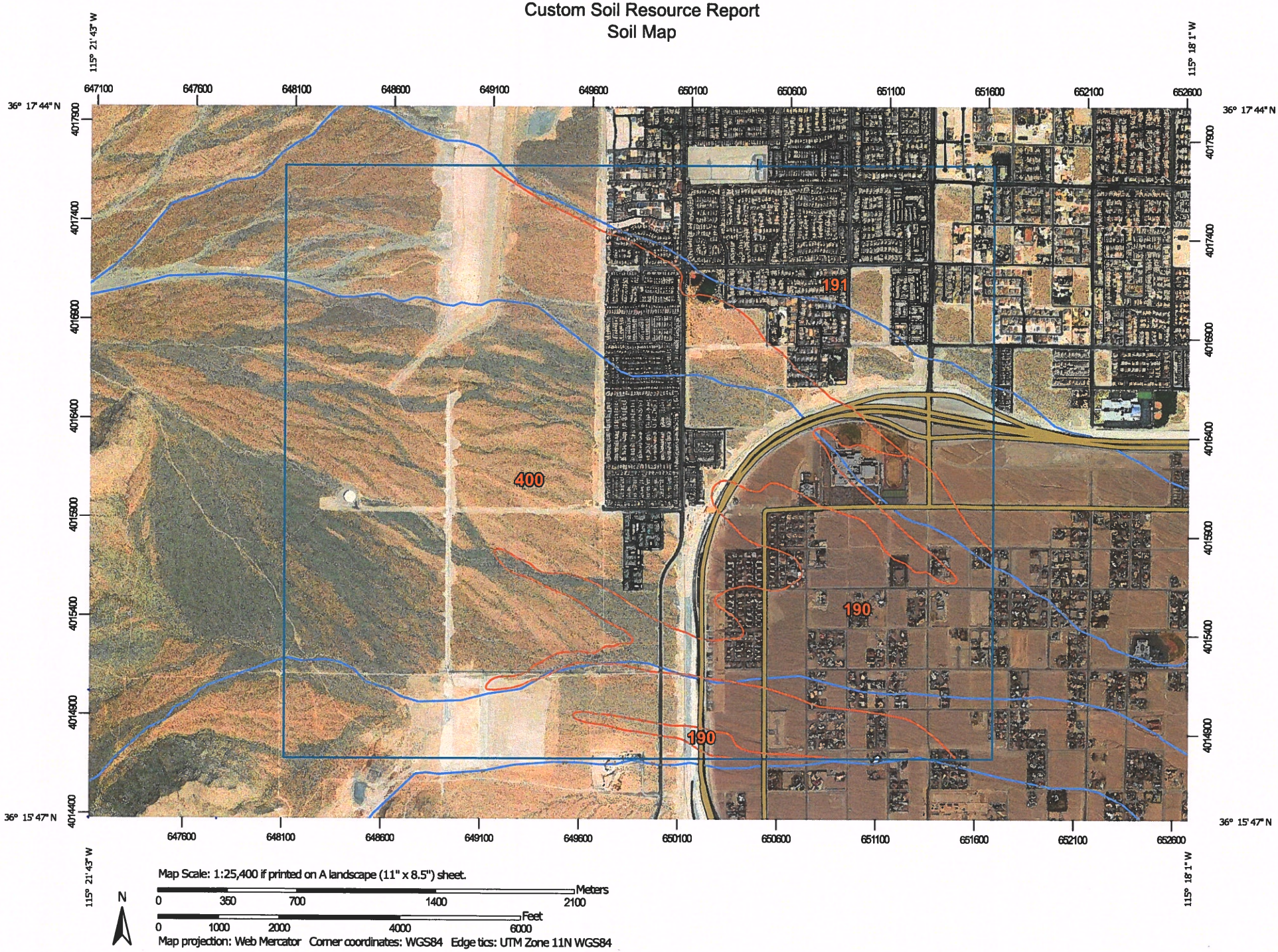
Soil Map

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

Custom Soil Resource Report
Soil Map



MAP 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.

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 14, Sep 16, 2019

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

Date(s) aerial images were photographed: May 7, 2011—Oct 1, 2017

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
190	Dalian very gravelly fine sandy loam, 2 to 4 percent slopes	431.7	16.2%
191	Dalian very cobbly fine sandy loam, 2 to 8 percent slopes	532.3	20.0%
400	Tencee very gravelly fine sandy loam, 2 to 8 percent slopes	1,692.9	63.7%
Totals for Area of Interest		**2,656.8**	**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

190—Dalian very gravelly fine sandy loam, 2 to 4 percent slopes

Map Unit Setting

National map unit symbol: hrb3
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 4 inches: very gravelly fine sandy loam
H2 - 4 to 61 inches: extremely gravelly fine sandy loam

Properties and qualities

Slope: 2 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

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

400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hrc1
Elevation: 2,400 to 5,700 feet
Mean annual precipitation: 4 to 10 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 180 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Tencee

Setting

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

Typical profile

H1 - 0 to 9 inches: very gravelly fine sandy loam
H2 - 9 to 15 inches: very gravelly sandy loam
H3 - 15 to 19 inches: indurated

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 7 to 20 inches to petrocalcic
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
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**
190—Dalian very gravelly fine sandy loam, 2 to 4 percent slopes			
Dalian	100	Very low	A
191—Dalian very cobbly fine sandy loam, 2 to 8 percent slopes			
Dalian	100	Low	A
400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes			
Tencee	100	Very high	D

References

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United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

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Curve Number Data & Computations

industrial, heavy industrial and commercial areas (land use categories 8 through 11) are assumed 100% fair condition desert shrub for the open space distribution. Parks/golf courses and schools (land use categories 2 and 12) are assumed 70% open landscaping (grass) in good condition and 30% fair condition desert shrub for the open space distribution. This 70%-30% split was determined after reviewing the Spring 2016 aerial imagery.

4. All designated right-of-way areas were categorized as public facility (land use category 7) to be consistent throughout the Las Vegas Valley.

It should be noted that undeveloped land, open desert (land use category 1) will continue to use 100% poor condition desert shrub (<30% ground cover).

The directly connected impervious area percentages and corresponding open space distribution of each land use category is presented in **Table 2-2**:

Table 2-2 - Land Use Categories

Land Use Index	Land Use Description	Impervious* (%)	Open Landscape Good Condition Grass (%)	Open Desert Shrub Fair Condition Natural Desert Landscaping (%)
1	Undeveloped Land, Open Desert	0	0	100**
2	Parks, Golf Courses	5	66.5	28.5
3	Rural, 0.5-1 units per acre (uses 1 unit/acre)	20	40	40
4	Low-Density Residential, 1-2 units per acre (uses 2 units/acre)	25	37.5	37.5
5	Medium-Density Residential, 2-4 units per acre (uses 3 units/acre)	30	35	35
6	High-Density residential, 4-8 units per acre (uses 6 units/acre)	52	24	24
7	Public Facility and Residential, 8-12 units/acre	72	14	14
8	Very High-Density Residential, 12 units/acre or more	80	0	20
9	Commercial, Retail, Casino, High Rise Condominiums	85	0	15
10	Light Industrial	72	0	28
11	Heavy Industrial	85	0	15
12	Schools	50	35	15
13	Lakes	0	0	0

* Impervious areas are directly connected to the drainage system
** Open Desert Shrub Poor Condition is applied for Undeveloped Land, Open Desert (Land Use Index Number 1)

The land use data used with the 2018 MPU is shown on the W-Maps. **Figure 2-1** shows the geographic comparison between the 2018 and 2008 MPU land use coverages in terms of percent imperviousness. The increase or decrease in impervious area represents an increase or decrease, respectively, in the runoff potential for a given area.

Westwood

Soil Data & Curve Number Computation

Project Name & Number: OLY1915.000 BLM 270 MDS UPDATE
Date: 5/28/2020
By: GND/ARP

Data:

Reference:
Web Access: 4/2020
NRCS Soil Data

Soil Type - Soil Survey Area & Version, Soil Description				A	B	C	D
LV	400	Las Vegas Valley (NV788)	Tencee very gravelly fine sandy loam, 2 to 8 percent slopes	0%	0%	0%	100%
LV	190	Las Vegas Valley (NV788)	Dalian very gravelly fine sandy loam, 2 to 4 percent slopes	100%	0%	0%	0%

Land Use	A	B	C	D
1 Undeveloped Land, Open Desert	63	77	85	88
3 Rural, 0.5-1 units/acre	57	73	82	86
6 High-Den Res, 4-8 units/acre	74	83	88	91
7 Public Facility/Res, 8-12 units/acre	84	89	92	94
8 Very High-Den Res, >12 units/acre	89	93	95	96

Referenced Puli Basin

PROPOSED CONDITION

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
PUL3	LV	400	100.0%	7 Public Facility/Res, 8-12 units/acre	0%	0%	0%	100%	84	89	92	94	2.48	94.00
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									2.48	94.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
PUL4	LV	400	100.0%	7 Public Facility/Res, 8-12 units/acre	0%	0%	0%	100%	84	89	92	94	3.75	94.00
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									3.75	94.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
ON5	LV	400	81.4%	7 Public Facility/Res, 8-12 units/acre	0%	0%	0%	100%	84	89	92	94	54.99	76.52
	LV	190	18.6%	7 Public Facility/Res, 8-12 units/acre	100%	0%	0%	0%	84	89	92	94	12.56	15.62
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									67.55	92.1

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		
IOFF2	LV	400	100.0%	1 Undeveloped Land, Open Desert	0%	0%	0%	100%	63	77	85	88	106.75	88.00
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									106.75	88.0

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		
IOFF3	LV	400	95.1%	1 Undeveloped Land, Open Desert	0%	0%	0%	100%	63	77	85	88	84.56	83.72
	LV	190	4.9%	1 Undeveloped Land, Open Desert	100%	0%	0%	0%	63	77	85	88	4.32	3.06
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									88.88	86.8

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		
IOFF8	LV	400	30.7%	7 Public Facility/Res, 8-12 units/acre	0%	0%	0%	100%	84	89	92	94	13.68	28.85
	LV	400	62.5%	1 Undeveloped Land, Open Desert	0%	0%	0%	100%	63	77	85	88	27.85	54.98
	LV	190	6.8%	1 Undeveloped Land, Open Desert	100%	0%	0%	0%	63	77	85	88	3.05	4.31
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									44.58	88.1

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		
DEV1	LV	400	100.0%	7 Public Facility/Res, 8-12 units/acre	0%	0%	0%	100%	84	89	92	94	7.91	94.00
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									7.91	94.0

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		
DEV2	LV	400	38.8%	7 Public Facility/Res, 8-12 units/acre	0%	0%	0%	100%	84	89	92	94	9.03	36.49
	LV	190	61.2%	7 Public Facility/Res, 8-12 units/acre	100%	0%	0%	0%	84	89	92	94	14.23	51.39
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									23.26	87.9

Lag Times Computations - Standard Form 4

Westwood

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION

Project Name & Number: OLY1915.000 BLM 270 MDS UPDATE
Description: Lag Times
By: ARP
Date: 5/28/2020

Referenced Basin

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]
PROPOSED CONDITION																	
PUL3	D	94.0	0.851	2.48	0.0039	30	2.00	1.95	1290	1.55	2.52	3.81	6.77	8.72	1320	17.333	0.087
PUL4	D	94.0	0.851	3.75	0.0059	30	2.00	1.95	1920	1.35	2.35	3.56	10.19	12.14	1950	20.833	0.121
ON5	D	92.1	0.826	67.55	0.1055	100	1.00	4.94	3250	3.35	3.70	5.60	10.43	15.37	3350	28.611	0.154
IOFF2	E	88.0	0.772	107.44	0.1679	300	4.33	6.28	3770	0.90	1.41	2.79	25.45	31.73			0.317
IOFF3	E	86.8	0.756	88.88	0.1389	175	2.86	5.78	2685	3.72	2.86	5.67	9.34	15.11			0.151
IOFF8	E	88.1	0.773	44.58	0.0697	24	1.00	2.88	1825	2.90	2.52	5.01	7.71	10.60			0.106
DEV1	D	94.0	0.851	7.91	0.0124	24	1.00	2.20	1055	2.46	3.17	4.80	4.55	6.75	1079	15.994	0.068
DEV2	D	87.9	0.770	23.26	0.0363	24	1.00	2.91	1530	1.50	2.48	3.75	7.94	10.85	1554	18.633	0.108
INT1	E	80.6	0.674	13.42	0.0210	170	5.88	5.54	1570	3.69	2.84	5.65	6.09	11.62			0.116
INT2	E	88.0	0.772	9.63	0.0150	130	2.31	5.10	1650	3.52	2.77	5.51	6.48	11.58			0.116
INT3	E	63.0	0.442	5.02	0.0078	60	6.67	4.88	775	2.97	2.55	5.06	4.17	9.05			0.100
INT4	E	63.0	0.442	4.58	0.0072	50	10.00	3.89	705	1.99	2.09	4.14	4.82	8.71			0.100
INT5	E	80.9	0.678	1.05	0.0016	35	2.86	3.17	315	3.17	2.64	5.24	1.99	5.16			0.100
INT6	E	86.4	0.750	122.11	0.1908	185	2.70	6.14	1950	3.59	2.80	5.57	7.31	13.45			0.135
ULTIMATE CONDITION																	
UOFF8	D	92.1	0.826	44.58	0.0697	24	1.00	2.42	1825	2.90	3.44	5.21	6.66	9.07	1849	20.272	0.091
ULT1	D	94.0	0.851	2.75	0.0043	30	10.00	1.14	480	2.71	3.32	5.04	2.41	3.55	510	12.833	0.050
ULT2	D	94.0	0.851	9.51	0.0149	50	4.00	2.00	1380	3.91	4.00	6.05	4.51	6.51	1430	17.944	0.065
ULT3	D	84.0	0.719	5.02	0.0078	60	6.67	2.82	775	2.97	3.48	5.27	3.26	6.09	835	14.639	0.061
ULT4	D	84.0	0.719	4.58	0.0072	50	10.00	2.25	705	1.99	2.85	4.31	3.72	5.97	755	14.194	0.060
ULT5	D	91.1	0.813	1.05	0.0016	35	2.86	2.16	315	3.17	3.60	5.45	1.46	3.62	350	11.944	0.050
ULT6	D	93.1	0.839	132.39	0.2069	185	2.70	4.59	1950	3.59	3.83	5.80	6.35	10.93	2135	21.861	0.109

[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

APPENDIX C

HEC-1 Analysis

Proposed Condition HEC-1

```
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   27MAY20  TIME  15:44:58  *                                                    *          (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     WESTWOOD PROFESSIONAL SERVICES
            2           ID     BLM 270 - MDS UPDATE
            3           ID     OLYMPIA
            4           ID     PROPOSED CONDITION
            5           ID
            6           ID          AREA    DARF
            7           ID          SQ.MI.
            8           ID                  SDN 3   SDN 3
            9           ID                  100-YR  10-YR
           10           ID          0 - 0.5 1.00
           11           ID          0.5 - 1 0.975
           12           ID          1 - 2   0.95
           13           ID          2 - 3   0.925
           14           ID          3 - 4   0.915
           15           ID          4 - 5   0.908
           16           ID                          0.55
           17           ID
           18           IT       5       0       0     650
           19           IO       5       0       0
           20           IN       5       0       0
           21           JR    PREC    1.00   0.975    0.95   0.925   0.915   0.908    0.55
                        *
                        *

           22           KK     ON1
           23           BA  0.0620
           24           PB    3.15
           25           PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
           26           PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
           27           PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
           28           PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
           29           PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
           30           PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
           31           PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
           32           PC   0.998   0.999       1
           33           LS       0    76.4
           34           UD   0.212
                        *

           35           KK     ON2
           36           BA  0.0718
           37           LS       0    89.0
           38           UD   0.147
                        *

           39           KK     SP1
           40           BA  0.0504
           41           LS       0    89.1
           42           UD   0.135
```

```
                    *
1                                   HEC-1 INPUT                                          PAGE  2

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

  43          KK    OFF1
  44          BA  0.0484
  45          LS       0    84.8
  46          UD   0.100
              *

  47          KK    CSP1
  48          HC       2
              *

  49          KK     CP1
  50          HC       2
              *

  51          KK    DCP1
  52          KM  10-YR FLOW BYPASSES PEAKING BASIN
  53          KM  FLOW IN EXCESS OF 150 CFS ENTERS PEAKING BASIN
  54          DT   BYCP1
  55          DI       0     150    1000
  56          DQ       0     150     150
              *

  57          KK   CP1PB
  58          KM  PROPOSED LOCAL PEAKING BASIN AT DORRELL LN
  59          KM  MITIGATE FLOW INCREASE FROM PROPOSED DEVELOPMENT
  60          RS       1    STOR      -1
  61          SV       0    0.27    0.69    1.26    3.01    2.94    2.95
  62          SE  3027.0  3029.0  3031.0  3033.0  3035.0  3037.0  3040.0
  63          SQ    0.00   10.00   11.00   12.00   13.00   14.00 1000.00
              *

  64          KK   BYCP1
  65          DR   BYCP1
              *

  66          KK    CP1B
  67          KM  COMBINE 150 CFS BYPASS FLOW AND DORRELL DB OUTFLOW
  68          HC       2
              *

  69          KK    DIV2
  70          KM  FLOW BEING CONVEYED DOWN DORRELL
  71          DT    DORR
  72          DI       0      33    1000
  73          DQ       0      33      33
              *

  74          KK    DORR
  75          KM   FLOW BEING CONVEYED DOWN DORRELL
  76          DR    DORR
              *
1                                   HEC-1 INPUT                                          PAGE  3

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

  77          KK     ON3
  78          BA  0.0813
  79          LS       0    94.0
  80          UD   0.160
              *

  81          KK     ON4
  82          BA  0.0948
  83          LS       0    94.0
  84          UD   0.124
              *

  85          KK     CP2
  86          HC       2
              *

  87          KK   IOFF2
  88          BA  0.1679
  89          LS       0    88.0
  90          UD   0.317
              *

  91          KK    CP2A
  92          HC       2
              *

  93          KK  CDMNA2
```

Project Site Basin

```
 94          KM   REFERENCED FROM BELTWAY FACILITY
 95          BA   0.125
 96          PB    3.18
 97          LS       0    92.8
 98          UD   0.188
             *

 99          KK    ONB7
100          KM   REFERENCED FROM CENTENNIAL CONDOS
101          BA  0.0016
102          PB    3.05
103          LS       0    93.0
104          UD   0.075
             *

105          KK    PUL3
106          BA  0.0039
107          PB    3.15
108          LS       0    94.0
109          UD   0.087
             *
```

Referenced Basin

```
1                                   HEC-1 INPUT                                          PAGE  4

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

110          KK    PUL4
111          BA  0.0059
112          LS       0    94.0
113          UD   0.121
             *

114          KK    CP2B
115          HC       5
             *

116          KK    OFF4
117          PB    3.15
118          BA   0.343
119          LS       0    88.0
120          UD   0.190
             *

121          KK    OFF5
122          BA   0.316
123          LS       0    88.0
124          UD   0.292
             *

125          KK     DUM
126          HC       2
             *

127          KK    OFF6
128          BA   1.809
129          LS       0    87.9
130          UD   0.232
             *

131          KK    OFF7
132          BA   1.246
133          LS       0    87.7
134          UD   0.286
             *

135          KK     DET
136          BA   0.046
137          PB   3.294
138          LS       0    87.9
139          UD   0.140
             *

140          KK  DET-IN
141          KM  TOTAL INFLOW TO DETENTION BASIN
142          HC       4
             *
1                                   HEC-1 INPUT                                          PAGE  5

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

143          KK   CAMDB
144          KM  FACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
145          KM  FACILITY # = GOAN 0061,0062
146          KM  CLEAR WATER STORAGE REQUIRED = 400.4 AC-FT
147          KM  SEDIMENTATION VOLUME REQUIRED = 38.5 AC-FT
148          KM  TOTAL VOLUME = 438.9 AC-FT
149          KM  VOLUME TO BE INCREASE BY 74.9 AC-FT
150          KM  OUTLET = 33" ORIFICE WITH 54" RCP
```

```
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       .98       .95       .93       .92       .91       .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
```

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00	RATIO 2 .98	RATIO 3 .95	RATIO 4 .93	RATIO 5 .92	RATIO 6 .91	RATIO 7 .55
HYDROGRAPH AT											
+	ON1	.06	1	FLOW	53.	51.	48.	46.	45.	44.	13.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	ON2	.07	1	FLOW	121.	117.	113.	109.	108.	106.	50.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	SP1	.05	1	FLOW	87.	84.	81.	78.	77.	76.	36.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	OFF1	.05	1	FLOW	75.	72.	69.	66.	65.	64.	27.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.58
2 COMBINED AT											
+	CSP1	.10	1	FLOW	158.	153.	147.	142.	140.	138.	63.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	CP1	.17	1	FLOW	279.	270.	260.	251.	247.	244.	113.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO											
+	BYCP1	.17	1	FLOW	150.	150.	150.	150.	150.	150.	113.
				TIME	3.42	3.42	3.42	3.42	3.42	3.42	3.58
HYDROGRAPH AT											
+	DCP1	.17	1	FLOW	129.	120.	110.	101.	97.	94.	0.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	.00
ROUTED TO											
+	CP1PB	.17	1	FLOW	13.	12.	12.	12.	12.	12.	0.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	.00
			** PEAK STAGES IN FEET **								
			1	STAGE	3034.06	3033.79	3033.52	3033.25	3033.15	3033.08	3027.00
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	.00
HYDROGRAPH AT											
+	BYCP1	.00	1	FLOW	150.	150.	150.	150.	150.	150.	113.
				TIME	3.42	3.42	3.42	3.42	3.42	3.42	3.58
2 COMBINED AT											
+	CP1B	.17	1	FLOW	163.	162.	162.	162.	162.	162.	113.
				TIME	3.75	3.75	3.75	3.75	3.67	3.67	3.58
DIVERSION TO											
+	DORR	.17	1	FLOW	33.	33.	33.	33.	33.	33.	33.
				TIME	3.17	3.17	3.17	3.17	3.17	3.17	3.33
HYDROGRAPH AT											
+	DIV2	.17	1	FLOW	130.	129.	129.	129.	129.	129.	80.
				TIME	3.75	3.75	3.75	3.75	3.67	3.67	3.58
HYDROGRAPH AT											
+	DORR	.00	1	FLOW	33.	33.	33.	33.	33.	33.	33.
				TIME	3.17	3.17	3.17	3.17	3.17	3.17	3.33
HYDROGRAPH AT											
+	ON3	.08	1	FLOW	155.	151.	146.	142.	140.	139.	75.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	ON4	.09	1	FLOW	187.	182.	177.	172.	169.	168.	92.

Project Site Basin

```
                                        TIME        3.58     3.58     3.58     3.58     3.58     3.58     3.58

  2 COMBINED AT
+                 CP2      .18    1    FLOW        343.     333.     323.     313.     310.     307.     167.
                                        TIME        3.58     3.58     3.58     3.58     3.58     3.58     3.58

 HYDROGRAPH AT
+                IOFF2      .17    1    FLOW        202.     195.     188.     181.     179.     177.      80.
                                        TIME        3.75     3.75     3.75     3.75     3.75     3.75     3.75

  2 COMBINED AT
+                 CP2A      .34    1    FLOW        503.     487.     472.     456.     450.     446.     226.
                                        TIME        3.58     3.58     3.58     3.58     3.58     3.58     3.58

 HYDROGRAPH AT
+               CDMNA2      .13    1    FLOW        221.     214.     207.     201.     198.     196.     102.
                                        TIME        3.58     3.58     3.58     3.58     3.58     3.58     3.58

 HYDROGRAPH AT
+                 ONB7      .00    1    FLOW          3.       3.       3.       3.       3.       3.       2.
                                        TIME        3.50     3.50     3.50     3.50     3.50     3.50     3.50

 HYDROGRAPH AT
+                 PUL3      .00    1    FLOW          9.       8.       8.       8.       8.       8.       4.
                                        TIME        3.50     3.50     3.50     3.50     3.50     3.50     3.50

 HYDROGRAPH AT
+                 PUL4      .01    1    FLOW         12.      11.      11.      11.      11.      10.       6.
                                        TIME        3.58     3.58     3.58     3.58     3.58     3.58     3.58

  5 COMBINED AT
+                 CP2B      .48    1    FLOW        745.     722.     700.     677.     668.     661.     339.
                                        TIME        3.58     3.58     3.58     3.58     3.58     3.58     3.58

 HYDROGRAPH AT
+                 OFF4      .34    1    FLOW        508.     491.     473.     456.     448.     444.     200.
                                        TIME        3.58     3.58     3.58     3.58     3.58     3.58     3.58

 HYDROGRAPH AT
+                 OFF5      .32    1    FLOW        392.     378.     365.     352.     346.     343.     157.
                                        TIME        3.75     3.75     3.75     3.75     3.75     3.75     3.75

  2 COMBINED AT
+                  DUM      .66    1    FLOW        875.     845.     815.     785.     773.     765.     349.
                                        TIME        3.67     3.67     3.67     3.67     3.67     3.67     3.67

 HYDROGRAPH AT
+                 OFF6     1.81    1    FLOW       2482.    2397.    2311.    2226.    2192.    2168.     987.
                                        TIME        3.67     3.67     3.67     3.67     3.67     3.67     3.67

 HYDROGRAPH AT
+                 OFF7     1.25    1    FLOW       1535.    1482.    1429.    1377.    1356.    1341.     610.
                                        TIME        3.75     3.75     3.75     3.75     3.75     3.75     3.75

 HYDROGRAPH AT
+                  DET      .05    1    FLOW         80.      78.      75.      72.      71.      70.      33.
                                        TIME        3.58     3.58     3.58     3.58     3.58     3.58     3.58

  4 COMBINED AT
+                DET-IN     3.76    1    FLOW       4955.    4783.    4612.    4441.    4372.    4325.    1956.
                                        TIME        3.67     3.67     3.67     3.67     3.67     3.67     3.67

 ROUTED TO
+                 CAMDB     3.76    1    FLOW        148.     145.     142.     139.     137.     137.      95.
                                        TIME        5.75     5.75     5.75     5.75     5.67     5.67     5.58

                                   ** PEAK STAGES IN FEET **
                                   1    STAGE    2997.16  2996.45  2995.75  2995.04  2994.75  2994.55  2985.29
                                        TIME        5.75     5.75     5.75     5.75     5.67     5.67     5.58

 ROUTED TO
+                DET-OT     3.76    1    FLOW        148.     145.     142.     139.     137.     137.      95.
                                        TIME        5.75     5.75     5.75     5.75     5.75     5.75     5.67

 HYDROGRAPH AT
+                 INT1      .02    1    FLOW         27.      26.      24.      23.      23.      23.       8.
                                        TIME        3.58     3.58     3.58     3.58     3.58     3.58     3.58

  2 COMBINED AT
+                CPSLAT     3.78    1    FLOW        149.     145.     142.     139.     138.     137.      95.
                                        TIME        5.83     5.83     5.83     5.83     5.83     5.83     5.50

 HYDROGRAPH AT
+                  ON5      .11    1    FLOW        193.     187.     181.     175.     173.     171.      88.
                                        TIME        3.58     3.58     3.58     3.58     3.58     3.58     3.58

 HYDROGRAPH AT
+                IOFF3      .14    1    FLOW        216.     208.     200.     193.     190.     188.      83.
                                        TIME        3.58     3.58     3.58     3.58     3.58     3.58     3.58
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Referenced Basin

Ultimate Condition HEC-1

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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   27MAY20  TIME  15:45:11  *                                                    *          (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     WESTWOOD PROFESSIONAL SERVICES
            2           ID     BLM 270 - MDS UPDATE
            3           ID     OLYMPIA
            4           ID     REVISED ULTIMATE CONDITION
            5           ID
            6           ID          AREA    DARF
            7           ID          SQ.MI.
            8           ID                  SDN 3   SDN 3
            9           ID                  100-YR  10-YR
           10           ID          0 - 0.5 1.00
           11           ID          0.5 - 1 0.975
           12           ID          1 - 2   0.95
           13           ID          2 - 3   0.925
           14           ID          3 - 4   0.915
           15           ID          4 - 5   0.908
           16           ID                          0.55
           17           ID
           18           IT       5       0       0     650
           19           IO       5       0       0
           20           IN       5       0       0
           21           JR    PREC    1.00   0.975    0.95   0.925   0.915   0.908    0.55
                        *
                        *

           22           KK     ON1
           23           BA  0.0620
           24           PB    3.15
           25           PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
           26           PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
           27           PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
           28           PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
           29           PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
           30           PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
           31           PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
           32           PC   0.998   0.999       1
           33           LS       0    76.4
           34           UD   0.212
                        *

           35           KK     ON2
           36           BA  0.0718
           37           LS       0    89.0
           38           UD   0.147
                        *

           39           KK     SP1
           40           BA  0.0504
           41           LS       0    89.1
           42           UD   0.135
```

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                    *
1                                   HEC-1 INPUT                                          PAGE  2

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

  43          KK  OFF1-U
  44          BA  0.0484
  45          LS       0    92.7
  46          UD   0.056
              *

  47          KK    CSP1
  48          HC       2
              *

  49          KK     CP1
  50          HC       2
              *

  51          KK    DCP1
  52          KM  10-YR FLOW BYPASSES PEAKING BASIN
  53          KM  FLOW IN EXCESS OF 150 CFS ENTERS PEAKING BASIN
  54          DT   BYCP1
  55          DI       0     150    1000
  56          DQ       0     150     150
              *

  57          KK   CP1PB
  58          KM  PROPOSED LOCAL PEAKING BASIN AT DORRELL LN
  59          KM  MITIGATE FLOW INCREASE FROM PROPOSED DEVELOPMENT
  60          RS       1    STOR      -1
  61          SV       0    0.27    0.69    1.26    3.01    2.94    2.95
  62          SE  3027.0  3029.0  3031.0  3033.0  3035.0  3037.0  3040.0
  63          SQ    0.00   10.00   11.00   12.00   13.00   14.00 1000.00
              *

  64          KK   BYCP1
  65          DR   BYCP1
              *

  66          KK    CP1B
  67          KM  COMBINE 150 CFS BYPASS FLOW AND DORRELL DB OUTFLOW
  68          HC       2
              *

  69          KK    DIV2
  70          KM  FLOW BEING CONVEYED DOWN DORRELL
  71          DT    DORR
  72          DI       0      33    1000
  73          DQ       0      33      33
              *

  74          KK    DORR
  75          KM   FLOW BEING CONVEYED DOWN DORRELL
  76          DR    DORR
              *
1                                   HEC-1 INPUT                                          PAGE  3

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

  77          KK     ON3
  78          BA  0.0813
  79          LS       0    94.0
  80          UD   0.160
              *

  81          KK     ON4
  82          BA  0.0948
  83          LS       0    94.0
  84          UD   0.124
              *

  85          KK     CP2
  86          HC       2
              *

  87          KK     SP2
  88          BA  0.0551
  89          LS       0    94.0
  90          UD   0.201
              *

  91          KK    CP2A
  92          HC       2
              *

  93          KK  CDMNA2
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Project Site Basin

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 94          KM   REFERENCED FROM BELTWAY FACILITY
 95          BA   0.125
 96          PB    3.18
 97          LS       0    92.8
 98          UD   0.188
             *

 99          KK    ONB7
100          KM   REFERENCED FROM CENTENNIAL CONDOS
101          BA  0.0016
102          PB    3.05
103          LS       0    93.0
104          UD   0.075
             *

105          KK    PUL3
106          PB    3.15
107          BA  0.0039
108          LS       0    94.0
109          UD   0.087
             *
```

Project Site Basin

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1                                   HEC-1 INPUT                                          PAGE  4

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


110          KK    PUL4
111          BA  0.0059
112          LS       0    94.0
113          UD   0.121
             *

114          KK    CP2B
115          HC       5
             *

116          KK     ON5
117          BA  0.1055
118          LS       0    92.0
119          UD   0.154
             *

120          KK     SP3
121          BA  0.0407
122          LS       0    92.5
123          UD   0.144
             *

124          KK    ULT1
125          BA  0.0043
126          LS       0    94.0
127          UD   0.050
             *

128          KK     CP3
129          HC       3
             *

130          KK    DEV1
131          BA  0.0124
132          LS       0    94.0
133          UD   0.068
             *

134          KK    DIV1
135          KM   REFERENCED FROM HORROCKS FOR DIV1 FLOWS
136          KM   D1 IS CAPTURED IN ONSITE DROP INLET FOR HORROCKS AND ROUTED EAST
137          KM   DIV1 IS ROUTED SOUTH TOWARD TROPICAL PARKWAY
138          DT      D1
139          DI      14      29
140          DQ       6      11
             *

141          KK    DEV2
142          BA  0.0363
143          LS       0    87.9
144          UD   0.108
             *
1                                   HEC-1 INPUT                                          PAGE  5

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

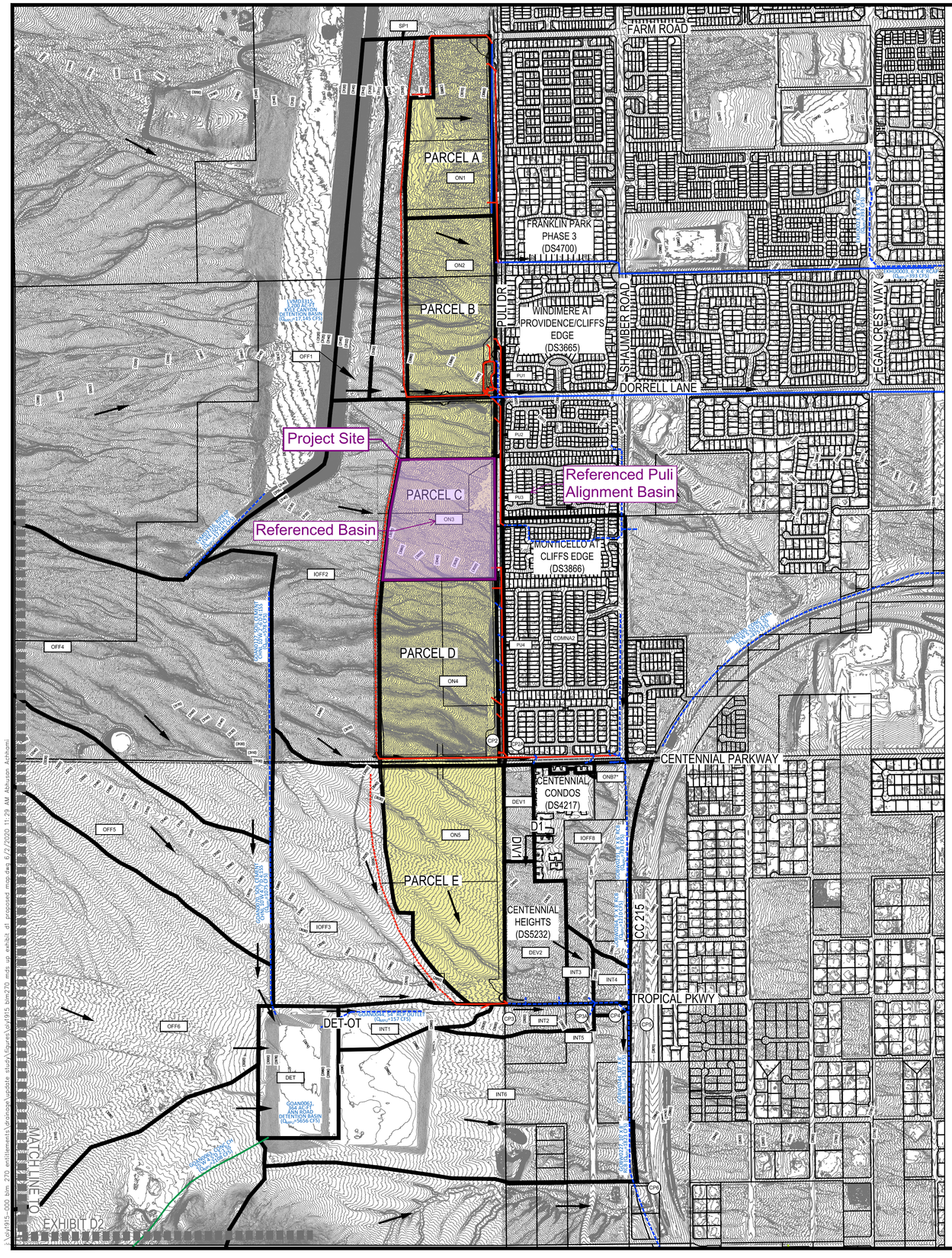

145          KK    ULT2
146          BA  0.0149
147          LS       0    94.0
148          UD   0.065
             *
```

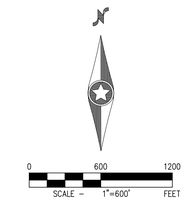
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	.00
HYDROGRAPH AT											
+	BYCP1	.00	1	FLOW	150.	150.	150.	150.	150.	150.	130.
				TIME	3.33	3.33	3.33	3.42	3.42	3.42	3.50
2 COMBINED AT											
+	CP1B	.17	1	FLOW	163.	163.	163.	162.	162.	162.	130.
				TIME	3.75	3.75	3.75	3.75	3.67	3.67	3.50
DIVERSION TO											
+	DORR	.17	1	FLOW	33.	33.	33.	33.	33.	33.	33.
				TIME	3.08	3.08	3.17	3.17	3.17	3.17	3.25
HYDROGRAPH AT											
+	DIV2	.17	1	FLOW	130.	130.	130.	129.	129.	129.	97.
				TIME	3.75	3.75	3.75	3.75	3.67	3.67	3.50
HYDROGRAPH AT											
+	DORR	.00	1	FLOW	33.	33.	33.	33.	33.	33.	33.
				TIME	3.08	3.08	3.17	3.17	3.17	3.17	3.25
HYDROGRAPH AT											
+	ON3	.08	1	FLOW	155.	151.	146.	142.	140.	139.	75.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	ON4	.09	1	FLOW	187.	182.	177.	172.	169.	168.	92.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	CP2	.18	1	FLOW	343.	333.	323.	313.	310.	307.	167.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	SP2	.06	1	FLOW	96.	93.	91.	88.	87.	86.	46.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	CP2A	.23	1	FLOW	439.	426.	414.	401.	396.	393.	213.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	CDMNA2	.13	1	FLOW	221.	214.	207.	201.	198.	196.	102.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	ONB7	.00	1	FLOW	3.	3.	3.	3.	3.	3.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	PUL3	.00	1	FLOW	9.	8.	8.	8.	8.	8.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	PUL4	.01	1	FLOW	12.	11.	11.	11.	11.	10.	6.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
5 COMBINED AT											
+	CP2B	.37	1	FLOW	681.	661.	642.	622.	614.	609.	326.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	ON5	.11	1	FLOW	193.	187.	181.	175.	173.	171.	88.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	SP3	.04	1	FLOW	77.	74.	72.	70.	69.	68.	36.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	ULT1	.00	1	FLOW	11.	10.	10.	10.	10.	10.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT											
+	CP3	.15	1	FLOW	275.	267.	259.	250.	247.	245.	127.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	DEV1	.01	1	FLOW	29.	28.	27.	27.	26.	26.	14.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO											
+	D1	.01	1	FLOW	11.	11.	10.	10.	10.	10.	6.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	DIV1	.01	1	FLOW	18.	17.	17.	16.	16.	16.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50

Project Site Basin

Referenced Basin

Drainage Exhibits





LEGEND

- BASIN BOUNDARY
- EXISTING DRAINAGE FACILITY
- PROPOSED DRAINAGE FACILITY
- PROPOSED DITCH
- FUTURE DRAINAGE FACILITY
- ID — BASIN ID
- PROPOSED DEVELOPMENT PARCEL
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID

Referenced Basin

Referenced Basins

Proposed Condition Flow Rate Summary

Basin/Concentration Point ID	Area (mi^2)	Q_{100} (cfs)	Q_{10} (cfs)
ON1	0.06	53	13
ON2	0.07	121	50
ON3	0.08	155	75
ON4	0.09	187	92
ON5	0.11	193	88
SP1	0.05	87	36
OFF1	0.06	75	27
IOFF2	0.17	202	80
IOFF3	0.14	216	83
OFF4	0.34	508	200
OFF5	0.32	392	157
OFF6	1.81	2311	987
OFF7	1.25	1429	610
IOFF8	0.07	122	49
PUL1	0.00	4	2
PUL2	0.00	5	2
PUL3	0.00	9	4
PUL4	0.01	12	6
DET	0.05	80	33
DEV1	0.01	29	14
DEV2	0.04	61	25
INT1	0.02	27	8
INT2	0.02	25	10
INT3	0.01	3	<1
INT4	0.01	3	<1
INT5	0.00	2	1
INT6	0.19	299	115
ONB7*	0.00	3	2
CDMNA2**	0.13	221	102
CP1 Q = ON2 + SP1 + OFF1	0.18	279	113
CP2 Q = ON3 + ON4	0.18	343	167
CP2A Q = CP2 + IOFF2	0.34	503	226
CP2B Q = CP2A + PUL3 + PUL4 + CDMNA2** + ONB7*	0.48	745	339
DET-OT Discharge from Detention Basin	3.76	137	95
CPSLAT Q = DET-OT + INT1	3.78	138	95
CP3 Q = CPSLAT + ON5 + IOFF3	4.03	468	240
DIV1*** Flow from DEV1 south thru DEV2	0.01	18	8
D1*** Flow from DEV1 east thru IOFF8	0.01	11	6
CP3A Q = CP3 + DIV1** + DEV2 + INT2 + INT3	4.09	556	279
CP4 Q = CP3A + INT4 +INT5	4.09	560	280
CP5 Q = CP2B + CP4 + D1*** + IOFF8	4.65	1334	675
CP6 Q = CP5 + INT6	4.89	1594	790

*Referenced from Condos Study (DS 4217)
**Referenced from Beltway Study (L-1803)
***Diversion referenced from Townhomes Study (DS 5232)

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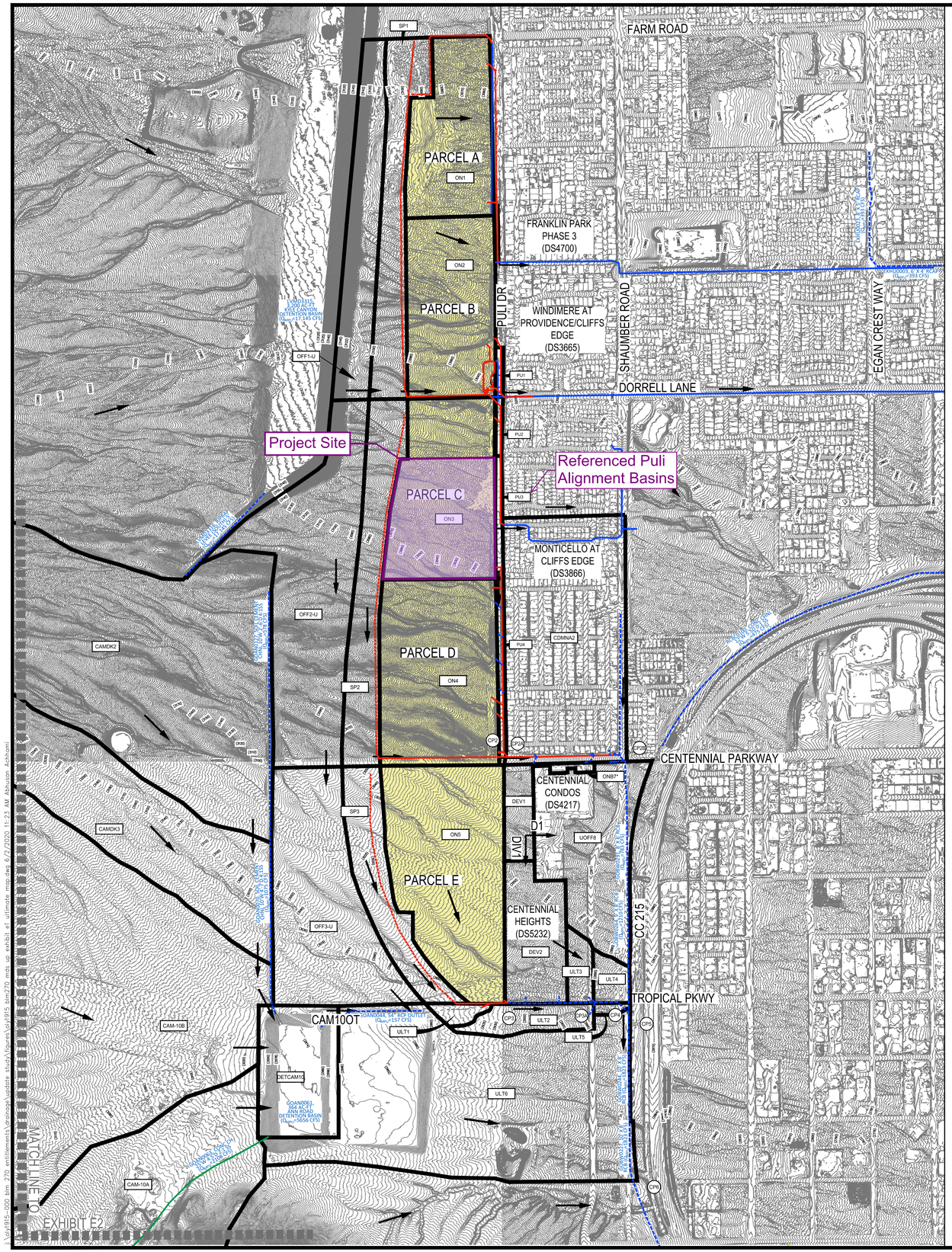
Westwood Professional Services, Inc.

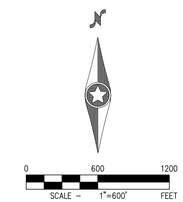
NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

OLYMPIA
BLM 270
PROPOSED CONDITION HYDROLOGIC MAP

DATE: JUNE 2020
DRAFTER: ARP
DESIGNER: ARP
CHECKED: LL/ARP
PROJECT NO. OLY1915.000

EXHIBIT D1
SHEET 1 OF 1





LEGEND

- BASIN BOUNDARY
- EXISTING DRAINAGE FACILITY
- PROPOSED DRAINAGE FACILITY
- PROPOSED DITCH
- FUTURE DRAINAGE FACILITY
- ID — BASIN ID
- PROPOSED DEVELOPMENT PARCEL
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID

Referenced Basin

Referenced Basins

Ultimate Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
ON1	0.06	53	13
ON2	0.07	121	50
ON3	0.08	155	75
ON4	0.09	187	92
ON5	0.11	193	88
SP1	0.05	87	36
SP2	0.06	96	46
SP3	0.04	77	36
OFF1-U	0.05	115	54
OFF2-U	0.12	254	124
OFF3-U	0.09	199	97
CAMDK2	0.34	585	274
CAMDK3	0.32	549	242
CAM-10B	1.81	2734	1255
CAM-10A	1.25	2108	1050
DETCAM10	0.05	80	33
UOFF8	0.07	143	66
PUL1	0.00	4	2
PUL2	0.00	5	2
PUL3	0.00	9	4
PUL4	0.01	12	6
DEV1	0.01	29	14
DEV2	0.04	61	25
ULT1	0.00	11	5
ULT2	0.01	35	17
ULT3	0.01	14	5
ULT4	0.01	13	5
ULT5	0.00	4	2
ULT6	0.21	411	192
ONB7*	0.00	3	2
CDMNA2**	0.13	221	102
CP1 Q = ON2 + SP1 + OFF1-U	0.17	303	130
CP2 Q = ON3 + ON4	0.18	343	167
CP2A Q = CP2 + SP2	0.23	439	213
CP2B Q = CP2A + CDMNA2** + ONB7* + PUL3 + PUL4	0.37	681	326
CP3 Q = SP3 + ON5 + ULT1	0.15	275	127
DIV1*** Flow from DEV1 south thru DEV2	0.01	18	8
D1*** Flow from DEV1 east thru IOFF8	0.01	11	6
CP3A Q = CP3 + DIV1*** + DEV2 + ULT2 + ULT3	0.22	382	171
CP4 Q = CP3A + ULT4 +ULT5	0.23	398	175
CP5 Q = CP2B + CP4 + D1*** + UOFF8	0.67	1171	566
CAM10OT Discharge from Detention Basin	3.76	157	107
CP6 Q = CP5 + CAM10OT + OFF2-U + OFF3-U + ULT6	4.84	1895	1014

*Referenced from Condos Study (DS 4217)
**Referenced from Beltway Study (L-1803)
***Diversion referenced from Townhomes Study (DS 5232)

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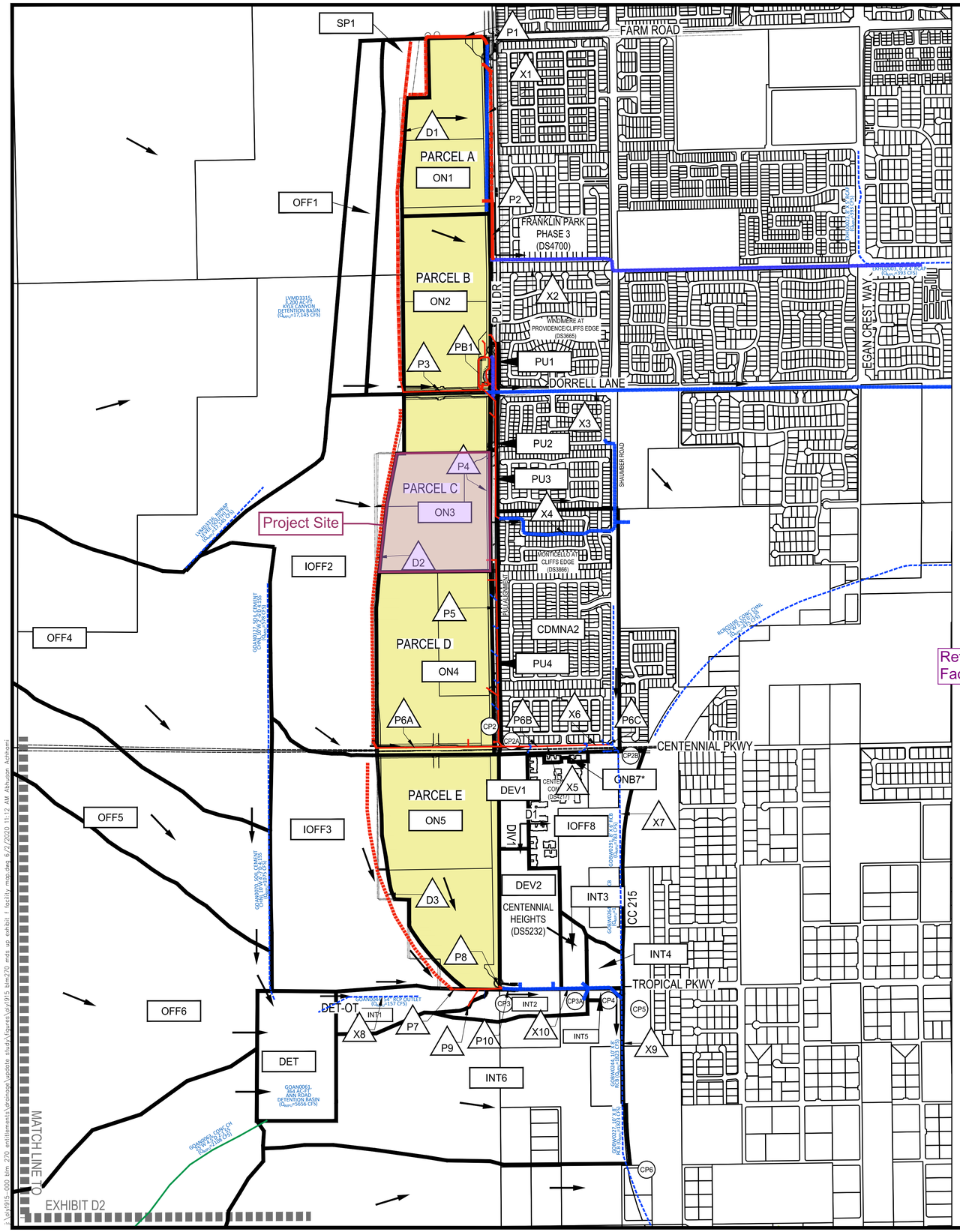
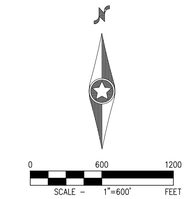
NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

OLYMPIA
BLM 270
ULTIMATE CONDITION HYDROLOGIC MAP

DATE: JUNE 2020
DRAFTER: ARP
DESIGNER: ARP
CHECKED: LL/ARP
PROJECT NO. OLY1915.000

EXHIBIT E1
SHEET 1 OF 1





LEGEND

- BASIN BOUNDARY
- ID — BASIN ID
- PROPOSED DEVELOPMENT PARCEL
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID
- EXISTING DRAINAGE FACILITY
- PROPOSED DRAINAGE FACILITY
- PROPOSED DITCH
- FUTURE DRAINAGE FACILITY

Referenced Facilities

Proposed Facility Hydraulic Summary Table

Facility ID	Facility Description	Length (FT)	Slope %	Flow Q_{100} (cfs)	Notes
P1	Proposed 18" RCP	780	3.0	9	
P2	Proposed 54" RCP	759	3.0	53	
P3	Proposed 66" RCP	907	4.2	202	
P4	Proposed 60" RCP	1900	2.0	130	
P5	Proposed 54" RCP	2125	2.1	155	
P6A	Proposed 48" RCP	1550	4.5	202	IOFF2
P6B	Proposed 60" RCP	1100	4.5	503	CP2A
P6C	Proposed 5'x5' RCB	250	4.5	527	CP2A + PUL3 + PUL4 + ONB7*
P7	Proposed 60" RCP	700	3.4	216	IOFF3
P8	Proposed 66" RCP	100	3.4	155	ON5
P9	Proposed 60" RCP	50	3.0	138	CPSLAT
P10	Proposed 60" RCP	200	4.0	468	CP3 = CPSLAT + ON5 + IOFF3
D1	Trapezoidal Ditch	3888	0.5	202	Bottom Width 35-ft w/ 3:1 SS
D2	Trapezoidal Ditch	3909	0.5	202	Bottom Width 35-ft w/ 3:1 SS
D3	Trapezoidal Ditch	2800	0.5	216	Bottom Width 35-ft w/ 3:1 SS

Existing Facility Hydraulic Summary Table

Facility ID	Facility Description	Design Flowrate (cfs)	Proposed Flowrate (cfs)	Notes
X1	Existing 18" RCP	4	9	
X2	Existing 42" RCP	62	62	
X3	Existing 24" RCP	30	33	
X4	Existing 48" RCP	85	130	
X5	Existing 36" RCP	63	-	Replace with P6B
X6	Existing 54" RCP	501	-	CCRFCD Facilility; Replace with P6B
X7	Existing 8'x6' RCB	783	745	CCRFCD Facilility
X8	Existing 54" RCP	157	157	CCRFCD Facilility
X9	Existing 10'x8' RCB	1823	1334	CCRFCD Facilility
X10	Existing Storm Drain	439	439	Built with Centennial Townhomes

Peaking Basin Hydraulic Summary Table

Facility ID	Inflow	Outflow	Notes
PB1	303	150	300' x 100' Peaking Basin w/ 3 ac-ft max storage

Proposed Condition Flow Rate Summary

Basin/Concentration Point ID	Area (mi^2)	Q_{100} (cfs)	Q_{10} (cfs)
ON1	0.06	53	13
ON2	0.07	121	50
ON3	0.08	155	75
ON4	0.09	187	92
ON5	0.11	193	88
SP1	0.05	87	36
OFF1	0.06	75	27
IOFF2	0.17	202	80
IOFF3	0.14	216	83
OFF4	0.34	508	200
OFF5	0.32	392	157
OFF6	1.81	2311	987
OFF7	1.25	1429	610
IOFF8	0.07	122	49
PUL1	0.00	4	2
PUL2	0.00	5	2
PUL3	0.00	9	4
PUL4	0.01	12	6
DET	0.05	80	33
DEV1	0.01	29	14
DEV2	0.04	61	25
INT1	0.02	27	8
INT2	0.02	25	10
INT3	0.01	3	<1
INT4	0.01	3	<1
INT5	0.00	2	1
INT6	0.19	299	115
ONB7*	0.00	3	2
CDMNA2**	0.13	221	102
CP1 Q = ON2 + SP1 + OFF1	0.18	279	113
CP2 Q = ON3 + ON4	0.18	343	167
CP2A Q = CP2 + IOFF2	0.34	503	226
CP2B Q = CP2A + PUL3 + PUL4 + CDMNA2** + ONB7*	0.48	745	339
DET-OT Discharge from Detention Basin	3.76	137	95
CPSLAT Q = DET-OT + INT1	3.78	138	95
CP3 Q = CPSLAT + ON5 + IOFF3	4.03	468	240
DIV1*** Flow from DEV1 south thru DEV2	0.01	18	8
D1*** Flow from DEV1 east thru IOFF8	0.01	11	6
CP3A Q = CP3 + DIV1** + DEV2 + INT2 + INT3	4.09	556	279
CP4 Q = CP3A + INT4 +INT5	4.09	560	280
CP5 Q = CP2B + CP4 + D1*** + IOFF8	4.65	1334	675
CP6 Q = CP5 + INT6	4.89	1594	790

*Referenced from Condos Study (DS 4217)
**Referenced from Beltway Study (L-1803)
***Diversion referenced from Townhomes Study (DS 5232)

NOTES:

1. REFER TO EXHIBIT D2 FOR THE FULL EXTENTS OF THE PROPOSED CONDITION DRAINAGE BASINS.
2. PROPOSED CONDITION CONTROLS DESIGN; UTIMATE CONDITION FLOWS REDUCED BY FUTURE SHEEP MOUNTAIN PARKWAY IMPROVEMENTS

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

OLYMPIA

BLM 270
FACILITY MAP

DATE: JUNE 2020
DRAFTER: ARP
DESIGNER: ARP
CHECKED: LL/ARP
PROJECT NO.
OLY1915.000

EXHIBIT F
SHEET 1 OF 1

Hydraulic Computations

Flow Master Normal Depth (Ditch Section)

Worksheet for D2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.50	%
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	45.00	ft
Discharge	368.00	ft^3/s

Results

Normal Depth	1.36	ft
Flow Area	66.64	ft^2
Wetted Perimeter	53.59	ft
Hydraulic Radius	1.24	ft
Top Width	53.15	ft
Critical Depth	1.24	ft
Critical Slope	0.00680	ft/ft
Velocity	5.52	ft/s
Velocity Head	0.47	ft
Specific Energy	1.83	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	1.36	ft
Critical Depth	1.24	ft
Channel Slope	0.50	%

Worksheet for D2

GVF Output Data

Critical Slope	0.00680	ft/ft

Cross Section for D2

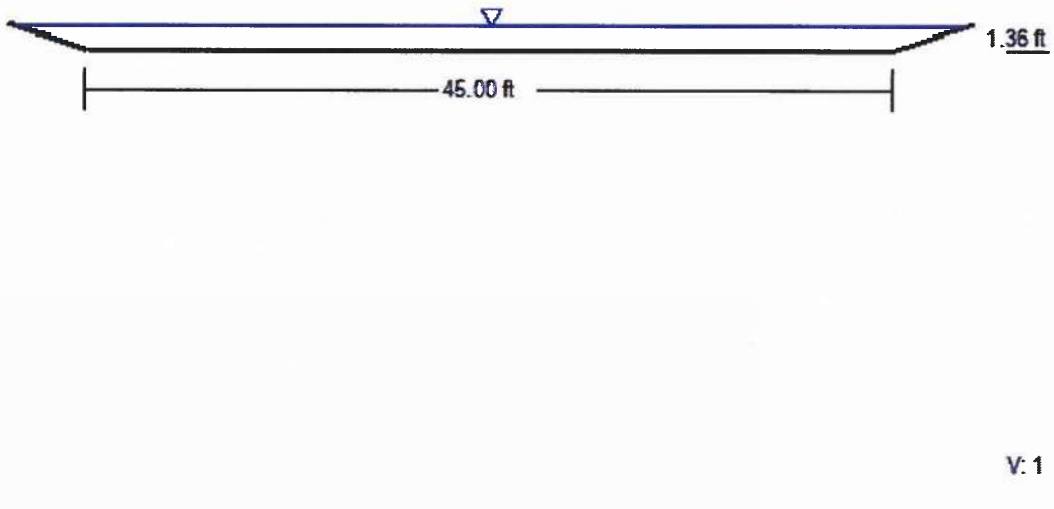
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.50	%
Normal Depth	1.36	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	45.00	ft
Discharge	368.00	ft^3/s

Cross Section Image



APPENDIX F

Reference Material
Technical Drainage Study for the BLM 270 –
Centennial Parkway Infrastructure
By Westwood (DS5280)

Approval Letters

ADDENDUM NO. 1 TO THE TECHNICAL DRAINAGE STUDY

BLM 270 Infrastructure Centennial Parkway

PREPARED FOR:

190 Octane FT Partners, LLC
Las Vegas, Nevada

PREPARED BY:

Westwood

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: August 3, 2020
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:			**COPIES TO:**
BLM 270 Centennial Parkway and Puli Drive Infrastructure				Westwood Professional Services
Cross Streets:	Puli Drive and Dorrell Lane/Farm Road			190 Octane FT Partners, LLC
File Number:	F:\Depot\DSMemos\DS05284B.doc			Bart Anderson, P.E., DevCo
Parcel Number:	126-14-000-001, 126-24-499-010, 126-25-201-010			CCRFCD
Zoning Action:	TMP-78365			
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	5/26/2020	6/15/2020	See Comments Below	$400.00	3871270: $400
2nd Submittal	7/10/2020	8/3/2020		$400.00	3911632: $400
			TOTAL FEES (LDDRS):	**$800.00**	**----**

REMARKS:

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

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

The following are comments pertaining to the subject site specific drainage study and grading plans:

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

   Please note that effective April 6, 2020, only electronic submittals to the CCRFCD will be accepted for regional concurrence. Contact cwang@regionalflood.org for direction.

   When it's applicable, structural calculations of facilities must be approved by the City prior to submittal to the Clark County Regional Flood Control District for their review and concurrence.

2. The proposed improvement plans show drainage facilities of a size that must be reviewed for Maintenance and Access concerns. The engineer must submit an extra set of improvement plans to CLV Flood Control Section that will be forwarded to the Streets & Sanitation Department for their review. Streets & Sanitation approval must be secured prior to drainage study approval.

3. The project proposes to build a temporary drainage facilities. Prior to final plan approval the developer must complete a maintenance and liability agreement for the interim drainage improvements (off-site berms or channels) and post a minimum maintenance bond of $50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must

submit an estimate of the quantities for constructing the facility and an exhibit that adequately shows the location and limits of the drainage facility to City of Las Vegas Flood Control for approval. Once the drainage study is conditionally approved, the engineer should contact the City's Land Development Section (229-6371) to begin the agreement process.

The temporary drainage facilities shall be maintained by the Master Developer and cannot be transferred to any HOAs.

In order for the maintenance bond to be released in the future, a drainage update / letter will be required to justify that the offsite berms / channels are no longer necessary and can be removed.

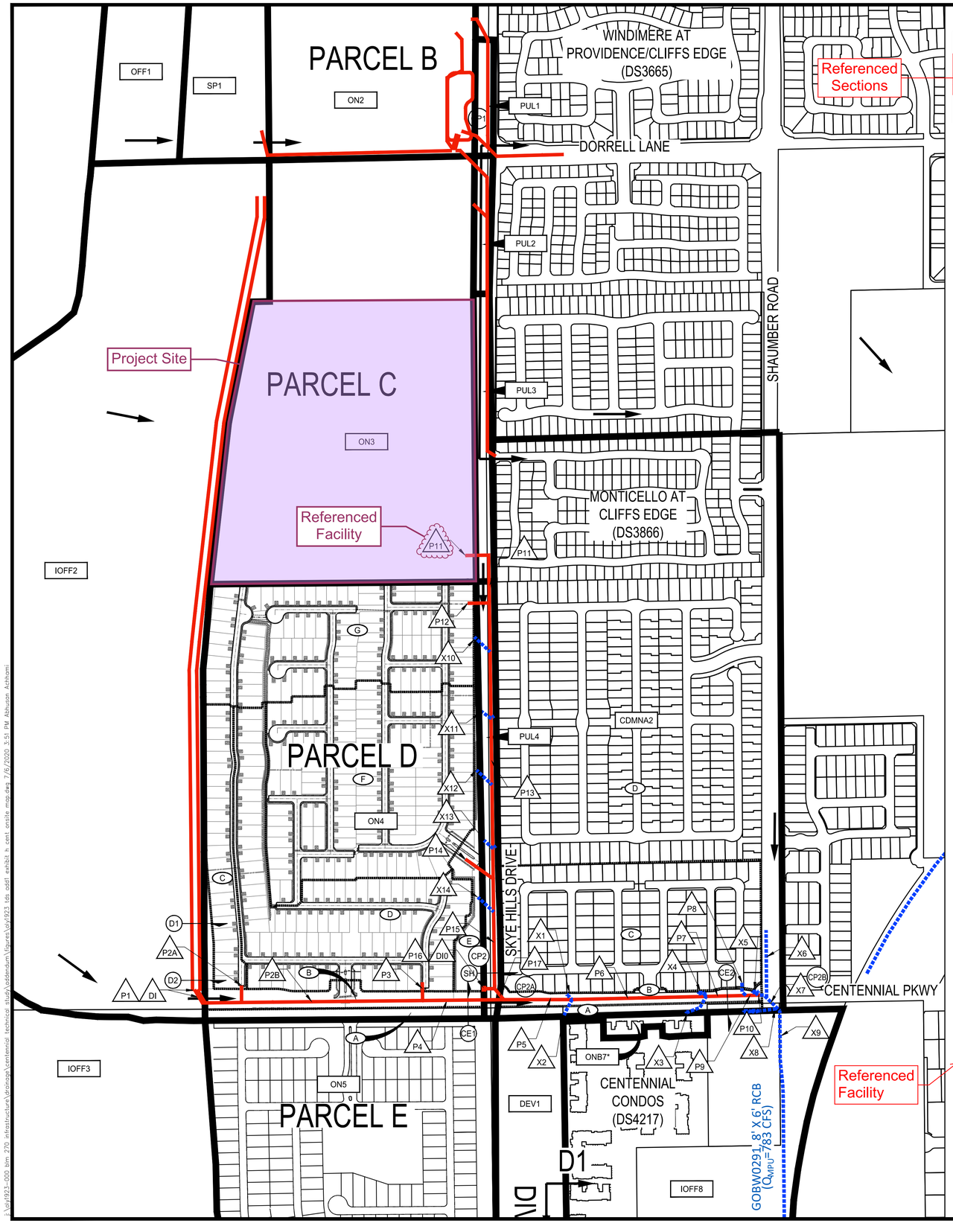
4. All special structures and mainline storm drain connection require details and structural calculations to be reviewed by the City of Las Vegas Building & Safety Department. Approval by the Building Department must be obtained prior to the final approval of the subject drainage study.
5. Provide details of the proposed junction structure.
6. Provide a 12-foot maintenance road along the proposed storm drain system in order to access storm drain manholes within the Puli Trail.
7. The proposed storm drain is within the public right-of-way and future Puli Trail. Development of the future trail will require access to the existing storm drain manholes.

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/R59E/S23
AREA F-23

Drainage Exhibits



Proposed Offsite Ditch Hydraulic Summary Table
Freeboard Calculations based on Section 706 from the CCRDCD Manual

Cross Section	Contributing Basin(s)	Q_{100} (cfs)	Slope (%)	Flow Velocity	Flow Depth	Froude No.	Freeboard (ft)	Total Depth	Design Depth	Notes
D1	IOFF2	202	0.50	4.41	1.19	0.75	1.00	2.19	2.2	
D2	IOFF2	202	8.80	7.88	0.69	1.72	1.17	1.86	1.9	Specific Energy = 1.66-ft

Equation 741: Fb=0.5+V^2/2g (Sub-critical)
Equation 747: Fb=1.0+.025VD^1/3 (Super-critical)
Note: Per Section 706.1.3 in no case shall the freeboard be less than 1 foot. All channel linings must extent to freeboard height.

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)
ON4	187	92	60.7	3.1	1.5
CDMNA2	221	102	80.0	2.8	1.3
Subbasin ID	**Q_{100} (cfs)**	**Q_{10} (cfs)**	**Area (acres)**	**100-yr Unit Flow (cfs/acre)**	**10-yr Unit Flow (cfs/acre)**
ON4(A)	4	2	1.3	3.1	1.5
ON4(B)	9	5	3.0	3.1	1.5
ON4(C)	13	6	4.1	3.1	1.5
ON4(D)	45	22	14.5	3.1	1.5
ON4(E)	10	5	3.2	3.1	1.5
ON4(F)	60	30	19.6	3.1	1.5
ON4(G)	46	23	15.0	3.1	1.5
TOTAL	***187***	***92***	***60.7***		
CDMNA2(A)	4	2	1.4	2.8	1.3
CDMNA2(B)	5	2	1.8	2.8	1.3
CDMNA2(C)	47	22	16.9	2.8	1.3
CDMNA2(D)	166	76	60.0	2.8	1.3
TOTAL	***221***	***102***	***80.0***		

Proposed Condition 100-Year Street Flow Summary

Section ID	Q_{100} (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV
CE1 (North) (Q = ON4(B))	9	2.00	0.44	3.77	1.7
		6.50	0.38	5.91	2.2
CE1 (South) (Q = ON4(A))	4	2.00	0.35	3.28	1.1
		6.50	0.30	4.92	1.5
CE2 (North) (Q = ON4(B) + ON4(E) +PUL3 + PUL4 + CDMNA2(B))	45	2.00	0.70	5.57	3.9
		6.03	0.59	8.42	5.0
CE2 (South) (Q = ON4(A)+ONB7*+CDMNA2(A))	11	2.00	0.47	3.96	1.9
		6.03	0.40	6.02	2.4
SH (Q = PUL3 + PUL4 + ON4(E))	31	1.00	0.50	3.28	1.6
		2.75	0.44	4.49	2.0

Proposed Condition Drainage Facility Summary (Centennial Parkway)

Facility ID	Facility Description	Contributing Flows	WSPW Model	Q_{100} (cfs)	Comment
D1	Proposed Dual Field Inlets	IOFF2	N/A	202	Half to each inlet
P1	Proposed Dual 48" RCP	IOFF2	CE-LAT	202	Half to each lateral
P2A	Proposed 18" RCP	ON4(C)	CE-LAT	13	
P2B	Proposed 48" RCP	IOFF2	CE-LAT	215	
P3	Proposed 36" RCP	ON4(D)	Lateral Loss	44	
P4	Proposed 54" RCP	IOFF2 + ON4(C) + ON4(D)	CE-LAT	259	In CE-LAT model, Q=259 cfs; but Q added at junction in CE-SH model is 247 cfs
P5	Proposed 60" RCP; Replace Ex 36"	CP2A	CE-SH	503	Q(design)=63 cfs for existing 36"
X1	Existing Inlet and Lateral	N/A	N/A	0	Nuisance Flows Only; Connect existing lateral into proposed main
X2	Existing Inlet and Lateral	N/A	N/A	0	Nuisance Flows Only; Connect existing lateral into proposed main
P6	Proposed 60" RCP; Replace Ex 36"	CP2A	CE-SH	503	Q(design)=63 cfs for existing 36"
X3	Existing Inlet and Lateral	N/A	N/A	0	Nuisance Flows Only; Connect existing lateral into proposed main
X4	Existing Inlet and 29"x45" HERCP Lateral	PUL3 + PUL4 + ON4(B) + CDMNA2(B)	CE-SH	33	Q(design)= 89 cfs
P7	Proposed 60" RCP; Replaces Ex 54" RCP	CP2A + PUL3 + PUL4 + ON4(B) + CDMNA2(B)	CE-SH	536	Ex 54" RCP = GOBW 0310; Q(design)= 327 cfs Q(2018 MPU) = 501 cfs
P8	Existing 24" RCP	10-yr CDMNA2(C)	CE-SH	22	Q(design)=31 cfs per Pod 307; 10-year flows only
P9	Proposed 5'x5' RCB; Replaces Ex 54" RCP	CP2A + PUL3 + PUL4 + ON4(B) + CDMNA2(B) + 10-yr CDMNA2(C)	CE-SH	558	Ex 54" RCP = GOBW 0310; Q(design)= 327 cfs Q(2018 MPU) = 501 cfs
X5	Existing Inlet and 29"x45" HERCP Lateral	100-yr CDMNA2(C) - 10-yr CDMNA(C)	CE-SH	25	Q(design)= 89 cfs
P10	Proposed 5'x5' RCB; Replaces Ex 54" RCP	CP2A + PUL3 + PUL4 + ON4(B) + CDMNA2(B+C)	CE-SH	583	Ex 54" RCP = GOBW 0310; Q(design)= 327 cfs Q(2018 MPU) = 501 cfs
X6	Existing 72" RCP	CDMNA2(D)	CE-SH	166	Q(design) = 329 cfs
X7	GOBW 0291: Existing 8'x6' RCB	CP2A + PUL3 + PUL4 + ON4(B) + CDMNA2 (B+C)	CE-SH	749	Q(design) = 656 cfs; Q(2018 MPU)= 783 cfs;
X8B	Existing Curb Inlets with 54" RCP Lateral	ON4(A) + CDMNA2(A) + ONB7*	CE-SH	12	Q(design)=178.5 cfs
X9	GOBW 0291: Existing 8'x6' RCB	CP2A + PUL3 + PUL4 + ON4(A+B) + CDMNA2	CE-SH	761	Q(design) = 814 cfs; Q(2018 MPU)= 783 cfs; Q(CP2B) = 745 cfs

Proposed Condition Drainage Facility Summary (Skye Hills Drive)

Facility ID	Facility Description	Contributing Flows	WSPW Model	Q_{100} (cfs)	Comment
P11	Proposed 54" RCP	ON3	CE-SH	155	
P12	Proposed 24" RCP	ON4(G)	CE-SH	46	
X10 thru X14	Existing laterals	N/A	N/A	0	Nuisance Flows Only; Connect existing lateral into proposed main
P13	Proposed 54" RCP; Replaces Ex 36" RCP	ON3 + ON4(G)	CE-SH	201	
P14	Proposed 54" RCP	ON4(D)	CE-SH	61	
P15	Proposed 60" RCP; Replaces Ex 36" RCP	ON3 + ON4(D)	CE-SH	262	
DI0	Proposed Curb Inlet	N/A	N/A	0	Nuisance flows only
P16	Proposed 24" RCP	N/A	N/A	0	Nuisance flows only
P17	Proposed 60" RCP; Replaces Ex 36" RCP	ON3 + ON4(D)	CE-SH	262	

Proposed Condition Flow Rate Summary

Basin/Concentration Point ID	Area (mi^2)	Q_{100} (cfs)	Q_{10} (cfs)
ON1	0.06	53	13
ON2	0.07	121	50
ON3	0.08	155	75
ON4	0.09	187	92
ON5	0.11	193	88
SP1	0.05	87	36
OFF1	0.06	75	27
IOFF2	0.17	202	80
IOFF3	0.14	216	83
OFF4	0.34	508	200
OFF5	0.32	392	157
OFF6	1.81	2311	987
OFF7	1.25	1429	610
IOFF8	0.07	122	49
PUL1	0.00	4	2
PUL2	0.00	5	2
PUL3	0.00	9	4
PUL4	0.01	12	6
DET	0.05	80	33
DEV1	0.01	29	14
DEV2	0.04	61	25
INT1	0.02	27	8
INT2	0.02	25	10
INT3	0.01	3	<1
INT4	0.01	3	<1
INT5	0.00	2	1
INT6	0.19	299	115
ONB7*	0.00	3	2
CDMNA2**	0.13	221	102
CP1 Q = ON2 + SP1 + OFF1	0.18	279	113
CP2 Q = ON3 + ON4	0.18	343	167
CP2A Q = CP2 + IOFF2	0.34	503	226
CP2B Q = CP2A + PUL3 + PUL4 + CDMNA2** + ONB7*	0.48	745	339
DET-OT Discharge from Detention Basin	3.76	137	95
CPSLAT Q = DET-OT + INT1	3.78	138	95
CP3 Q = CPSLAT + ON5 + IOFF3	4.03	468	240
DIV1*** Flow from DEV1 south thru DEV2	0.01	18	8
D1*** Flow from DEV1 east thru IOFF8	0.01	11	6
CP3A Q = CP3 + DIV1** + DEV2 + INT2 + INT3	4.09	556	279
CP4 Q = CP3A + INT4 +INT5	4.09	560	280
CP5 Q = CP2B + CP4 + D1*** + IOFF8	4.65	1334	675
CP6 Q = CP5 + INT6	4.89	1594	790

*Referenced from Condos Study (DS 4217)
**Referenced from Beltway Study (L-1803)
***Diversion referenced from Townhomes Study (DS 5232)

NOTES:
1. REFER TO EXHIBIT E FOR THE FULL EXTENTS OF THE PROPOSED CONDITION DRAINAGE BASINS.
2. PROPOSED CONDITION CONTROLS DESIGN; ULTIMATE CONDITION FLOWS REDUCED BY FUTURE SHEEP MOUNTAIN PARKWAY IMPROVEMENTS

N

0 250 500
SCALE – 1"=250' FEET

LEGEND

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

Westwood
Phone (702) 284-5300
Fax (702) 284-5399
5740 S. Arville Street
Suite 216
Las Vegas, NV 89118
westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

OLYMPIA

BLM 270 CENTENNIAL INFRASTRUCTURE
CENTENNIAL INFRASTRUCTURE MAP

DATE: JULY 2020
DRAFTER: ARP
DESIGNER: ARP
CHECKED: LL/ARP
PROJECT NO. OLY1923.000

EXHIBIT H
SHEET 1 OF 1

Hydraulic Computations

Ditch Computations

Worksheet for Section D1 - Pro Ditch min%

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)
Bottom Width	35.00	ft
Discharge	202.00	ft^3/s

Results

Normal Depth	1.19	ft
Flow Area	45.76	ft^2
Wetted Perimeter	42.51	ft
Hydraulic Radius	1.08	ft
Top Width	42.12	ft
Critical Depth	0.98	ft
Critical Slope	0.00949	ft/ft
Velocity	4.41	ft/s
Velocity Head	0.30	ft
Specific Energy	1.49	ft
Froude Number	0.75	
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	1.19	ft
Critical Depth	0.98	ft
Channel Slope	0.50	%

Worksheet for Section D1 - Pro Ditch min%

GVF Output Data

Critical Slope	0.00949	ft/ft

Cross Section for Section D1 - Pro Ditch min%

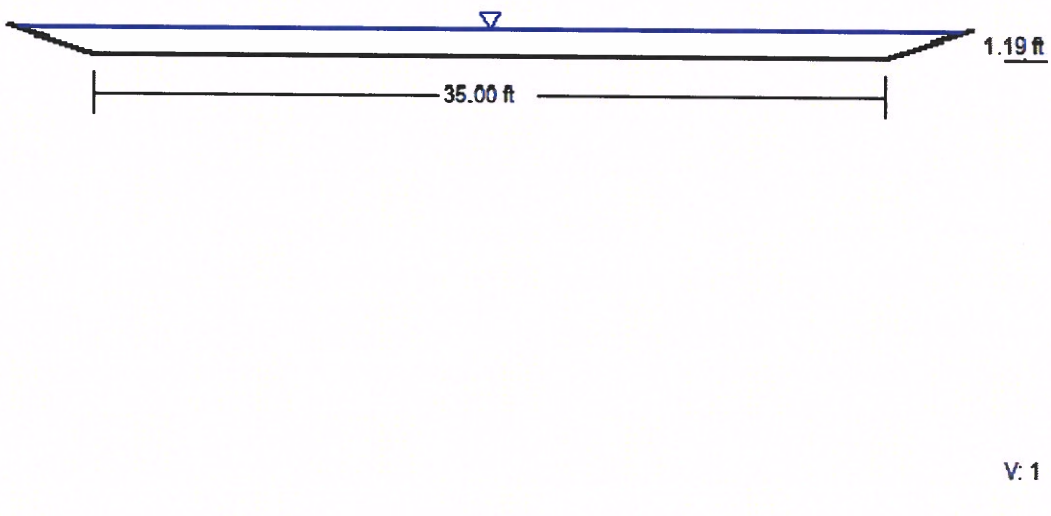
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.50	%
Normal Depth	1.19	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	35.00	ft
Discharge	202.00	ft^3/s

Cross Section Image



Worksheet for Section D2 - Pro Ditch max%

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.042	
Channel Slope	8.80	%
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	35.00	ft
Discharge	202.00	ft^3/s

Results

Normal Depth	0.69	ft
Flow Area	25.62	ft^2
Wetted Perimeter	39.37	ft
Hydraulic Radius	0.65	ft
Top Width	39.15	ft
Critical Depth	0.98	ft
Critical Slope	0.02678	ft/ft
Velocity	7.88	ft/s
Velocity Head	0.97	ft
Specific Energy	1.66	ft
Froude Number	1.72	
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	0.69	ft
Critical Depth	0.98	ft
Channel Slope	8.80	%

Worksheet for Section D2 - Pro Ditch max%

GVF Output Data

Critical Slope	0.02678	ft/ft

Cross Section for Section D2 - Pro Ditch max%

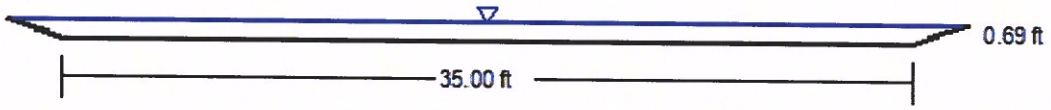
Project Description

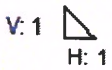
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.042	
Channel Slope	8.80	%
Normal Depth	0.69	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	35.00	ft
Discharge	202.00	ft^3/s

Cross Section Image





Centennial-Skye Hills Main

```
T1 OLY1923 BLM 270 INFRASTRUCTURE
T2 CENTENNIAL PARKWAY THEN PULI ALIGNMENT
T3 FROM BELTWAY FACILITY EAST IN CENTENNIAL THEN NORTH IN PULI ALIGNMENT
SO   3364.51 2901.27  86                              0.000
R    3453.26 2903.32  86      .015                                        15.0
R    3454.26 2903.35  86      .015                                        15.0
R    3455.26 2903.37  86      .015                                        15.0
R    3467.09 2903.61  86      .015
JX   3472.09 2903.71  86 54   .015   12.0           2904.56          51.0
R    3505.31 2904.38  86      .015
R    3540.78 2905.11  86      .015                                                 1
JX   3545.78 2905.21  86 72   .015  166.0           2905.21          45.0
R    3558.07 2905.45  86      .015                                        15.0
R    3559.07 2905.47  86      .015                                        15.0
R    3560.07 2905.49  86      .015                                        15.0    1
R    3578.00 2905.85  86      .015                                                 1
WX   3578.00 2905.85  55      .015
R    3584.02 2907.15  55      .015                                                 1
JX   3589.02 2907.39  55 36   .015   25.0           2910.84          52.0
R    3640.17 2910.11  55      .015                                                 1
JX   3645.17 2911.11  60 24   .013   22.0           2912.37          46.0
R    3700.00 2913.69  60      .013                                                 1
R    3825.22 2918.70  60      .013                                                 1
JX   3830.22 2918.90  60 36 18.013   33.0      0.01 2922.08 2922.16  41.0 60.0
R    4145.33 2931.51  60      .013                                                 1
R    4455.42 2943.91  60      .013                                                 1
JX   4460.42 2944.11  60 18 18.013    0.01     0.01 2953.21 2953.21  48.0 61.0
R    4776.25 2956.74  60      .013                                        15.0    1
R    4777.25 2956.78  60      .013                                        15.0    1
R    4778.25 2956.82  60      .013                                        15.0    1
R    4779.25 2956.86  60      .013                                         5.0    1
JX   4780.25 2956.90  60 54   .013  241.0           2957.40          50.0
R    4844.76 2966.10  60      .013                                        15.0
R    4845.76 2966.24  60      .013                                        15.0
R    4846.76 2966.39  60      .013                                         9.0    1
JX   4847.76 2966.53  60 24   .013    0.01           2970.00          90.0
R    5203.12 2973.26  60      .013                                                 1
JX   5208.12 2973.35  60 24   .013    0.01           2975.50          46.0
R    5358.39 2975.68  60      .013
JX   5363.39 2976.18  54 54   .013   61.0           2976.18          54.0
R    5500.92 2977.76  54      .013                                                 1
JX   5505.92 2977.82  54 18 18.013    0.01     0.01 2982.96 2983.26  46.0 50.0
R    5799.38 2980.75  54      .013                                                 1
JX   5804.38 2980.80  54 24   .013    0.01           2984.50          45.0
R    6111.57 2986.95  54      .013                                                 1
JX   6116.57 2987.05  54 18 18.013    0.01     0.01 2992.10 2992.10  53.0 53.0
R    6423.76 2990.12  54      .013                                                 1
JX   6428.76 2990.17  54 24   .013    0.01           2995.29          46.0
R    6653.28 2993.69  54      .013                                                 1
JX   6658.28 2993.77  54 30   .013   46.0           2996.27          90.0
R    6883.28 2997.17  54      .013                                        15.0
```


Referenced storm drain model

```
                                                                                CE-SH.WSW
R     6883.78 2997.18  54      .013                                                15.0
R     6884.28 2997.19  54      .013                                                15.0
R     6884.78 2997.19  54      .013                                                15.0
R     6885.28 2997.20  54      .013                                                15.0
R     6885.78 2997.21  54      .013                                                15.0   1
JX    6888.28 2998.12   5      .013
R     6992.30 3002.65   5      .013                                                      1
SH    6992.30 3002.65   5
CD  18  4   1   0.000   1.500    0.000 0.000 0.000  0.0000.00  0.00
CD  24  4   1   0.000   2.000    0.000 0.000 0.000  0.0000.00  0.00
CD  30  4   1   0.000   2.500    0.000 0.000 0.000  0.0000.00  0.00
CD  36  4   1   0.000   3.000    0.000 0.000 0.000  0.0000.00  0.00
CD  48  4   1   0.000   4.000    0.000 0.000 0.000  0.0000.00  0.00
CD  54  4   1   0.000   4.500    0.000 0.000 0.000  0.0000.00  0.00
CD  60  4   1   0.000   5.000    0.000 0.000 0.000  0.0000.00  0.00
CD  66  4   1   0.000   5.500    0.000 0.000 0.000  0.0000.00  0.00
CD  72  4   1   0.000   6.000    0.000 0.000 0.000  0.0000.00  0.00
CD  55  3   0   0.000   5.000    5.000 0.000 0.000  0.0000.00  0.00
CD  86  3   0   0.000   6.000    8.000 0.000 0.000  0.0000.00  0.00
CD   5  6   0      0.0      0.0      0.0      0.0       0.0    0.0
PTS  516  0.00   1.79   0.22   1.10   0.81   0.54   1.85   0.11   2.83   0.00
PTS       3.81   0.11   4.85   0.54   5.45   1.10   5.66   1.79   5.45   2.48
PTS       4.85   3.05   3.81   3.47   2.83   3.58   1.85   3.47   0.81   3.05
PTS       0.22   2.48   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
Q           155.000
```

System head of main storm drain system (MAINC)

Connection to proposed storm drain

```
FILE: CE-SH.WSW                          W S P G W  - EDIT LISTING - Version 14.10              Date: 7- 6-2020  Time: 4:34:11
                                   WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING                                PAGE    1
 CARD  SECT  CHN   NO OF  AVE PIER  HEIGHT 1  BASE    ZL    ZR   INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)  Y(6)  Y(7)  Y(8)  Y(9)  Y(10)
 CODE   NO   TYPE PIER/PIP WIDTH    DIAMETER  WIDTH              DROP

 CD     18    4      1             1.500
 CD     24    4      1             2.000
 CD     30    4      1             2.500
 CD     36    4      1             3.000
 CD     48    4      1             4.000
 CD     54    4      1             4.500
 CD     60    4      1             5.000
 CD     66    4      1             5.500
 CD     72    4      1             6.000
 CD     55    3      0     .000    5.000    5.000    .000   .000    .00
 CD     86    3      0     .000    6.000    8.000    .000   .000    .00
 CD      5    6      0        .000
FILE:                                    W S P G W  - EDIT LISTING - Version 14.10              Date: 7- 6-2020  Time: 4:34:11
                                   WATER SURFACE PROFILE - CROSS SECTION POINT LISTING                               PAGE    2
   CARD  SECT  NO OF    X(1) , Y(1)    X(2) , Y(2)    X(3) , Y(3)    X(4) , Y(4)    X(5) , Y(5)    X(6) , Y(6)    X(7) , Y(7)
   CODE   NO   POINTS   X(8) , Y(8)    X(9) , Y(9)   X(10) ,Y(10)   X(11) ,Y(11)    X(N) , Y(N)   X(N+1),Y(N+1)  X(35) ,Y(35)

   PTS     5    16        .000   1.790     .220   1.100     .810    .540    1.850    .110    2.830    .000    3.810    .110    4.850    .540
   PTS                  5.450   1.100    5.660   1.790    5.450   2.480    4.850   3.050    3.810   3.470    2.830   3.580    1.850   3.470
   PTS                   .810   3.050     .220   2.480
                                                W S P G W                                                          PAGE NO   1
                          WATER SURFACE PROFILE - TITLE CARD LISTING
HEADING LINE NO 1 IS -
                            OLY1923 BLM 270 INFRASTRUCTURE
HEADING LINE NO 2 IS -
                            CENTENNIAL PARKWAY THEN PULI ALIGNMENT
HEADING LINE NO 3 IS -
                            FROM BELTWAY FACILITY EAST IN CENTENNIAL THEN NORTH IN PULI ALIGNMENT
                                                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
                                3364.510 2901.270   86                                          .000
 ELEMENT NO   2 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                     RADIUS    ANGLE     ANG PT  MAN H
                                3453.260 2903.320   86             .015                      .000     .000    15.000     0
 ELEMENT NO   3 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                     RADIUS    ANGLE     ANG PT  MAN H
                                3454.260 2903.350   86             .015                      .000     .000    15.000     0
 ELEMENT NO   4 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                     RADIUS    ANGLE     ANG PT  MAN H
                                3455.260 2903.370   86             .015                      .000     .000    15.000     0
 ELEMENT NO   5 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                     RADIUS    ANGLE     ANG PT  MAN H
                                3467.090 2903.610   86             .015                      .000     .000      .000     0
 ELEMENT NO   6 IS A JUNCTION          *         *     *     *                  *                *               *
```

```
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           3472.090 2903.710   86    54     0   .015    12.000      .000  2904.560      .000  51.000     .000
                                                                                                RADIUS    ANGLE
                                                                                                  .000    .000
ELEMENT NO   7 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           3505.310 2904.380   86               .015                             .000     .000      .000     0
ELEMENT NO   8 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           3540.780 2905.110   86               .015                             .000     .000      .000     1
ELEMENT NO   9 IS A JUNCTION         *         *     *     *                 *                   *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           3545.780 2905.210   86    72     0   .015   166.000      .000  2905.210      .000  45.000     .000
                                                                                                RADIUS    ANGLE
                                                                                                  .000    .000
ELEMENT NO  10 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           3558.070 2905.450   86               .015                             .000     .000    15.000     0
                                                W S P G W                                                                PAGE NO   3
                      WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  11 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           3559.070 2905.470   86               .015                             .000     .000    15.000     0
ELEMENT NO  12 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           3560.070 2905.490   86               .015                             .000     .000    15.000     1
ELEMENT NO  13 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           3578.000 2905.850   86               .015                             .000     .000      .000     1
ELEMENT NO  14 IS A  WALL  EXIT                    *
                U/S DATA   STATION    INVERT  SECT
                           3578.000 2905.850   55
ELEMENT NO  15 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           3584.020 2907.150   55               .015                             .000     .000      .000     1
ELEMENT NO  16 IS A JUNCTION         *         *     *     *                 *                   *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           3589.020 2907.390   55    36     0   .015    25.000      .000  2910.840      .000  52.000     .000
                                                                                                RADIUS    ANGLE
                                                                                                  .000    .000
ELEMENT NO  17 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           3640.170 2910.110   55               .015                             .000     .000      .000     1
ELEMENT NO  18 IS A JUNCTION         *         *     *     *                 *                   *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           3645.170 2911.110   60    24     0   .013    22.000      .000  2912.370      .000  46.000     .000
                                                                                                RADIUS    ANGLE
                                                                                                  .000    .000
ELEMENT NO  19 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           3700.000 2913.690   60               .013                             .000     .000      .000     1
```

```
ELEMENT NO  20 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           3825.220 2918.700   60              .013                           .000     .000      .000     1
                                                                                                                  PAGE NO   4
                                          W S P G W
                     WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  21 IS A JUNCTION         *         *     *     *                 *                   *               *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           3830.220 2918.900   60    36    18   .013    33.000      .010  2922.080  2922.160  41.000   60.000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
ELEMENT NO  22 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           4145.330 2931.510   60              .013                           .000     .000      .000     1
ELEMENT NO  23 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           4455.420 2943.910   60              .013                           .000     .000      .000     1
ELEMENT NO  24 IS A JUNCTION         *         *     *     *                 *                   *               *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           4460.420 2944.110   60    18    18   .013      .010      .010  2953.210  2953.210  48.000   61.000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
ELEMENT NO  25 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           4776.250 2956.740   60              .013                           .000     .000    15.000     1
ELEMENT NO  26 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           4777.250 2956.780   60              .013                           .000     .000    15.000     1
ELEMENT NO  27 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           4778.250 2956.820   60              .013                           .000     .000    15.000     1
ELEMENT NO  28 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           4779.250 2956.860   60              .013                           .000     .000     5.000     1
ELEMENT NO  29 IS A JUNCTION         *         *     *     *                 *                   *               *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           4780.250 2956.900   60    54     0   .013   241.000      .000  2957.400      .000  50.000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
                                          W S P G W                                                               PAGE NO   5
                     WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  30 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           4844.760 2966.100   60              .013                           .000     .000    15.000     0
ELEMENT NO  31 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           4845.760 2966.240   60              .013                           .000     .000    15.000     0
ELEMENT NO  32 IS A REACH            *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           4846.760 2966.390   60              .013                           .000     .000     9.000     1
ELEMENT NO  33 IS A JUNCTION         *         *     *     *                 *                   *               *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
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                          4847.760 2966.530   60    24     0   .013      .010      .000  2970.000      .000  90.000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
ELEMENT NO  34 IS A REACH            *         *     *
                U/S DATA  STATION    INVERT  SECT                N                         RADIUS    ANGLE     ANG PT  MAN H
                          5203.120 2973.260   60                .013                          .000     .000      .000     1
ELEMENT NO  35 IS A JUNCTION         *         *     *     *                 *                 *                *
                U/S DATA  STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                          5208.120 2973.350   60    24     0   .013      .010      .000  2975.500      .000  46.000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
ELEMENT NO  36 IS A REACH            *         *     *
                U/S DATA  STATION    INVERT  SECT                N                         RADIUS    ANGLE     ANG PT  MAN H
                          5358.390 2975.680   60                .013                          .000     .000      .000     0
ELEMENT NO  37 IS A JUNCTION         *         *     *     *                 *                 *                *
                U/S DATA  STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                          5363.390 2976.180   54    54     0   .013    61.000      .000  2976.180      .000  54.000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
                                                W S P G W                                                          PAGE NO   6
                      WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  38 IS A REACH            *         *     *
                U/S DATA  STATION    INVERT  SECT                N                         RADIUS    ANGLE     ANG PT  MAN H
                          5500.920 2977.760   54                .013                          .000     .000      .000     1
ELEMENT NO  39 IS A JUNCTION         *         *     *     *                 *                 *                *
                U/S DATA  STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                          5505.920 2977.820   54    18    18   .013      .010      .010  2982.960  2983.260  46.000   50.000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
ELEMENT NO  40 IS A REACH            *         *     *
                U/S DATA  STATION    INVERT  SECT                N                         RADIUS    ANGLE     ANG PT  MAN H
                          5799.380 2980.750   54                .013                          .000     .000      .000     1
ELEMENT NO  41 IS A JUNCTION         *         *     *     *                 *                 *                *
                U/S DATA  STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                          5804.380 2980.800   54    24     0   .013      .010      .000  2984.500      .000  45.000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
ELEMENT NO  42 IS A REACH            *         *     *
                U/S DATA  STATION    INVERT  SECT                N                         RADIUS    ANGLE     ANG PT  MAN H
                          6111.570 2986.950   54                .013                          .000     .000      .000     1
ELEMENT NO  43 IS A JUNCTION         *         *     *     *                 *                 *                *
                U/S DATA  STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                          6116.570 2987.050   54    18    18   .013      .010      .010  2992.100  2992.100  53.000   53.000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
ELEMENT NO  44 IS A REACH            *         *     *
                U/S DATA  STATION    INVERT  SECT                N                         RADIUS    ANGLE     ANG PT  MAN H
                          6423.760 2990.120   54                .013                          .000     .000      .000     1
ELEMENT NO  45 IS A JUNCTION         *         *     *     *                 *                 *                *
                U/S DATA  STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                          6428.760 2990.170   54    24     0   .013      .010      .000  2995.290      .000  46.000     .000
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                                                                                                                  RADIUS    ANGLE
                                                                                                                    .000     .000
                                                W S P G W                                                                          PAGE NO   7
                        WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  46 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT                N                          RADIUS    ANGLE     ANG PT  MAN H
                           6653.280 2993.690   54                .013                           .000     .000      .000     1
ELEMENT NO  47 IS A JUNCTION           *         *     *     *                 *                 *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           6658.280 2993.770   54    30     0   .013    46.000      .000  2996.270      .000  90.000     .000
                                                                                                                  RADIUS    ANGLE
                                                                                                                    .000     .000
ELEMENT NO  48 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT                N                          RADIUS    ANGLE     ANG PT  MAN H
                           6883.280 2997.170   54                .013                           .000     .000    15.000     0
ELEMENT NO  49 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT                N                          RADIUS    ANGLE     ANG PT  MAN H
                           6883.780 2997.180   54                .013                           .000     .000    15.000     0
ELEMENT NO  50 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT                N                          RADIUS    ANGLE     ANG PT  MAN H
                           6884.280 2997.190   54                .013                           .000     .000    15.000     0
ELEMENT NO  51 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT                N                          RADIUS    ANGLE     ANG PT  MAN H
                           6884.780 2997.190   54                .013                           .000     .000    15.000     0
ELEMENT NO  52 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT                N                          RADIUS    ANGLE     ANG PT  MAN H
                           6885.280 2997.200   54                .013                           .000     .000    15.000     0
ELEMENT NO  53 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT                N                          RADIUS    ANGLE     ANG PT  MAN H
                           6885.780 2997.210   54                .013                           .000     .000    15.000     1
ELEMENT NO  54 IS A JUNCTION           *         *     *     *                 *                 *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           6888.280 2998.120    5     0     0   .013      .000      .000      .000      .000    .000     .000
                                                                                                                  RADIUS    ANGLE
                                                                                                                    .000     .000
ELEMENT NO  55 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT                N                          RADIUS    ANGLE     ANG PT  MAN H
                           6992.300 3002.650    5                .013                           .000     .000      .000     1
                                                W S P G W                                                                          PAGE NO   8
                        WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  56 IS A SYSTEM HEADWORKS                 *                        *
                U/S DATA   STATION    INVERT  SECT                                        W S ELEV
                           6992.300 3002.650    5                                            .000
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OLY1923 BLM 270 INFRASTRUCTURE
CENTENNIAL PARKWAY THEN PULI ALIGNMENT
FROM BELTWAY FACILITY EAST IN CENTENNIAL THEN NORTH IN PULI ALIGNMENT

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
3364.510	2901.270	4.116	2905.386	761.11	23.11	8.29	2913.68	.00	6.00	8.00	6.000	8.000	.00	0 .0
88.750	.0231					.0207	1.84	4.12	2.01	3.99	.015	.00	.00	BOX
3453.260	2903.320	4.188	2907.509	761.11	22.71	8.01	2915.52	.00	6.00	8.00	6.000	8.000	.00	0 .0
1.000	.0300					.0202	.02	4.19	1.96	3.61	.015	.00	.00	BOX
3454.260	2903.350	4.192	2907.542	761.11	22.70	8.00	2915.54	.00	6.00	8.00	6.000	8.000	.00	0 .0
1.000	.0200					.0202	.02	4.19	1.95	4.21	.015	.00	.00	BOX
3455.260	2903.370	4.192	2907.562	761.11	22.70	8.00	2915.56	.00	6.00	8.00	6.000	8.000	.00	0 .0
11.830	.0203					.0202	.24	4.19	1.95	4.18	.015	.00	.00	BOX
3467.090	2903.610	4.192	2907.802	761.11	22.70	8.00	2915.80	.00	6.00	8.00	6.000	8.000	.00	0 .0
JUNCT STR	.0200					.0210	.11	4.19	1.95		.015	.00	.00	BOX
3472.090	2903.710	4.019	2907.729	749.11	23.30	8.43	2916.16	.00	6.00	8.00	6.000	8.000	.00	0 .0
33.220	.0202					.0220	.73	4.02	2.05	4.14	.015	.00	.00	BOX
3505.310	2904.380	3.999	2908.379	749.11	23.41	8.51	2916.89	.00	6.00	8.00	6.000	8.000	.00	0 .0
35.470	.0206					.0223	.79	4.00	2.06	4.11	.015	.00	.00	BOX
3540.780	2905.110	3.981	2909.091	749.11	23.52	8.59	2917.68	.00	6.00	8.00	6.000	8.000	.00	0 .0
JUNCT STR	.0200					.0385	.19	3.98	2.08		.015	.00	.00	BOX
3545.780	2905.210	2.402	2907.612	583.11	30.34	14.30	2921.91	.00	5.49	8.00	6.000	8.000	.00	0 .0
12.290	.0195					.0559	.69	2.40	3.45	3.48	.015	.00	.00	BOX

OLY1923 BLM 270 INFRASTRUCTURE
CENTENNIAL PARKWAY THEN PULI ALIGNMENT
FROM BELTWAY FACILITY EAST IN CENTENNIAL THEN NORTH IN PULI ALIGNMENT

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
3558.070	2905.450	2.362	2907.812	583.11	30.86	14.79	2922.60	.00	5.49	8.00	6.000	8.000	.00	0 .0
1.000	.0200					.0574	.06	2.36	3.54	3.45	.015	.00	.00	BOX
3559.070	2905.470	2.359	2907.829	583.11	30.90	14.83	2922.66	.00	5.49	8.00	6.000	8.000	.00	0 .0
1.000	.0200					.0576	.06	2.36	3.55	3.45	.015	.00	.00	BOX
3560.070	2905.490	2.355	2907.845	583.11	30.94	14.87	2922.71	.00	5.49	8.00	6.000	8.000	.00	0 .0
17.930	.0201					.0599	1.07	2.36	3.55	3.44	.015	.00	.00	BOX
3578.000	2905.850	2.296	2908.146	583.11	31.74	15.64	2923.79	.00	5.49	8.00	6.000	8.000	.00	0 .0
WALL EXIT														
3578.000	2905.850	3.762	2909.612	583.11	31.00	14.92	2924.53	.00	5.00	5.00	5.000	5.000	.00	0 .0
6.020	.2159					.0543	.33	3.76	2.82	2.26	.015	.00	.00	BOX
3584.020	2907.150	3.912	2911.062	583.11	29.81	13.80	2924.86	.00	5.00	5.00	5.000	5.000	.00	0 .0
JUNCT STR	.0480					.0527	.26	3.91	2.66		.015	.00	.00	BOX
3589.020	2907.390	3.714	2911.104	558.11	30.05	14.03	2925.13	.00	5.00	5.00	5.000	5.000	.00	0 .0
51.150	.0532					.0540	2.76	3.71	2.75	3.73	.015	.00	.00	BOX
3640.170	2910.110	3.708	2913.818	558.11	30.11	14.07	2927.89	.00	5.00	5.00	5.000	5.000	.00	0 .0
JUNCT STR	.2000					.0396	.20	3.71	2.76		.013	.00	.00	BOX

---------- WARNING - Junction Analysis - Change in Channel Type ----------

Program Package Serial Number: 7189
WATER SURFACE PROFILE LISTING Date: 7- 6-2020 Time: 4:34:14

OLY1923 BLM 270 INFRASTRUCTURE
CENTENNIAL PARKWAY THEN PULI ALIGNMENT
FROM BELTWAY FACILITY EAST IN CENTENNIAL THEN NORTH IN PULI ALIGNMENT

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
3645.170	2911.110	4.353	2915.463	536.11	29.55	13.56	2929.02	.00	4.96	3.36	5.000	.000	.00	1 .0
54.830	.0471					.0380	2.08	4.35	2.24	3.89	.013	.00	.00	PIPE
3700.000	2913.690	4.490	2918.179	536.11	28.85	12.93	2931.10	.00	4.96	3.03	5.000	.000	.00	1 .0
125.220	.0400					.0370	4.64	4.49	2.05	4.24	.013	.00	.00	PIPE
3825.220	2918.700	4.620	2923.320	536.11	28.29	12.43	2935.75	.00	4.96	2.65	5.000	.000	.00	1 .0
JUNCT STR	.0400					.0382	.19	4.62	1.86		.013	.00	.00	PIPE
3830.220	2918.900	3.969	2922.869	503.10	30.10	14.07	2936.94	.00	4.95	4.05	5.000	.000	.00	1 .0
315.110	.0400					.0392	12.37	3.97	2.61	3.95	.013	.00	.00	PIPE
4145.330	2931.510	4.012	2935.522	503.10	29.79	13.78	2949.30	.00	4.95	3.98	5.000	.000	.00	1 .0
310.090	.0400					.0376	11.65	4.01	2.55	3.95	.013	.00	.00	PIPE
4455.420	2943.910	4.161	2948.071	503.10	28.81	12.89	2960.96	.00	4.95	3.74	5.000	.000	.00	1 .0
JUNCT STR	.0400					.0363	.18	4.16	2.35		.013	.00	.00	PIPE
4460.420	2944.110	4.165	2948.275	503.08	28.79	12.87	2961.14	.00	4.95	3.73	5.000	.000	.00	1 .0
76.478	.0400					.0358	2.74	4.16	2.34	3.95	.013	.00	.00	PIPE
4536.898	2947.168	4.240	2951.408	503.08	28.34	12.47	2963.88	.00	4.95	3.59	5.000	.000	.00	1 .0
146.715	.0400					.0340	5.00	4.24	2.25	3.95	.013	.00	.00	PIPE
4683.613	2953.035	4.502	2957.537	503.08	27.02	11.34	2968.87	.00	4.95	2.99	5.000	.000	.00	1 .0
92.637	.0400					.0331	3.06	4.50	1.91	3.95	.013	.00	.00	PIPE

Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 7- 6-2020 Time: 4:34:14

OLY1923 BLM 270 INFRASTRUCTURE
CENTENNIAL PARKWAY THEN PULI ALIGNMENT
FROM BELTWAY FACILITY EAST IN CENTENNIAL THEN NORTH IN PULI ALIGNMENT

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

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 4776.250  2956.740    4.891  2961.631    503.08   25.76   10.31  2971.94     .00    4.95     1.46    5.000     .000   .00   1   .0
 1.000    .0400                                      .0334      .03     4.89    1.24    3.95    .013       .00   .00  PIPE
 4777.250  2956.780    4.903  2961.683    503.08   25.74   10.29  2971.97     .00    4.95     1.38    5.000     .000   .00   1   .0
 1.000    .0400                                      .0336      .03     4.90    1.20    3.95    .013       .00   .00  PIPE
 4778.250  2956.820    4.919  2961.739    503.08   25.71   10.27  2972.00     .00    4.95     1.26    5.000     .000   .00   1   .0
 1.000    .0400                                      .0341      .03     4.92    1.15    3.95    .013       .00   .00  PIPE
 4779.250  2956.860    4.954  2961.814    503.08   25.66   10.22  2972.04     .00    4.95      .95    5.000     .000   .00   1   .0
JUNCT STR   .0398                                      .0223      .02    4.95    1.00            .013       .00   .00  PIPE
 4780.250  2956.900   16.117  2973.017    262.08   13.35    2.77  2975.78     .00    4.49      .00    5.000     .000   .00   1   .0
 64.510    .1426                                      .0101      .65    16.12     .00    1.76    .013       .00   .00  PIPE
 4844.760  2966.100    7.707  2973.807    262.08   13.35    2.77  2976.57     .00    4.49      .00    5.000     .000   .00   1   .0
 1.000    .1399                                      .0101      .01     7.71     .00    1.77    .013       .00   .00  PIPE
 4845.760  2966.240    7.714  2973.954    262.08   13.35    2.77  2976.72     .00    4.49      .00    5.000     .000   .00   1   .0
 1.000    .1499                                      .0101      .01     7.71     .00    1.74    .013       .00   .00  PIPE
 4846.760  2966.390    7.795  2974.185    262.08   13.35    2.77  2976.95     .00    4.49      .00    5.000     .000   .00   1   .0
JUNCT STR   .1401                                      .0101      .01    7.79     .00            .013       .00   .00  PIPE
 4847.760  2966.530    7.665  2974.195    262.07   13.35    2.77  2976.96     .00    4.49      .00    5.000     .000   .00   1   .0
 231.193    .0189                                      .0101     2.34     7.67     .00    3.17    .013       .00   .00  PIPE
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Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 7- 6-2020 Time: 4:34:14

OLY1923 BLM 270 INFRASTRUCTURE
CENTENNIAL PARKWAY THEN PULI ALIGNMENT
FROM BELTWAY FACILITY EAST IN CENTENNIAL THEN NORTH IN PULI ALIGNMENT

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********************************************************************************************************************************************** ********
         | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev |  Depth |  Width |Dia.-FT|or I.D.|  ZL  |Prs/Pip
         |         |        |         |         |          SF Ave|    HF   |SE Dpth|Froude N|Norm Dp|  "N"  | X-Fall|  ZR  |Type Ch
 L/Elem  |Ch Slope |        |         |         |        |       |         |       |        |       |       |       |      |
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****|*******
 5078.953  2970.908    5.717  2976.626    262.07   13.35    2.77  2979.39     .00    4.49      .00    5.000     .000   .00   1   .0
```

```
HYDRAULIC JUMP
         |         |         |         |                |         |       |        |       |       |       |
 5078.953  2970.908    3.384  2974.292    262.07   18.53    5.33  2979.62     .00    4.49    4.68    5.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   63.938    .0189                                        .0153      .98     3.38    1.88    3.17    .013       .00   .00  PIPE
         |         |         |         |                |         |       |        |       |       |       |
 5142.891  2972.119    3.474  2975.593    262.07   18.00    5.03  2980.62     .00    4.49    4.61    5.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   60.229    .0189                                        .0139      .84     3.47    1.78    3.17    .013       .00   .00  PIPE
         |         |         |         |                |         |       |        |       |       |       |
 5203.120  2973.260    3.630  2976.890    262.07   17.16    4.57  2981.46     .00    4.49    4.46    5.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
JUNCT STR   .0180                                        .0131      .07     3.63    1.63            .013       .00   .00  PIPE
         |         |         |         |                |         |       |        |       |       |       |
 5208.120  2973.350    3.645  2976.995    262.06   17.09    4.53  2981.53     .00    4.49    4.44    5.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    4.533    .0155                                        .0130      .06     3.64    1.62    3.41    .013       .00   .00  PIPE
         |         |         |         |                |         |       |        |       |       |       |
 5212.653  2973.420    3.652  2977.072    262.06   17.06    4.52  2981.59     .00    4.49    4.44    5.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   74.435    .0155                                        .0123      .92     3.65    1.62    3.41    .013       .00   .00  PIPE
         |         |         |         |                |         |       |        |       |       |       |
 5287.087  2974.574    3.824  2978.399    262.06   16.26    4.11  2982.51     .00    4.49    4.24    5.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   41.155    .0155                                        .0111      .46     3.82    1.47    3.41    .013       .00   .00  PIPE
         |         |         |         |                |         |       |        |       |       |       |
 5328.242  2975.213    4.016  2979.228    262.06   15.50    3.73  2982.96     .00    4.49    3.98    5.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   22.397    .0155                                        .0101      .23     4.02    1.33    3.41    .013       .00   .00  PIPE
         |         |         |         |                |         |       |        |       |       |       |
 5350.639  2975.560    4.233  2979.793    262.06   14.78    3.39  2983.19     .00    4.49    3.60    5.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    7.751    .0155                                        .0093      .07     4.23    1.17    3.41    .013       .00   .00  PIPE
↑ FILE: CE-SH.WSW                    W S P G W - CIVILDESIGN Version 14.08                                        PAGE    6
                    Program Package Serial Number: 7189
                                  WATER SURFACE PROFILE LISTING                  Date: 7- 6-2020  Time: 4:34:14
                 OLY1923 BLM 270 INFRASTRUCTURE
                   CENTENNIAL PARKWAY THEN PULI ALIGNMENT
                    FROM BELTWAY FACILITY EAST IN CENTENNIAL THEN NORTH IN PULI ALIGNMENT
************************************************************************************************************************ ********
         | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-
 L/Elem  |Ch Slope |        |         |         |         SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****|*******
         |         |        |         |         |                |         |       |        |       |       |       |
 5358.390  2975.680    4.494  2980.174    262.06   14.09    3.08  2983.26     .00    4.49    3.02    5.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
JUNCT STR   .1000                                        .0097      .05     4.49    1.00            .013       .00   .00  PIPE
         |         |         |         |                |         |       |        |       |       |       |
 5363.390  2976.180    5.868  2982.048    201.06   12.64    2.48  2984.53     .00    4.04     .00    4.500     .000   .00   1   .0
```

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 137.530    .0115                                        .0105     1.44     5.87     .00    3.51    .013       .00   .00  PIPE
 5500.920  2977.760    5.850  2983.610    201.06   12.64    2.48  2986.09     .00    4.04      .00    4.500     .000   .00   1   .0
JUNCT STR   .0120                                        .0105      .05    5.85     .00             .013       .00   .00  PIPE
 5505.920  2977.820    5.843  2983.663    201.04   12.64    2.48  2986.14     .00    4.04      .00    4.500     .000   .00   1   .0
 293.460    .0100                                        .0105     3.07     5.84     .00    3.79    .013       .00   .00  PIPE
 5799.380  2980.750    6.104  2986.854    201.04   12.64    2.48  2989.34     .00    4.04      .00    4.500     .000   .00   1   .0
JUNCT STR   .0100                                        .0105      .05    6.10     .00             .013       .00   .00  PIPE
 5804.380  2980.800    6.107  2986.907    201.03   12.64    2.48  2989.39     .00    4.04      .00    4.500     .000   .00   1   .0
  90.994    .0200                                        .0105      .95    6.11     .00    2.83    .013       .00   .00  PIPE
 5895.374  2982.622    5.271  2987.893    201.03   12.64    2.48  2990.37     .00    4.04      .00    4.500     .000   .00   1   .0
HYDRAULIC JUMP
 5895.374  2982.622    2.976  2985.598    201.03   18.01    5.04  2990.63     .00    4.04     4.26    4.500     .000   .00   1   .0
  53.494    .0200                                        .0170      .91    2.98    1.96    2.83    .013       .00   .00  PIPE
 5948.868  2983.693    3.022  2986.714    201.03   17.70    4.87  2991.58     .00    4.04     4.23    4.500     .000   .00   1   .0
  72.733    .0200                                        .0158     1.15    3.02    1.90    2.83    .013       .00   .00  PIPE
```


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WATER SURFACE PROFILE LISTING Date: 7- 6-2020 Time: 4:34:14

OLY1923 BLM 270 INFRASTRUCTURE
CENTENNIAL PARKWAY THEN PULI ALIGNMENT
FROM BELTWAY FACILITY EAST IN CENTENNIAL THEN NORTH IN PULI ALIGNMENT

```
**********************************************************************************************************************************
         | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
         |         |        |         |         |          SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
 L/Elem  |Ch Slope |        |         |         |        |       |         |       |        |        |       |       |      |
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****|*******
 6021.602  2985.149    3.154  2988.303    201.03   16.88    4.42  2992.73     .00    4.04     4.12    4.500     .000   .00   1   .0
  43.472    .0200                                        .0141      .61    3.15    1.75    2.83    .013       .00   .00  PIPE
 6065.073  2986.019    3.298  2989.317    201.03   16.09    4.02  2993.34     .00    4.04     3.98    4.500     .000   .00   1   .0
  28.189    .0200                                        .0126      .36    3.30    1.60    2.83    .013       .00   .00  PIPE
```

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 6093.263  2986.583    3.454  2990.038    201.03   15.35    3.66  2993.69     .00    4.04     3.80    4.500     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   18.307    .0200                                          .0113      .21     3.45    1.46    2.83    .013       .00   .00  PIPE
        |         |        |         |         |              |        |       |        |       |       |       |       |
 6111.570  2986.950    3.628  2990.578    201.03   14.63    3.32  2993.90     .00    4.04     3.56    4.500     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
JUNCT STR   .0200                                          .0106      .05     3.63    1.31            .013       .00   .00  PIPE
        |         |        |         |         |              |        |       |        |       |       |       |       |
 6116.570  2987.050    3.699  2990.749    201.01   14.37    3.21  2993.96     .00    4.04     3.44    4.500     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
  147.876    .0100                                          .0109     1.62     3.70    1.26    3.79    .013       .00   .00  PIPE
        |         |        |         |         |              |        |       |        |       |       |       |       |
 6264.446  2988.528    3.519  2992.047    201.01   15.07    3.52  2995.57     .00    4.04     3.72    4.500     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   90.458    .0100                                          .0121     1.09     3.52    1.40    3.79    .013       .00   .00  PIPE
        |         |        |         |         |              |        |       |        |       |       |       |       |
 6354.905  2989.432    3.356  2992.788    201.01   15.80    3.88  2996.66     .00    4.04     3.92    4.500     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   68.855    .0100                                          .0135      .93     3.36    1.55    3.79    .013       .00   .00  PIPE
        |         |        |         |         |              |        |       |        |       |       |       |       |
 6423.760  2990.120    3.208  2993.328    201.01   16.57    4.26  2997.59     .00    4.04     4.07    4.500     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
JUNCT STR   .0100                                          .0143      .07     3.21    1.69            .013       .00   .00  PIPE
        |         |        |         |         |              |        |       |        |       |       |       |       |
 6428.760  2990.170    3.196  2993.366    201.00   16.64    4.30  2997.66     .00    4.04     4.08    4.500     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   86.323    .0157                                          .0139     1.20     3.20    1.70    3.09    .013       .00   .00  PIPE
```


Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 7- 6-2020 Time: 4:34:14

OLY1923 BLM 270 INFRASTRUCTURE
CENTENNIAL PARKWAY THEN PULI ALIGNMENT
FROM BELTWAY FACILITY EAST IN CENTENNIAL THEN NORTH IN PULI ALIGNMENT

```
********************************************************************************************************************************************** ********
         | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.| Elev  | Depth  | Width |Dia.-FT|or I.D.|  ZL  |Prs/Pip
       -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-
 L/Elem  |Ch Slope |        |         |         |         SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****|*******
         |         |        |         |         |              |         |       |        |       |       |       |       |
 6515.083  2991.523    3.285  2994.808    201.00   16.16    4.05  2998.86     .00    4.04     4.00    4.500     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   71.939    .0157                                          .0127      .91     3.29    1.61    3.09    .013       .00   .00  PIPE
        |         |        |         |         |              |        |       |        |       |       |       |       |
 6587.021  2992.651    3.440  2996.091    201.00   15.41    3.69  2999.78     .00    4.04     3.82    4.500     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   38.534    .0157                                          .0114      .44     3.44    1.47    3.09    .013       .00   .00  PIPE
        |         |        |         |         |              |        |       |        |       |       |       |       |
 6625.555  2993.255    3.612  2996.867    201.00   14.69    3.35  3000.22     .00    4.04     3.58    4.500     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   20.644    .0157                                          .0104      .21     3.61    1.32    3.09    .013       .00   .00  PIPE
```

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 6646.199  2993.579    3.808  2997.386    201.00   14.01    3.05  3000.43     .00    4.04     3.25    4.500     .000   .00   1   .0
 7.081    .0157                                                .0096      .07     3.81    1.17     3.09     .013      .00   .00  PIPE
 6653.280  2993.690    4.042  2997.732    201.00   13.35    2.77  3000.50     .00    4.04     2.72    4.500     .000   .00   1   .0
JUNCT STR   .0160                                                .0077      .04     4.04    1.00              .013      .00   .00  PIPE
 6658.280  2993.770    6.354  3000.124    155.00    9.75    1.47  3001.60     .00    3.65      .00    4.500     .000   .00   1   .0
 116.192    .0151                                                .0062      .72     6.35     .00     2.62     .013      .00   .00  PIPE
 6774.472  2995.526    5.358  3000.884    155.00    9.75    1.47  3002.36     .00    3.65      .00    4.500     .000   .00   1   .0
HYDRAULIC JUMP
 6774.472  2995.526    2.371  2997.897    155.00   18.24    5.17  3003.06     .00    3.65     4.49    4.500     .000   .00   1   .0
    .833    .0151                                                .0208      .02     2.37    2.34     2.62     .013      .00   .00  PIPE
 6775.305  2995.538    2.371  2997.910    155.00   18.24    5.17  3003.08     .00    3.65     4.49    4.500     .000   .00   1   .0
  60.158    .0151                                                .0222     1.34     2.37    2.34     2.62     .013      .00   .00  PIPE
```


Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 7- 6-2020 Time: 4:34:14

OLY1923 BLM 270 INFRASTRUCTURE
CENTENNIAL PARKWAY THEN PULI ALIGNMENT
FROM BELTWAY FACILITY EAST IN CENTENNIAL THEN NORTH IN PULI ALIGNMENT

```
********************************************************************************************************************************************** ********
         | Invert  | Depth | Water  |    Q    | Vel     Vel  | Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT) | Elev   |  (CFS)  | (FPS)   Head | Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
        -|        -|       -|        -|        -|        -|     -|       -|      -|       -|       -|       -|      -|     -|
 L/Elem  |Ch Slope |        |         |         |         SF Ave|    HF  |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
*********|*********|********|*********|*********|*******|*******|********|*******|********|********|*******|*******|*****|*******
 6835.463  2996.447    2.283  2998.731    155.00   19.13    5.68  3004.41     .00    3.65     4.50    4.500     .000   .00   1   .0
  47.816    .0151                                                .0252     1.21     2.28    2.51     2.62     .013      .00   .00  PIPE
 6883.280  2997.170    2.200  2999.370    155.00   20.06    6.25  3005.62     .00    3.65     4.50    4.500     .000   .00   1   .0
    .500    .0200                                                .0269      .01     2.20    2.70     2.40     .013      .00   .00  PIPE
 6883.780  2997.180    2.199  2999.379    155.00   20.07    6.25  3005.63     .00    3.65     4.50    4.500     .000   .00   1   .0
    .500    .0200                                                .0269      .01     2.20    2.70     2.40     .013      .00   .00  PIPE
 6884.280  2997.190    2.198  2999.388    155.00   20.08    6.26  3005.65     .00    3.65     4.50    4.500     .000   .00   1   .0
```

```
     .500    .0000                                          .0269      .01     2.20    2.70     .00    .013       .00   .00  PIPE
 6884.780  2997.190    2.196  2999.386    155.00   20.10    6.28  3005.66     .00    3.65    4.50    4.500     .000   .00   1   .0
     .500    .0200                                          .0270      .01     2.20    2.71    2.40    .013       .00   .00  PIPE
 6885.280  2997.200    2.196  2999.396    155.00   20.11    6.28  3005.68     .00    3.65    4.50    4.500     .000   .00   1   .0
     .500    .0200                                          .0270      .01     2.20    2.71    2.40    .013       .00   .00  PIPE
 6885.780  2997.210    2.195  2999.405    155.00   20.12    6.28  3005.69     .00    3.65    4.50    4.500     .000   .00   1   .0
JUNCT STR   .3641                                           .0264      .07     2.20    2.71            .013       .00   .00  PIPE
                    -------------------- WARNING - Junction Analysis - Change in Channel Type ---------------
 6888.280  2998.120    1.838  2999.959    155.00   19.32    5.80  3005.75     .00    3.08    5.63                 5         0   .0
    2.007    .0435                                          .0255      .05     1.84    2.85   1.594    .013                IR-COV
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System head of main storm drain system (MAINC) and starting HGL


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                    Program Package Serial Number: 7189
                                WATER SURFACE PROFILE LISTING                    Date: 7- 6-2020  Time: 4:34:14
                  OLY1923 BLM 270 INFRASTRUCTURE
                    CENTENNIAL PARKWAY THEN PULI ALIGNMENT
                      FROM BELTWAY FACILITY EAST IN CENTENNIAL THEN NORTH IN PULI ALIGNMENT
*************************************************************************************************************************************** ********
         | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev |  Depth |  Width |Dia.-FT|or I.D.|  ZL  |Prs/Pip
         |         |        |         |         |          SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****|*******
 6890.287  2998.208    1.843  3000.051    155.00   19.25    5.75  3005.81     .00    3.08    5.63                 5         0   .0
   22.971    .0435                                          .0238      .55     1.84    2.84   1.594    .013                IR-COV
 6913.258  2999.208    1.914  3001.122    155.00   18.35    5.23  3006.35     .00    3.08    5.58                 5         0   .0
   17.710    .0435                                          .0209      .37     1.91    2.63   1.594    .013                IR-COV
 6930.968  2999.979    1.988  3001.967    155.00   17.50    4.76  3006.72     .00    3.08    5.54                 5         0   .0
   14.024    .0435                                          .0183      .26     1.99    2.44   1.594    .013                IR-COV
 6944.992  3000.590    2.066  3002.656    155.00   16.69    4.32  3006.98     .00    3.08    5.49                 5         0   .0
   11.284    .0435                                          .0161      .18     2.07    2.26   1.594    .013                IR-COV
 6956.276  3001.081    2.149  3003.230    155.00   15.91    3.93  3007.16     .00    3.08    5.44                 5         0   .0
    9.156    .0435                                          .0141      .13     2.15    2.09   1.594    .013                IR-COV
```

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 6965.432  3001.480    2.237  3003.717    155.00   15.17    3.57  3007.29     .00    3.08     5.38                 5         0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    7.442    .0435                                          .0124      .09     2.24    1.94   1.594    .013                 IR-COV
         |         |        |         |         |              |         |       |        |        |       |       |       |
 6972.874  3001.804    2.330  3004.134    155.00   14.46    3.25  3007.38     .00    3.08     5.32                 5         0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    6.023    .0435                                          .0109      .07     2.33    1.80   1.594    .013                 IR-COV
         |         |        |         |         |              |         |       |        |        |       |       |       |
 6978.896  3002.066    2.429  3004.495    155.00   13.79    2.95  3007.45     .00    3.08     5.26                 5         0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    4.816    .0435                                          .0097      .05     2.43    1.66   1.594    .013                 IR-COV
         |         |        |         |         |              |         |       |        |        |       |       |       |
 6983.713  3002.276    2.534  3004.810    155.00   13.15    2.68  3007.49     .00    3.08     5.12                 5         0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    3.690    .0435                                          .0086      .03     2.53    1.53   1.594    .013                 IR-COV
```


Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 7- 6-2020 Time: 4:34:14

OLY1923 BLM 270 INFRASTRUCTURE
CENTENNIAL PARKWAY THEN PULI ALIGNMENT
FROM BELTWAY FACILITY EAST IN CENTENNIAL THEN NORTH IN PULI ALIGNMENT

```
**********************************************************************************************************************************
         | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-
 L/Elem  |Ch Slope |        |         |         |         SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****|*******
         |         |        |         |         |              |         |       |        |        |       |       |       |
 6987.403  3002.437    2.650  3005.086    155.00   12.54    2.44  3007.53     .00    3.08     4.88                 5         0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    2.644    .0435                                          .0077      .02     2.65    1.39   1.594    .013                 IR-COV
         |         |        |         |         |              |         |       |        |        |       |       |       |
 6990.046  3002.552    2.777  3005.328    155.00   11.95    2.22  3007.55     .00    3.08     4.61                 5         0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    1.637    .0435                                          .0070      .01     2.78    1.26   1.594    .013                 IR-COV
         |         |        |         |         |              |         |       |        |        |       |       |       |
 6991.684  3002.623    2.919  3005.542    155.00   11.40    2.02  3007.56     .00    3.08     4.31                 5         0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
     .616    .0435                                          .0063      .00     2.92    1.13   1.594    .013                 IR-COV
         |         |        |         |         |              |         |       |        |        |       |       |       |
 6992.300  3002.650    3.080  3005.730    155.00   10.86    1.83  3007.56     .00    3.08     3.89                 5         0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
```

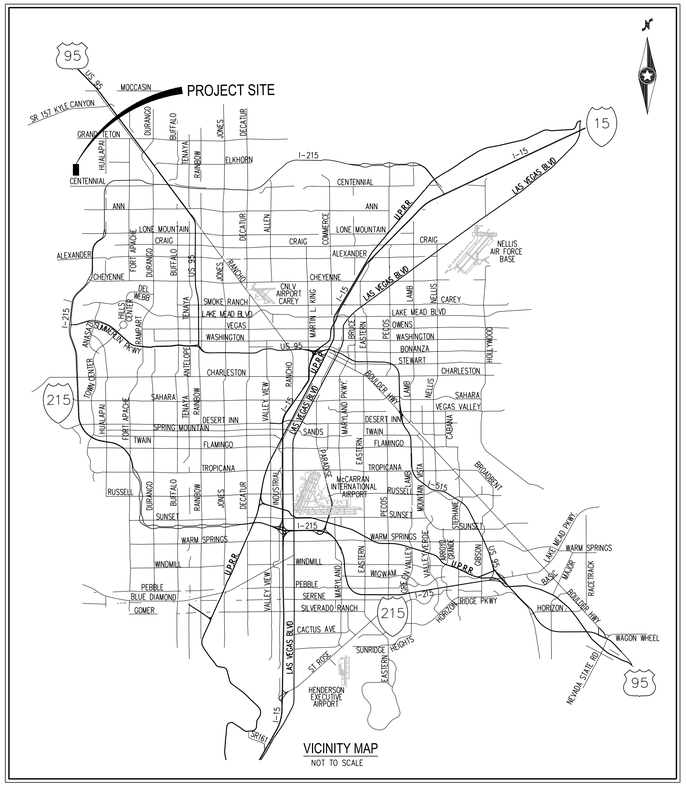
APPENDIX G

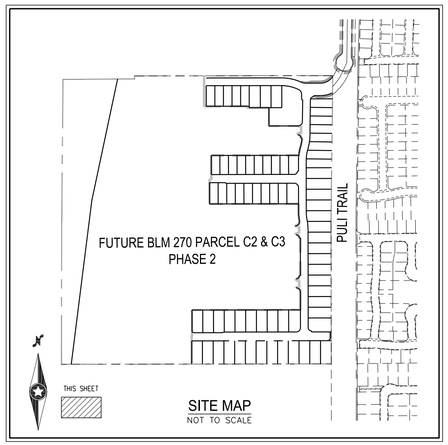
CD of Electronic Files & Improvement Plans

190 OCTANE FT PARTNERS, LLC

IMPROVEMENT PLANS
FOR
BLM 270 PARCEL C-2 & C-3
PHASE 1

CITY OF LAS VEGAS, NEVADA
RESIDENTIAL SUBDIVISION
APN: 126-23-610-002 & 126-23-710-001





SHEET INDEX		
NO.	SHEET	TITLE
1	C-1	COVER SHEET
2	C-2	GENERAL NOTES
3	C-3	LEGEND, ABBREVIATIONS, & QUANTITIES
4	G-1	GRADING PLAN I
5	G-2	GRADING PLAN II
6	G-3	GRADING PLAN III
7	G-4	GRADING PLAN IV
8	G-5	GRADING PLAN V
9	G-6	GRADING PLAN VI
10	G-7	GRADING PLAN VII
11	G-8	GRADING PLAN VIII
12	G-9	GRADING PLAN IX
13	D-1	STREET SECTIONS AND GRADING DETAILS I
14	D-2	GRADING DETAILS II
14	SD-1	STORM DRAIN A
15	SD-2	STORM DRAIN B
16	SD-3	STORM DRAIN LATERALS 1
17	SD-4	STORM DRAIN LATERALS 2

APPROVALS

CITY OF LAS VEGAS ENGINEER APPROVAL

LAS VEGAS FIRE AND RESCUE DATE

CITY OF LAS VEGAS 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.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES
PROJECT NO. #####. FIRST APPROVED DATE:
LVVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW 20 GPM

SHEETS: ADD FIELD

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

Westwood
Phone (702) 284-5300
Fax (702) 284-5399
5740 S. Arville Street
Suite 216
Las Vegas, NV 89118
westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA
190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3 PHASE 1
COVER SHEET

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

C-1
SHEET 1 OF 17

LEGAL DESCRIPTION

A PORTION OF THE SOUTH HALF (S 1/2) OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 23, TOGETHER WITH A PORTION OF THE NORTH HALF (N 1/2) OF THE NORTHEAST QUARTER (NE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 23, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

BENCHMARK

BENCHMARK NUMBER: 6LV9913W4

RIVET AND PLATE FOUND IN TOP OF CURB NORTHEAST CORNER OF FARM ROAD AND PULI ROAD.

ELEVATION = 3054.93 FEET, 931.143 METERS
NAVD88 DATUM

PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE

BASIS OF BEARINGS

SOUTH 00°41'32" WEST, BEING THE BEARING OF THE EAST LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 23, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 162, PAGE 55 OR PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

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 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.

OWNER

190 OCTANE FT PARTNERS, LLC
11411 SOUTHERN HIGHLANDS PKWY,
SUITE 300
LAS VEGAS, NV 89141
PH: (702) 220-6565
FX: (702) 220-6566
CONTACT: CHRIS ARMSTRONG

DEVELOPER

OLYMPIA GROUP
11411 SOUTHERN HIGHLANDS PKWY,
SUITE 300
LAS VEGAS, NV 89141
PH: (702) 220-6565
FX: (702) 220-6566
CONTACT: CHRIS ARMSTRONG

ENGINEER

WESTWOOD PROFESSIONAL SERVICES
5740 S. ARVILLE STREET, SUITE 216
LAS VEGAS, NV 89118
PH: (702) 284-5300
FX: (702) 284-5399
CONTACT: KEVIN BROSS

PROJECT INFORMATION

ACREAGE (GROSS):	= 38.61± AC
ACREAGE (NET):	= 34.43± AC
DENSITY (LOTS/GROSS ACRE):	= 6.48 DU/GROSS AC
ZONING:	= P-D
TOTAL NO. OF RESIDENTIAL LOTS	= 74
TOTAL NO. OF COMMON ELEMENTS *	= 4
MINIMUM LOT SIZE	= 3,560 SF±
MAXIMUM LOT SIZE	= 6,117 SF±

EARTHWORK SUMMARY (UNADJUSTED)

CUT	79,506 CY.
FILL	76,965 CY.
NET	2,541 CY. (CUT)

M.O.U. ITEMS

TMP-

DEVIATIONS FROM STANDARDS

NONE

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/BWPC/STORM01.HTM PROJECTS THAT DISTURB MORE THAN ONE ACRE OF LAND MUST SUBMIT TO NDEP A "NOTICE OF INTENT" FOR INCLUSION UNDER STORMWATER PERMIT NO. NVR100000 ALONG WITH THE APPROPRIATE FILING FEE.

GEOTECHNICAL ENGINEER

PREPARED BY: SOUTHWEST GEOTECHNICAL
ADDRESS: 5275 ARVILLE ST, SUITE 108, LAS VEGAS, NV 89118
PHONE: 702-323-6000
PROJECT No. 197111
DATED: 01/28/20

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

\bzr2001 blm 270 C:\dwg\improv\phase 1\bzr2001 cvr-1.dwg 10/15/2020 12:33 PM Hung Nguyen

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 SOUTH HALF (S 1/2) OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 23, TOGETHER WITH A PORTION OF THE NORTH HALF (N 1/2) OF THE NORTHEAST QUARTER (NE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 23, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

BENCHMARK

BENCHMARK NUMBER: 6LV9913W4

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PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE

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SOUTH 00°41'32" WEST, BEING THE BEARING OF THE EAST LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 23, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 162, PAGE 55 OR PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

SOUTHERN NEVADA - SOUTHWEST GAS CORPORATION GENERAL NOTES

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

SOUTHWEST GAS APPROVAL

SOUTHWEST GAS CORPORATION _____ DATE

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 "C" 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.

REVISED 04/15/10

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.

15. NO LEAD COMPLIANCE NOTE:
TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER WORKS BRASS PRODUCTS PROPOSED TO BE RELOCATED, OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

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. 197111, DATED 01/28/20.
6. EARTHWORK QUANTITIES (RAW):
   -CUT = 79,506 CUBIC YARDS.
   -FILL = 76,965 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 # 6631 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 THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. IFC §105.6.15
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. IFC §3310, §3312
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. IFC §507.5.7.3
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. IFC §106.3
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. IFC §507.2.1, NFPA 24
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. IFC §507
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. IFC §507.5.7.1
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. IFC §507
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: IFC §C102
    - RESIDENTIAL - 500 FT UNSPRINKLERED, 600 FT SPRINKLERED.
    - COMMERCIAL - 300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FT SPACING, TO PROVIDE FOR FUTURE HYDRANTS WHEN PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY. HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. IFC ▲C102.8
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. IFC ▲C102.10
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. IFC ▲C102.4
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. IFC ▲C102.7
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. IFC ▲C102.6
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 45 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. FOR SYSTEMS REQUIRED TO HAVE TWO (2) SOURCES OF WATER SUPPLY, SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD-INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION. FOR SYSTEMS PERMITTED TO HAVE ONE SOURCE OF WATER SUPPLY, SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 3 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD-INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION. IFC ▲C104
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. IFC ▲503.2.3
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10%. THE ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. IFC ▲503.2.7, ▲503.2.8
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. IFC ▲503.2.4
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13FT 6 INS. IFC ▲ 503.2.1
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 33 FT WITH PARKING ON BOTH SIDES MEASURED TO FACE OF CURB. NOT LESS THAN 28 FT WIDE WITH PARKING RESTRICTED TO ONE SIDE MEASURED TO FACE OF CURB. NOT LESS THAN 24 FT WIDE WITH NO PARKING ON EITHER SIDE. MEASURED TO FACE OF CURB. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. IFC ▲ 503.2.1.1
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. IFC ▲503.1.1
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 200 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD- ENDS OR A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. CLV REGULATION AND MOU
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. CLV REGULATION
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. IFC ▲503.3
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. IFC ▲503.6
29. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS, OR HAVING FOUR OR MORE TRAVEL LANES AND A TRAFFIC COUNT OF MORE THAN 30,000 VEHICLES PER DAY, ALL HYDRANTS BEING UTILIZED TO DELIVER FIRE FLOW TO THE PROPOSED LOCATION SHALL BE LOCATED ON THE SAME SIDE OF THE STREET AS THE PROPOSED DEVELOPMENT. CLV REGULATION

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.

REVISED 04/15/10

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: 702-278-8451 (STANDBY CONTACT NUMBER)

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 OF 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 N

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	ROAD
BCR	BEGINNING OF CURB RETURN	HOA	HOME OWNERS ASSOCIATION	RDWY 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	RIGHT
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
CML&C	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
DE	DRAINAGE EASEMENT	NUE	NONEXCLUSIVE UTILITY EASEMENT	SY	SQUARE YARD
DET	DETAIL	NVE	NV ENERGY	TAN	TANGENT
DI	DUCTILE IRON OR DRAIN INLET	OC	ON CENTER	TC	TOP OF CURB
DIA, ø	DIAMETER	OD	OUTSIDE DIAMETER OR OVERALL DIMENSION	TF	TOP OF FLOOR OR TOP OF FOOTING
DIP	DUCTILE IRON PIPE	OFF	OFFSET	TG	TOP OF GRATE
DR	DRIVE	ORIG	ORIGINAL	THRU	THROUGH
DWG(S)	DRAWING	PAE	PUBLIC OR PEDESTRIAN ACCESS EASEMENT	THW	TOP OF HEADWALL
DWY	DRIVEWAY	PB	PULL BOX	TP	TOP OF PIPE
EA	EACH	PC	POINT OF CURVE	TW	TOP OF WALL
ECR	END CURB RETURN	PCC	POINT OF COMPOUND CURVE	TRW	TOP OF RETAINING WALL
EG	EXISTING GROUND	PDE	PUBLIC DRAINAGE EASEMENT	TSW	TOP OF SCREEN WALL
ELEV	ELEVATION	℄ OR PL	PROPERTY LINE	TYP	TYPICAL
ESMT	EASEMENT	POB	POINT OF BEGINNING	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
EP	EDGE OF PAVEMENT	POC	POINT OF CURVATURE		
ERU	EQUIVALENT RESIDENTIAL UNIT	POE	POINT OF ENDING	UE	UTILITY EASEMENT
EVC	END VERTICAL CURVE	PRC	POINT OF REVERSE CURVATURE	VC	VERTICAL CURVE
EX OR EXIST	EXISTING	PRELIM	PRELIMINARY	VERT	VERTICAL
FC	FACE OF CURB	PROP	PROPOSED	VG	VALLEY GUTTER
FF	FINISHED FLOOR	PRV	PRESSURE REDUCING VALVE	WI	WROUGHT IRON
FG	FINISHED GRADE	PUE	PUBLIC UTILITY EASEMENT	WL	WATER LINE
FGH	FINISHED GRADE, HIGH SIDE	PT	POINT OF TANGENT OR POINT	WPZ	WATER PRESSURE ZONE
FGL	FINISHED GRADE, LOW SIDE	PVC	POLYVINYL CHLORIDE	WT	WEIGHT
FH	FIRE HYDRANT			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= XXXX F = XXXX	PAD= XXXX F = XXXX	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	6	–
2.	15' TYPE "CM2" DROP INLET	EA	2	–
3.	20.0' TYPE "CM2" DROP INLET	EA	3	–
4.	18" RCP CLASS III STORM DRAIN	LF	40	–
5.	30" RCP CLASS III STORM DRAIN	LF	53	–
6.	36" RCP CLASS III STORM DRAIN	LF	198	–
7.	42" RCP CLASS III STORM DRAIN	LF	218	–
8.	68" X 43" CLASS III HERCP STORM DRAIN	LF	29	–
9.	RIPRAP D50=6', THK=12"	SF	2,975	–
10.	8" WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	3,847	–
11.				
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)	EA	–	–
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 18" TYPE "L" ISLAND CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	387	–
3.	STANDARD 8" TYPE "A" ISLAND CURB W/6" TYPE I AGGREGATE BASE	LF	179	–
4.	STANDARD 30" TYPE "ROLL" CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	4,839	–
5.	4' WIDE CONCRETE SIDEWALK W/4" TYPE II AGGREGATE BASE	SF	14,299	–
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:
LVVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW ## GPM

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

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westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 1

LEGEND, ABBREVIATIONS, & QUANTITIES

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK

PROJECT NO.
BZR2001

PROFESSIONAL ENGINEER – STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

C-3
SHEET 3 OF 17

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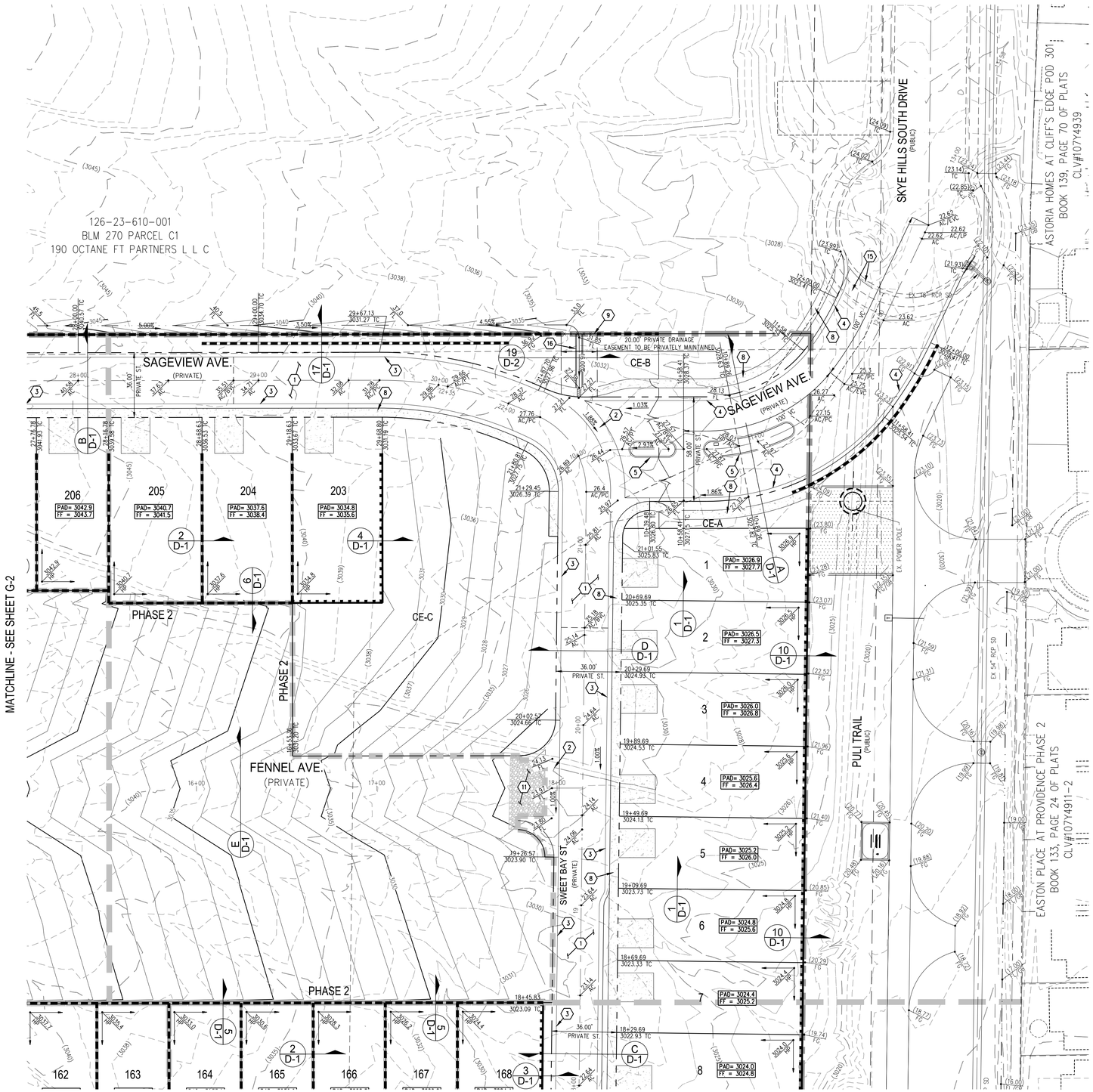

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SCALE - 1"=30' FEET

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SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL
PROJECT NO. 197111 DATED 01/28/20

EARTHWORKS

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FILL= 76,965 CU YDS

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GRADING NOTES

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3. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
4. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
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6. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
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(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.
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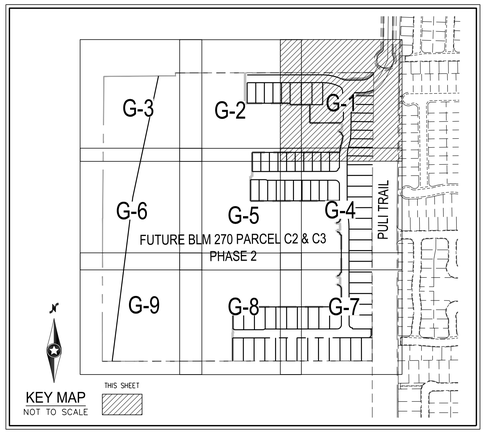
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 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.



CONSTRUCTION NOTES

1. CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II AGGREGATE BASE
2. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1
4. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD NO. 216
5. CONSTRUCT "A" TYPE CURB PER CCAUSD NO. 219
6. CONSTRUCT 3' TRANSITION PER CCAUSD NO. 223
7. FIELD VERIFY AND CONNECT TO EXISTING CURB AND GUTTER
8. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
9. INSTALL STEEL TUBING FENCE & MAINTENANCE ACCESS GATE PER CCAUSD NO. 425.51 (GATE WIDTH PER PLAN)
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13. INSTALL 15.0' TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND 421
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15. REMOVE EXISTING IMPROVEMENTS
16. CONSTRUCT CONCRETE FLUME PER DETAIL ON SHEET D-2

DRAINAGE EASEMENT NOTE

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DRAINAGE IMPROVEMENT QUANTITIES

1.	48" TYPE III STORM DRAIN MANHOLE	EA	6
2.	15' TYPE "CM2" DROP INLET	EA	2
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FLOOD CERTIFICATION

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

KEVIN M. BROSS, P.E. 24572 DATE

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

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5740 S. Arville Street
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westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3 PHASE 1
GRADING PLAN I

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

G-1
SHEET 4 OF 17

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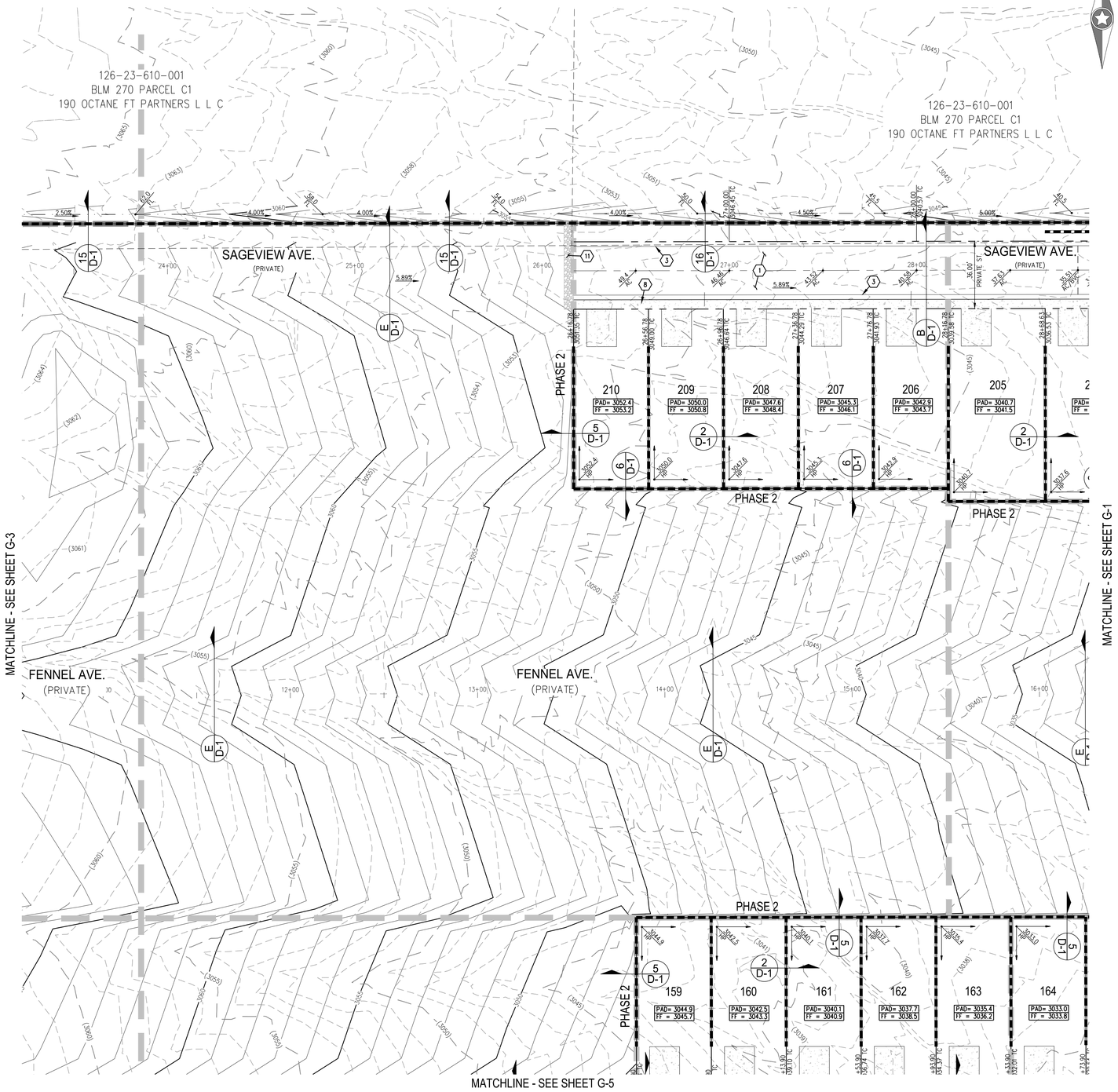

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SOILS REPORT BY SOUTHWEST GEOTECHNICAL
PROJECT NO. 197111 DATED 01/28/20

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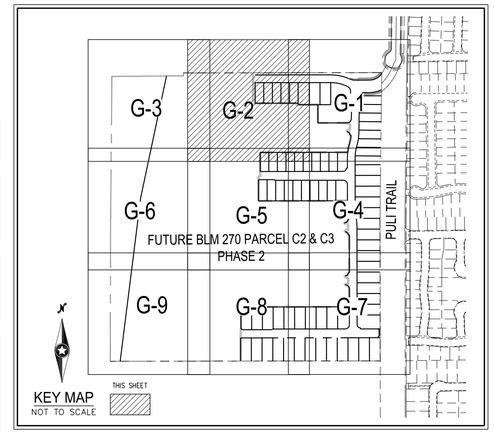

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KEVIN M. BROSS, P.E. 24572 DATE

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Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3 PHASE 1
GRADING PLAN II

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK

PROJECT NO.
BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

G-2
SHEET 5 OF 17

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0 30 60
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 3000 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 3001.00)

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL
PROJECT NO. 197111 DATED 01/28/20

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= 79,506 CU YDS
FILL= 76,965 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

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. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
2. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
3. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
4. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
5. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
6. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
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8. 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.

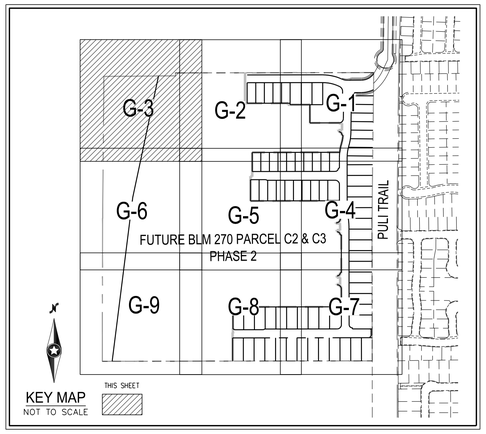
LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(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 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.



CONSTRUCTION NOTES

1. CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II AGGREGATE BASE
2. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1
4. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD NO. 216
5. CONSTRUCT "A" TYPE CURB PER CCAUSD NO. 219
6. CONSTRUCT 3' TRANSITION PER CCAUSD NO. 223
7. FIELD VERIFY AND CONNECT TO EXISTING CURB AND GUTTER
8. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
9. INSTALL STEEL TUBING FENCE & MAINTENANCE ACCESS GATE PER CCAUSD NO. 425.S1 (GATE WIDTH PER PLAN)
10. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE I
11. INSTALL RIP RAP W/ 6" TYPE II GRANULAR BEDDING WITH FILTER FABRIC D50=6", T=12"
12. INSTALL 20.0' TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND 421
13. INSTALL 15.0' TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND 421
14. INSTALL 48" TYPE II SDMH PER CCAUSD NO. 401 AND 405.2
15. REMOVE EXISTING IMPROVEMENTS
16. CONSTRUCT CONCRETE FLUME PER DETAIL ON SHEET D-2

DRAINAGE EASEMENT NOTE

ALL PRIVATE STREETS, DRAINAGE EASEMENTS AND COMMON LOTS ARE PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE HOA

DRAINAGE IMPROVEMENT QUANTITIES

1.	48" TYPE III STORM DRAIN MANHOLE	EA	6
2.	15' TYPE "CM2" DROP INLET	EA	2
3.	20.0' TYPE "CM2" DROP INLET	EA	3
4.	18" RCP CLASS III STORM DRAIN	LF	40
5.	30" RCP CLASS III STORM DRAIN	LF	53
6.	36" RCP CLASS III STORM DRAIN	LF	–
7.	42" RCP CLASS III STORM DRAIN	LF	416
8.	68" X 43" CLASS III HERCP STORM DRAIN	LF	29
9.	RIPRAP D50=6", THK=12"	SF	2,975
10.	8' WIDE CONCRETE VALLEY GUTTER	SF	3,847

FLOOD CERTIFICATION

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

KEVIN M. BROSS, P.E. 24572 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

Westwood
Phone (702) 284-5300
Fax (702) 284-5399
5740 S. Arville Street
Suite 216
Las Vegas, NV 89118
westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3 PHASE 1
GRADING PLAN III

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK

PROJECT NO.
BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

G-3
SHEET 6 OF 17

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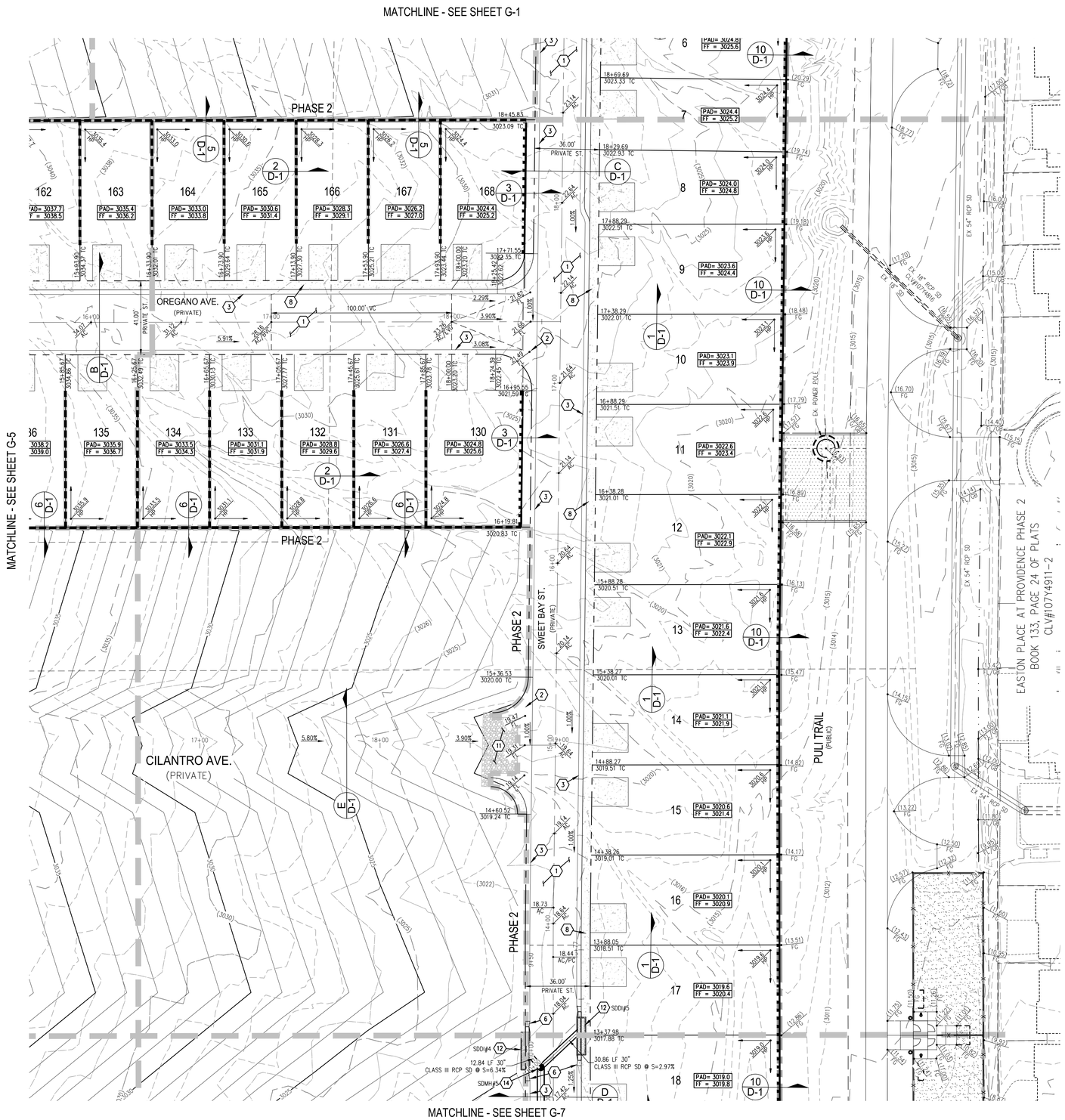

SCALE – 1"=30' (0 30 60 FEET)

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SOILS REPORT BY SOUTHWEST GEOTECHNICAL
PROJECT NO. 197111 DATED 01/28/20

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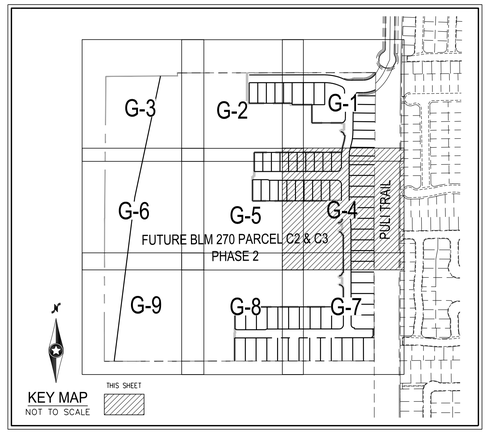

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KEVIN M. BROSS, P.E. 24572 DATE

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Call 811
OR
1-800-227-2600

Westwood
Phone (702) 284-5300
Fax (702) 284-5399
5740 S. Arville Street
Suite 216
Las Vegas, NV 89118
westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP DATE	APP

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3 PHASE 1
GRADING PLAN IV

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER – STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

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SHEET 7 OF 17

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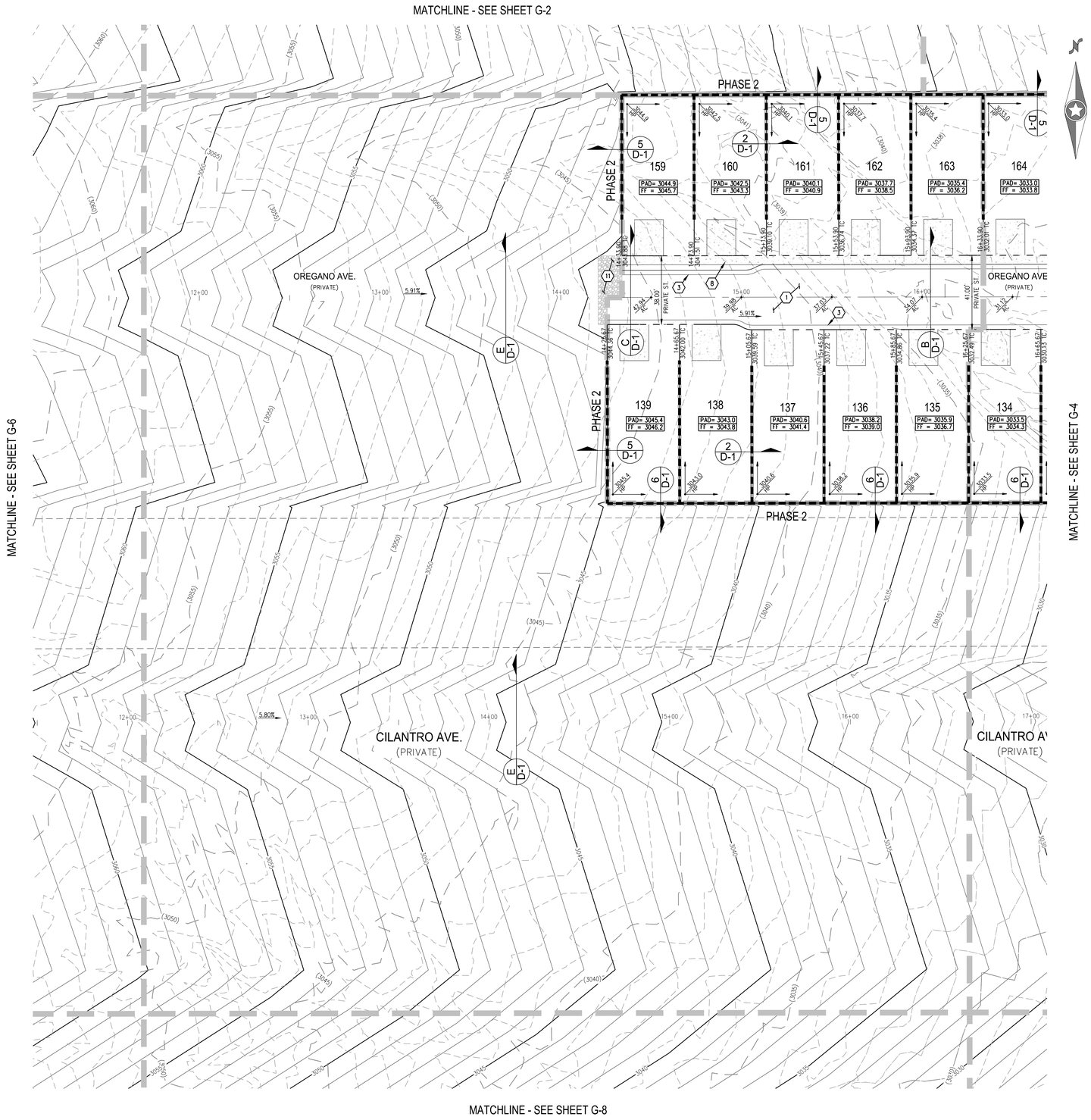

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SOILS REPORT BY SOUTHWEST GEOTECHNICAL
PROJECT NO. 197111 DATED 01/28/20

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EARTHWORK QUANTITIES (RAW):
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FILL= 76,965 CU YDS

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LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

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

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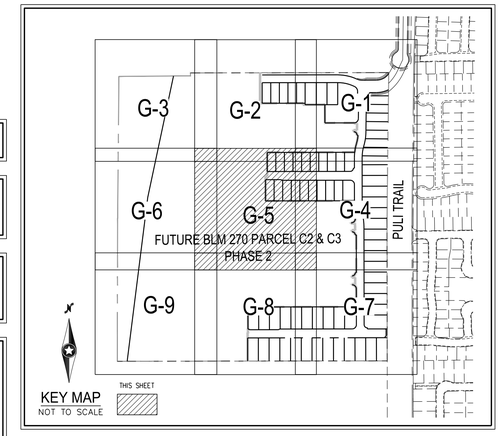

CONSTRUCTION NOTES

1. CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II AGGREGATE BASE
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3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1
4. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD NO. 216
5. CONSTRUCT "A" TYPE CURB PER CCAUSD NO. 219
6. CONSTRUCT 3' TRANSITION PER CCAUSD NO. 223
7. FIELD VERIFY AND CONNECT TO EXISTING CURB AND GUTTER
8. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
9. INSTALL STEEL TUBING FENCE & MAINTENANCE ACCESS GATE PER CCAUSD NO. 425.S1 (GATE WIDTH PER PLAN)
10. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE I
11. INSTALL RIP RAP W/ 6" TYPE II GRANULAR BEDDING WITH FILTER FABRIC D50=6", T=12"
12. INSTALL 20.0' TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND 421
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15. REMOVE EXISTING IMPROVEMENTS
16. CONSTRUCT CONCRETE FLUME PER DETAIL ON SHEET D-2

DRAINAGE EASEMENT NOTE

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DRAINAGE IMPROVEMENT QUANTITIES

1.	48" TYPE III STORM DRAIN MANHOLE	EA	6
2.	15' TYPE "CM2" DROP INLET	EA	2
3.	20.0' TYPE "CM2" DROP INLET	EA	3
4.	18" RCP CLASS III STORM DRAIN	LF	40
5.	30" RCP CLASS III STORM DRAIN	LF	53
6.	36" RCP CLASS III STORM DRAIN	LF	-
7.	42" RCP CLASS III STORM DRAIN	LF	416
8.	68" X 43" CLASS III HERCP STORM DRAIN	LF	29
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KEVIN M. BROSS, P.E. 24572 DATE

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Fax (702) 284-5399
5740 S. Arville Street
Suite 216
Las Vegas, NV 89118
westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3 PHASE 1
GRADING PLAN V

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER – STATE OF NEVADA – KEVIN M. BROSS – Exp. 12/31/2020 – CIVIL – No. 24572
10/15/2020

G-5
SHEET 8 OF 17

\\bzr2001 bim 270 c\dwg\improv\phase 1\bzr2001 grd-1.dwg 10/15/2020 12:34 PM Hung Nguyen

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

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ADD 3000 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 3001.00)

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL
PROJECT NO. 197111 DATED 01/28/20

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
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FILL= 76,965 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.

GRADING NOTES

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LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

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

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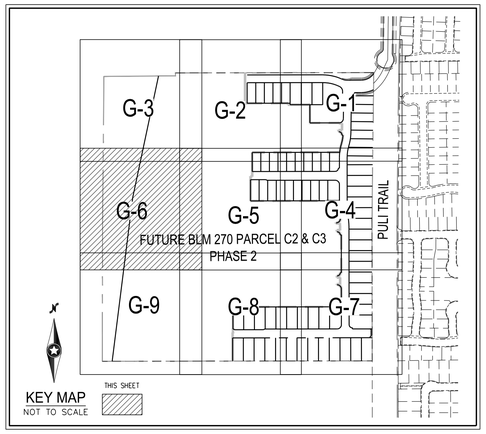

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KEVIN M. BROSS, P.E. 24572 DATE

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Westwood
Phone (702) 284-5300
Fax (702) 284-5399
5740 S. Arville Street
Suite 216
Las Vegas, NV 89118
westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 1

GRADING PLAN VI

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK

PROJECT NO.
BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

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SHEET 9 OF 17

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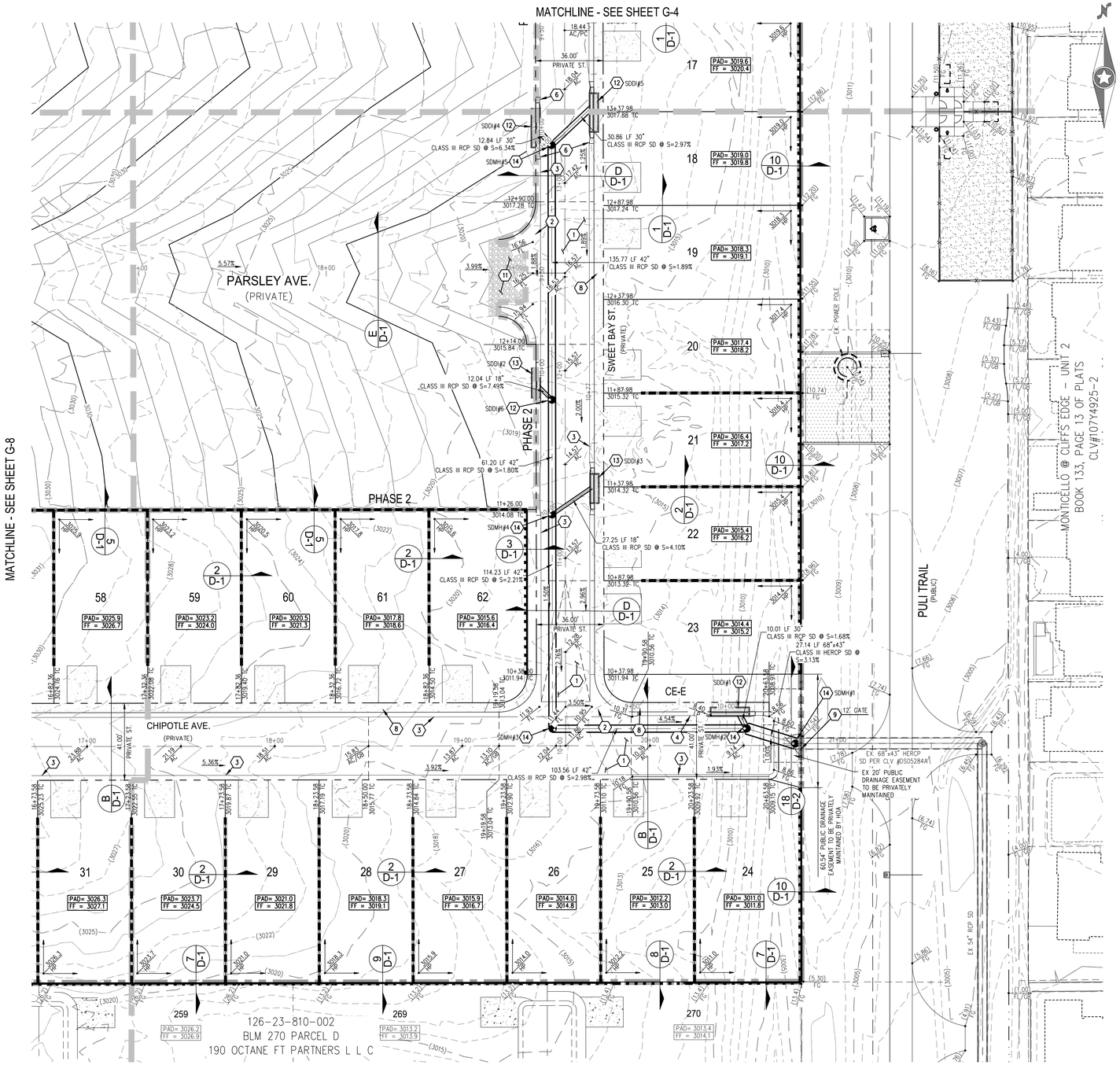

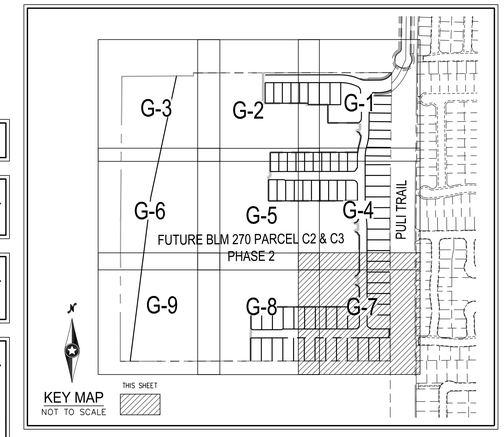

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SOILS REPORT BY SOUTHWEST GEOTECHNICAL
PROJECT NO. 197111 DATED 01/28/20

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FAST
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1-702-227-2929

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Westwood
Phone (702) 284-5300
Fax (702) 284-5399
5740 S. Arville Street
Suite 216
Las Vegas, NV 89118
westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3 PHASE 1
GRADING PLAN VII

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK

PROJECT NO. BZR2001

STATE OF NEVADA PROFESSIONAL ENGINEER KEVIN M. BROSS Exp. 12/31/2020 CIVIL No. 24572 10/15/2020

G-7
SHEET 10 OF 17

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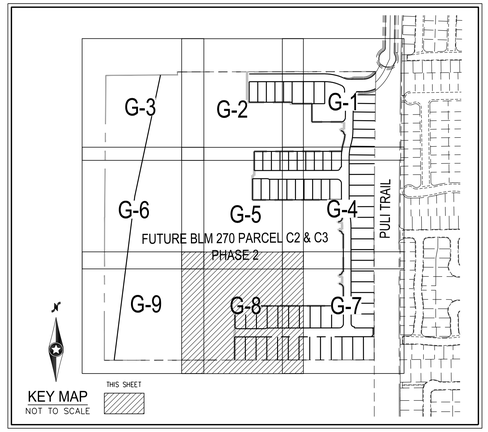

0 30 60
SCALE – 1"=30' FEET

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

SURVEY NOTE

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ELEVATION NOTE

ADD 3000 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 3001.00)

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL
PROJECT NO. 197111 DATED 01/28/20

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= 79,506 CU YDS
FILL= 76,965 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.

GRADING NOTES

1. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
2. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
3. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
4. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
5. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
6. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
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8. 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.

CONSTRUCTION NOTES

1. CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II AGGREGATE BASE
2. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1
4. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD NO. 216
5. CONSTRUCT "A" TYPE CURB PER CCAUSD NO. 219
6. CONSTRUCT 3' TRANSITION PER CCAUSD NO. 223
7. FIELD VERIFY AND CONNECT TO EXISTING CURB AND GUTTER
8. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
9. INSTALL STEEL TUBING FENCE & MAINTENANCE ACCESS GATE PER CCAUSD NO. 425.S1 (GATE WIDTH PER PLAN)
10. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE I
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12. INSTALL 20.0' TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND 421
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14. INSTALL 48" TYPE II SDMH PER CCAUSD NO. 401 AND 405.2
15. REMOVE EXISTING IMPROVEMENTS
16. CONSTRUCT CONCRETE FLUME PER DETAIL ON SHEET D-2

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.
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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.

DRAINAGE EASEMENT NOTE

ALL PRIVATE STREETS, DRAINAGE EASEMENTS AND COMMON LOTS ARE PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE HOA

DRAINAGE IMPROVEMENT QUANTITIES

1.	48" TYPE III STORM DRAIN MANHOLE	EA	6
2.	15' TYPE "CM2" DROP INLET	EA	2
3.	20.0' TYPE "CM2" DROP INLET	EA	3
4.	18" RCP CLASS III STORM DRAIN	LF	40
5.	30" RCP CLASS III STORM DRAIN	LF	53
6.	36" RCP CLASS III STORM DRAIN	LF	–
7.	42" RCP CLASS III STORM DRAIN	LF	416
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9.	RIPRAP D50=6", THK=12"	SF	2,975
10.	8' WIDE CONCRETE VALLEY GUTTER	SF	3,847

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 DS-_____ ON FILE AT CITY OF LAS VEGAS FOR THE SUBJECT PROJECT.

KEVIN M. BROSS, P.E. 24572 DATE

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 1

GRADING PLAN VIII

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER – STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

G-8
SHEET 11 OF 17

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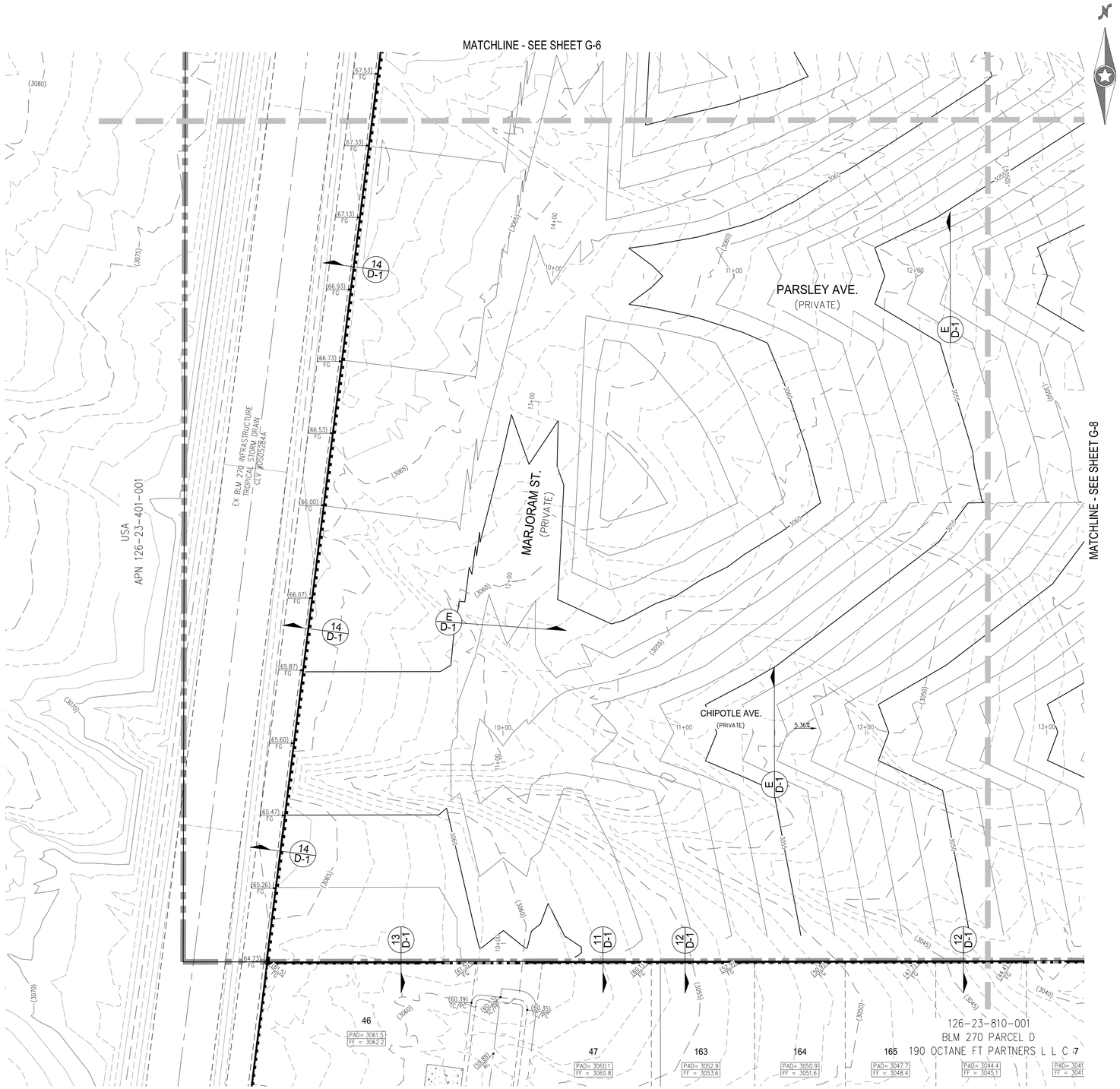

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PROJECT NO. 197111 DATED 01/28/20

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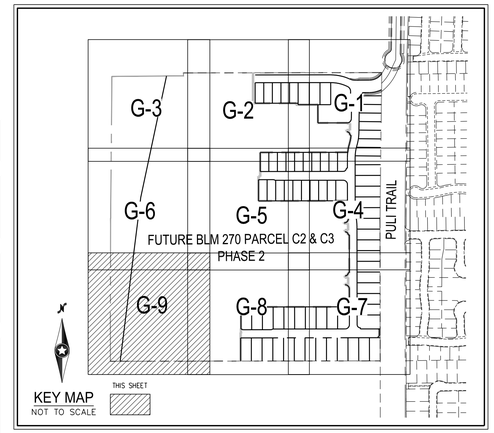

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KEVIN M. BROSS, P.E. 24572 DATE

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Suite 216
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Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3 PHASE 1
GRADING PLAN IX

S23 T139 R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

G-9
SHEET 12 OF 17

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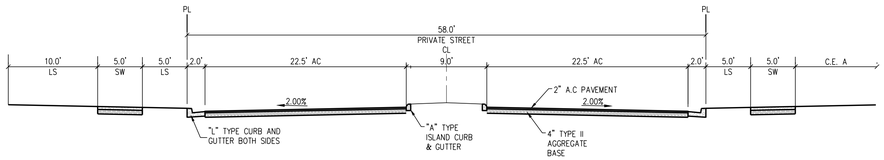
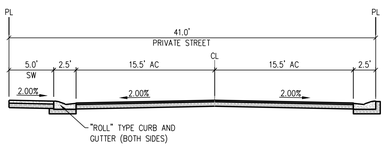
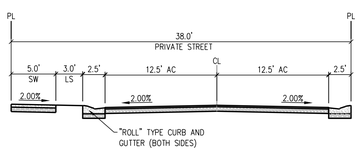


A. ENTRANCE SECTION
NOT TO SCALE
INTERIOR STREET



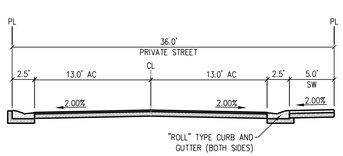
NOTE: PARKING ON BOTH SIDES OF THE STREET

B. 41' STREET SECTION
NOT TO SCALE
INTERIOR STREET



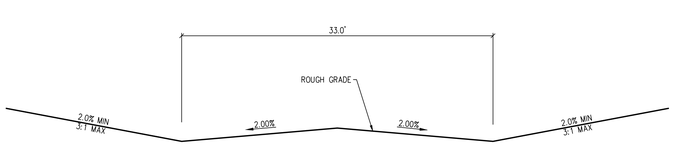
NOTE: NO PARKING ON EITHER SIDE OF THE STREET

C. 38' STREET SECTION (POPOUT)
NOT TO SCALE
INTERIOR STREET

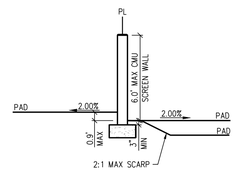


NOTE: PARKING ON SIDEWALK SIDE OF STREET

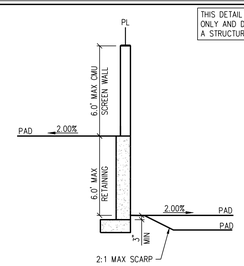
D. 36' STREET SECTION
NOT TO SCALE
INTERIOR STREET



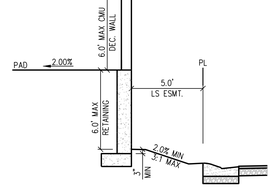
E. ROUGH GRADE SECTION
NOT TO SCALE



1. WALL SECTION
NOT TO SCALE



2. WALL SECTION
NOT TO SCALE



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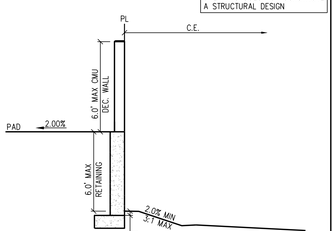
NOT TO SCALE



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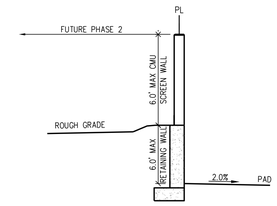

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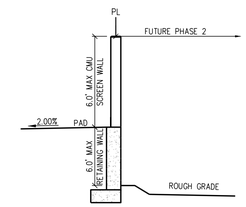

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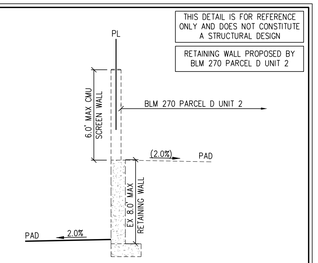

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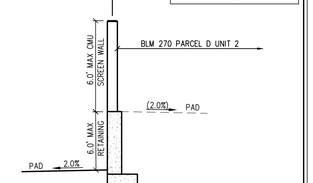

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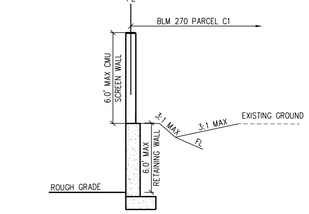
NOT TO SCALE



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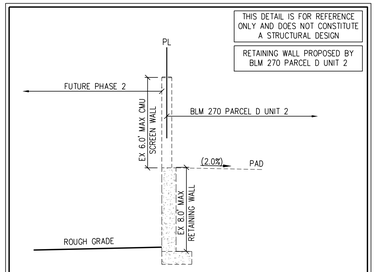
NOT TO SCALE



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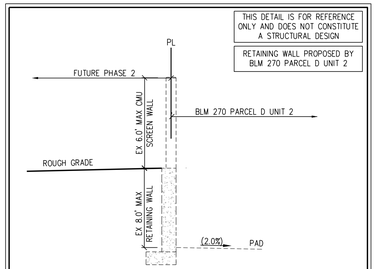
NOT TO SCALE



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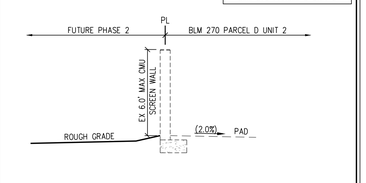

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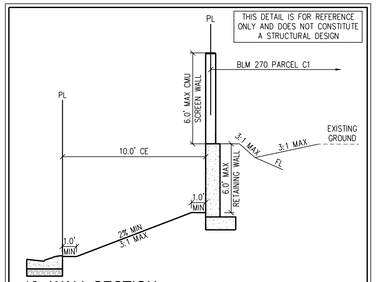
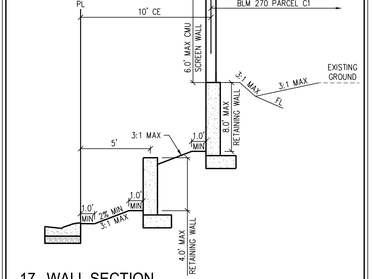
NOT TO SCALE



14. WALL SECTION
NOT TO SCALE

15. WALL SECTION
NOT TO SCALE

16. WALL SECTION
NOT TO SCALE



17. WALL SECTION
NOT TO SCALE

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
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Call 811
OR
1-800-227-2600

Westwood
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Fax (702) 284-5399
5740 S. Arville Street
Suite 216
Las Vegas, NV 89118
westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

S23 T19S R59E

BLM 270 PARCEL C-2 & C-3 PHASE 1
STREET SECTIONS AND GRADING DETAILS I

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK

PROJECT NO.
BZR2001

PROFESSIONAL ENGINEER – STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

D-1
SHEET 13 OF 17

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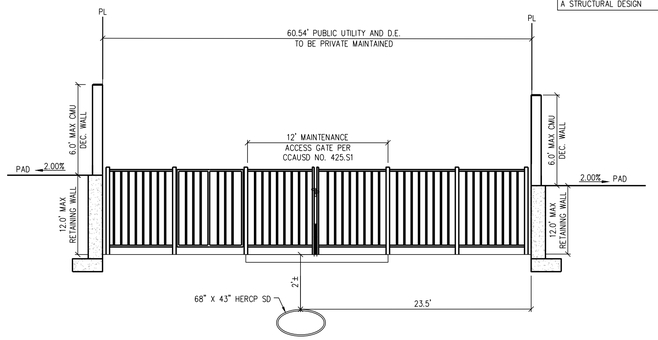
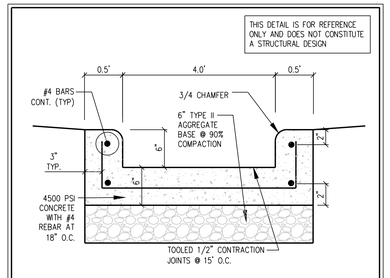
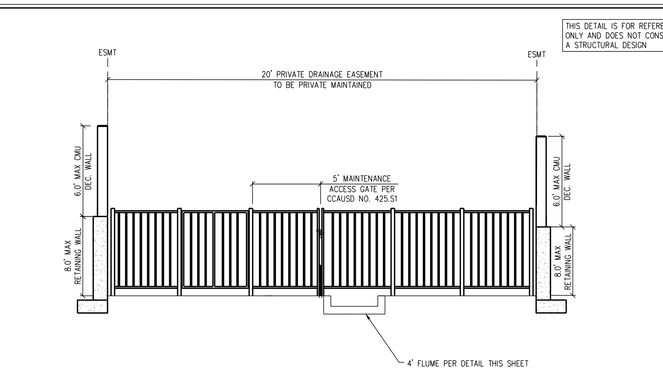


18. EASEMENT SECTION
NOT TO SCALE



4' CONCRETE FLUME DETAIL
NOT TO SCALE



19. EASEMENT SECTION
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 1

GRADING DETAILS II

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

D-2
SHEET 14 OF 17

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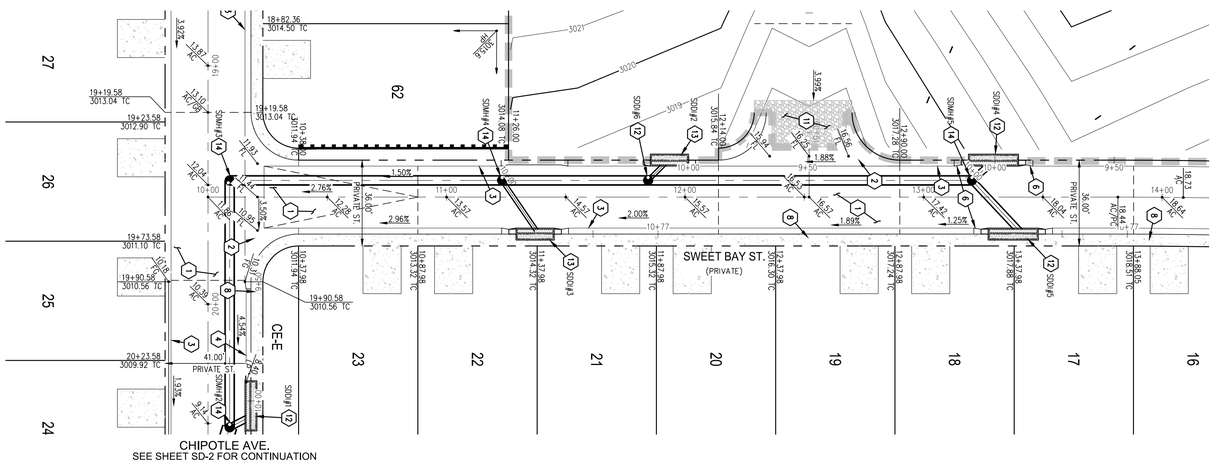
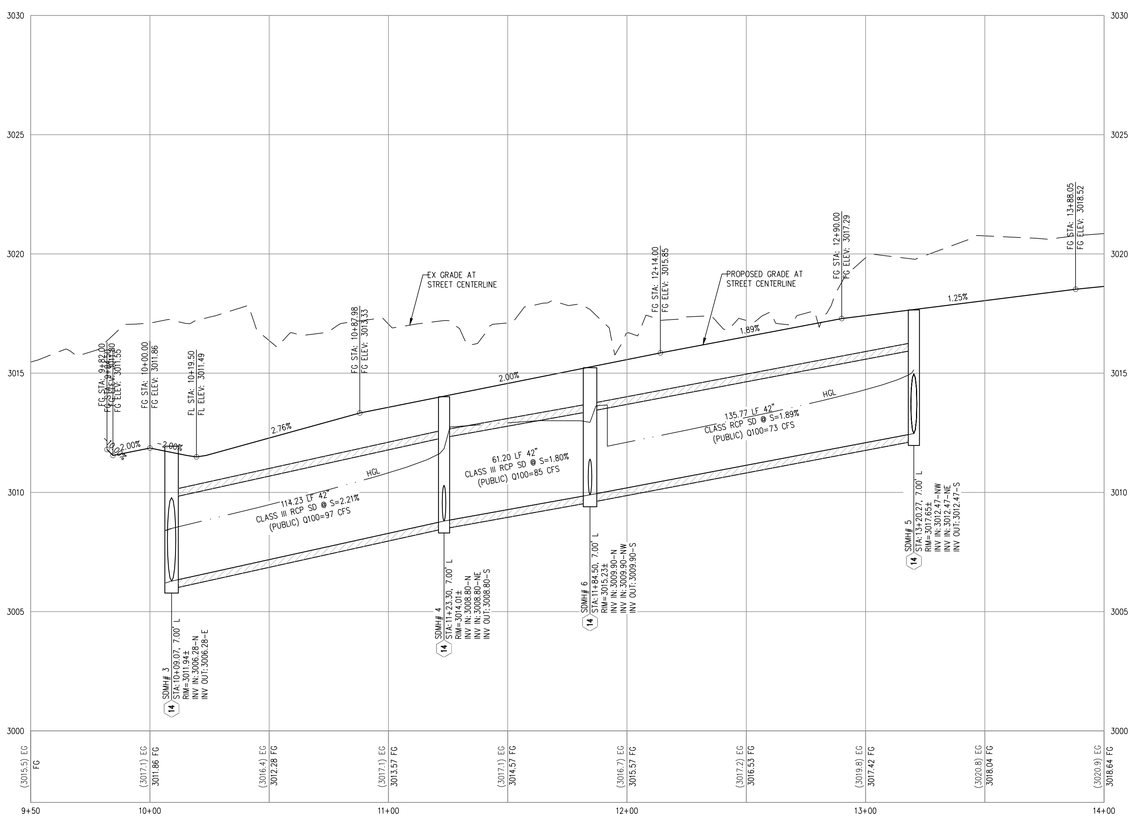


SWEET BAY ST. - PLAN VIEW

(PRIVATE STREET)



SWEET BAY ST. - 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 3000 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 3001.00)

SIDEWALK RAMP TABLE

RAMP NUMBER	GRADE (%) "B" TO "A"	"A" (FT) MIN.	"B" (FT) MIN.
1	-6 TO -5.01	4.5	21.5
2	-5 TO -4.01	4.5	15.0
3	-4 TO -3.01	4.5	12.0
4	-3 TO -2.01	4.5	9.5
5	-2 TO 2	8.0	8.0
6	2.01 TO 3	9.5	4.5
7	3.01 TO 4	12.0	4.5
8	4.01 TO 5	15.0	4.5
9	5.01 TO 6	21.5	4.5

DISCLAIMER NOTE

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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.

GRADING NOTES

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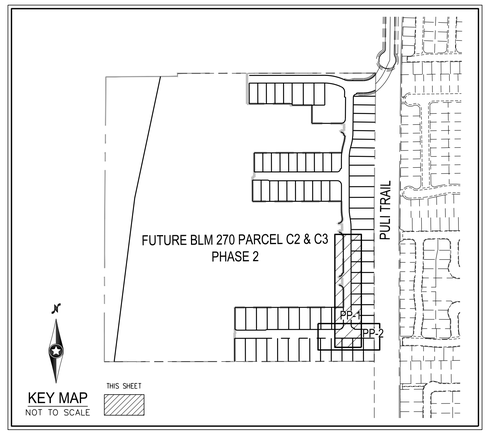
2. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
3. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
4. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
5. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
6. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
7. 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.
8. 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.



CONSTRUCTION NOTES

1. CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II AGGREGATE BASE
2. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1
4. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD NO. 216
5. CONSTRUCT "A" TYPE CURB PER CCAUSD NO. 219
6. CONSTRUCT 3' TRANSITION PER CCAUSD NO. 223
7. FIELD VERIFY AND CONNECT TO EXISTING CURB AND GUTTER
8. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
9. INSTALL STEEL TUBING FENCE & MAINTENANCE ACCESS GATE PER CCAUSD NO. 425.51 (GATE WIDTH PER PLAN)
10. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE I
11. INSTALL RIP RAP W/ 6" TYPE II GRANULAR BEDDING WITH FILTER FABRIC D50=6", T=12"
12. INSTALL 20.0' TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND 421
13. INSTALL 15.0' TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND 421
14. INSTALL 48" TYPE II SDMH PER CCAUSD NO. 401 AND 405.2
15. REMOVE EXISTING IMPROVEMENTS
16. CONSTRUCT CONCRETE FLUME PER DETAIL ON SHEET D-2

DRAINAGE EASEMENT NOTE

ALL PRIVATE STREETS, DRAINAGE EASEMENTS AND COMMON LOTS ARE PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE HOA

FAST
Call before you UnderGround
1-702-432-5300
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Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 1

STORM DRAIN A

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK

PROJECT NO.
BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

SD-1
SHEET 14 OF 17

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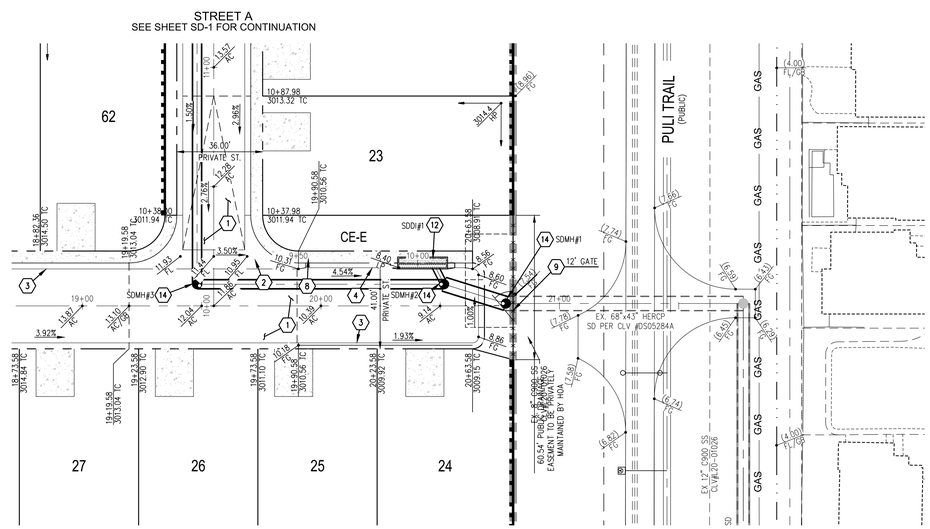
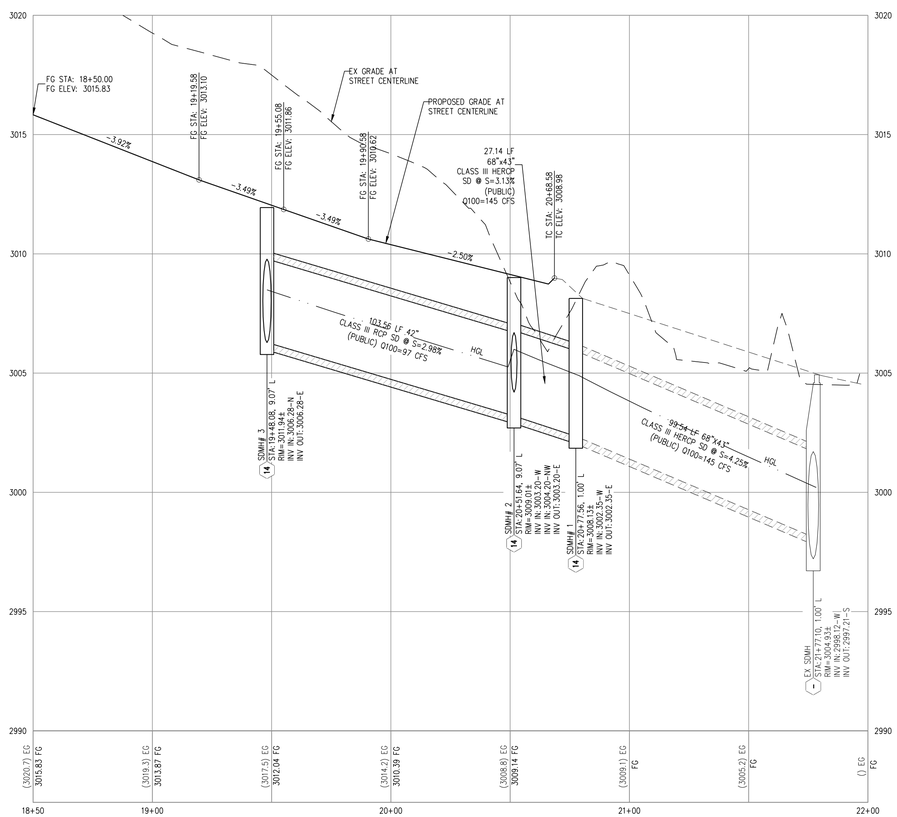


CHIPOTLE AVE. - PLAN VIEW

(PRIVATE STREET)



CHIPOTLE AVE. - PROFILE VIEW

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

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

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5	-2 TO 2	8.0	8.0
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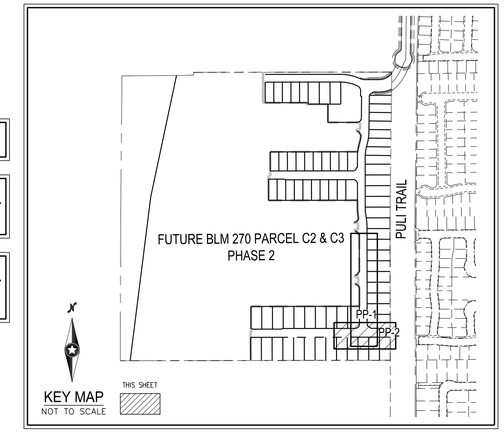

CONSTRUCTION NOTES

1. CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II AGGREGATE BASE
2. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1
4. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD NO. 216
5. CONSTRUCT "A" TYPE CURB PER CCAUSD NO. 219
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7. FIELD VERIFY AND CONNECT TO EXISTING CURB AND GUTTER
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 1

STORM DRAIN B

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK

PROJECT NO. BZR2001

PROFESSIONAL ENGINEER — STATE OF NEVADA — KEVIN M. BROSS — Exp. 12/31/2020 — CIVIL — No. 24572 — 10/15/2020

SD-2

SHEET 15 OF 17

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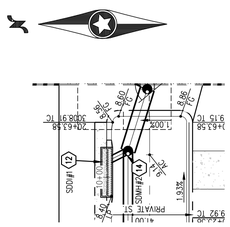
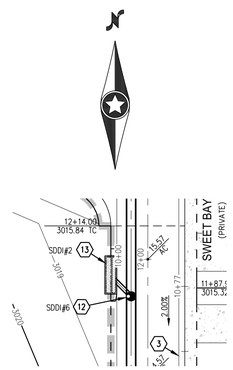
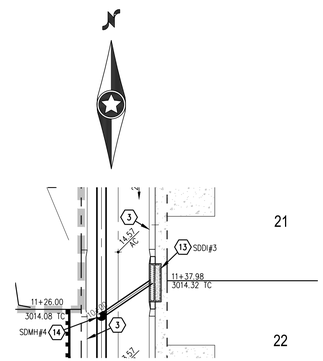


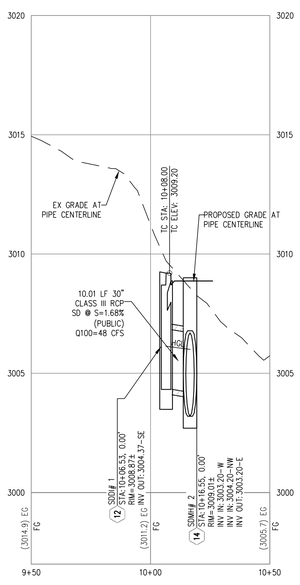
SD LAT #1 - PLAN VIEW



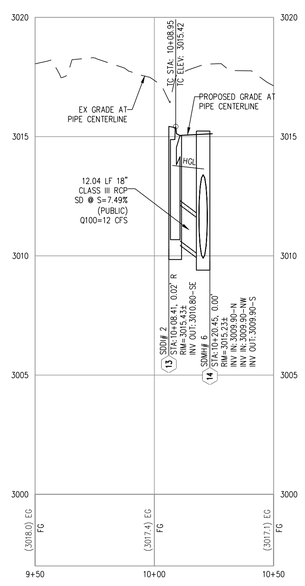
SD LAT #2 - PLAN VIEW



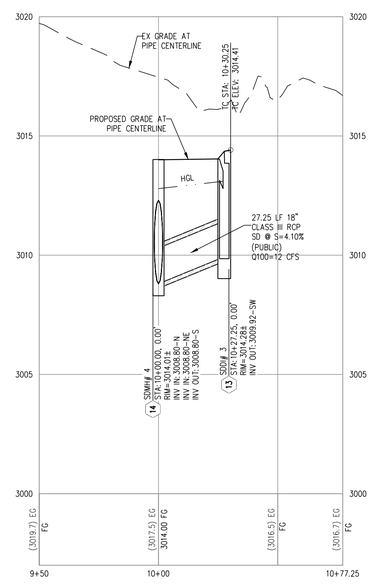
SD LAT #3 - PLAN VIEW



SD LAT #1 - PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 3'



SD LAT #2 - PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 3'



SD LAT #3 - PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 3'

0 30 60
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 3000 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 3001.00)

SIDEWALK RAMP TABLE

RAMP NUMBER	GRADE (%) "B" TO "A"	"A" (FT) MIN.	"B" (FT) MIN.
1	-6 TO -5.01	4.5	21.5
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3	-4 TO -3.01	4.5	12.0
4	-3 TO -2.01	4.5	9.5
5	-2 TO 2	8.0	8.0
6	2.01 TO 3	9.5	4.5
7	3.01 TO 4	12.0	4.5
8	4.01 TO 5	15.0	4.5
9	5.01 TO 6	21.5	4.5

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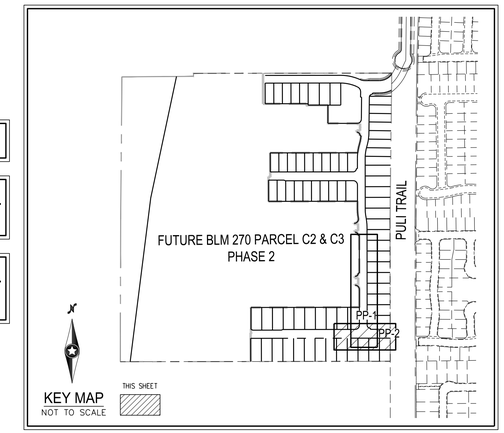
8. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.



CONSTRUCTION NOTES

1. CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II AGGREGATE BASE
2. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1
4. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD NO. 216
5. CONSTRUCT "A" TYPE CURB PER CCAUSD NO. 219
6. CONSTRUCT 3' TRANSITION PER CCAUSD NO. 223
7. FIELD VERIFY AND CONNECT TO EXISTING CURB AND GUTTER
8. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
9. INSTALL STEEL TUBING FENCE & MAINTENANCE ACCESS GATE PER CCAUSD NO. 425.51 (GATE WIDTH PER PLAN)
10. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE I
11. INSTALL RIP RAP W/ 6" TYPE II GRANULAR BEDDING WITH FILTER FABRIC D50=6", T=12"
12. INSTALL 20.0' TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND 421
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DRAINAGE EASEMENT NOTE

ALL PRIVATE STREETS, DRAINAGE EASEMENTS AND COMMON LOTS ARE PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE HOA

FAST
Call before you UnderGround
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Call 811
OR
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Westwood
Phone (702) 284-5300
Fax (702) 284-5399
5740 S. Arville Street
Suite 216
Las Vegas, NV 89118
westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 1
STORM DRAIN LATERALS 1

S23 T19S R58E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

SD-3
SHEET 16 OF 17

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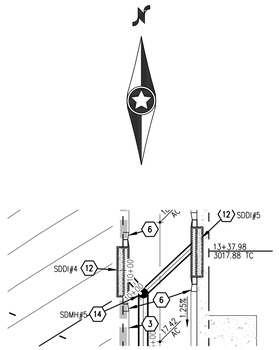
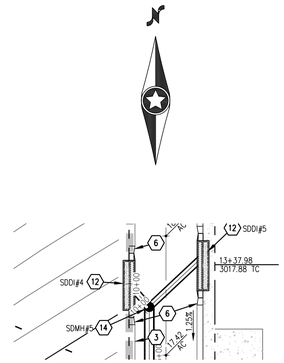
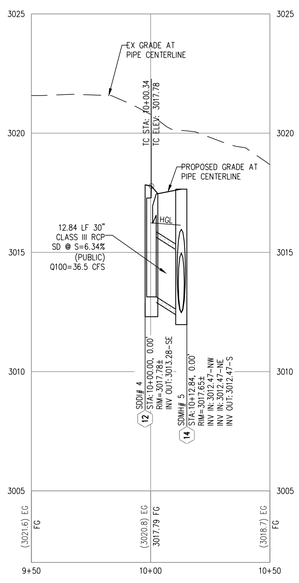


SD LAT #4 - PLAN VIEW



SD LAT #5 - PLAN VIEW



SD LAT #4 - PROFILE VIEW
HORIZ: 1" = 30'
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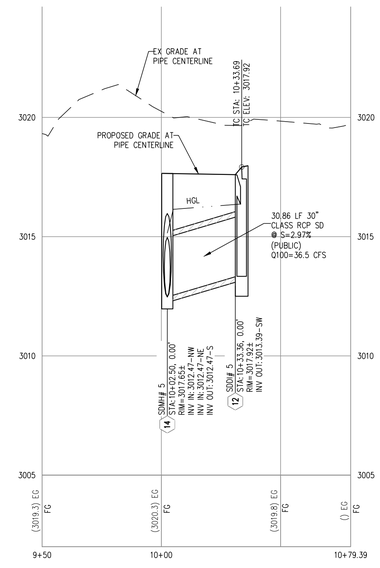

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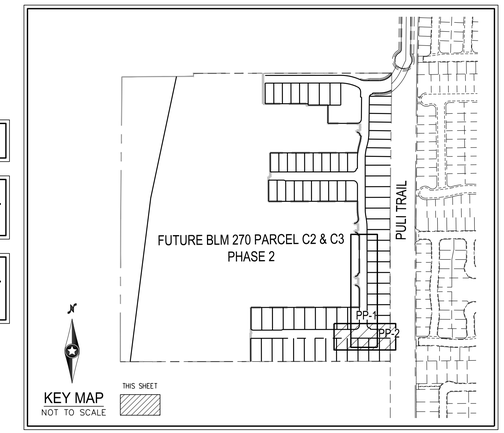

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westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 1 STORM DRAIN LATERALS 2

S23 T19S R59E

DATE: 10/12/20
DRAFTER: YZ
DESIGNER: HN
CHECKED: MK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

SD-4
SHEET 17 OF 17

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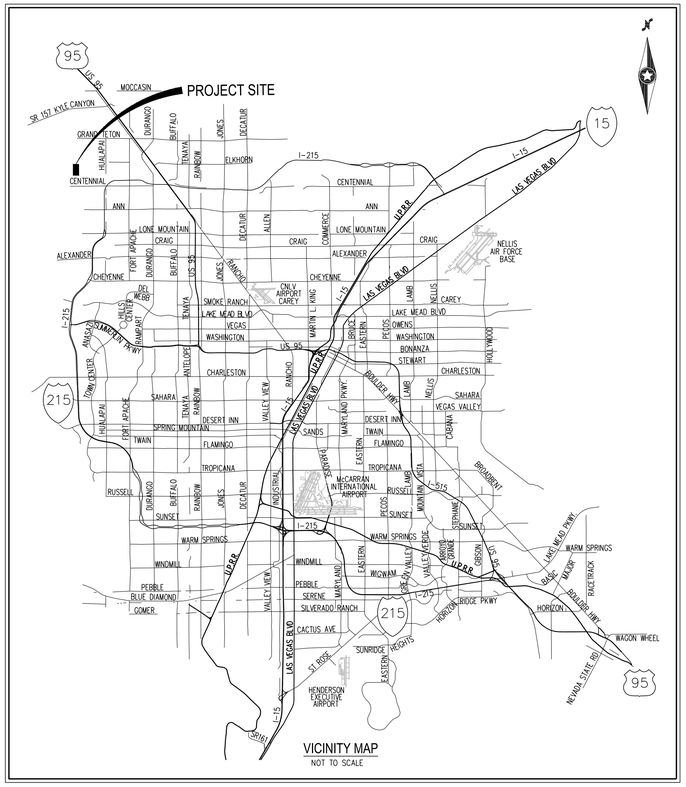
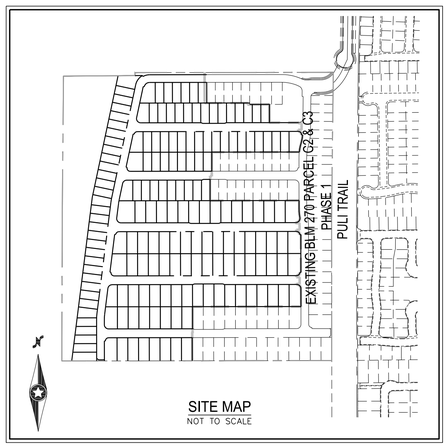
190 OCTANE FT PARTNERS, LLC

IMPROVEMENT PLANS
FOR
BLM 270 PARCEL C-2 & C-3
PHASE 2

CITY OF LAS VEGAS, NEVADA
RESIDENTIAL SUBDIVISION
APN: 126-23-610-002 & 126-23-710-001



VICINITY MAP
NOT TO SCALE



SITE MAP
NOT TO SCALE

SHEET INDEX		
NO.	SHEET	DESCRIPTION
1	C-1	COVER SHEET
2	C-2	GENERAL NOTES
3	C-3	LEGEND, ABBREVIATIONS, & QUANTITIES
4	G-1	GRADING PLAN I
5	G-2	GRADING PLAN II
6	G-3	GRADING PLAN III
7	G-4	GRADING PLAN IV
8	G-5	GRADING PLAN V
9	G-6	GRADING PLAN VI
10	G-7	GRADING PLAN VII
11	G-8	GRADING PLAN VIII
12	G-9	GRADING PLAN IX
13	D-1	STREET SECTIONS AND GRADING DETAILS I
14	D-2	GRADING DETAILS

APPROVALS

CITY OF LAS VEGAS ENGINEER APPROVAL

LAS VEGAS FIRE AND RESCUE DATE

CITY OF LAS VEGAS 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.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES
PROJECT NO. #####. FIRST APPROVED DATE:
LVVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW 20 GPM

SHEETS: ADD FIELD

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

LEGAL DESCRIPTION

A PORTION OF THE SOUTH HALF (S 1/2) OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 23, TOGETHER WITH A PORTION OF THE NORTH HALF (N 1/2) OF THE NORTHEAST QUARTER (NE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 23, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

BENCHMARK

BENCHMARK NUMBER: 6LV9913W4

RIVET AND PLATE ON TOP OF CURB AT THE NORTHEAST CORNER OF FARM ROAD AND MAINWAL BLVD.

ELEVATION = 3054.93 FEET, 931.43 METERS
88 DATUM

PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE

BASIS OF BEARINGS

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS AND LAS VEGAS HIGH ELEVATION ZONES, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

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 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.

OWNER

190 OCTANE FT PARTNERS, LLC
11411 SOUTHERN HIGHLANDS PKWY, SUITE 300
LAS VEGAS, NV 89141
PH: (702) 220-6565
FX: (702) 220-6566
CONTACT: CHRIS ARMSTRONG

DEVELOPER

OLYMPIA GROUP
11411 SOUTHERN HIGHLANDS PKWY, SUITE 300
LAS VEGAS, NV 89141
PH: (702) 220-6565
FX: (702) 220-6566
CONTACT: CHRIS ARMSTRONG

ENGINEER

WESTWOOD PROFESSIONAL SERVICES
5740 S. ARVILLE STREET, SUITE 216
LAS VEGAS, NV 89118
PH: (702) 284-5300
FX: (702) 284-5399
CONTACT: KEVIN BROSS

PROJECT INFORMATION

ACREAGE (GROSS):	= 38.61± AC
ACREAGE (NET):	= 34.43± AC
DENSITY (LOTS/GROSS ACRE):	= 6.48 DU/GROSS AC
ZONING:	= P-D
TOTAL NO. OF RESIDENTIAL LOTS	= 176
TOTAL NO. OF COMMON ELEMENTS *	= 2
MINIMUM LOT SIZE	= 3,560 SF±
MAXIMUM LOT SIZE	= 8,268 SF±

EARTHWORK SUMMARY (UNADJUSTED)

CUT	79,506 CY.
FILL	76,965 CY.
NET	2,541 CY. (CUT)

M.O.U. ITEMS

DEVIATIONS FROM STANDARDS

NONE

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/BWPC/STORMO.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 ST, SUITE 108, LAS VEGAS, NV, 89118
PHONE: 702-323-6000
PROJECT No. 197111
DATED: 01/28/20

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
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CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 2

COVER SHEET

S23 T19S R59E

DATE: 10/15/2020
DRAFTER: YZ
DESIGNER: HN
CHECKED: MAK

PROJECT NO.
BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

C-1
SHEET 1 OF 13

J:\bzr2001 blm 270 c&d\eng\improv\phase 2\bzr2001 cvr-2.dwg 10/15/2020 12:29 PM Hung Nguyen

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 SOUTH HALF (S 1/2) OF THE SOUTHEAST QUARTER (SE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 23, TOGETHER WITH A PORTION OF THE NORTH HALF (N 1/2) OF THE NORTHEAST QUARTER (NE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 23, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

BENCHMARK

BENCHMARK NUMBER: 6LV991.3W4

RIVET AND PLATE ON TOP OF CURB AT THE NORTHEAST CORNER OF FARM ROAD AND MAINWAL BLVD.

ELEVATION = 3054.93 FEET, 931.43 METERS
88 DATUM

PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE

BASIS OF BEARINGS

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS AND LAS VEGAS HIGH ELEVATION ZONES, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

SOUTHERN NEVADA - SOUTHWEST GAS CORPORATION GENERAL NOTES

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

SOUTHWEST GAS APPROVAL

SOUTHWEST GAS CORPORATION DATE

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 "C" 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.

REVISED 04/15/10

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.

15. NO LEAD COMPLIANCE NOTE:
TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER WORKS BRASS PRODUCTS PROPOSED TO BE RELOCATED, OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

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. 197111, DATED 01/28/20.
6. EARTHWORK QUANTITIES (RAW):
   -CUT = 79,506 CUBIC YARDS.
   -FILL = 76,965 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 # 6631 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 THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. IFC §105.6.15
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. IFC §3310, §3312
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. IFC § 507.5.7.3
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. IFC §106.3
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. IFC §507.2.1, NFPA 24
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. IFC §507
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. IFC §507.5.7.1
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. IFC §507
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: IFC §C102
    - RESIDENTIAL - 500 FT UNSPRINKLERED, 600 FT SPRINKLERED.
    - COMMERCIAL - 300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FT SPACING, TO PROVIDE FOR FUTURE HYDRANTS WHEN PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY. HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. IFC ▲C102.8
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. IFC ▲C102.10
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. IFC ▲C102.4
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. IFC ▲C102.7
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. IFC ▲C102.6
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. FOR SYSTEMS REQUIRED TO HAVE TWO (2) SOURCES OF WATER SUPPLY, SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD-INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION. FOR SYSTEMS PERMITTED TO HAVE ONE SOURCE OF WATER SUPPLY, SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 3 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD-INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION. IFC ▲C104
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. IFC ▲503.2.3
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10%. THE ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. IFC ▲503.2.7, ▲503.2.8
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. IFC ▲503.2.4
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13FT 6 INS. IFC ▲ 503.2.1
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 33 FT WITH PARKING ON BOTH SIDES MEASURED TO FACE OF CURB. NOT LESS THAN 28 FT WIDE WITH PARKING RESTRICTED TO ONE SIDE MEASURED TO FACE OF CURB. NOT LESS THAN 24 FT WIDE WITH NO PARKING ON EITHER SIDE MEASURED TO FACE OF CURB. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. IFC ▲ 503.2.1.1
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. IFC ▲503.1.1
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 200 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD- ENDS OR A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. CLV REGULATION AND MOU
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. CLV REGULATION
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. IFC ▲503.3
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. IFC ▲503.6
29. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS, OR HAVING FOUR OR MORE TRAVEL LANES AND A TRAFFIC COUNT OF MORE THAN 30,000 VEHICLES PER DAY, ALL HYDRANTS BEING UTILIZED TO DELIVER FIRE FLOW TO THE PROPOSED LOCATION SHALL BE LOCATED ON THE SAME SIDE OF THE STREET AS THE PROPOSED DEVELOPMENT. CLV REGULATION

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.

REVISED 04/15/10

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: 702-278-8451 (STANDBY CONTACT NUMBER)

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 OF 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 PROV

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	ROAD
BCR	BEGINNING OF CURB RETURN	HOA	HOME OWNERS ASSOCIATION	RDWY 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	RIGHT
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
CML&C	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
DE	DRAINAGE EASEMENT	NUE	NONEXCLUSIVE UTILITY EASEMENT	SY	SQUARE YARD
DET	DETAIL	NVE	NV ENERGY	TAN	TANGENT
DI	DUCTILE IRON OR DRAIN INLET	OC	ON CENTER	TC	TOP OF CURB
DIA, ø	DIAMETER	OD	OUTSIDE DIAMETER OR OVERALL DIMENSION	TF	TOP OF FLOOR OR TOP OF FOOTING
DIP	DUCTILE IRON PIPE	OFF	OFFSET	TG	TOP OF GRATE
DR	DRIVE	ORIG	ORIGINAL	THRU	THROUGH
DWG(S)	DRAWING	PAE	PUBLIC OR PEDESTRIAN ACCESS EASEMENT	THW	TOP OF HEADWALL
DWY	DRIVEWAY	PB	PULL BOX	TP	TOP OF PIPE
EA	EACH	PC	POINT OF CURVE	TW	TOP OF WALL
ECR	END CURB RETURN	PCC	POINT OF COMPOUND CURVE	TRW	TOP OF RETAINING WALL
EG	EXISTING GROUND	PDE	PUBLIC DRAINAGE EASEMENT	TSW	TOP OF SCREEN WALL
ELEV	ELEVATION	℄ OR PL	PROPERTY LINE	TYP	TYPICAL
ESMT	EASEMENT	POB	POINT OF BEGINNING	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
EP	EDGE OF PAVEMENT	POC	POINT OF CURVATURE		
ERU	EQUIVALENT RESIDENTIAL UNIT	POE	POINT OF ENDING	UE	UTILITY EASEMENT
EVC	END VERTICAL CURVE	PRC	POINT OF REVERSE CURVATURE	VC	VERTICAL CURVE
EX OR EXIST	EXISTING	PRELIM	PRELIMINARY	VERT	VERTICAL
FC	FACE OF CURB	PROP	PROPOSED	VG	VALLEY GUTTER
FF	FINISHED FLOOR	PRV	PRESSURE REDUCING VALVE	WI	WROUGHT IRON
FG	FINISHED GRADE	PUE	PUBLIC UTILITY EASEMENT	WL	WATER LINE
FGH	FINISHED GRADE, HIGH SIDE	PT	POINT OF TANGENT OR POINT	WPZ	WATER PRESSURE ZONE
FGL	FINISHED GRADE, LOW SIDE	PVC	POLYVINYL CHLORIDE	WT	WEIGHT
FH	FIRE HYDRANT			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= XXXX F = XXXX	PAD= XXXX F = XXXX	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.	60" TYPE III STORM DRAIN MANHOLE	EA	–	–
2.	5.0' TYPE "CM2" DROP INLET	EA	–	–
3.	10.0' TYPE "CM2" DROP INLET	EA	–	–
4.	12.5' TYPE "CM2" DROP INLET	EA	–	–
5.	20.0' TYPE "CM2" DROP INLET	EA	–	–
6.	18" RCP CLASS IV STORM DRAIN	LF	–	–
7.	24" RCP CLASS IV STORM DRAIN	LF	–	–
8.	30" RCP CLASS IV STORM DRAIN	LF	–	–
9.	36" RCP CLASS IV STORM DRAIN	LF	–	–
10.	RIPRAP D50=8", THK=16"	SF	–	–
11.	8' WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	–	–
12.	SIDEWALK UNDER DRAIN	SF	–	–
13.				
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)	EA	–	–
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	–	–
2.	STANDARD 18" TYPE "L" ISLAND CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	–	–
3.	STANDARD 8" TYPE "A" ISLAND CURB W/6" TYPE I AGGREGATE BASE	LF	–	–
4.	STANDARD 30" TYPE "ROLL" CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	–	–
5.	4' WIDE CONCRETE SIDEWALK W/4" TYPE II AGGREGATE BASE	SF	–	–
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: _____
LVVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW ## GPM

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

Westwood
Phone (702) 284-5300 5740 S. Arville Street
Fax (702) 284-5399 Suite 216
Las Vegas, NV 89118
westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 2

LEGEND, ABBREVIATIONS, & QUANTITIES

S23 T19S R59E

DATE: 10/15/2020
DRAFTER: YZ
DESIGNER: HN
CHECKED: MAK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

C-3
SHEET 3 OF 13

J:\bzr2001 blm 270 2\dwg\improv\phase 2\bzr2001 cv-2.dwg 10/15/2020 12:29 PM Hung Nguyen

0 30 60
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 3000 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 3001.00)

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL
PROJECT NO. 197111 DATED 01/28/20

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= 79,506 CU YDS
FILL= 76,965 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

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. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
2. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
3. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
4. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
5. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
6. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
7. 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.
8. 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.

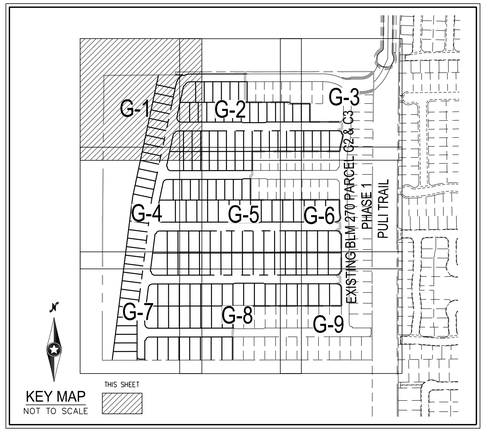
LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(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 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.



CONSTRUCTION NOTES

1. CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II AGGREGATE BASE
2. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1
4. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
5. FIELD VERIFY AND CONNECT TO EXISTING CURB AND GUTTER
6. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE I

DRAINAGE EASEMENT NOTE

ALL PRIVATE STREETS, DRAINAGE EASEMENTS AND COMMON LOTS ARE PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE HOA

FLOOD CERTIFICATION

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

KEVIN M. BROSS, P.E. 24572 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

Westwood
Phone (702) 284-5300
Fax (702) 284-5399
5740 S. Arville Street
Suite 216
Las Vegas, NV 89118
westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 2

GRADING PLAN I

S23 T19S R59E

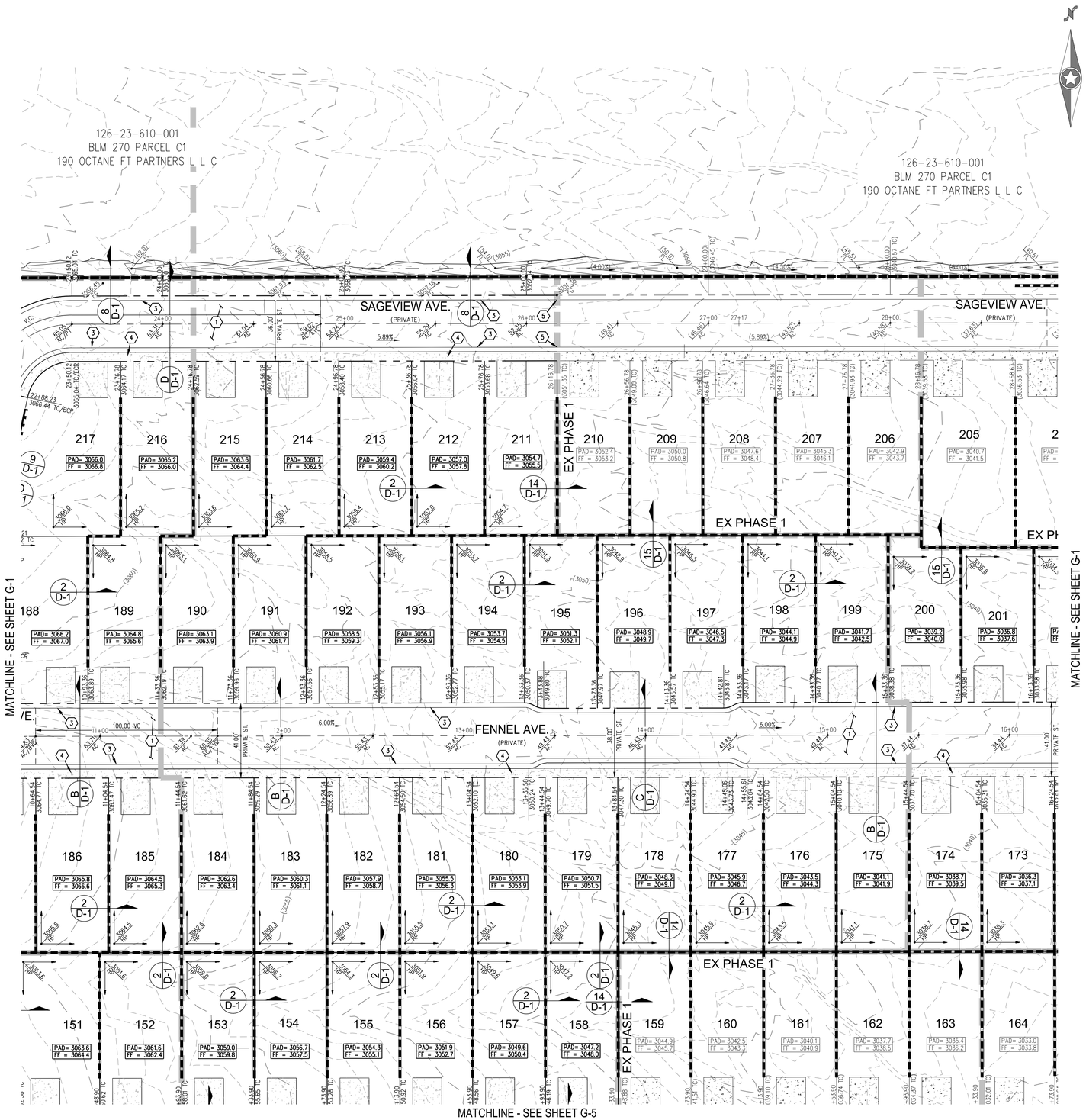
DATE: 10/15/2020
DRAFTER: YZ
DESIGNER: HN
CHECKED: MAK

PROJECT NO.
BZR2001

PROFESSIONAL ENGINEER – STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

G-1
SHEET 4 OF 13

J:\bzr2001 blm 270 c\dwg\improv\phase 2\bzr2001 grd-2.dwg 10/15/2020 12:30 PM Hung Nguyen



0 30 60
SCALE – 1"=30' FEET

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

SURVEY NOTE

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ELEVATION NOTE

ADD 3000 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 3001.00)

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL
PROJECT NO. 197111 DATED 01/28/20

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= 79,506 CU YDS
FILL= 76,965 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.

GRADING NOTES

1. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
2. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
3. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
4. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
5. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
6. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
7. 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.
8. 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.
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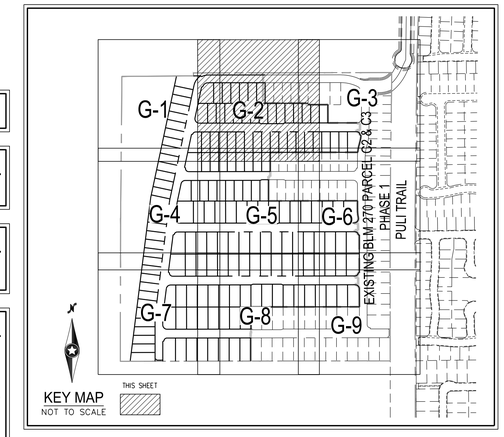
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 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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2. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1
4. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
5. FIELD VERIFY AND CONNECT TO EXISTING CURB AND GUTTER
6. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE 1

DRAINAGE EASEMENT NOTE

ALL PRIVATE STREETS, DRAINAGE EASEMENTS AND COMMON LOTS ARE PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE HOA

FLOOD CERTIFICATION

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KEVIN M. BROSS, P.E. 24572 DATE

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westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3 PHASE 2
GRADING PLAN II

S23 T19S R59E

DATE: 10/15/2020
DRAFTER: YZ
DESIGNER: HN
CHECKED: MAK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

G-2
SHEET 5 OF 13

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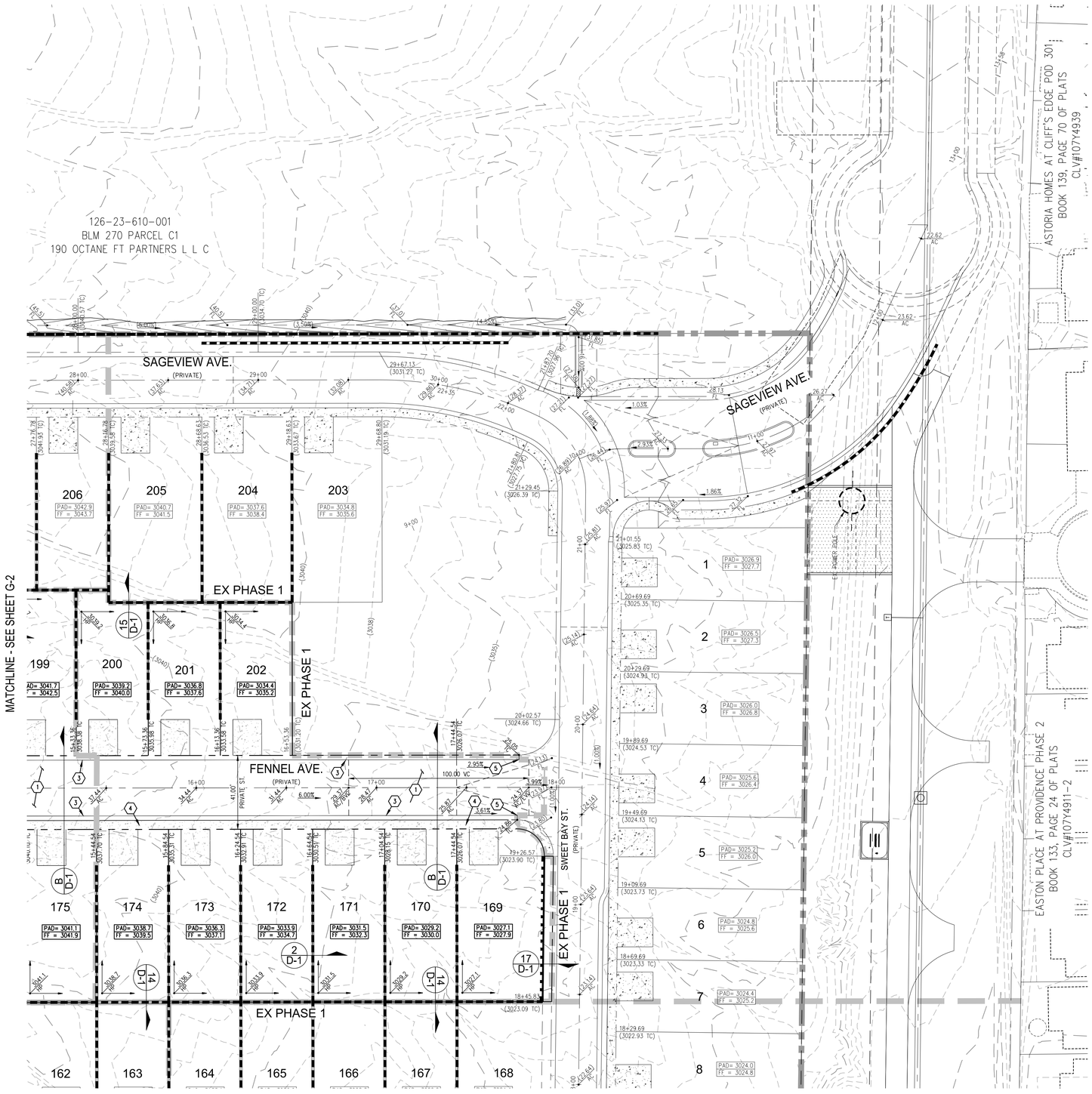

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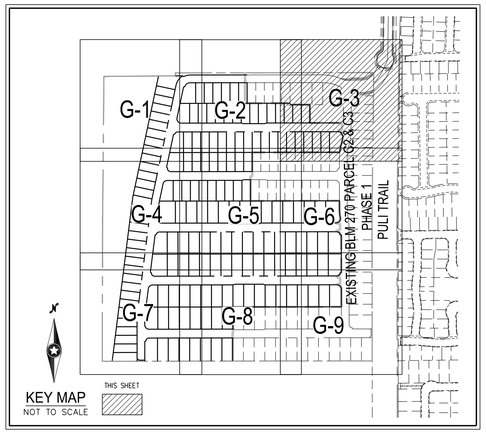

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 2

GRADING PLAN III

S23 T19S R59E

DATE: 10/15/2020
DRAFTER: YZ
DESIGNER: HN
CHECKED: MAK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER – STATE OF NEVADA
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G-3
SHEET 6 OF 13

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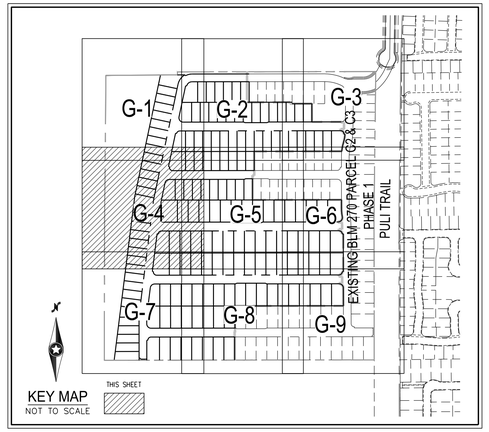

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Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3 PHASE 2
GRADING PLAN IV

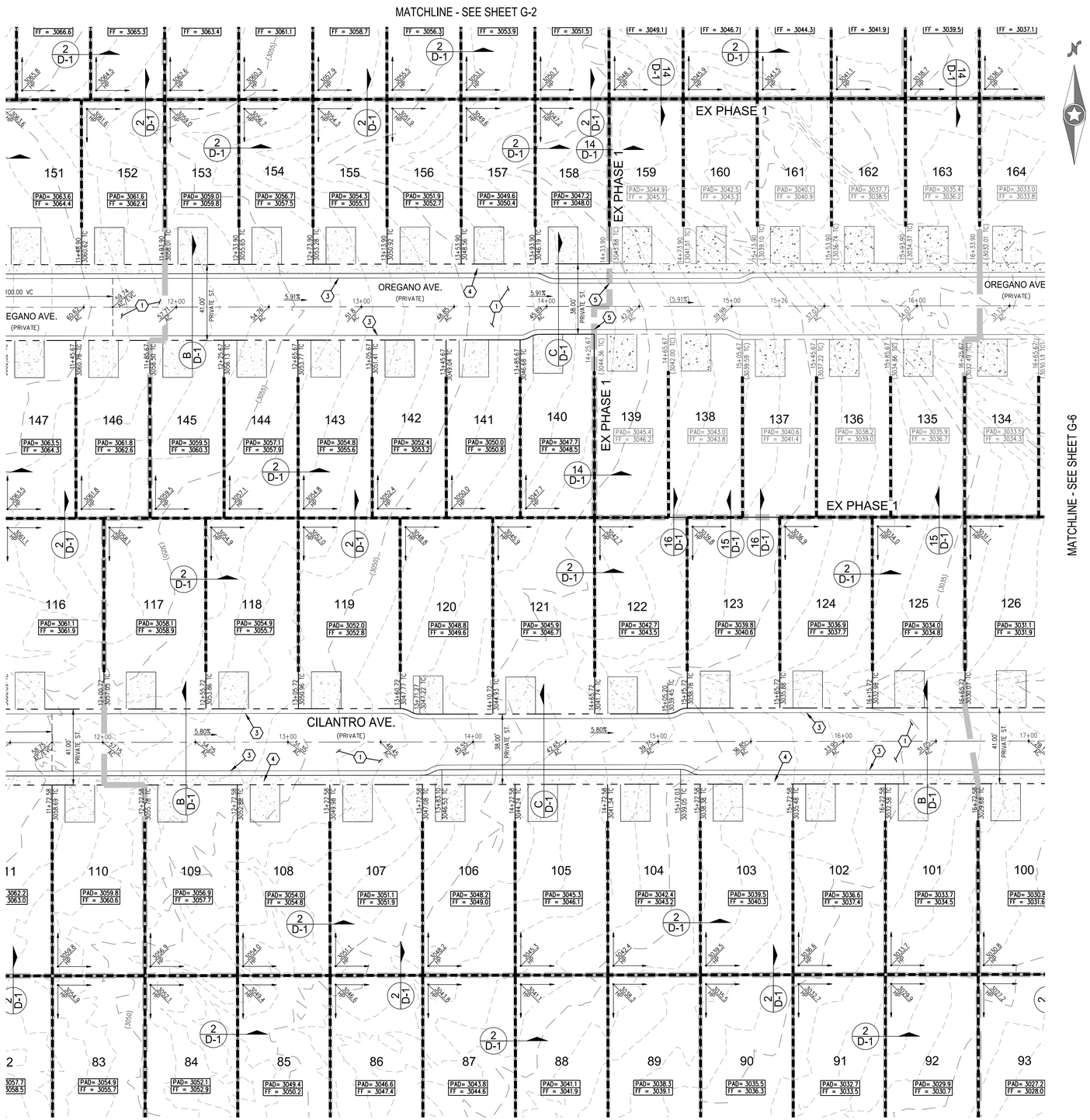
S23 T19S R59E

DATE: 10/15/2020
DRAFTER: YZ
DESIGNER: HN
CHECKED: MAK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER — STATE OF NEVADA — KEVIN M. BROSS — Exp. 12/31/2020 — CIVIL — No. 24572 — 10/15/2020

G-4
SHEET 7 OF 13

j:\bzr2001 blm 270 c\dwg\improv\phase 2\bzr2001 grd-2.dwg 10/15/2020 12:30 PM Hung Nguyen



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

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ELEVATION NOTE

ADD 3000 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 3001.00)

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL
PROJECT NO. 197111 DATED 01/28/20

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= 79,506 CU YDS
FILL= 76,965 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.

GRADING NOTES

1. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
2. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
3. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
4. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
5. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
6. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
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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.
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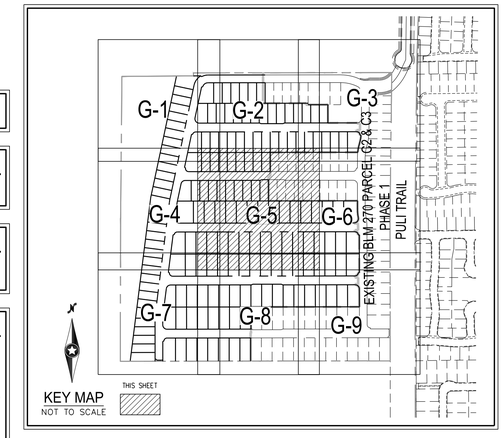
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 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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KEVIN M. BROSS, P.E. 24572 DATE

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Westwood
Phone (702) 284-5300
Fax (702) 284-5399
5740 S. Arville Street
Suite 216
Las Vegas, NV 89118
westwoodps.com
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G-5
SHEET 8 OF 13

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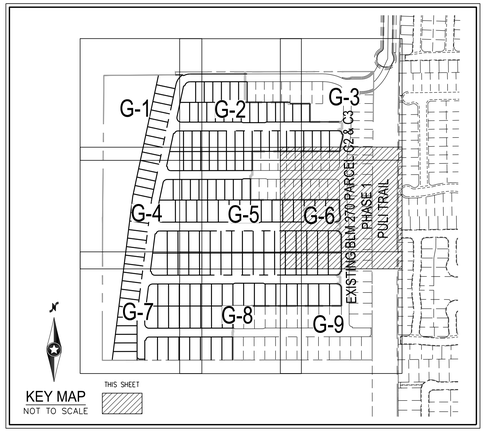

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190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3 PHASE 2
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SHEET 9 OF 13

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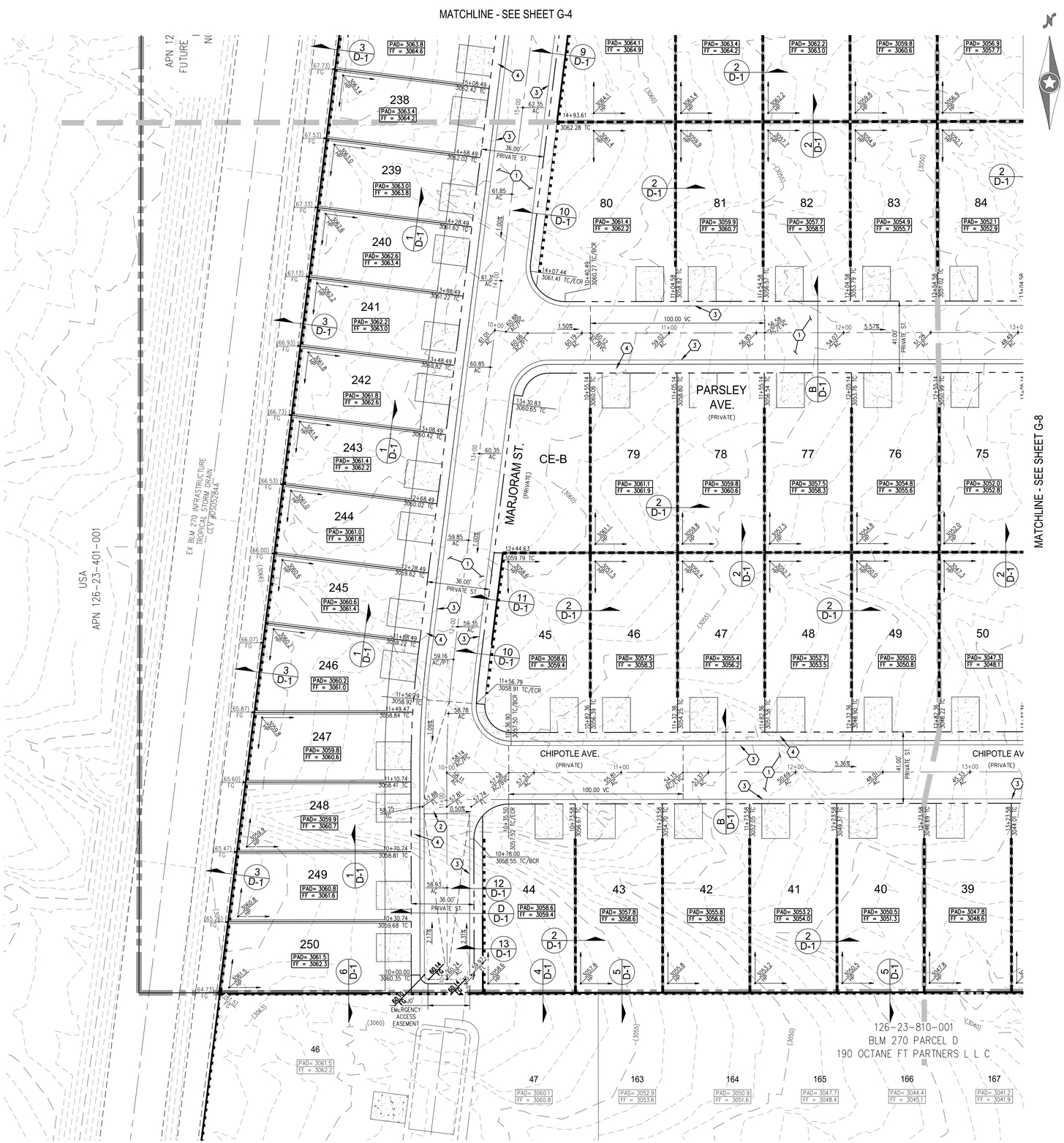

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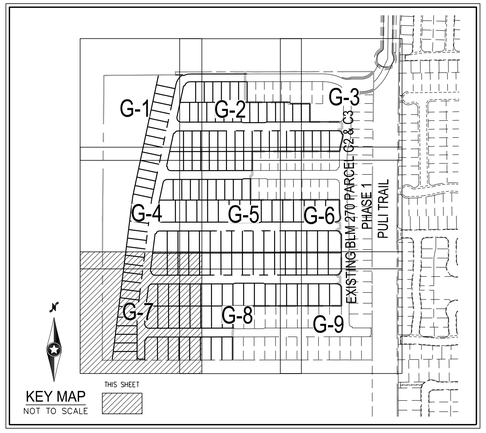

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AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

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

Westwood
Phone (702) 284-5300
Fax (702) 284-5399
5740 S. Arville Street
Suite 216
Las Vegas, NV 89118
westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3 PHASE 2
GRADING PLAN VII

S23 T19S R59E

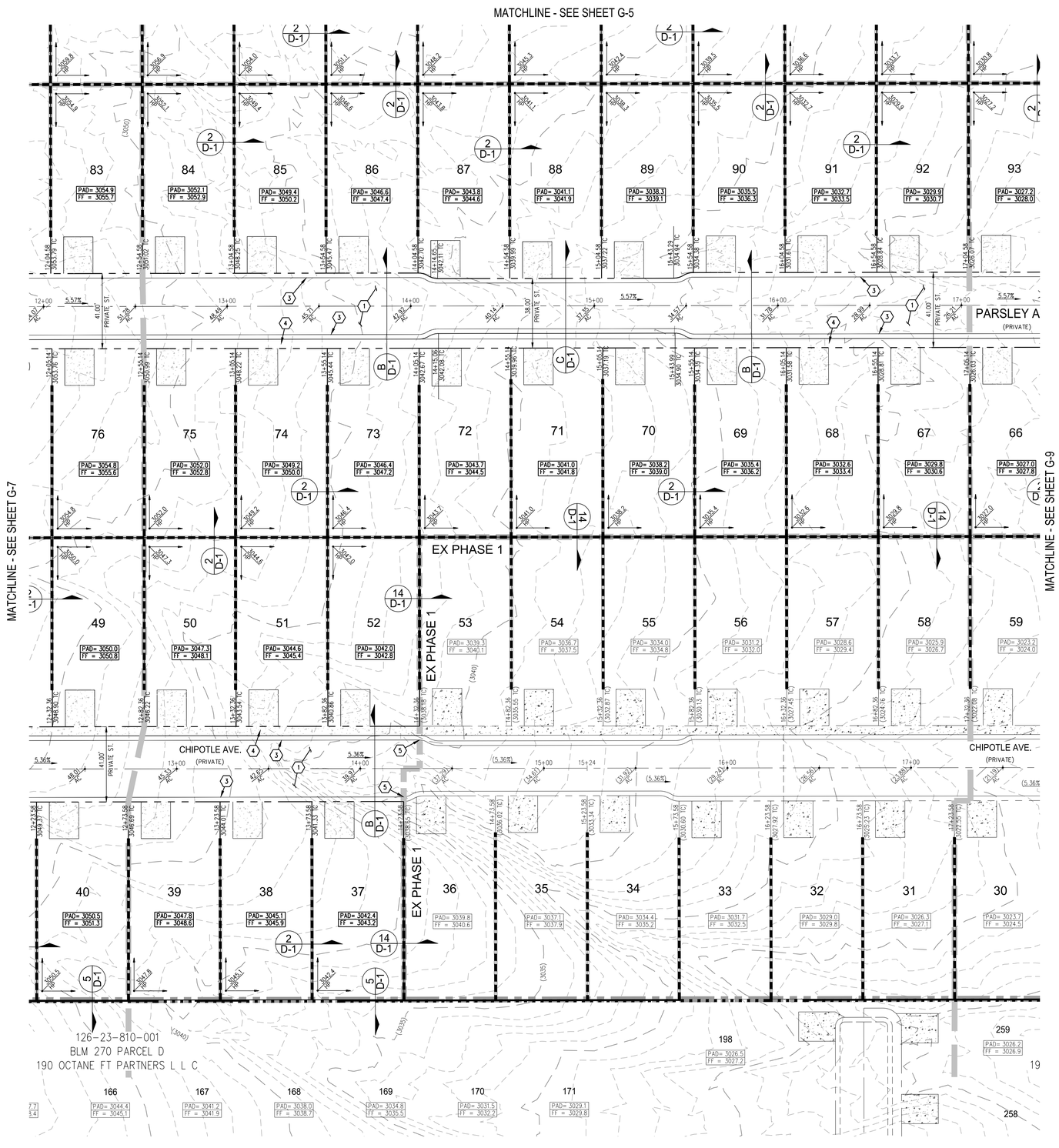
DATE: 10/15/2020
DRAFTER: YZ
DESIGNER: HN
CHECKED: MAK

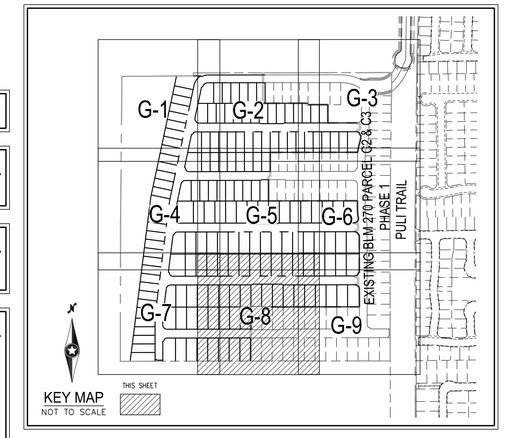
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

G-7
SHEET 10 OF 13

J:\bzr2001 bim 270 C\dwg\improv\phase 2\bzr2001 grd-2.dwg 10/15/2020 12:31 PM Hung Nguyen





SCALE – 1"=30'

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 3000 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 3001.00)

SOILS REPORT

SOILS REPORT BY SOUTHWEST GEOTECHNICAL
PROJECT NO. 197111 DATED 01/28/20

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= 79,506 CU YDS
FILL= 76,965 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

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. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
2. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
3. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
4. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
5. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
6. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
7. 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.
8. 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 ENTRANCES 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 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.

CONSTRUCTION NOTES

1. CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II AGGREGATE BASE
2. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
3. CONSTRUCT 30" ROLL CURB PER CCAUSD NO. 217.1
4. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
5. FIELD VERIFY AND CONNECT TO EXISTING CURB AND GUTTER
6. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE 1

DRAINAGE EASEMENT NOTE

ALL PRIVATE STREETS, DRAINAGE EASEMENTS AND COMMON LOTS ARE PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE HOA

FLOOD CERTIFICATION

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

KEVIN M. BROSS, P.E. 24572 DATE

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 2

GRADING PLAN VIII

S23 T19S R59E

DATE: 10/15/2020
DRAFTER: YZ
DESIGNER: HN
CHECKED: MAK
PROJECT NO. BZR2001

PROFESSIONAL ENGINEER – STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

G-8
SHEET 11 OF 13

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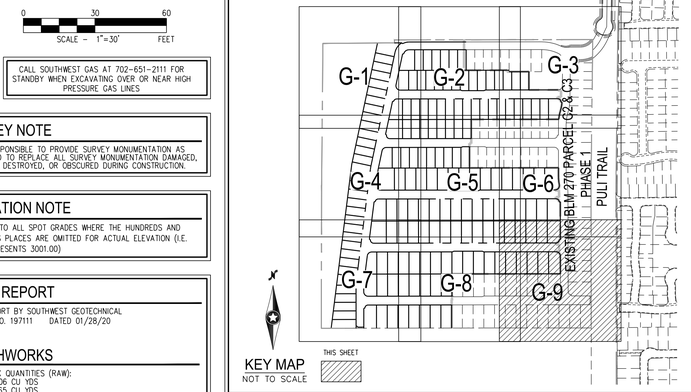

SCALE – 1"=30' (0 – 30 – 60 FEET)

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PROJECT NO. 197111 DATED 01/28/20

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Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC
BLM 270 PARCEL C-2 & C-3 PHASE 2
GRADING PLAN IX

S23 T19S R59E

DATE: 10/15/2020
DRAFTER: YZ
DESIGNER: HN
CHECKED: MAK

PROJECT NO. BZR2001

PROFESSIONAL ENGINEER – STATE OF NEVADA – KEVIN M. BROSS – Exp. 12/31/2020 – CIVIL – No. 24572 – 10/15/2020

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SHEET 12 OF 13

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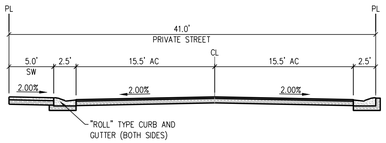
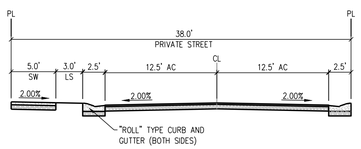


NOTE: PARKING ON BOTH SIDES OF THE STREET

B. 41' STREET SECTION

NOT TO SCALE

INTERIOR STREET

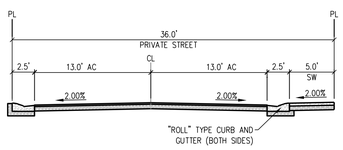


NOTE: NO PARKING ON EITHER SIDE OF THE STREET

C. 38' STREET SECTION (POPOUT)

NOT TO SCALE

INTERIOR STREET

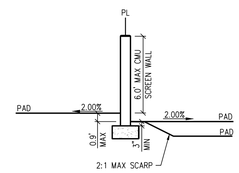


NOTE: PARKING ON SIDEWALK SIDE OF STREET

D. 36' STREET SECTION

NOT TO SCALE

INTERIOR STREET



1. WALL SECTION

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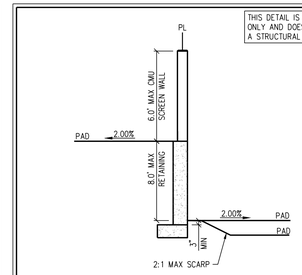

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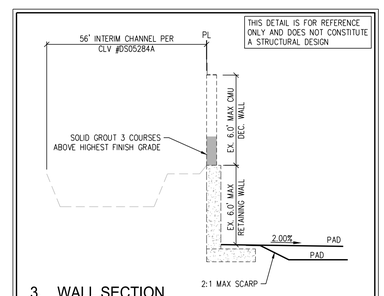

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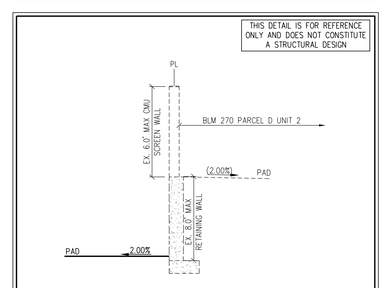

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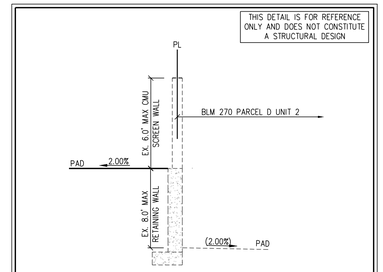

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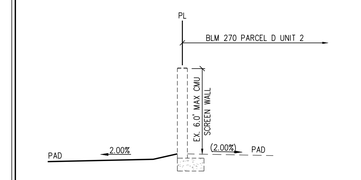

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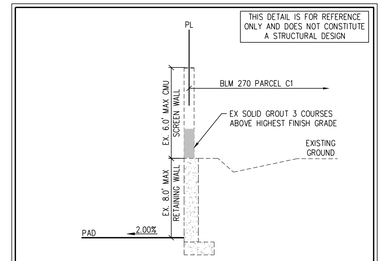

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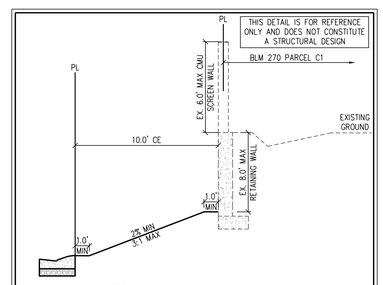

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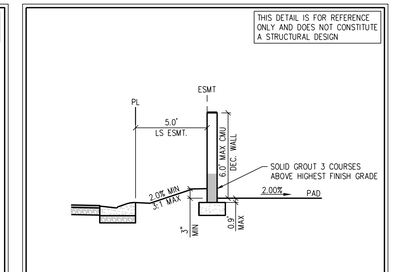

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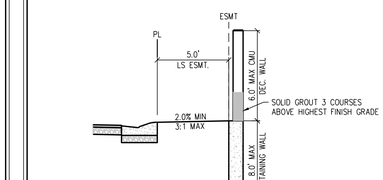

11. WALL SECTION

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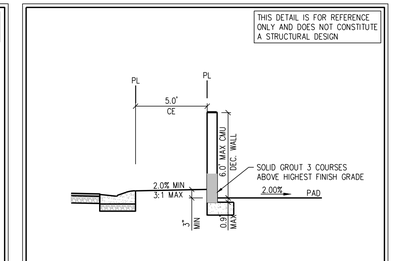
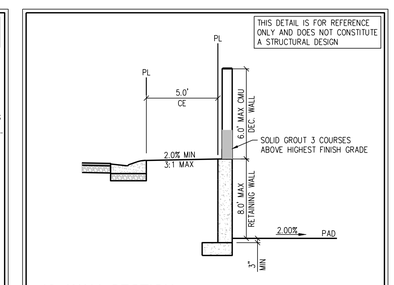


12. WALL SECTION

NOT TO SCALE



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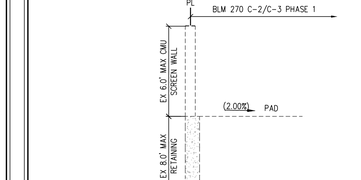
NOT TO SCALE



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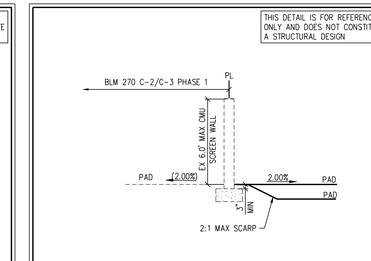
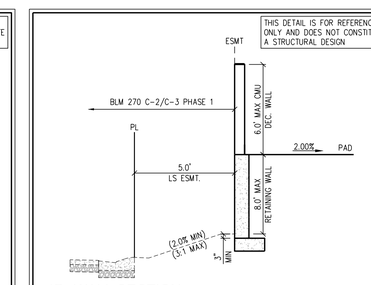
NOT TO SCALE



16. WALL SECTION

NOT TO SCALE



17. WALL SECTION

NOT TO SCALE

9. WALL SECTION

NOT TO SCALE

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CITY OF LAS VEGAS, NEVADA

190 OCTANE FT PARTNERS, LLC

BLM 270 PARCEL C-2 & C-3 PHASE 2
STREET SECTIONS AND GRADING DETAILS I

S23
T19S
R59E

DATE: 10/15/2020

DRAFTER: YZ

DESIGNER: HN

CHECKED: MAK

PROJECT NO.
BZR2001

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2020
CIVIL
No. 24572
10/15/2020

D-1

SHEET 13 OF 13

J:\bzr2001 blm 270 _L\dwg\improv\phase 2\bzr2001 dt1-2.dwg 10/15/2020 12:31 PM Hung Nguyen