DS #: 5405

APN: 137-22-813-001

PROJECT: Summerlin West Village 25 - Parcel F

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:

CITY OF LAS VEGAS NEVADA

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: February 1, 2021
TO: **Land Development Services** Department of Building & Safety				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:			**COPIES TO:**
Summerlin West Village 25 - Parcel F				GCW Inc.
Cross Streets:	SWC of Sky Vista Drive & Fox Hill Drive			Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5405A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	137-22-813-001			
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	1/13/2021	2/1/2021	See Comments Below	$400.00	4128053: $400
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS:

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

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

1. The subject development is under the premise of flood protection by the improved *Sky Vista Drive, Fox Hill Drive* and *Redpoint Drive* and the associated storm drain facilities. No occupancy permit of the houses will be issued prior to the substantial buildout of the perimeter facilities.
2. 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.
3. The *Proposed Condition* printed map does not match the map provided digitally. Address and resolve in the next submittal.
4. **Hydraulic Section 4**: Worksheet slope does not match with cross section channel slope. Revise accordingly.
5. **Sheet G1**: *Cross Section M/D1* does not match with corresponding cross section on Sheet D1. This detail also shows a small swale against the block wall. This swale needs to also be shown on the grading plans. Additionally, this swale is in a location owned by *Howard Hughes Company* (Summerlin), obtain permission of the proposed grading from Summerlin prior to the final approval of the subject drainage study.

6. **Sheet G1**: Provide one drop inlet at the east side of SDMH #2 in *Parker Mesa Street*. This additional inlet is used to reduce the 100-year flow depth at the intersection of the entrance roadway and *Parker Mesa Street*.
7. **Sheet G2**: Clearly identify C.E. "G" also as a public drainage easement to be privately maintained and to be dedicated as such in the Final Map.
8. **Sheet G4**: Lot 24 does not meet FF criteria. Provide 3-course (8"-CMU) solid grouted on *Section Detail F/D2* for Lot 24 to meet FF.
9. **Sheet G3 & Sheet G4:** Provide and label minimum 1% slope in all bulbs of cul-de-sac on all pertinent grading plans.
10. Clearly label the depth of all proposed drop inlets in all pertinent plans. Drop inlets deeper than 10' require special design and structural calculations.
11. The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.
12. Provide a note on the grading plans: All Onsite Storm Drains and the associated facilities are Privately Owned and to be 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/AYS

T/R/S: T20S/R59E/22
AREA K-22

GCW

ENGINEERS \ SURVEYORS

Technical Drainage Study for Village 25 Parcel F

5523-A077

January 2021

Prepared for:
Pardee Homes
4675 W. Teco Avenue
Las Vegas, NV 89118
(702) 614-1400

Prepared by GCW, Inc.

1555 South Rainbow Blvd
Las Vegas, NV 89146

P: 702.804.2000
F: 702.804.2298

info@gcwengineering.com
www.gcwengineering.com

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Village 25 Parcel F Date: January 2021

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

East/West: Fox Hill Drive

b) Section: 22 Township: 20 Range: 59

c) APN : 137-22-813-001

Name of Owner: Owner: Howard Hughes Company LLC Developer: Pardee Homes

Telephone No.: (702)614-1400 Fax No.: E-Mail Address:

Address: 4675 W Teco Ave. Las Vegas, NV 89118

Contact Person-Name: Steve Jones, P.E. **Telephone No.:** (702) 804-2000

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

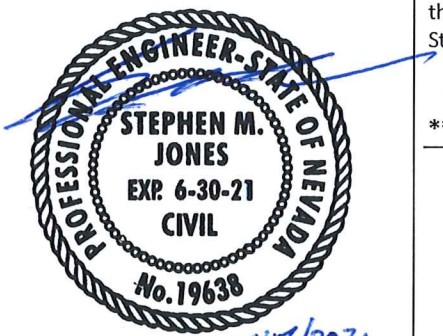
Firm: GCW, Inc.

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

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: +/- 10.4 Ac. Being Developed/Disturbed: +/- 10.4 Ac.
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ **Yes**** ☒ **No**
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☐ **Yes**** ☒ **No**
4. Proposed type of development (Residential, Commercial, Etc.): Residential
5. Approximate upstream land area which drains to the subject site: 0 Ac.
6. Has the site drainage been evaluated in the past? ☒ **YES** ☐ **NO** If yes, please identify documentation: Master Conceptual Drainage Study for Summerlin West Village 25, Technical Drainage Study for Village 25 Foxhill Drive Improvements (Red Point Drive to Sky Vista Drive
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Storm drain in Fox Hill Drive
8. Briefly describe your proposed schedule for the subject project: The Client intends to start construction as soon as practical. Any expediting of the review is appreciated.



Engineer's Seal 1/7/2021

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

***New Required Field**

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

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

GCW
ENGINEERS \ SURVEYORS

5523-A077

January 6, 2021

Oh Sang Kwon, P.E.
City of Las Vegas, Public Works
495 S. Main St., Las Vegas, NV 89101

Re: Technical Drainage Study for Village 25 Parcel F

Dear Mr. Kwon,

This letter is to certify that all documents provided on electronic submittal (CD) match the hardcopy version of the study.

Respectfully submitted,

Steve Jones, PE
Vice President
Flood Control Division Manager

1555 South Rainbow Boulevard
Las Vegas, Nevada 89146
O 702.804.2000
F 702.804.2299
info@gcwengineering.com
gcwengineering.com

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Village 25 Parcel F	Map ID: 137-22-813-001	
Firm Name: GCW, Inc.	Engineer: Steve Jones	
Address: 1555 S Rainbow Blvd.		
City: Las Vegas	State: NV	Zip: 89146
Phone Number: (702) 804-2000	Fax Number: (702) 804-2299	
Property Owner: Owner: Howard Hughes Company LLC Developer: Pardee Homes		
Address: 4675 W Teco Ave.		
City: Las Vegas	State: NV	Zip: 89118
Reviewed By:	Date Received:	Date Accepted for Review:

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

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

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

I. GENERAL REQUIREMENT

Yes	No	
X		Design Manual **Standard Form 1** with the engineer's seal and signature.
X		Design Manual **Standard Form 4**.
X		2 copies of the 24” x 36” Drainage Plan.
	NA	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	
_____	NA	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 Q100 and V100 and D100 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.
_____	NA	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.
_____	NA	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.
_____	NA	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.
X	_____	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	
_____	NA	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 Q100 flows.
X	_____	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
_____	NA	Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

Yes	No	
X	_____	Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
X	_____	Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
X	_____	Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
X	_____	Use of correct precipitation values in and around the McCarran Airport rainfall area.
X	_____	A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
X	_____	A summary table of stormwater flows showing basin area, Q10 and Q100 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.
_____	NA	Calculation for impervious area for parking lots and LIDs (if required).

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
_____	NA	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 Q100 and Q10 flows representing the worst case for interior and all perimeter streets. Q100 d x v < 8. Q10 d x v < 6 and 12 foot dry lane for rights-of-way > 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
X	_____	A summary table of interior and exterior street capacity calculations showing the street name, Q100 flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
_____	NA	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 Q100 weir height or flow depth, whichever is greater.
_____	NA	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.
_____	NA	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:	**STANDARD FORM 2**

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

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

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

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

I. GENERAL REQUIREMENT		
Yes	No	
	NA	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. will obtain
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.)
	NA	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.
	NA	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	
	NA	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.
	NA	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.
	NA	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	
	NA	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.
	NA	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.

GCW

ENGINEERS \ SURVEYORS

Technical Drainage Study for Village 25 Parcel F

5523-A077

January 2021

Prepared for:
Pardee Homes
4675 W. Teco Avenue
Las Vegas, NV 89118
(702) 614-1400

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I. INTRODUCTION

Pardee Homes is proposing a residential development on Parcel F within Summerlin Village 25, in the City of Las Vegas. The project is identified as Village 25 Parcel F (hereafter referred to as the project). Summerlin Village 25 is approximately located west of the 215 Beltway between Far Hills Avenue and Lake Mead Boulevard. Refer to the Master Plan Village Boundaries figure included in Appendix B for the exact location. Within Summerlin Village 25, Parcels F is located on the southwest side of the Sky Vista Drive and Fox Hills Drive intersection. The purpose of this report is to accompany the improvement plans, to provide detailed hydrologic and hydraulic analyses for the site, and to determine adequate protection for the project from offsite and onsite flows. The following tasks were performed in the preparation of this report:

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

II. LOCATION AND DESCRIPTION

The proposed site is located within Section 22, Township 20 South, Range 59 East on APN 137-22-813-001 within the jurisdictional limits of the City of Las Vegas (CLV). The site is bordered by Sky Vista Drive to the north, Fox Hills Drive to the east, and Parcel COS4 to the southwest. Please refer to Figure 1 in Appendix C for the location of the project.

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

Figure 2 in Appendix C shows the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) containing Community Panel 32003C2150E dated September 27, 2002. The project site lies within a Zone X. Areas designated as Zone X are described as being outside the 500-year floodplain. Therefore, this project is not located in a FEMA designated Special Flood Hazard Area (SFHA).

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

Figures 3 and 4, included in Appendix C are based on information provided in the CCRFCD 2018 Las Vegas Valley Master Plan Update (Reference 2, hereafter referred to as the 2018 MPU). Figure 3 shows the project site in relation to the 2018 MPU subbasins and land use for the area. Figure 4 shows the project site in relation to CCRFCD facilities in the area according to the 2018 MPU. As shown on Figure 4, the site is not adjacent to existing or proposed CCRFCD Facilities, however the regional facility APDF0073 passes through the Sky Vista and Foxhills Drive intersection. Note that facilities shown in the 2018 MPU have been superseded by the V25 Master Study and the regional facility proposed in Sky Vista can be seen in the Sky Vista Study.

V. REFERENCED STUDIES

In preparation of this study, the following approved drainage studies and improvement plans were referenced to complete hydrologic and hydraulic analyses. These studies have been reviewed and accepted as suitable for reference material. See Appendix B for referenced documents. A brief synopsis of the pertinence of each of the referenced items is as follows:

- *Summerlin West Planning Area Master Plan Update #2* (Reference 3, hereinafter referred to as The Summerlin West MPU Study) was approved by the City of Las Vegas on May 22, 2018 and provides the master plan for the Summerlin West area.
- *Master Conceptual Drainage Study Update #1 for Summerlin West Village 25* (Reference 4, hereinafter referred to as the V25 Study) was approved by the City of Las Vegas on April 14, 2020 and provides the overall plan for Summerlin Village 25 and provides ultimate condition hydrology for the Site.
- *Update to the Technical Drainage Study for Village 25 Sky Vista Drive Improvements Redpoint Drive to Kettle Ridge Drive* (Reference 5, hereinafter referred to as the Sky Vista Study) was conditionally approved by the City of Las Vegas on September 10, 2020 and provides the flow rates adjacent to the Site and the design for the storm drain in Sky Vista Drive.
- *Summerlin West Village 25 – Fox Hill Drive Improvements (Redpoint Drive to Sky Vista Drive)-Update* (Reference 6, hereinafter referred to as the Fox Hill Study) provides flow rates adjacent to the Site and designed the stub and storm drain system that the Project Site discharges to. This Study was also used to show the existing condition for the Site.

VI. HYDROLOGY

The methodology presented in this study is in compliance with the *CCRFCD Hydrologic Criteria and Drainage Design Manual* (Reference 3, hereinafter referred to as the Manual).

Model Description: The referenced watersheds were modeled using the SCS Unit Hydrograph method within the Army Corps of Engineers HEC-1 Flood Hydrograph package.

Drainage Areas and Flow Patterns: Flow patterns for the site have been determined from 1-ft aerial topography, proposed grading, and reference material. Referenced basins were prorated to determine the flow rate at facilities designed with this study.

Soils: Soils information for the Project Site was referenced from the V25 Study. The Project Site consists of soil types 152 and 156. Soil type 152 consists of 100 percent Hydrologic Soil Group (HSG) D. Soil type 156 consists of 89 percent HSG D, 10 percent B, and 1 percent A. Refer to reference material from the V25 Study for more detailed soil information.

Curve Numbers (CN): A curve number of 95 was used in the referenced study for the onsite basin derived from the soils information and using a commercial land use. A commercial land use was used since the typical lot size was less than 6,000 square feet.

VII. EXISTING CONDITION

In the existing condition, the Project Site is undeveloped with all adjacent roadways constructed. A 30" RCP stub extending from Fox Hill Drive (designed with the Fox Hill Drive Study) collects all the runoff from the site. The existing condition was referenced from the Fox Hill Drive Study. Note that since offsite flows generated from parcels in Village 25 are collected before discharging to roadways, there are only minor street flows adjacent to the Project Site. Pertinent reference material showing the existing condition has been included in Appendix C.

VIII. PROPOSED CONDITION

In the proposed condition the Project Site is developed with offsite areas remaining the same as in the existing condition. Storm drain is extended from Fox Hill Drive into the site to collect all onsite runoff. Since adjacent street and storm drain improvements are considered developed in the existing condition and flow rates in the streets are the same in the proposed and ultimate condition, a separate ultimate condition analysis was not required for this project.

The proposed Site is developed in conformance with land plan used in the Village 25 Study, therefore the runoff generate onsite has been directly referenced from the Village 25 Study and pro-rated for the hydraulic design of proposed facilities detailed below.

IX. ULTIMATE CONDITION

The ultimate condition was reference from the V25 Study. As stated in the Proposed Condition section a separate analysis was not necessary for the ultimate condition as flow rates remain the same. Refer to Figures 6 and 7 from the Village 25 Study for an illustration of the ultimate condition drainage patterns and facilities.

X. HYDRAULICS

STREET HYDRAULICS

A normal depth calculation for the typical street section has been provided using the highest flow rate along with the maximum and minimum slopes for the development. Street sections have also been provided at proposed drop inlet locations. Hydraulic calculations have been included in Appendix A. Refer to the prorate table on Figure 5 in Appendix C for the flowrates used in the street normal depth calculations.

Based on the calculated street flow characteristics, the Manual criteria for depth (D) and velocity times depth (D*V) for the 100-year storm event will be met.

CCRFCD criteria requires that finished floor elevations are set a minimum vertical distance above the flow line of the gutter equal to twice the depth of the 100-year flow in the gutter up to a maximum of 18 inches above the depth of flow. CLV requires finished floor elevations be set at a minimum of 6-inches above the top of curb. All proposed lot finished floors meet these criteria or have been flood protected up to the minimum finished floor elevation.

STORM DRAIN IMPROVEMENTS

Storm drain has been proposed to collect onsite runoff extending from the existing storm drain in Fox Hills Drive. Storm drain is proposed to collect street flow where flow depths exceed back of curb, based on Summerlin street criteria. The starting water surface elevation used in the WSPG model was referenced from the Fox Hill Drive Study. Hydraulic calculations have been provided in Appendix A. Pertinent reference material has been included in Appendix C.

XI. CONCLUSIONS AND RECOMMENDATIONS

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

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

3. The site is not adjacent to existing or proposed CCRFCD facilities.

4. Onsite storm drain is proposed to collect onsite flow and convey it to the existing storm drain system in Fox Hills Drive. As soon as flow depths exceed back of curb height, storm drain has been extended to meet Summerlin street flow criteria. The proposed storm drain is designed to meet CCRFCD drainage requirements.

5. The proposed drainage patterns in this report are consistent with all the referenced studies, therefore the proposed development does not adversely impact downstream properties or facilities.

XII. REFERENCES

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

2. *CCRFCD 2018 Las Vegas Valley Master Plan Update*. 2018.

3. VTN. *Summerlin West Planning Area Master Plan Update #2.* February 2020.

4. VTN. *Master Conceptual Drainage Study for Summerlin West Village 25.* April 2020.

5. *GCW, Inc. Update to the Technical Drainage Study for Village 25 Sky Vista Drive Improvements Redpoint Drive to Kettle Ridge Drive. August 2020.*

6. *GCW, Inc. Summerlin West Village 25 – Fox Hill Drive Improvements (Redpoint Drive to Sky Vista Drive)-Update. September 2020.*

APPENDIX LAYOUT

Appendix A — Hydraulic Calculations and Information

1. Street/Ditch Normal Depth Calculations
2. Drop Inlet Calculations
3. WSPG Calculations
4. Lateral Calculations
5. Inlet Control Calculations
6. Emergency Overflow Weir Calculation

Appendix B — Referenced Materials and Supporting Documents

1. Summerlin West Planning Area Master Plan Update #2
    a. Approval Letter
    b. Village Boundaries Map
    c. Land Use Map
2. Master Conceptual Drainage Study for Summerlin West Village 25
    a. Approval Letter
    b. Soil Information
    c. Curve Number Calculations
    d. Travel Time Calculations
    e. Standard Form 4
    f. Ultimate Condition HEC-1 Model
    g. Figure 6 – Ultimate Condition Basin Map
    h. Figure 7 – Facilities Map
3. Update to the Technical Drainage Study for Village 25 Sky Vista Drive Improvements (Redpoint Drive to Kettle Ridge Drive)
    a. Approval Letter
    b. Street Normal Depth Calculations
    c. Drop Inlet Calculations
    d. Improvement Plan Sheets : G1, GD1, PP1, PP2, PP3, and LP3
    e. Figure 5 – Interim Condition Drainage Map
4. Update to the Technical Drainage Study for Village 25 Fox Hill Drive Improvements (Redpoint Drive to Sky Vista Drive)
    a. Approval Letter
    b. Street Normal Depth Calculation
    c. Drop Inlet Calculation
    d. WSPG Model
    e. Improvement Plan Sheets : G1, GD1, PP1, PP3, and LP2
    f. Figure 5 – Interim Condition Drainage Map

Appendix C

Drainage Figures and Plans

1. Figure 1- Vicinity Map
2. Figure 2 - FEMA FIRM Map
3. Figure 3 - MPU 2018 Subbasin Map
4. Figure 4 - MPU 2018 Facility Map
5. Figure 5 – Proposed Condition Map

APPENDIX A

Worksheet for Section 1 (Typical Onsite Street Max Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	7.94	%
Discharge	19.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+19.00	0.51
0+36.00	0.17
0+36.00	0.13
0+37.00	0.00
0+37.02	0.08
0+38.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+19.00, 0.51)	(0+38.00, 0.38)	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 0.51 ft	
Flow Area	2.50	ft²
Wetted Perimeter	16.00	ft
Hydraulic Radius	0.16	ft
Top Width	15.78	ft
Normal Depth	0.45	ft

Worksheet for Section 1 (Typical Onsite Street Max Slope)

Results

Critical Depth		0.63	ft
Critical Slope		0.00569	ft/ft
Velocity		7.60	ft/s
Velocity Head		0.90	ft
Specific Energy		1.34	ft
Froude Number		3.37	
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	0.63	ft
Channel Slope	7.94	%
Critical Slope	0.00569	ft/ft

Cross Section for Section 1 (Typical Onsite Street Max Slope)

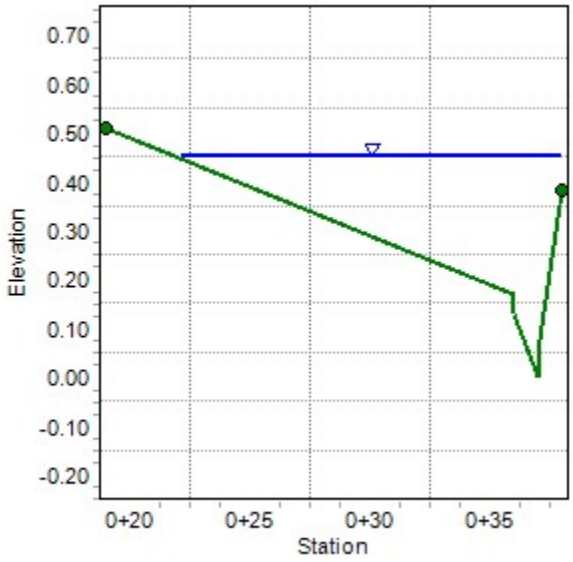
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	7.94	%
Normal Depth	0.45	ft
Discharge	19.00	ft³/s

Cross Section Image



Worksheet for Section 1 (Typical Onsite Street Min Slope)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.50	%
Discharge	19.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+19.00	0.51
0+36.00	0.17
0+36.00	0.13
0+37.00	0.00
0+37.02	0.08
0+38.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+19.00, 0.51)	(0+38.00, 0.38)	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	0.55	ft
Elevation Range	0.00 to 0.51 ft	
Flow Area	4.45	ft²
Wetted Perimeter	19.38	ft
Hydraulic Radius	0.23	ft
Top Width	19.00	ft
Normal Depth	0.55	ft

Worksheet for Section 1 (Typical Onsite Street Min Slope)

Results

Critical Depth		0.63	ft
Critical Slope		0.00569	ft/ft
Velocity		4.27	ft/s
Velocity Head		0.28	ft
Specific Energy		0.84	ft
Froude Number		1.56	
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	0.55	ft
Critical Depth	0.63	ft
Channel Slope	1.50	%
Critical Slope	0.00569	ft/ft

Cross Section for Section 1 (Typical Onsite Street Min Slope)

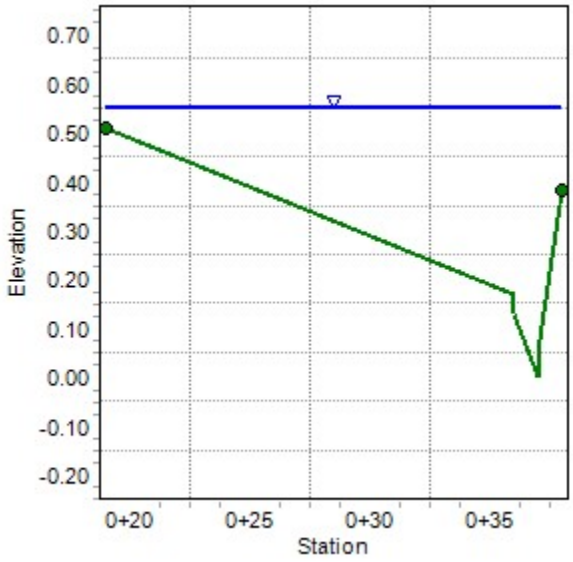
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.50	%
Normal Depth	0.55	ft
Discharge	19.00	ft³/s

Cross Section Image



Worksheet for Facility 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	5.95	%
Discharge	19.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+19.00	0.51
0+36.00	0.17
0+36.00	0.13
0+37.00	0.00
0+37.02	0.08
0+38.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+19.00, 0.51)	(0+38.00, 0.38)	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	0.46	ft
Elevation Range	0.00 to 0.51 ft	
Flow Area	2.79	ft²
Wetted Perimeter	16.91	ft
Hydraulic Radius	0.16	ft
Top Width	16.67	ft
Normal Depth	0.46	ft

Worksheet for Facility 1

Results

Critical Depth		0.63	ft
Critical Slope		0.00569	ft/ft
Velocity		6.82	ft/s
Velocity Head		0.72	ft
Specific Energy		1.19	ft
Froude Number		2.94	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.46	ft
Critical Depth	0.63	ft
Channel Slope	5.95	%
Critical Slope	0.00569	ft/ft

Cross Section for Facility 1

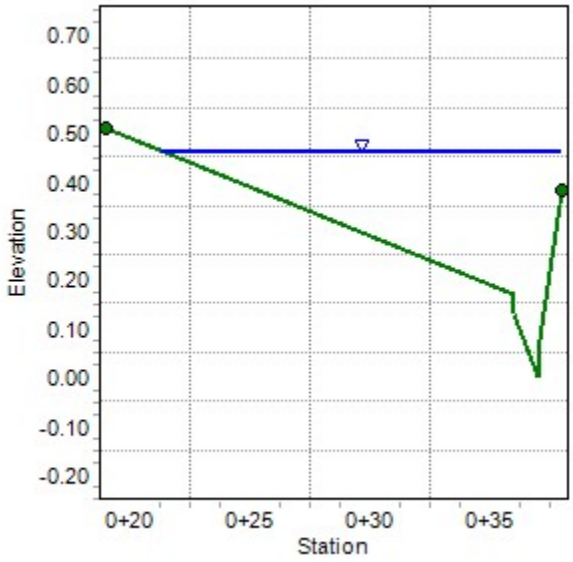
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	5.95	%
Normal Depth	0.46	ft
Discharge	19.00	ft³/s

Cross Section Image



Worksheet for Facility 3

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	6.48	%
Discharge	10.50	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+19.00	0.51
0+36.00	0.17
0+36.00	0.13
0+37.00	0.00
0+37.02	0.08
0+38.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+19.00, 0.51)	(0+38.00, 0.38)	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	0.39	ft
Elevation Range	0.00 to 0.51 ft	
Flow Area	1.73	ft²
Wetted Perimeter	13.30	ft
Hydraulic Radius	0.13	ft
Top Width	13.13	ft
Normal Depth	0.39	ft

Worksheet for Facility 3

Results

Critical Depth		0.53	ft
Critical Slope		0.00640	ft/ft
Velocity		6.06	ft/s
Velocity Head		0.57	ft
Specific Energy		0.96	ft
Froude Number		2.94	
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		0.39	ft
Critical Depth		0.53	ft
Channel Slope		6.48	%
Critical Slope		0.00640	ft/ft

Cross Section for Facility 3

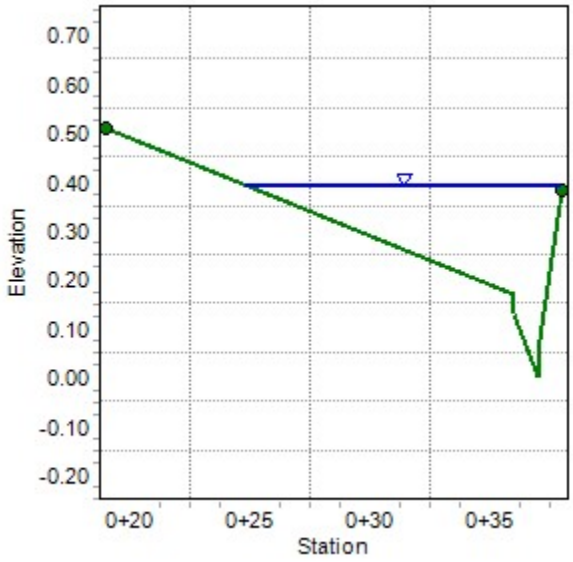
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	6.48	%
Normal Depth	0.39	ft
Discharge	10.50	ft³/s

Cross Section Image



Worksheet for Facility 4

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	6.48	%
Discharge	6.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+19.00	0.51

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+19.00, 0.51)	0.016

Options

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

Results

Normal Depth	0.34	ft
Elevation Range	0.00 to 0.51 ft	
Flow Area	1.13	ft²
Wetted Perimeter	10.61	ft
Hydraulic Radius	0.11	ft
Top Width	10.46	ft
Normal Depth	0.34	ft

Worksheet for Facility 4

Results

Critical Depth		0.45	ft
Critical Slope		0.00697	ft/ft
Velocity		5.30	ft/s
Velocity Head		0.44	ft
Specific Energy		0.78	ft
Froude Number		2.84	
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		0.45	ft
Channel Slope		6.48	%
Critical Slope		0.00697	ft/ft

Cross Section for Facility 4

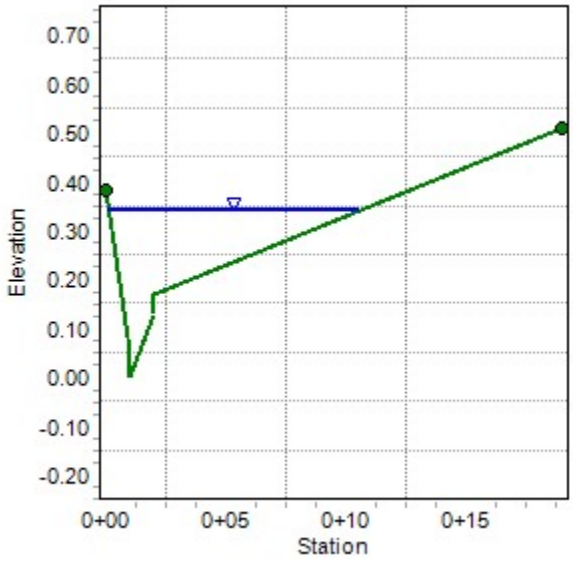
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	6.48	%
Normal Depth	0.34	ft
Discharge	6.00	ft³/s

Cross Section Image



Worksheet for Section 4 Wash

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	6.80	%
Discharge	16.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	82.00
0+15.50	76.00
0+40.00	76.00
0+55.00	82.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 82.00)	(0+55.00, 82.00)	0.030

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	0.17	ft
Elevation Range	76.00 to 82.00 ft	
Flow Area	4.14	ft²
Wetted Perimeter	25.41	ft
Hydraulic Radius	0.16	ft
Top Width	25.35	ft
Normal Depth	0.17	ft
Critical Depth	0.23	ft
Critical Slope	0.02153	ft/ft

Worksheet for Section 4 Wash

Results

Velocity		3.86	ft/s
Velocity Head		0.23	ft
Specific Energy		0.40	ft
Froude Number		1.68	
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	0.17	ft
Critical Depth	0.23	ft
Channel Slope	6.80	%
Critical Slope	0.02153	ft/ft

Cross Section for Section 4 Wash

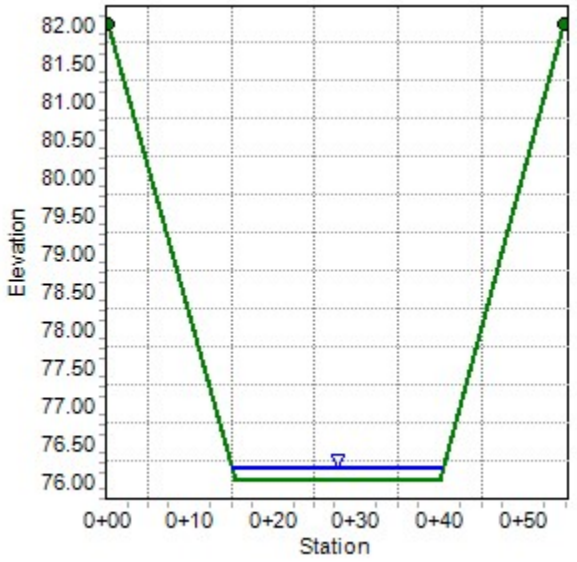
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00	%
Normal Depth	0.17	ft
Discharge	16.00	ft³/s

Cross Section Image



ENGINEERS \ SURVEYORS

Drop Inlet Sizing Calculation

Project Name: Village 25 Parcel F
By: NB
Date: 01/04/2020

Drop Inlet Sizing on a Continuous Grade

12.5' TYPE DM2

FACILITY 1

Known:

Q_s=	Street Flow	19.0	cfs
S_o=	Longitudinal Slope	0.0595	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	6.82	fps
D=	Flow Depth	0.46	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Grate Width	1.5	ft
a=	Gutter Depression	5.0	in
L_g=	Length of Grate	10.0	ft
L_c=	Length of Curb Opening	12.5	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00	
	V_o= Splash over velocity=p+q*(L_g*(1-(C_{fg}/100)))-r*(L_g*(1-(C_{fg}/100)))^2+s*(L_g*(1-(C_{fg}/100)))^3†	9.86	fps
E_o=	Grate flow ratio = Q_w/Q_s	0.23	
	Q_w= Frontal flow=A_w*V_s	4.28	cfs
	Q_x= Side flow = Q_s-Q_w	14.72	cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*(L_g*(1-C_{fg}/100))$^{2.3}$))	0.15	
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	6.4	cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)		

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.084	ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.285	ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	46.74	ft
Q_{ic}=	Flow intercepted = (1-(1-(L_c*(1-C_{fc}/100))/L_t)$^{1.8}$)*Q_s	4.3	cfs

Total Inlet Calculations

Q_{ti}=	**Total flow intercepted = Q_{ig}+Q_{ic}**	**10.8**	**cfs**
Q_{tq}=	**Flow bypass = Q_s-Q_{ti}**	**8.2**	**cfs**
q=	Interception per unit ratio = Q_{ti}/L_g	0.86	cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	57	%

ENGINEERS \ SURVEYORS

Drop Inlet Sizing Calculation

Project Name: Village 25 Parcel F
By: NB
Date: 01/04/2020

Drop Inlet Sizing on a Continuous Grade

5' TYPE DM2

FACILITY 3

Known:

Q_s=	Street Flow	10.5	cfs
S_o=	Longitudinal Slope	0.0648	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	6.06	fps
D=	Flow Depth	0.39	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Grate Width	1.5	ft
a=	Gutter Depression	5.0	in
L_g=	Length of Grate	2.5	ft
L_c=	Length of Curb Opening	5.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	0.91	
	V_o= Splash over velocity=p+q*(L_g*(1-(C_{fg}/100)))-r*(L_g*(1-(C_{fg}/100)))^2+s*(L_g*(1-(C_{fg}/100)))^3†	5.02	fps
E_o=	Grate flow ratio = Q_w/Q_s	0.30	
	Q_w= Frontal flow=A_w*V_s	3.17	cfs
	Q_x= Side flow = Q_s-Q_w	7.33	cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*(L_g*(1-C_{fg}/100))$^{2.3}$))	0.01	
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	2.9	cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)		

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.106	ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.285	ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	32.56	ft
Q_{ic}=	Flow intercepted = (1-(1-(L_c*(1-C_{fc}/100))/L_t)$^{1.8}$)*Q_s	1.4	cfs

Total Inlet Calculations

Q_{ti}=	**Total flow intercepted = Q_{ig}+Q_{ic}**	**4.3**	**cfs**
Q_{tq}=	**Flow bypass = Q_s-Q_{ti}**	**6.2**	**cfs**
q=	Interception per unit ratio = Q_{ti}/L_g	0.87	cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	41	%

ENGINEERS \ SURVEYORS

Drop Inlet Sizing Calculation

Project Name: Village 25 Parcel F
By: NB
Date: 01/04/2020

Drop Inlet Sizing on a Continuous Grade

5' TYPE DM2

FACILITY 4

Known:

Q_s=	Street Flow	6.0	cfs
S_o=	Longitudinal Slope	0.0648	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	5.30	fps
D=	Flow Depth	0.34	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Grate Width	1.5	ft
a=	Gutter Depression	5.0	in
L_g=	Length of Grate	2.5	ft
L_c=	Length of Curb Opening	5.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	0.97	
	V_o= Splash over velocity=p+q*(L_g*(1-(C_{fg}/100)))-r*(L_g*(1-(C_{fg}/100)))^2+s*(L_g*(1-(C_{fg}/100)))^3†	5.02	fps
E_o=	Grate flow ratio = Q_w/Q_s	0.40	
	Q_w= Frontal flow=A_w*V_s	2.37	cfs
	Q_x= Side flow = Q_s-Q_w	3.63	cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*(L_g*(1-C_{fg}/100))$^{2.3}$))	0.01	
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	2.4	cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)		

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.133	ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.285	ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	22.49	ft
Q_{ic}=	Flow intercepted = (1-(1-(L_c*(1-C_{fc}/100))/L_t)$^{1.8}$)*Q_s	1.1	cfs

Total Inlet Calculations

Q_{ti}=	**Total flow intercepted = Q_{ig}+Q_{ic}**	**3.5**	**cfs**
Q_{tq}=	**Flow bypass = Q_s-Q_{ti}**	**2.5**	**cfs**
q=	Interception per unit ratio = Q_{ti}/L_g	0.70	cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	58	%

ENGINEERS \ SURVEYORS

Drop Inlet Sizing Calculation

Project Name: Village 25 Parcel F
By: NB
Date: 01/04/2021

Drop Inlet Sizing in Sump

10' TYPE DM2
FACILITY 6

Known:

Q=	Design Flow	25.0	cfs
D_p=	Ponding Depth at Inlet	0.83	ft
W=	Grate Width	1.5	ft
L_g=	Length of Grate	7.5	ft
L_c=	Length of Curb Opening	10.0	ft
H_c=	Curb Opening Height	0.5	ft
C_{wc}=	Weir coefficient for curb opening	2.3	
C_{wg}=	Weir coefficient for grate	3.0	
C_o=	Orifice coefficient	0.67	
R_o=	Grate opening factor	0.60	
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

P_g=	Active grate weir length (agwl) = 2*W+Lg	10.50	ft
P_{agl}	Adjusted agwl = 2*(1-Cfg/100)*W+Lg	9.00	ft
A_g=	Grate area = W*L_g	11.25	ft^2
A_{aga}=	Adjusted open grate area = Ag*Ro*(1-Cfg/100)	3.38	ft^2
	check - If Dp<1.792*Aaga/Pagl; weir; else orifice	orifice	
Q_{ig}=	Flow intercepted by grate If "weir" controls Qig=Cwg*Pagl*$Dp^{1.5}$ If "orifice" controls Qig=Co*Aaga*$(64.4*Dp)^{0.5}$	16.5	cfs

Curb Opening Capacity Calculations

Pc =	Active curb opening weir length (acowl) = Lc+1.8*W	12.70	ft
Pacl =	Adjusted acowl = Lc+1.8*(1-Cfc/100)*W	11.35	ft
Ac=	curb opening area (coa) = Lc*Hc	5.00	ft^2
A_{aca}=	Adjusted coa = Ac*(1-Cfc/100)	2.50	ft^2
	check - If Dp<Hc; weir; else orifice	orifice	
Qic=	Flow intercepted by curb opening If "weir" controls Qic=Cwc*Pacl*Dp1.5 If "orifice" controls Qic=Co*Aaca*(64.4*Dp-Hc/2)0.5	12.2	cfs

Total Inlet Calculations

Qti =	Flow Interception Capacity = Qig+Qic	28.7	cfs
q =	Interception per unit ratio = Q_{ti}/L_g	2.87	cfs/ft

Actual Flow Collected by Drop Inlet 25 cfs

ParcelFMain.WSW

```
T1 Village 25 Parcel F                                                    0
T2 Mainline Storm Drain
T3 Starting WSE from Fox Hill Study
SO   1000.0003451.840  1                          3453.175
R    1017.1003455.015  1      .013                                .000    .000 0
WE   1017.1003455.015  5
R    1019.5903455.480  5      .013                                .000    .000 0
JX   1019.6003455.480  5  2   .013    7.000         3455.480       90.0         .000
R    1022.1003455.510  5      .013                                .000    .000 0
WX   1022.1003455.510  1
R    1053.5903455.930  1      .013                                .000  24.000 1
R    1062.0953456.053  1      .013                                .000    .000 0
WE   1062.0953456.053  6
R    1063.2103456.070  6      .013                                .000    .000 0
JX   1063.2203456.070  6  2   .013   25.000         3456.070       90.0         .000
R    1064.3453456.120  6      .013                                .000    .000 0
WX   1064.3453456.120  3
R    1099.1703457.690  3      .013                                .000  30.000 1
R    1173.7003460.670  3      .013                                .000  69.000 1
R    1212.0103461.630  3      .013                                .000  35.000 1
R    1305.0203464.220  3      .013                                .000    .000 0
JX   1305.0203464.220  4  3  3.013    4.000    3.5003464.2203464.220 76.0 70.0    .000
R    1472.8003470.000  4      .013                                .000   8.000 1
R    1553.7603476.840  4      .013                                .000  60.000 1
R    1563.8403477.340  4      .013                                .000    .000 0
SH   1563.8403477.340  4
CD   1  4   1    .000   2.500     .000  .000  .000   .00
CD   2  4   1    .000   2.500     .000  .000  .000   .00
CD   3  4   1    .000   2.000     .000  .000  .000   .00
CD   4  4   1    .000   1.500     .000  .000  .000   .00
CD   5  3   0   0.000   9.000   15.000  .000  .000   .00
CD   6  3   0   0.000   9.000   10.000  .000  .000   .00
Q            10.500   .0
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Village 25 Parcel F
Mainline Storm Drain
Starting WSE from Fox Hill Study

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	3451.840	1.347	3453.187	50.00	18.55	5.34	3458.53	.00	2.30	2.49	2.500	.000	.00	1 .0
2.396	.1857					.0442	.11	1.35	3.14	.91	.013	.00	.00	PIPE
1002.396	3452.285	1.387	3453.672	50.00	17.88	4.96	3458.64	.00	2.30	2.48	2.500	.000	.00	1 .0
2.715	.1857					.0397	.11	1.39	2.97	.91	.013	.00	.00	PIPE
1005.111	3452.789	1.442	3454.231	50.00	17.05	4.51	3458.74	.00	2.30	2.47	2.500	.000	.00	1 .0
2.339	.1857					.0350	.08	1.44	2.76	.91	.013	.00	.00	PIPE
1007.450	3453.223	1.500	3454.723	50.00	16.26	4.10	3458.83	.00	2.30	2.45	2.500	.000	.00	1 .0
2.018	.1857					.0310	.06	1.50	2.56	.91	.013	.00	.00	PIPE
1009.467	3453.598	1.561	3455.159	50.00	15.50	3.73	3458.89	.00	2.30	2.42	2.500	.000	.00	1 .0
1.727	.1857					.0275	.05	1.56	2.37	.91	.013	.00	.00	PIPE
1011.194	3453.918	1.627	3455.546	50.00	14.78	3.39	3458.94	.00	2.30	2.38	2.500	.000	.00	1 .0
1.478	.1857					.0244	.04	1.63	2.19	.91	.013	.00	.00	PIPE
1012.672	3454.193	1.697	3455.890	50.00	14.09	3.08	3458.97	.00	2.30	2.33	2.500	.000	.00	1 .0
1.252	.1857					.0217	.03	1.70	2.01	.91	.013	.00	.00	PIPE
1013.924	3454.425	1.772	3456.198	50.00	13.43	2.80	3459.00	.00	2.30	2.27	2.500	.000	.00	1 .0
1.039	.1857					.0194	.02	1.77	1.85	.91	.013	.00	.00	PIPE
1014.963	3454.618	1.854	3456.472	50.00	12.81	2.55	3459.02	.00	2.30	2.19	2.500	.000	.00	1 .0
.848	.1857					.0174	.01	1.85	1.69	.91	.013	.00	.00	PIPE

Village 25 Parcel F
Mainline Storm Drain
Starting WSE from Fox Hill Study

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
1015.811	3454.776	1.943	3456.719	50.00	12.21	2.32	3459.03	.00	2.30	2.08	2.500	.000	.00	1 .0
.656	.1857					.0157	.01	1.94	1.53	.91	.013	.00	.00	PIPE
1016.467	3454.897	2.042	3456.939	50.00	11.64	2.11	3459.05	.00	2.30	1.93	2.500	.000	.00	1 .0
.446	.1857					.0143	.01	2.04	1.38	.91	.013	.00	.00	PIPE
1016.913	3454.980	2.157	3457.137	50.00	11.10	1.91	3459.05	.00	2.30	1.72	2.500	.000	.00	1 .0
.187	.1857					.0133	.00	2.16	1.21	.91	.013	.00	.00	PIPE
1017.100	3455.015	2.300	3457.315	50.00	10.58	1.74	3459.05	.00	2.30	1.36	2.500	.000	.00	1 .0
WALL	ENTRANCE													
1017.100	3455.015	5.640	3460.655	50.00	.59	.01	3460.66	.00	.70	15.00	9.000	15.000	.00	0 .0
1.402	.1868					.0000	.00	5.64	.04	.20	.013	.00	.00	BOX
1018.502	3455.277	5.377	3460.654	50.00	.62	.01	3460.66	.00	.70	15.00	9.000	15.000	.00	0 .0
1.088	.1868					.0000	.00	5.38	.05	.20	.013	.00	.00	BOX
JUNCT STR	.0000					.0000	.00	5.17	.05		.013	.00	.00	BOX
1019.600	3455.480	5.177	3460.657	43.00	.55	.00	3460.66	.00	.63	15.00	9.000	15.000	.00	0 .0
2.500	.0120					.0000	.00	5.18	.04	.42	.013	.00	.00	BOX

1022.100	3455.510	5.147	3460.657	43.00	.56	.00	3460.66	.00	.63	15.00	9.000	15.000	.00	0	.0			
WALL	EXIT																	

Village 25 Parcel F
Mainline Storm Drain
Starting WSE from Fox Hill Study

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
1022.100	3455.510	5.147	3460.657	43.00	8.76	1.19	3461.85	.00	2.19	.00	2.500	.000	.00	1 .0
31.490	.0133					.0110	.35	5.15	.00	1.87	.013	.00	.00	PIPE
1053.590	3455.930	5.227	3461.157	43.00	8.76	1.19	3462.35	.00	2.19	.00	2.500	.000	.00	1 .0
8.505	.0145					.0110	.09	5.23	.00	1.81	.013	.00	.00	PIPE
1062.095	3456.053	5.198	3461.251	43.00	8.76	1.19	3462.44	.00	2.19	.00	2.500	.000	.00	1 .0
WALL	ENTRANCE													
1062.095	3456.053	6.977	3463.030	43.00	.62	.01	3463.04	.00	.83	10.00	9.000	10.000	.00	0 .0
1.115	.0153					.0000	.00	6.98	.04	.51	.013	.00	.00	BOX
1063.210	3456.070	6.960	3463.030	43.00	.62	.01	3463.04	.00	.83	10.00	9.000	10.000	.00	0 .0
JUNCT STR	.0000					.0000	.00	6.96	.04		.013	.00	.00	BOX
1063.220	3456.070	6.970	3463.040	18.00	.26	.00	3463.04	.00	.47	10.00	9.000	10.000	.00	0 .0
1.125	.0445					.0000	.00	6.97	.02	.21	.013	.00	.00	BOX
1064.345	3456.120	6.920	3463.040	18.00	.26	.00	3463.04	.00	.47	10.00	9.000	10.000	.00	0 .0
WALL	EXIT													
1064.345	3456.120	6.920	3463.041	18.00	5.73	.51	3463.55	.00	1.53	.00	2.000	.000	.00	1 .0
34.825	.0451					.0063	.22	6.92	.00	.85	.013	.00	.00	PIPE
1099.170	3457.690	5.647	3463.337	18.00	5.73	.51	3463.85	.00	1.53	.00	2.000	.000	.00	1 .0
74.530	.0400					.0063	.47	5.65	.00	.88	.013	.00	.00	PIPE

Village 25 Parcel F
Mainline Storm Drain
Starting WSE from Fox Hill Study

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
1173.700	3460.670	3.280	3463.950	18.00	5.73	.51	3464.46	.00	1.53	.00	2.000	.000	.00	1 .0
38.310	.0251					.0063	.24	3.28	.00	1.00	.013	.00	.00	PIPE
1212.010	3461.630	2.647	3464.277	18.00	5.73	.51	3464.79	.00	1.53	.00	2.000	.000	.00	1 .0
20.992	.0278					.0063	.13	2.65	.00	.97	.013	.00	.00	PIPE
1233.002	3462.214	2.195	3464.409	18.00	5.73	.51	3464.92	.00	1.53	.00	2.000	.000	.00	1 .0
HYDRAULIC JUMP														
1233.002	3462.214	1.013	3463.228	18.00	11.27	1.97	3465.20	.00	1.53	2.00	2.000	.000	.00	1 .0
23.834	.0278					.0228	.54	1.01	2.22	.97	.013	.00	.00	PIPE
1256.836	3462.878	1.052	3463.930	18.00	10.74	1.79	3465.72	.00	1.53	2.00	2.000	.000	.00	1 .0
15.578	.0278					.0200	.31	1.05	2.07	.97	.013	.00	.00	PIPE
1272.414	3463.312	1.093	3464.405	18.00	10.24	1.63	3466.03	.00	1.53	1.99	2.000	.000	.00	1 .0
10.227	.0278					.0177	.18	1.09	1.92	.97	.013	.00	.00	PIPE

1282.641	3463.597	1.137	3464.734	18.00	9.76	1.48	3466.21	.00	1.53	1.98	2.000	.000	.00	1	.0		
7.322	.0278					.0156	.11	1.14	1.78	.97	.013	.00	.00	PIPE			
1289.962	3463.801	1.182	3464.983	18.00	9.31	1.34	3466.33	.00	1.53	1.97	2.000	.000	.00	1	.0		
5.293	.0278					.0138	.07	1.18	1.65	.97	.013	.00	.00	PIPE			
1295.255	3463.948	1.230	3465.178	18.00	8.87	1.22	3466.40	.00	1.53	1.95	2.000	.000	.00	1	.0		
3.790	.0278					.0122	.05	1.23	1.53	.97	.013	.00	.00	PIPE			

Program Package Serial Number: 3074

WATER SURFACE PROFILE LISTING Date: 1- 7-2021 Time: 3:33:14

Village 25 Parcel F
Mainline Storm Drain
Starting WSE from Fox Hill Study

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
1299.046	3464.053	1.282	3465.335	18.00	8.46	1.11	3466.45	.00	1.53	1.92	2.000	.000	.00	1	.0		
2.771	.0278					.0109	.03	1.28	1.42	.97	.013	.00	.00	PIPE			
1301.816	3464.131	1.336	3465.467	18.00	8.07	1.01	3466.48	.00	1.53	1.88	2.000	.000	.00	1	.0		
1.807	.0278					.0097	.02	1.34	1.31	.97	.013	.00	.00	PIPE			
1303.623	3464.181	1.395	3465.576	18.00	7.69	.92	3466.49	.00	1.53	1.84	2.000	.000	.00	1	.0		
1.067	.0278					.0086	.01	1.40	1.20	.97	.013	.00	.00	PIPE			
1304.690	3464.211	1.458	3465.669	18.00	7.33	.84	3466.50	.00	1.53	1.78	2.000	.000	.00	1	.0		
.330	.0278					.0077	.00	1.46	1.10	.97	.013	.00	.00	PIPE			
1305.020	3464.220	1.528	3465.748	18.00	6.99	.76	3466.51	.00	1.53	1.70	2.000	.000	.00	1	.0		
JUNCT STR	.0000					.0086	.00	1.53	1.00		.013	.00	.00	PIPE			
1305.020	3464.220	2.398	3466.618	10.50	5.94	.55	3467.17	.00	1.25	.00	1.500	.000	.00	1	.0		
20.119	.0345					.0100	.20	2.40	.00	.78	.013	.00	.00	PIPE			
1325.139	3464.913	1.914	3466.827	10.50	5.94	.55	3467.38	.00	1.25	.00	1.500	.000	.00	1	.0		
HYDRAULIC JUMP																	
1325.139	3464.913	.784	3465.697	10.50	11.24	1.96	3467.66	.00	1.25	1.50	1.500	.000	.00	1	.0		
47.804	.0345					.0355	1.70	.78	2.51	.78	.013	.00	.00	PIPE			
1372.943	3466.560	.769	3467.329	10.50	11.50	2.05	3469.38	.00	1.25	1.50	1.500	.000	.00	1	.0		
38.359	.0345					.0391	1.50	.77	2.60	.78	.013	.00	.00	PIPE			

Program Package Serial Number: 3074

WATER SURFACE PROFILE LISTING Date: 1- 7-2021 Time: 3:33:14

Village 25 Parcel F
Mainline Storm Drain
Starting WSE from Fox Hill Study

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
1411.302	3467.881	.741	3468.623	10.50	12.06	2.26	3470.88	.00	1.25	1.50	1.500	.000	.00	1	.0		
20.013	.0345					.0444	.89	.74	2.79	.78	.013	.00	.00	PIPE			
1431.315	3468.571	.714	3469.285	10.50	12.65	2.48	3471.77	.00	1.25	1.50	1.500	.000	.00	1	.0		
13.909	.0345					.0504	.70	.71	2.99	.78	.013	.00	.00	PIPE			
1445.224	3469.050	.688	3469.738	10.50	13.27	2.73	3472.47	.00	1.25	1.49	1.500	.000	.00	1	.0		
10.843	.0345					.0573	.62	.69	3.21	.78	.013	.00	.00	PIPE			
1456.067	3469.424	.663	3470.087	10.50	13.91	3.01	3473.09	.00	1.25	1.49	1.500	.000	.00	1	.0		
9.007	.0345					.0653	.59	.66	3.45	.78	.013	.00	.00	PIPE			
1465.074	3469.734	.640	3470.374	10.50	14.59	3.31	3473.68	.00	1.25	1.48	1.500	.000	.00	1	.0		

7.726	.0345					.0743	.57	.64	3.69	.78	.013	.00	.00	PIPE					
1472.800	3470.000	.618	3470.618	10.50	15.30	3.64	3474.25	.00	1.25	1.48	1.500	.000	.00	1	.0				
13.759	.0845					.0777	1.07	.62	3.96	.61	.013	.00	.00	PIPE					
1486.559	3471.162	.624	3471.786	10.50	15.10	3.54	3475.33	.00	1.25	1.48	1.500	.000	.00	1	.0				
23.273	.0845					.0716	1.67	.62	3.88	.61	.013	.00	.00	PIPE					
1509.832	3473.129	.646	3473.775	10.50	14.39	3.22	3476.99	.00	1.25	1.49	1.500	.000	.00	1	.0				
12.422	.0845					.0629	.78	.65	3.62	.61	.013	.00	.00	PIPE					
1522.254	3474.178	.670	3474.848	10.50	13.72	2.93	3477.77	.00	1.25	1.49	1.500	.000	.00	1	.0				
8.244	.0845					.0553	.46	.67	3.38	.61	.013	.00	.00	PIPE					

Program Package Serial Number: 3074

WATER SURFACE PROFILE LISTING Date: 1- 7-2021 Time: 3:33:14

Village 25 Parcel F
Mainline Storm Drain
Starting WSE from Fox Hill Study

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
1530.498	3474.875	.695	3475.570	10.50	13.09	2.66	3478.23	.00	1.25	1.50	1.500	.000	.00	1 .0
6.012	.0845					.0486	.29	.70	3.15	.61	.013	.00	.00	PIPE
1536.510	3475.383	.721	3476.104	10.50	12.48	2.42	3478.52	.00	1.25	1.50	1.500	.000	.00	1 .0
4.598	.0845					.0428	.20	.72	2.93	.61	.013	.00	.00	PIPE
1541.108	3475.771	.749	3476.520	10.50	11.90	2.20	3478.72	.00	1.25	1.50	1.500	.000	.00	1 .0
3.650	.0845					.0377	.14	.75	2.73	.61	.013	.00	.00	PIPE
1544.757	3476.079	.778	3476.857	10.50	11.34	2.00	3478.86	.00	1.25	1.50	1.500	.000	.00	1 .0
2.958	.0845					.0332	.10	.78	2.54	.61	.013	.00	.00	PIPE
1547.715	3476.329	.808	3477.137	10.50	10.82	1.82	3478.95	.00	1.25	1.50	1.500	.000	.00	1 .0
2.412	.0845					.0293	.07	.81	2.37	.61	.013	.00	.00	PIPE
1550.128	3476.533	.840	3477.373	10.50	10.31	1.65	3479.02	.00	1.25	1.49	1.500	.000	.00	1 .0
1.998	.0845					.0259	.05	.84	2.20	.61	.013	.00	.00	PIPE
1552.126	3476.702	.873	3477.575	10.50	9.83	1.50	3479.08	.00	1.25	1.48	1.500	.000	.00	1 .0
1.634	.0845					.0229	.04	.87	2.04	.61	.013	.00	.00	PIPE
1553.760	3476.840	.909	3477.749	10.50	9.37	1.36	3479.11	.00	1.25	1.47	1.500	.000	.00	1 .0
.124	.0496					.0214	.00	.91	1.89	.70	.013	.00	.00	PIPE
1553.884	3476.846	.910	3477.757	10.50	9.35	1.36	3479.12	.00	1.25	1.47	1.500	.000	.00	1 .0
2.904	.0496					.0202	.06	.91	1.88	.70	.013	.00	.00	PIPE

Program Package Serial Number: 3074

WATER SURFACE PROFILE LISTING Date: 1- 7-2021 Time: 3:33:14

Village 25 Parcel F
Mainline Storm Drain
Starting WSE from Fox Hill Study

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
1556.789	3476.990	.948	3477.938	10.50	8.92	1.24	3479.17	.00	1.25	1.45	1.500	.000	.00	1 .0
2.279	.0496					.0179	.04	.95	1.74	.70	.013	.00	.00	PIPE
1559.068	3477.104	.988	3478.092	10.50	8.50	1.12	3479.21	.00	1.25	1.42	1.500	.000	.00	1 .0
1.782	.0496					.0159	.03	.99	1.61	.70	.013	.00	.00	PIPE
1560.850	3477.192	1.030	3478.222	10.50	8.11	1.02	3479.24	.00	1.25	1.39	1.500	.000	.00	1 .0

```
   1.292    .0496                                        .0142      .02     1.03    1.48     .70    .013       .00   .00  PIPE
         |        |        |        |        |             |        |       |       |       |       |       |       |       |
  1562.143  3477.256    1.077  3478.333    10.50    7.73     .93  3479.26     .00    1.25    1.35   1.500     .000   .00   1   .0
        -|-      -|-      -|-      -|-      -|-     -|-     -|-      -|-     -|-     -|-     -|-     -|-     -|-     -|-     |-
    .931    .0496                                        .0127      .01     1.08    1.36     .70    .013       .00   .00  PIPE
         |        |        |        |        |             |        |       |       |       |       |       |       |       |
  1563.073  3477.302    1.127  3478.429    10.50    7.37     .84  3479.27     .00    1.25    1.30   1.500     .000   .00   1   .0
        -|-      -|-      -|-      -|-      -|-     -|-     -|-      -|-     -|-     -|-     -|-     -|-     -|-     -|-     |-
    .568    .0496                                        .0114      .01     1.13    1.24     .70    .013       .00   .00  PIPE
         |        |        |        |        |             |        |       |       |       |       |       |       |       |
  1563.641  3477.330    1.182  3478.512    10.50    7.03     .77  3479.28     .00    1.25    1.23   1.500     .000   .00   1   .0
        -|-      -|-      -|-      -|-      -|-     -|-     -|-      -|-     -|-     -|-     -|-     -|-     -|-     -|-     |-
    .199    .0496                                        .0103      .00     1.18    1.12     .70    .013       .00   .00  PIPE
         |        |        |        |        |             |        |       |       |       |       |       |       |       |
  1563.840  3477.340    1.245  3478.585    10.50    6.70     .70  3479.28     .00    1.25    1.13   1.500     .000   .00   1   .0
        -|-      -|-      -|-      -|-      -|-     -|-     -|-      -|-     -|-     -|-     -|-     -|-     -|-     -|-     |-
```

FILE: ParcelFMain.WSW W S P G W - EDIT LISTING - Version 14.10 Date: 1- 7-2021 Time: 3:33:12

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	4	1		2.500														
CD	2	4	1		2.500														
CD	3	4	1		2.000														
CD	4	4	1		1.500														
CD	5	3	0	.000	9.000	15.000	.000	.000	.00										
CD	6	3	0	.000	9.000	10.000	.000	.000	.00										

W S P G W PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -
Village 25 Parcel F
HEADING LINE NO 2 IS -
Mainline Storm Drain
HEADING LINE NO 3 IS -
Starting WSE from Fox Hill Study

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	3451.840	1	3453.175

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1017.100	3455.015	1	.013	.000	.000	.000	0

ELEMENT NO 3 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1017.100	3455.015	5	.500

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1019.590	3455.480	5	.013	.000	.000	.000	0

ELEMENT NO 5 IS A JUNCTION * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1019.600	3455.480	5	2	0	.013	7.000	.000	3455.480	.000	90.000	.000

RADIUS	ANGLE
.000	.000

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

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1022.100	3455.510	5	.013	.000	.000	.000	0

ELEMENT NO 7 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	1022.100	3455.510	1

ELEMENT NO 8 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1053.590	3455.930	1	.013	.000	.000	24.000	1

ELEMENT NO 9 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1062.095	3456.053	1	.013	.000	.000	.000	0

ELEMENT NO 10 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1062.095	3456.053	6	.500

ELEMENT NO 11 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1063.210	3456.070	6	.013	.000	.000	.000	0

W S P G W PAGE NO 3

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 12 IS A JUNCTION * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1063.220	3456.070	6	2	0	.013	25.000	.000	3456.070	.000	90.000	.000

RADIUS	ANGLE
.000	.000

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

ELEMENT NO 13 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1064.345	3456.120	6	.013	.000	.000	.000	0

ELEMENT NO 14 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	1064.345	3456.120	3

ELEMENT NO 15 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1099.170	3457.690	3	.013	.000	.000	30.000	1

ELEMENT NO 16 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1173.700	3460.670	3	.013	.000	.000	69.000	1

ELEMENT NO 17 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1212.010	3461.630	3	.013	.000	.000	35.000	1

ELEMENT NO 18 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1305.020	3464.220	3	.013	.000	.000	.000	0

ELEMENT NO 19 IS A JUNCTION * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1305.020	3464.220	4	3	3	.013	4.000	3.500	3464.220	3464.220	76.000	70.000

RADIUS	ANGLE

```
                                                                                                    .000    .000
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
 ELEMENT NO  20 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                           RADIUS    ANGLE     ANG PT  MAN H
                                1472.800 3470.000    4              .013                           .000     .000     8.000     1
                                                        W S P G W                                                      PAGE NO   4
                               WATER SURFACE PROFILE - ELEMENT CARD LISTING
 ELEMENT NO  21 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                           RADIUS    ANGLE     ANG PT  MAN H
                                1553.760 3476.840    4              .013                           .000     .000    60.000     1
 ELEMENT NO  22 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                           RADIUS    ANGLE     ANG PT  MAN H
                                1563.840 3477.340    4              .013                           .000     .000      .000     0
 ELEMENT NO  23 IS A SYSTEM HEADWORKS                 *                      *
                     U/S DATA   STATION    INVERT  SECT                                  W S ELEV
                                1563.840 3477.340    4                                     .000
```

GCW
ENGINEERS \ SURVEYORS

MINOR STORM DRAIN LATERAL - CCRFCD MANUAL FRICTION LOSS CALCULATION SHEET

STORM DRAIN DESIGN						PIPE HYDRAULIC CHARACTERISTICS						LOSS	HGL			DESCRIPTION	
Q_{DESIGN}			INVERTS			A	R		V	H_V =	S_f	PIPE	PIPE				
(CFS)	DIAMETER (FT)	MANNING'S 'n'	D / S ELEV.	U / S ELEV.	LENGTH	(FT^2)	(FT)	Φ	(FPS)	$V^2/2g$ (FT)	(FT/FT)	H_f (FT)	TRUNK WSE (from Model)	LATERAL PIPE D/S HGL ELEV.[1]	LATERAL PIPE U/S HGL ELEV.	PARTIAL FLOW?	LATERAL
4	1.5	0.013	3464.22	3465.05	8.26	1.77	0.375	0.004925	2.26	0.079559	0.001444136	0.012	3466.62	3466.6	3466.6	No	FACILITY 3 18" RCP LATERAL
3.5	1.5	0.013	3464.22	3464.53	31.16	1.77	0.375	0.004925	1.98	0.060912	0.001105666	0.034	3466.62	3466.6	3466.7	No	FACILITY 4 18" RCP LATERAL

Pipe Friction Loss Calculations per CCRFCD Manual 804.2.1

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

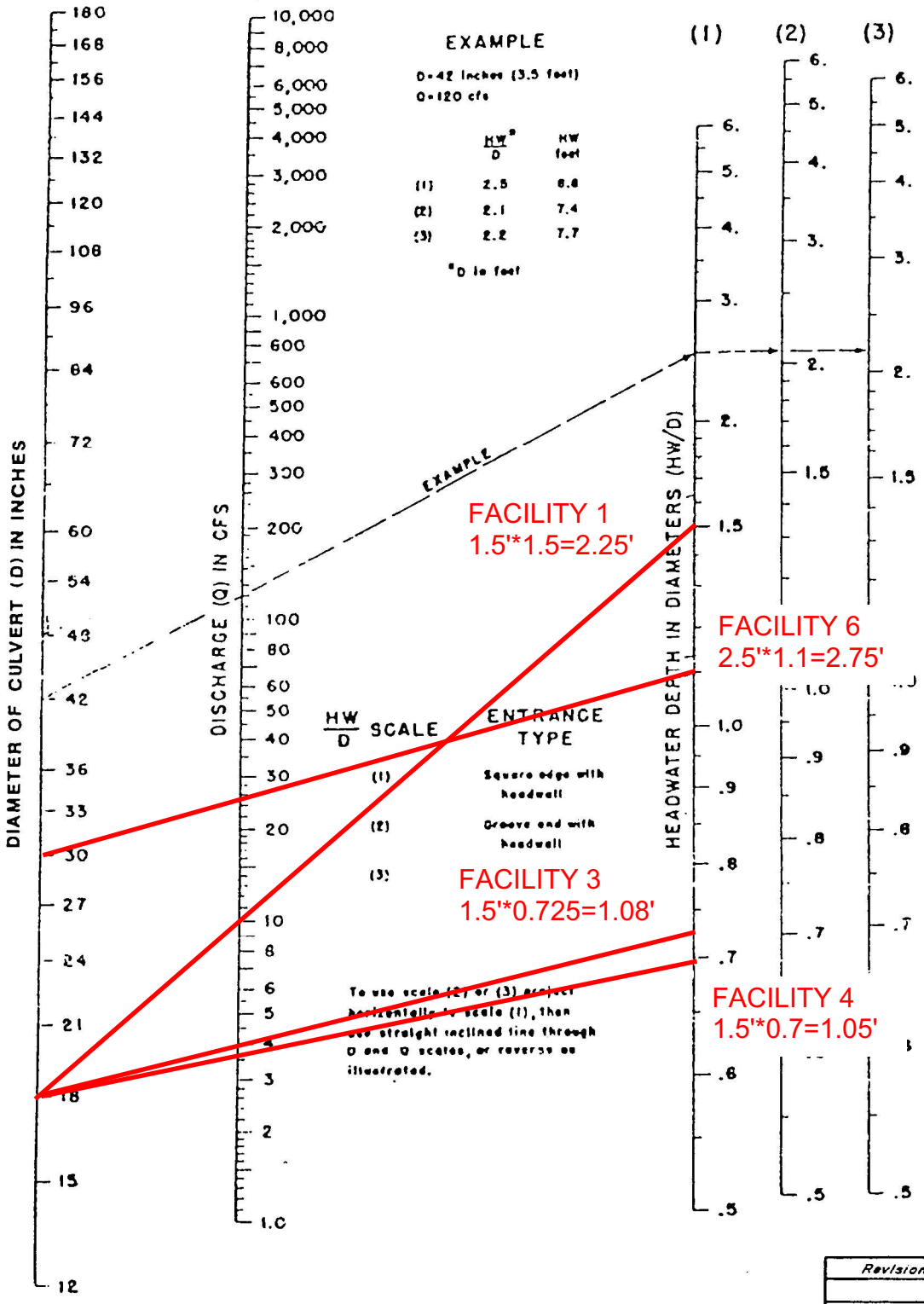
$Sf = \Phi\, Hv / R^{1.33}$

$H_f = \text{Length} \times S_f$

1 - Where HGL in lateral is below top of pipe, assume HGL is at top of pipe.

NOMOGRAPH – INLET CONTROL RCP

INLET CONTROL CALCULATIONS



Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Worksheet for Section A - Emergency Overflow

Project Description

Solve For	Headwater Elevation

Input Data

Discharge	43.00	ft³/s
Crest Elevation	65.69	ft
Weir Coefficient	3.00	US
Crest Length	41.00	ft

Results

Headwater Elevation	66.19	ft
Headwater Height Above Crest	0.50	ft
Flow Area	20.35	ft²
Velocity	2.11	ft/s
Wetted Perimeter	41.99	ft
Top Width	41.00	ft

Cross Section for Section A - Emergency Overflow

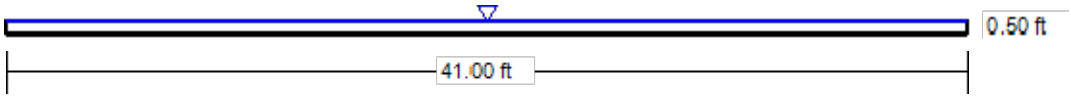
Project Description

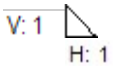
Solve For	Headwater Elevation

Input Data

Discharge	43.00	ft³/s
Headwater Elevation	66.19	ft
Crest Elevation	65.69	ft
Weir Coefficient	3.00	US
Crest Length	41.00	ft

Cross Section Image





APPENDIX B

Addendum #1 to Update #2 to the FLOOD CONTROL MASTER PLAN UPDATE

SUMMERLIN WEST PLANNING AREA

Las Vegas, Nevada

W.O. # 7809

Prepared for:
The Howard Hughes Company, LLC

Submitted to:
Public Works Department
City of Las Vegas

vtn

CITY OF LAS VEGAS
INTER-OFFICE MEMORANDUM

DATE: February 27, 2020

TO:
Land Development Services
Department of Building & Safety

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

SUBJECT: Drainage Study for:
Summerlin West Planning Area Master Plan - Update #2

COPIES TO:
VTN Nevada
The Howard Hughes Corporation
Bart Anderson, P.E., DevCo
CCRFCD
CCPW

Cross Streets:	West of I-215 between Lake Mead Boulevard and Charleston Boulevard	
File Number:	F:\Depot\DSMemos\DS4926M.doc	
Parcel Number:	137-22-000-017 & more	
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	10/9/2017 & 10/25/2017	11/8/2017	Not Approved	$400.00	490518: $400
2nd Submittal	12/6/2017	12/20/2017 & 1/10/2018	Not Approved	$400.00	492005: $400
3rd Submittal	2/27/2018	3/24/2018	Not Approved	$400.00	493739: $400
4th Submittal & Supplement	4/23/2018 & 5/22/2018	5/22/2018	See Comments Below	$400.00	495223: $400
CCPW & CCRFCD	7/30/2018	7/30/2018	Concurrence Recv'd	N/C	N/C
5th Submittal	1/3/2019 (Paid on 1/7/2019)	1/30/2019	Not Approved	$100.00	502286: $100
6th Submittal	2/19/2019	3/13/2019	Conditional Approval	$400.00	503267: $400
CCPW & CCRFCD	4/15/2019	4/17/2019	Concurrence Recv'd	N/C	N/C
7th Submittal	10/28/2019	12/2/2019	Not Approved	$100.00	3625174: $100
8th Submittal – Mass Grading	11/19/2019 & 11/27/2019	11/25/2019	Conditionally Approved	$100.00	3645141: $100
9th Submittal & Supplement	12/17/2019 & 1/21/2020	1/21/2019	Conditional Approval	$400.00	3679639: $400
Revised Memo	1/23/2020	1/23/2020	Conditional Approval	N/C	N/C
CCRFCD	2/24/2020	2/27/2020	Concurrence Recv'd	N/C	N/C
			TOTAL FEES (LDDRS):	**$2,700.00**	**----**

REMARKS:

9th Submittal: Addendum & Supplement to Update #2

8th Submittal: Update for Mass Grading ONLY within V21 and V25

7th Submittal: Update #2 to refine the overall drainage basins model

5th & 6th Submittals: Update #1 & Addendum #1 to address Land Use Changes in the Summerlin West Planning Area

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

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

Note that the Clark County Regional Flood Control District (District) has begun efforts to update the *Hydrologic Criteria and Drainage Design Manual* (HCDDM) and is requesting participation from the engineering community. The District is collecting comments and suggestions on errors, clarifications, or changes needed to the current Manual and/or content and usability enhancements to be incorporated into the updated Manual. Additional information on procedures and deadline to provide feedback and comments are available online at (http://www.ccrfcd.org/hcddmupdate.html).

1. The subject Update #2 to the Summerlin West Planning Area is premised on the *DB5 Modifications* (ie, Enhancement) for regulating the downstream outflows. A technical drainage study for *DB5 Modifications* must be submitted for review and approval prior to any upstream Villages development with the exception of Villages 21 and 22.

The following comments are repeated until they are complete:

1. Flood Control supports the Mass Grading concept with the understanding that these are interim improvements and are the responsibility of the Master Developer. Mass Grading shall not place any fill material in the proposed embankment area of the detention basin. State Dam Safety Permit approval is required prior to any other detention basin work.
2. The Mass Grading Plans shall be revised to show no grading work within the area of the future detention basin embankment & spillway areas. This exclusion area needs to be clearly delineated on the plans and added as a Note on each Sheet of the Grading Plans.
3. Howard Hughes Company (Summerlin) is solely responsible for the maintenance and erosion control of the interim facilities based upon the Mass Grading.

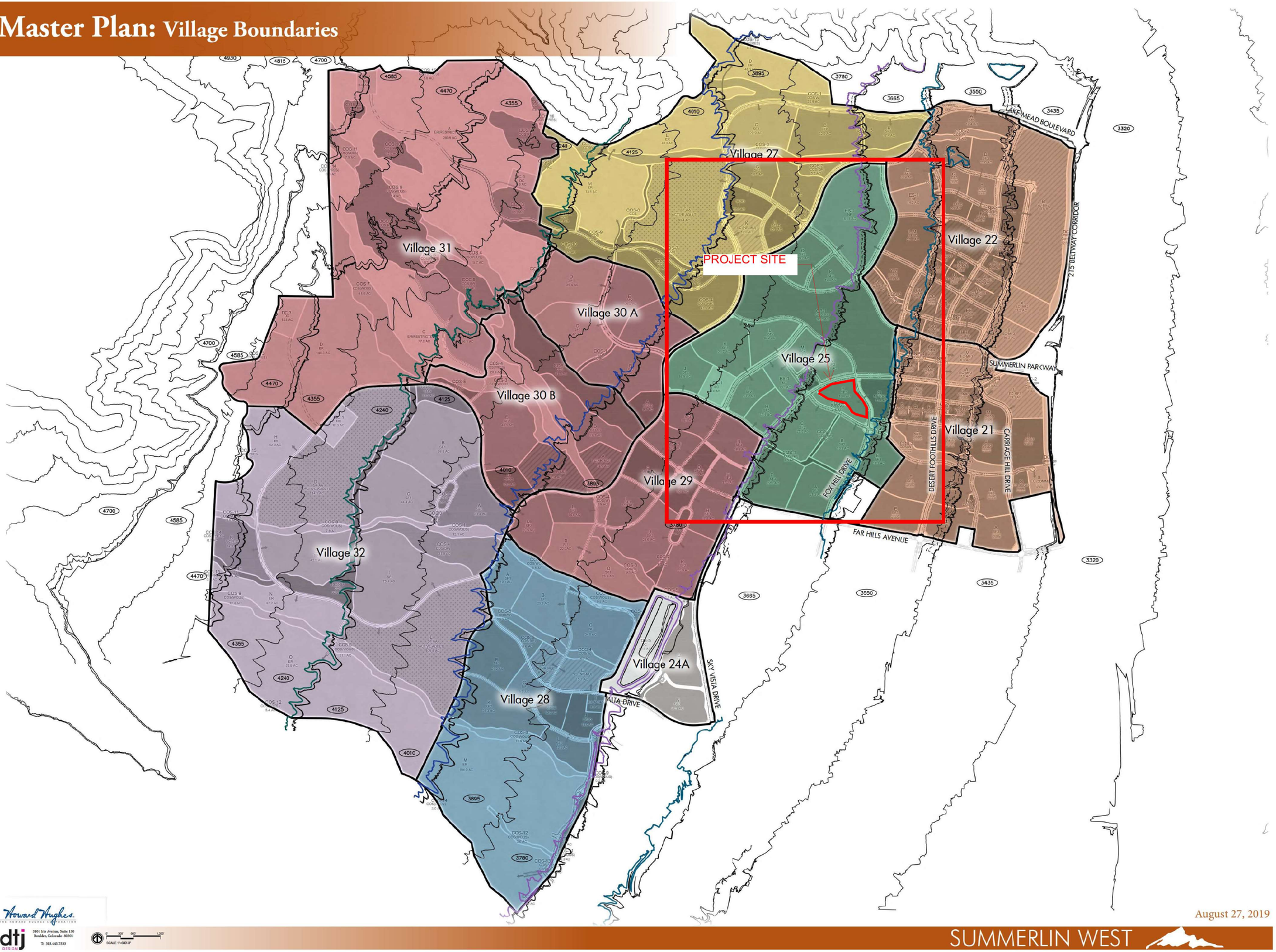
NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained 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.

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

END OF REMARKS
WSP/AYS/PBJ

T/R/S: T21S/R69E/22
AREA K-22

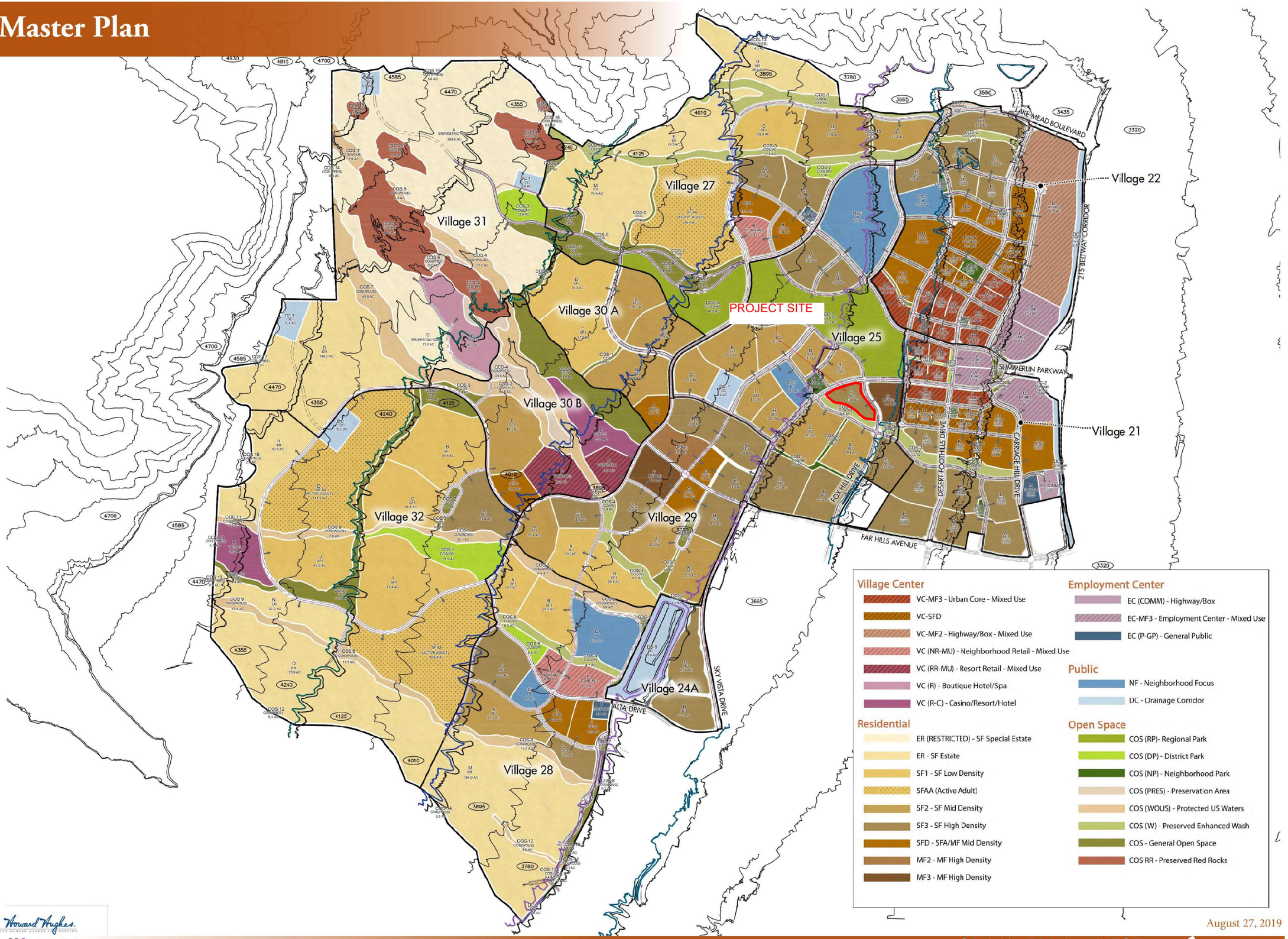
Master Plan: Village Boundaries



Howard Hughes
dtj DESIGN
3101 Iris Avenue, Suite 130
Boulder, Colorado 80301
T: 303.443.7533

SCALE: 1"=600'-0"

Master Plan



Village Center

- VC-MF3 - Urban Core - Mixed Use
- VC-SFD
- VC-MF2 - Highway/Box - Mixed Use
- VC (NR-MU) - Neighborhood Retail - Mixed Use
- VC (RR-MU) - Resort Retail - Mixed Use
- VC (R) - Boutique Hotel/Spa
- VC (R-C) - Casino/Resort/Hotel

Residential

- ER (RESTRICTED) - SF Special Estate
- ER - SF Estate
- SF1 - SF Low Density
- SFAA (Active Adult)
- SF2 - SF Mid Density
- SF3 - SF High Density
- SFD - SFA/MF Mid Density
- MF2 - MF High Density
- MF3 - MF High Density

Employment Center

- EC (COMM) - Highway/Box
- EC-MF3 - Employment Center - Mixed Use
- EC (P-GP) - General Public

Public

- NF - Neighborhood Focus
- DC - Drainage Corridor

Open Space

- COS (RP)- Regional Park
- COS (DP) - District Park
- COS (NP) - Neighborhood Park
- COS (PRES) - Preservation Area
- COS (WOUS) - Protected US Waters
- COS (W) - Preserved Enhanced Wash
- COS - General Open Space
- COS RR - Preserved Red Rocks

Howard Hughes
dtj DESIGN
3101 Iris Avenue, Suite 130
Boulder, Colorado 80301
T: 303.443.7533

SCALE: 1"=600'-0"

August 27, 2019

Update #1 to the Master Conceptual Drainage Study for

Summerlin West Village 25

Las Vegas, Nevada

W.O. # 7919

Prepared for:

Howard Hughes Company, LLC

Submitted to:

City of Las Vegas
Public Works

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: April 14, 2020
TO: **Land Development Services** Department of Building & Safety			FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **Master Conceptual Drainage Study – Update #1** **For Summerlin West Village 25**		**COPIES TO:** VTN Nevada
Cross Streets:	Sky Vista Drive and Far Hills Avenue		Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5104F.doc		Bart Anderson, P.E., DevCo
Parcel Number:	137-22-101-001, 137-21-000-002		CCRFCD
Zoning Action:	MDR-75107 & PMP-74780		
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	2/20/2019	2/27/2019 & 3/20/2019	Not Approved	$400.00	503292: $400
2nd Submittal	4/4/2019	4/17/2019	Not Approved	$400.00	3081574: $400
3rd Submittal	4/25/2019	5/9/2019	Conditional Approval	$400.00	3105175: $400
CCRFCD	6/10/2019	6/18/2019	Concurrence Recv'd	N/C	N/C
4th Submittal	12/26/2019	1/23/2020	Conditional Approval	$100.00	3686588: $100
CCRFCD	3/23/2020	4/14/2020	Concurrence Recv'd	N/C	N/C
			TOTAL FEES (LDDRS):	**$1,300.00**	----

REMARKS:

4th Submittal: Update to revise the layout of V25 to match the changes to the overall Summerlin West Planning Area land plan

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

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

1. The *Grand Park Detention Basin* is proposed to regulate and meter outflow to match the previously approved downstream flow conditions at the junction of *Far Hills* storm drain and the *Beltway Channel*. Without the *Grand Park Detention Basin*, there will be a net increase in flows at the *Beltway Channel* downstream of *Far Hills* intersection exceeding the previously approved flow.

   A technical drainage study for the analysis, design and construction plans for the *Grand Park Detention Basin* must be submitted and approved by the City prior to the individual onsite parcel developments.

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

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

END OF REMARKS
WSP/AYS

T/R/S: T20S/R59E/22
AREA K-22

CURVE NUMBERS FOR SOILS - W.O. #7919

Soil # 152 Cave gravelly fine sandy loam, 0 to 4 percent slopes									
Soil	Percent	Group	Residential$_{1}$ (Apartment/Condo)	Residential$_{2}$ (7,000 ft^2)	Open Space $_{3}$(Poor Condition)	Urban Districts $_{4}$(Commercial)	Impervious $_{5}$(Streets and roads(Paved)	Urban Districts $_{6}$(Industrial)	Residential$_{7}$ (Townhomes)
Cave	100%	D	93	91	89	95	98	93	92
Total	**100%**		**93**	**91**	**89**	**95**	**98**	**93**	**92**

Soil # 155 Cave gravelly fine sandy loam, 4 to 15 percent slopes									
Soil	Percent	Group	Residential$_{1}$ (Apartment/Condo)	Residential$_{2}$ (7,000 ft^2)	Open Space $_{3}$(Poor Condition)	Urban Districts $_{4}$(Commercial)	Impervious $_{5}$(Streets and roads(Paved)	Urban Districts $_{6}$(Industrial)	Residential$_{7}$ (Townhomes)
Cave	100%	D	93	91	89	95	98	93	92
Total	**100%**		**93**	**91**	**89**	**95**	**98**	**93**	**92**

Soil # 156 Vace - Wechech association									
Soil	Percent	Group	Residential$_{1}$ (Apartment/Condo)	Residential$_{2}$ (7,000 ft^2)	Open Space $_{3}$(Poor Condition)	Urban Districts $_{4}$(Commercial)	Impervious $_{5}$(Streets and roads(Paved)	Urban Districts $_{6}$(Industrial)	Residential$_{7}$ (Townhomes)
Vace and Similar	45%	D	93	91	89	95	98	93	92
Wechech and Similar	25%	D	93	91	89	95	98	93	92
Wechech, steep, and similar	15%	D	93	91	89	95	98	93	92
Weiser	8%	B	88	84	79	92	98	88	87
Irongold	4%	D	93	91	89	95	98	93	92
Commski	2%	B	88	84	79	92	98	88	87
Threelakes	1%	A	81	76	68	89	98	81	80
Total	**100%**		**93**	**91**	**88**	**95**	**98**	**93**	**92**

Soil # 502 Canutio-Cave gravelly fine sandy loams, 2 to 8 percent slopes									
Soil	Percent	Group	Residential$_{1}$ (Apartment/Condo)	Residential$_{2}$ (7,000 ft^2)	Open Space $_{3}$(Poor Condition)	Urban Districts $_{4}$(Commercial)	Impervious $_{5}$(Streets and roads(Paved)	Urban Districts $_{6}$(Industrial)	Residential$_{7}$ (Townhomes)
Canutio	55%	A	81	76	68	89	98	81	80
Cave	40%	D	93	91	89	95	98	93	92
Arizo	5%	D	93	91	89	95	98	93	92
Total	**100%**		**87**	**83**	**78**	**92**	**98**	**87**	**86**

Soil # 731 Purob-Irongold association									
Soil	Percent	Group	Residential$_{1}$ (Apartment/Condo)	Residential$_{2}$ (7,000 ft^2)	Open Space $_{3}$(Poor Condition)	Urban Districts $_{4}$(Commercial)	Impervious $_{5}$(Streets and roads(Paved)	Urban Districts $_{6}$(Industrial)	Residential$_{7}$ (Townhomes)
Purob	60%	D	93	91	89	95	98	93	92
Irongold	25%	D	93	91	89	95	98	93	92
Typic torriorthents	5%	A	81	76	68	89	98	81	80
Arizo	3%	A	81	76	68	89	98	81	80
Purob	3%	D	93	91	89	95	98	93	92
Typic haplocalcids	2%	B	88	84	79	92	98	88	87
Xeric haplocambids	1%	A	81	76	68	89	98	81	80
Aridic calcixerolls	1%	A	81	76	68	89	98	81	80
Total	**100%**		**92**	**90**	**87**	**95**	**98**	**92**	**91**

1-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602A
* Residential (Apartments / Condos)
2-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602A
* Residential (7,000 sq ft lots)
3-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602 page 1 of 4
* Open spaces in poor condition (grass cover < 50%)
4-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602 page 1 of 4
* Urban Districts (Commercial / Business & Residential with average lot size <6000 sqft)
5-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602 page 1 of 4
*Impervious (Paved Streets)
6-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602 page 1 of 4
*Urban Districts (Industrial)
7-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602 page 1 of 4
*Residential (Townhomes)

Curve Number calculations for basins										
Basin Name	Type	Soil Percentage	1	2	3	4	5	6	7	CN Value
A	156	100%				100%				95.0
B	156	100%				100%				95.0
C	156	74%				100%				95.0
	731	26%				100%				
D	156	100%				100%				95.0
DC-1	731	100%						100%		92.0
E	156	100%				100%				95.0
ES-1	156	48%				100%				95.0
	731	52%				100%				
F	152	79%				100%				95.0
	156	21%				100%				
G	152	84%	100%							93.0
	156	16%	100%							
H	156	5%				100%				95.0
	731	95%				100%				
HS-1A	155	6%				100%				95.0
	502	94%				100%				
HS-1B	155	93%				100%				94.8
	502	7%				100%				
I	156	2%				100%				95.0
	731	98%				100%				
J	731	100%				100%				95.0
K	156	3%				100%				95.0
	731	97%				100%				
L	156	80%				100%				95.0
	731	20%				100%				
M	156	100%				100%				95.0
N	152	5%				100%				95.0
	156	95%				100%				
O	155	1%				100%				81.3
	156	32%				100%				
	502	67%				100%				
P	156	40%				100%				93.2
	502	60%				100%				
COS-1	156	100%			100%					88.0
COS-2	156	100%			100%					88.0
COS-3	152	9%			100%					88.1
	156	91%			100%					
COS-4	156	100%			100%					88.0
	731	0%			100%					
CP-1	156	94%			100%					87.1
	731	5%			100%					
NP-1	152	37%			100%					88.4
	156	63%			100%					
FOX1	156	75%					100%			98.0
	731	25%					100%			
FOX2	156	100%					100%			98.0
FOX3	156	100%					100%			98.0
FOX4	152	67%					100%			98.0
	156	33%					100%			
FOX5A	156	100%					100%			98.0
FOX5B	156	100%					100%			98.0
LM	155	12%					100%			98.0
	156	58%								
	502	30%								
RES3	156	100%					100%			98.0
RES4	156	90%					100%			98.0
	731	10%					100%			
SKY0	156	100%					100%			98.0
SKY1	156	22%					100%			98.0
	731	78%					100%			
SKY2	152	43%					100%			98.0
	156	55%					100%			
	731	2%					100%			
STAA	152	72%					100%			98.0
	156	28%					100%			
STAB	731	100%					100%			98.0
STA1	156	82%					100%			98.0
	731	18%					100%			
STA2	156	100%					100%			98.0
STBE	156	72%					100%			98.0
	731	28%					100%			

STL1	156	80%					100%			**98.0**
	731	20%					100%			
STL2	156	100%					100%			**98.0**
STM	731	17%					100%			**98.0**
	156	83%					100%			
STN	155	68%					100%			**98.0**
	502	32%					100%			
STO	156	97%					100%			**98.0**
	502	3%					100%			
STO1	155	25%					100%			**98.0**
	502	75%					100%			
STO2	155	45%					100%			**98.0**
	502	55%					100%			
STP	156	35%					100%			**98.0**
	502	65%					100%			
STQ	155	66%					100%			**98.0**
	502	34%					100%			
STQ1	155	33%					100%			**98.0**
	502	67%					100%			
STQ2	502	100%					100%			**98.0**
STQ3	156	87%					100%			**98.0**
	502	13%					100%			
SUMM	156	100%					100%			**98.0**
V30-A	731	100%				100%				**95.0**
V30-B	731	40%				100%				**95.0**
	156	60%				100%				
V30-E	156	100%				100%				**95.0**
V27-G	155	99%				100%				**95.0**
	502	1%				100%				
V27-H	155	58%							100%	**89.5**
	502	42%							100%	
V27-I	155	16%							100%	**87.0**
	502	84%							100%	
V27-K	155	13%				100%				**93.0**
	156	20%				100%				
	502	67%				100%				

TRAVEL TIME CALCULATIONS

DEVELOPMENT: Summerlin West Village 25

W.O. # 7919 **CALCULATED BY:** AH

$$Velocity = CS^{1/2}$$

C1 applies to the first 500 feet of travel distance
C2 applies to the remaining travel distance

Existing:		Urbanized	
C1=14.8	C2=29.4	C1=20.2	C2=30.6

					First 500 feet		Remaining Travel Distance	
Basin	Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (ft/ft)	C1	V1 (fps)	C2	V2 (fps)
DEVELOPED CONDITION								
A	1409	3502	3452	0.036	20.2	3.8	30.6	5.8
B	1311	3499	3452	0.036	20.2	3.8	30.6	5.8
C	1465	3537	3497	0.027	20.2	3.3	30.6	5.1
COS-1	1898	3564	3550	0.008	20.2	1.8	30.6	2.7
COS-2	1036	3507	3496	0.010	20.2	2.1	30.6	3.1
COS-3	390	3453	3422	0.079	20.2	5.7	30.6	8.6
COS-4	1205	3538	3451	0.072	20.2	5.4	30.6	8.2
CP-1	2646	3737	3440	0.112	20.2	6.8	30.6	10.3
D	1417	3562	3497	0.045	20.2	4.3	30.6	6.5
DC-1	917	3680	3638	0.045	20.2	4.3	30.6	6.5
E	1250	3447	3406	0.033	20.2	3.7	30.6	5.5
ES-1	1032	3623	3545	0.075	20.2	5.5	30.6	8.4
F	1030	3538	3455	0.081	20.2	5.7	30.6	8.7
G	879	3491	3422	0.078	20.2	5.7	30.6	8.6
H	999	3602	3564	0.038	20.2	3.9	30.6	6.0
HS-1A	1494	3643	3531	0.075	20.2	5.5	30.6	8.4
HS-1B	1541	3648	3523	0.081	20.2	5.8	30.6	8.7
I	1122	3637	3593	0.039	20.2	4.0	30.6	6.0
J	1097	3740	3680	0.055	20.2	4.7	30.6	7.2
K	1721	3729	3618	0.064	20.2	5.1	30.6	7.7
L	846	3661	3604	0.067	20.2	5.2	30.6	7.9
M	743	3601	3530	0.095	20.2	6.2	30.6	9.4
N	877	3550	3505	0.052	20.2	4.6	30.6	7.0
NP-1	442	3569	3540	0.066	20.2	5.2	30.6	7.9
O	1301	3696	3610	0.066	20.2	5.2	30.6	7.8
P	656	3616	3562	0.083	20.2	5.8	30.6	8.8
FOX1	2115	3711	3599	0.053	20.2	4.6	30.6	7.0
FOX2	641	3589	3546	0.067	20.2	5.2	30.6	7.9
FOX3	907	3544	3504	0.044	20.2	4.2	30.6	6.4
FOX4	1230	3502	3452	0.041	20.2	4.1	30.6	6.2
FOX5A	1182	n/a	n/a	0.005	20.2	1.4	30.6	2.2
FOX5B	1004	3451	3444	0.007	20.2	1.7	30.6	2.6
LM	1577	3741	3655	0.055	20.2	4.7	30.6	7.1
RES3	978	3571	3528	0.045	20.2	4.3	30.6	6.5
RES4	909	3603	3548	0.060	20.2	5.0	30.6	7.5
SKY0	1325	3565	3559	0.005	20.2	1.4	30.6	2.1
SKY1	1241	3565	3544	0.017	20.2	2.6	30.6	4.0
SKY2	1114	3543	3500	0.038	20.2	4.0	30.6	6.0
STAA	314	3555	3538	0.052	20.2	4.6	30.6	7.0
STAB	722	3634	3631	0.004	20.2	1.3	30.6	2.0
STA1	1455	3537	3456	0.056	20.2	4.8	30.6	7.2

TRAVEL TIME CALCULATIONS

DEVELOPMENT: Summerlin West Village 25

W.O. # 7919 **CALCULATED BY:** AH

$$Velocity = CS^{1/2}$$

C1 applies to the first 500 feet of travel distance
C2 applies to the remaining travel distance

Existing:		Urbanized	
C1=14.8	C2=29.4	C1=20.2	C2=30.6

					First 500 feet		Remaining Travel Distance	
Basin	**Length** (ft)	**High Elev** (ft)	**Low Elev** (ft)	**Slope** (ft/ft)	**C1**	**V1** (fps)	**C2**	**V2** (fps)
STA2	1555	3450	3360	0.058	20.2	4.9	30.6	7.4
STBE	1169	3635	3566	0.059	20.2	4.9	30.6	7.4
STL1	1750	3635	3606	0.017	20.2	2.6	30.6	3.9
STL2	780	3606	3597	0.012	20.2	2.2	30.6	3.3
STM	2493	3711	3568	0.057	20.2	4.8	30.6	7.3
STN	2716	3551	3514	0.014	20.2	2.4	30.6	3.6
STO	2302	3701	3557	0.062	20.2	5.0	30.6	7.6
STO1	667	3722	3706	0.024	20.2	3.1	30.6	4.7
STO2	408	3722	3703	0.047	20.2	4.4	30.6	6.6
STP	995	3635	3603	0.032	20.2	3.6	30.6	5.5
STQ	2010	3798	3650	0.074	20.2	5.5	30.6	8.3
STQ1	804	3648	3603	0.056	20.2	4.8	30.6	7.3
STQ2	691	3599	3563	0.052	20.2	4.6	30.6	7.0
STQ3	1530	3555	3465	0.059	20.2	4.9	30.6	7.4
SUMM	753	3492	3448	0.058	20.2	4.9	30.6	7.4
V30-A	834	3715	3665	0.060	20.2	5.0	30.6	7.5
V30-B	876	3629	3594	0.040	20.2	4.1	30.6	6.1
V30-E	472	3594	3565	0.061	20.2	5.0	30.6	7.6
V27-G	1390	3769	3715	0.039	20.2	4.0	30.6	6.0
V27-H	622	3719	3661	0.093	20.2	6.2	30.6	9.3
V27-I	947	3782	3707	0.079	20.2	5.7	30.6	8.6
V27-K	655	3756	3710	0.070	20.2	5.4	30.6	8.1

STANDARD FORM 4

DEVELOPMENT: Summerlin West Village 25

W.O. # 7919 **CALCULATED BY:** JYA/ RBR

V1 applies to the first 500 feet of travel distance applies to the remaining travel distance		V2
Existing:		**Developed**
$V1 = 1.48 * S^{1/2}$	$V2 = 2.94 * S^{1/2}$	$V1 = 2.02 * S^{1/2}$ $V2 = 3.06 * S^{1/2}$

$$T_i = \frac{1.8(1.1-k)L^{1/2}}{S^{1/3}} \qquad T_t = \frac{L}{60V}$$

$$k = 0.0132 C_n - 0.39 \qquad T_c = T_i + T_t$$

SUB-BASIN					INITIAL/OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK (URBANIZED BASINS)		FINAL Tc	LAG TIME	REMARKS
DESIG. (1)	Cn	K (2)	AREA Ac. (3)	AREA Mi^2	LENGTH Ft (4)	SLOPE % (5)	Ti Min. (6)	LENGTH Ft. (7)	SLOPE % (8)	V1 fps (9a)	V2 fps (9b)	Tt Min. (10)	TOTAL LENGTH (11)	Tc Min. (12)	Min.	TLAG Hr.	
DEVELOPED CONDITION																	
A	95.0	0.864	21.35	0.0334	100	1.0	4.25	1409	3.6	3.8	5.8	4.81	1509	18.38	9.06	0.091	
B	95.0	0.864	19.86	0.0310	100	1.0	4.25	1311	3.6	3.8	5.8	4.51	1411	17.84	8.76	0.088	
C	95.0	0.864	26.54	0.0415	100	1.0	4.25	1465	2.7	3.3	5.1	5.68	1565	18.69	9.93	0.099	
COS-1	88.0	0.772	3.48	0.0054	100	1.0	5.91	1898	0.8	1.8	2.7	13.49	1998	21.10	19.40	0.194	
COS-2	88.0	0.772	1.72	0.0027	100	1.0	5.91	1036	1.0	2.1	3.1	6.94	1136	16.31	12.85	0.128	
COS-3	88.1	0.773	2.40	0.0038	100	1.0	5.89	390	7.9	5.7	8.6	1.14	490	12.72	7.03	0.070	
COS-4	88.0	0.772	5.04	0.0079	100	1.0	5.91	1205	7.2	5.4	8.2	2.96	1305	17.25	8.88	0.089	
CP-1	87.1	0.759	93.32	0.1458	100	1.0	6.13	2646	11.2	6.8	10.3	4.72	2746	25.26	10.85	0.109	
D	95.0	0.864	27.15	0.0424	100	1.0	4.25	1417	4.5	4.3	6.5	4.28	1517	18.43	8.53	0.085	
DC-1	92.0	0.824	9.42	0.0147	100	1.0	4.96	917	4.5	4.3	6.5	3.00	1017	15.65	7.96	0.080	
E	95.0	0.864	17.14	0.0268	100	1.0	4.25	1250	3.3	3.7	5.5	4.53	1350	17.50	8.78	0.088	
ES-1	95.0	0.864	10.20	0.0159	100	1.0	4.25	1032	7.5	5.5	8.4	2.57	1132	16.29	6.81	0.068	
F	95.0	0.864	10.44	0.0163	100	1.0	4.25	1030	8.1	5.7	8.7	2.47	1130	16.28	6.72	0.067	
G	93.0	0.838	11.44	0.0179	100	1.0	4.72	879	7.8	5.7	8.6	2.21	979	15.44	6.93	0.069	
H	95.0	0.864	12.11	0.0189	100	1.0	4.25	999	3.8	3.9	6.0	3.51	1099	16.11	7.76	0.078	
HS-1A	95.0	0.864	11.70	0.0183	100	1.0	4.25	1494	7.5	5.8	8.7	3.35	1594	18.86	7.60	0.076	
HS-1B	94.8	0.861	49.79	0.0778	100	1.0	4.30	1541	8.1	5.8	8.7	3.44	1641	19.12	7.74	0.077	
I	95.0	0.864	13.23	0.0207	100	1.0	4.25	1122	3.9	4.0	6.0	3.82	1222	16.79	8.07	0.081	
J	95.0	0.864	16.90	0.0264	100	1.0	4.25	1097	5.5	4.7	7.2	3.15	1197	16.65	7.40	0.074	
K	95.0	0.864	25.71	0.0402	100	1.0	4.25	1721	6.4	5.1	7.7	4.26	1821	20.12	8.51	0.085	
L	95.0	0.864	16.19	0.0253	100	1.0	4.25	846	6.7	5.2	7.9	2.33	946	15.25	6.58	0.066	
M	95.0	0.864	11.09	0.0173	100	1.0	4.25	743	9.5	6.2	9.4	1.77	843	14.69	6.01	0.060	
N	95.0	0.864	9.91	0.0155	100	1.0	4.25	877	5.2	4.6	7.0	2.72	977	15.43	6.97	0.070	
NP-1	88.4	0.776	2.70	0.0042	100	1.0	5.82	442	6.6	5.2	7.9	1.42	542	13.01	7.24	0.072	
O	81.3	0.683	19.18	0.0300	100	1.0	7.50	1301	6.6	5.2	7.8	3.31	1401	17.79	10.81	0.108	
P	93.2	0.840	10.31	0.0161	100	1.0	4.67	656	8.3	5.8	8.8	1.73	756	14.20	6.40	0.064	
FOX1	98.0	0.904	2.91	0.0045	26	2.0	1.44	2115	5.3	4.6	7.0	5.62	2141	21.90	7.06	0.071	
FOX2	98.0	0.904	1.67	0.0026	27	2.0	1.45	641	6.7	5.2	7.9	1.89	667	13.71	3.35	0.033	Use Min TLAG = 0.050 per HCDDM
FOX3	98.0	0.904	1.51	0.0024	36	2.0	1.69	907	4.4	4.2	6.4	3.03	943	15.24	4.72	0.047	Use Min TLAG = 0.050 per HCDDM
FOX4	98.0	0.904	3.20	0.0050	60	2.0	2.17	1230	4.1	4.1	6.2	4.02	1290	17.17	6.19	0.062	
FOX5A	98.0	0.904	3.15	0.0049	60	2.0	2.17	1182	0.5	1.4	2.2	11.09	1242	16.90	13.26	0.133	
FOX5B	98.0	0.904	3.19	0.0050	60	2.0	2.17	1004	0.7	1.7	2.6	8.22	1064	15.91	10.39	0.104	
LM	98.0	0.904	4.65	0.0073	30	2.0	1.54	1577	5.5	4.7	7.1	4.28	1607	18.93	5.82	0.058	
RES3	98.0	0.904	1.97	0.0031	44	2.0	1.87	978	4.5	4.3	6.5	3.19	1022	15.68	5.05	0.051	Use Min TLAG = 0.050 per HCDDM
RES4	98.0	0.904	1.60	0.0025	33	2.0	1.62	909	6.0	5.0	7.5	2.59	942	15.23	4.20	0.042	
SKY0	98.0	0.904	4.15	0.0065	60	2.0	2.17	1325	0.5	1.4	2.1	12.81	1385	17.69	14.98	0.150	
SKY1	98.0	0.904	3.91	0.0061	61	2.0	2.18	1241	1.7	2.6	4.0	6.32	1301	17.23	8.50	0.085	

STANDARD FORM 4

DEVELOPMENT: Summerlin West Village 25

W.O. # 7919 **CALCULATED BY:** JYA/ RBR

V1 applies to the first 500 feet of travel distance applies to the remaining travel distance		V2
Existing:		**Developed**
$V1 = 148 * S^{1/2}$	$V2 = 294 * S^{1/2}$	$V1 = 202 * S^{1/2}$ $V2 = 306 * S^{1/2}$

$$T_i = \frac{1.8(1.1-k)L^{1/2}}{S^{1/3}} \qquad T_t = \frac{L}{60V}$$

$$k = 0.0132 C_n - 0.39 \qquad T_c = T_i + T_t$$

SUB-BASIN					INITIAL/OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK (URBANIZED BASINS)		FINAL Tc	LAG TIME	REMARKS
DESIG. (1)	Cn	K (2)	AREA Ac. (3)	AREA Mi^2	LENGTH Ft (4)	SLOPE % (5)	Ti Min. (6)	LENGTH Ft. (7)	SLOPE % (8)	V1 fps (9a)	V2 fps (9b)	Tt Min. (10)	TOTAL LENGTH (11)	Tc Min. (12)	Min.	TLAG Hr.	
SKY2	98.0	0.904	3.78	0.0059	65	2.0	2.27	1114	3.8	4.0	6.0	3.81	1179	16.55	6.07	0.061	Use Min TLAG = 0.050 per HCDDM
STAA	98.0	0.904	0.44	0.0007	32	2.0	1.59	314	5.2	4.6	7.0	1.13	347	11.93	2.73	0.027	
STAB	98.0	0.904	0.80	0.0013	24	2.0	1.37	722	0.4	1.3	2.0	8.28	746	14.14	9.65	0.097	
STA1	98.0	0.904	2.29	0.0036	32	2.0	1.59	1455	5.6	4.8	7.2	3.95	1487	18.26	5.54	0.055	
STA2	98.0	0.904	2.84	0.0044	35	2.0	1.67	1555	5.8	4.9	7.4	4.10	1590	18.84	5.77	0.058	
STBE	98.0	0.904	1.67	0.0026	27	2.0	1.46	1169	5.9	4.9	7.4	3.20	1196	16.64	4.66	0.047	
STL1	98.0	0.904	5.60	0.0088	62	2.0	2.22	1750	1.7	2.6	3.9	8.49	1812	20.07	10.71	0.107	
STL2	98.0	0.904	2.26	0.0035	62	2.0	2.21	780	1.2	2.2	3.3	5.26	842	14.68	7.47	0.075	
STM	98.0	0.904	4.76	0.0074	38	2.0	1.74	2493	5.7	4.8	7.3	6.26	2531	24.06	7.99	0.080	
STN	98.0	0.904	7.67	0.0120	57	2.0	2.13	2716	1.4	2.4	3.6	13.83	2773	25.41	15.95	0.160	
STO	98.0	0.904	4.10	0.0064	36	2.0	1.67	2302	6.2	5.0	7.6	5.58	2338	22.99	7.26	0.073	
STO1	98.0	0.904	1.24	0.0019	20	2.0	1.25	995	3.2	3.6	5.5	3.81	1015	15.64	5.06	0.051	
STO2	98.0	0.904	0.76	0.0012	20	2.0	1.25	2010	7.4	5.5	8.3	4.55	2030	21.28	5.81	0.058	
STP	98.0	0.904	2.05	0.0032	37	2.0	1.72	995	3.2	3.6	5.5	3.81	1033	15.74	5.52	0.055	Use Min TLAG = 0.050 per HCDDM
STQ	98.0	0.904	4.13	0.0065	20	2.0	1.25	2010	7.4	5.5	8.3	4.55	2030	21.28	5.81	0.058	Use Min TLAG = 0.050 per HCDDM
STQ1	98.0	0.904	2.49	0.0039	61	2.0	2.19	804	5.6	4.8	7.3	2.44	865	14.81	4.63	0.046	Use Min TLAG = 0.050 per HCDDM
STQ2	98.0	0.904	2.11	0.0033	65	2.0	2.27	691	5.2	4.6	7.0	2.26	757	14.20	4.53	0.045	
STQ3	98.0	0.904	4.22	0.0066	60	2.0	2.18	1530	5.9	4.9	7.4	4.02	1590	18.83	6.19	0.062	Use Min TLAG = 0.050 per HCDDM
SUMM	98.0	0.904	1.65	0.0026	41	1.0	2.26	753	5.8	4.9	7.4	2.28	793	14.41	4.54	0.045	
V30-A	95.0	0.864	19.05	0.0298	100	1.0	4.25	834	6.0	5.0	7.5	2.42	934	15.19	6.67	0.067	
V30-B	95.0	0.864	20.53	0.0321	100	1.0	4.25	876	4.0	4.1	6.1	3.07	976	15.42	7.32	0.073	
V30-E	95.0	0.864	10.36	0.0162	100	1.0	4.25	472	6.1	5.0	7.6	1.57	572	13.18	5.82	0.058	
V27-G	95.0	0.864	18.08	0.0283	100	1.0	4.26	1390	3.9	4.0	6.0	4.55	1490	18.28	8.81	0.088	
V27-H	89.5	0.791	10.40	0.0163	100	1.0	5.56	622	9.3	6.2	9.3	1.57	722	14.01	7.13	0.071	
V27-I	87.0	0.758	11.97	0.0187	100	1.0	6.16	947	7.9	5.7	8.6	2.33	1047	15.82	8.49	0.085	
V27-K	93.0	0.837	11.98	0.0187	100	1.0	4.73	655	7.0	5.4	8.1	1.88	755	14.19	6.60	0.066	
																	Tc Min (Urban)= 5 min
																	Tc Min (Non Urb)= 10 min

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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   18DEC19  TIME  17:42:07  *                    *          (916) 756-1104              *
 *                                      *                    *                                      *
 ****************************************                    ****************************************

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


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

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

1                                              HEC-1 INPUT                                                PAGE  1

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

                        *DIAGRAM
 *** FREE ***
              1         ID    ULTIMATE CONDITION HYDROLOGIC MODEL
              2         ID    OFFSITE BASINS DRAINING TO STUB AT STREET A
              3         ID    INPUT FILE DATE = JUNE 27, 2018
              4         ID    DESIGN STORM = 100-YEAR 6-HR STORM
              5         ID    STORM DISTRIBUTION = SDN #3
              6         ID    MODELED BY VTN (AH)
              7         ID
              8         ID    ********************************************************
              9         ID    * SUMMERLIN WEST VILLAGE 25                           *
             10         ID    ********************************************************
             11         ID
             12         ID
             13         ID  JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
             14         ID
             15         ID  100-YEAR,  6-HOUR STORM,  SDN3
             16         ID
             17         IT       5       0       0     300
             18         IO       5       0       0
             19         IN       5       0       0
             20         JR    PREC    1.00
                        *
             21         KK       J
             22         KM   ONSITE BASIN
             23         BA  0.0264
             24         PB    3.49
             25         PC       0    0.02   0.057    0.07   0.087   0.108   0.124    0.13    0.13   0.130
             26         PC    0.13    0.13    0.13   0.133    0.14   0.142   0.148   0.158   0.172   0.181
             27         PC    0.19   0.197   0.199     0.2   0.201   0.204   0.214   0.229   0.241   0.249
             28         PC   0.251   0.256    0.27   0.278   0.281   0.283   0.295   0.322   0.352   0.409
             29         PC   0.499    0.59    0.71   0.744   0.781   0.812   0.819   0.835   0.851   0.856
             30         PC    0.86   0.868   0.876   0.888    0.91   0.926   0.937    0.95    0.97   0.976
             31         PC   0.982   0.985   0.987   0.989    0.99   0.993   0.993   0.994   0.995   0.998
             32         PC   0.998   0.999       1
             33         LS       0    95.0
             34         UD   0.074
                        *
             35         KK     STM
             36         KM   ONSITE BASIN
             37         BA  0.0074
             38         PB    3.46
             39         LS       0    98.0
             40         UD   0.080
                        *
             41         KK      CJ
             42         KM   COMBINE J AND STM
             43         HC       2
                        *
1                                              HEC-1 INPUT                                                PAGE  2
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  44          KK    DC-1
  45          KM   ONSITE BASIN
  46          BA  0.0147
  47          PB    3.47
  48          LS       0    92.0
  49          UD   0.080
              *

  50          KK   CDC-1
  51          KM   COMBINE CJ AND DC-1
  52          HC       2
              *

  53          KK       I
  54          KM   ONSITE BASIN
  55          BA  0.0207
  56          PB    3.47
  57          LS       0    95.0
  58          UD   0.081
              *

  59          KK      CI
  60          KM   COMBINE I AND CJ
  61          HC       2
              *

  62          KK    SKY0
  63          KM   ONSITE BASIN
  64          BA  0.0065
  65          PB    3.45
  66          LS       0    98.0
  67          UD   0.150
              *

  68          KK   V30-B
  69          KM   OFFSITE BASIN
  70          BA  0.0321
  71          PB    3.45
  72          LS       0    95.0
  73          UD   0.073
              *

  74          KK   CV30B
  75          KM   COMBINE CI, SKY0, AND V30-B
  76          HC       3
              *

  77          KK   V30-A
  78          BA  0.0298
  79          PB    3.48
  80          LS       0    95.0
  81          UD   0.067
              *
1                                      HEC-1 INPUT                                        PAGE  3

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

  82          KK    STAB
  83          BA  0.0013
  84          PB    3.46
  85          LS       0    98.0
  86          UD   0.097
              *

  87          KK  CV30-A
  88          KM   COMBINE CR AND V30-S
  89          HC       2
              *

  90          KK    STBE
  91          BA  0.0026
  92          PB    3.45
  93          LS       0    98.0
  94          UD   0.050
              *

  95          KK   CSTBE
  96          KM   COMBINE CV30-A, STBE, AND CV30-B
  97          HC       3
              *

  98          KK   V30-E
  99          KM   ONSITE BASIN
 100          BA  0.0162
 101          PB    3.45
 102          LS       0    95.0
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 103          UD   0.058
              *

 104          KK  CV30-E
 105          KM   COMBINE V30-E AND CSTBE
 106          HC       2
              *

 107          KK    SKY1
 108          KM   STREET BASIN
 109          BA  0.0061
 110          PB    3.45
 111          LS       0    98.0
 112          UD   0.085
              *

 113          KK       H
 114          KM   ONSITE BASIN
 115          BA  0.0189
 116          PB    3.45
 117          LS       0    95.0
 118          UD   0.078
              *
1                                      HEC-1 INPUT                                        PAGE  4

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

 119          KK      CH
 120          KM   COMBINE SKY1 AND H
 121          HC       2
              *

 122          KK     RCH
 123          KM   ROUTE CH TO CES-1
 124          RD     670   0.028   0.013       0    CIRC     3.5
              *

 125          KK    ES-1
 126          KM   ONSITE BASIN
 127          BA  0.0159
 128          PB    3.46
 129          LS       0    95.0
 130          UD   0.068
              *

 131          KK   CES-1
 132          KM   COMBINE CH AND ES-1
 133          HC       2
              *

 134          KK  RCES-1
 135          KM   ROUTE CES-1 TO CNP-1
 136          RD     330   0.018   0.013       0    CIRC     3.5
              *

 137          KK    SKY2
 138          KM   STREET BASIN
 139          BA  0.0059
 140          PB    3.44
 141          LS       0    98.0
 142          UD   0.061
              *

 143          KK    NP-1
 144          KM   ONSITE BASIN
 145          BA  0.0042
 146          PB    3.44
 147          LS       0    88.4
 148          UD   0.072
              *

 149          KK   CNP-1
 150          KM   COMBINE CES-1, SKY2, AND NP-1
 151          HC       3
              *
1                                      HEC-1 INPUT                                        PAGE  5

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

 152          KK    STL1
 153          KM   STREET BASIN
 154          BA  0.0088
 155          PB    3.46
 156          LS       0    98.0
 157          UD   0.107
              *

 158          KK       K
 159          KM   ONSITE BASIN
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```
160          BA  0.0402
161          PB    3.49
162          LS       0    95.0
163          UD   0.085
             *

164          KK      CK
165          KM   COMBINE K AND STL1
166          HC       2
             *

167          KK     RCK
168          KM   ROUTE CK TO CL
169          RD     825   0.032   0.013       0    CIRC     3.5
             *

170          KK       L
171          KM   ONSITE BASIN
172          BA  0.0253
173          PB    3.47
174          LS       0    95.0
175          UD   0.066
             *

176          KK     RCL
177          KM   ROUTE CL TO CRES4
178          RD     650   0.059   0.013       0    CIRC     3.5
             *

179          KK      CL
180          KM   COMBINE CK AND L
181          HC       2
             *

182          KK    RES4
183          KM   STREET BASIN
184          BA  0.0025
185          PB    3.46
186          LS       0    98.0
187          UD   0.050
             *
1                                        HEC-1 INPUT                                          PAGE  6

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

188          KK   CRES4
189          KM   COMBINE CL AND RES4
190          HC       2
             *

191          KK   CRES4
192          KM   ROUTE CRES4 TO CRES3
193          RD     340   0.033   0.013       0    CIRC     3.5
             *

194          KK    RES3
195          KM   STREET BASIN
196          BA  0.0031
197          PB    3.44
198          LS       0    98.0
199          UD   0.051
             *

200          KK       M
201          KM   ONSITE BASIN
202          BA  0.0173
203          PB    3.44
204          LS       0    95.0
205          UD   0.060
             *

206          KK   CRES3
207          KM   COMBINE CRES4, RES3, AND M
208          HC       3
             *

209          KK  RCRES3
210          KM   ROUTE CRES3 TO CSTAA
211          RD     450   0.046   0.013       0    CIRC       4
             *

212          KK    STAA
213          KM   ONSITE BASIN
214          BA  0.0007
215          PB    3.44
216          LS       0    98.0
217          UD   0.050
             *

218          KK   CSTAA
```

```
 219          KM   COMBINE CRES3 AND STAA
 220          HC       2
              *
1                                    HEC-1 INPUT                                        PAGE  7

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


 221          KK  DUMMY1
 222          KM   COMBINE CNP-1 AND CSTAA
 223          HC       2
              *

 224          KK       N
 225          KM   ONSITE BASIN
 226          BA  0.0155
 227          PB    3.44
 228          LS       0    95.0
 229          UD   0.070
              *

 230          KK  DUMMY2
 231          KM   COMBINE DUMMY1, N
 232          HC       2
              *

 233          KK    CP-1
 234          KM   ONSITE BASIN
 235          BA  0.1458
 236          PB    3.45
 237          LS       0    87.1
 238          UD   0.109
              *

 239          KK    STL2
 240          KM   STREET BASIN
 241          BA  0.0035
 242          PB    3.46
 243          LS       0    98.0
 244          UD   0.075
              *

 245          KK    FOX1
 246          KM   STREET BASIN
 247          BA  0.0045
 248          PB    3.47
 249          LS       0    98.0
 250          UD   0.071
              *

 251          KK    FOX2
 252          KM   STREET BASIN
 253          BA  0.0026
 254          PB    3.45
 255          LS       0    98.0
 256          UD   0.050
              *
1                                    HEC-1 INPUT                                        PAGE  8

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


 257          KK    FOX3
 258          KM   STREET BASIN
 259          BA  0.0024
 260          PB    3.42
 261          LS       0    98.0
 262          UD   0.050
              *

 263          KK DUMMY2B
 264          KM   COMBINE DUMMY2, FOX1, FOX2, F0X3
 265          HC       5
              *

 266          KK    SUMM
 267          KM   SUMMERLIN PARKWAY STREET BASIN
 268          BA  0.0026
 269          PB    3.42
 270          LS       0    98.0
 271          UD   0.050
              *

 272          KK       G
 273          KM   ONSITE BASIN
 274          BA  0.0179
 275          PB    3.41
 276          LS       0    93.0
 277          UD   0.069
              *
```

```
 278          KK  DUMMY3
 279          KM   COMBINE DUMMY2, SUMM, AND G
 280          HC       3
              *

 281          KK       D
 282          KM   ONSITE BASIN
 283          BA  0.0424
 284          PB    3.44
 285          LS       0    95.0
 286          UD   0.085
              *

 287          KK   FOX5B
 288          KM   1/2 FOX5 STREET BASIN
 289          BA  0.0050
 290          PB    3.40
 291          LS       0    98.0
 292          UD   0.104
              *
1                                        HEC-1 INPUT                                        PAGE  9

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

 293          KK   COS-1
 294          KM   ONSITE BASIN
 295          BA  0.0054
 296          PB    3.42
 297          LS       0    88.0
 298          UD   0.194
              *

 299          KK  CCOS-1
 300          KM   COMBINE FOX5B AND COS-1
 301          HC       2
              *

 302          KK   FOX5A
 303          KM   1/2 FOX5 STREET BASIN
 304          BA  0.0049
 305          PB    3.41
 306          LS       0    98.0
 307          UD   0.133
              *

 308          KK       A
 309          KM   ONSITE BASIN
 310          BA  0.0334
 311          PB    3.41
 312          LS       0    95.0
 313          UD   0.091
              *

 314          KK   CFOX5
 315          KM   COMBINE FOX5A,CCOS-1, AND A
 316          HC       3
              *

 317          KK DUMMY3B
 318          KM   COMBINE COMBINE CFOX5 AND D
 319          HC       2
              *

 320          KK       C
 321          KM   ONSITE BASIN
 322          BA  0.0415
 323          PB    3.45
 324          LS       0    95.0
 325          UD   0.099
              *

 326          KK    STA1
 327          KM   STREET BASIN
 328          BA  0.0036
 329          PB    3.43
 330          LS       0    98.0
 331          UD   0.055
              *
1                                        HEC-1 INPUT                                        PAGE 10

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

 332          KK      CC
 333          KM   COMBINE STA1, AND C
 334          HC       2
              *

 335          KK   COS-2
 336          KM   ONSITE BASIN
```

```
337          BA  0.0027
338          PB    3.43
339          LS       0    88.0
340          UD   0.128
             *

341          KK  CCOS-2
342          KM   COMBINE CC AND COS-2
343          HC       2
             *

344          KK    FOX4
345          KM   STREET BASIN
346          BA  0.0050
347          PB    3.42
348          LS       0    98.0
349          UD   0.062
             *

350          KK       F
351          KM   ONSITE BASIN
352          BA  0.0163
353          PB    3.44
354          LS       0    95.0
355          UD   0.067
             *

356          KK   COS-4
357          KM   ONSITE BASIN
358          BA  0.0079
359          PB    3.43
360          LS       0    88.0
361          UD   0.089
             *

362          KK  CFOX4A
363          KM   COMBINE F, COS-4, AND FOX4
364          HC       3
             *

365          KK       B
366          KM   ONSITE BASIN
367          BA  0.0310
368          PB    3.42
369          LS       0    95.0
370          UD   0.088
             *
```



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

371          KK  CFOX4B
372          KM   COMBINE CCOS-2, B AND CFOX4A
373          HC       3
             *

374          KK    STA2
375          KM   STREET BASIN
376          BA  0.0044
377          PB    3.39
378          LS       0    98.0
379          UD   0.058
             *

380          KK   CSTA2
381          KM   COMBINE CFOX4B AND STA2
382          HC       2
             *

383          KK   COS-3
384          KM   STREET BASIN
385          BA  0.0038
386          PB    3.41
387          LS       0    88.1
388          UD   0.070
             *

389          KK       E
390          KM   ONSITE BASIN
391          BA  0.0268
392          PB    3.40
393          LS       0    95.0
394          UD   0.088
             *

395          KK    CSTE
396          KM   COMBINE CSTA2, COS-3 AND E
397          HC       3
             *
```

```
 398          KK   V27-G
 399          BA  0.0283
 400          PB    3.50
 401          LS       0    95.0
 402          UD   0.088
              *

 403          KK   V27-I
 404          BA  0.0187
 405          PB    3.50
 406          LS       0    87.0
 407          UD   0.085
              *
1                                        HEC-1 INPUT                                          PAGE 12

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


 408          KK    STO2
 409          KM   STREET BASIN
 410          BA  0.0012
 411          PB    3.48
 412          LS       0    98.0
 413          UD   0.058
              *

 414          KK     STQ
 415          KM   STREET BASIN
 416          BA  0.0065
 417          PB    3.48
 418          LS       0    98.0
 419          UD   0.058
              *

 420          KK    CSTQ
 421          KM   COMBINE V27-G, V27-I, STO2, AND STQ
 422          HC       4
              *

 423          KK   V27-K
 424          BA  0.0187
 425          PB    3.50
 426          LS       0    93.0
 427          UD   0.066
              *

 428          KK    STO1
 429          BA  0.0019
 430          PB    3.48
 431          LS       0    98.0
 432          UD   0.051
              *

 433          KK   CSTO1
 434          KM   COMBINE V27K AND STO1
 435          HC       2
              *

 436          KK      LM
 437          KM   STREET BASIN
 438          BA  0.0073
 439          PB    3.48
 440          LS       0    98.0
 441          UD   0.058
              *

 442          KK   V27-H
 443          BA  0.0163
 444          PB    3.48
 445          LS       0    89.5
 446          UD   0.071
              *
1                                        HEC-1 INPUT                                          PAGE 13

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


 447          KK  DUMMY4
 448          KM   COMBINE CSTO3, CSTQ, LM, V27-H
 449          HC       4
              *

 450          KK    STQ1
 451          KM   STREET BASIN
 452          BA  0.0039
 453          PB    3.46
 454          LS       0    98.0
 455          UD   0.050
              *

 456          KK       O
```

```
 457          KM   ONSITE BASIN
 458          BA  0.0300
 459          PB    3.48
 460          LS       0    81.3
 461          UD   0.108
              *

 462          KK     STP
 463          KM   STREET BASIN
 464          BA  0.0032
 465          PB    3.46
 466          LS       0    98.0
 467          UD   0.055
              *

 468          KK    STQ2
 469          KM   STREET BASIN
 470          BA  0.0033
 471          PB    3.46
 472          LS       0    98.0
 473          UD   0.050
              *

 474          KK  DUMMY5
 475          KM   COMBINE DUMMY4, STQ1, O, STP, STQ2
 476          HC       5
              *

 477          KK       P
 478          KM   ONSITE BASIN
 479          BA  0.0161
 480          PB    3.46
 481          LS       0    93.2
 482          UD   0.064
              *
1                                        HEC-1 INPUT                                        PAGE 14

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

 483          KK     STO
 484          KM   STREET BASIN
 485          BA  0.0064
 486          PB    3.46
 487          LS       0    98.0
 488          UD   0.073
              *

 489          KK  DUMMY6
 490          KM   COMBINE P, STO, AND DUMMY5
 491          HC       3
              *

 492          KK    STQ3
 493          KM   STREET BASIN
 494          BA  0.0066
 495          PB    3.44
 496          LS       0    98.0
 497          UD   0.062
              *

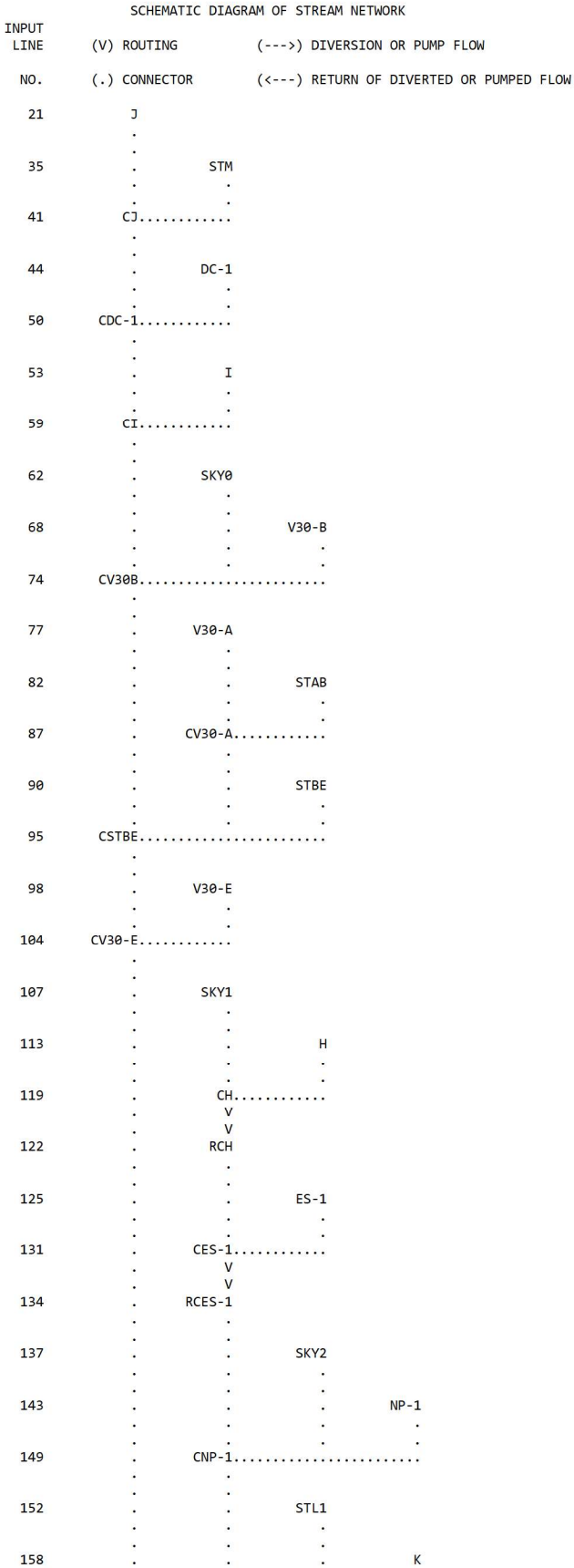
 498          KK     STN
 499          KM   ONSITE BASIN
 500          BA  0.0120
 501          PB    3.44
 502          LS       0    98.0
 503          UD   0.160
              *

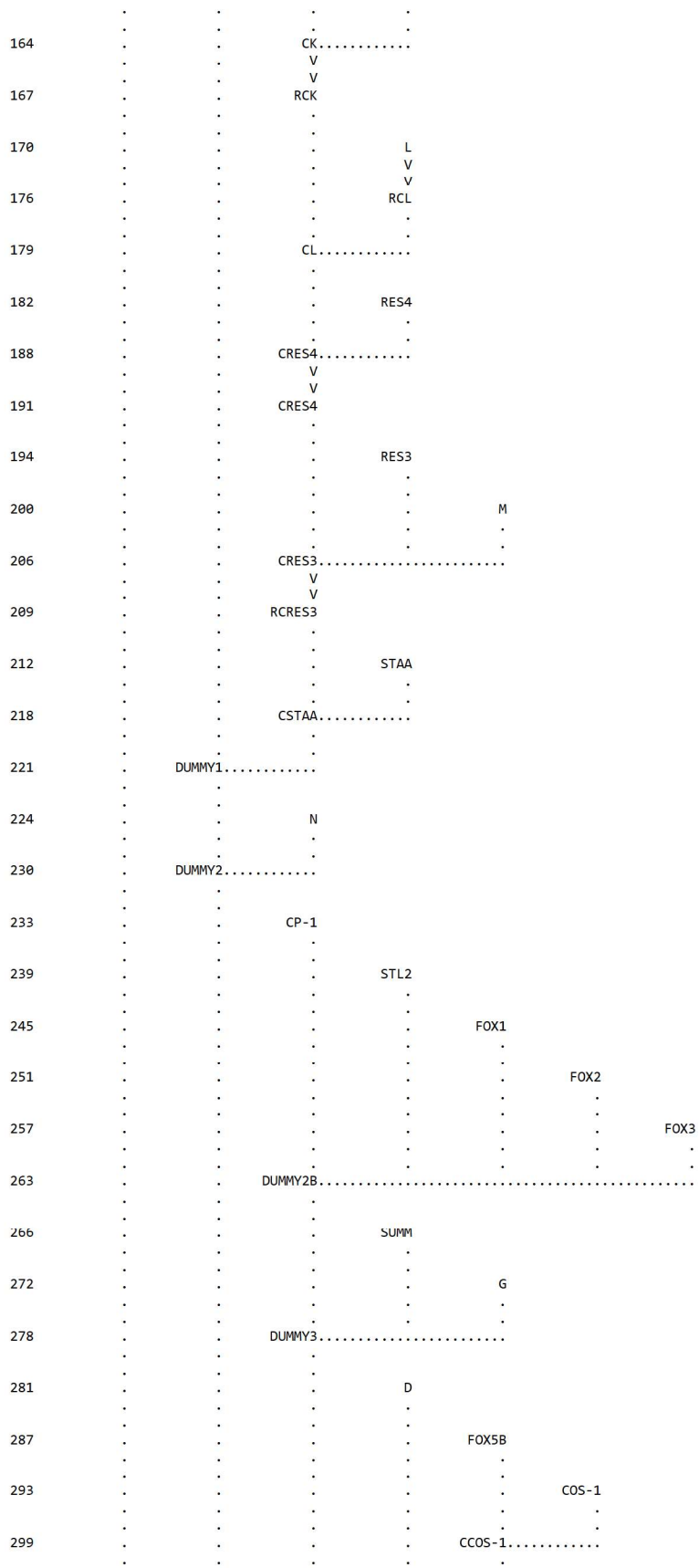
 504          KK   HS-1A
 505          KM   ONSITE BASIN
 506          BA  0.0183
 507          PB    3.44
 508          LS       0    95.0
 509          UD   0.076
              *

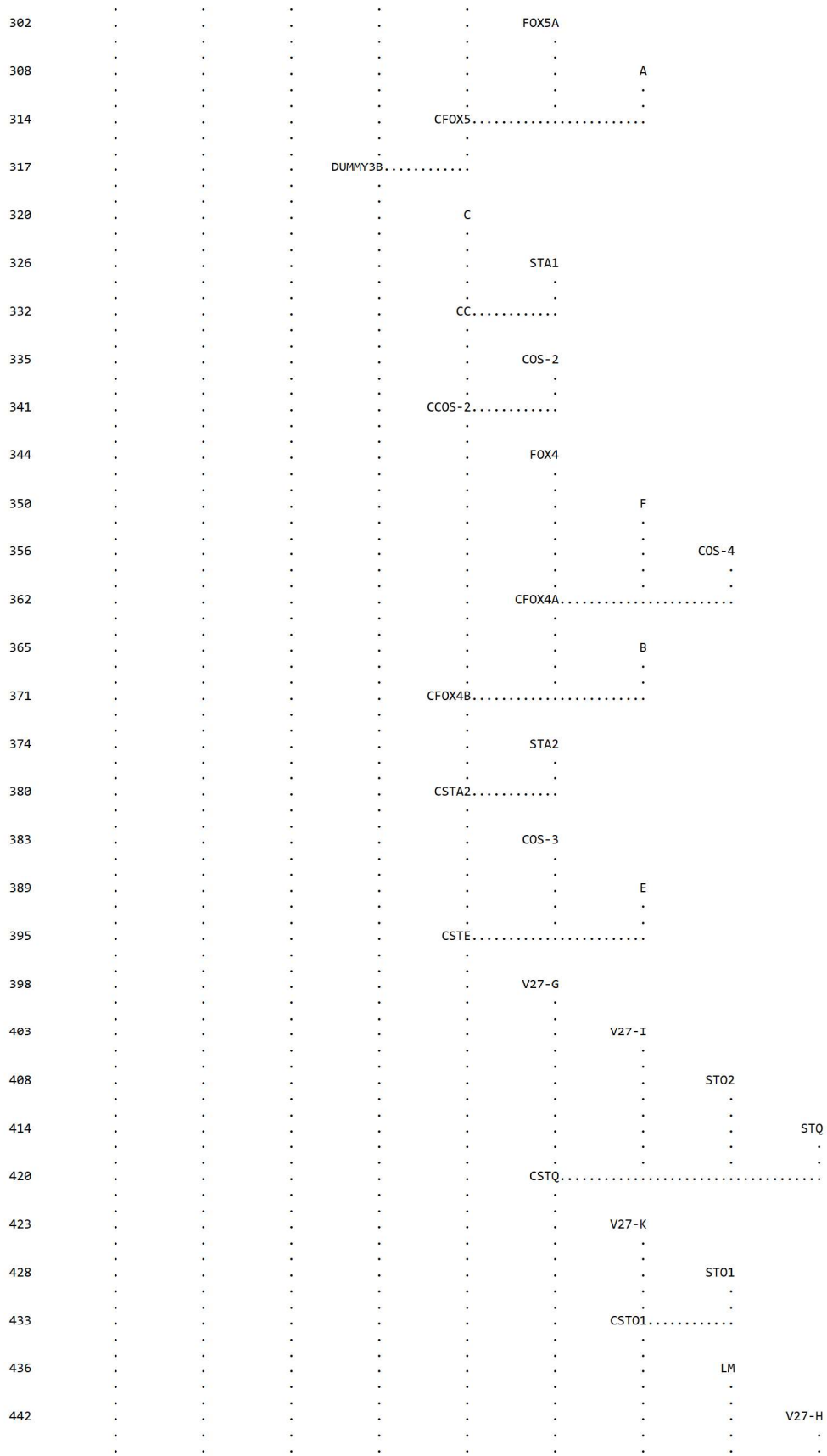
 510          KK   HS-1B
 511          KM   ONSITE BASIN
 512          BA  0.0778
 513          PB    3.44
 514          LS       0    94.8
 515          UD   0.077
              *

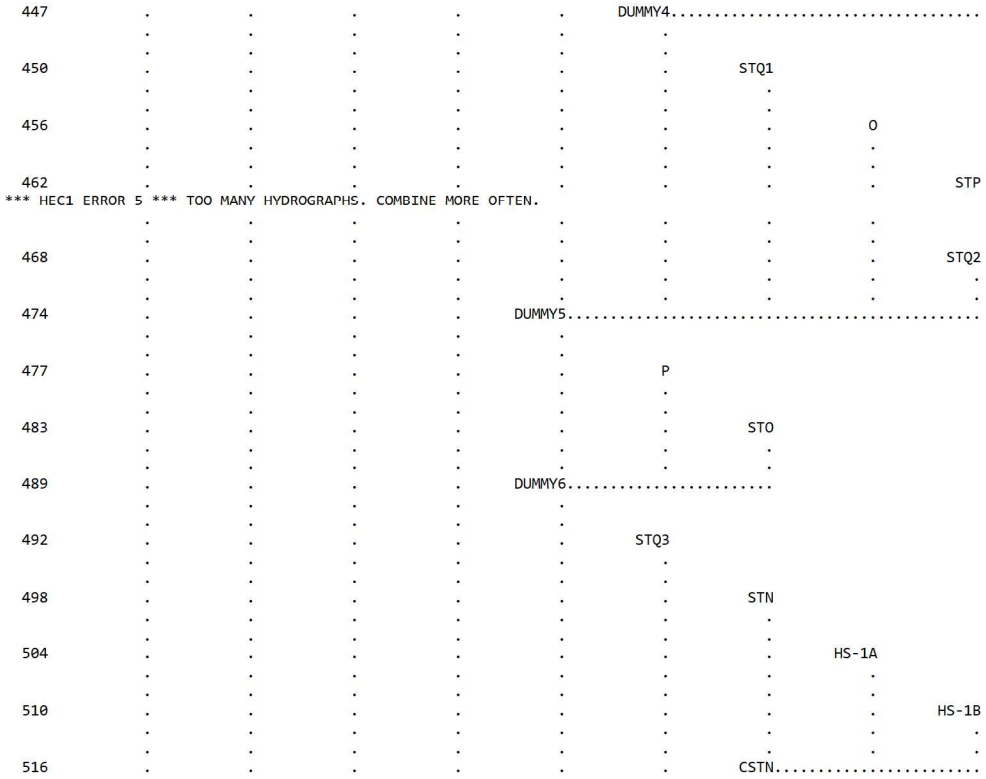
 516          KK    CSTN
 517          KM   COMBINE STN AND HS-1A AND HS-1B
 518          HC       3
              *
 519          ZZ
1
```

SCHEMATIC DIAGRAM OF STREAM NETWORK




164 CK
167 RCK
170 L
176 RCL
179 CL
182 RES4
188 CRES4
191 CRES4
194 RES3
200 M
206 CRES3
209 RCRES3
212 STAA
218 CSTAA
221 DUMMY1
224 N
230 DUMMY2
233 CP-1
239 STL2
245 FOX1
251 FOX2
257 FOX3
263 DUMMY2B
266 SUMM
272 G
278 DUMMY3
281 D
287 FOX5B
293 COS-1
299 CCOS-1


302 FOX5A
308 A
314 CFOX5
317 DUMMY3B
320 C
326 STA1
332 CC
335 COS-2
341 CCOS-2
344 FOX4
350 F
356 COS-4
362 CFOX4A
365 B
371 CFOX4B
374 STA2
380 CSTA2
383 COS-3
389 E
395 CSTE
398 V27-G
403 V27-I
408 STO2
414 STQ
420 CSTQ
423 V27-K
428 STO1
433 CSTO1
436 LM
442 V27-H



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1 ERRORS IN STREAM SYSTEM

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   18DEC19  TIME  17:42:07   *
*                                       *
*****************************************
```

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

ULTIMATE CONDITION HYDROLOGIC MODEL
OFFSITE BASINS DRAINING TO STUB AT STREET A
INPUT FILE DATE = JUNE 27, 2018
DESIGN STORM = 100-YEAR 6-HR STORM
STORM DISTRIBUTION = SDN #3
MODELED BY VTN (AH)

```
*********************************************************
* SUMMERLIN WEST VILLAGE 25                             *
*********************************************************
```

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)

100-YEAR, 6-HOUR STORM, SDN3

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

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

               COMPUTATION INTERVAL     .08 HOURS
```

TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

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

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00
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
HYDROGRAPH AT					
+	J	.03	1	FLOW	69.
				TIME	3.50
HYDROGRAPH AT					
+	STM	.01	1	FLOW	20.
				TIME	3.50
2 COMBINED AT					
+	CJ	.03	1	FLOW	89.
				TIME	3.50
HYDROGRAPH AT					
+	DC-1	.01	1	FLOW	35.
				TIME	3.50
2 COMBINED AT					
+	CDC-1	.05	1	FLOW	124.
				TIME	3.50
HYDROGRAPH AT					
+	I	.02	1	FLOW	53.
				TIME	3.50
2 COMBINED AT					
+	CI	.07	1	FLOW	176.
				TIME	3.50
HYDROGRAPH AT					
+	SKY0	.01	1	FLOW	15.
				TIME	3.58
HYDROGRAPH AT					
+	V30-B	.03	1	FLOW	83.
				TIME	3.50
3 COMBINED AT					
+	CV30B	.11	1	FLOW	273.
				TIME	3.50
HYDROGRAPH AT					
+	V30-A	.03	1	FLOW	80.
				TIME	3.50
HYDROGRAPH AT					
+	STAB	.00	1	FLOW	3.
				TIME	3.50
2 COMBINED AT					
+	CV30-A	.03	1	FLOW	83.
				TIME	3.50
HYDROGRAPH AT					
+	STBE	.00	1	FLOW	8.
				TIME	3.50
3 COMBINED AT					
+	CSTBE	.14	1	FLOW	364.
				TIME	3.50
HYDROGRAPH AT					
+	V30-E	.02	1	FLOW	44.
				TIME	3.50

```
  2 COMBINED AT
+                CV30-E       .16     1   FLOW         408.
                                          TIME        3.50

 HYDROGRAPH AT
+                  SKY1       .01     1   FLOW          16.
                                          TIME        3.50

 HYDROGRAPH AT
+                     H       .02     1   FLOW          48.
                                          TIME        3.50

  2 COMBINED AT
+                    CH       .02     1   FLOW          64.
                                          TIME        3.50

 ROUTED TO
+                   RCH       .02     1   FLOW          63.
                                          TIME        3.50

 HYDROGRAPH AT
+                  ES-1       .02     1   FLOW          42.
                                          TIME        3.50

  2 COMBINED AT
+                 CES-1       .04     1   FLOW         105.
                                          TIME        3.50

 ROUTED TO
+                RCES-1       .04     1   FLOW         103.
                                          TIME        3.50

 HYDROGRAPH AT
+                  SKY2       .01     1   FLOW          17.
                                          TIME        3.50

 HYDROGRAPH AT
+                  NP-1       .00     1   FLOW           9.
                                          TIME        3.50

  3 COMBINED AT
+                 CNP-1       .05     1   FLOW         129.
                                          TIME        3.50

 HYDROGRAPH AT
+                  STL1       .01     1   FLOW          21.
                                          TIME        3.50

 HYDROGRAPH AT
+                     K       .04     1   FLOW         101.
                                          TIME        3.50

  2 COMBINED AT
+                    CK       .05     1   FLOW         123.
                                          TIME        3.50

 ROUTED TO
+                   RCK       .05     1   FLOW         120.
                                          TIME        3.50

 HYDROGRAPH AT
+                     L       .03     1   FLOW          68.
                                          TIME        3.50

 ROUTED TO
+                   RCL       .03     1   FLOW          67.
                                          TIME        3.50

  2 COMBINED AT
+                    CL       .07     1   FLOW         187.
                                          TIME        3.50

 HYDROGRAPH AT
+                  RES4       .00     1   FLOW           7.
                                          TIME        3.50

  2 COMBINED AT
+                 CRES4       .08     1   FLOW         194.
                                          TIME        3.50

 ROUTED TO
+                 CRES4       .08     1   FLOW         192.
                                          TIME        3.50

 HYDROGRAPH AT
+                  RES3       .00     1   FLOW           9.
                                          TIME        3.50

 HYDROGRAPH AT
+                     M       .02     1   FLOW          47.
```

```
                                        TIME         3.50

  3 COMBINED AT
+                 CRES3       .10     1   FLOW         248.
                                          TIME         3.50

 ROUTED TO
+                RCRES3       .10     1   FLOW         246.
                                          TIME         3.50

 HYDROGRAPH AT
+                  STAA       .00     1   FLOW           2.
                                          TIME         3.50

  2 COMBINED AT
+                 CSTAA       .10     1   FLOW         248.
                                          TIME         3.50

  2 COMBINED AT
+                DUMMY1       .15     1   FLOW         377.
                                          TIME         3.50

 HYDROGRAPH AT
+                     N       .02     1   FLOW          40.
                                          TIME         3.50

  2 COMBINED AT
+                DUMMY2       .16     1   FLOW         418.
                                          TIME         3.50

 HYDROGRAPH AT
+                  CP-1       .15     1   FLOW         270.
                                          TIME         3.50

 HYDROGRAPH AT
+                  STL2       .00     1   FLOW           9.
                                          TIME         3.50

 HYDROGRAPH AT
+                  FOX1       .00     1   FLOW          12.
                                          TIME         3.50

 HYDROGRAPH AT
+                  FOX2       .00     1   FLOW           8.
                                          TIME         3.50

 HYDROGRAPH AT
+                  FOX3       .00     1   FLOW           7.
                                          TIME         3.50

  5 COMBINED AT
+               DUMMY2B       .16     1   FLOW         306.
                                          TIME         3.50

 HYDROGRAPH AT
+                  SUMM       .00     1   FLOW           7.
                                          TIME         3.50

 HYDROGRAPH AT
+                     G       .02     1   FLOW          45.
                                          TIME         3.50

  3 COMBINED AT
+                DUMMY3       .18     1   FLOW         358.
                                          TIME         3.50

 HYDROGRAPH AT
+                     D       .04     1   FLOW         105.
                                          TIME         3.50

 HYDROGRAPH AT
+                 FOX5B       .00     1   FLOW          12.
                                          TIME         3.50

 HYDROGRAPH AT
+                  COS-1      .01     1   FLOW           9.
                                          TIME         3.58

  2 COMBINED AT
+                 CCOS-1      .01     1   FLOW          20.
                                          TIME         3.58

 HYDROGRAPH AT
+                  FOX5A      .00     1   FLOW          11.
                                          TIME         3.58

 HYDROGRAPH AT
+                     A       .03     1   FLOW          81.
                                          TIME         3.50

  3 COMBINED AT
```

```
+                 CFOX5       .05     1   FLOW         111.
                                          TIME        3.50

  2 COMBINED AT
+               DUMMY3B       .09     1   FLOW         216.
                                          TIME        3.50

 HYDROGRAPH AT
+                     C       .04     1   FLOW          99.
                                          TIME        3.50

 HYDROGRAPH AT
+                  STA1       .00     1   FLOW          10.
                                          TIME        3.50

  2 COMBINED AT
+                    CC       .05     1   FLOW         109.
                                          TIME        3.50

 HYDROGRAPH AT
+                 COS-2       .00     1   FLOW           5.
                                          TIME        3.58

  2 COMBINED AT
+                CCOS-2       .05     1   FLOW         114.
                                          TIME        3.50

 HYDROGRAPH AT
+                  FOX4       .00     1   FLOW          14.
                                          TIME        3.50

 HYDROGRAPH AT
+                     F       .02     1   FLOW          43.
                                          TIME        3.50

 HYDROGRAPH AT
+                 COS-4       .01     1   FLOW          16.
                                          TIME        3.50

  3 COMBINED AT
+                CFOX4A       .03     1   FLOW          73.
                                          TIME        3.50

 HYDROGRAPH AT
+                     B       .03     1   FLOW          76.
                                          TIME        3.50

  3 COMBINED AT
+                CFOX4B       .11     1   FLOW         263.
                                          TIME        3.50

 HYDROGRAPH AT
+                  STA2       .00     1   FLOW          12.
                                          TIME        3.50

  2 COMBINED AT
+                 CSTA2       .11     1   FLOW         275.
                                          TIME        3.50

 HYDROGRAPH AT
+                 COS-3       .00     1   FLOW           8.
                                          TIME        3.50

 HYDROGRAPH AT
+                     E       .03     1   FLOW          65.
                                          TIME        3.50

  3 COMBINED AT
+                  CSTE       .14     1   FLOW         348.
                                          TIME        3.50

 HYDROGRAPH AT
+                 V27-G       .03     1   FLOW          71.
                                          TIME        3.50

 HYDROGRAPH AT
+                 V27-I       .02     1   FLOW          39.
                                          TIME        3.50

 HYDROGRAPH AT
+                  STO2       .00     1   FLOW           3.
                                          TIME        3.50

 HYDROGRAPH AT
+                   STQ       .01     1   FLOW          19.
                                          TIME        3.50

  4 COMBINED AT
+                  CSTQ       .05     1   FLOW         132.
                                          TIME        3.50
```

```
 HYDROGRAPH AT
+                  V27-K       .02     1   FLOW          49.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STO1       .00     1   FLOW           6.
                                           TIME         3.50

  2 COMBINED AT
+                  CSTO1       .02     1   FLOW          54.
                                           TIME         3.50

 HYDROGRAPH AT
+                     LM       .01     1   FLOW          21.
                                           TIME         3.50

 HYDROGRAPH AT
+                  V27-H       .02     1   FLOW          38.
                                           TIME         3.50

  4 COMBINED AT
+                 DUMMY4       .10     1   FLOW         245.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STQ1       .00     1   FLOW          11.
                                           TIME         3.50

 HYDROGRAPH AT
+                      O       .03     1   FLOW          46.
                                           TIME         3.58

 HYDROGRAPH AT
+                    STP       .00     1   FLOW           9.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STQ2       .00     1   FLOW          10.
                                           TIME         3.50

  5 COMBINED AT
+                 DUMMY5       .14     1   FLOW         320.
                                           TIME         3.50

 HYDROGRAPH AT
+                      P       .02     1   FLOW          42.
                                           TIME         3.50

 HYDROGRAPH AT
+                    STO       .01     1   FLOW          17.
                                           TIME         3.50

  3 COMBINED AT
+                 DUMMY6       .16     1   FLOW         379.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STQ3       .01     1   FLOW          18.
                                           TIME         3.50

 HYDROGRAPH AT
+                    STN       .01     1   FLOW          27.
                                           TIME         3.58

 HYDROGRAPH AT
+                  HS-1A       .02     1   FLOW          47.
                                           TIME         3.50

 HYDROGRAPH AT
+                  HS-1B       .08     1   FLOW         198.
                                           TIME         3.50

  3 COMBINED AT
+                   CSTN       .11     1   FLOW         269.
                                           TIME         3.50
1
                                       SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                           (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                 INTERPOLATED TO
                                                                               COMPUTATION INTERVAL
            ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                      PEAK                                     PEAK

                                 (MIN)     (CFS)      (MIN)     (IN)     (MIN)     (CFS)     (MIN)       (IN)

          FOR PLAN = 1  RATIO=  .00
               RCH  MANE          .58     63.39    210.36      2.97      5.00     62.71    210.00        2.97


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .3960E+01 EXCESS= .0000E+00 OUTFLOW= .3960E+01 BASIN STORAGE= .5449E-04 PERCENT ERROR=    .0
```

```
          FOR PLAN = 1  RATIO=  .00
            RCES-1  MANE          .31    103.96    210.14      2.94      5.00    103.50    210.00        2.95


CONTINUITY SUMMARY (AC-FT) - INFLOW= .6424E+01 EXCESS= .0000E+00 OUTFLOW= .6424E+01 BASIN STORAGE= .3174E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
               RCK  MANE          .60    121.94    210.79      2.98      5.00    120.24    210.00        2.99


CONTINUITY SUMMARY (AC-FT) - INFLOW= .7795E+01 EXCESS= .0000E+00 OUTFLOW= .7795E+01 BASIN STORAGE= .6238E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
               RCL  MANE          .42     67.10    210.47      2.91      5.00     66.55    210.00        2.91


CONTINUITY SUMMARY (AC-FT) - INFLOW= .3926E+01 EXCESS= .0000E+00 OUTFLOW= .3926E+01 BASIN STORAGE= .3668E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
             CRES4  MANE          .22    193.27    210.30      2.97      5.00    192.47    210.00        2.97

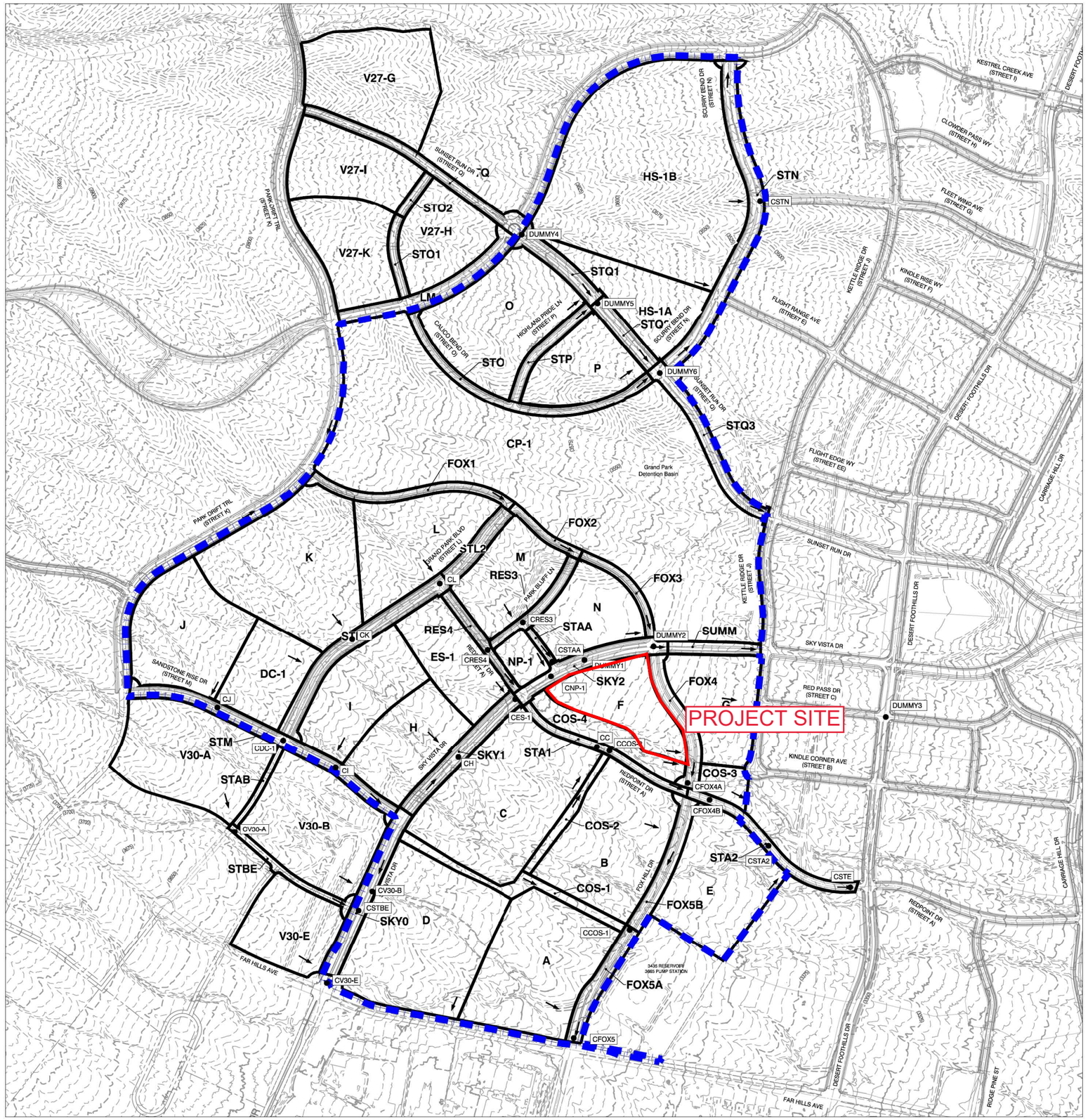

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1216E+02 EXCESS= .0000E+00 OUTFLOW= .1216E+02 BASIN STORAGE= .2537E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCRES3  MANE          .24    246.91    210.13      2.96      5.00    245.91    210.00        2.96


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1536E+02 EXCESS= .0000E+00 OUTFLOW= .1536E+02 BASIN STORAGE= .2944E-04 PERCENT ERROR=    .0



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



LEGEND

- VILLAGE 25 BOUNDARY
- BASIN BOUNDARY
- W51 BASIN DESIGNATION
- CW51 ● CONCENTRATION POINT
- FLOW ARROW

GRAPHIC SCALE
400 0 200 400 800
1" = 400'

NORTH

ULTIMATE CONDITION HEC-1 SUMMARY TABLE

BASIN ID	Area (a.c.)			Q100 (cfs)		
	Update #1	Previous	Difference	Update #1	Previous	Difference
J	16.90	16.90	0.00	69	69	0.00
STM	4.76	4.76	0.00	20	20	0.00
CJ	-	-	N/A	89	-	N/A
DC-1	9.42	15.02	-5.60	35	56	-21.00
CDC-1	-	-	N/A	124	184	-60.00
I	13.23	13.23	0.00	53	53	0.00
CI	-	-	N/A	176	274	-98.00
SKY0	4.15	4.15	0.00	15	14	1.00
V30-B	20.53	N/A	N/A	83	N/A	N/A
CV30B	-	N/A	N/A	273	N/A	N/A
V30-A	19.05	N/A	N/A	80	N/A	N/A
STAB	0.80	N/A	N/A	3	N/A	N/A
CV30-A	-	N/A	N/A	83	N/A	N/A
STBE	1.67	N/A	N/A	8	N/A	N/A
CSTBE	-	N/A	N/A	364	N/A	N/A
V30-E	10.36	N/A	N/A	44	N/A	N/A
CV30-E	-	N/A	N/A	408	N/A	N/A
SKY1	3.91	3.91	0.00	16	16	0.00
H	12.11	12.11	0.00	48	48	0.00
CH	-	-	N/A	64	64	0.00
ES-1	10.20	10.20	0.00	42	42	0.00
CES-1	-	-	N/A	105	106	-1.00
SKY2	3.78	3.78	0.00	17	17	0.00
NP-1	2.70	2.70	0.00	9	9	0.00
CNP-1	-	-	N/A	129	132	-3.00
STL1	5.60	7.86	-2.26	21	28	-7.00
K	25.71	21.91	3.80	101	86	15.00
CK	-	-	N/A	123	113	10.00
L	16.19	12.79	3.40	68	53	15.00
CL	-	-	N/A	187	167	20.00
RES4	1.60	1.60	0.00	7	7	0.00
CRES4	-	-	N/A	194	174	20.00
RES3	1.97	1.97	0.00	9	9	0.00
M	11.09	10.88	0.21	47	46	1.00
CRES3	-	-	N/A	248	229	19.00
STAA	0.44	0.44	0.00	2	2	0.00
CSTAA	-	-	N/A	248	231	17.00
N	9.91	9.91	0.00	40	40	0.00
CP-1	93.32	94.28	-0.96	270	282	-12.00
STL2	2.26	N/A	N/A	9	N/A	N/A
FOX1	2.91	3.39	-0.48	12	14	-2.00
FOX2	1.67	1.06	0.61	8	5	3.00
FOX3	1.51	1.51	0.00	7	7	0.00
SUMM	1.65	1.65	0.00	7	7	0.00
G	11.44	11.44	0.00	45	45	0.00
D	27.15	27.15	0.00	105	105	0.00
FOX5B	3.19	3.19	0.00	12	12	0.00
COS-1	3.48	3.48	0.00	9	9	0.00
CCOS-1	-	-	N/A	20	20	0.00
FOX5A	3.15	3.15	0.00	11	11	0.00
A	21.35	21.35	0.00	81	81	0.00
CFOX5	-	-	N/A	111	111	0.00
C	26.54	26.54	0.00	99	99	0.00
STA1	2.29	2.29	0.00	10	10	0.00
CC	-	-	N/A	109	109	0.00
COS-2	1.72	1.72	0.00	5	5	0.00
CCOS-2	-	-	N/A	114	114	0.00
FOX4	3.20	3.20	0.00	14	14	0.00
F	10.44	10.44	0.00	43	43	0.00
COS-4	5.04	5.04	0.00	16	16	0.00
CFOX4A	-	-	N/A	73	73	0.00
B	19.86	19.86	0.00	76	76	0.00
CFOX4B	-	-	N/A	263	263	0.00
STA2	2.84	2.84	0.00	12	12	0.00
CSTA2	-	-	N/A	275	275	0.00
COS-3	2.40	2.40	0.00	8	8	0.00
E	17.14	17.14	0.00	65	65	0.00
CSTE	-	-	N/A	348	348	0.00
V27-G	18.08	N/A	N/A	71	N/A	N/A
V27-I	11.97	N/A	N/A	39	N/A	N/A
STO2	0.76	N/A	N/A	3	N/A	N/A
STQ	4.13	N/A	N/A	19	N/A	N/A
CSTQ	-	N/A	N/A	132	N/A	N/A
V27-K	11.98	N/A	N/A	49	N/A	N/A
STO1	1.24	N/A	N/A	6	N/A	N/A
CSTO1	-	N/A	N/A	54	N/A	N/A
LM	4.65	N/A	N/A	21	N/A	N/A
V27-H	10.40	N/A	N/A	38	N/A	N/A
STQ1	2.49	2.49	0.00	11	11	0.00
O	19.18	19.18	0.00	46	46	0.00
STP	2.05	2.05	0.00	9	9	0.00
STQ2	2.11	2.11	0.00	10	10	0.00
P	10.31	10.31	0.00	42	42	0.00
STO	4.10	4.10	0.00	17	17	0.00
STQ3	4.22	4.22	0.00	18	18	0.00
STN	7.67	7.67	0.00	27	27	0.00
HS-1A	11.70	11.70	0.00	47	47	0.00
HS-1B	49.79	49.79	0.00	198	195	3.00
CSTN	-	-	N/A	269	266	3.00

REV	DATE	BY	REVISION

THE HOWARD HUGHES CORPORATION
10001 WEST CHARLESTON BLVD, 3RD FLOOR
LAS VEGAS, NEVADA 89135

vtn
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH. (702) 873-7550 FAX (702) 362-2597 WEB WWW.VTNNV.COM
CONSULTING ENGINEERS ● PLANNERS ● LAND SURVEYORS

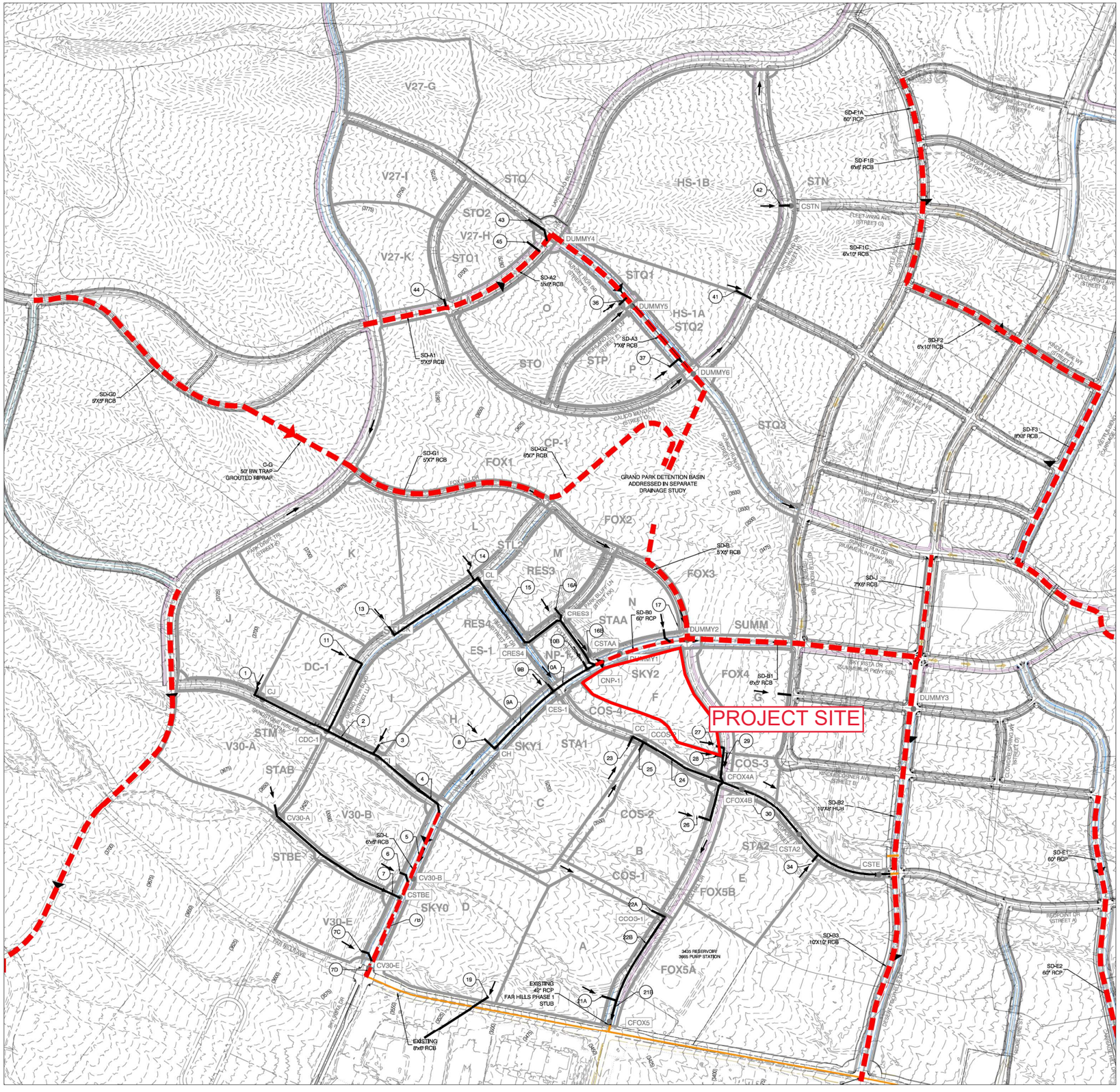
FIGURE 6
ULTIMATE CONDITION BASIN MAP

SUMMERLIN WEST VILLAGE 25

DRAWN BY: JYA — DECEMBER 2019
DESIGNED BY: JYA — DECEMBER 2019
CHECKED BY: JYA — DECEMBER 2019
PROJECT NO: 7919
SCALE: 1" = 400' HORIZ. N/A VERT.

SHEET
OF SHEETS
DRAWING NO.
FIG 6

H:\7919\Drainage\5_UP1\A_Figures\Figure 6 - Village 25 Drainage Basin Map.dwg



GRAPHIC SCALE

400 0 200 400 800

1" = 400'

NORTH

LEGEND

- CCRFCD STORM DRAIN ALIGNMENT
- EXISTING FACILITY
- VILLAGE 25 LOCAL STORM DRAIN
- W51 BASIN DESIGNATION
- CONCENTRATION POINT
- (1) LOCAL FACILITY DESIGNATION
- DEVELOPED CONDITION FLOW ARROW

VILLAGE 25 LOCAL FLOOD PROTECTION FACILITIES

Facility #	Design Slope %	Q100 cfs	Tributary Basin/CP	Facility	Velocity fps
1	1.00%	39	J	30" RCP	9.51
2	6.00%	89	CJ	48" RCP	23.35
3	0.70%	53	I	36" RCP	8.98
4	6.00%	176	CI	48" RCP	28.00
5	0.50%	176	CI	6'X6' RCB	10.38
6	1.00%	83	V30-B	42" RCP	11.68
7	1.00%	83	CV30-A	42" RCP	11.68
7B	0.50%	364	CSTBE	6'X6' RCB	12.26
7C	1.00%	44	V30-E	36" RCP	10.08
7D	0.50%	408	CV30-E	6'X6' RCB	12.54
8	6.00%	48	H	36" RCP	20.09
9A	0.50%	64	CH	42" RCP	8.37
9B	0.99%	42	ES-1	36" RCP	9.93
10A	6.00%	105	CES-1	42" RCP	24.59
10B	5.78%	9	NP-1	24" RCP	12.81
11	1.00%	35	DC-1	30" RCP	9.38
13	0.90%	101	K	42" RCP	11.20
14	1.00%	68	L	42" RCP	11.23
15	5.98%	187	CL	42" RCP	28.14
16A	6.00%	47	M	24" RCP	19.79
16B	4.05%	248	CSTAA	48" RCP	25.86
17	2.55%	40	N	30" RCP	14.00
19	0.50%	105	D	36" RCP	24.04
21A	1.00%	81	A	42" RCP	11.63
21B	2.02%	111	CFOX5	42" RCP	16.42
22A	4.00%	9	COS-1	24" RCP	11.23
22B	1.00%	20	CCOS-1	24" RCP	8.13
23	0.50%	99	C	48" RCP	9.21
24	5.13%	114	CCOS-2	48" RCP	23.60
25	0.50%	5	COS-2	24" RCP	4.50
26	1.00%	76	B	48" RCP	11.59
27	1.33%	43	F	30" RCP	10.92
29	1.50%	73	CFOX4A	36" RCP	13.07
30	5.50%	263	CFOX4B	54" RCP	29.95
31	4.27%	8	COS-3	24" RCP	11.12
34	0.50%	65	E	42" RCP	8.38
36	1.00%	46	O	36" RCP	10.18
37	1.00%	42	P	36" RCP	9.97
41	1.00%	47	HS-1A	36" RCP	10.22
42	1.00%	198	HS-1B	54" RCP	14.09
43	1.00%	132	CSTQ	48" RCP	12.97
44	1.00%	49	V27-K	36" RCP	10.31
45	1.00%	38	V27-H	30" RCP	9.49

REVISION | BY | DATE | REV

THE HOWARD HUGHES CORPORATION
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CONSULTING ENGINEERS ● PLANNERS ● LAND SURVEYORS

FIGURE 7
LOCAL STORM DRAIN FACILITIES MAP

SUMMERLIN WEST VILLAGE 25

DRAWN BY: JYA — DECEMBER 2019
DESIGNED BY: JYA — DECEMBER 2019
CHECKED BY: JYA — DECEMBER 2019
PROJECT NO: 7919
SCALE: 1"=400' HORIZ. NA VERT.

SHEET
OF SHEETS
DRAWING NO.

H:\7919\Drainage\5_UP\A_Figures\Figure 7 - Local Flood Control Facilities Map V25-REV.dwg

UPDATE TO THE
TECHNICAL DRAINAGE STUDY
FOR
VILLAGE 25 SKY VISTA DRIVE IMPROVEMENTS
(REDPOINT DRIVE TO KETTLE RIDGE DRIVE)

62025-206

August 2020

Prepared for:

The Howard Hughes Company, LLC
10845 Griffith Peak Drive, Suite 160
Las Vegas, NV 89135
Phone: (702) 791-4300

GCW
ENGINEERS \ SURVEYORS

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: September 10, 2020
TO: **Land Development Services** Department of Building & Safety				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT: Drainage Study for: **Summerlin West Village 25 - Sky Vista Drive Improvements (Redpoint Drive to Kettle Ridge Drive) - Update**				**COPIES TO:** GCW, Inc.
Cross Streets:	Sky Vista Drive and Redpoint Drive			April Chapman Director, Residential Engineering Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5187F.doc			Bart Anderson, P.E., DevCo
Parcel Number:	137-26-301-001			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	9/3/2019	9/23/2019	Not Approved	$400.00	3553608: $400
2nd Submittal	11/13/2019	12/9/2019	Not Approved	$400.00	3643003: $400
3rd Submittal	12/31/2019	1/22/2020	Not Approved	$400.00	3690620: $400
4th Submittal & Supplement	2/4/2020 & 2/27/2020	2/24/2020 & 3/2/2020	Conditional Approval	$400.00	3733577: $400
CCRFCD	4/13/2020	5/5/2020	Concurrence Recv'd	N/C	N/C
5th Submittal & Supplement	8/5/2020 & 9/9/2020	9/10/2020	See Comments Below	$100.00	3945926: $100
			TOTAL FEES (LDDRS):	**$1,700.00**	**----**

REMARKS:

5th Submittal & Supplement: Update

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

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

1. The subject drainage study is premised on the existence of storm drains downstream, ie, the continuation of the outlet storm drains until *Desert Foothills Boulevard* as proposed in the *Summerlin West Village 21 Summerlin Parkway Extension* project.

   The subject drainage study will not be finally approved prior to the final approval of the *Summerlin West Village 21 Summerlin Parkway Extension Technical Drainage Study.*

2. The project proposed to construct temporary drainage facilities including drainage berms/ditches primarily along the north side of the proposed segment of *Sky Vista Drive*. Prior to the final plans approval, the developer must complete a ***Maintenance & Liability Agreement*** for the interim drainage improvements 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 facilities and an exhibit that adequately shows the location and limits of the drainage facilities to *City Flood Control* for approval. Once the drainage study is conditionally approved, the engineer/developer should contact the *City's Land Development Section* (702-229-6371) to begin the agreement process.

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

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/AYS

T/R/S: T20S/R59E/22
AREA K-22

to be existing. In the existing condition, Street K is a drainage cut-off in the upstream that is routing what would be contributing runoff toward Sky Vista instead to the Grand Park Detention Basin. In the existing condition, there is a channel alongside Kettle Ridge Drive (constructed with the Parkway Extension Study) that directs runoff to the south, crossing the proposed alignment of Sky Vista Drive.

VIII. INTERIM DRAINAGE CONDITION

The interim condition is defined as the offsite watershed in its current state and the project is developed. Note that Street K is a drainage cut-off in the upstream, and subbasin OFF-1, and OFF-2 (referenced from the Desert Foothills Study) have been prorated to the offsite runoff calculations. Two ditches have been designed to protect the proposed road. Note that Ditch 1 is an extension of the existing ditch, constructed with the V25 Sky Vista Phase I Study. The interim ditches convey runoff to storm drain laterals that are open during the interim condition to collect the offsite runoff. The proposed trunk storm drain for this project connects to the 48-inch RCP, constructed with the V25 Sky Vista Phase I Study at its upstream limits and connects to the 6' by 5' RCB (APDF 0073) constructed with the GPDB Study at its downstream limits. Note that all the drop inlets on Sky Vista Drive from Redpoint to Kettle Ridge are proposed to be constructed with this project since the roadway, curb and gutter are to be constructed with this project's plans.

Refer to Figure 5 in Appendix C for an illustration of the interim condition drainage map.

IX. ULTIMATE DRAINAGE CONDITION & MASTER DRAINAGE CONFORMANCE

The ultimate condition is defined as the project developed and the offsite watershed also developed, previously established in the master studies for the area: Summerlin West MPU and Master Drainage Study for Summerlin Village 25. The Master Drainage Study for Village 25 provides ultimate condition drainage map for the project area. Therefore, a site specific ultimate condition hydrology analysis is not necessary for this study. In general, the drainage patterns for the ultimate conditions subbasins are consistent with interim conditions but with larger flow rates to account for future development. Refer to Appendix B for the ultimate condition hydrologic analysis for this project area.

The 6' by 5' RCB (constructed with the GPDB Study) is designed for 407 cfs based off basin 3-G1 basin (the Summerlin West MPU). Per Summerlin West Master studies, basin 3-G1 includes subbasins DC1, ES1, H, K, L, M, N, etc (see references materials). However, per Summerlin West Village 25, subbasin DC1 is supposed to drain to Street M on the south (accounted in a lateral SD in the Sky Vista Phase I Study). This was the basis for the design of the 48" RCP lateral at Street M in the Sky Vista Drive phase I (Far Hills to Redpoint) project. Therefore, SD facilities are designed for subbasin DC1 draining both toward north and south. As a result, our lateral SD at Foxtail Pass Way will be designed for 287 cfs (CSTAA + DC1) to match GPDB Outfall Pipe. This provides future development flexibility.

X. STREET HYDRAULICS

The resulting street flow data is based on the ultimate condition flow rates. The flowrates used in the street flow normal depth calculations have been referenced from The Master Drainage Study for Village 25. Note that subbasins SKY2 and SUMM have been used

to obtain street 100-year flowrate. Street sections have been provided with the flow evenly distributed through the cross sections. Note that the drop inlets on both side of Sky Vista Drive are able to collect all the flows. Additionally, the inlets are provided every 600-ft for nuisance flow collection requirements by CLV. Hydraulic calculations have been included in Appendix A.

Based on the calculated street flow characteristics, the criteria for depth (D) and velocity times depth (D*V) for the 100-year storm event will be met. Since the 10-year storm event criteria for (D*V) is met during the 100-year storm event, a 10-year flow analysis has not been provided.

XI. STORM DRAIN FACILITIES

WSPG models have been used to ensure the proposed storm drain system could safely convey the interim and the ultimate condition runoff. Here are brief descriptions for main storm drain models:

1- SkyV_Ph2.WSW; this model provides hydraulic characteristic of storm runoff in the proposed 60-inch RCP from Foxtail Pass Way to the existing 6' by 5' RCB at the intersection of Fox Hill Drive and Sky Vista Drive. The starting flow rate has been obtained from the Master Drainage Study for Village 25. Note that subbasin DC-1 is added to the concentration point CSTAA for conservative purposes (Refer to Figure 6 from the Master Drainage Study for Village 25 provided in Appendix B). The models ends at the 4' by 5 RCB because we are in conformance with the discharge rate in the reference material. Hence the starting HGL was referenced. Additionally, the starting flow rate is 287 cfs and is increased to 407 cfs after the 48-inch RCP addition to be consistent with the downstream flow rates. This is the reason why they do not add peak to peak. In order to protect the storm drain, 1 inch of sacrificial concrete is proposed at high velocity locations (>15 fps).

2- SkyV_Lat.WSW; this model connects the existing 48-inch RCP to the proposed 60-inch RCP at the intersection of Sky Vista Drive and Foxtail Pass Way. The starting HGL is referenced from SkyV_Ph2 model. The ending HGL is compared with the HGL in the existing 48-inch RCP to assure there is no tailwater affect in the upstream storm drain.

All drop inlet calculations contain a 50 percent clogging factor. Since the bypass flow from the inlets in Sky Vista Drive is zero, this project will not negatively impact downstream facilities.

Inlet control calculation has been performed for culvert openings in sump to assure enough depth is provided based of the calculated headwaters. Refer to hydraulic calculation provided in Appendix A.

XII. CONCLUSIONS AND RECOMMENDATIONS

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

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

Worksheet for Section - 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.00	%
Discharge	4.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.50
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+45.67	1.04

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+45.67, 1.04)	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	0.35	ft
Elevation Range	0.00 to 1.04 ft	
Flow Area	1.29	ft²
Wetted Perimeter	11.15	ft
Hydraulic Radius	0.12	ft
Top Width	10.75	ft
Normal Depth	0.35	ft

Worksheet for Section - 1

Results

Critical Depth		0.40	ft
Critical Slope		0.00748	ft/ft
Velocity		3.11	ft/s
Velocity Head		0.15	ft
Specific Energy		0.50	ft
Froude Number		1.59	
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	0.35	ft
Critical Depth	0.40	ft
Channel Slope	2.00	%
Critical Slope	0.00748	ft/ft

Cross Section for Section - 1

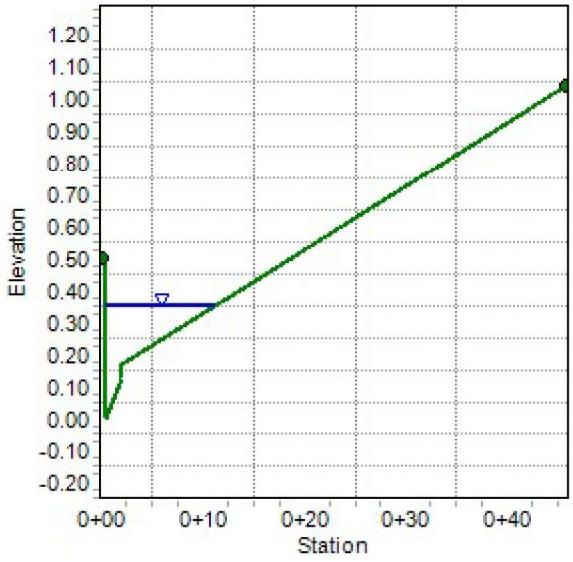
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.00	%
Normal Depth	0.35	ft
Discharge	4.00	ft³/s

Cross Section Image



Worksheet for Section - 2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	7.50	%
Discharge	4.50	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.50
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+45.67	1.04

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+45.67, 1.04)	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	0.31	ft
Elevation Range	0.00 to 1.04 ft	
Flow Area	0.84	ft²
Wetted Perimeter	8.79	ft
Hydraulic Radius	0.10	ft
Top Width	8.44	ft
Normal Depth	0.31	ft

Worksheet for Section - 2

Results

Critical Depth		0.42	ft
Critical Slope		0.00736	ft/ft
Velocity		5.33	ft/s
Velocity Head		0.44	ft
Specific Energy		0.75	ft
Froude Number		2.97	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.31	ft
Critical Depth	0.42	ft
Channel Slope	7.50	%
Critical Slope	0.00736	ft/ft

Cross Section for Section - 2

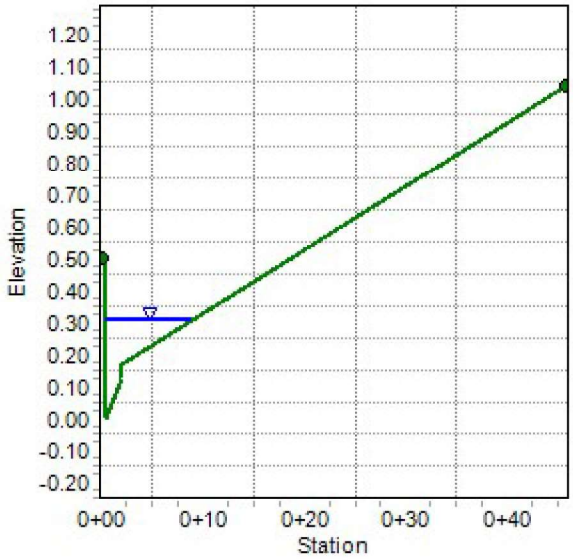
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	7.50	%
Normal Depth	0.31	ft
Discharge	4.50	ft³/s

Cross Section Image



ENGINEERS \ SURVEYORS

Drop Inlet Sizing Calculation

Project Name: Sky Vista Improvements Phase II
By: Masih Edalat
Date: 08/13/2019

Drop Inlet Sizing on a Continuous Grade

10' Type CM2
DI2.1 & 2.2 @ 436+64

Known:

Q_s=	Street Flow	4.0	cfs
S_o=	Longitudinal Slope	0.02	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	3.11	fps
D=	Flow Depth	0.35	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Grate Width	1.5	ft
a=	Gutter Depression	5.0	in
L_g=	Length of Grate	7.5	0
L_c=	Length of Curb Opening	10.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00	
	V_o= Splash over velocity=$p+q*(L_g*(1-(C_{fg}/100)))-r*(L_g*(1-(C_{fg}/100)))^2+s*(L_g*(1-(C_{fg}/100)))^3$†	8.71	fps
E_o=	Grate flow ratio = Q_w/Q_s	0.36	
	Q_w= Frontal flow=A_w*V_s	1.44	cfs
	Q_x= Side flow = Q_s-Q_w	2.56	cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*(L_g*(1-C_{fg}/100))^{2.3}))$	0.27	
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	2.1	cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)		

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.123	ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.285	ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	13.99	ft
Q_{ic}=	Flow intercepted = $(1-(1-(L_c*(1-C_{fc}/100))/L_t)^{1.8})*Q_s$	2.2	cfs

Total Inlet Calculations

Q_{ti}= Total flow intercepted = $Q_{ig}+Q_{ic}$	**4.0**	**cfs**
Q_{tq}= Flow bypass = Q_s-Q_{ti}	**0.0**	**cfs**
q= Interception per unit ratio = Q_{ti}/L_g	0.40	cfs/ft
E_q= Efficiency = (Qti/Qs)*100	100	%

ENGINEERS \ SURVEYORS

Drop Inlet Sizing Calculation

Project Name: Sky Vista Improvements Phase II
By: Masih Edalat
Date: 08/13/2019

Drop Inlet Sizing on a Continuous Grade

12.5' Type CM2
DI5.1 & 5.2 @ 443+50

Known:

Q_s=	Street Flow	4.5	cfs
S_o=	Longitudinal Slope	0.075	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	5.33	fps
D=	Flow Depth	0.31	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Grate Width	1.5	ft
a=	Gutter Depression	5.0	in
L_g=	Length of Grate	10.0	ft
L_c=	Length of Curb Opening	12.5	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00	
	V_o= Splash over velocity=p+q*(L_g*(1-(C_{fg}/100)))-r*(L_g*(1-(C_{fg}/100)))^2+s*(L_g*(1-(C_{fg}/100)))^3†	9.86	fps
E_o=	Grate flow ratio = Q_w/Q_s	0.48	
	Q_w= Frontal flow=A_w*V_s	2.15	cfs
	Q_x= Side flow = Q_s-Q_w	2.35	cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*(L_g*(1-C_{fg}/100))$^{2.3}$))	0.21	
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	2.6	cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)		

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.156	ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.285	ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	18.91	ft
Q_{ic}=	Flow intercepted = (1-(1-(L_c*(1-C_{fc}/100))/L_t)$^{1.8}$)*Q_s	2.3	cfs

Total Inlet Calculations

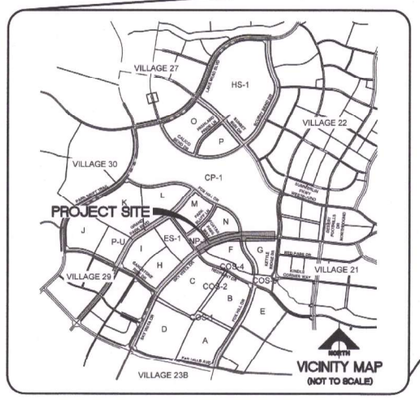
Q_{ti}=	**Total flow intercepted = Q_{ig}+Q_{ic}**	**4.5**	**cfs**
Q_{tq}=	**Flow bypass = Q_s-Q_{ti}**	**0.0**	**cfs**
q=	Interception per unit ratio = Q_{ti}/L_g	0.36	cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	100	%

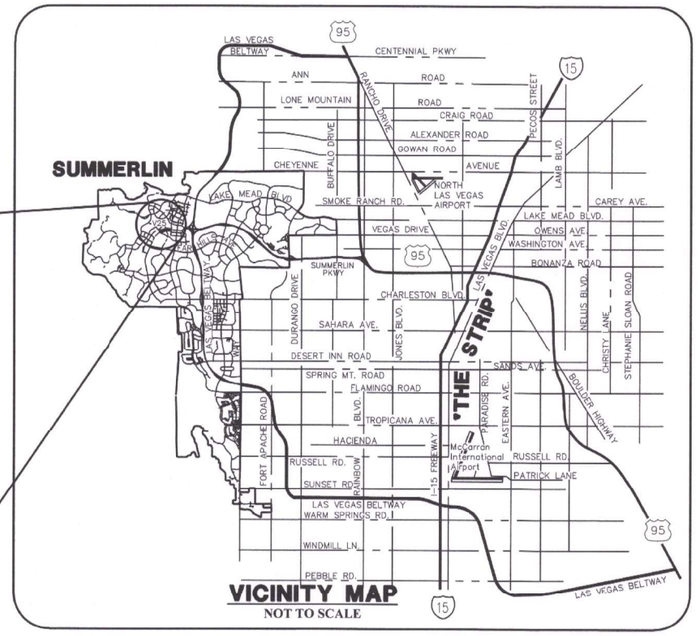
SUMMERLIN

SM

VILLAGE 25
SKY VISTA DRIVE IMPROVEMENTS
(REDPOINT DRIVE TO KETTLE RIDGE DRIVE)
FUTURE SID PROJECT
A.P.N. 137-22-301-004
2020

SHEET INDEX		
NO.	DWG	DESCRIPTION
1	G1	COVER SHEET
2	G2	PROJECT DATA SHEET
3	G3	GENERAL NOTES
4	HC1	HORIZONTAL CONTROL 1
5	HC2	HORIZONTAL CONTROL 2
6	MU1	MASTER UTILITY PLAN – WATER
7	MU2	MASTER UTILITY PLAN – STORM DRAIN
8	MU3	MASTER UTILITY PLAN – SEWER
9	MG	MASTER GRADING PLAN
10	GD1	GRADING PLAN 1
11	PP1	PLAN AND PROFILE 1
12	PP2	PLAN AND PROFILE 2
13	PP3	PLAN AND PROFILE 3
14	PP4	PLAN AND PROFILE 4
15	PP5	PLAN AND PROFILE 5
16	LP1	LATERAL PROFILES 1
17	LP2	LATERAL PROFILES 2
18	LP3	LATERAL PROFILES 3
19	LP4	LATERAL PROFILES 4
20	LP5	LATERAL PROFILES 5
21	DT1	TYPICAL DETAILS AND SECTIONS 1
22	DT2	TYPICAL DETAILS AND SECTIONS 2
23	DT3	TYPICAL DETAILS AND SECTIONS 3
24	DT4	UTILITY DETAILS
25	TR1	SIGNAGE AND STRIPING PLAN 1
26	TR2	SIGNAGE AND STRIPING PLAN 2
27	TR3	SIGNAGE AND STRIPING PLAN 3
28	SL1	STREETLIGHT AND ELECTRICAL PLAN 1
29	SL2	STREETLIGHT AND ELECTRICAL PLAN 2
30	SL3	STREETLIGHT AND ELECTRICAL PLAN 3
31	SL4	STREETLIGHT AND ELECTRICAL PLAN 4
32	S1	GENERAL STRUCTURAL NOTES AND TYPICAL DETAILS
33	S2	JUNCTION STRUCTURE DETAILS
34	S3	JUNCTION STRUCTURE DETAILS II
35	S4	6'X5' RCB SECTION





OWNER/DEVELOPER

THE HOWARD HUGHES COMPANY, LLC
10845 GRIFFITH PEAK DRIVE, SUITE 160
LAS VEGAS, NEVADA 89135
OFFICE PHONE NO. (702) 791-4300

ENGINEER

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
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F: 702.804.2299
gcwengineering.com

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FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. 136980 FIRST APPROVAL DATE: _____
LVVWD APPROVED FIRE FLOW: TOTAL 1,500 GPM / ON-SITE N/A GPM
SHEETS: G1-G3, MU1-MU3, PP1-PP5, LP1-LP5, DT4

LAS VEGAS FIRE & RESCUE APPROVAL

LAS VEGAS FIRE & RESCUE DATE

UTILITY APPROVALS

COX COMMUNICATIONS LAS VEGAS, INC. DATE

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 STATUTES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

NV ENERGY DATE

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

NV ENERGY – TRANSMISSION ENGINEERING DATE

SOUTHWEST GAS CORPORATION DATE

CAUTION TO CONTRACTOR

THE CONTRACTOR SHALL BE RESPONSIBLE TO INVESTIGATE AND VERIFY THE ACTUAL LOCATION AND DEPTH OF ALL EXISTING UNDERGROUND FACILITIES AT LEAST 48 HOURS IN ADVANCE OF THE PERFORMANCE OF ANY WORK.

THE HOWARD HUGHES COMPANY, LLC

KEVIN ORROCK DATE
VICE PRESIDENT

DRAINAGE CERTIFICATION

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

MICHAEL FANG, P.E. 24464 8/3/20 DATE

L#: L20-00376 CLV#: 107V8310

STATE OF NEVADA PROFESSIONAL ENGINEER MICHAEL FANG No. 24464 CIVIL date: 08/30/2021 DATE: 08/03/2020

DESCRIPTION	REV	DATE	AGEN APP	DATE	GCW APP	DATE
A 07/17/20 REVISED SHEETS 1,2,4-23,25-32						

FOR AGENCY REVIEW - NOT FOR CONSTRUCTION

PROJECT NO. 62025-206
DESIGN: LG/MF
DRAWN: AS
CHECK: LG/MF
PLOT DATE: 08-03-20
PLOT TIME: 14:38:34

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

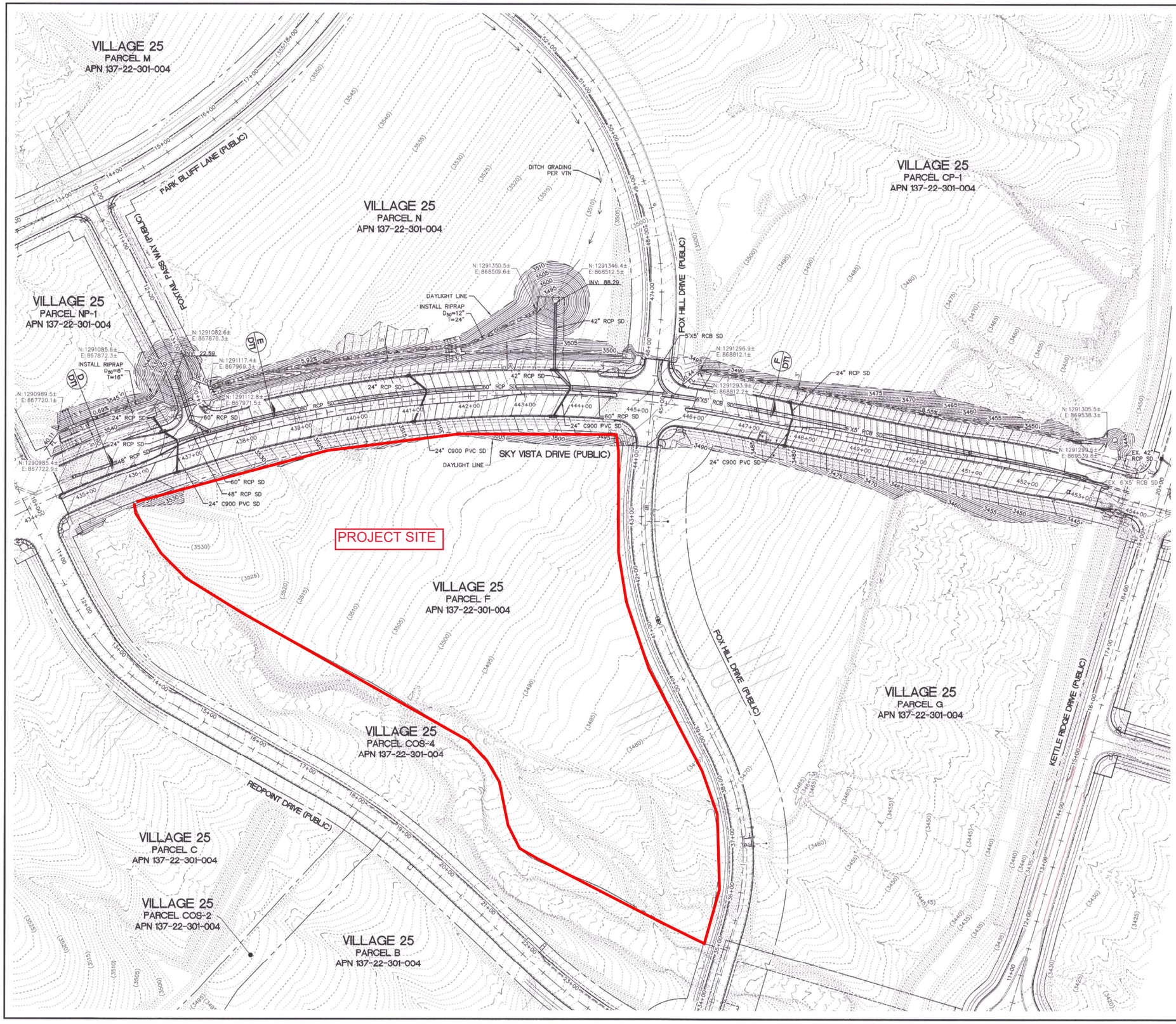
P:\PROJECTS\62025-206\CIVIL\PRODUCTION\62025-206C01_GN.DWG ALEXANDER SANTIAGO

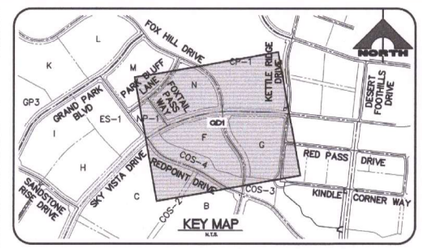
THE HOWARD HUGHES COMPANY, LLC

VILLAGE 25 SKY VISTA DRIVE IMPROVEMENTS
(REDPOINT DRIVE TO KETTLE RIDGE DRIVE)

COVER SHEET

DRAWING
G1
1 OF 35 SHTS





NORTH

80' 0' 40' 80' 160'

SCALE: 1" = 80'

OFF-SITE FLOOD CONTROL NOTE

ALL OFF-SITE INTERIM FLOOD CONTROL FACILITIES SUCH AS, BUT NOT LIMITED TO, BERMS/DITCHES AND TEMPORARY SUMPS ARE PRIVATELY OWNED AND ARE TO BE PRIVATELY MAINTAINED BY THE HOWARD HUGHES COMPANY.

BASIS OF BEARING AND COORDINATES

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

LINEAR UNIT: US SURVEY FOOT (FTUS)
DATUM (REFERENCE FRAME): NAD 83 (2011) EPOCH 2010.00
SYSTEM: NEVADA COORDINATE REFERENCE SYSTEM (NCRS)
ZONE: LAS VEGAS HIGH ELEVATION ZONE

PROJECTION: TRANSVERSE MERCATOR
STANDARD PARALLEL (AND LATITUDE OF GRID ORIGIN): 36°15'00"N
LONGITUDE OF CENTRAL MERIDIAN: 114°58'00"W
NORTHING AT GRID ORIGIN: 400,000.00 M (1,312,333.3333 FTUS)
EASTING AT CENTRAL MERIDIAN: 300,000 M (984,250.0000 FTUS)
SCALE FACTOR ON CENTRAL MERIDIAN: 1.000135 (EXACT)

NOTES:
1. ALL DISTANCES AND BEARINGS SHOWN HEREON ARE PROJECTED (GRID) VALUES BASED ON THE PRECEDING PROJECTION DEFINITION. THE PROJECTION WAS DEFINED SUCH THAT PROJECTED (GRID) DISTANCES ARE EQUIVALENT TO "GROUND" DISTANCES IN THE PROJECT AREA.
2. GRID BEARINGS SHOWN HEREON (OR IMPLIED BY GRID COORDINATES) DO NOT EQUAL GEODETIC BEARINGS DUE TO MERIDIAN CONVERGENCE.

BENCHMARK

BM#	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM No. 7LV0934SW6	FIND RIVET AND PLATE IN TOP OF CURB SE CORNER OF DESERT MOON RD. AND SKY VISTA DR. T20S,R59E,S34	3318.31 (FEET)	1,011.422 (METERS)

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FAST
Call before you UnderGround
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FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

L#: L20-00376 CLV#: 107V8310

ENGINEER - STATE OF NEVADA
MICHAEL FANG
No. 24467
PROFESSIONAL
CIVIL
Exp. 06/30/2021
DATE: 08/03/2020

	DATE	AGEN APP	DATE	GCW APP	DATE

FOR AGENCY REVIEW - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION
A	07/17/20	REVISED LINE WORK & GRADING

PROJECT NO. 62025-206
DESIGN: LG/MF
DRAWN: AS
CHECK: LG/MF
PLOT DATE: 08-03-20
PLOT TIME: 14:22:33

GCW
ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
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F: 702.804.2299
gcwengineering.com

P:\PROJECTS\62025-206\DWG\PRODUCTION\62025-206GCA_GD1.DWG
ALEXANDER SANTIAGO

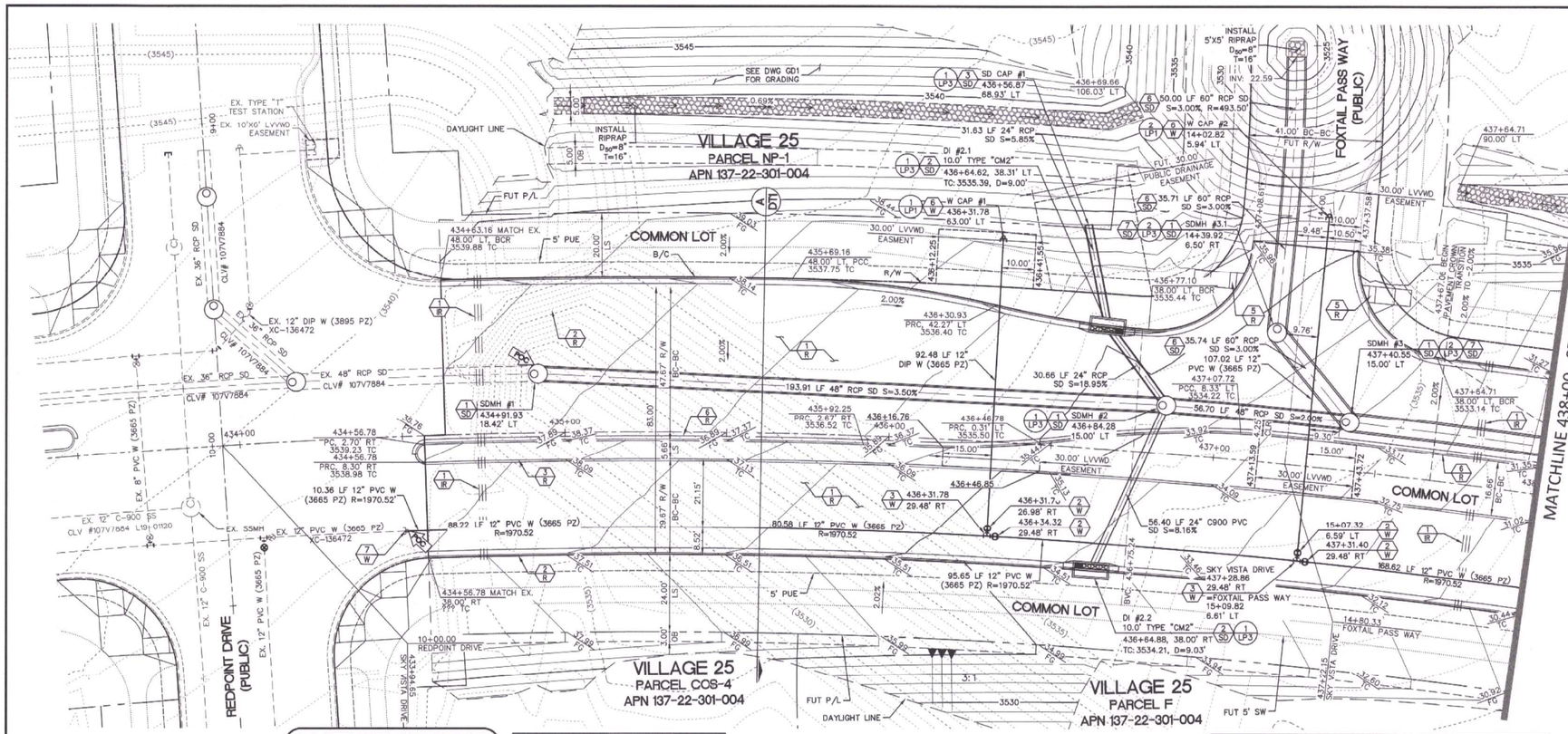
THE HOWARD HUGHES COMPANY, LLC

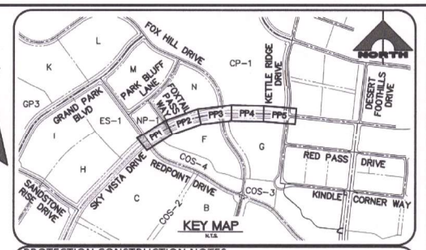
VILLAGE 25 SKY VISTA DRIVE IMPROVEMENTS
(REDPOINT DRIVE TO KETTLE RIDGE DRIVE)

GRADING PLAN 1

DRAWING GD1
10 OF 35 SHTS

ADJACENT STORM DRAIN IN SKY VISTA DR





KEY MAP

PROTECTION CONSTRUCTION NOTES

1. EXISTING PAVEMENT, PROTECT IN PLACE
2. EXISTING CURB/GUTTER, PROTECT IN PLACE
3. EXISTING PULLBOX, ADJUST TO FINISH GRADE
4. EXISTING TEST STATION, ADJUST TO FINISH GRADE & RELOCATE TO BEHIND CURB IF NECESSARY.
5. EXISTING BLOW-OFF, ADJUST TO FINISH GRADE PER UDACS PLT. NO. 37
6. EXISTING AVAR, ADJUST TO FINISH GRADE PER UDACS PLT. NO. 38
7. EXISTING GATE VALVE, ADJUST TO FINISH GRADE PER UDACS PLT. NO. 39
8. EXISTING WATER VAULT MH, ADJUST TO FINISH GRADE PER DETAIL 4 & 8 DWG. DT4
9. EXISTING SDMH, ADJUST TO FINISH GRADE
10. EXISTING WATER FIBER OPTIC VAULT PROTECT IN PLACE. ADJUST MANHOLE TO FINISH GRADE PER DETAIL 4 & 8 DWG. DT4
11. EXISTING WATER ACCESS MANHOLE PROTECT IN PLACE. RAISE TO FINAL PAVEMENT GRADE PER DETAIL 4 & 8 DWG. DT4

ROADWAY CONSTRUCTION NOTES

1. INSTALL A.C. PAVEMENT PER STREET SECTIONS, SEE DWG. DT1
2. INSTALL "L" TYPE CURB & GUTTER, SEE SUMMERLIN STD DWG. S-47
3. INSTALL "A" TYPE ISLAND CURB, SEE SUMMERLIN STD DWG. S-50
4. INSTALL CURB TRANSITION PER DETAIL 5 DWG. DT4
5. CONSTRUCT SIDEWALK RAMP PER USD DWG. NO. 235 (CASE II) AND DETAILS ON DWG. DT2 & DT3
6. INSTALL "L" TYPE ISLAND CURB, SEE SUMMERLIN STD DWG. S-50

WATER CONSTRUCTION NOTES

1. INSTALL FIRE HYDRANT & ASSEMBLY PER UDACS PLT. NO. 40. FOR "DEEP" FIRE HYDRANTS SEE UDACS PL. NO. 41.
2. INSTALL GATE VALVE AND BOX PER UDACS PLT. NO. 30 AND 39
3. INSTALL TEE W/ MECHANICALLY RESTRAINED JOINTS
4. INSTALL HORIZONTAL BEND W/ MECHANICALLY RESTRAINED JOINTS (SEE PLAN FOR ANGLE)
5. INSTALL CROSS W/ MECHANICALLY RESTRAINED JOINTS
6. INSTALL CAP W/ 2" BLOW-OFF ASSEMBLY PER UDACS PLT. NO. 36
7. REMOVE CAP AND BLOWOFF PER UDACS PLT. NO. 36 AND CONNECT TO EXISTING WATER LINE.
8. INSTALL VERTICAL BEND W/ MECHANICALLY RESTRAINED JOINTS (SEE PROFILE FOR ANGLE)

SEWER CONSTRUCTION NOTES

1. INSTALL SEWER MANHOLE PER DCSWCS SD-1 & SD-3 WITH SINGLE 24" LID
2. STUB AND CAP SEWER PIPE PER DETAIL 1, DWG. DT4
3. REMOVE PLUG & CONNECT TO SEWER LINE (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EX. SEWER PRIOR TO CONSTRUCTION)
4. INSTALL 48" STANDARD MANHOLE (PER DCSWCS SD-1, SD-3, SD-4, SD-5) W/ CORROSION PROTECTION PER DCSWCS 3.16.8.

STORM DRAIN CONSTRUCTION NOTES

1. INSTALL TYPE II-SD MANHOLE PER USD DWG. NO. 405.2
2. INSTALL TYPE "CM2" DROP INLET PER USD DWG. NO. 412.1 AND 421
3. INSTALL TEMPORARY PLUG AND CAP
4. REMOVE PLUG & CONNECT TO EX. STORM DRAIN TO NEAREST RCP JOINT OR W/ CONCRETE COLLAR PER DETAIL 3 ON DWG. DT4 (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EX. STORM DRAIN PRIOR TO CONSTRUCTION)
5. INSTALL 1" SACRIFICIAL CONCRETE, MIN. 6000 PSI
6. RCP TO BE CONSTRUCTED WITH WATER TIGHT JOINTS, ELASTOMERIC JOINT SEALANT, AND 4-INCHES OF SLURRY ENCASEMENT
7. LVVWD APPROVED ELASTOMERIC JOINT SEALANT AT ALL MANHOLE JOINTS. SDMH TO BE INSTALLED WITH WATER TIGHT JOINTS.
8. INSTALL TYPICAL TYPE I ACCESS MANHOLE IN RCB PER USD DWG. NO. 403.1

IRRIGATION CONSTRUCTION NOTES

1. BANK "A": 1-6" & 2-4" SCH 40 PVC. PER DETAIL 2 DWG. DT4

OFF-SITE FLOOD CONTROL NOTE

ALL OFF-SITE INTERIM FLOOD CONTROL FACILITIES SUCH AS, BUT NOT LIMITED TO, BERMS/DITCHES AND TEMPORARY SUMPS ARE PRIVATELY OWNED AND ARE TO BE PRIVATELY MAINTAINED BY THE HOWARD HUGHES COMPANY.

FOR SKY VISTA DRIVE EXISTING IMPROVEMENTS FROM FAR HILLS AVENUE TO REDPOINT DRIVE, REFER TO THE FOLLOWING SET:
"SUMMERLIN VILLAGE 25
SKY VISTA DRIVE IMPROVEMENTS (FAR HILLS AVENUE TO REDPOINT DRIVE)"
BY GCW, INC.
CLV #107V7884

SKY VISTA DRIVE

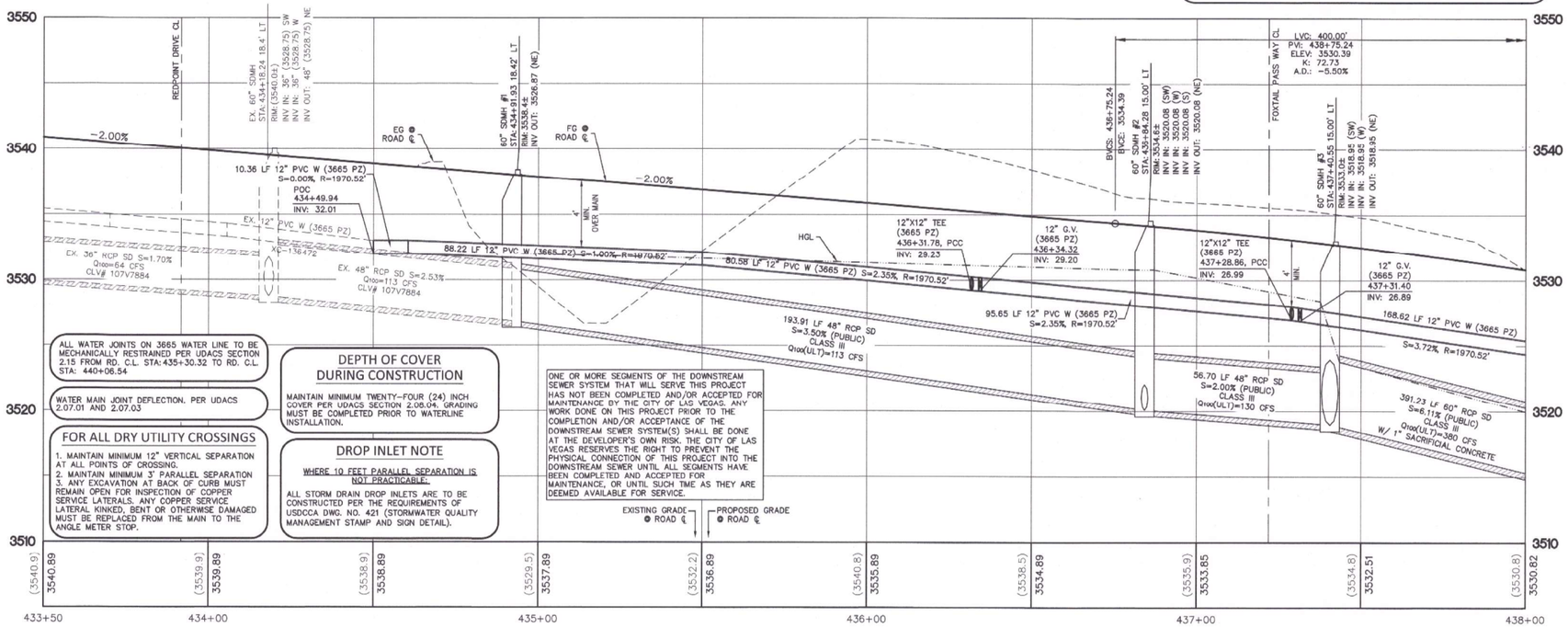
(PUBLIC)
SCALE: HORIZ 1" = 20'
VERT. 1" = 5'

20' 0' 10' 20' 40'
SCALE: 1" = 20'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. 136980 FIRST APPROVAL DATE: _____
LVVWD APPROVED FIRE FLOW: TOTAL 1,500 GPM / ON-SITE N/A GPM



DEPTH OF COVER DURING CONSTRUCTION

MAINTAIN MINIMUM TWENTY-FOUR (24) INCH COVER PER UDACS SECTION 2.08.04. GRADING MUST BE COMPLETED PRIOR TO WATERLINE INSTALLATION.

DROP INLET NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE:

ALL STORM DRAIN DROP INLETS ARE TO BE CONSTRUCTED PER THE REQUIREMENTS OF USDCCA DWG. NO. 421 (STORMWATER QUALITY MANAGEMENT STAMP AND SIGN DETAIL).

ALL WATER JOINTS ON 3665 WATER LINE TO BE MECHANICALLY RESTRAINED PER UDACS SECTION 2.15 FROM RD. C.L. STA: 435+30.32 TO RD. C.L. STA: 440+06.54

WATER MAIN JOINT DEFLECTION, PER UDACS 2.07.01 AND 2.07.03

FOR ALL DRY UTILITY CROSSINGS

1. MAINTAIN MINIMUM 12" VERTICAL SEPARATION AT ALL POINTS OF CROSSING.
2. MAINTAIN MINIMUM 3' PARALLEL SEPARATION
3. ANY EXCAVATION AT BACK OF CURB MUST REMAIN OPEN FOR INSPECTION OF COPPER SERVICE LATERALS. ANY COPPER SERVICE LATERAL KINKED, BENT OR OTHERWISE DAMAGED MUST BE REPLACED FROM THE MAIN TO THE ANGLE METER STOP.

ONE OR MORE SEGMENTS OF THE DOWNSTREAM SEWER SYSTEM THAT WILL SERVE THIS PROJECT HAS NOT BEEN COMPLETED AND/OR ACCEPTED FOR MAINTENANCE BY THE CITY OF LAS VEGAS. ANY WORK DONE ON THIS PROJECT PRIOR TO THE COMPLETION AND/OR ACCEPTANCE OF THE DOWNSTREAM SEWER SYSTEM(S) SHALL BE DONE AT THE DEVELOPER'S OWN RISK. THE CITY OF LAS VEGAS RESERVES THE RIGHT TO PREVENT THE PHYSICAL CONNECTION OF THIS PROJECT INTO THE DOWNSTREAM SEWER UNTIL ALL SEGMENTS HAVE BEEN COMPLETED AND ACCEPTED FOR MAINTENANCE, OR UNTIL SUCH TIME AS THEY ARE DEEMED AVAILABLE FOR SERVICE.

EXISTING GRADE @ ROAD ℄ — PROPOSED GRADE @ ROAD ℄

BASIS OF BEARING AND COORDINATES

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

LINEAR UNIT: US SURVEY FOOT (FTUS)
DATUM (REFERENCE FRAME): NAD 83 (2011) EPOCH 2010.00
SYSTEM: NEVADA COORDINATE REFERENCE SYSTEM (NCRS)
ZONE: LAS VEGAS HIGH ELEVATION ZONE

PROJECTION: TRANSVERSE MERCATOR
STANDARD PARALLEL (AND LATITUDE OF GRID ORIGIN): 36°15'00"N
LONGITUDE OF CENTRAL MERIDIAN: 114°58'00"W
NORTHING AT GRID ORIGIN: 400,000.00 M (1,312,333.3333 FTUS)
EASTING AT CENTRAL MERIDIAN: 300,000 M (984,250.0000 FTUS)
SCALE FACTOR ON CENTRAL MERIDIAN: 1.000135 (EXACT)

NOTES:
1. ALL DISTANCES AND BEARINGS SHOWN HEREON ARE PROJECTED (GRID) VALUES BASED ON THE PRECEDING PROJECTION DEFINITION. THE PROJECTION WAS DEFINED SUCH THAT PROJECTED (GRID) DISTANCES ARE EQUIVALENT TO "GROUND" DISTANCES IN THE PROJECT AREA.
2. GRID BEARINGS SHOWN HEREON (OR IMPLIED BY GRID COORDINATES) DO NOT EQUAL GEODETIC BEARINGS DUE TO MERIDIAN CONVERGENCE.

BENCHMARK

BM#	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM No. 7LV0934SW6	FIND RIVET AND PLATE IN TOP OF CURB SE CORNER OF DESERT MOON RD. AND SKY VISTA DR. T20S,R59E,S34	3318.31 (FEET)	1,011.422 (METERS)

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811 OR 1-800-227-2600

FAST Call before you UnderGround 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

L#: L20-00376 CLV#: 107V8310

FOR AGENCY REVIEW - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP	DATE
A	07/17/23	REVISED LINE WORK & GRADING					

PROJECT NO. 62025-206
DESIGN: LG/MF
DRAWN: AS
CHECK: LG/MF
PLOT DATE: 08-03-20
PLOT TIME: 14:25:00

DATE: 08/03/2020

ENGINEER'S STATE OF NEVADA — MICHAEL FANG — No. 14490 — PROFESSIONAL — CIVIL

GCW
ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

F:\PROJECTS\VOL1\62025 - 206\CIVIL\PRODUCTION\62025-206GDS_PP.DWG
ALEXANDER SANTIAGO

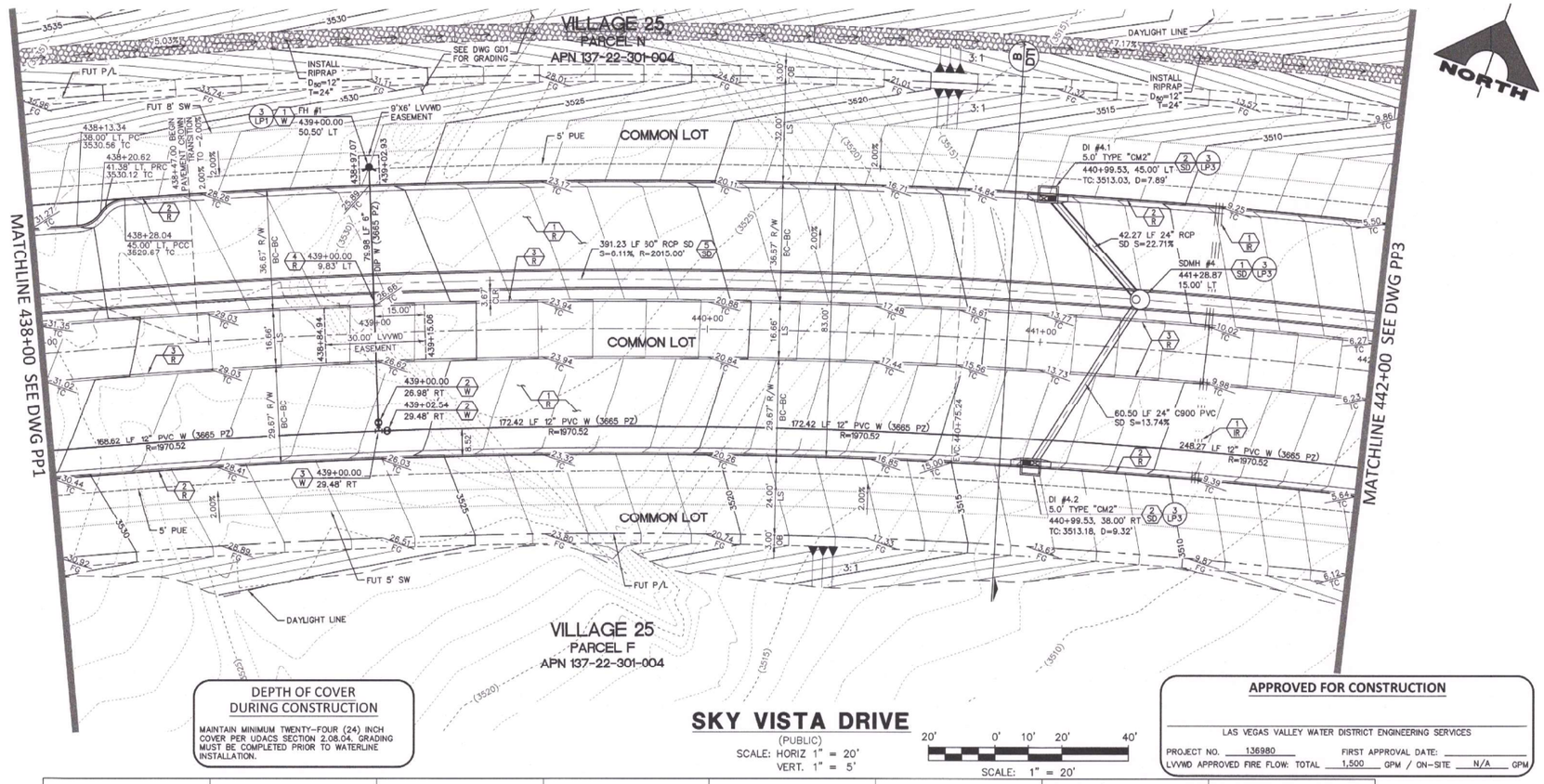
THE HOWARD HUGHES COMPANY, LLC

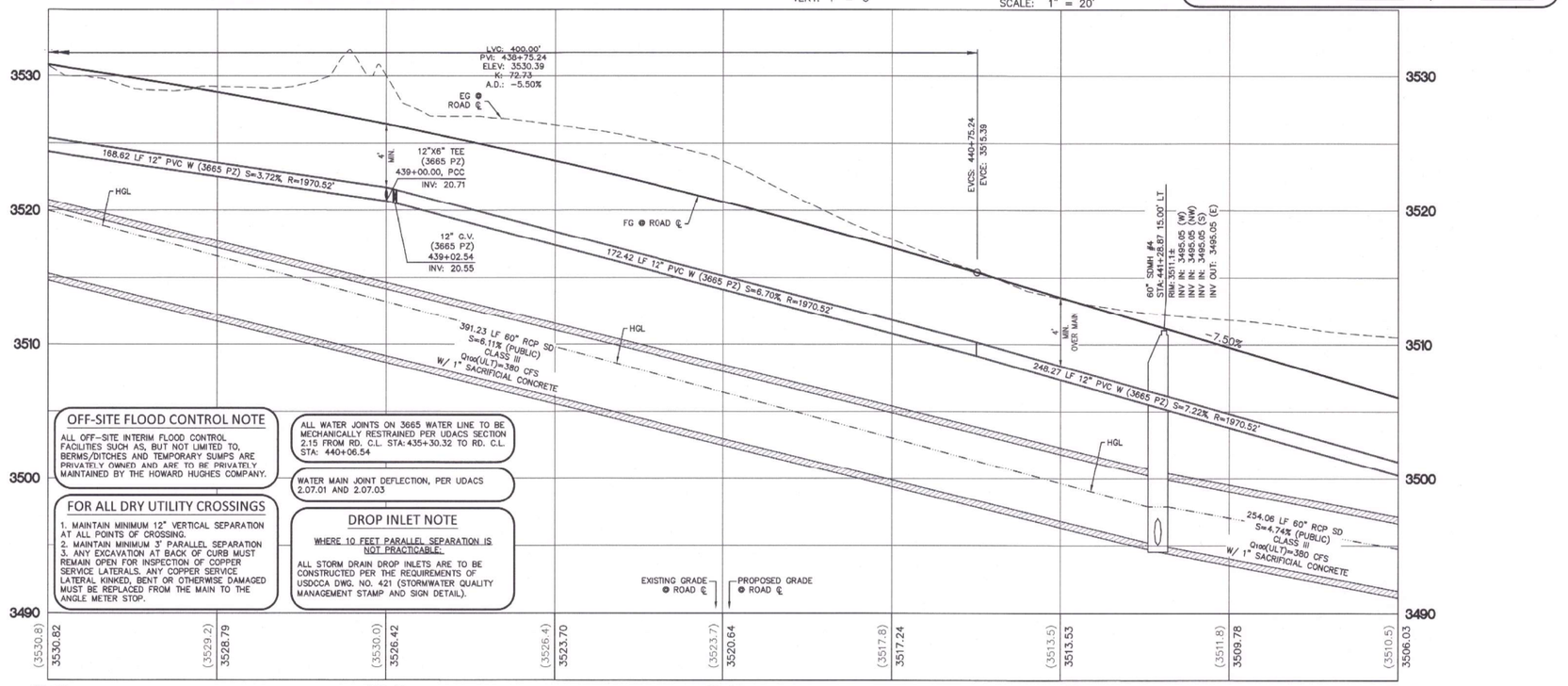
VILLAGE 25 SKY VISTA DRIVE IMPROVEMENTS (REDPOINT DRIVE TO KETTLE RIDGE DRIVE)

PLAN AND PROFILE 1

DRAWING PP1
11 OF 35 SHTS

ADJACENT STORM DRAIN IN SKY VISTA DR





DEPTH OF COVER DURING CONSTRUCTION

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ALL OFF-SITE INTERIM FLOOD CONTROL FACILITIES SUCH AS, BUT NOT LIMITED TO, BERMS/DITCHES AND TEMPORARY SUMPS ARE PRIVATELY OWNED AND ARE TO BE PRIVATELY MAINTAINED BY THE HOWARD HUGHES COMPANY.

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WATER MAIN JOINT DEFLECTION, PER UDACS 2.07.01 AND 2.07.03

DROP INLET NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE:

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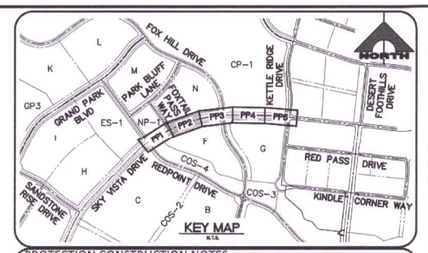
APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. 136980 FIRST APPROVAL DATE: _____

LVVWD APPROVED FIRE FLOW: TOTAL 1,500 GPM / ON-SITE N/A GPM



PROTECTION CONSTRUCTION NOTES

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3 P EXISTING PULLBOX, ADJUST TO FINISH GRADE
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ROADWAY CONSTRUCTION NOTES

1 R INSTALL A.C. PAVEMENT PER STREET SECTIONS, SEE DWG. DT1
2 R INSTALL "L" TYPE CURB & GUTTER, SEE SUMMERLIN STD DWG. S-47
3 R INSTALL "A" TYPE ISLAND CURB, SEE SUMMERLIN STD DWG. S-50
4 R INSTALL CURB TRANSITION PER DETAIL 5 DWG. DT4
5 R CONSTRUCT SIDEWALK RAMP PER USD DWG. NO. 235 (CASE II) AND DETAILS ON DWG. DT2 & DT3
6 R INSTALL "L" TYPE ISLAND CURB, SEE SUMMERLIN STD DWG. S-50

WATER CONSTRUCTION NOTES

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3 W INSTALL TEE W/ MECHANICALLY RESTRAINED JOINTS
4 W INSTALL HORIZONTAL BEND W/ MECHANICALLY RESTRAINED JOINTS (SEE PLAN FOR ANGLE)
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7 W REMOVE CAP AND BLOWOFF PER UDACS PLT. NO. 36 AND CONNECT TO EXISTING WATER LINE.
8 W INSTALL VERTICAL BEND W/ MECHANICALLY RESTRAINED JOINTS (SEE PROFILE FOR ANGLE)

SEWER CONSTRUCTION NOTES

1 S INSTALL SEWER MANHOLE PER DCSWCS SD-1 & SD-3 WITH SINGLE 24" LID
2 S STUB AND CAP SEWER PIPE PER DETAIL 1, DWG. DT4
3 S REMOVE PLUG & CONNECT TO SEWER LINE (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EX. SEWER PRIOR TO CONSTRUCTION)
4 S INSTALL 48" STANDARD MANHOLE (PER DCSWCS SD-1, SD-3, SD-4, SD-5) W/ CORROSION PROTECTION PER DCSWCS 3.16.8.

STORM DRAIN CONSTRUCTION NOTES

1 SD INSTALL TYPE II-SD MANHOLE PER USD DWG. NO. 405.2
2 SD INSTALL TYPE "CM2" DROP INLET PER USD DWG. NO. 412.1 AND 421
3 SD INSTALL TEMPORARY PLUG AND CAP
4 SD REMOVE PLUG & CONNECT TO EX. STORM DRAIN TO NEAREST RCP JOINT OR W/ CONCRETE COLLAR PER DETAIL 3 ON DWG. DT4 (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EX. STORM DRAIN PRIOR TO CONSTRUCTION)
5 SD INSTALL 1" SACRIFICIAL CONCRETE, MIN. 6000 PSI
6 SD RCP TO BE CONSTRUCTED WITH WATER TIGHT JOINTS, ELASTOMERIC JOINT SEALANT, AND 4-INCHES OF SLURRY ENCASEMENT
7 SD LVVWD APPROVED ELASTOMERIC JOINT SEALANT AT ALL MANHOLE JOINTS. SDMH TO BE INSTALLED WITH WATER TIGHT JOINTS.
8 SD INSTALL TYPICAL TYPE I ACCESS MANHOLE IN RCB PER USD DWG. NO. 403.1

IRRIGATION CONSTRUCTION NOTES

1 IR BANK "A": 1-6" & 2-4" SCH 40 PVC. PER DETAIL 2 DWG. DT4

BASIS OF BEARING AND COORDINATES

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

LINEAR UNIT: US SURVEY FOOT (FTUS)
DATUM (REFERENCE FRAME): NAD 83 (2011) EPOCH 2010.00
SYSTEM: NEVADA COORDINATE REFERENCE SYSTEM (NCRS)
ZONE: LAS VEGAS HIGH ELEVATION ZONE

PROJECTION: TRANSVERSE MERCATOR
STANDARD PARALLEL (AND LATITUDE OF GRID ORIGIN): 36°15'00"N
LONGITUDE OF CENTRAL MERIDIAN: 114°58'00"W
NORTHING AT GRID ORIGIN: 400,000.00 M (1,312,333.3333 FTUS)
EASTING AT CENTRAL MERIDIAN: 300,000 M (984,250.0000 FTUS)
SCALE FACTOR ON CENTRAL MERIDIAN: 1.000135 (EXACT)

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BENCHMARK

BM#	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM No. 7LV09.34SW6	FIND RIVET AND PLATE IN TOP OF CURB SE CORNER OF DESERT MOON RD. AND SKY VISTA DR. T20S,R59E,S34	3318.31 (FEET)	1,011.422 (METERS)

Call before you Dig
Avoid cutting underground utility lines. It's costly.
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L#: L20-00376 CLV#: 107V8310

ENGINEER - STATE OF NEVADA
MICHAEL FANG
Exp. 06/30/2021
CIVIL
No. 23464
PROFESSIONAL

DATE	DESCRIPTION	REV
07/17/20	REVISED LINE WORK & GRADING	1

FOR AGENCY REVIEW - NOT FOR CONSTRUCTION

DATE: 08/03/2020
CGW APP
DATE
AGEN. APP
DATE

PROJECT NO. 62025-206
DESIGN: LG/MF
DRAWN: AS
CHECK: LG/MF
PLOT DATE: 08-03-20
PLOT TIME: 14:25:52

GCW ENGINEERS\SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

F:\PROJECTS\62025-206\CIVIL\PRODUCTION\62025-206DR_PP.DWG
ALEXANDER SANTIAGO

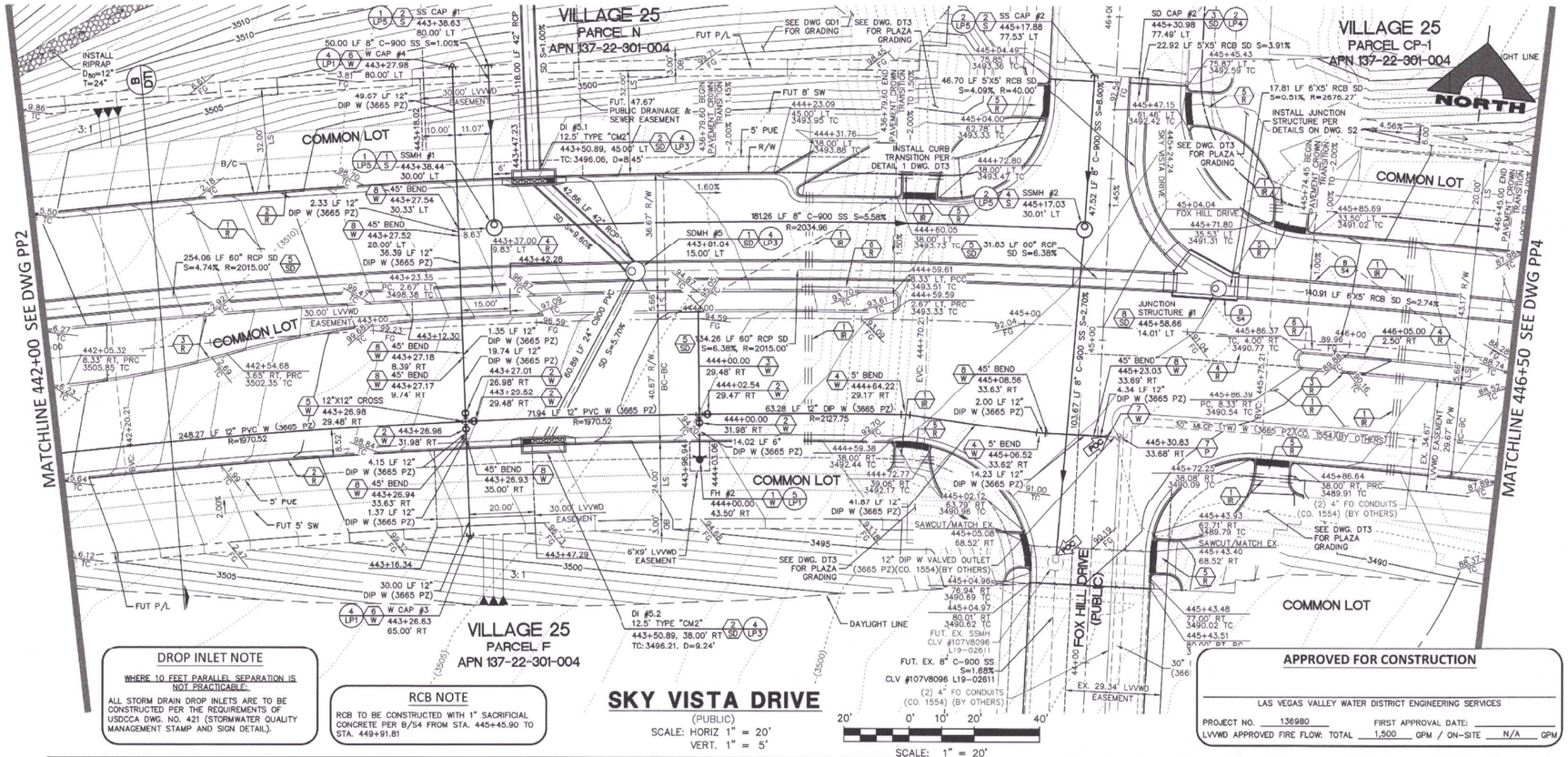
THE HOWARD HUGHES COMPANY, LLC

VILLAGE 25 SKY VISTA DRIVE IMPROVEMENTS
(REDPOINT DRIVE TO KETTLE RIDGE DRIVE)

PLAN AND PROFILE 2

DRAWING PP2
12 OF 35 SHTS

ADJACENT STORM DRAIN IN SKY VISTA DR



DROP INLET NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE:

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RCB NOTE

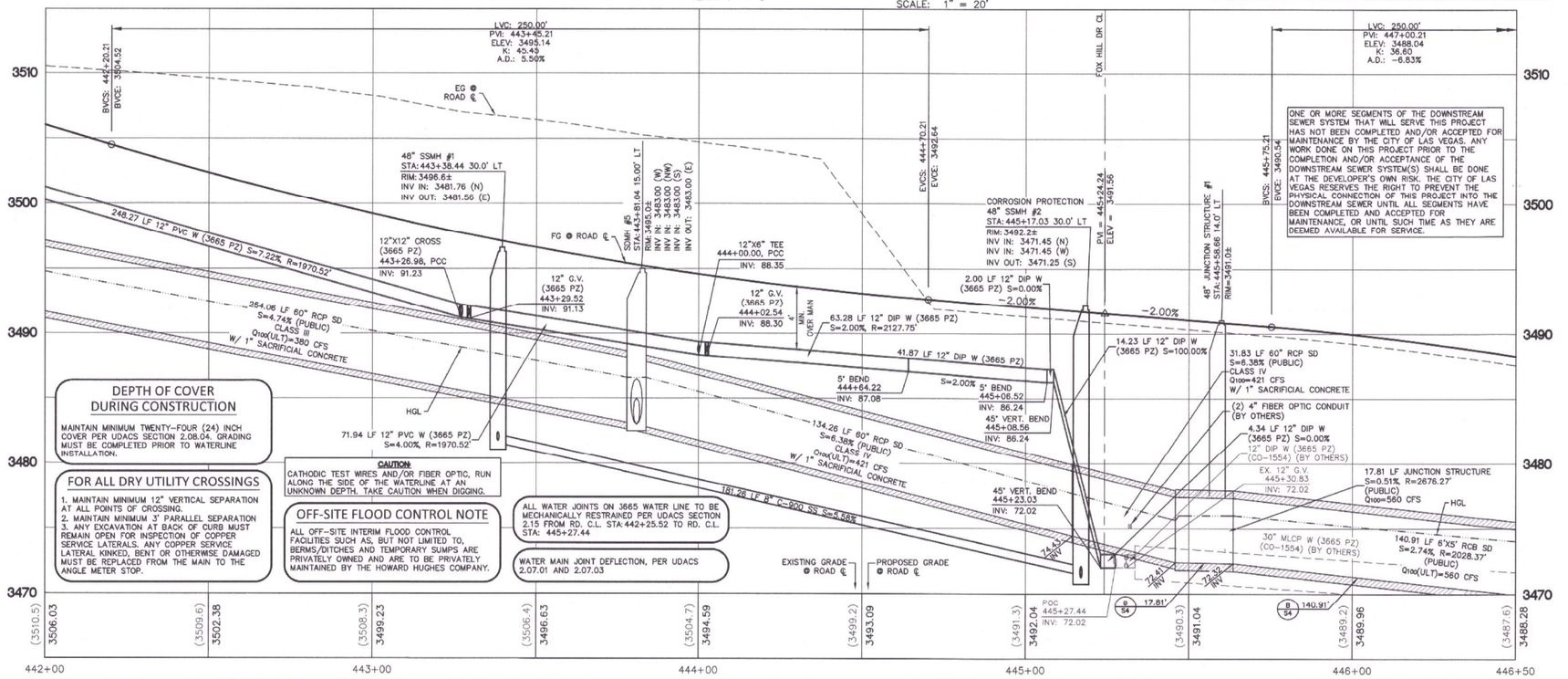
RCB TO BE CONSTRUCTED WITH 1" SACRIFICIAL CONCRETE PER B/S4 FROM STA. 445+45.90 TO STA. 449+91.81

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. 136980 FIRST APPROVAL DATE: _____

LVVWD APPROVED FIRE FLOW: TOTAL 1,500 GPM / ON-SITE N/A GPM



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CAUTION

CATHODIC TEST WIRES AND/OR FIBER OPTIC, RUN ALONG THE SIDE OF THE WATERLINE AT AN UNKNOWN DEPTH. TAKE CAUTION WHEN DIGGING.

OFF-SITE FLOOD CONTROL NOTE

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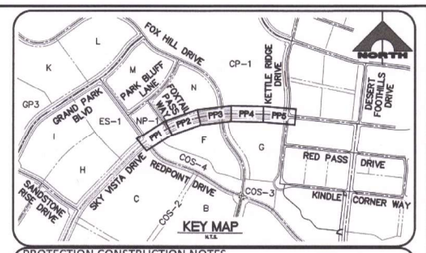
WATER MAIN JOINT DEFLECTION, PER UDACS 2.07.01 AND 2.07.03



KEY MAP

PROTECTION CONSTRUCTION NOTES

1P EXISTING PAVEMENT, PROTECT IN PLACE
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3P EXISTING PULLBOX, ADJUST TO FINISH GRADE
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11P EXISTING WATER ACCESS MANHOLE PROTECT IN PLACE. RAISE TO FINAL PAVEMENT GRADE PER DETAIL 4 & 8 DWG. DT4

ROADWAY CONSTRUCTION NOTES

1R INSTALL A.C. PAVEMENT PER STREET SECTIONS, SEE DWG. DT1
2R INSTALL "L" TYPE CURB & GUTTER, SEE SUMMERLIN STD DWG. S-47
3R INSTALL "A" TYPE ISLAND CURB, SEE SUMMERLIN STD DWG. S-50
4R INSTALL CURB TRANSITION PER DETAIL 5 DWG. DT4
5R CONSTRUCT SIDEWALK RAMP PER USD DWG. NO. 235 (CASE II) AND DETAILS ON DWG. DT2 & DT3
6R INSTALL "L" TYPE ISLAND CURB, SEE SUMMERLIN STD DWG. S-50

WATER CONSTRUCTION NOTES

1W INSTALL FIRE HYDRANT & ASSEMBLY PER UDACS PLT. NO. 40. FOR "DEEP" FIRE HYDRANTS SEE UDACS PL. NO. 41.
2W INSTALL GATE VALVE AND BOX PER UDACS PLT. NO. 30 AND 39
3W INSTALL TEE W/ MECHANICALLY RESTRAINED JOINTS
4W INSTALL HORIZONTAL BEND W/ MECHANICALLY RESTRAINED JOINTS (SEE PLAN FOR ANGLE)
5W INSTALL CROSS W/ MECHANICALLY RESTRAINED JOINTS
6W INSTALL CAP W/ 2" BLOW-OFF ASSEMBLY PER UDACS PLT. NO. 36
7W REMOVE CAP AND BLOWOFF PER UDACS PLT. NO. 36 AND CONNECT TO EXISTING WATER LINE.
8W INSTALL VERTICAL BEND W/ MECHANICALLY RESTRAINED JOINTS (SEE PROFILE FOR ANGLE)

SEWER CONSTRUCTION NOTES

1S INSTALL SEWER MANHOLE PER DCSWCS SD-1 & SD-3 WITH SINGLE 24" LID
2S STUB AND CAP SEWER PIPE PER DETAIL 1, DWG. DT4
3S REMOVE PLUG & CONNECT TO SEWER LINE (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EX. SEWER PRIOR TO CONSTRUCTION)
4S INSTALL 48" STANDARD MANHOLE (PER DCSWCS SD-1, SD-3, SD-4, SD-5) W/ CORROSION PROTECTION PER DCSWCS 3.16.8.

STORM DRAIN CONSTRUCTION NOTES

1SD INSTALL TYPE II-SD MANHOLE PER USD DWG. NO. 405.2
2SD INSTALL TYPE "CM2" DROP INLET PER USD DWG. NO. 412.1 AND 421
3SD INSTALL TEMPORARY PLUG AND CAP
4SD REMOVE PLUG & CONNECT TO EX. STORM DRAIN TO NEAREST RCP JOINT OR W/ CONCRETE COLLAR PER DETAIL 3 ON DWG. DT4 (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EX. STORM DRAIN PRIOR TO CONSTRUCTION)
5SD INSTALL 1" SACRIFICIAL CONCRETE, MIN. 6000 PSI
6SD RCP TO BE CONSTRUCTED WITH WATER TIGHT JOINTS, ELASTOMERIC JOINT SEALANT, AND 4-INCHES OF SLURRY ENCASEMENT
7SD LVVWD APPROVED ELASTOMERIC JOINT SEALANT AT ALL MANHOLE JOINTS.
8SD SDMH TO BE INSTALLED WITH WATER TIGHT JOINTS.
9SD INSTALL TYPICAL TYPE I ACCESS MANHOLE IN RCB PER USD DWG. NO. 403.1

IRRIGATION CONSTRUCTION NOTES

1IR BANK "A": 1-6" & 2-4" SCH 40 PVC. PER DETAIL 2 DWG. DT4

BASIS OF BEARING AND COORDINATES

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

LINEAR UNIT: US SURVEY FOOT (FTUS)
DATUM (REFERENCE FRAME): NAD 83 (2011) EPOCH 2010.00
SYSTEM: NEVADA COORDINATE REFERENCE SYSTEM (NCRS)
ZONE: LAS VEGAS HIGH ELEVATION ZONE

PROJECTION: TRANSVERSE MERCATOR
STANDARD PARALLEL (AND LATITUDE OF GRID ORIGIN): 36°15'00"N
LONGITUDE OF CENTRAL MERIDIAN: 114°58'00"W
NORTHING AT GRID ORIGIN: 400,000.00 M (1,312,333.3333 FTUS)
EASTING AT CENTRAL MERIDIAN: 300,000 M (984,250.0000 FTUS)
SCALE FACTOR ON CENTRAL MERIDIAN: 1.000135 (EXACT)

NOTES:
1. ALL DISTANCES AND BEARINGS SHOWN HEREON ARE PROJECTED (GRID) VALUES BASED ON THE PREGENING PROJECTION DEFINITION. THE PROJECTION WAS DEFINED SUCH THAT PROJECTED (GRID) DISTANCES ARE EQUIVALENT TO "GROUND" DISTANCES IN THE PROJECT AREA.
2. GRID BEARINGS SHOWN HEREON (OR IMPLIED BY GRID COORDINATES) DO NOT EQUAL GEODETIC BEARINGS DUE TO MERIDIAN CONVERGENCE.

BENCHMARK

BM#	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM No. 7LV0934SW6	FIND RIVET AND PLATE IN TOP OF CURB SE CORNER OF DESERT MOON RD. AND SKY VISTA DR. T20S,R59E,S34	3318.31 (FEET)	1,011.422 (METERS)

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811 or 1-800-227-2600

FAST Call before you UnderGround 1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

L#: L20-00376 CLV#: 107V8310

FOR AGENCY REVIEW - NOT FOR CONSTRUCTION

DESCRIPTION	DATE	APP
REVISED LINE WORK & GRADING	07/17/23	

PROJECT NO. 62025-206
DESIGN: LG/MF
DRAWN: AS
CHECK: LG/MF
PLOT DATE: 08-03-20
PLOT TIME: 14:26:49

ENGINEER - STATE OF NEVADA
MICHAEL FANG
No. 24450
CIVIL
PROFESSIONAL
DATE: 08/03/2020

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

I:\PROJECTS\VOL1\62025 - 206\CIVIL\PRODUCTION\62025-206DS_PP.DWG
ALEXANDER SANTIAGO

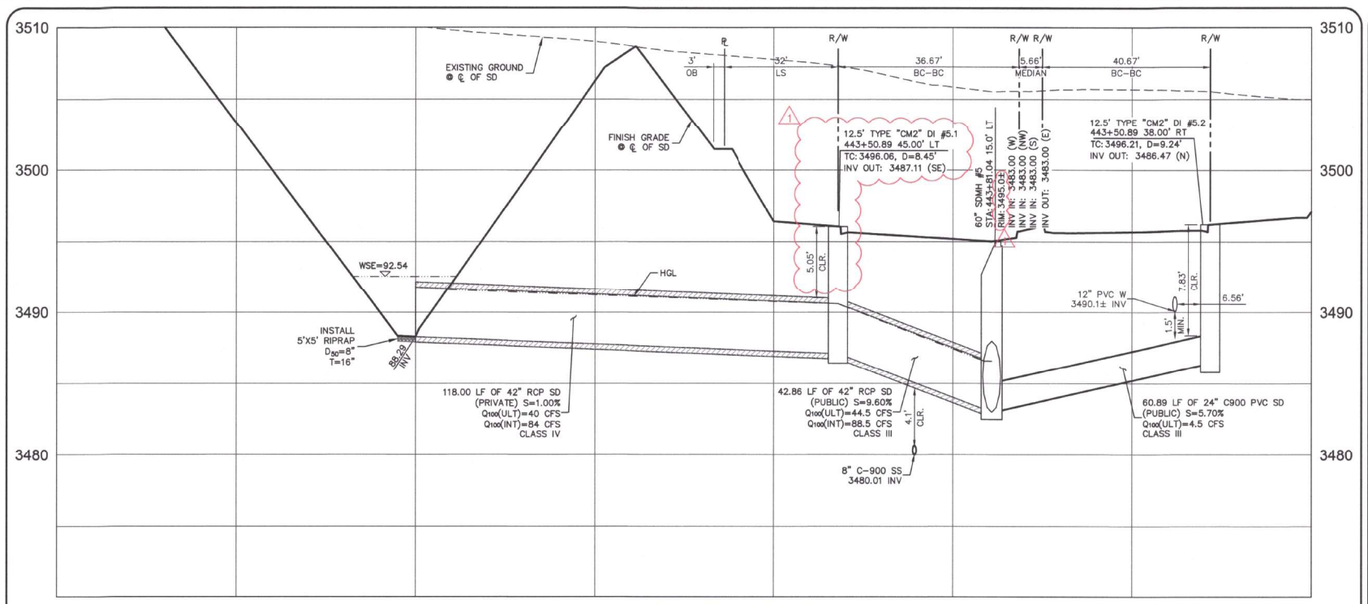
THE HOWARD HUGHES COMPANY, LLC

VILLAGE 25 SKY VISTA DRIVE IMPROVEMENTS
(REDPOINT DRIVE TO KETTLE RIDGE DRIVE)

PLAN AND PROFILE 3

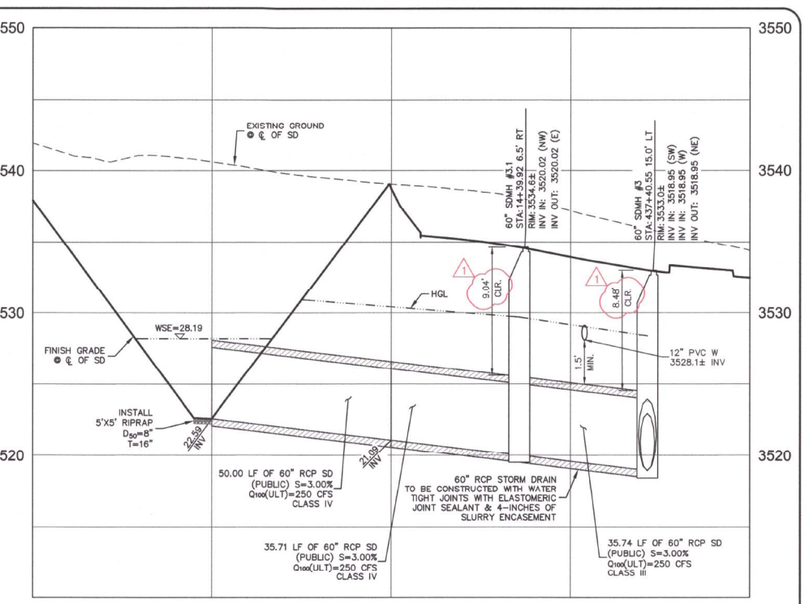
DRAWING 1 PP3
13 OF 35 SHTS

ADJACENT STORM DRAIN IN SKY VISTA DR



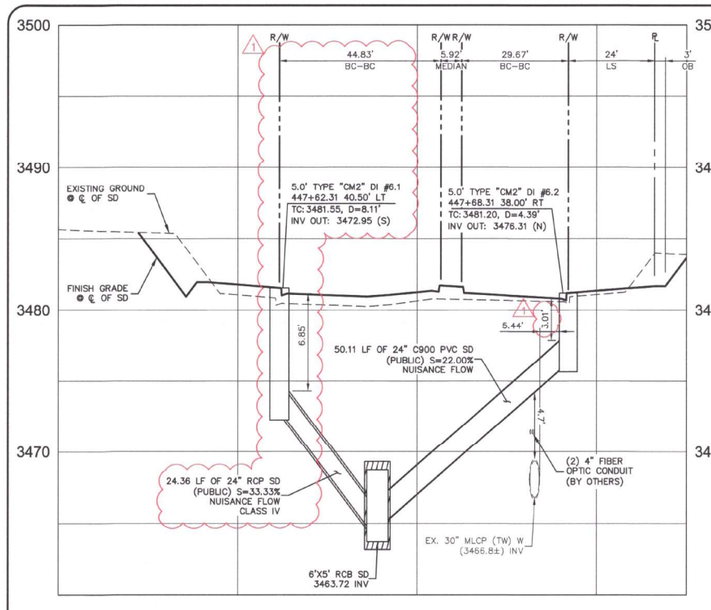
SKY VISTA DRIVE
SD LATERAL @ 443+81.04
SCALE: HORIZ. 1"=20', VERT. 1"=5'
SEE DRAWING PP3

4 / –



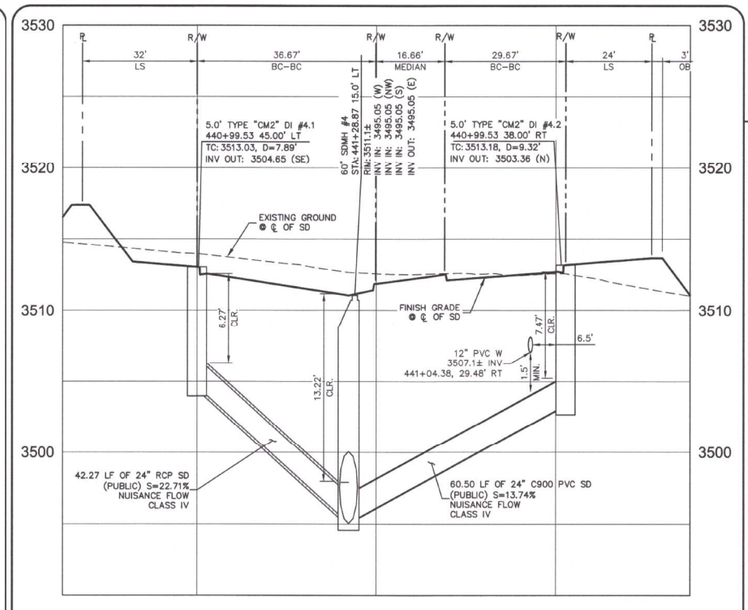
SKY VISTA DRIVE
SD LATERAL @ 437+40.55
SCALE: HORIZ. 1"=20', VERT. 1"=5'
SEE DRAWING PP1

2 / –



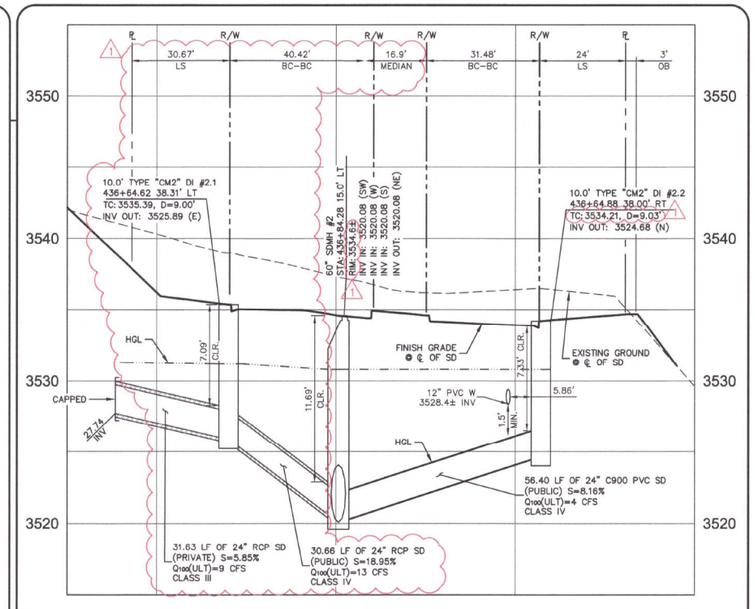
SKY VISTA DRIVE
SD LATERAL @ 447+61.68
SCALE: HORIZ. 1"=20', VERT. 1"=5'
SEE DRAWING PP4

5 / –



SKY VISTA DRIVE
SD LATERAL @ 441+28.87
SCALE: HORIZ. 1"=20', VERT. 1"=5'
SEE DRAWING PP2

3 / –



SKY VISTA DRIVE
SD LATERAL @ 436+84.28
SCALE: HORIZ. 1"=20', VERT. 1"=5'
SEE DRAWING PP1

1 / –

OFF-SITE FLOOD CONTROL NOTE

ALL OFF-SITE INTERIM FLOOD CONTROL FACILITIES SUCH AS, BUT NOT LIMITED TO, BERMS/DITCHES AND TEMPORARY SUMPS ARE PRIVATELY OWNED AND ARE TO BE PRIVATELY MAINTAINED BY THE HOWARD HUGHES COMPANY.

DROP INLET NOTE

ALL STORM DRAIN DROP INLETS ARE TO BE CONSTRUCTED PER THE REQUIREMENTS OF USDCCA DWG. NO. 421 (STORMWATER QUALITY MANAGEMENT STAMP AND SIGN DETAIL).

HORIZONTAL SEPARATION NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE:

CAST-IN-PLACE MONOLITHIC POUR WITH WATERSTOP BETWEEN SLAB AND WALLS. BASE, WALLS AND TOP TO BE CONSTRUCTED WITH WATERSTOPS, CENTER BULB OR FLAT STRIP (VINYLEX, GREENSTREAK PLASTIC PRODUCTS OR APPROVED EQUAL).

CONSTRUCTION NOTE

IN AREAS WHERE THE EXCAVATION OR GROUND ELEVATION IS LESS THAN THREE (3) FEET, FROM THE TOP OF THE LVVWD TRANSMISSION MAIN, NO EXCAVATION EQUIPMENT, OTHER THAN HAND HELD EQUIPMENT WILL BE ALLOWED WITHIN TEN (10) FEET OF THE PIPELINE IN THESE AREAS. THE CONTRACTOR IS TO PLACE A CONCRETE BARRIER; I.E. JERSEY RAIL, TO IDENTIFY AND PROTECT THE "NO EQUIPMENT ZONE".

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. 136980 FIRST APPROVAL DATE:

L#: L20-00376 CLV#: 107V8310

PROFESSIONAL ENGINEER – STATE OF NEVADA – MICHAEL FANG – No. 24440 – CIVIL – Exp. 06/30/2021 – 08/03/2020

FOR AGENCY REVIEW - NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	AGEN. APP	DATE	CCW APP	DATE
1	REVISED GRADING & UTILITY LOCATIONS	07/17/23				

PROJECT NO. 62025-206
DESIGN: LG/MF
DRAWN: AS
CHECK: LG/MF
PLOT DATE: 08-03-20
PLOT TIME: 14:30:14

GCW ENGINEERS \ SURVEYORS
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gcwengineering.com

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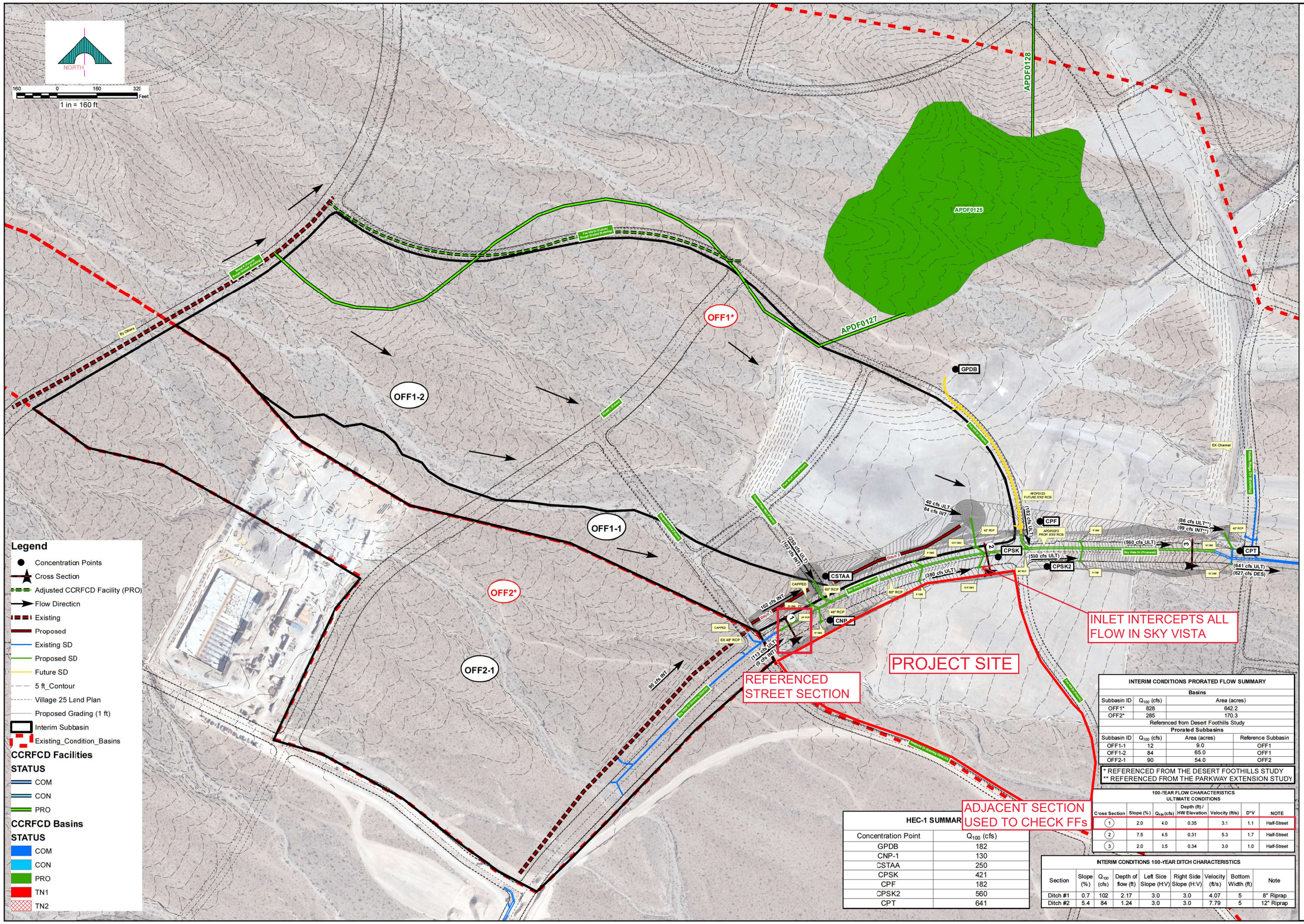
ALEXANDER SANTIAGO

THE HOWARD HUGHES COMPANY, LLC

VILLAGE 25 SKY VISTA DRIVE IMPROVEMENTS
(REDPOINT DRIVE TO KETTLE RIDGE DRIVE)

LATERAL PROFILES 3

DRAWING
LP3
18 OF 35 SHTS



Legend

- Concentration Points
- Cross Section
- Adjusted CCRFCD Facility (PRO)
- Flow Direction
- Existing
- Proposed
- Existing SD
- Proposed SD
- Future SD
- 5 ft_Contour
- Village 25 Land Plan
- Proposed Grading (1 ft)
- Interim Subbasin
- Existing_Condition_Basins

CCRFCD Facilities

STATUS

- COM
- CON
- PRO

CCRFCD Basins

STATUS

- COM
- CON
- PRO
- TN1
- TN2

HEC-1 SUMMARY

Concentration Point	Q_{100} (cfs)
GPDB	182
CNP-1	130
CSTAA	250
CPSK	421
CPF	182
CPSK2	560
CPT	641

INTERIM CONDITIONS PRORATED FLOW SUMMARY

Basins		
Subbasin ID	Q_{100} (cfs)	Area (acres)
OFF1*	828	642.2
OFF2*	285	170.3
Referenced from Desert Foothills Study		
Prorated Subbasins		
Subbasin ID	Q_{100} (cfs)	Area (acres) / Reference Subbasin
OFF1-1	12	9.0 / OFF1
OFF1-2	84	65.0 / OFF1
OFF2-1	90	54.0 / OFF2

* REFERENCED FROM THE DESERT FOOTHILLS STUDY
** REFERENCED FROM THE PARKWAY EXTENSION STUDY

100-YEAR FLOW CHARACTERISTICS ULTIMATE CONDITIONS

Cross Section	Slope (%)	Q_{100} (cfs)	Depth (ft) / HW Elevation	Velocity (ft/s)	D*V	NOTE
1	2.0	4.0	0.35	3.1	1.1	Half-Street
2	7.5	4.5	0.31	5.3	1.7	Half-Street
3	2.0	3.5	0.34	3.0	1.0	Half-Street

INTERIM CONDITIONS 100-YEAR DITCH CHARACTERISTICS

Section	Slope (%)	Q_{100} (cfs)	Depth of flow (ft)	Left Side Slope (H:V)	Right Side Slope (H:V)	Velocity (ft/s)	Bottom Width (ft)	Note
Ditch #1	0.7	102	2.17	3.0	3.0	4.07	5	8" Riprap
Ditch #2	5.4	84	1.24	3.0	3.0	7.79	5	12" Riprap

NO.	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP

DATE: _____

PROJECT NO. 62025-206

DESIGN: _____
DRAWN: _____
CHECK: _____
PLOT DATE: 12/20/2019
PLOT TIME: 3:31:31 PM

GCW ENGINEERS \ SURVEYORS
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gcwengineering.com

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medalat

THE HOWARD HUGHES COMPANY, LLC

VILLAGE 25 SKY VISTA DRIVE IMPROVEMENTS
(REDPOINT DRIVE TO KETTLE RIDGE DRIVE)

INTERIM CONDITION DRAINAGE MAP

DRAWING
FIG5
1 OF 1 SHTS

GCW

ENGINEERS \ SURVEYORS

UPDATE TO THE TECHNICAL DRAINAGE STUDY FOR

VILLAGE 25 FOX HILL DRIVE IMPROVEMENTS (REDPOINT DRIVE TO SKY VISTA DRIVE)

62025-207

September 2020

Prepared for:
The Howard Hughes Company, LLC
10845 Griffith Peak Drive, Suite 160
Las Vegas, NV 89135
Phone: (702) 791-4300

Prepared by GCW, Inc.

1555 South Rainbow Blvd
Las Vegas, NV 89146

P: 702.804.2000
F: 702.804.2298

info@gcwengineering.com
www.gcwengineering.com

CITY OF LAS VEGAS **INTER-OFFICE MEMORANDUM**			**DATE:** **October 8, 2020**
TO: **Land Development Services** Department of Building & Safety			**FROM:** Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **Summerlin West Village 25 - Fox Hill Drive Improvements (Redpoint Drive to Sky Vista Drive) - Update**		**COPIES TO:** GCW Inc.
Cross Streets:	Fox Hill Drive and Redpoint Drive		Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5186C.doc		Bart Anderson, P.E., DevCo
Parcel Number:	137-22-301-001		
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	9/3/2019	9/20/2019	Not Approved	$400.00	3553603: $400
2nd Submittal	10/17/2019	10/31/2019	Approved	$400.00	3614923: $400
3rd Submittal	9/22/2020	10/8/2020	See Comments Below	$100.00	3999521: $100
			TOTAL FEES (LDDRS):	**$900.00**	**----**

REMARKS:

3rd Submittal: Update for minor revision for grading at the intersection of Fox Hill and Sky Vista

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

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

The following conditions are repeated until they are complete:

1. The subject drainage study is premised on the protection of improved *Sky Vista Drive (Redpoint* to *Fox Hill*), *Redpoint Drive (Sky Vista* to *Fox Hill*) and the interim berm/ditch adjacent to the subject street improvements of *Fox Hill Drive (Redpoint* to *Sky Vista*). The subject improvement plans will not be approved prior to the execution of the improvement bonds of *Sky Vista Drive (Redpoint* to *Fox Hill*) and *Redpoint Drive (Sky Vista* to *Fox Hill*).
2. The project proposed to construct temporary drainage facilities including drainage berms/swales along the west side of the proposed segment of *Fox Hill Drive*. Prior to the final plans approval, the developer must complete a ***Maintenance & Liability Agreement*** for the interim drainage improvements 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 facilities and an exhibit that adequately shows the location and limits of the drainage facilities to *City Flood Control* for approval. Once the drainage study is conditionally approved, the engineer/developer should contact the *City's Land Development Section* (702-229-6371) to begin the agreement process.

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

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

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

END OF REMARKS
HDR/AYS

T/R/S: T20S/R59E/22
AREA K-22

ADJACENT STREET SECTION IN FOX HILL

Worksheet for Section A - 100yr

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.53	%
Discharge	14.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.50
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+18.50	0.50
0+35.00	0.17
0+35.00	0.13
0+36.50	0.00
0+36.50	0.50
0+37.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+02.00, 0.13)	0.013
(0+02.00, 0.13)	(0+35.00, 0.13)	0.016
(0+35.00, 0.13)	(0+37.00, 0.50)	0.013

Options

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

Worksheet for Section A - 100yr

Results

Normal Depth		0.38	ft
Elevation Range	0.00 to 0.50 ft		
Flow Area		3.11	ft²
Wetted Perimeter		24.70	ft
Hydraulic Radius		0.13	ft
Top Width		23.85	ft
Normal Depth		0.38	ft
Critical Depth		0.48	ft
Critical Slope		0.00658	ft/ft
Velocity		4.50	ft/s
Velocity Head		0.31	ft
Specific Energy		0.69	ft
Froude Number		2.19	
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	0.38	ft
Critical Depth	0.48	ft
Channel Slope	3.53	%
Critical Slope	0.00658	ft/ft

Cross Section for Section A - 100yr

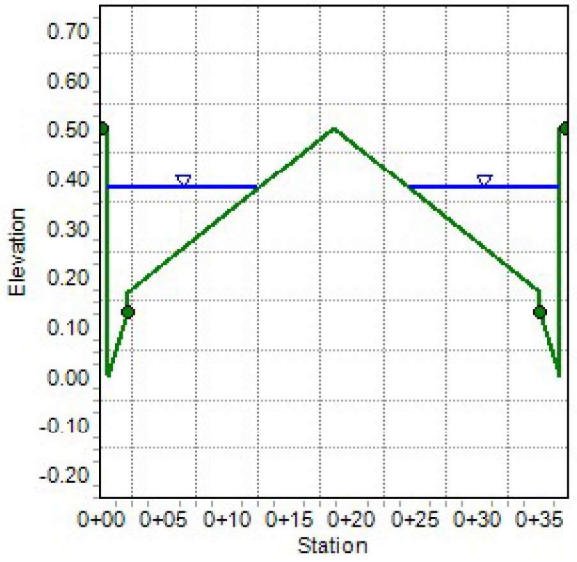
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.53	%
Normal Depth	0.38	ft
Discharge	14.00	ft³/s

Cross Section Image



DROP INLETS IN FOX HILL

ENGINEERS \ SURVEYORS

Drop Inlet Sizing Calculation

Project Name: V25 Fox Hill Drive Improvements
By: Masih Edalat
Date: 04/10/2019

Drop Inlet Sizing on a Continuous Grade

15 ft DI Type CM2
DI # 3.1 & 5.1

Known:

Q_s=	Street Flow	7.0	cfs
S_o=	Longitudinal Slope	0.0353	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	4.50	fps
D=	Flow Depth	0.38	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Grate Width	1.5	ft
a=	Gutter Depression	5.0	in
L_g=	Length of Grate	12.5	ft
L_c=	Length of Curb Opening	15.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00	
	V_o= Splash over velocity=p+q*(L_g*(1-(C_{fg}/100)))-r*(L_g*(1-(C_{fg}/100)))^2+s*(L_g*(1-(C_{fg}/100)))^3†	11.01	fps
E_o=	Grate flow ratio = Q_w/Q_s	0.33	
	Q_w= Frontal flow=A_w*V_s	2.28	cfs
	Q_x= Side flow = Q_s-Q_w	4.72	cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*(L_g*(1-C_{fg}/100))$^{2.3}$))	0.38	
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	4.1	cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)		

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.113	ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.285	ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	22.02	ft
Q_{ic}=	Flow intercepted = (1-(1-(L_c*(1-C_{fc}/100))/L_t)$^{1.8}$)*Q_s	3.7	cfs

Total Inlet Calculations

Q_{ti}=	**Total flow intercepted = Q_{ig}+Q_{ic}**	**7.0**	**cfs**
Q_{tq}=	**Flow bypass = Q_s-Q_{ti}**	**0.0**	**cfs**
q=	Interception per unit ratio = Q_{ti}/L_g	0.47	cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	100	%

FOX HILL STORM DRAIN MODEL

```
                                                                    FOX_H.WSW
T1 V25 Fox Hill Dr                                                          0
T2 Storm Drain Mainline
T3 North of the intersection of Fox Hill & Redpoint
SO   1000.0003437.670  1                          3447.340
R    1048.8003441.130  1      .013                                 .000  45.000 1
R    1083.3203441.650  1      .013                                 .000    .000 1
R    1177.2303444.939  1      .013                                 .000    .000 1
JX   1177.2403444.940  1  2   .013   16.000         3444.940        45.000      .000
R    1271.6303448.239  1      .013                                 .000    .000 1
JX   1271.6403448.240  1  3   .013    7.000         3448.240       -45.000      .000
R    1323.5003450.060  1      .013                                 .000 -20.000 1
R    1375.3603451.870  1      .013                                 .000 -45.000 1
JX   1375.3703451.871  2      .013                                    .000      .000
R    1392.1303455.479  2      .013                                 .000 -45.000 1
JX   1392.1403455.480  2  2   .013    7.000         3455.480        90.000      .000
R    1457.8303456.360  2      .013                                 .000 -45.000 1
SH   1457.8303456.360  2                          3456.360
CD   1  4   1    .000   3.000     .000  .000  .000   .00
CD   2  4   1    .000   2.500     .000  .000  .000   .00
CD   3  4   1    .000   2.000     .000  .000  .000   .00
Q           43.000   .0
```

Program Package Serial Number: 3074

WATER SURFACE PROFILE LISTING Date: 4-18-2019 Time: 2:33:30

V25 Fox Hill Dr
Storm Drain Mainline
North of the intersection of Fox Hill & Redpoint

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	3437.670	9.670	3447.340	73.00	10.33	1.66	3449.00	.00	2.70	.00	3.000	.000	.00	1 .0
48.800	.0709					.0120	.58	9.67	.00	1.34	.013	.00	.00	PIPE
1048.800	3441.130	7.124	3448.253	73.00	10.33	1.66	3449.91	.00	2.70	.00	3.000	.000	.00	1 .0
34.520	.0151					.0120	.41	7.12	.00	2.21	.013	.00	.00	PIPE
1083.320	3441.650	7.100	3448.750	73.00	10.33	1.66	3450.41	.00	2.70	.00	3.000	.000	.00	1 .0
93.910	.0350					.0120	1.12	7.10	.00	1.65	.013	.00	.00	PIPE
1177.230	3444.939	5.019	3449.958	73.00	10.33	1.66	3451.61	.00	2.70	.00	3.000	.000	.00	1 .0
JUNCT STR	.0976					.0096	.00	5.02	.00		.013	.00	.00	PIPE
1177.240	3444.940	6.148	3451.088	57.00	8.06	1.01	3452.10	.00	2.45	.00	3.000	.000	.00	1 .0
93.900	.0350					.0073	.69	6.15	.00	1.42	.013	.00	.00	PIPE
1271.140	3448.222	3.602	3451.824	57.00	8.06	1.01	3452.83	.00	2.45	.00	3.000	.000	.00	1 .0
HYDRAULIC JUMP														
1271.140	3448.222	1.589	3449.811	57.00	14.99	3.49	3453.30	.00	2.45	2.99	3.000	.000	.00	1 .0
.490	.0350					.0241	.01	1.59	2.35	1.42	.013	.00	.00	PIPE
1271.630	3448.239	1.589	3449.828	57.00	14.99	3.49	3453.32	.00	2.45	2.99	3.000	.000	.00	1 .0
HYDRAULIC DROP														
1271.630	3448.239	3.589	3451.828	57.00	8.06	1.01	3452.84	.00	2.45	.00	3.000	.000	.00	1 .0
JUNCT STR	.0976					.0065	.00	3.59	.00		.013	.00	.00	PIPE

Program Package Serial Number: 3074

WATER SURFACE PROFILE LISTING Date: 4-18-2019 Time: 2:33:30

V25 Fox Hill Dr
Storm Drain Mainline
North of the intersection of Fox Hill & Redpoint

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
1271.640	3448.240	4.005	3452.245	50.00	7.07	.78	3453.02	.00	2.30	.00	3.000	.000	.00	1 .0
.126	.0351					.0056	.00	4.01	.00	1.32	.013	.00	.00	PIPE
1271.766	3448.244	4.005	3452.250	50.00	7.07	.78	3453.03	.00	2.30	.00	3.000	.000	.00	1 .0
HYDRAULIC JUMP														
1271.766	3448.244	1.275	3449.519	50.00	17.48	4.74	3454.26	.00	2.30	2.97	3.000	.000	.00	1 .0
51.734	.0351					.0421	2.18	1.27	3.14	1.32	.013	.00	.00	PIPE
1323.500	3450.060	1.236	3451.296	50.00	18.20	5.14	3456.44	.00	2.30	2.95	3.000	.000	.00	1 .0
20.230	.0349					.0458	.93	1.24	3.33	1.32	.013	.00	.00	PIPE
1343.730	3450.766	1.215	3451.981	50.00	18.63	5.39	3457.37	.00	2.30	2.95	3.000	.000	.00	1 .0
31.630	.0349					.0506	1.60	1.22	3.44	1.32	.013	.00	.00	PIPE
1375.360	3451.870	1.172	3453.042	50.00	19.53	5.93	3458.97	.00	2.30	2.93	3.000	.000	.00	1 .0
JUNCT STR	.0976					.0527	.00	1.17	3.68		.013	.00	.00	PIPE
1375.370	3451.871	1.304	3453.175	50.00	19.31	5.79	3458.97	.00	2.30	2.50	2.500	.000	.00	1 .0
1.787	.2153					.0496	.09	1.30	3.34	.87	.013	.00	.00	PIPE

1377.157	3452.256	1.334	3453.590	50.00	18.75	5.46	3459.05	.00	2.30	2.49	2.500	.000	.00	1	.0				
2.603	.2153					.0449	.12	1.33	3.20	.87	.013	.00	.00	PIPE					
1379.760	3452.816	1.387	3454.203	50.00	17.88	4.96	3459.17	.00	2.30	2.48	2.500	.000	.00	1	.0				
2.257	.2153					.0397	.09	1.39	2.97	.87	.013	.00	.00	PIPE					

Program Package Serial Number: 3074

WATER SURFACE PROFILE LISTING Date: 4 18 2019 Time: 2:33:30

V25 Fox Hill Dr
Storm Drain Mainline
North of the intersection of Fox Hill & Redpoint

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
1382.017	3453.302	1.442	3454.744	50.00	17.05	4.51	3459.26	.00	2.30	2.47	2.500	.000	.00	1 .0
1.955	.2153					.0350	.07	1.44	2.76	.87	.013	.00	.00	PIPE
1383.972	3453.723	1.500	3455.223	50.00	16.26	4.10	3459.33	.00	2.30	2.45	2.500	.000	.00	1 .0
1.693	.2153					.0310	.05	1.50	2.56	.87	.013	.00	.00	PIPE
1385.665	3454.087	1.561	3455.648	50.00	15.50	3.73	3459.38	.00	2.30	2.42	2.500	.000	.00	1 .0
1.454	.2153					.0275	.04	1.56	2.37	.87	.013	.00	.00	PIPE
1387.119	3454.400	1.627	3456.027	50.00	14.78	3.39	3459.42	.00	2.30	2.38	2.500	.000	.00	1 .0
1.248	.2153					.0244	.03	1.63	2.19	.87	.013	.00	.00	PIPE
1388.368	3454.669	1.697	3456.366	50.00	14.09	3.08	3459.45	.00	2.30	2.33	2.500	.000	.00	1 .0
1.061	.2153					.0217	.02	1.70	2.01	.87	.013	.00	.00	PIPE
1389.428	3454.897	1.772	3456.669	50.00	13.43	2.80	3459.47	.00	2.30	2.27	2.500	.000	.00	1 .0
.882	.2153					.0194	.02	1.77	1.85	.87	.013	.00	.00	PIPE
1390.310	3455.087	1.854	3456.941	50.00	12.81	2.55	3459.49	.00	2.30	2.19	2.500	.000	.00	1 .0
.721	.2153					.0174	.01	1.85	1.69	.87	.013	.00	.00	PIPE
1391.031	3455.242	1.943	3457.186	50.00	12.21	2.32	3459.50	.00	2.30	2.08	2.500	.000	.00	1 .0
.559	.2153					.0157	.01	1.94	1.53	.87	.013	.00	.00	PIPE
1391.590	3455.363	2.042	3457.405	50.00	11.64	2.11	3459.51	.00	2.30	1.93	2.500	.000	.00	1 .0
.380	.2153					.0143	.01	2.04	1.38	.87	.013	.00	.00	PIPE

Program Package Serial Number: 3074

WATER SURFACE PROFILE LISTING Date: 4-18-2019 Time: 2:33:30

V25 Fox Hill Dr
Storm Drain Mainline
North of the intersection of Fox Hill & Redpoint

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
1391.970	3455.445	2.157	3457.602	50.00	11.10	1.91	3459.52	.00	2.30	1.72	2.500	.000	.00	1 .0
.160	.2153					.0133	.00	2.16	1.21	.87	.013	.00	.00	PIPE
1392.130	3455.479	2.300	3457.779	50.00	10.58	1.74	3459.52	.00	2.30	1.36	2.500	.000	.00	1 .0
JUNCT STR	.0976					.0119	.00	2.30	1.00		.013	.00	.00	PIPE
1392.140	3455.480	3.282	3458.762	43.00	8.76	1.19	3459.95	.00	2.19	.00	2.500	.000	.00	1 .0
65.690	.0134					.0110	.72	3.28	.00	1.86	.013	.00	.00	PIPE
1457.830	3456.360	3.360	3459.720	43.00	8.76	1.19	3460.91	.00	2.19	.00	2.500	.000	.00	1 .0

FILE: FOX_H.WSW W S P G W - EDIT LISTING - Version 14.10 Date: 4-18-2019 Time: 2:33:25

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	4	1		3.000														
CD	2	4	1		2.500														
CD	3	4	1		2.000														

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -
V25 Fox Hill Dr

HEADING LINE NO 2 IS -
Storm Drain Mainline

HEADING LINE NO 3 IS -
North of the intersection of Fox Hill & Redpoint

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1000.000	3437.670	1	3447.340

ELEMENT NO 2 IS A REACH * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1048.800	3441.130	1	.013	.000	.000	45.000	1

ELEMENT NO 3 IS A REACH * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1083.320	3441.650	1	.013	.000	.000	.000	1

ELEMENT NO 4 IS A REACH * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1177.230	3444.939	1	.013	.000	.000	.000	1

ELEMENT NO 5 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1177.240	3444.940	1	2	0	.013	16.000	.000	3444.940	.000	45.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 6 IS A REACH * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1271.630	3448.239	1	.013	.000	.000	.000	1

ELEMENT NO 7 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1271.640	3448.240	1	3	0	.013	7.000	.000	3448.240	.000	-45.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 8 IS A REACH * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1323.500	3450.060	1	.013	.000	.000	-20.000	1

ELEMENT NO 9 IS A REACH * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1375.360	3451.870	1	.013	.000	.000	-45.000	1

ELEMENT NO 10 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1375.370	3451.871	2	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

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
	1392.130	3455.479	2	.013	.000	.000	-45.000	1

ELEMENT NO 12 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1392.140	3455.480	2	2	0	.013	7.000	.000	3455.480	.000	90.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 13 IS A REACH * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1457.830	3456.360	2	.013	.000	.000	-45.000	1

ELEMENT NO 14 IS A SYSTEM HEADWORKS * *

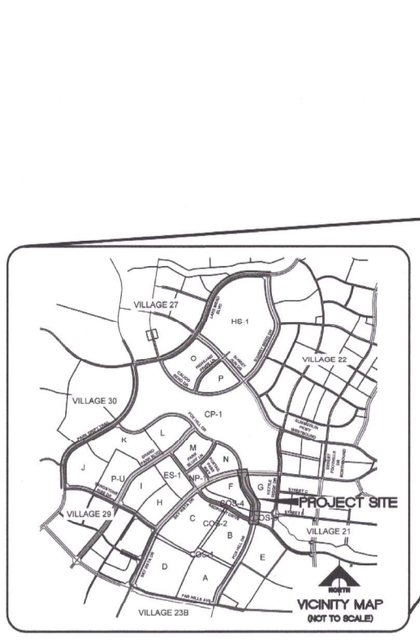
U/S DATA	STATION	INVERT	SECT	W S ELEV
	1457.830	3456.360	2	3456.360

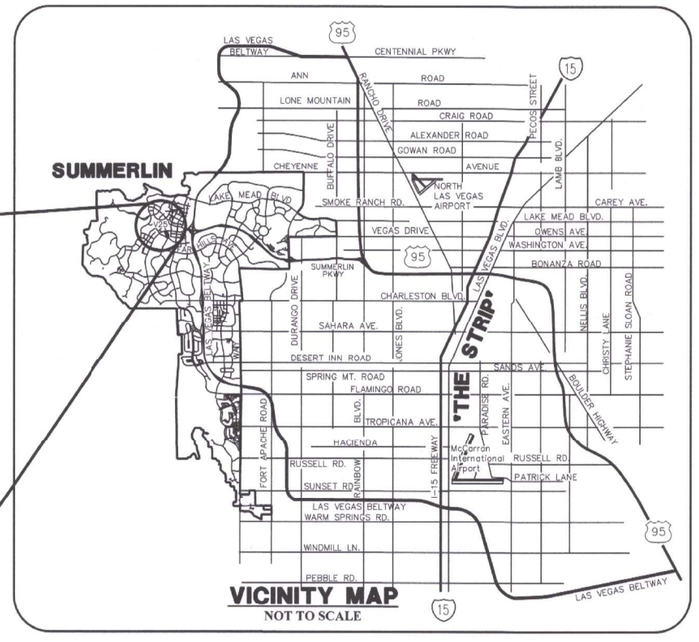
SUMMERLIN

SM

VILLAGE 25
FOX HILL DRIVE IMPROVEMENTS
(REDPOINT DRIVE TO SKY VISTA DRIVE)
FUTURE SID PROJECT
A.P.N. 137-22-301-004
2020

SHEET INDEX		
NO.	DWG	DESCRIPTION
1	G1	COVER SHEET
2	G2	LEGEND AND ABBREVIATIONS
3	G3	GENERAL NOTES
4	HC1	HORIZONTAL CONTROL 1
5	MU1	MASTER UTILITY PLAN – WATER
6	MU2	MASTER UTILITY PLAN – STORM DRAIN
7	MU3	MASTER UTILITY PLAN – SEWER
8	MG	MASTER GRADING PLAN
9	GD1	GRADING PLAN 1
10	PP1	PLAN AND PROFILE 1
11	PP2	PLAN AND PROFILE 2
12	PP3	PLAN AND PROFILE 3
13	LP1	LATERAL PROFILES 1
14	LP2	LATERAL PROFILES 2
15	LP3	LATERAL PROFILES 3
16	DT1	ROADWAY TYPICAL SECTIONS
17	DT2	UTILITY DETAILS
18	TR1	SIGNAGE AND STRIPING PLAN 1
19	TR2	SIGNAGE AND STRIPING PLAN 2
20	SL1	STREETLIGHT, CONDUIT, AND ELECTRICAL PLAN 1
21	SL2	STREETLIGHT, CONDUIT, AND ELECTRICAL PLAN 2
22	SL3	STREETLIGHT, CONDUIT, AND ELECTRICAL PLAN 3





OWNER/DEVELOPER

THE HOWARD HUGHES COMPANY, LLC
10845 GRIFFITH PEAK DRIVE, SUITE 160
LAS VEGAS, NEVADA 89135
OFFICE PHONE NO. (702) 791-4300

ENGINEER

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811 or 1-800-227-2600

FAST Call before you UnderGround
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

CAUTION TO CONTRACTOR

THE CONTRACTOR SHALL BE RESPONSIBLE TO INVESTIGATE AND VERIFY THE ACTUAL LOCATION AND DEPTH OF ALL EXISTING UNDERGROUND FACILITIES AT LEAST 48 HOURS IN ADVANCE OF THE PERFORMANCE OF ANY WORK.

THE HOWARD HUGHES COMPANY, LLC

KEVIN ORROCK — DATE
VICE PRESIDENT

DRAINAGE CERTIFICATION

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

MICHAEL FANG, P.E. 24464 — DATE 9/21/20

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. 136981 — FIRST APPROVAL DATE:
LVVWD APPROVED FIRE FLOW: TOTAL 1,500 GPM / ON-SITE N/A GPM
SHEETS: C1–C3, MU1–MU3, PP1–PP3, LP1–LP3, DT2

LAS VEGAS FIRE & RESCUE APPROVAL

LAS VEGAS FIRE & RESCUE — DATE

UTILITY APPROVALS

COX COMMUNICATIONS LAS VEGAS, INC. — DATE

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 STATUTES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

NV ENERGY — DATE

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

NV ENERGY – TRANSMISSION ENGINEERING — DATE

SOUTHWEST GAS CORPORATION — DATE

L#: L19–02611 | CLV#: 107V8096

PROFESSIONAL ENGINEER STATE OF NEVADA — MICHAEL FANG — No. 24464 — DATE: 09/21/2020

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP	DATE
A	09/01/21	REVISED SHEETS 1–10, 12–14, 16, 19, 21					

PROJECT NO. 62025-207
DESIGN: LG/MF
DRAWN: AS
CHECK: LG/MF
PLOT DATE: 09-21-20
PLOT TIME: 11:30:16

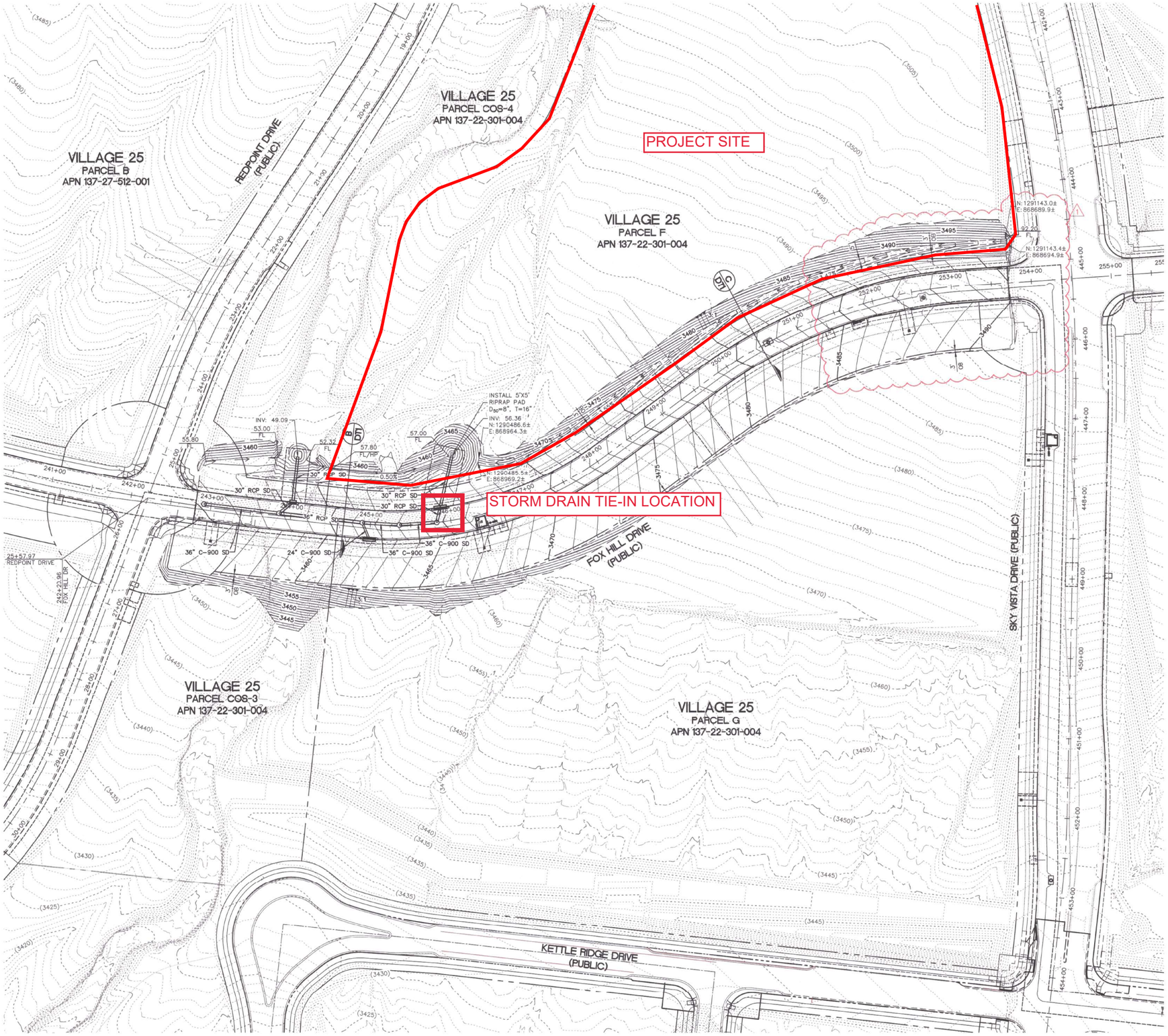
GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com
P:\PROJECTS\6000\62025-207\DWG\PRODUCTION\62025-207_G1.DWG
ALEXANDER SANTIAGO

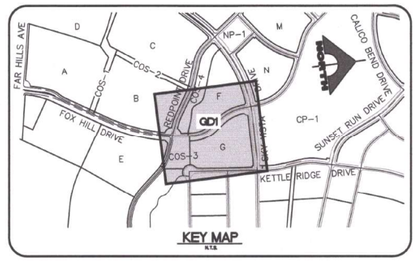
THE HOWARD HUGHES COMPANY, LLC

VILLAGE 25 FOX HILL DRIVE IMPROVEMENTS
REDPOINT DRIVE TO SKY VISTA DRIVE

COVER SHEET

DRAWING
G1
1 OF 22 SHTS





NORTH

40' 0' 20' 40' 80'

SCALE: 1" = 40'

OFF-SITE FLOOD CONTROL NOTE

ALL OFF-SITE INTERIM FLOOD CONTROL FACILITIES SUCH AS, BUT NOT LIMITED TO, BERMS/DITCHES AND TEMPORARY SUMPS ARE PRIVATELY OWNED AND ARE TO BE PRIVATELY MAINTAINED BY THE HOWARD HUGHES COMPANY.

BASIS OF BEARING AND COORDINATES

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

LINEAR UNIT: US SURVEY FOOT (FTUS)
DATUM (REFERENCE FRAME): NAD 83 (2011) EPOCH 2010.00
SYSTEM: NEVADA COORDINATE REFERENCE SYSTEM (NCRS)
ZONE: LAS VEGAS HIGH ELEVATION ZONE

PROJECTION: TRANSVERSE MERCATOR
STANDARD PARALLEL (AND LATITUDE OF GRID ORIGIN): 36°15'00"N
LONGITUDE OF CENTRAL MERIDIAN: 114°58'00"W
NORTHING AT GRID ORIGIN: 400,000.00 M (1,312,333.3333 FTUS)
EASTING AT CENTRAL MERIDIAN: 300,000 M (984,250.0000 FTUS)
SCALE FACTOR ON CENTRAL MERIDIAN: 1.000135 (EXACT)

NOTES:
1. ALL DISTANCES AND BEARINGS SHOWN HEREON ARE PROJECTED (GRID) VALUES BASED ON THE PRECEDING PROJECTION DEFINITION. THE PROJECTION WAS DEFINED SUCH THAT PROJECTED (GRID) DISTANCES ARE EQUIVALENT TO "GROUND" DISTANCES IN THE PROJECT AREA.
2. GRID BEARINGS SHOWN HEREON (OR IMPLIED BY GRID COORDINATES) DO NOT EQUAL GEODETIC BEARINGS DUE TO MERIDIAN CONVERGENCE.

BENCHMARK

BM #	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM No. 7LV0934SW6	FIND RIVET AND PLATE IN TOP OF CURB SE CORNER OF DESERT MOON RD. AND SKY VISTA DR. T20S,R59E,S34	3318.31 (FEET)	1,011.422 (METERS)

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811 OR 1-800-642-2444

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 AND ARTERIAL SYSTEM OF TRANSPORTATION

L#: L19-02611 | CLV#: 107V8096

STATE OF NEVADA – PROFESSIONAL ENGINEER – MICHAEL FANG – Exp. 06/30/2021 – CIVIL – No. 24445 – DATE: 09/21/2020

REV	DATE	DESCRIPTION	DATE	AGEN. APP.	DATE	CCNV APP.
1	09/25/20	REVISED LINE WORK AND GRADING				

PROJECT NO. 62025-207
DESIGN: LG/MF
DRAWN: AS
CHECK: LG/MF
PLOT DATE: 09-21-20
PLOT TIME: 11:36:13

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

F:\PROJECTS\62025-207\CIVIL\PRODUCTION\62025-207_GD1.DWG

ALEXANDER SANTIAGO

THE HOWARD HUGHES COMPANY, LLC

VILLAGE 25 FOX HILL DRIVE IMPROVEMENTS
REDPOINT DRIVE TO SKY VISTA DRIVE

GRADING PLAN 1

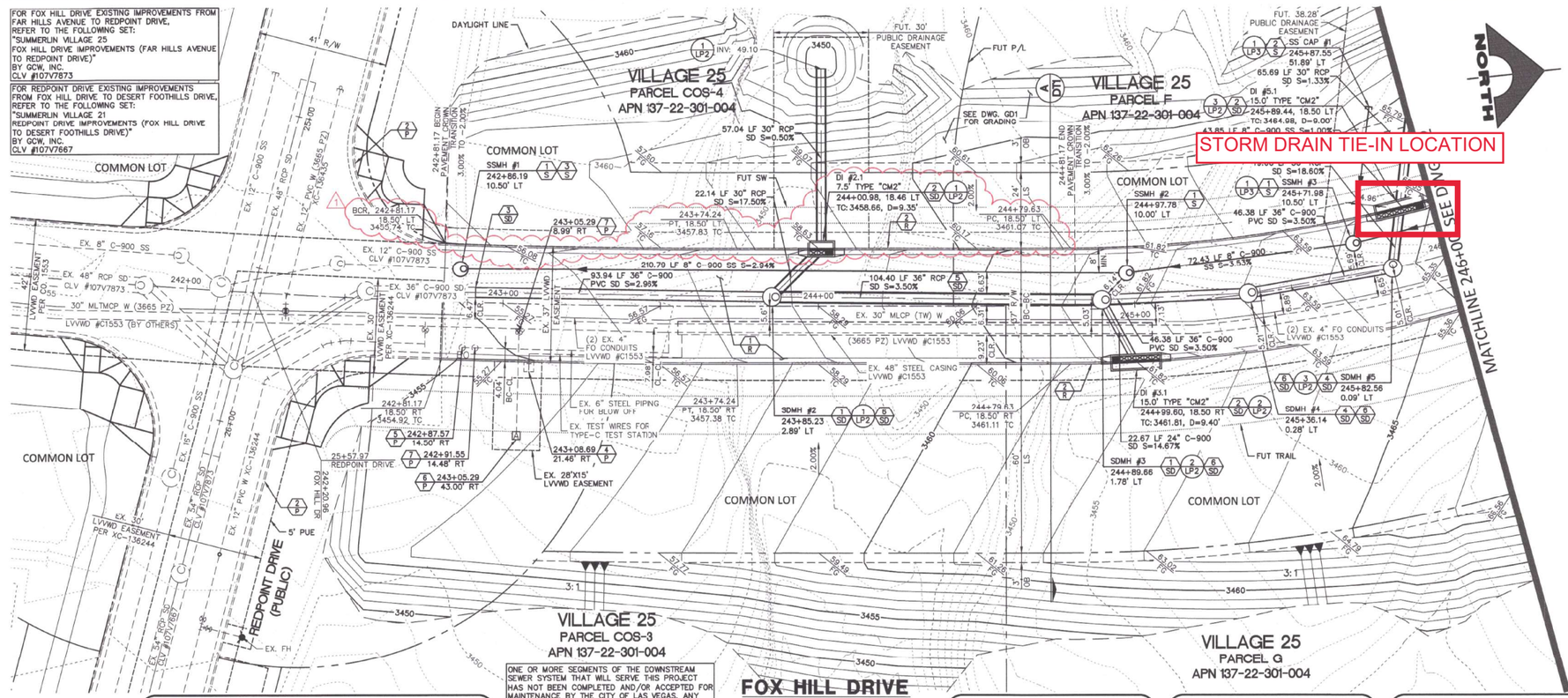
DRAWING
GD1
9 OF 22 SHTS

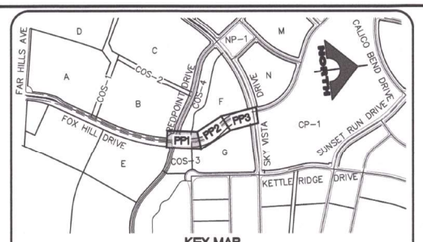
STORM DRAIN SYSTEM IN FOX HILL

STORM DRAIN TIE-IN LOCATION

FOR FOX HILL DRIVE EXISTING IMPROVEMENTS FROM FAR HILLS AVENUE TO REDPOINT DRIVE, REFER TO THE FOLLOWING SET:
"SUMMERLIN VILLAGE 25
FOX HILL DRIVE IMPROVEMENTS (FAR HILLS AVENUE TO REDPOINT DRIVE)"
BY GCW, INC.
CLV #107V7873

FOR REDPOINT DRIVE EXISTING IMPROVEMENTS FROM FOX HILL DRIVE TO DESERT FOOTHILLS DRIVE, REFER TO THE FOLLOWING SET:
"SUMMERLIN VILLAGE 21
REDPOINT DRIVE IMPROVEMENTS (FOX HILL DRIVE TO DESERT FOOTHILLS DRIVE)"
BY GCW, INC.
CLV #107V7667





KEY MAP
N.T.S.

PROTECTION CONSTRUCTION NOTES

1 (P) EXISTING PAVEMENT, PROTECT IN PLACE
2 (P) EXISTING CURB/GUTTER, PROTECT IN PLACE
3 (P) EXISTING PULLBOX, ADJUST TO FINISH GRADE
4 (P) EXISTING TEST STATION, ADJUST TO FINISH GRADE & RELOCATE TO BEHIND CURB IF NECESSARY.
5 (P) EXISTING BLOW-OFF, ADJUST TO FINISH GRADE PER UDACS PLT. NO. 37
6 (P) EXISTING AVAR, ADJUST TO FINISH GRADE PER UDACS PLT. NO. 38
7 (P) EXISTING GATE VALVE, ADJUST TO FINISH GRADE PER UDACS PLT. NO. 39
8 (P) EXISTING WATER VAULT MH, ADJUST TO FINISH GRADE PER DETAIL 5 & 7 DWG. DT2
9 (P) EXISTING SSMH.

ROADWAY CONSTRUCTION NOTES

1 (R) INSTALL A.C. PAVEMENT PER STREET SECTIONS, SEE DWG. DT1
2 (R) INSTALL "L" TYPE CURB & GUTTER, SEE SUMMERLIN STD DWG. S-47
3 (R) INSTALL "A" TYPE CURB, SEE SUMMERLIN STD DWG. S-50
4 (R) INSTALL CONCRETE SIDEWALK PER USD DWG NO. 234.
5 (R) CONSTRUCT SIDEWALK RAMP PER USD DWG. NO. 235 (CASE II)

WATER CONSTRUCTION NOTES

1 (W) INSTALL 1-½" WATER METER AND 1-½" RPPA PER DETAIL 1 DWG. DT2
2 (W) INSTALL CAP W/ 2" BLOW-OFF ASSEMBLY PER UDACS PLT. NO. 36
3 (W) INSTALL GATE VALVE AND BOX PER UDACS PL. NO. 30 AND 39
4 (W) INSTALL FIRE HYDRANT & ASSEMBLY PER UDACS PLT. NO. 40. FOR "DEEP" FIRE HYDRANTS SEE UDACS PL. NO. 41.
5 (W) INSTALL HORIZONTAL BEND PER UDACS PL. NO. 31
6 (W) REMOVE CAP AND BLOWOFF PER UDACS PLT. NO. 36 AND CONNECT TO EX WATER LINE (CONTRACTOR TO VERIFY SIZE, INVERT AND LOCATION OF EX WATER PRIOR TO CONSTRUCTION)
7 (W) INSTALL VERTICAL BEND PER UDACS PLT. NO. 31 UNLESS OTHERWISE IDENTIFIED. (SEE PLAN FOR ANGLE)
8 (W) INSTALL TEE PER UDACS PLT. NO. 31

SEWER CONSTRUCTION NOTES

1 (S) INSTALL SEWER MANHOLE PER DCSWCS SD-1 & SD-4 WITH SINGLE 24" LID PER SD-3.
2 (S) STUB AND CAP SEWER PIPE PER DETAIL 2, DWG. DT2
3 (S) REMOVE PLUG & CONNECT TO SEWER LINE (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EX. SEWER PRIOR TO CONSTRUCTION)
4 (S) ADD CORROSION PROTECTION PER DCSWCS 3.16.8.
5 (S) INSTALL CURVED SEWER IN 10-FT PIPE SECTIONS PER DCSWCS 2.3.4.5

STORM DRAIN CONSTRUCTION NOTES

1 (SD) INSTALL TYPE II MANHOLE PER USD DWG. NO. 405
2 (SD) INSTALL TYPE "CM2" DROP INLET PER USD DWG. NO. 412.1 AND 421
3 (SD) REMOVE PLUG & CONNECT TO EX. STORM DRAIN TO NEAREST RCP JOINT OR W/ CONCRETE COLLAR PER DETAIL 6 ON DWG. DT2 (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EX. STORM DRAIN PRIOR TO CONSTRUCTION)
4 (SD) INSTALL TYPE III MANHOLE PER USD DWG. NO. 406
5 (SD) RCP TO BE CONSTRUCTED WITH WATER TIGHT JOINTS, ELASTOMERIC JOINT SEALANT, AND 4-INCHES OF SLURRY ENCASEMENT
6 (SD) LVVWD APPROVED ELASTOMERIC JOINT SEALANT AT ALL MANHOLE JOINTS.

IRRIGATION CONSTRUCTION NOTES

1 (IR) BANK "A": 1-6" & 2-4" SCH 40 PVC. PER DETAIL 3 DWG. DT2

BASIS OF BEARING AND COORDINATES

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

LINEAR UNIT: US SURVEY FOOT (FTUS)
DATUM (REFERENCE FRAME): NAD 83 (2011) EPOCH 2010.00
SYSTEM: NEVADA COORDINATE REFERENCE SYSTEM (NCRS)
ZONE: LAS VEGAS HIGH ELEVATION ZONE

PROJECTION: TRANSVERSE MERCATOR
STANDARD PARALLEL (AND LATITUDE OF GRID ORIGIN): 36°15'00"N
LONGITUDE OF CENTRAL MERIDIAN: 114°58'00"W
NORTHING AT GRID ORIGIN: 400,000.00 M (1,312,333.3333 FTUS)
EASTING AT CENTRAL MERIDIAN: 300,000 M (984,250.0000 FTUS)
SCALE FACTOR ON CENTRAL MERIDIAN: 1.000135 (EXACT)

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BENCHMARK

BM#	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM No. 7LV0934SW6	FIND RIVET AND PLATE IN TOP OF CURB SE CORNER OF DESERT MOON RD. AND SKY VISTA DR. T20S,R59E,S34	3318.31 (FEET)	1,011.422 (METERS)

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811 OR 1-800-227-2600

FAST
Call before you UnderGround
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. 136981 FIRST APPROVAL DATE:
LVVWD APPROVED FIRE FLOW: TOTAL 1,500 GPM / ON-SITE N/A GPM

ONE OR MORE SEGMENTS OF THE DOWNSTREAM SEWER SYSTEM THAT WILL SERVE THIS PROJECT HAS NOT BEEN COMPLETED AND/OR ACCEPTED FOR MAINTENANCE BY THE CITY OF LAS VEGAS. ANY WORK DONE ON THIS PROJECT PRIOR TO THE COMPLETION AND/OR ACCEPTANCE OF THE DOWNSTREAM SEWER SYSTEM(S) SHALL BE DONE AT THE DEVELOPER'S OWN RISK. THE CITY OF LAS VEGAS RESERVES THE RIGHT TO PREVENT THE PHYSICAL CONNECTION OF THIS PROJECT INTO THE DOWNSTREAM SEWER UNTIL ALL SEGMENTS HAVE BEEN COMPLETED AND ACCEPTED FOR MAINTENANCE, OR UNTIL SUCH TIME AS THEY ARE DEEMED AVAILABLE FOR SERVICE.

DROP INLET NOTE

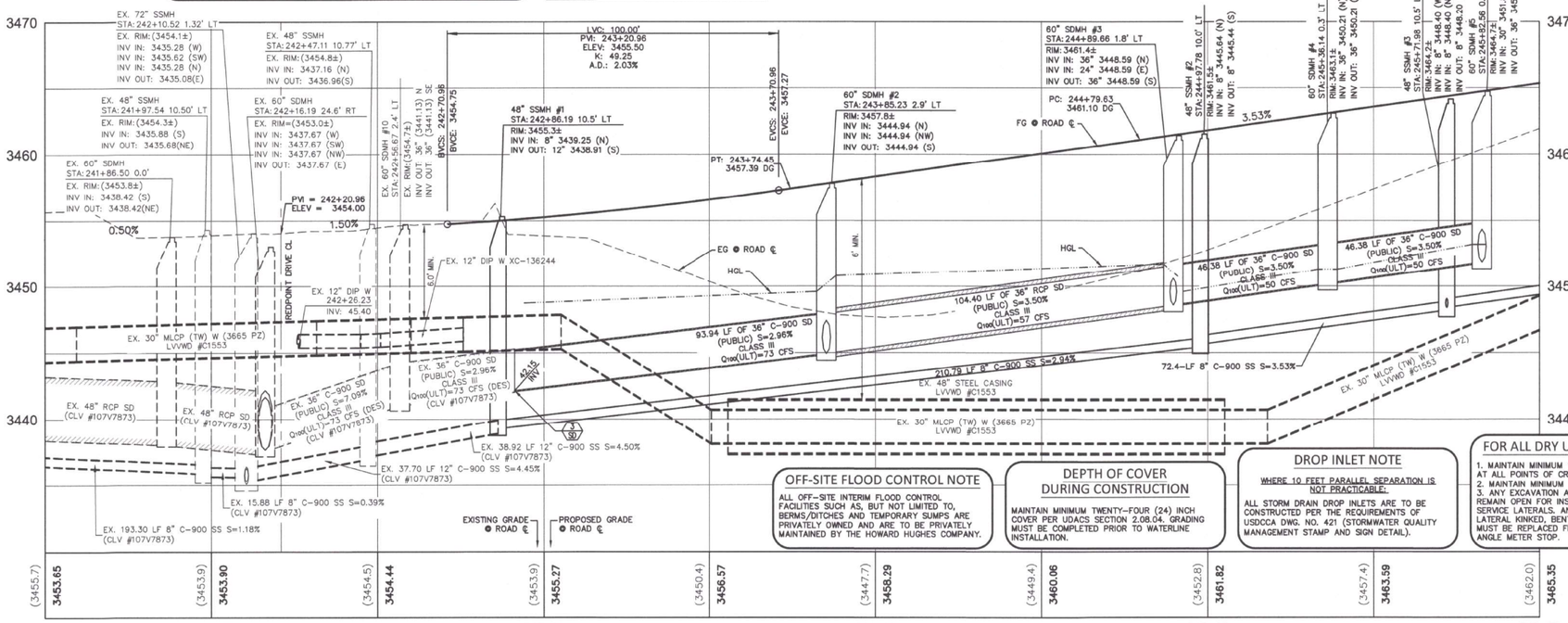
ALL STORM DRAIN DROP INLETS ARE TO BE CONSTRUCTED PER THE REQUIREMENTS OF USDCCA DWG. NO. 421 (STORMWATER QUALITY MANAGEMENT STAMP AND SIGN DETAIL).

LVVWD NOTE

PROTECT IN PLACE AND ADJUST LVVWD EXISTING FACILITIES TO FINISHED GRADE PER UDACS. ALL LVVWD FACILITIES SHALL BE ACCESSIBLE AT ALL TIMES.

CAUTION:

CATHODIC TEST WIRES RUN ALONG THE SIDE OF THE WATERLINE AT AN UNKNOWN DEPTH. TAKE CAUTION WHEN DIGGING.



OFF-SITE FLOOD CONTROL NOTE

ALL OFF-SITE INTERIM FLOOD CONTROL FACILITIES SUCH AS, BUT NOT LIMITED TO, BERMS/DITCHES AND TEMPORARY SUMPS ARE PRIVATELY OWNED AND ARE TO BE PRIVATELY MAINTAINED BY THE HOWARD HUGHES COMPANY.

DEPTH OF COVER DURING CONSTRUCTION

MAINTAIN MINIMUM TWENTY-FOUR (24) INCH COVER PER UDACS SECTION 2.08.04. GRADING MUST BE COMPLETED PRIOR TO WATERLINE INSTALLATION.

DROP INLET NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE:

ALL STORM DRAIN DROP INLETS ARE TO BE CONSTRUCTED PER THE REQUIREMENTS OF USDCCA DWG. NO. 421 (STORMWATER QUALITY MANAGEMENT STAMP AND SIGN DETAIL).

FOR ALL DRY UTILITY CROSSINGS

1. MAINTAIN MINIMUM 12" VERTICAL SEPARATION AT ALL POINTS OF CROSSING.
2. MAINTAIN MINIMUM 3' PARALLEL SEPARATION
3. ANY EXCAVATION AT BACK OF CURB MUST REMAIN OPEN FOR INSPECTION OF COPPER SERVICE LATERALS. ANY COPPER SERVICE LATERAL KINKED, BENT OR OTHERWISE DAMAGED MUST BE REPLACED FROM THE MAIN TO THE ANGLE METER STOP.

STATE OF NEVADA — PROFESSIONAL ENGINEER — MICHAEL FANG — No. 21454 — CIVIL — Exp. 06/30/2021 — DATE: 09/21/2020

REV	DATE	DESCRIPTION	AGEN. APP	DATE	CGW. APP	DATE
1	09/15/20	REVISED TC GRADES				

PROJECT NO. 62025-207
DESIGN: LG/MF
DRAWN: AS
CHECK: LG/MF
PLOT DATE: 09-21-20
PLOT TIME: 11:38:32

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com
F:\PROJECTS\62025-207\DWG\PRODUCTION\62025-207_PP.DWG
ALEXANDER SANTIAGO

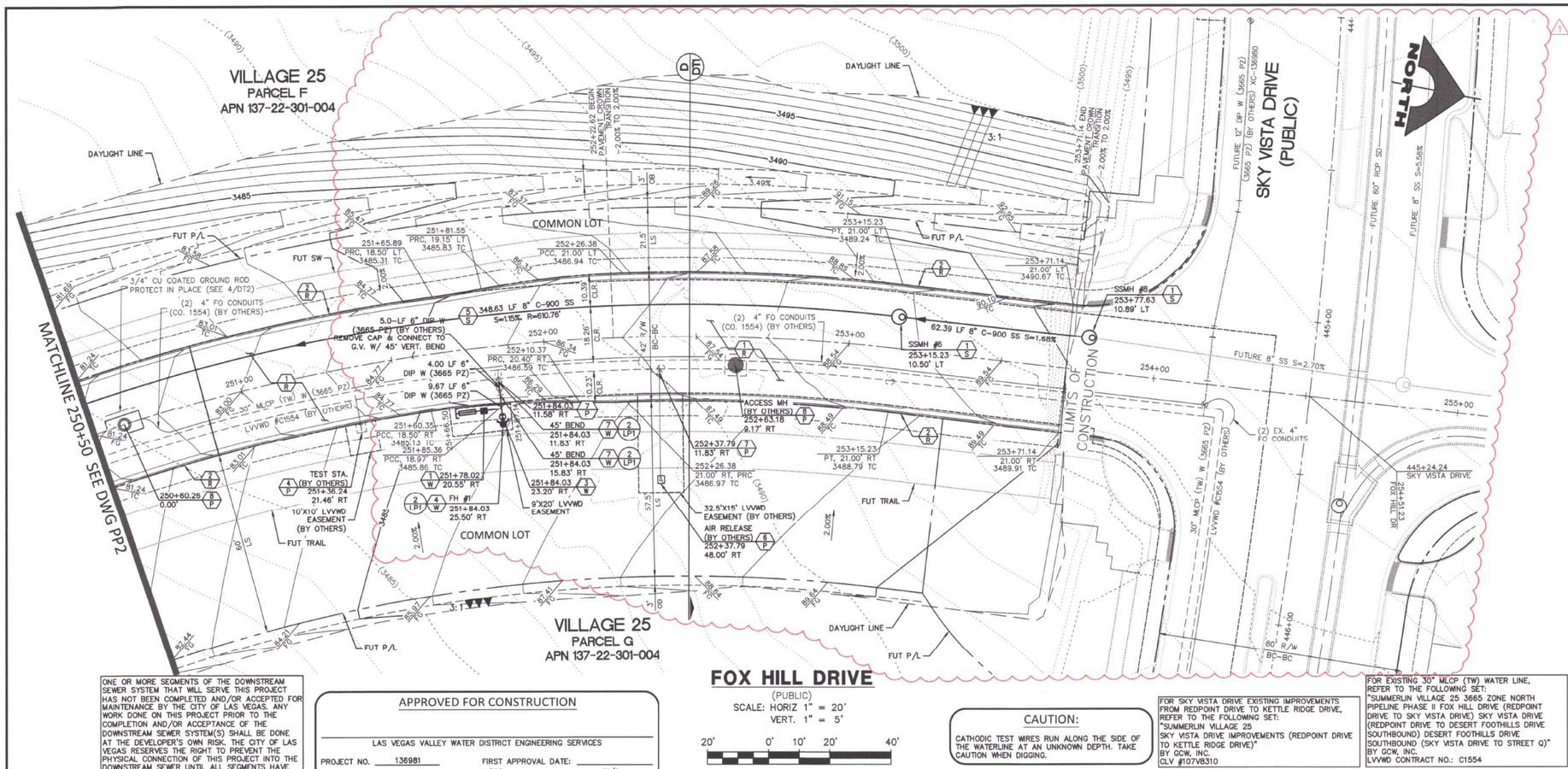
THE HOWARD HUGHES COMPANY, LLC

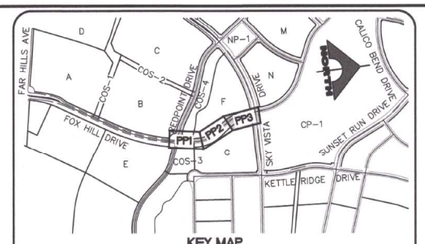
VILLAGE 25 FOX HILL DRIVE IMPROVEMENTS
REDPOINT DRIVE TO SKY VISTA DRIVE

PLAN AND PROFILE 1

DRAWING
PP1
10 OF 22 SHTS

L#: L19-02611 CLV#: 107V8096





ONE OR MORE SEGMENTS OF THE DOWNSTREAM SEWER SYSTEM THAT WILL SERVE THIS PROJECT HAS NOT BEEN COMPLETED AND/OR ACCEPTED FOR MAINTENANCE BY THE CITY OF LAS VEGAS. ANY WORK DONE ON THIS PROJECT PRIOR TO THE COMPLETION AND/OR ACCEPTANCE OF THE DOWNSTREAM SEWER SYSTEM(S) SHALL BE DONE AT THE DEVELOPER'S OWN RISK. THE CITY OF LAS VEGAS RESERVES THE RIGHT TO PREVENT THE PHYSICAL CONNECTION OF THIS PROJECT INTO THE DOWNSTREAM SEWER UNTIL ALL SEGMENTS HAVE BEEN COMPLETED AND ACCEPTED FOR MAINTENANCE, OR UNTIL SUCH TIME AS THEY ARE DEEMED AVAILABLE FOR SERVICE.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. 136981 FIRST APPROVAL DATE:

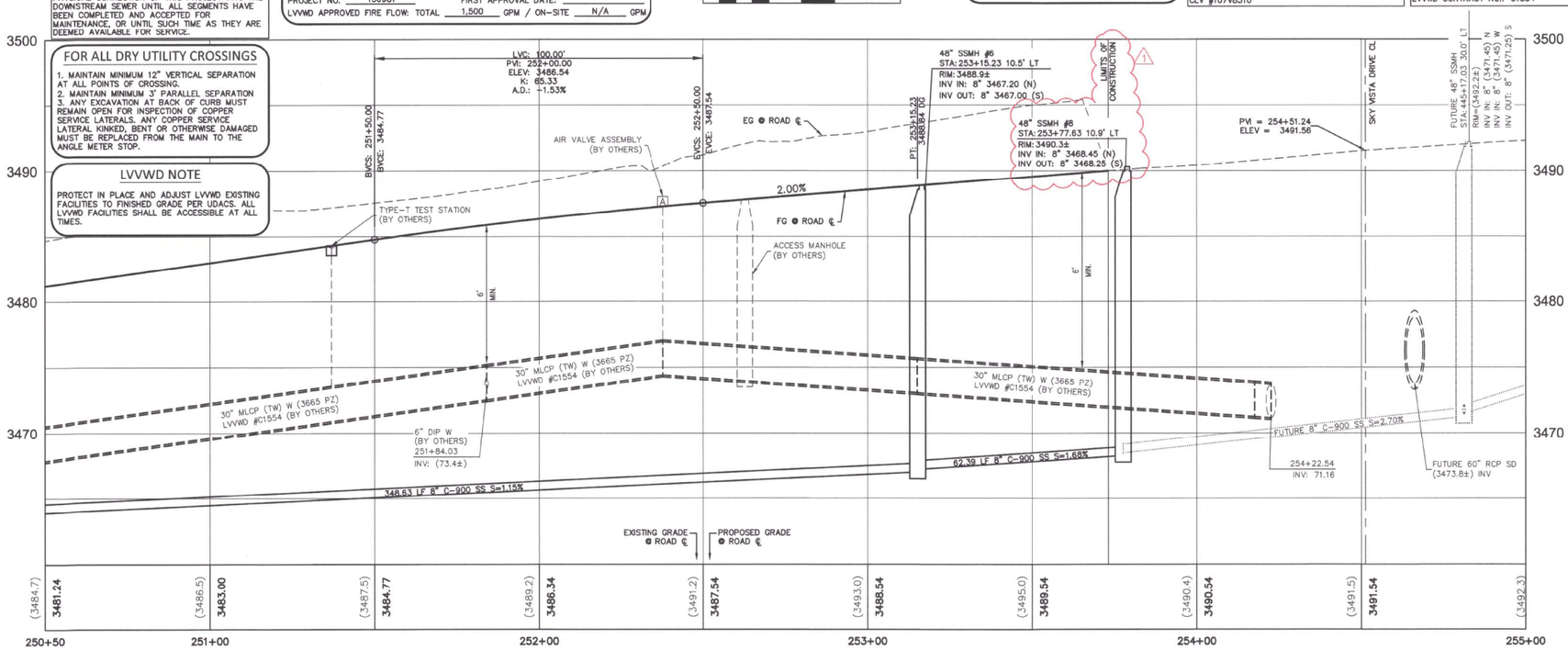
LVVWD APPROVED FIRE FLOW: TOTAL 1,500 GPM / ON-SITE N/A GPM

CAUTION:

CATHODIC TEST WIRES RUN ALONG THE SIDE OF THE WATERLINE AT AN UNKNOWN DEPTH. TAKE CAUTION WHEN DIGGING.

FOR SKY VISTA DRIVE EXISTING IMPROVEMENTS FROM REDPOINT DRIVE TO KETTLE RIDGE DRIVE, REFER TO THE FOLLOWING SET:
"SUMMERLIN VILLAGE 25
SKY VISTA DRIVE IMPROVEMENTS (REDPOINT DRIVE TO KETTLE RIDGE DRIVE)"
BY GCW, INC.
CLV #107V8310

FOR EXISTING 30" MLCP (TW) WATER LINE, REFER TO THE FOLLOWING SET:
"SUMMERLIN VILLAGE 25 3665 ZONE NORTH PIPELINE PHASE II FOX HILL DRIVE (REDPOINT DRIVE TO SKY VISTA DRIVE) SKY VISTA DRIVE (REDPOINT DRIVE TO DESERT FOOTHILLS DRIVE SOUTHBOUND) DESERT FOOTHILLS DRIVE SOUTHBOUND (SKY VISTA DRIVE TO STREET Q)"
BY GCW, INC.
LVVWD CONTRACT NO.: C1554



PROTECTION CONSTRUCTION NOTES

1. EXISTING PAVEMENT, PROTECT IN PLACE
2. EXISTING CURB/GUTTER, PROTECT IN PLACE
3. EXISTING PULLBOX, ADJUST TO FINISH GRADE
4. EXISTING TEST STATION, ADJUST TO FINISH GRADE & RELOCATE TO BEHIND CURB IF NECESSARY.
5. EXISTING BLOW-OFF, ADJUST TO FINISH GRADE PER UDACS PLT. NO. 37
6. EXISTING AVAR, ADJUST TO FINISH GRADE PER UDACS PLT. NO. 38
7. EXISTING GATE VALVE, ADJUST TO FINISH GRADE PER UDACS PLT. NO. 39
8. EXISTING WATER VAULT MH, ADJUST TO FINISH GRADE PER DETAIL 5 & 7 DWG. DT2
9. EXISTING SSMH.

ROADWAY CONSTRUCTION NOTES

1. INSTALL A.C. PAVEMENT PER STREET SECTIONS, SEE DWG. DT1
2. INSTALL "L" TYPE CURB & GUTTER, SEE SUMMERLIN STD DWG. S-47
3. INSTALL "A" TYPE CURB, SEE SUMMERLIN STD DWG. S-50
4. INSTALL CONCRETE SIDEWALK PER USD DWG NO. 234.
5. CONSTRUCT SIDEWALK RAMP PER USD DWG. NO. 235 (CASE II)

WATER CONSTRUCTION NOTES

1. INSTALL 1-½" WATER METER AND 1-½" RPPA PER DETAIL 1 DWG. DT2
2. INSTALL CAP W/ 2" BLOW-OFF ASSEMBLY PER UDACS PLT. NO. 36
3. INSTALL GATE VALVE AND BOX PER UDACS PL. NO. 30 AND 39
4. INSTALL FIRE HYDRANT & ASSEMBLY PER UDACS PLT. NO. 40. FOR "DEEP" FIRE HYDRANTS SEE UDACS PL. NO. 41.
5. INSTALL HORIZONTAL BEND PER UDACS PL. NO. 31
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7. INSTALL VERTICAL BEND PER UDACS PLT. NO. 31 UNLESS OTHERWISE IDENTIFIED. (SEE PLAN FOR ANGLE)
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SEWER CONSTRUCTION NOTES

1. INSTALL SEWER MANHOLE PER DCSWCS SD-1 & SD-4 WITH SINGLE 24" LID PER SD-3.
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3. REMOVE PLUG & CONNECT TO EX. STORM DRAIN TO NEAREST RCP JOINT OR W/ CONCRETE COLLAR PER DETAIL 6 ON DWG. DT2 (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EX. STORM DRAIN PRIOR TO CONSTRUCTION)
4. INSTALL TYPE III MANHOLE PER USD DWG. NO. 406
5. RCP TO BE CONSTRUCTED WITH WATER TIGHT JOINTS, ELASTOMERIC JOINT SEALANT, AND 4-INCHES OF SLURRY ENCASEMENT
6. LVVWD APPROVED ELASTOMERIC JOINT SEALANT AT ALL MANHOLE JOINTS.

IRRIGATION CONSTRUCTION NOTES

1. BANK "A": 1-6" & 2-4" SCH 40 PVC. PER DETAIL 3 DWG. DT2

BASIS OF BEARING AND COORDINATES

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LINEAR UNIT: US SURVEY FOOT (FTUS)
DATUM (REFERENCE FRAME): NAD 83 (2011) EPOCH 2010.00
SYSTEM: NEVADA COORDINATE REFERENCE SYSTEM (NCRS)
ZONE: LAS VEGAS HIGH ELEVATION ZONE

PROJECTION: TRANSVERSE MERCATOR
STANDARD PARALLEL (AND LATITUDE OF GRID ORIGIN): 36°15'00"N
LONGITUDE OF CENTRAL MERIDIAN: 114°58'00"W
NORTHING AT GRID ORIGIN: 400,000.00 M (1,312,333.3333 FTUS)
EASTING AT CENTRAL MERIDIAN: 300,000 M (984,250.0000 FTUS)
SCALE FACTOR ON CENTRAL MERIDIAN: 1.000135 (EXACT)

NOTES:
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BENCHMARK

BM#	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM No. 7LV0934SW6	FIND RIVET AND PLATE IN TOP OF CURB SE CORNER OF DESERT MOON RD. AND SKY VISTA DR. T20S,R59E,S34	3318.31 (FEET)	1,011.422 (METERS)

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FAST Call before you UnderGround 1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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1-702-227-2929

L#: L19-02611 CLV#: 107V8096

STATE OF NEVADA — PROFESSIONAL ENGINEER — MICHAEL FANG — Exp. 06/30/2021 — CIVIL — No. 21464 — DATE: 09/21/2020

REV	DATE	DESCRIPTION	DRN APP	DATE	AGEN APP	DATE	CGW APP	DATE
1	8/25/20	REVISED BASE LINE WORK AND GRADING						

PROJECT NO. 62025-207
DESIGN: LG/MF
DRAWN: AS
CHECK: LG/MF
PLOT DATE: 09-21-20
PLOT TIME: 11:39:16

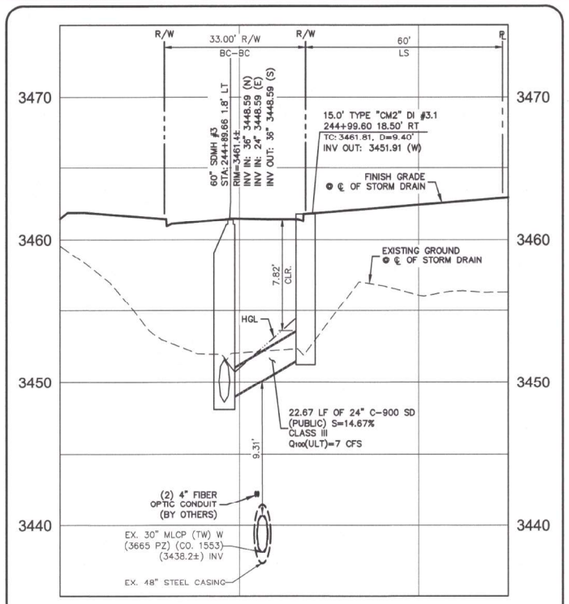
GCW
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com
ENGINEERS \ SURVEYORS
P:\PROJECTS\VOL6\62025-207\DWG\PRODUCTION\62025-207_PP3.DWG
ALEXANDER SANTIAGO

THE HOWARD HUGHES COMPANY, LLC

VILLAGE 25 FOX HILL DRIVE IMPROVEMENTS
REDPOINT DRIVE TO SKY VISTA DRIVE

PLAN AND PROFILE 3

DRAWING
PP3
12 OF 22 SHTS



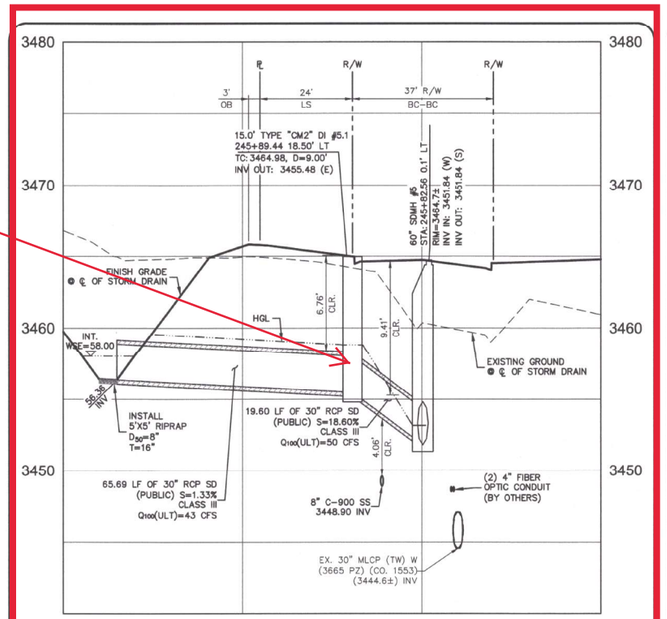
FOX HILL DRIVE
SDMH LATERAL @ 244+79.63

2 / –

SCALE: HORIZ. 1"=20', VERT. 1"=5'

SEE DRAWING PP1

STORM DRAIN TIE-IN LOCATION

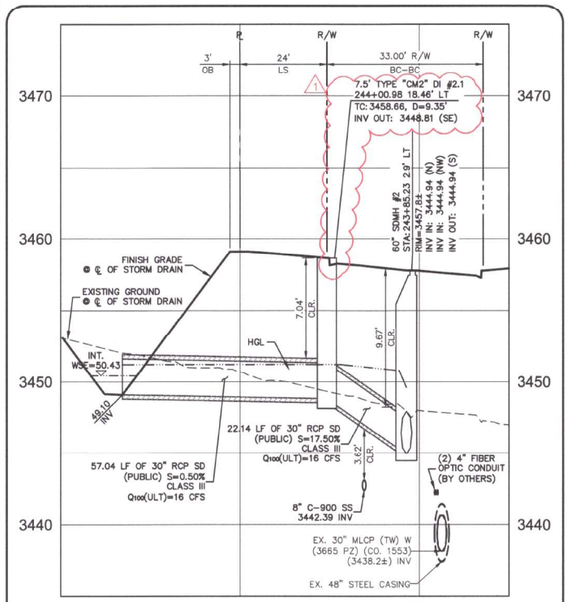


FOX HILL DRIVE
SDMH LATERAL @ 245+83.52

3 / –

SCALE: HORIZ. 1"=20', VERT. 1"=5'

SEE DRAWING PP1



FOX HILL DRIVE
SDMH LATERAL @ 243+74.24

1 / –

SCALE: HORIZ. 1"=20', VERT. 1"=5'

SEE DRAWING PP1

DROP INLET NOTE

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ALL STORM DRAIN DROP INLETS ARE TO BE CONSTRUCTED PER THE REQUIREMENTS OF USDCCA DWG. NO. 421 (STORMWATER QUALITY MANAGEMENT STAMP AND SIGN DETAIL).

HORIZONTAL SEPARATION NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE:

CAST-IN-PLACE MONOLITHIC POUR WITH WATERSTOP BETWEEN SLAB AND WALLS. BASE, WALLS AND TOP TO BE CONSTRUCTED WITH WATERSTOPS, CENTER BULB OR FLAT STRIP (VINYLEX, GREENSTREAK PLASTIC PRODUCTS OR APPROVED EQUAL).

CONSTRUCTION NOTE

IN AREAS WHERE THE EXCAVATION OR GROUND ELEVATION IS LESS THAN THREE (3) FEET, FROM THE TOP OF THE LVVWD TRANSMISSION MAIN, NO EXCAVATION EQUIPMENT, OTHER THAN HAND HELD EQUIPMENT WILL BE ALLOWED WITHIN TEN (10) FEET OF THE PIPELINE IN THESE AREAS. THE CONTRACTOR IS TO PLACE A CONCRETE BARRIER; I.E. JERSEY RAIL, TO IDENTIFY AND PROTECT THE "NO EQUIPMENT ZONE".

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. 136981 FIRST APPROVAL DATE: _____

L#: L19-02611 CLV#: 107V8096

ENGINEER - STATE OF NEVADA PROFESSIONAL
MICHAEL FANG
No. 24457
CIVIL
Exp. 06/30/2022
DATE: 09/21/2020

REV	DATE	DESCRIPTION	DATE AGEN APP	DATE CGW APP
Δ	09/15/20	REVISED TC GRADE		

PROJECT NO. 62025-207

DESIGN: LG/MF
DRAWN: AS
CHECK: LG/MF
PLOT DATE: 09-21-20
PLOT TIME: 11:46:37

GCW
ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

F:\PROJECTS\600\62025-207\DWG\PRODUCTION\62025-207_LAT-PROD.DWG

ALEXANDER SANTIAGO

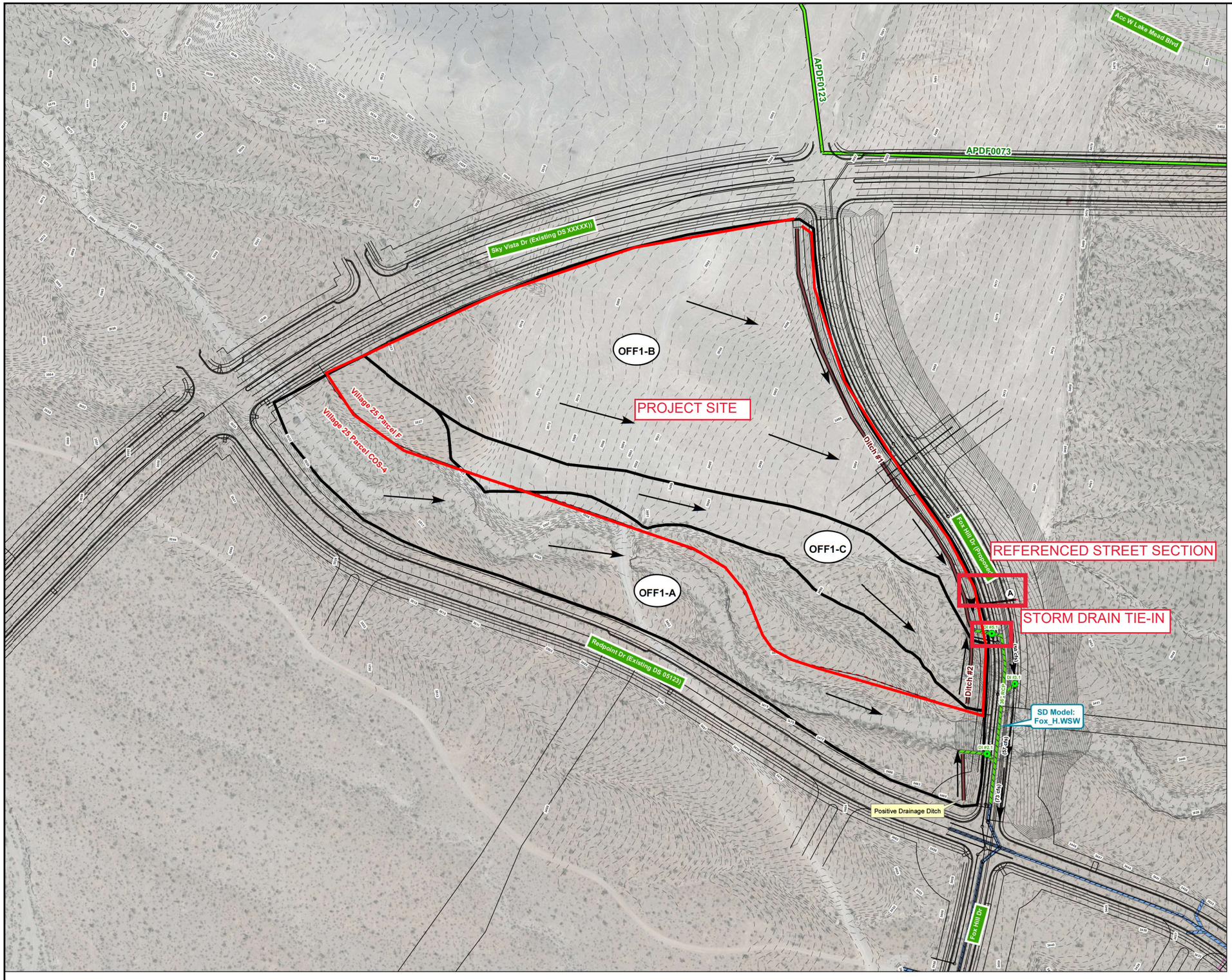
THE HOWARD HUGHES COMPANY, LLC

VILLAGE 25 FOX HILL DRIVE IMPROVEMENTS
REDPOINT DRIVE TO SKY VISTA DRIVE

LATERAL PROFILES 2

DRAWING
LP2
14 OF 22 SHTS

REFERENCED EXISTING CONDITION



NORTH

100 0 100 Feet

1 in = 80 ft

Legend

- DI
- Proposed SD
- Roadways
- Cross Section
- Ultimate Condition Parcel Boundaries
- Flow Direction
- Ditch
- Interim Subbasins
- Existing SD
- 1-ft Existing Contours
- 1-ft Proposed Contours
- Assessor Map
- Street Centerline

CCRFCD Facilities

STATUS

- COM
- CON
- PRO
- TN1
- TN2

(XX CFS) Ultimate Condition SD Flowrate

INTERIM CONDITIONS PRORATED FLOW SUMMARY

Subbasin ID	Q_{100} (cfs)	Area (acres)	
OFF1	828	642.2	
Referenced from Desert Foothills Study			
Prorated Subbasins			
Subbasin ID	Q_{100} (cfs)	Area (acres)	Reference Subbasin
OFF1-A	8	6.0	OFF1
OFF1-B	9	7.0	OFF1
OFF1-C	3	2.1	OFF1

ULTMATE CONDITION FLOW SUMMARY

* Referenced from the Master Drainage Study for Village 25		
BASIN ID	**Q_{100} (cfs)**	**Area (acres)**
F	43	10.4
COS-4	16	5.0
FOX4	14	3.2

100-YEAR FLOW CHARACTERISTICS ULTIMATE CONDITIONS

Cross Section	Slope (%)	Q_{100} (cfs)	Depth (ft) / HW Elevation	Velocity (ft/s)	D*V	NOTE
A	3.5	14.0	0.38	4.5	1.7	37' Street

INTERIM CONDITIONS 100-YEAR DITCH CHARACTERISTICS

Section	Slope (%)	Q_{100} (cfs)	Depth of flow (ft)	Left Side Slope (H:V)	Right Side Slope (H:V)	Velocity (ft/s)	Bottom Width (ft)
Ditch #1	3.55	9	0.32	3.0	3.0	4.70	5
Ditch #2	0.54	3	0.69	3.0	3.0	2.08	-

DATE:
CCRV APP'D
DATE
AGEN APP'D
DATE
DESCRIPTION
DATE
REV

PROJECT NO. 62025-207
DESIGN:
DRAWN:
CHECK:
PLOT DATE: 04/18/2019
PLOT TIME: 2:47:31 PM

GCW ENGINEERS\SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
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gcwengineering.com

F:\Projects\600\62025-207\Division\Fcd\Figures\GIS\FIG5.mxd
medalat

THE HOWARD HUGHES COMPANY, LLC

VILLAGE 25 FOX I IILL DRIVE IMPROVEMENTS (REDPOINT DRIVE TO SKY VISTA DRIVE)

INTERIM CONDITION DRAINAGE MAP

DRAWING
FIG5
1 OF 1 SHTS

APPENDIX C

Legend

Project Site

GRAPHIC SCALE

0 750 1500 2250 3000 ft

NORTH

DEC 2020

5523-A077

PARDEE HOMES

VILLAGE 25 PARCEL F

FIGURE 1

LOCATION MAP

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F: 702.804.2299
gcwengineering.com

F:\Projects\500\5523-A077\Division\Ecil\Figures\GIS\Maps\1911-Upfront_Exhibits.qgz

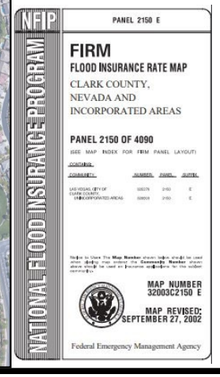
LEGEND

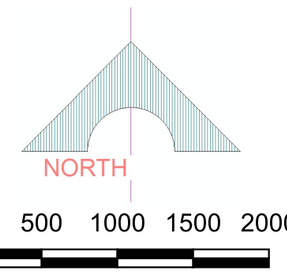
- Project Site

FEMA FLOOD ZONE

- ZONE SHADED X
- Zone A
- ZONE AE
- Zone AO

THE PROJECT SITE LIES WITHIN ZONE X. ZONE X IS CLASSIFIED AS BEING OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.





GCV ENGINEERS \ SURVEYORS

DATE: DEC 2020
DRAFTER:
DESIGNER: NB
PROJECT NO:5523-A077

PARDEE HOMES
VILLAGE 25 PARCEL F
FEMA FIRM MAP

SHEET
FIGURE 2
SHEET 1 OF 1

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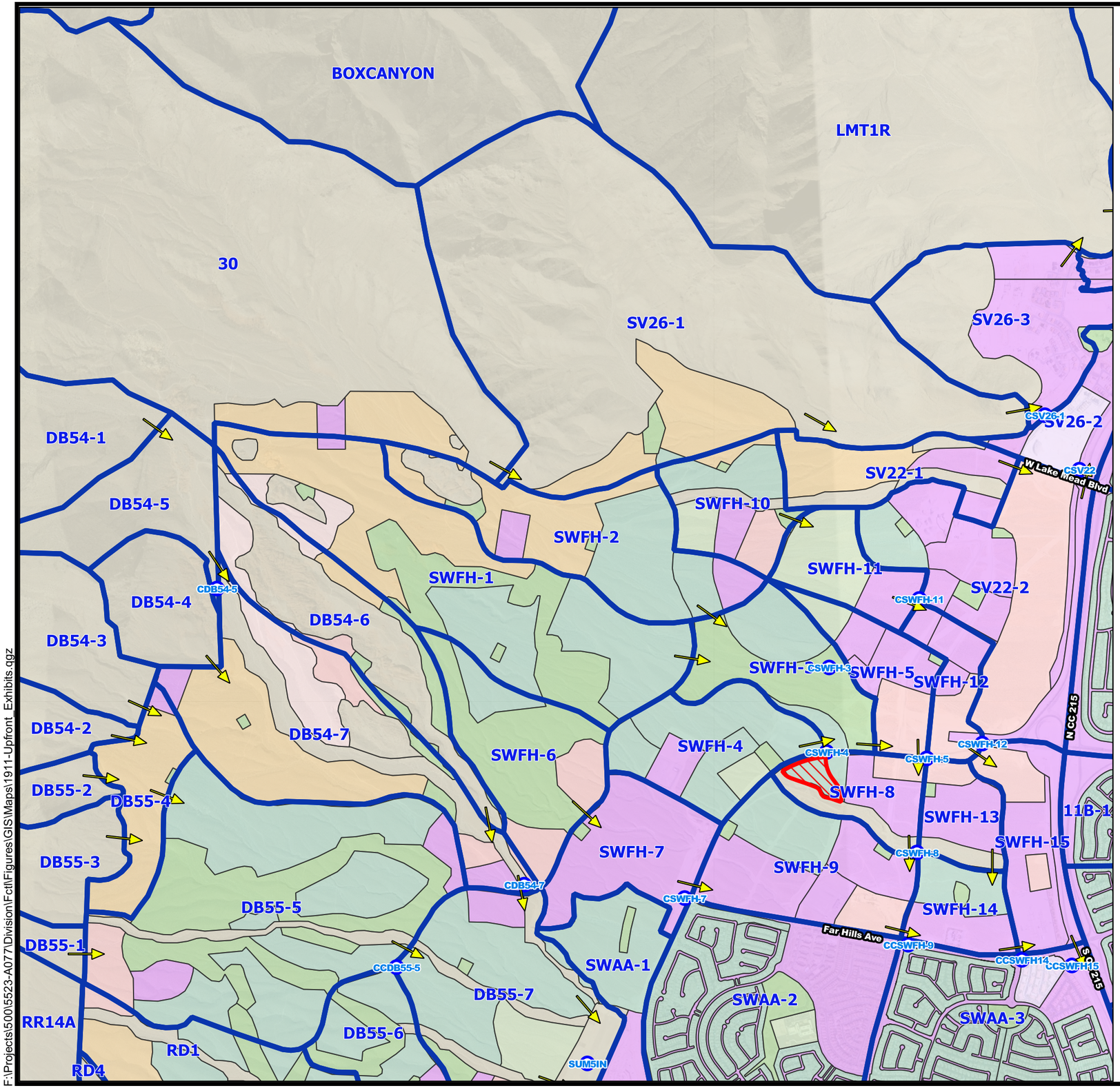

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LEGEND

- Project Site

Planned Land Use

- Undeveloped Land, Opendesert
- Parks, Golf Courses
- Rural, 0.5-1 units per acre (uses1 unit/acre)
- Low-Density Residential, 1-2units per acre (uses 2 units/acre)
- Medium-Density Residential, 2-4 units per acre (uses 3 units/acre)
- High-Density Residential, 4-8units per acre (uses 6 units/acre)
- Public Facility and Residential,8-12 units/acre
- Very High-Density Residential,12 units/acre or more
- Commercial, Retail, Casino,High Rise Condominiums
- Light Industrial
- Heavy Industrial
- Schools
- Lakes

NORTH

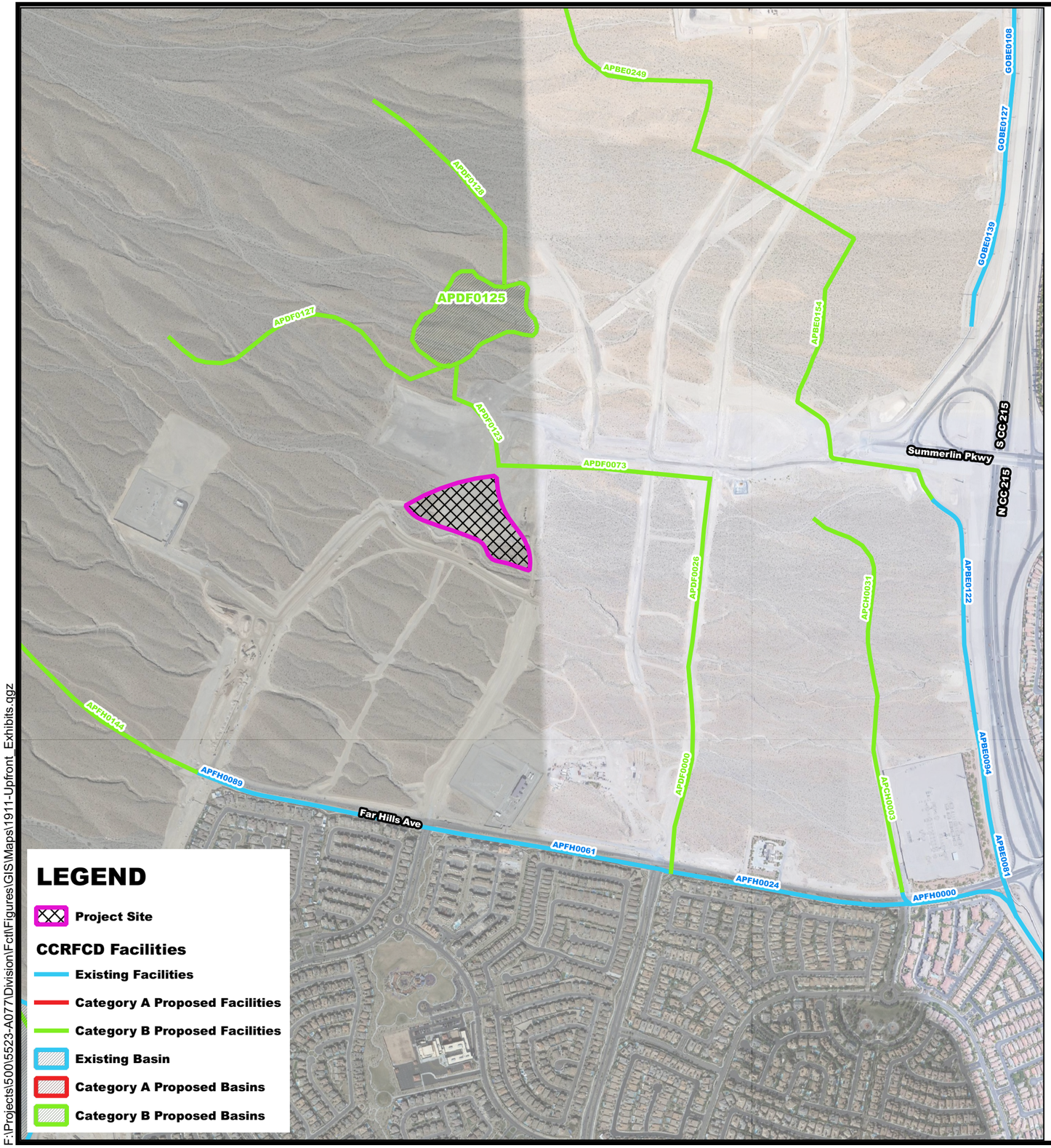
0 1000 2000 3000 4000 ft

GCV ENGINEERS \ SURVEYORS

DATE: DEC 2020
DRAFTER:
DESIGNER: NB
PROJECT NO:5523-A077

PARDEE HOMES
VILLAGE 25 PARCEL F
2018 CCRFCD WATERSHED MAP

SHEET
FIGURE 3
SHEET 1 OF 1



MPU ID	DESCRIPTION	TRIB A	DESIGN Q	STATUS
APBE0051	CONC CHNL 20'W 7'D 2:1 SS	3.39	3366	COM
APBE0081	8' X 8' RCBC @ FAR HILLS	0.59	1048	COM
APBE0094	CONC CHNL 10'W 5'D 2:1 SS	0.59	1048	COM
APBE0122	CONC CHNL 10'W 4'D 2:1 SS	0.59	1048	COM
APBE0154	8' X 6' RCB	0.41	781	PRO
APBE0249	6' X 5' RCB	0.31	606	PRO
APCH0000	8' X 6' RCB	0.21	399	COM
APCH0003	72" RCP	0.21	399	PRO
APCH0031	60" RCP	0.1	206	PRO
APDF0000	10' X 6' RCB	0.8	1428	PRO
APDF0026	8' X 6' RCB	1.8	968	PRO
APDF0073	6' X 4' RCB	1.52	486	PRO
APDF0123	42" RCP	1.29	141	PRO
APDF0127	6' X 6' RCB	0.69	853	PRO
APDF0128	5' X 4' RCB	0.37	509	PRO
APFH0000	2: 8' X 8' RCB	1.51	2494	COM
APFH0019	2: 8' X 8' RCB	1.3	2149	COM
APFH0024	16' X 8' RCAP	1.3	2149	COM
APFH0061	8' X 6' RCB	0.5	839	COM
APFH0089	8' X 6' RCB	0.5	839	COM
APFH0144	5' X 4' RCB	0.28	456	PRO
APM50008	CONC CHNL 50'W 4.5'D 2:1 SS	4.13	3634	PRO
GOBE0108	CONC CHNL 20'W 6'D 2:1 SS	0.49	782	COM
GOBE0127	CONC CHNL 20'W 6'D 2:1 SS	0.49	782	COM
GOBE0139	CONC CHNL 10'W 5.5'D 2:1 SS	0.49	782	COM

MPU ID	DESCRIPTION	TRIB A	DESIGN Q	STATUS
APM50000	384 AC-FT DETENTION BASIN #5	6.73	6856	COM
APDF0125	130 AC-FT GRAND PARK DETENTION BASIN	1.29	1543	PRO

NORTH

0 500 1000 1500 2000 ft

GCV ENGINEERS \ SURVEYORS

DATE: DEC 2020

DRAFTER:

DESIGNER: NB

PROJECT NO:5523-A077

PARDEE HOMES

VILLAGE 25 PARCEL F

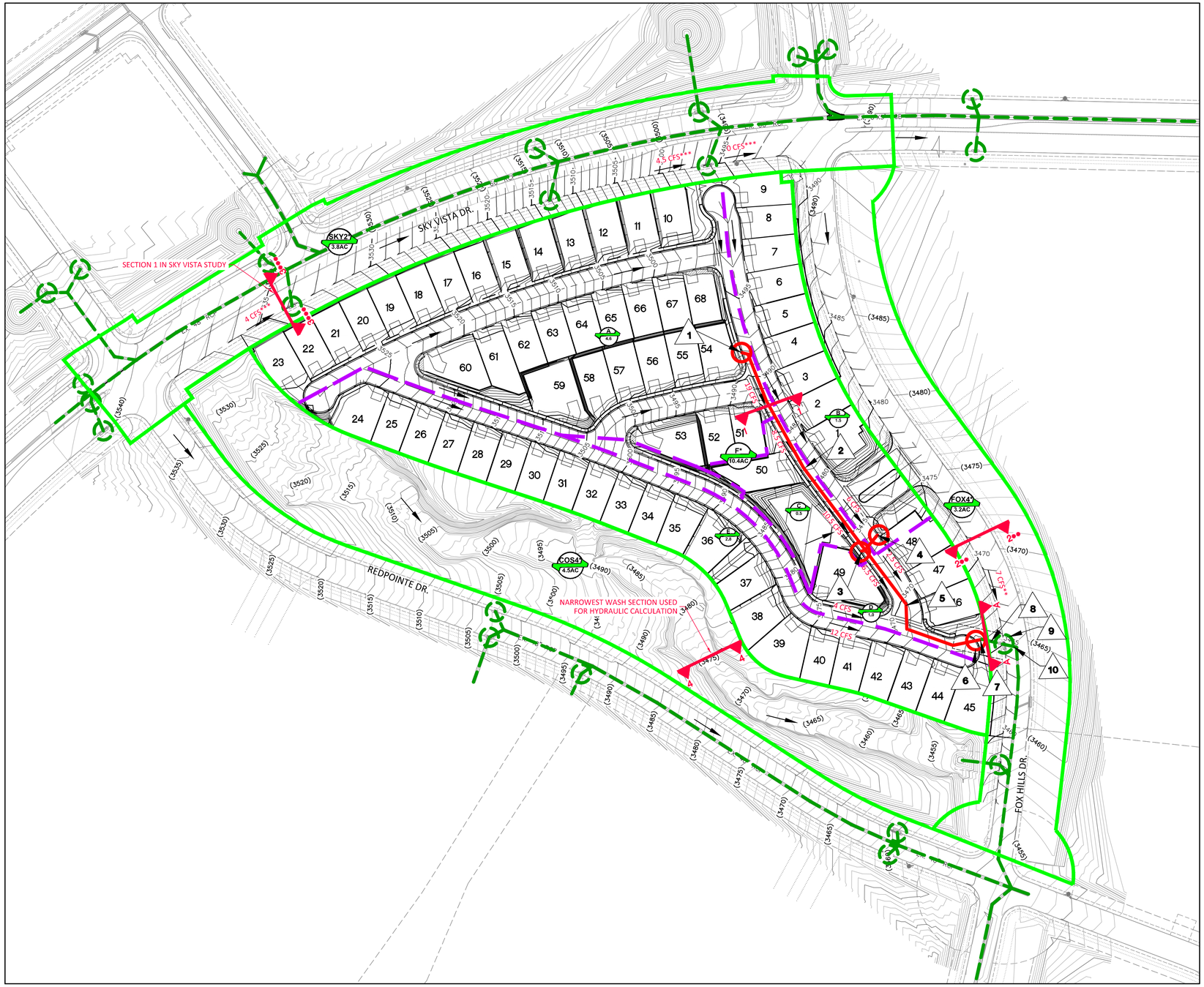
2018 CCRFCD FACILITIES MAP

SHEET

FIGURE 4

SHEET 1 OF 1

F:\Projects\500\5523-A077\Division\Fct\Figures\GIS\Maps\1911-Upfront_Exhibits.qgz



NORTH

SCALE 80 0 80 160 FEET

ULTIMATE CONDITION
PRORATED FLOW SUMMARY

BASINS			
Subbasin	Area (acres)	Q_{100} (cfs)	100-YR cfs/acre
F*	10.4	43	4.12
PRORATED BASINS			
Subbasin	Area (acres)	Q_{100} (cfs)	100-YR cfs/acre
A	4.6	19	4.12
B	1.5	6	4.12
C	0.5	2	4.12
D	1.0	4	4.12
E	2.8	12	4.12
TOTAL	**10.4**	**43**	**NA**

*Referenced from the Village 25 Study

Ultimate Condition
100-Year Hydraulic Summary Table

Section ID	Slope (%)	Q_{100} (cfs)	Depth (ft)	Velocity (fps)	DxV
1 (Max Slope)	7.94	19	0.45	7.6	3.4
1 (Min Slope)	1.50	19	0.55	4.3	2.3
2**	3.53	14	0.38	4.5	1.7
3***	2.00	4	0.35	3.1	1.1
4	6.80	16	0.17	3.9	-

** Referenced from the Fox Hills Drive Study
*** Referenced from the Sky Vista Study

FLOOD PROTECTION FACILITIES

LOCATION	Q_{100} (cfs)	Q_{100} Bypass (cfs)	FACILITY
1	19	8.5	12.5' TYPE CM2 DROP INLET
2	10.5	-	18" RCP
3	10.5	6.5	5' TYPE DM2 DROP INLET
4	6	2.5	5' TYPE DM2 DROP INLET
5	18	-	24" RCP
6	25	0	10' TYPE DM2 DROP INLET
7	43	-	30" RCP
8	43	-	EX. '30" RCP
9	7	0	EX. 15' TYPE CM2 INLET
10	50	-	EX. '30" RCP

DATE:
GCW APP
DATE
AGEN APP
DATE
DESCRIPTION
REV
DATE

PROJECT NO. 5523-A077
DESIGN: NB
DRAWN: NB
CHECK: SJ
PLOT DATE: 01-06-21
PLOT TIME: 11:21:38

GCW
ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
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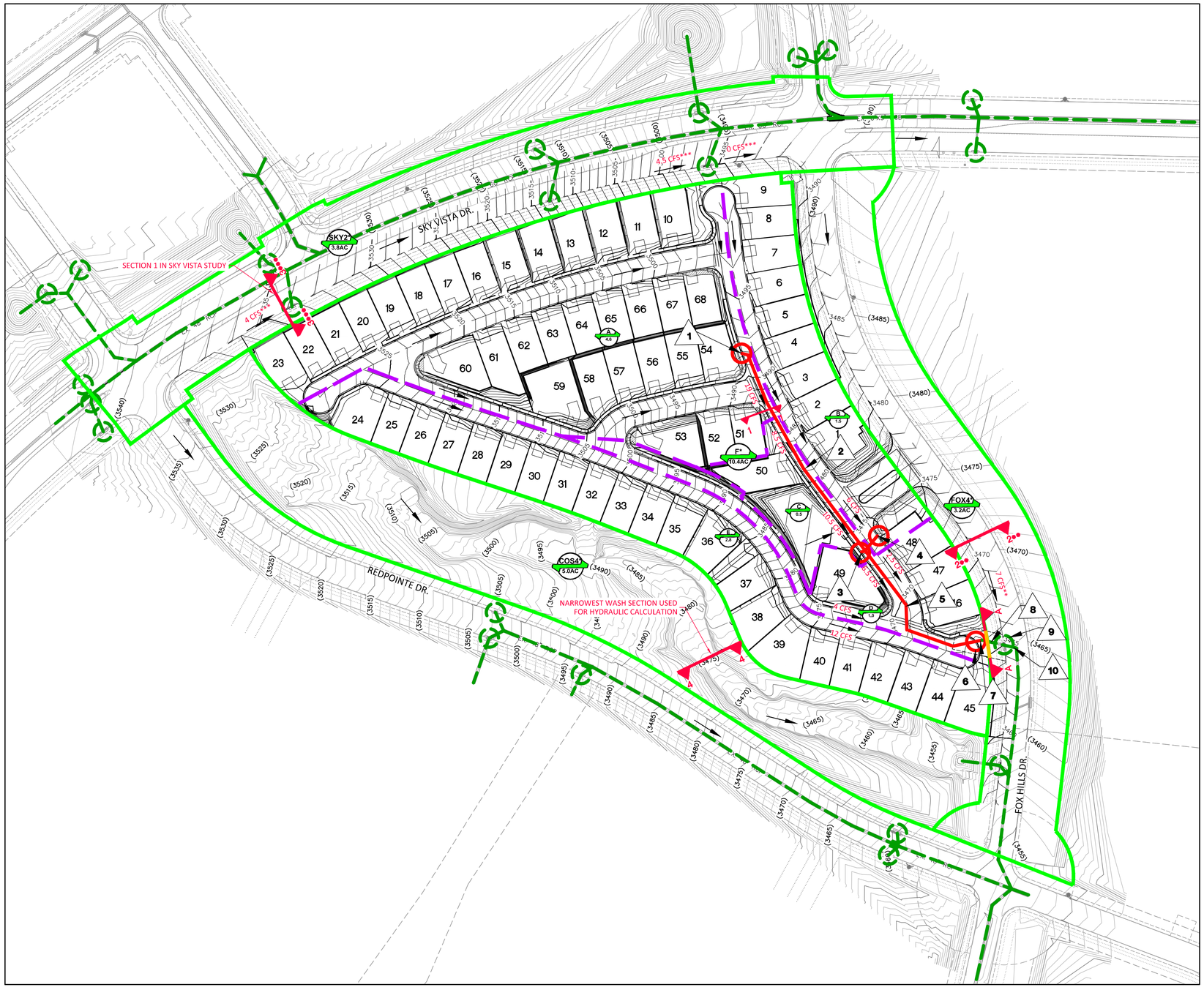
F:\PROJECTS\5001\5523-A077\DIVISION\FCTL\FIGURES\ULTIMATE CONDITION.DWG
NELSON BAGGS

PARDEE HOMES
VILLAGE 25 PARCEL F
PROPOSED CONDITION DRAINAGE MAP

DRAWING
FIG5
1 OF 1 SHTS



NORTH

SCALE 80 0 80 160 FEET

LEGEND

- SUBBASIN ID
- PRORATE ID
- SUBBASIN BOUNDARY
- FLOW DIRECTION
- CROSS SECTION
- PRORATED SUBBASIN BOUNDARY
- PROPOSED FACILITY
- EXISTING FACILITY
- EMERGENCY OVERFLOW WEIR WIDTH

ULTIMATE CONDITION PRORATED FLOW SUMMARY

BASINS

Subbasin	Area (acres)	Q_{100} (cfs)	100-YR cfs/acre
F*	10.4	43	4.12
COS4*	5.0	16	3.17

PRORATED BASINS

Subbasin	Prorate Subbasin	Area (acres)	Q_{100} (cfs)	100-YR cfs/acre
F*	A	4.6	19	4.12
	B	1.5	6	4.12
	C	0.5	2	4.12
	D	1.0	4	4.12
	E	2.8	12	4.12
	TOTAL	**10.4**	**43**	**NA**

*Referenced from the Village 25 Study

Ultimate Condition
100-Year Hydraulic Summary Table

Section ID	Slope (%)	Q_{100} (cfs)	Depth (ft)	Velocity (fps)	DxV
1 (Max Slope)	7.94	19	0.45	7.6	3.4
1 (Min Slope)	1.50	19	0.55	4.3	2.3
2**	3.53	14	0.38	4.5	1.7
3***	2.00	4	0.35	3.1	1.1
4	6.80	16	0.17	3.9	-

** Referenced from the Fox Hills Drive Study
*** Referenced from the Sky Vista Study

Emergency Overflow Summary Table

Section ID	Tributary Sources	Q_{100} (cfs)	Width (ft)	Type of Analysis	Depth (ft)	Velocity (fps)
A	F*	43.0	41	Weir	0.5	2.11

FLOOD PROTECTION FACILITIES

LOCATION	Q_{100} (cfs)	Q_{100} Bypass (cfs)	FACILITY
1	19	8.5	12.5' TYPE CM2 DROP INLET
2	10.5	-	18" RCP
3	10.5	6.5	5' TYPE DM2 DROP INLET
4	6	2.5	5' TYPE DM2 DROP INLET
5	18	-	24" RCP
6	25	0	10' TYPE DM2 DROP INLET
7	43	-	30" RCP
8	43	-	EX. '30" RCP
9	7	0	EX. 15' TYPE CM2 INLET
10	50	-	EX. '30" RCP

DATE:
GCW APP
DATE
AGEN APP
DATE
DESCRIPTION
REV
DATE

PROJECT NO. 5523-A077
DESIGN: NB
DRAWN: NB
CHECK: SJ
PLOT DATE: 01-07-21
PLOT TIME: 13:52:40

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
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gcwengineering.com

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NELSON BAGGS

PARDEE HOMES
VILLAGE 25 PARCEL F
PROPOSED CONDITION DRAINAGE MAP

DRAWING
FIG5
1 OF 1 SHTS

GROSS ACREAGE:	12.66
NO. OF LOTS:	68
DENSITY(UNIT/AC):	5.37

IMPROVEMENT PLAN
FOR
SUMMERLIN VILLAGE 25 - PARCEL F
APN # 137-22-301-004

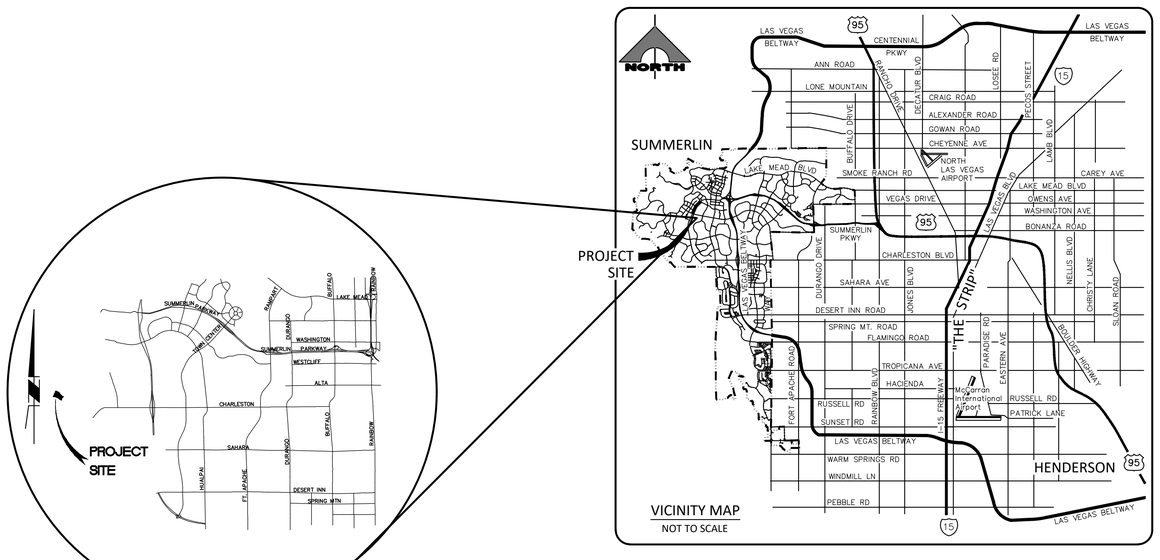
ACREAGE/AREA OF LAND DISTURBANCE:
12.66 AC

PARCEL F IS A PORTION OF LOT 1 MAPPED WITH THE PARCEL MAP RECORDED IN FILE 125 PAGE 15 OF PARCEL MAPS BY THE CITY OF LAS VEGAS ON SEPTEMBER 24, 2019.
APN# 137-22-301-004

PARCEL F WILL BE ESTABLISHED AS A SEPARATE LEGAL PARCEL BY HHC WITH THE VILLAGE 25 UNIT 3 FINAL MAP.

INDEX OF DRAWINGS

SHEET NUMBER	SHEET NAME	SHEET TITLE
1	C1	COVER SHEET
2	C2	GENERAL NOTES
3	C3	LEGEND, ABBREVIATIONS, AND QUANTITIES
4	G1	GRADING PLAN 1
5	G2	GRADING PLAN 2
6	G3	GRADING PLAN 3
7	G4	GRADING PLAN 4
8	DT1	GRADING SECTIONS AND DETAILS 1
9	DT2	GRADING SECTIONS AND DETAILS 2
10	DT3	GRADING SECTIONS AND DETAILS 3
11	P1	ARROYOS EDGE STA: 10+00.00 TO STA: 11+48.50 PLAN AND PROFILE
12	P2	CARLON HILLS STA: 10+00.00 TO STA: 13+50.00 PLAN AND PROFILE
13	P3	CARLON HILLS STA: 13+50.00 TO STA: 16+88.36 PLAN AND PROFILE
14	P4	HIGHBANK STA: 10+00.00 TO STA: 14+50.00 PLAN AND PROFILE
15	P5	HIGHBANK STA: 14+50.00 TO STA: 17+00.00 PLAN AND PROFILE
16	P6	HIGHBANK STA: 17+00.00 TO STA: 20+77.52 PLAN AND PROFILE
17	P7	KEYS VIEW STA: 10+00.00 TO STA: 13+50.00 PLAN AND PROFILE
18	P8	PARKER MESA STA: 10+00.00 TO STA: 13+00.00 PLAN AND PROFILE
19	P9	PARKER MESA STA: 13+00.00 TO STA: 17+58.10 PLAN AND PROFILE
20	LAT	STORM DRAIN LATERALS
21	MU	MASTER UTILITY PLAN
22	U1	UTILITY PLAN 1
23	U2	UTILITY PLAN 2
24	U3	UTILITY PLAN 3
25	U4	UTILITY PLAN 4
26	T1	TRAFFIC AND HORIZONTAL CONTROL PLAN 1
27	T2	TRAFFIC AND HORIZONTAL CONTROL PLAN 2
28	T3	TRAFFIC AND HORIZONTAL CONTROL PLAN 3
29	T4	TRAFFIC AND HORIZONTAL CONTROL PLAN 4



BASIS OF BEARING:

NORTH 05°36'00" WEST, BEING THE BEARING OF THE WEST LINE OF THE SOUTHWEST QUARTER (SW ¼) OF SECTION 33, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M. AS SHOWN IN BOOK 152, PAGE 41 OF PLATS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

CITY OF LAS VEGAS BENCHMARK NO. D368, U.S.C. & G.S. DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD & WEST OF DETENTION BASIN.

ELEVATION: 3246.63 (FEET)
989.574 (METERS)

BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

OWNER/DEVELOPER

PARDEE HOMES OF NEVADA
4675 W. TECO AVENUE, SUITE 115
LAS VEGAS, NV 89118
(702) 614-1400

ENGINEER

GCW, INC.
1555 SOUTH RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
(702) 804-2000
(702) 804-2299 (FAX)

UTILITY/AGENCY APPROVALS

COX COMMUNICATIONS LAS VEGAS, INC. — DATE

CENTRAL TELEPHONE COMPANY, DBA CENTURY LINK — DATE

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

NV ENERGY — DATE

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

NV ENERGY – TRANSMISSION ENGINEERING — DATE

SOUTHWEST GAS CORP. — DATE

ALLEN PAVELKA, PE# 9029 — DATE
CITY ENGINEER/ACTING
CITY OF LAS VEGAS, NEVADA

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

CLV PLANNING DEPARTMENT

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE CITY OF LAS VEGAS PLANNING DEPARTMENT

PLANNING DEPARTMENT — DATE

APPROVED FOR CONSTRUCTION

LAS VEGAS FIRE AND RESCUE, FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL — DATE

SUMMERLIN DESIGN REVIEW COMMITTEE — DATE

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. 135633 FIRST APPROVED DATE: _____
LVVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW 30 GPM
SHEETS: C1-C3, DT3, MU, U1-U9, P1-P19, LAT

ENGINEER

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811 or 1-800-642-2444

FAST LANE
Call before you UnderGround
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

PROFESSIONAL ENGINEER — STATE OF NEVADA — No. 14918 — LUKY NGUYEN — exp. 12/31/2021 — CIVIL — DATE: 01/07/2021

60% REVIEW - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	AGEN APP	DATE	GCW APP	DATE

PROJECT NO. 5523-A077
DESIGN: GCW
DRAWN: GCW
CHECK: GCW
PLOT DATE: 01-07-21
PLOT TIME: 16:31:45

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LUKY ROXANA LOPEZ

PARDEE HOMES
VILLAGE 25 PARCEL F
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1 OF 30 SHTS

CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA". LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE, AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE'S WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY

    XXXXXXXXXXXXX, REPORT # XXXXX-X,
    DATE XXXXXXXXX XXTH, 20XX APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.

WALL NOTES:

16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC, THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
21. AFTER HAUNCHING AND PRIOR TO BACKFILL OPERATIONS WHICH WOULD COVER SANITARY SEWER AND STORM DRAIN FACILITIES, CONTRACTOR IS REQUIRED TO SCHEDULE CLV OPEN-TRENCH UTILITY SURVEY INSPECTION FOR DETERMINATION OF FINAL LOCATION COORDINATES. FACILITIES TO BE LOCATED BY CLV SHALL INCLUDE AT A MINIMUM THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, SEWER AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS.

    OR

    (MAY BE USED ONLY ON PROJECTS ASSOCIATED WITH A TENTATIVE MAP CONTAINING 5 LOTS OR MORE)

    - SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE CITY AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION. THE MAP(S) SHALL INCLUDE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, SEWER AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. THE LOCATION SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE OFFICIAL HORIZONTAL AND VERTICAL CONTROL NETWORKS OF THE CITY OF LAS VEGAS. FINAL LOCATION MAPS MUST BE SEALED AND CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINTIES OF ± 0.09 METERS (± 0.3 FEET) HORIZONTALLY AND VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).
22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST EDITION.
23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

REVISED 06/04/18

CITY OF LAS VEGAS FIRE AND RESCUE GENERAL NOTES FOR HYDRANTS AND ACCESS

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 SECTION 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 SECTION 3310, SECTION 3312]
5. TO IDENTIFY FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [IFC SECTION 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 SECTION 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 SECTION 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 SECTION 507]
9. PRIVATE FIRE HYDRANTS SHALL BE PAINTED RED. [IFC SECTION 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 SECTION 507]
11. FIRE HYDRANTS SPACING SHALL BE AS FOLLOWS: [IFC SECTION 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 1,000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. [IFC SECTION 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 SECTION 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 SECTION 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 SECTION C102.7]
17. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [IFC SECTION 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 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 SECTION 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 SECTION 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6% [IFC SECTION 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 13 FT 6 IN. [IFC SECTION 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 NOT BE LESS THAN 24 FT. [IFC SECTION 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 SECTION 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 200 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-ENDS OR 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 SECTION 503.3]
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. [IFC SECTION 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 PROPOSED LOCATION SHALL BE LOCATED ON THE SAME SIDE OF THE STREET AS THE PROPOSED DEVELOPMENT. CLV REGULATION.

REVISED FEBRUARY 4, 2019

FLOOD ZONE NOTE

NO PORTION OF THE SITE FALLS WITHIN A FEMA DESIGNATED SPECIAL FLOOD HAZARD AREA. SITE LOCATED ON PANEL XXXXXXXXXXX, DATED XXXXXXXXXX XX, 20XX, AND PANEL XXXXXXXXXX, DATED XXXXXXXXXX XX, 20XX. THIS PANEL SHOWS THAT THE PROJECT IS LOCATED WITHIN A ZONE X AND NOT LOCATED WITHIN A FEMA DESIGNATED 100-YEAR ZONE A OR SPECIAL FLOOD HAZARD AREA.

CITY OF LAS VEGAS GRADING NOTES

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

- 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 HIW OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.

REVISED 4/15/10

CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" 'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

REVISED 04/15/10

LAS VEGAS VALLEY CONSTRUCTION STORMWATER RUNOFF MANAGEMENT - STANDARD NOTES

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 THE CITY OF LAS VEGAS AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
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 THE CLARK COUNTY UDACS 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 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.

LAS VEGAS VALLEY WATER DISTRICT LVVWD PROJECT # XXXXXX

(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 THESE 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 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

ABBREVIATIONS

A	AIR	DIA, ⌀	DIAMETER	NOSHA	STATE OF NEVADA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION	SF	SQUARE FOOT/FEET
AC	ASPHALT CONCRETE, ACRE	DIP	DUCTILE IRON PIPE			SHLDR	SHOULDER
ACP	ASBESTOS CEMENT PIPE	DIST	DISTANCE			SHT	SHEET
ADD'L	ADDITIONAL	DR	DRIVE	NPC	NEVADA POWER COMPANY	SIS	SUMMERLIN IMPROVEMENT STANDARDS
AP	ANGLE POINT	DS	DOWNSPOUT	NTS	NOT TO SCALE		
APN	ASSESSOR'S PARCEL NUMBER	DTL	DETAIL	NVE	NV ENERGY	SL	STREET LIGHT
APPROX	APPROXIMATELY	DW	DRIVEWAY	OB	OVERBUILD	SP	SERVICE POINT
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS	DWG	DRAWING	OC	ON CENTER	SQ	SQUARE
		E	EAST	OHC	OVERHEAD COX COMMUNICATION	SR	SEWER RECLAIM MAIN
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	ECR	END CURB RETURN	OHP	OVERHEAD POWER LINE	SS	SANITARY SEWER
AVE	AVENUE	ELEC,ELE	ELECTRICAL	P	POWER LINE	SSMH	SANITARY SEWER MANHOLE
AVAR	AIR VALVE, AIR RELEASE ASSEMBLY	ELEV	ELEVATION	PAC	PUBLIC ACCESS EASEMENT	STA	STATION
AWWA	AMERICAN WATER WORKS ASSOCIATION	EP,EOP	EDGE OF PAVEMENT	PB	PULL BOX	ST	STREET
		ESMT	EASEMENT	PBS	PLANTMIX BITUMINOUS SURFACE	STD	STANDARD
BC	BACK OF CURB	EVC	END VERTICAL CURVE	PDE	PUBLIC DRAINAGE EASEMENT	STL	STEEL
BCR	BEGIN CURB RETURN	EVP	END VERTICAL POINT	PLT	PLATE	STRUCT	STRUCTURE
BLM	BUREAU OF LAND MANAGEMENT	EX,EXIST	EXISTING	PC	POINT OF CURVE, PRESSURE CLASS	SV	SKY VISTA DRIVE
BLVD	BOULEVARD	EXP	EXPANSION JOINT			SVZ	SIGHT VISIBILITY ZONE
BM	BENCHMARK	FC	FACE OF CURB	PCC	POINT OF COMPOUND CURVE	SW	SIDEWALK
BO	BLOW-OFF	FF, FFE	FINISH FLOOR ELEVATION	PE	PROJECT ENGINEER OR POLYETHYLENE	SWG	SOUTHWEST GAS
BVCE	BEGIN VERTICAL CURVE ELEVATION	FG	FINISH GRADE			T	TELEPHONE OR TOP
		FH	FIRE HYDRANT	PED	PEDESTRIAN	TAN	TANGENT
BVCS	BEGIN VERTICAL CURVE STATION	FL	FLOW LINE	PGL	PROFILE GRADE LINE	TB	TOP OF BERM
BVP	BEGIN VERTICAL POINT	FO	FIBER OPTIC	PH	POTHOLE	TC	TOP OF CURB
BW	BACK OF SIDEWALK	FRP	FIBERGLASS REINFORCED PLASTIC	PI	POINT OF INTERSECTION	TCE	TEMPORARY CONSTRUCTION ESMT
℄, ℄	CENTERLINE	FS	FINISH SURFACE	PIV	POST INDICATOR VALVE	TEL,TELE	TELEPHONE
C&G	CURB AND GUTTER	FT	FOOT/FEET	PL, P/L	PROPERTY LINE	TEMP	TEMPORARY
CATV	UNDERGROUND CABLE TV	FTG	FOOTING	PLCP	POLYURETHANE LINED AND COATED STEEL PIPE	TF	TOP OF FOOTING
CCBM	CLARK COUNTY BENCH MARK	FUT	FUTURE			TG	TOP OF GRATE
CCPW	CLARK COUNTY PUBLIC WORKS	G	GAS	PMF	PAVEMENT MARKING FILM	TMH	TOP OF MANHOLE
CCTV	CLOSED-CIRCUIT TELEVISION	GA	GAGE, GUY ANCHOR	POB	POINT OF BEGINNING	TOP	TOP OF PIPE
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT	GB	GRADE BREAK	POC	POINT ON CURVE, POINT OF CONNECTION	TP	TELEPHONE POLE
		GND	GROUND			TRANS	TRANSITION
CE	COMMON ELEMENT	GRD	GRADE, GROUND	POT	POINT ON TANGENT	TRW	TOP OF RETAINING WALL
CFS	CUBIC FEET PER SECOND	H, HGT	HEIGHT	PP	POWER POLE	TS	TEST STATION
CIP	CAPITAL IMPROVEMENTS PROJECT, CORRUGATED IRON PIPE	HDWL	HEADWALL	PROP	PROPOSED	TS&V	TAPPING SLEEVE & VALVE
		HGL	HYDRAULIC GRADE LINE	PRC	POINT OF REVERSE CURVE	TW	TOP OF WALL
CIPM	CURED-IN-PLACE MANHOLE	HORIZ	HORIZONTAL	PRVC	POINT OF REVERSE VERTICAL CURVE	TWIF	TOP OF WROUGHT IRON FENCE
CIPP	CURED-IN-PLACE PIPE	HP	HIGH POINT, HIGH PRESSURE			TYP,(TYP)	TYPICAL
CIR	CIRCLE	HPS	HIGH PRESSURE SODIUM	PSI	POUNDS PER SQUARE INCH	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS (LATEST EDITION)
CLR	CLEAR OR CLEARANCE	IBC	INTERNATIONAL BUILDING CODE	PT	POINT OF TANGENCY		
CLSM	CONTROLLED LOW STRENGTH MATERIAL	INV	INVERT	PUE	PUBLIC UTILITY EASEMENT		
		INT	INTERIM	PVC	POLYVINYL CHLORIDE		
CLV	CITY OF LAS VEGAS	JT	JOINT	PVI	POINT OF VERTICAL INTERSECTION	UG	UNDERGROUND
CMP	CORRUGATED METAL PIPE	L	LENGTH	PVMT	PAVEMENT	ULT	ULTIMATE
CMU	CONCRETE MASONRY UNIT	LT	LEFT	PZ	PRESSURE ZONE	USDCCA, USD	UNIFORM STD. DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS CLARK COUNTY AREA, NEVADA (LATEST EDITION)
CNLV	CITY OF NORTH LAS VEGAS	LF	LINEAR FEET	R, RAD	RADIAL, RADIUS		
CO	CLEANOUT	LIP	LIP OF GUTTER	RT	RIGHT		
CONC	CONCRETE	LN	LANE	RCB	REINFORCED CONCRETE BOX		
COND	CONDUIT	LP	LOW POINT, LIGHT POLE	RCP	REINFORCED CONCRETE PIPE		
CONST	CONSTRUCT OR CONSTRUCTION	LS,LSCP	LANDSCAPE	RD	ROAD	UT	UNDERGROUND TELEPHONE
COORD	COORDINATE	LVVWD	LAS VEGAS VALLEY WATER DISTRICT	RDWY	ROADWAY	VAR	VARIABLE/VARIES
COR	CORNER	MAX	MAXIMUM	REC	RECTANGULAR	VC	VERTICAL CURVE
CPEP	CORRUGATED POLYETHELYNE PIPE	MH	MANHOLE	REF	REFERENCE	VCP	VITRIFIED CLAY PIPE
CT	COURT	MIN	MINIMUM	REINF	REINFORCED	VERT	VERTICAL
CY	CUBIC YARD(S)	MLTMCP	MORTAR LINED TAPE & MORTAR COATED PIPE	REQD	REQUIRED	VG	VALLEY GUTTER
Δ	DELTA	MP	MESA PARK	RIM	TOP OF RIM ELEVATION	VOL	VOLUME
DBL	DOUBLE	MOD	MODIFY/MODIFIED	RND	ROUND	W	WATER, WEST
DCSWCS	DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEM (LATEST ED.)	MON	MONUMENT	R/W,ROW	RIGHT OF WAY	W/	WITH
		MPH	MILES PER HOUR	RP	RADIUS POINT	WMH	WATER MANHOLE
		N	NORTH	RPM	RAISED PAVEMENT MARKERS	WS	WATER SUPPLY
DE	DRAINAGE EASEMENT	NAP	NOT A PART	RSGV	RESILIENT SEAT GATE VALVE	WT	WEIGHT
DEFL	DEFLECTION	NDOT	NEVADA DEPARTMENT OF TRANSPORTATION	S	SEWER, SOUTH	WTR	WATER
DG	DESIGN GRADE	N.I.C.	NOT IN CONTRACT	SCH	SCHEDULE	XING	CROSSING
DI/D.I.	DROP INLET	No.	NUMBER	SDWK	SIDEWALK	YD	YARD, YARD DRAIN
				SD	STORM DRAIN	Z	PRESSURE ZONE
				SDMH	STORM DRAIN MANHOLE		
				SECT	SECTION		

LEGEND

TYPICAL PROPOSED LINEWORK		1 / C	DETAIL BUBBLE W/ REF.
TYPICAL EXISTING LINEWORK			BENCHMARK
TYPICAL FUTURE LINEWORK			GATE VALVE
SECTION LINE		PRV	PRESSURE REDUCING VALVE
EASEMENT LINE		BWV	BACK WATER VALVE
EDGE OF PAVEMENT			DROP INLET
LOTLINE			FIRE HYDRANT
RIGHT-OF-WAY LINE			WATER METER
PROPERTY LINE			WATER RPPA
CENTERLINE			WATER RPDA
TYPICAL UTILITY LINE 4" – 12" (SINGLE LINE)			TRAFFIC SIGNAL PULL BOX
TYPICAL UTILITY LINE > THAN 12" (DOUBLE LINE)			STREET LIGHT CLARK COUNTY
TYPICAL SEWER LINE W/MH			STREET LIGHT SUMMERLIN STD
TYPICAL WATER LINE W/GV			
TYPICAL STORM LINE W/MH			TRAFFIC SIGNAL/FLASHER
100 YR HYDRAULIC GRADE LINE		T	EXISTING TELE POLE
CONCRETE OR STEEL ENCASEMENT			EXISTING POWER POLE
TYPICAL STUB & BLOW-OFF			EXISTING POLE
PE GAS	EX. GAS LINE		EX. ELEC MARKER
ELEC	EX. ELECTRICAL		TRANSFORMER PAD
CBL	EX. CABLE TV		SERVICE PEDESTAL
TEL	EX. TELEPHONE		PULLBOX
OPL	EX. OVERHEAD POWER LINES	3005	PROPOSED CONTOUR
EX. ELEC & PWR POLES		(3005)	EXISTING CONTOUR
TYPICAL CURB & GUTTER, SIDEWALK AND RAMP		60.50 TC	PROPOSED SPOT ELEVATION
POST AND CABLE FENCE		(60.5) TC	EXISTING SPOT ELEVATION
WROUGHT IRON FENCE		1.00%	PROPOSED SLOPE
CHAIN LINK FENCE		TOP SLOPE	
SAWCUT			SLOPE DIRECTION
PAVEMENT RESORATION AREA		TOE SLOPE	
PROPOSED ABANDONMENT			
EXISTING ABANDONMENT			
CUT LINE LIMITS		FF = 2333.25	FINISH FLOOR ELEVATION
FILL LINE LIMITS			

SEWER QUANTITIES (PUBLIC)

8" C-900	816 LF
12" C-900	XXX LF
48" MANHOLE	X EA
PIPE END CAP	X EA

QUANTITIES ARE ESTIMATES ONLY. CONTRACTOR IS TO VERIFY DURING BIDDING PROCESS.

CAUTION: HIGH PRESSURE GAS!!

CALL SOUTHWEST GAS AT 702-400-1789 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES 48 HOURS PRIOR TO CONSTRUCTION.

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 ELECTRIC 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 702-668-6107 48 HOURS PRIOR TO CONSTRUCTION
4. IN THE EVENT OF A NATURAL GAS CONFLICT WITH PROPOSED UTILITIES AND STRUCTURES CONTACT 702-365-2099

SOUTHWEST GAS APPROVAL

SOUTHWEST GAS CORPORATION — DATE

BASIS OF BEARING

SOUTH 89°19'11" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE NORTHEAST QUARTER (NE 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 19, TOWNSHIP 21 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN BOOK 143, PAGE 42 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

BENCHMARK

BM#	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM No. 7LV0934DW6	FIND RIVET AND PLATE IN TOP OF CURB SE CORNER OF DESERT MOON RD. AND SKY VISTA DR. T5OS,R59E,S34	3318.31 (FEET)	1,011.422 (METERS)

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. XXXXXX — FIRST APPROVAL DATE: ____

LVVWD APPROVED FIRE FLOW: TOTAL X,XXX GPM / ON-SITE XXXX GPM

PROFESSIONAL ENGINEER - STATE OF NEVADA - LUKY ROXANA LOPEZ - No. 14918 - Exp. 12/31/2021 - CIVIL

DATE: 01/07/2021

60% REVIEW - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	AGEN APP	DATE	GCW APP	DATE

PROJECT NO. 5523-A077

DESIGN: GCW
DRAWN: GCW
CHECK: GCW
PLOT DATE: 01-07-21
PLOT TIME: 16:31:47

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

F:\PROJECTS\500\5523-A077\DWG\PRODUCTION\5523-A077GEN-CVDWG

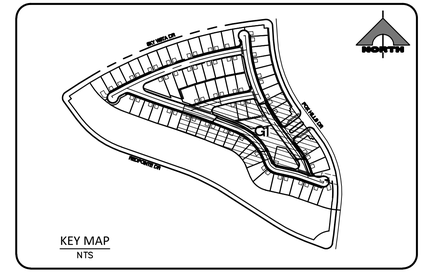
LUKY ROXANA LOPEZ

PARDEE HOMES

VILLAGE 25 PARCEL F

LEGEND, ABBREVIATIONS, AND QUANTITIES

DRAWING
PD
3 OF 30 SHTS



CONSTRUCTION NOTES

1. CONSTRUCT CONCRETE SIDEWALK PER SUMMERLIN STD DWG NO. S-72 & S-48.
2. CONSTRUCT 8' WIDE VALLEY GUTTER PER SUMMERLIN STD DWG NO. S-64.
3. CONSTRUCT RESIDENTIAL "R" CURB AND GUTTER PER USDCCA NO. 217.3.S1.
4. CONSTRUCT MEDIAN "A" TYPE PER SUMMERLIN STD DWG NO. S-50.
5. CONSTRUCT "L" CURB PER SUMMERLIN STD DWG NO. S-47.
6. CONSTRUCT 2" AC OVER 4" TYPE II BASE. SEE SOIL REPORT PREPARED BY PROJ. #_____ FOR MORE DETAIL.
7. CONSTRUCT HANDICAP RAMP PER USDCCA NO. 235 CASE 1 & NO. 235.1. SEE PLAN FOR "A" & "B" DIMENSION.
8. CONSTRUCT HANDICAP RAMP PER USDCCA NO. 235 CASE 2. SEE PLAN FOR "A" & "B" DIMENSION.
9. SAWCUT & MATCH TO EXISTING CURB & SIDEWALK. CONTRACTOR SHALL VERIFY EX. LOCATION & PAVEMENT PRIOR TO CONSTRUCTION.
10. EXISTING CURB TO BE REMOVED
11. CONSTRUCT SIDEWALK UNDERDRAIN PER USDCCA NO. 236.
12. CONSTRUCT 5' TRANSITION FROM "L" CURB TO "R" CURB PER USDCCA NO. 223.
13. CONSTRUCT FENCE PER USDCCA NO. 425.S1 SEE DETAIL "P" SHEET D1.

NO DEEP ROOTED TREES SHALL BE PLACED WITHIN 10 FEET OF THE OUTSIDE EDGE OF THE STORM DRAIN PIPE.

STORM DRAIN CONSTRUCTION NOTES

1. CONNECT TO EXISTING 30" RCP STORM DRAIN W MANHOLE
2. CONSTRUCT 48" TYPE II STORM DRAIN MANHOLE PER STD. DWG 405.2.
3. CONSTRUCT MODIFIED TYPE "DM2" PER STD DWG 412.1 & 421. SEE PLAN PER SIZE.
4. REMOVE EXIST. STORM DRAIN PIPE.
5. CONSTRUCT 60" TYPE I STORM DRAIN MANHOLE PER STD. DWG 403.
6. CONSTRUCT 60" TYPE II STORM DRAIN MANHOLE PER STD. DWG 406.1.

EARTHWORKS

ADJUSTED CUT	ADJUSTED FILL
28,245 CY	24,655 CY

CAUTION TO CONTRACTOR

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 OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

STEVEN FORD, P.E. 12175 DATE
ACTING CITY ENGINEER
CITY OF LAS VEGAS, NEVADA

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

SOUTHWEST GAS APPROVAL

SOUTHWEST GAS CORPORATION DATE

DRAINAGE CERTIFICATION

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

01/07/2021

GIA D. NGUYEN, P.E. 14918 DATE

BASIS OF BEARING

NORTH 01°26'53" EAST, BEING THE BEARING OF THE WEST LINE OF SECTION 27, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M.,REF CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN FILE 123, PAGE 36 OF PARCEL MAPS.

BENCHMARK

COF LAS VEGAS. BENCHMARK NO. 7LV0934SW6, FOUND RIVET AND PLATE IN THE TOP OF CURB AT THE SOUTHWEST CORNER OF DESERT MOON ROAD AND SKY VISTA DRIVE.

ELEVATION: 3318.31 (FEET)
1,011.422 (METERS)

BASED ON NORTH AMERICAN VERTICAL DATUM OF 2018 (NAVD'88).

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED WITHIN A FEMA DESIGNATED FLOOD ZONE X PER FIRM PANEL 32003C2150E, DATED SEPTEMBER 27, 2002. A ZONE X IS DEFINED AS BEING OUTSIDE THE 100-YEAR FLOODPLAIN AND NOT LOCATED WITHIN A FEMA-DESIGNATED SPECIAL FLOOD HAZARD AREA.

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811 or 1-800-642-2444

FAST Call before you UnderGround 1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

L# CLV DWG#

60% REVIEW - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP	DATE

PROJECT NO. 5523-A077
DESIGN: GCW
DRAWN: GCW
CHECK: GCW
PLOT DATE: 01-07-21
PLOT TIME: 16:31:56

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

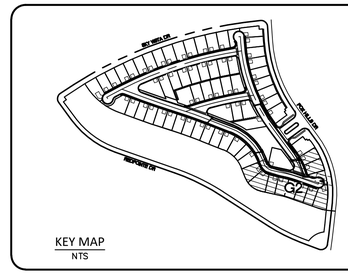
F:\PROJECTS\5501\5523-A077\DWG\PRODUCTION\5523-A077D03-GD.DWG
LUKY ROXANA LOPEZ

PARDEE HOMES
VILLAGE 25 PARCEL F
GRADING PLAN 1

DRAWING
G1
4 OF 30 SHTS

ENGINEER - STATE OF NEVADA - PROFESSIONAL - GIA D. NGUYEN - No. 14918 - Exp. 12/31/2021 - CIVIL - DATE: 01/07/2021

KEY MAP
NTS



NORTH

30' 0' 15' 30' 60'
SCALE: 1" = 30'

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STEVEN FORD, P.E. 12175 DATE
ACTING CITY ENGINEER
CITY OF LAS VEGAS, NEVADA

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SOUTHWEST GAS APPROVAL

SOUTHWEST GAS CORPORATION DATE

DRAINAGE CERTIFICATION

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

GIA D. NGUYEN, P.E. 14918 01/07/2021
DATE

BASIS OF BEARING

NORTH 01°26'53" EAST, BEING THE BEARING OF THE WEST LINE OF SECTION 27, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M.,REF CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN FILE 123, PAGE 36 OF PARCEL MAPS.

BENCHMARK

COF LAS VEGAS. BENCHMARK NO. 7LV0934SW6, FOUND RIVET AND PLATE IN THE TOP OF CURB AT THE SOUTHWEST CORNER OF DESERT MOON ROAD AND SKY VISTA DRIVE.

ELEVATION: 3318.31 (FEET)
1,011.422 (METERS)

BASED ON NORTH AMERICAN VERTICAL DATUM OF 2018 (NAVD'88).

FLOOD ZONE NOTE

THIS PROJECT IS LOCATED WITHIN A FEMA DESIGNATED FLOOD ZONE X PER FIRM PANEL 32003C2150E, DATED SEPTEMBER 27, 2002. A ZONE X IS DEFINED AS BEING OUTSIDE THE 100-YEAR FLOODPLAIN AND NOT LOCATED WITHIN A FEMA-DESIGNATED SPECIAL FLOOD HAZARD AREA.

Call before you Dig
Avoid cutting underground utility lines. It's costly.
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FAST
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1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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1-702-227-2929

ENGINEER - STATE OF NEVADA - PROFESSIONAL
GIA DU NGUYEN
No. 14918
Exp. 12/31/2021
CIVIL

DATE:	DESCRIPTION	REV
01/07/2021	60% REVIEW - NOT FOR CONSTRUCTION	

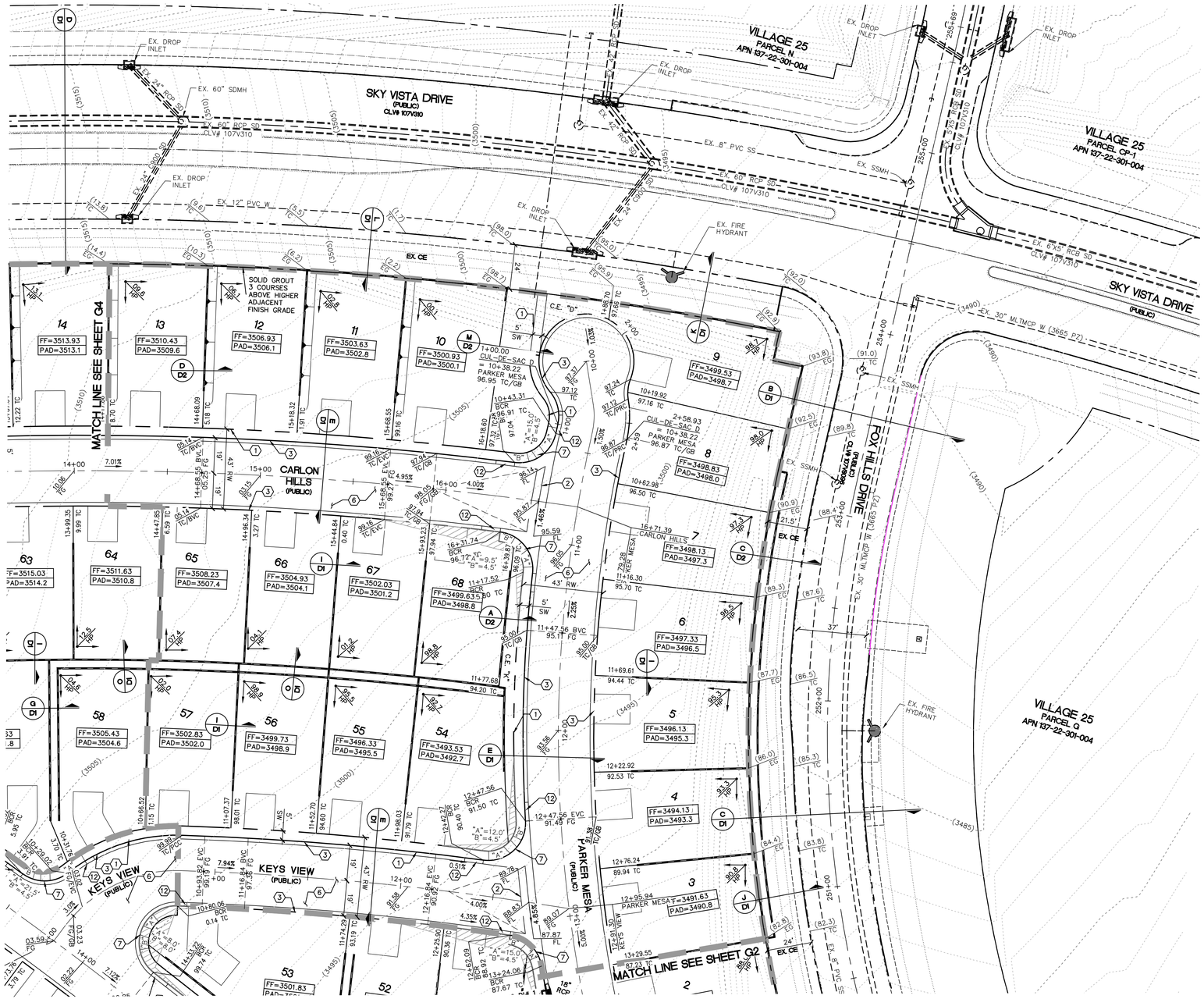
PROJECT NO. 5523-A077
DESIGN: GCW
DRAWN: GCW
CHECK: GCW
PLOT DATE: 01-07-21
PLOT TIME: 16:32:03

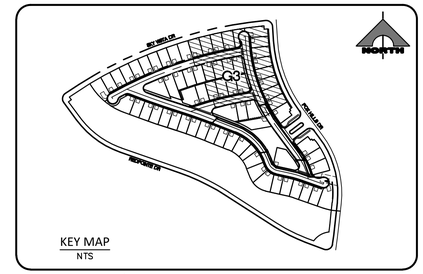
GCW
ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com
LUKY ROXANA LOPEZ
F:\PROJECTS\5500\5523-A077\DWG\PRODUCTION\5523-A077D03-GD2.DWG

PARDEE HOMES
VILLAGE 25 PARCEL F
GRADING PLAN 2

DRAWING
G2
5 OF 30 SHTS

L# CLV DWG#





NORTH

30' 0' 15' 30' 60'

SCALE: 1" = 30'

CONSTRUCTION NOTES

1. CONSTRUCT CONCRETE SIDEWALK PER SUMMERLIN STD DWG NO. S-72 & S-48.
2. CONSTRUCT 8' WIDE VALLEY GUTTER PER SUMMERLIN STD DWG NO. S-64.
3. CONSTRUCT RESIDENTIAL "R" CURB AND GUTTER PER USDCCA NO. 217.3.S1.
4. CONSTRUCT MEDIAN "A" TYPE PER SUMMERLIN STD DWG NO. S-50.
5. CONSTRUCT "L" CURB PER SUMMERLIN STD DWG NO. S-47.
6. CONSTRUCT 2" AC OVER 4" TYPE II BASE. SEE SOIL REPORT PREPARED BY PROJ. #_____ FOR MORE DETAIL.
7. CONSTRUCT HANDICAP RAMP PER USDCCA NO. 235 CASE 1 & NO. 235.1. SEE PLAN FOR "A" & "B" DIMENSION.
8. CONSTRUCT HANDICAP RAMP PER USDCCA NO. 235 CASE 2. SEE PLAN FOR "A" & "B" DIMENSION.
9. SAWCUT & MATCH TO EXISTING CURB & SIDEWALK. CONTRACTOR SHALL VERIFY EX. LOCATION & PAVEMENT PRIOR TO CONSTRUCTION.
10. EXISTING CURB TO BE REMOVED
11. CONSTRUCT SIDEWALK UNDERDRAIN PER USDCCA NO. 236.
12. CONSTRUCT 5' TRANSITION FROM "L" CURB TO "R" CURB PER USDCCA NO. 223.
13. CONSTRUCT FENCE PER USDCCA NO. 425.S1 SEE DETAIL "P" SHEET D1.

NO DEEP ROOTED TREES SHALL BE PLACED WITHIN 10 FEET OF THE OUTSIDE EDGE OF THE STORM DRAIN PIPE.

STORM DRAIN CONSTRUCTION NOTES

1. CONNECT TO EXISTING 30" RCP STORM DRAIN W MANHOLE
2. CONSTRUCT 48" TYPE II STORM DRAIN MANHOLE PER STD. DWG 405.2.
3. CONSTRUCT MODIFIED TYPE "DM2" PER STD DWG 412.1 & 421. SEE PLAN PER SIZE.
4. REMOVE EXIST. STORM DRAIN PIPE.
5. CONSTRUCT 60" TYPE I STORM DRAIN MANHOLE PER STD. DWG 403.
6. CONSTRUCT 60" TYPE II STORM DRAIN MANHOLE PER STD. DWG 406.1.

EARTHWORKS

ADJUSTED CUT	ADJUSTED FILL
28,245 CY	24,655 CY

CAUTION TO CONTRACTOR

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 OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

STEVEN FORD, P.E. 12175 DATE
ACTING CITY ENGINEER
CITY OF LAS VEGAS, NEVADA

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

SOUTHWEST GAS APPROVAL

SOUTHWEST GAS CORPORATION DATE

DRAINAGE CERTIFICATION

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

01/07/2021

GIA D. NGUYEN, P.E. 14918 DATE

BASIS OF BEARING

NORTH 01°26'53" EAST, BEING THE BEARING OF THE WEST LINE OF SECTION 27, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., REF CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN FILE 123, PAGE 36 OF PARCEL MAPS.

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PROFESSIONAL ENGINEER - STATE OF NEVADA
GIA DUC NGUYEN
No. 14918
Exp. 12/31/2021
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60% REVIEW - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP	DATE

PROJECT NO. 5523-A077
DESIGN: GCW
DRAWN: GCW
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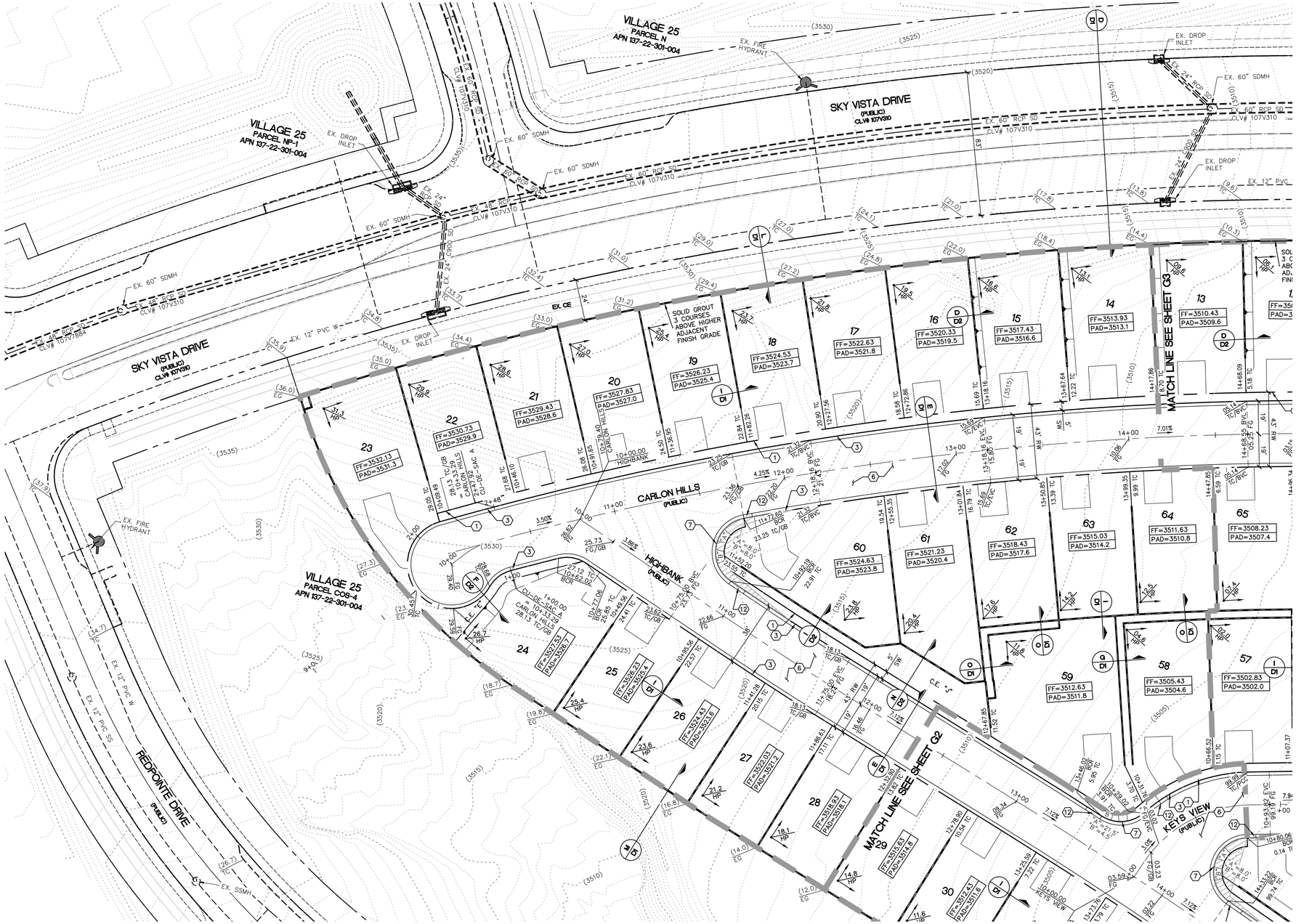
GCW
ENGINEERS \ SURVEYORS
1556 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

F:\PROJECTS\5501\5523-A077\DWG\PRODUCTION\5523-A077D01-GD.DWG
LUKY ROXANA LOPEZ

PARDEE HOMES
VILLAGE 25 PARCEL F
GRADING PLAN 3

DRAWING
G3
6 OF 30 SHTS

L# CLV DWG#


VILLAGE 25
PARCEL N
APN 137-22-301-004
SKY VISTA DRIVE
(PUBLIC)
CLV# 107V310
VILLAGE 25
PARCEL NP-1
APN 137-22-301-004
VILLAGE 25
PARCEL COS-4
APN 137-22-301-004
CARLON HILLS
(PUBLIC)
HIGHBANK
(PUBLIC)
REDPOINTE DRIVE
(PUBLIC)
KEYS VIEW
(PUBLIC)
EX. 60" SDMH
EX. DROP INLET
EX. FIRE HYDRANT
EX. 24" RCP SD
EX. 18" RCP SD
EX. 12" PVC W
EX. 12" PVC SS
EX. SSMH
EX. CE
SOLID GROUT 3 COURSES ABOVE HIGHER ADJACENT FINISH GRADE
MATCH LINE SEE SHEET G3
MATCH LINE SEE SHEET G2
MATCH LINE SEE SHEET G4
FF=3513.93 PAD=3513.1
FF=3510.43 PAD=3509.6
FF=3517.43 PAD=3516.6
FF=3520.33 PAD=3519.5
FF=3522.63 PAD=3521.8
FF=3524.53 PAD=3523.7
FF=3526.23 PAD=3525.4
FF=3527.83 PAD=3527.0
FF=3529.43 PAD=3528.6
FF=3530.73 PAD=3529.9
FF=3532.13 PAD=3531.3
FF=3512.63 PAD=3511.8
FF=3515.03 PAD=3514.2
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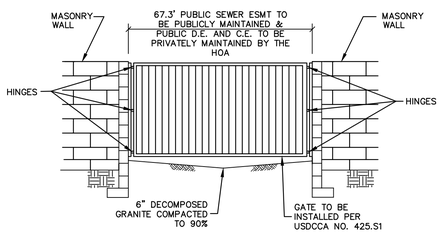

TYPICAL SECTION — P

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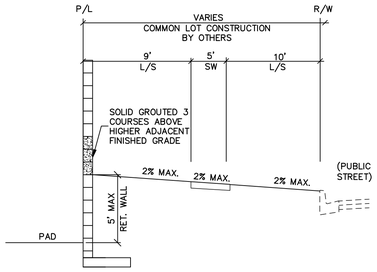

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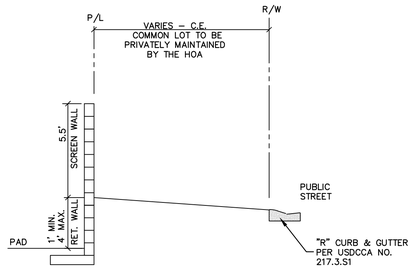

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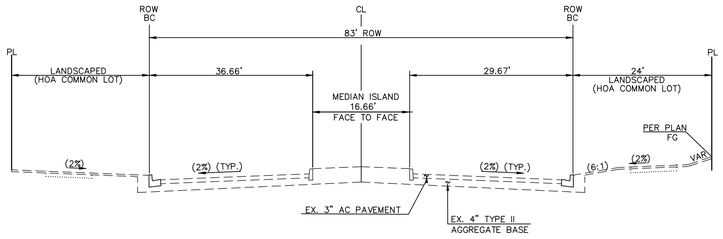

SKY VISTA DRIVE (PUBLIC) — D

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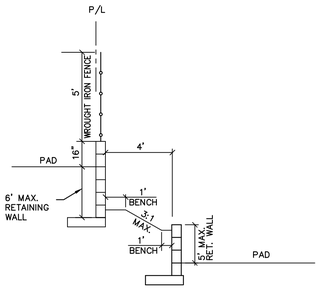

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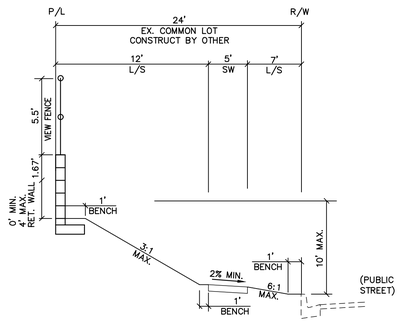

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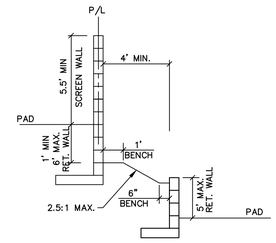

TYPICAL SECTION — G

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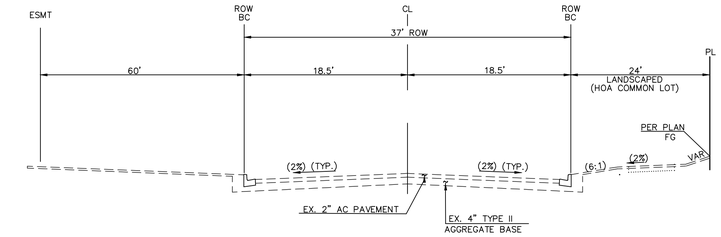
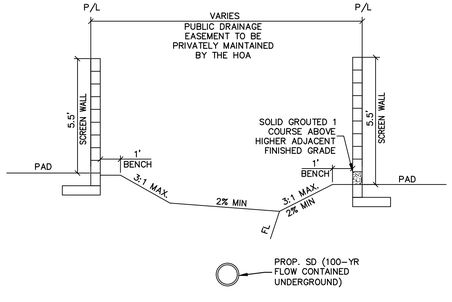


FOX HILL DR (PUBLIC) — C

SCALE: NTS



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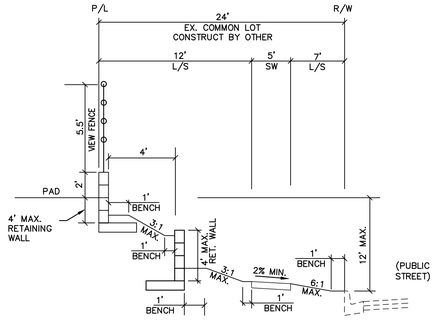

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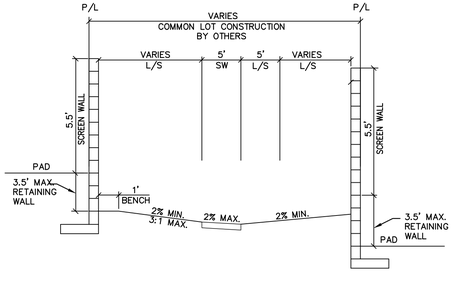

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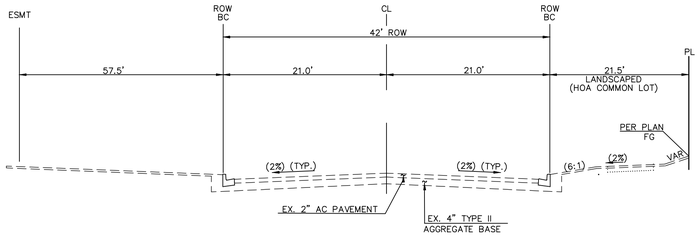

FOX HILL DR (PUBLIC) — B

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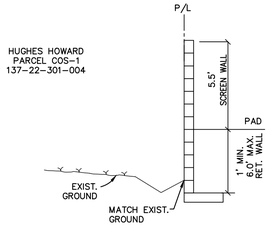

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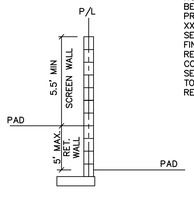
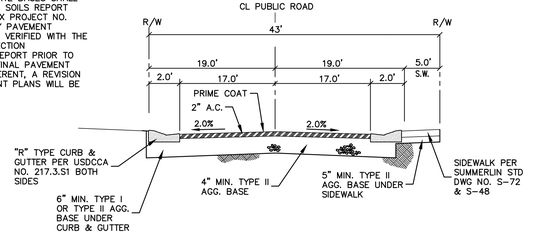


TYPICAL SECTION — I

SCALE: NTS

NOTE: ALL AGGREGATE BASES SHALL BE COMPACTED PER SOILS REPORT PREPARED BY XXXXX PROJECT NO. XXXXX. PRELIMINARY PAVEMENT SECTIONS SHALL BE VERIFIED WITH THE FINAL PAVEMENT SECTION RECOMMENDATION REPORT PRIOR TO CONSTRUCTION. IF FINAL PAVEMENT SECTIONS ARE DIFFERENT, A REVSION TO THE IMPROVEMENT PLANS WILL BE REQUIRED.



43' PUBLIC STREET SECTION — E

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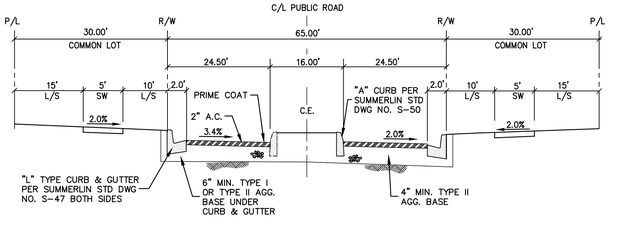

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65' PUBLIC ENTRY — A

SCALE: NTS

GCW
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com
ENGINEERS \ SURVEYORS

LUCY ROXANA LOPEZ
F:\PROJECTS\500\5523-A077\GWC\PRODUCTION\5523-A077D06-DT.DWG

PROJECT NO. 5523-A077
DESIGN: GCW
DRAWN: GCW
CHECK: GCW
PLOT DATE: 01-07-21
PLOT TIME: 16:32:28

REV	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP	DATE:
						01/07/2021

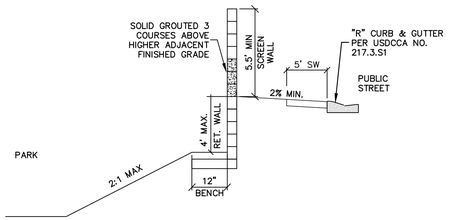
60% REVIEW - NOT FOR CONSTRUCTION

PARDEE HOMES

VILLAGE 25 PARCEL F

SECTIONS AND DETAILS

DRAWING
D1
8 OF 30 SHTS



TYPICAL SECTION — P

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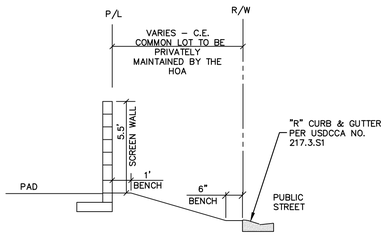

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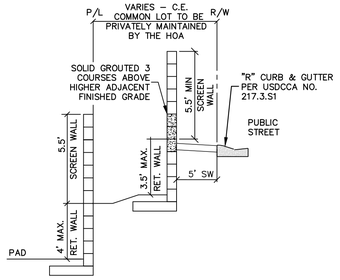

TYPICAL SECTION — H

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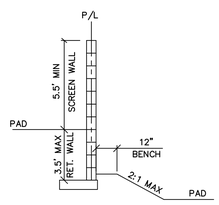

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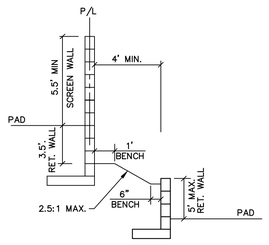

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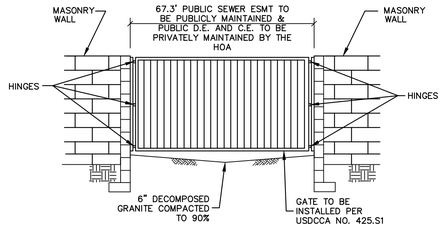
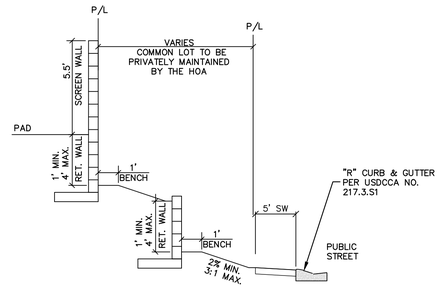


TYPICAL SECTION — K

SCALE: NTS



TYPICAL SECTION — G

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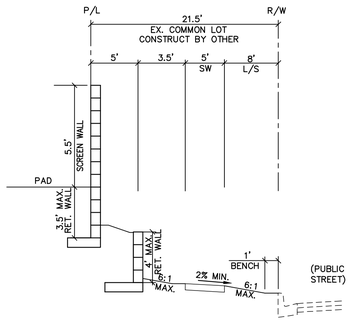

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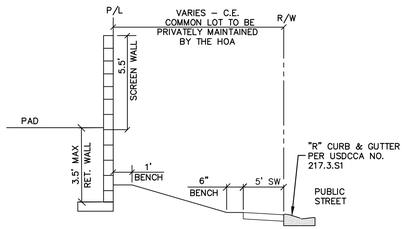
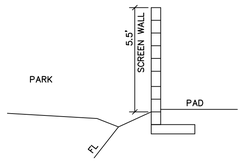


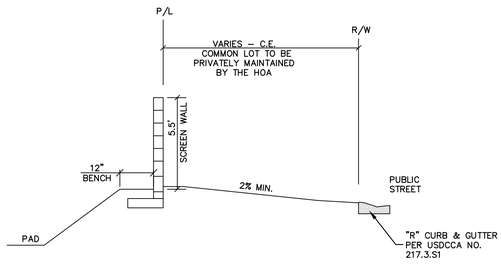
TYPICAL SECTION — N

SCALE: NTS



TYPICAL SECTION — J

SCALE: NTS



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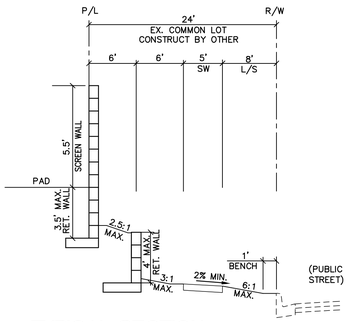

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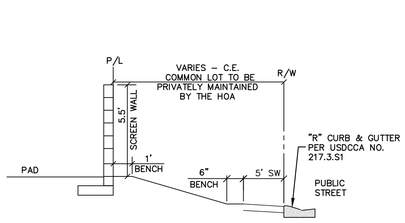
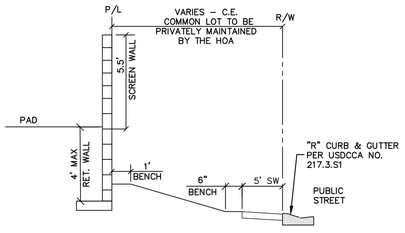


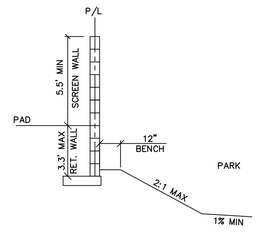
TYPICAL SECTION — M

SCALE: NTS



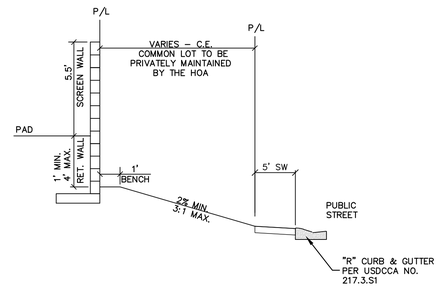
TYPICAL SECTION — I

SCALE: NTS



TYPICAL SECTION — E

SCALE: NTS



TYPICAL SECTION — A

SCALE: NTS

60% REVIEW - NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP	DATE

PROJECT NO. 5523-A077

DESIGN: GCW
DRAWN: GCW
CHECK: GCW
PLOT DATE: 01-07-21
PLOT TIME: 16:32:30

LUKY ROXANA LOPEZ

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

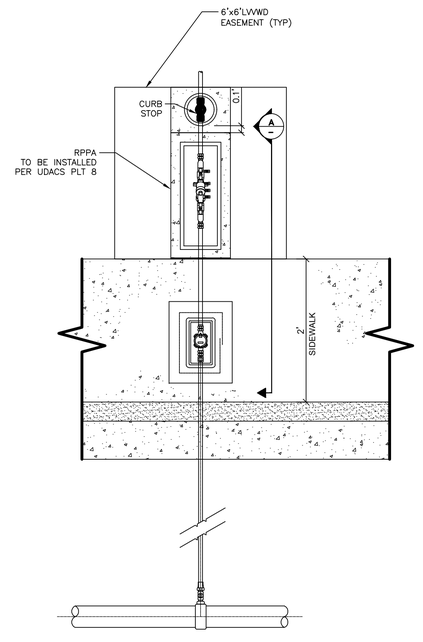
F:\PROJECTS\5500\5523-A077\GWC\PRODUCTION\5523-A077D0E-DT.DWG

PARDEE HOMES

VILLAGE 25 PARCEL F

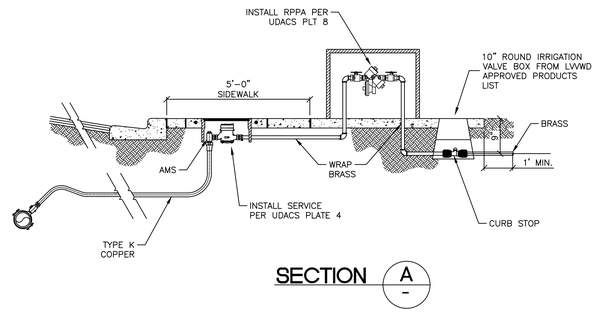
SECTIONS AND DETAILS

DRAWING
D2
9 OF 30 SHTS



METER W/ RPPA PER UDACS PLATE NO. 4 AND 8 WITH CURB STOP (A)

SCALE: NTS



SECTION (A)

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES

PROJECT NO. XXXXX FIRST APPROVED DATE: _____
LVVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW 30 GPM

PROFESSIONAL ENGINEER - STATE OF NEVADA
No. 14918
KEVIN D. NGUYEN
Exp. 12/31/2021
CIVIL
DATE: 01/07/2021

60% REVIEW - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP

PROJECT NO. 5523-A077

DESIGN: GCW
DRAWN: GCW
CHECK: GCW
PLOT DATE: 01-07-21
PLOT TIME: 16:32:32

GCW ENGINEERS \ SURVEYORS
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LAS VEGAS, NV 89146
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F: 702.804.2299
gcwengineering.com

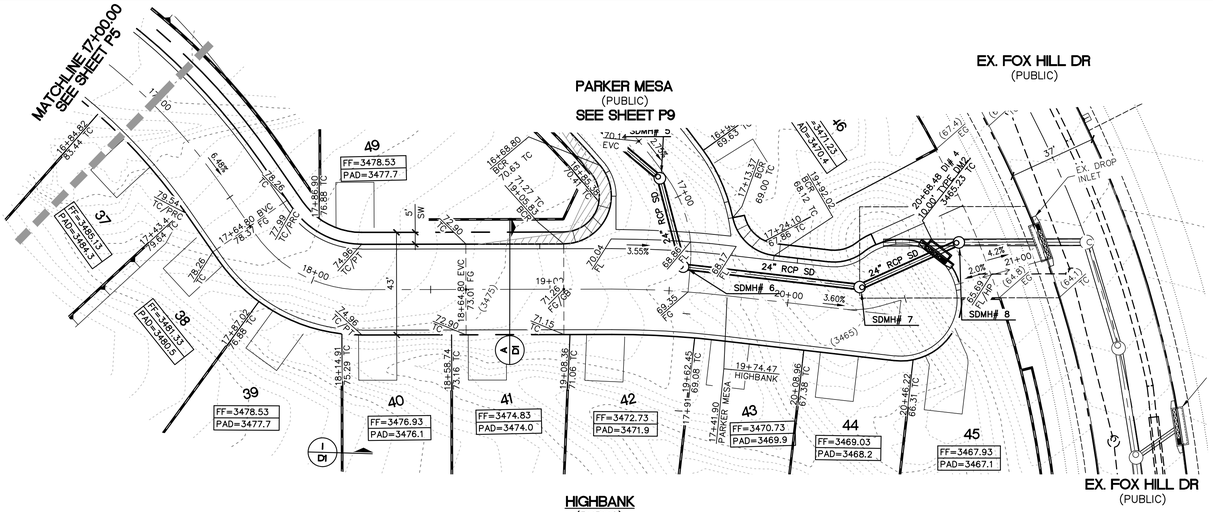
F:\PROJECTS\500\5523-A077\DWG\PRODUCTION\5523-A077D06-DT.DWG
LUKY ROXANA LOPEZ

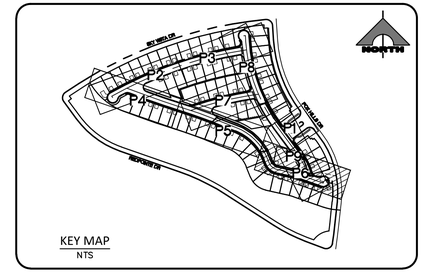
PARDEE HOMES

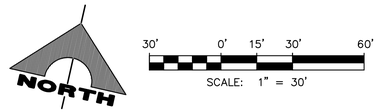
VILLAGE 25 PARCEL F

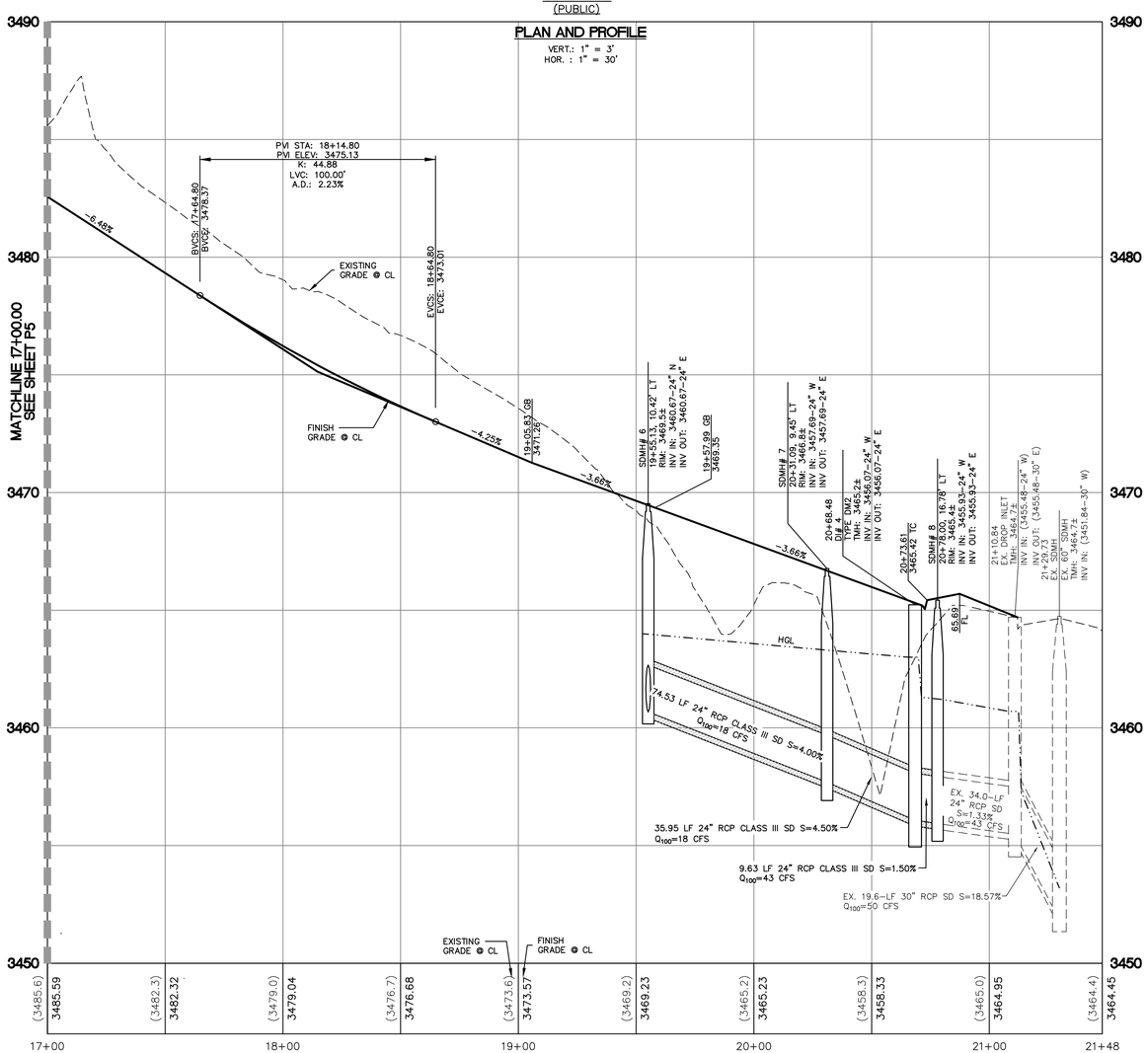
SECTIONS AND DETAILS

DRAWING
D3
10 OF 30 SHTS









CONSTRUCTION NOTES

1. CONSTRUCT CONCRETE SIDEWALK PER SUMMERLIN STD DWG NO. S-72 & S-48.
2. CONSTRUCT 8' WIDE VALLEY GUTTER PER SUMMERLIN STD DWG NO. S-64.
3. CONSTRUCT ROLL CURB PER USDCCA NO. 217.1
4. CONSTRUCT MEDIAN "A" TYPE PER SUMMERLIN STD DWG NO. S-50.
5. CONSTRUCT "L" CURB PER SUMMERLIN STD DWG NO. S-47.
6. INSTALL GATE – SEE LANDSCAPE.
7. CONSTRUCT 2" AC OVER 4" TYPE II BASE. SEE SOIL REPORT PREPARED BY GEOTEK RESIDENTIAL, LLC PROJ. #15310-LVR FOR MORE DETAIL.
8. CONSTRUCT HANDICAP RAMP PER USDCCA NO. 235 CASE 1 & NO. 235.1. SEE PLAN FOR "A" & "B" DIMENSION.
9. SAWCUT & MATCH TO EXISTING CURB & SIDEWALK. CONTRACTOR SHALL VERIFY EX. LOCATION & PAVEMENT PRIOR TO CONSTRUCTION.
10. EXISTING CURB TO BE REMOVED
11. CONSTRUCT 10' TRANSITION FROM "L" CURB TO ROLL CURB PER DETAIL "B" SHEET D3.
12. CONSTRUCT 5' TRANSITION FROM "L" CURB TO ROLL CURB PER DETAIL "C" SHEET D3.
13. CONSTRUCT SIDEWALK UNDERDRAIN PER USDCCA NO. 236.
14. CONSTRUCT HANDICAP RAMP PER USDCCA NO. 235 CASE 2. SEE PLAN FOR "A" & "B" DIMENSION.
15. CONSTRUCT 24' WIDE GATE.

NO DEEP ROOTED TREES SHALL BE PLACED WITHIN 10 FEET OF THE OUTSIDE EDGE OF THE STORM DRAIN PIPE.

STORM DRAIN CONSTRUCTION NOTES

1. CONNECT TO EXISTING 48" RCP STORM DRAIN.
2. CONSTRUCT DEEP DROP INLET PER STD DWG 412.1 & 421. SEE DETAIL "3" SHEET S1 FOR DETAIL.
3. CONSTRUCT 60" TYPE II STORM DRAIN MANHOLE PER STD. DWG 406.1.
4. CONSTRUCT MODIFIED TYPE "DM2" PER STD DWG 412.1 & 421. SEE PLAN PER SIZE.
5. CONSTRUCT 48" TYPE II STORM DRAIN MANHOLE PER STD. DWG 405.2.
6. CONSTRUCT 60" TYPE I STORM DRAIN MANHOLE PER STD. DWG 403.

CAUTION TO CONTRACTOR

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 OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

BASIS OF BEARING

NORTH 01°26'53" EAST, BEING THE BEARING OF THE WEST LINE OF SECTION 27, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M.,REF CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN FILE 123, PAGE 36 OF PARCEL MAPS.

BENCHMARK

COF LAS VEGAS. BENCHMARK NO. 7LV0934SW6, FOUND RIVET AND PLATE IN THE TOP OF CURB AT THE SOUTHWEST CORNER OF DESERT MOON ROAD AND SKY VISTA DRIVE.

ELEVATION: 3318.31 (FEET)
1,011.422 (METERS)

BASED ON NORTH AMERICAN VERTICAL DATUM OF 2018 (NAVD'88).

SOUTHWEST GAS APPROVAL

SOUTHWEST GAS CORPORATION DATE

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811 or 1-800-642-2444

FAST
Call before you UnderGround
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
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1-702-227-2929

L#	CLV DWG#

ENGINEER – STATE OF NEVADA – PROFESSIONAL
GIA DU NGUYEN
No. 14918
CIVIL
Exp. 12/31/2021
DATE: 01/07/2021

60% REVIEW - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP

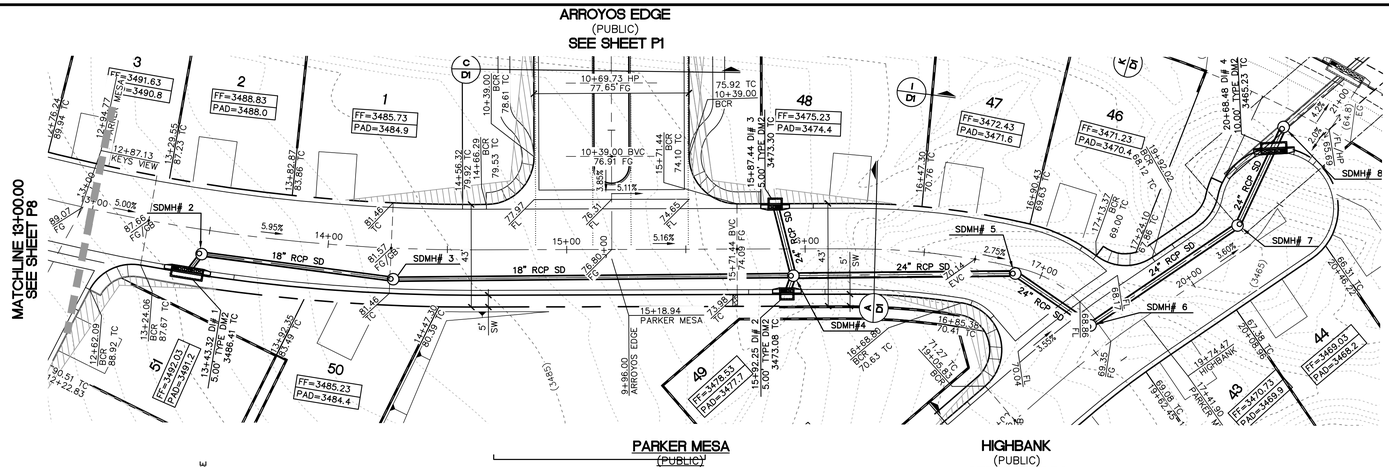
PROJECT NO. 5523-A077
DESIGN: GCW
DRAWN: GCW
CHECK: GCW
PLOT DATE: 01-07-21
PLOT TIME: 16:32:38

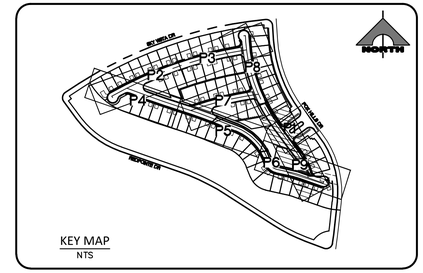
GCW
ENGINEERS & SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

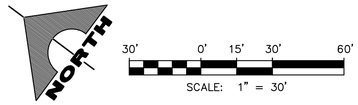
F:\PROJECTS\5XX\5523-A077\DWG\PRODUCTION\5523-A077D3S-PP4-6,8-9.DWG
LUKY ROXANA LOPEZ

PARDEE HOMES
VILLAGE 25 PARCEL F
HIGHBANK
STA. 17+00 - STA. 20+78.79
PLAN & PROFILE

DRAWING
PP6
16 OF 30 SHTS

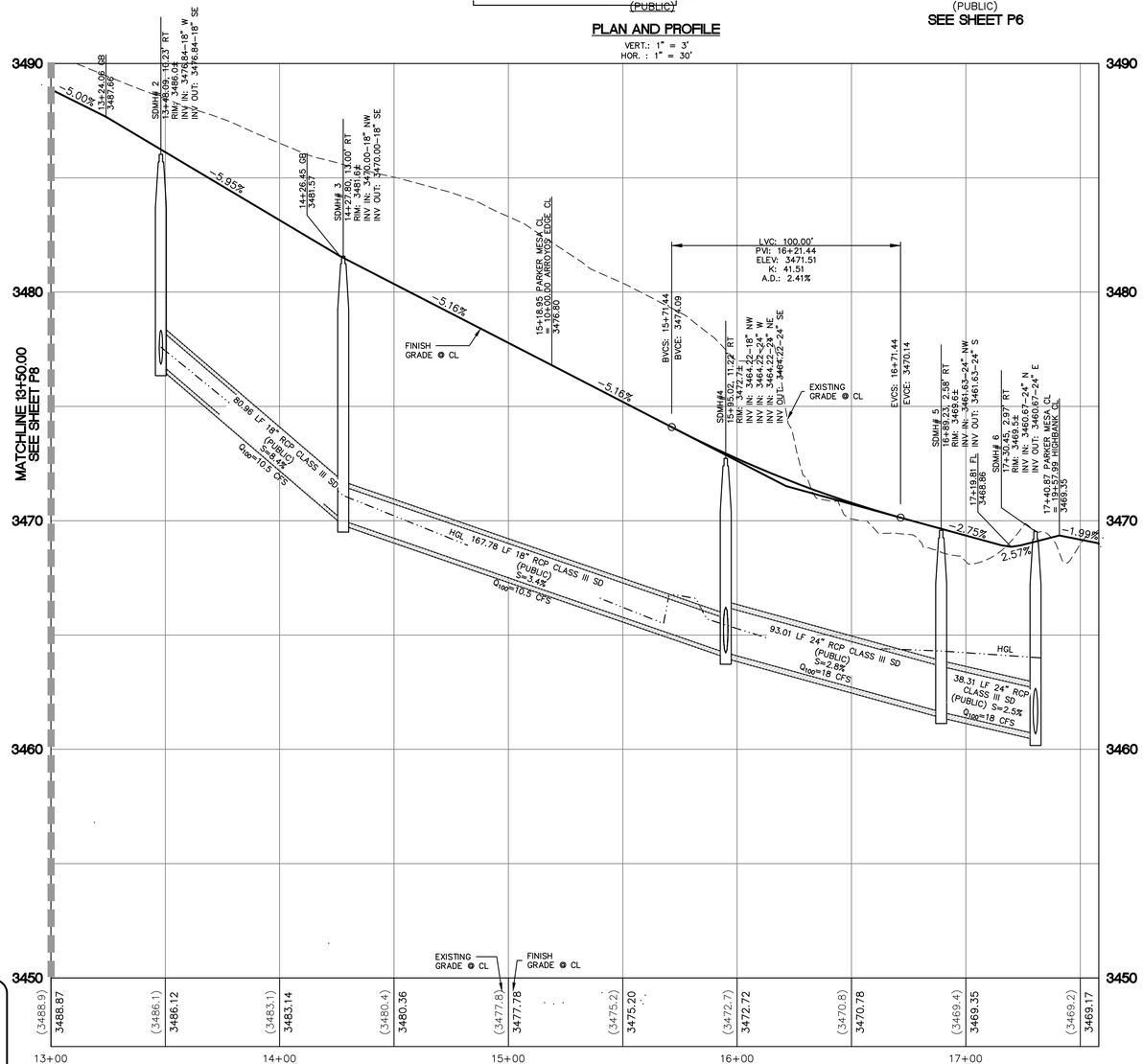






PLAN AND PROFILE

VERT.: 1" = 3'
HOR. : 1" = 30'



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SOUTHWEST GAS APPROVAL

SOUTHWEST GAS CORPORATION DATE

L# | CLV DWG#

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811 OR 1-800-642-2444

FAST
Call before you UnderGround
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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ENGINEER - STATE OF NEVADA - PROFESSIONAL
No. 14918
GIA DU NGUYEN
Exp. 12/31/2021
CIVIL
DATE: 01/07/2021

GCW | ENGINEERS \ SURVEYORS
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LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com
F:\PROJECTS\5523\5523-A077\DWG\PRODUCTION\5523-A077D03-PP4-6,8-9.DWG
LUCY ROXANA LOPEZ

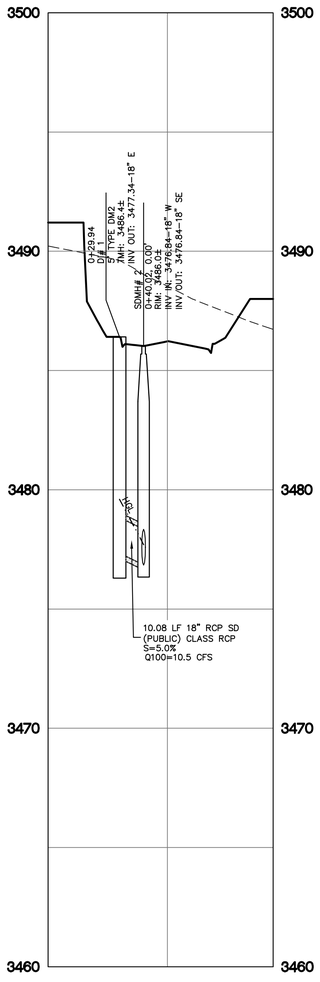
REV	DATE	DESCRIPTION	AGEN APP	DATE	GCW APP	DATE

60% REVIEW - NOT FOR CONSTRUCTION

PROJECT NO. 5523-A077
DESIGN: GCW
DRAWN: GCW
CHECK: GCW
PLOT DATE: 01-07-21
PLOT TIME: 16:32:45

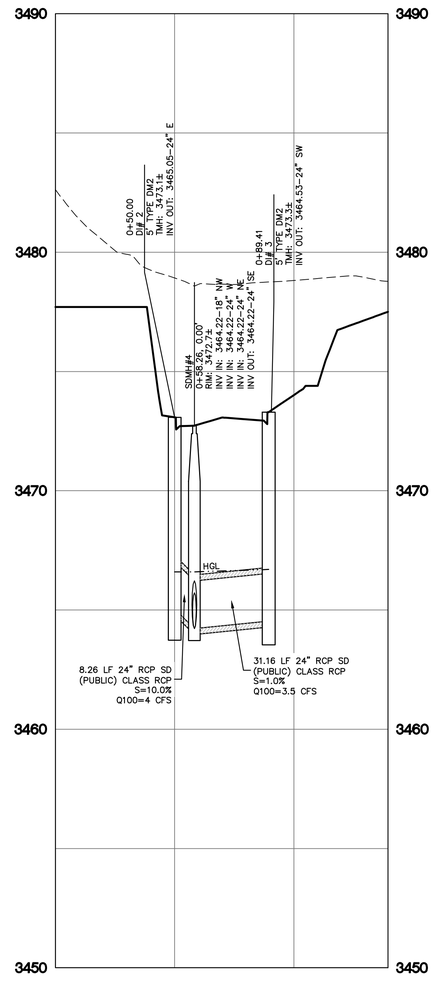
PARDEE HOMES
VILLAGE 25 PARCEL F
PARKER MESA
STA. 13+00 - END
PLAN & PROFILE

DRAWING
PP9
19 OF 30 SHTS



LATERAL A (A)

VERT.: 1" = 3'
HOR. : 1" = 30'



LATERAL B (B)

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L#	CLV DWG#

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F:\PROJECTS\5500\5523-A077\DWG\PRODUCTION\5523-A077D03-LAT.DWG
LUX* ROXANA LOPEZ

PROJECT NO. 5523-A077

DESIGN: GCW
DRAWN: GCW
CHECK: GCW
PLOT DATE: 01-07-21
PLOT TIME: 16:33:41

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP

ENGINEER - STATE OF NEVADA - PROFESSIONAL
No. 14918
GIA DU NGUYEN
Exp. 12/31/2021
CIVIL
DATE: 01/07/2021

60% REVIEW - NOT FOR CONSTRUCTION

PARDEE HOMES

VILLAGE 25 PARCEL F

STORM DRAIN LATERALS

DRAWING
LAT
20 OF 30 SHTS