

DS #: 5307

APN: 137-23-210.001

PROJECT: Summerlin West Village 22-Fleet Wing Avenue
(Street G)

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		October 13/2020
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 22 - Fleet Wing Avenue (Street G) (Kettle Ridge Drive to Scurry Bend Drive)		COPIES TO: Atkins Global
Cross Streets:	Kettle Bend Road and Sunset Run Drive	Howard Hughes Company, LLC.
File Number:	F:\Depot\DSMemos\DS5367A.doc	Bart Anderson, P.E., DevCo
Parcel Number:	137-23-210-001	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 #
1 st Submittal	9/22/2020 & 10/7/2020	10/13/2020	See Comments Below	\$400.00	3999164: \$400
TOTAL FEES (LDDRS):				\$400.00	----

REMARKS:

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

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

- The subject project is based on the premise that the downstream *Kettle Ridge Drive* and *Kindle Rise Way* and the associated storm drain facilities are in place for flood flow perpetuation. The subject drainage study will not be finally approved prior to the posting of the construction bonds of the *Summerlin West Village 22 – Kettle Ridge Drive (Fleet Wing to Kindle Rise) and Kindle Rise Way (Kettle Ridge to Desert Foothill)* street improvements project.
- The project proposed to construct temporary drainage facilities including drainage berms/ditches along both sides of the proposed roadway. 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.

3. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

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

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

4. **Figure 3: Interim Hydrology Workmap:** The basins listed in the tables are not shown on the Exhibit. For example, there is a basin STN1 shown on the exhibit, but StN-1a and StN-1b are shown in the table.
5. **Figure 3: Interim Hydrology Workmap:** The Interim and Ultimate Conditions appear to have different basins however there is no differentiation shown on the exhibit. Create separate exhibits or show different line type for interim and ultimate conditions.
6. **Figure 3: Interim Hydrology Workmap:** Basins F and L-M are not shown on the Exhibit.
7. **Figure 4: Hydraulics Work Map:** Section 3 for the 100-YR Ultimate Condition states that it collects from StG-2 + StG-3+bypass from SDDI#1 & SDDI#2, this flow totals to 7.51 cfs, not 7.40 cfs.
8. **Table 6 of Chapter 2.3 (Storm Drain System Modeling)** showed that downstream of SDMH #4, the flow velocities are more than 25 ft/s in both 100-year Interim and Ultimate Conditions. Besides using higher strength concrete pipe and sacrificial concrete, address what other means have been explored, such as using larger diameter pipe or drop structure manholes to reduce the pipe slope, ie, resulting in lower velocity.
9. The new villages in Summerlin have 0 cfs enter into intersections, therefore there any bypass flow entering into intersections should be collected by the proposed inlets. None of the flow from FWA-2 or FWA-3 or bypass from SDDI#2 and SDDI#1 is collected before the intersection of Fleet Wing Avenue and Kettle Ridge Drive.
10. The only proposed inlet on the south side of the road is SDDI#2. The next inlet in the intersection exceeds the maximum distance of 600'. Additional inlets are required on the south side of the road to address this.
11. The HGLs shown on *Storm Drain Lateral 2* do not match the WSPG and the lines shown do not meet the minimum requirement of 1' below the proposed surface. Review and revise accordingly.

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/23
AREA K-23



Summerlin West Village 22

Fleet Wing Avenue (Street G): Kettle Ridge Drive (Street J) to Scurry Bend Drive

Prepared for Howard Hughes Company, LLC

September 2020

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Fleet Wing Avenue (Street G): Kettle Bend Drive to Scurry Bend Drive Date: September 17, 2020
Location of Development: a) Descriptive (Cross Streets) North/South: Kettle Bend Road
East/West: Lake Mead Boulevard
b) Section: 23 Township: 20S Range: 59E
c) APN : 137-23-210-001

Name of Owner: Howard Hughes Company, LLC
Telephone No.: (702) 791-4000 Fax No.: (702) 791-4450 E-Mail Address: chris.anderson@howardhughes.com
Address: 10845 Griffith Peak Drive, Suite 160, Las Vegas, NV 89135

Contact Person-Name: Janelle Klein, PE Telephone No.: (702) 551-0365
* E-Mail Address: janelle.klein@atkinsglobal.com Fax No.: (702) 263-7200
Firm: Atkins
Address: 2270 Corporate Circle, Ste 200, Henderson, NV 89074

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: +/- 446 acres Being Developed/Disturbed: 3.56 acres
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.): Public - Roadway Improvements
5. Approximate upstream land area which drains to the subject site: _____
6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: Update #2 to the Master Conceptual Drainage Study for Summerlin West Village 22
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Existing CC-215 Western Beltway Channel
8. Briefly describe your proposed schedule for the subject project: ASAP

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

Engineer's Seal

Local Entity File No.

REFERENCE:

STANDARD FORM 1

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Fleet Wing Avenue (St G): Kettle Bend Dr to Scurry Bend Dr

Map ID: 137-23-210-001

Firm Name: **Atkins**

Engineer: Janelle Klein, PE

Address: 2270 Corporate Circle, Ste 200

City: **Henderson**

State:

NV

Zip: **89074**

Phone Number: **(702) 551-0330**

Fax Number: **(702) 263-7200**

Property Owner: Howard Hughes Company, LLC

Address: 10845 Griffith Peak Drive, Suite 160

City: Las Vegas

State: NV

Zip: 89135

Reviewed By:

Date Received:

Date Accepted for Review:

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

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

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

I. GENERAL REQUIREMENT

Yes

No

 x

Design Manual **Standard Form 1** with the engineer's seal and signature.

 X

Design Manual **Standard Form 4**.

 X

2 copies of the 24" x 36" Drainage Plan.

 N/A

A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

Yes

No

 X

A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.

 X

A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
<u>X</u>	<u> </u>	Streets with off-set crowns.
<u>X</u>	<u> </u>	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
<u>X</u>	<u> </u>	Property lines.
<u>X</u>	<u> </u>	Right-of-way lines and widths, existing and proposed.
<u>X</u>	<u> </u>	Existing improvements and their elevations.
<u>X</u>	<u> </u>	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
<u>X</u>	<u> </u>	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
<u>X</u>	<u> </u>	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
<u>X</u>	<u> </u>	Location and cross-section of street capacity calculations.
<u>X</u>	<u> </u>	Cross-sectional detail for channels, including cutoff wall locations.
<u>X</u>	<u> </u>	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.
<u>X</u>	<u> </u>	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
<u> </u>	<u>N/A</u>	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.
<u> </u>	<u>N/A</u>	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.
<u> </u>	<u>N/A</u>	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.
<u>X</u>	<u> </u>	Building and/or lot numbers.
<u>X</u>	<u> </u>	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
<u>X</u>	<u> </u>	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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

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

IV. HYDROLOGIC ANALYSIS

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

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

REFERENCE:

STANDARD FORM 2



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 (CCRFCDD) 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 CCRFCDD Hydrologic Criteria and Drainage Design Manual (Design Manual).

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

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

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

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

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

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

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

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

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

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

Engineer's Certification

Atkins certifies that the information contained herein has been prepared in accordance with generally accepted engineering principles and practices, and to the best of our knowledge, is true and correct.

This letter certifies that all items in the **Technical Drainage study for Fleet Wing Avenue (Street G): Kettle Ridge Drive (Street J) to Scurry Bend Drive** electronic submittal matches the paper version bound into the study.

Janelle L. Klein, PE (NV #17313)
Senior Engineer

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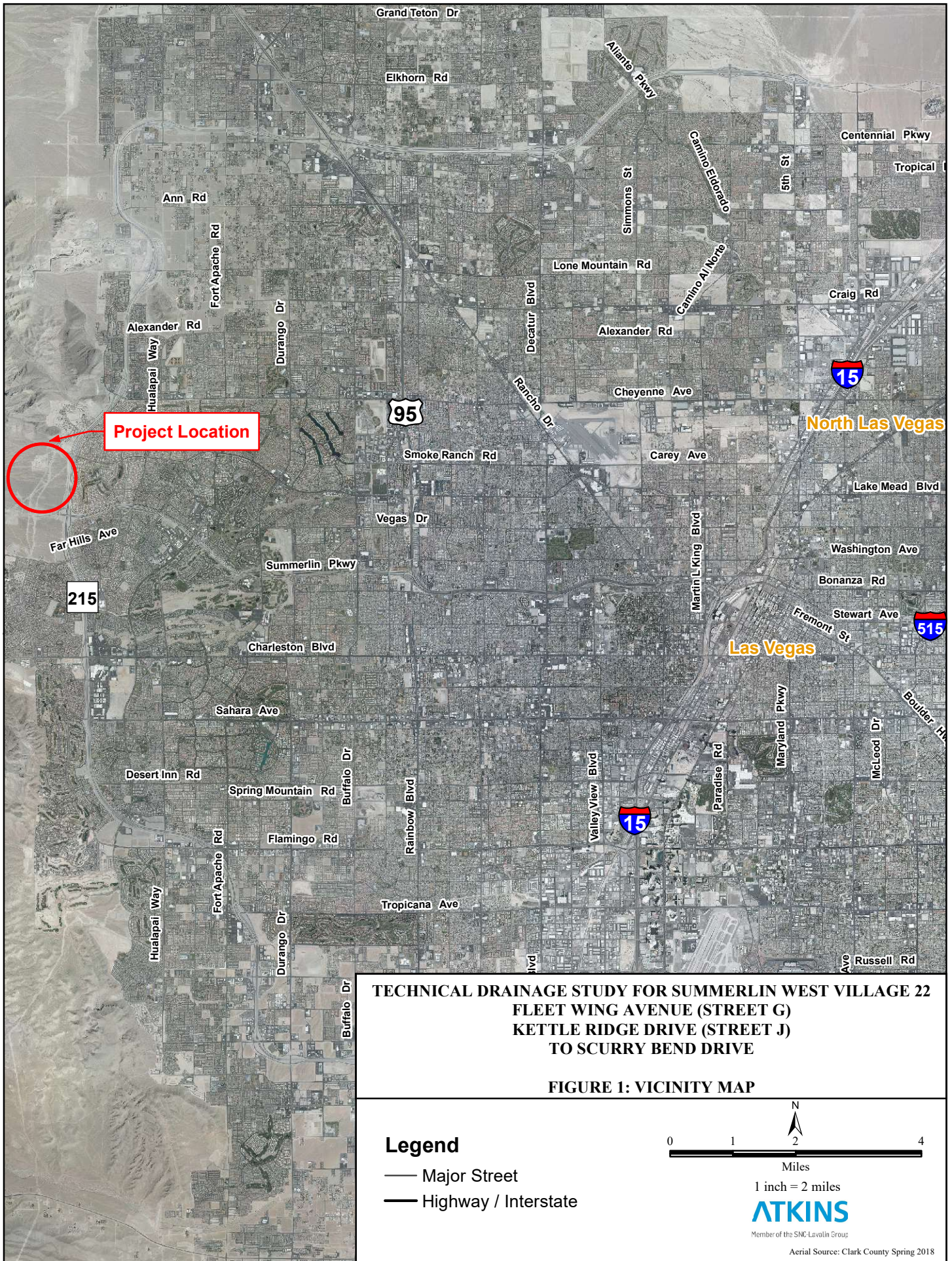
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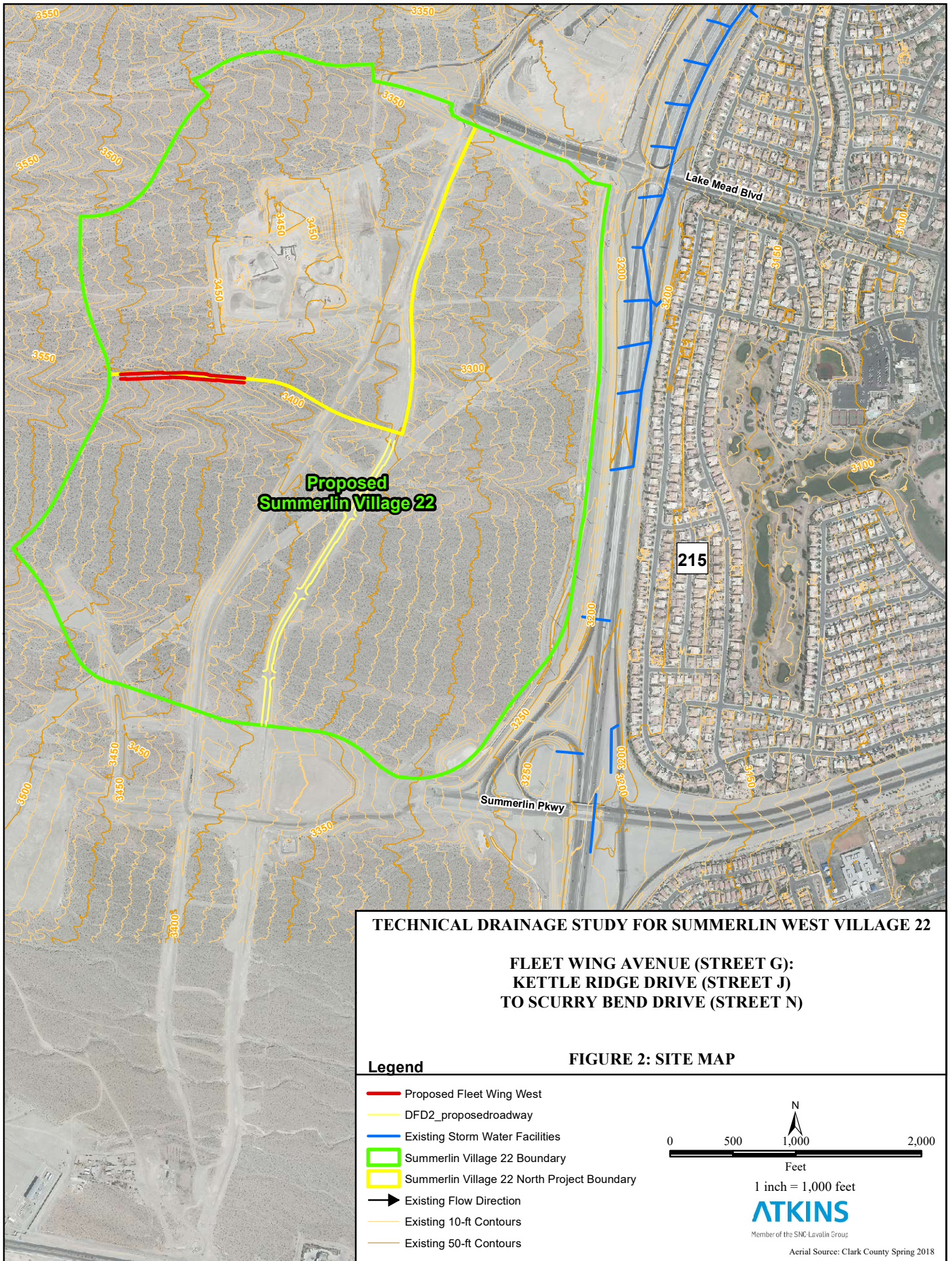
Executive Summary

This Technical Drainage Study (TDS), prepared on behalf of Howard Hughes Company, LLC represents the hydrologic and hydraulic analysis for the Fleet Wing Avenue (Street G) roadway improvements of the Summerlin West Village 22 development. Summerlin West Village 22 is located in the northwest Las Vegas Valley west of the CC-215 beltway and is bounded by Lake Mead Boulevard and Summerlin Parkway. A vicinity map is provided in Figure 1. The Fleet Wing Avenue is located between Kettle Ridge Drive (Street J) and Scurry Bend Drive and is shown on the location map on Figure 2.

A Master Conceptual Drainage Study (MCDS) for Summerlin West Village 22 (W.O. 7861-3A) was approved November 28, 2018. Update #2 of the MCDS was approved January 23, 2020. Portions of the TDS, such as parcel names, rainfall depths, and facility locations are directly referenced from the MCDS and the relevant information is included in Appendix A.







1. Hydrologic Analysis

1.1. Existing Condition

The existing site condition is undeveloped desert land. As established in the Master Conceptual Drainage Study (MCDS), there is one existing downstream storm drain facility that collects runoff from the proposed Street G improvements and adjacent development. The Western Beltway Channel to the east of the project is fully developed and includes a 20-foot wide concrete channel that conveys flow north to the Village 26 Detention Basin.

In the existing condition, runoff generated by the project and the undeveloped areas west of the project drains east as sheet flow to the Western Beltway Channel. According to the 2002 Conceptual Drainage Study and Western Beltway Study, the existing channel has been designed to accept both the existing and ultimate condition flows from Village 22. The Village 22 site was included in the area previously analyzed in the Western Beltway Study. In addition, the allowable discharge flow rates for the project have been established in the 2017 Summerlin West Planning Area (SWPA) MPU study. Therefore, an additional existing condition hydrologic model was not required as part of this study.

1.2. Interim Condition

The proposed roadway is referred to as “Fleet Wing Avenue” in this study and on the plans. The MCDS refers to the proposed roadway by a letter name, “Street G”. Now that the roadways have been named, the plans and report refer to the roadways by name. Table 1 compares the roadway names to their letter name in the MCDS.

The proposed Fleet Wing Avenue improvements will be constructed prior to the development of adjacent onsite parcels (F and L-M). As a result, an interim condition exists for the proposed improvements. Refer to Figure 3 to see the interim conditions in the hydrology workmap.

The proposed Fleet Wing Avenue improvements and interim grading have been designed to ensure that the existing drainage patterns are maintained in the interim condition and that none of the existing downstream facilities are adversely affected by the proposed improvements.

Construction of Kettle Ridge Drive (Street J) and the Scurry Bend Rough Grade is to be completed prior to the interim conditions of Fleet Wing Avenue. Drainage basins to the west of the Scurry Bend Rough Grade will be intercepted before entering Fleet Wing Avenue in the interim and ultimate conditions. The flows from portions of Scurry Bend Drive are tributary to Fleet Wing Avenue in the interim and ultimate conditions. There are several drainage basins on the north and south side of Fleet Wing Avenue that collect flows in the interim condition which are either intercepted by interim drop inlets or swales; flows from these adjacent interim subbasins do not drain onto Fleet Wing Avenue.

The hydrologic conditions for 10-year and 100-year storm events in the interim subbasins were modeled using HEC-1. The results are summarized in Table 2 and Figure 3.

The proposed Fleet Wing Avenue storm drain discharges east to the existing Kettle Ridge Drive storm drain facility. The tailwater elevation for the hydraulic model was taken from the upstream hydraulic grade line (HGL) in the Technical Drainage Study for Kettle Ridge Drive (Street J): Fleet Wing Avenue to Kindle Rise Way. The plan sheets that reference the HGL information is included in the reference information in Appendix A.

Table 1 – Village 22 MCDS and TDS Roadway Names

MCDS Street Name	TDS Street Name
Street E	Flight Range Avenue
Street EE	Flight Edge Way
Street F	Kindle Rise Way
Street G	Fleet Wing Avenue
Street H	Clowder Pass Way
Street I	Kestrel Creek Avenue
Street J	Kettle Ridge Drive
Street N	Scurry Bend Drive
Summerlin Parkway WB/Street Q	Sunset Run Drive
Carriage Hill Drive	Kettle Bend Road

Table 2 – Interim Condition HEC-1 Model Results

Basin ID	Tributary Area (sq mi)	Tributary Area (ac)	100-year Flow (cfs)	10-year Flow (cfs)
OFF-1*	0.06690	42.82	122	-
25-HS1*	0.07542	48.27	144	63
StN-1a	0.00269	1.72	8	4
StN-1b	0.00271	1.74	8	4
StN-2b	0.00252	1.62	7	4
StN-2c	0.00146	0.94	4	2
FWA-1	0.00066	0.42	2	1
FWA-2	0.00116	0.74	3	2
FWA-3	0.00143	0.91	4	2

**Referenced from Scurry Bend Drive Rough Grade Drainage Study*

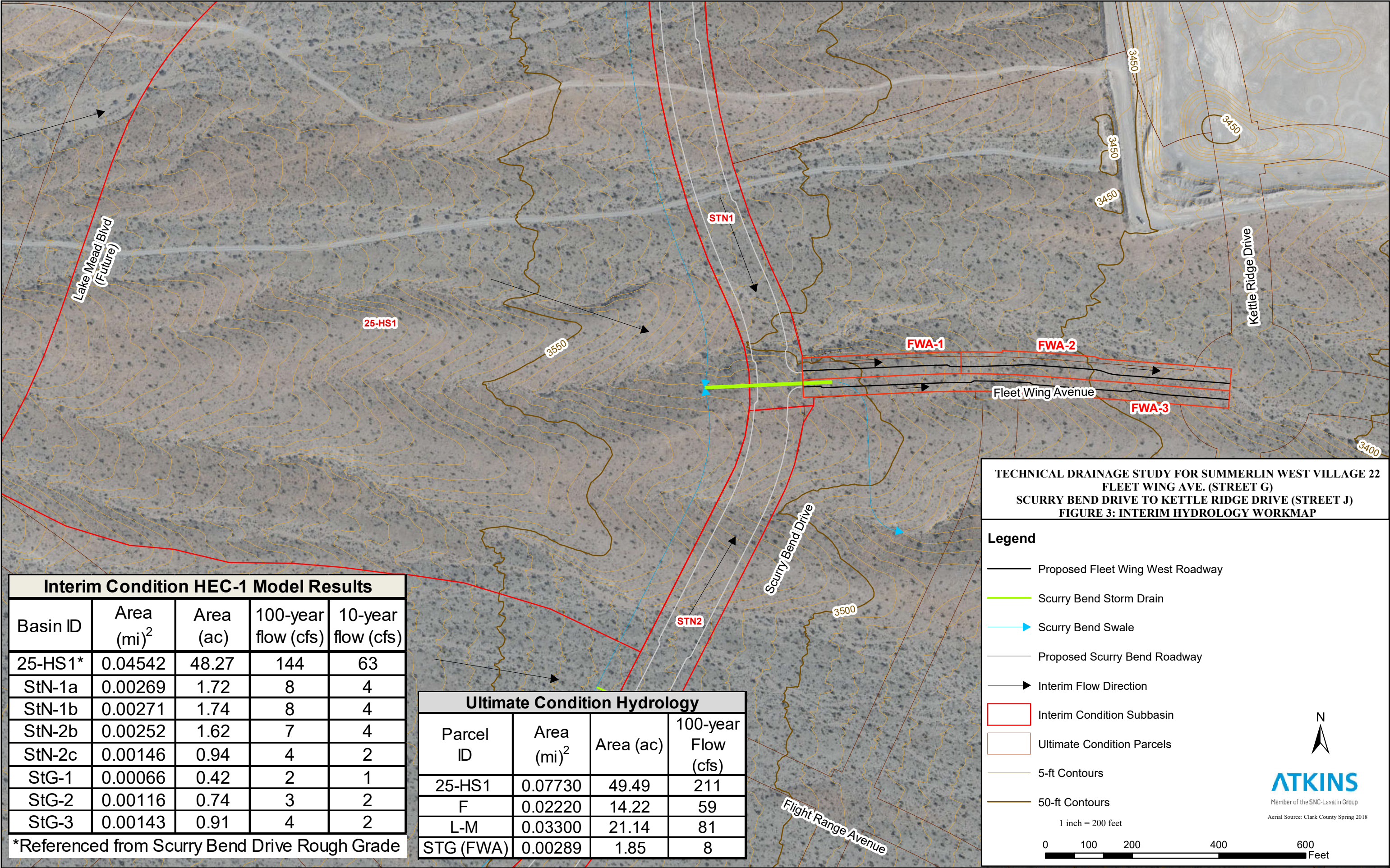
- No flow given in referenced study

1.3. Ultimate Condition

The ultimate condition flows were directly referenced from the approved MCDS as shown in the HEC-1 output and in the Ultimate Condition Basin Map, Figure 6, of Appendix A. Table 3, below, summarizes the ultimate conditions results from the MCDS for the Fleet Wing Avenue study. Ultimate conditions are also displayed on Figure 3.

Table 3 – Ultimate Condition MCDS Reference Information

Parcel ID	Tributary Area (sq mi)	Tributary Area (ac)	100-year Flow (cfs)
25-HS1	0.0773	49.49	211
F	0.0222	14.22	59
L-M	0.0330	21.14	81



Interim Condition HEC-1 Model Results				
Basin ID	Area (mi) ²	Area (ac)	100-year flow (cfs)	10-year flow (cfs)
25-HS1*	0.04542	48.27	144	63
StN-1a	0.00269	1.72	8	4
StN-1b	0.00271	1.74	8	4
StN-2b	0.00252	1.62	7	4
StN-2c	0.00146	0.94	4	2
StG-1	0.00066	0.42	2	1
StG-2	0.00116	0.74	3	2
StG-3	0.00143	0.91	4	2

*Referenced from Scurry Bend Drive Rough Grade

Ultimate Condition Hydrology			
Parcel ID	Area (mi) ²	Area (ac)	100-year Flow (cfs)
25-HS1	0.07730	49.49	211
F	0.02220	14.22	59
L-M	0.03300	21.14	81
STG (FWA)	0.00289	1.85	8

TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 22
FLEET WING AVE. (STREET G)
SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE (STREET J)
FIGURE 3: INTERIM HYDROLOGY WORKMAP

Legend

- Proposed Fleet Wing West Roadway
- Scurry Bend Storm Drain
- Scurry Bend Swale
- Proposed Scurry Bend Roadway
- Interim Flow Direction
- Interim Condition Subbasin
- Ultimate Condition Parcels
- 5-ft Contours
- 50-ft Contours

1 inch = 200 feet

0 100 200 400 600 Feet

N

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Aerial Source: Clark County Spring 2018

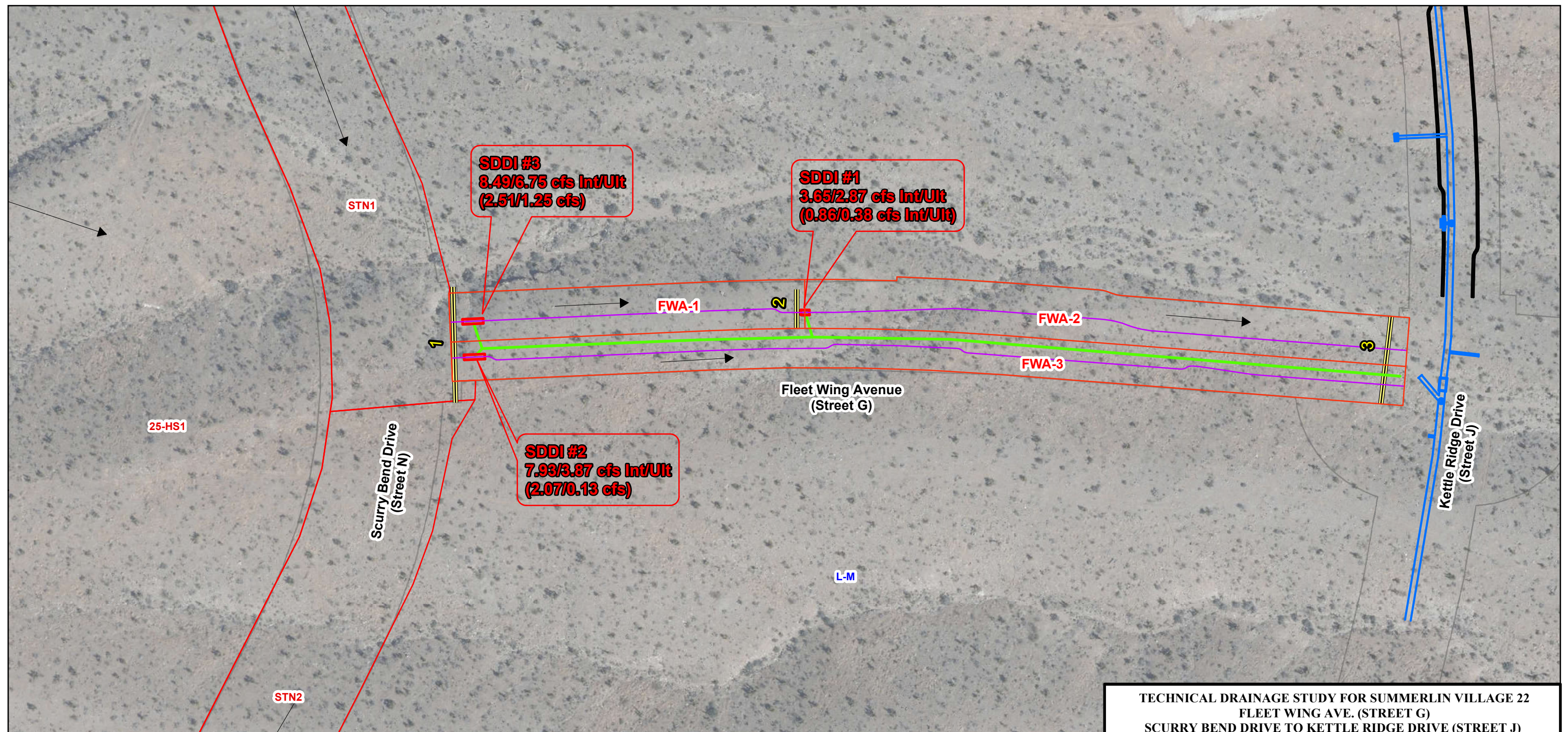
2. Hydraulic Analysis

2.1. Drop Inlet Calculations

The computer program Bentley FlowMaster V10.2 was utilized to perform calculations for the six proposed drop inlets along Fleet Wing Avenue. SDDI #2 and SDDI #3 were sized for the ultimate condition 100-event. In the Interim condition SDDI #2 and SDDI #3 are subject to higher flows than in the ultimate condition. SDDI#1 will collect the bypass flow from SDDI#3 before the future entrance to ES-1. Drop inlet calculations are provided in Appendix C. Table 4 provides a summary of the drop inlet calculation results. Drop inlet locations and calculation results are also shown on Figure 4.

Table 4 – Drop Inlet Calculations

ID	Total Flow (cfs)	Discharge Source	Intercepted Flow (cfs)	Bypass Flow (cfs)
100-Year Interim Conditions				
SDDI #1	4.51	StG-1+bypass from SDDI#3	3.65	0.86
SDDI #2	10	StN-2c	7.93	2.07
SDDI #3	11	StN-1b	8.49	2.51
100-Year Ultimate Conditions				
SDDI #1	3.25	StG-1+bypass from SDDI#3	2.87	0.38
SDDI #2	4	StN-2c	3.87	0.13
SDDI #3	8	StN-1b	6.75	1.25



Drop Inlet Calculations				
SDDI	Total Flow (cfs)	Discharge Source	Intercepted Flow (cfs)	Bypass Flow (cfs)
100-year Interim Conditions				
1	4.51	StG-1 + bypass from SDD#3	3.65	0.86
2	10.00	StN-2	7.93	2.07
3	11.00	StN-1	8.49	2.51
100-year Ultimate Conditions				
1	3.25	StG-1 + bypass from SDD#3	2.87	0.38
2	4.00	StN-2c	3.87	0.13
3	8.00	StN-1b	6.75	1.25

Normal Depth Calculations					
Section	Total Flow (cfs)	Discharge Source	D (ft)	V (ft/s)	D*V
100-year Interim Conditions					
1	21.00	StN-1 + StN-2	0.39	5.43	2.12
2	4.51	StG-1 + bypass from SDD#3	0.20	4.93	0.99
3	9.93	StG-2 + StG-3 + bypass from SDD#1 & SDD#2	0.31	4.56	1.41
100-year Ultimate Conditions					
1	12.00	StN-1b + StN-2c	0.33	4.76	1.57
2	3.25	StG-1 + bypass from SDD#3	0.18	4.60	0.83
3	7.40	StG-2 + StG-3 + bypass from SDD#1 & SDD#2	0.29	4.28	1.24

TECHNICAL DRAINAGE STUDY FOR SUMMERLIN VILLAGE 22

FLEET WING AVE. (STREET G)

SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE (STREET J)

FIGURE 4: HYDRAULICS WORKMAP

Fleet Wing Ave (FWA) Basins

Proposed FWA Roadway

FWA Drop Inlets

FWA Storm Drain

Existing Storm Drain

Cross Sections

Flow Paths

Existing Roadways

Ultimate Condition Parcels

Intercepted Flow (Bypass Flow)

N

1 inch = 100 feet

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Aerial Source: Clark County Spring 2018

050100200300400

Feet

2.2. Normal Depth Calculations

The computer program Bentley FlowMaster V10.2 was utilized to perform normal depth calculations for the proposed roadway. These normal depth calculations were utilized to ensure that the proposed storm drain facility is adequately designed and that all local street flow criteria are met.

Two full street cross-sections were analyzed as roadway flow and storm drain capture were equal on north and south sides of the street for western portion of the roadway (STG-2), but not for the eastern portion (STG-1). The cross-section locations were specified based on the flow patterns and utilized the worst-case slope or roadway width when applicable for the calculations. Street roadway flows for the western portion of the roadway (STG-2) and the eastern portion of the roadway (STG-1) are equal in both the interim and ultimate conditions.

Table 5 summarizes the normal depth calculations for 100-year interim and ultimate storm events. Depth*Velocity must be less than 8 for the 100-year event and less than 6 for the 10-year event. Since the street conditions in the interim and ultimate 100-yr events meet the roadway criteria for the 10-year event as well, the computations for the 10-yr events are not shown in tables and figures.

Print-outs of all normal depth calculations for the ultimate condition are provided in Appendix C. Cross section locations and calculation summaries are shown on Figure 4.

Table 5 – Normal Depth Calculations

ID	Total Flow (cfs)	Discharge Source	Slope (%)	Flow Depth (ft)	Velocity (ft/s)	D* V
100-year Interim Condition						
STG-1	21	StN-1b + StN-2c	~4.0	0.39	5.43	2.12
STG-2	4.51	StG-1+bypass from SDDI#3	7.86	0.20	4.93	0.99
STG-3	9.93	STG-2 + STG-3 + bypass from SDDI#1 & SDDI#3	~4.0	0.31	4.56	1.41
100-year Ultimate Condition						
STG-1	12	StN-1b + StN-2c	~4.0	0.33	4.76	1.57
STG-2	3.25	StG-1+bypass from SDDI#3	7.86	0.18	4.60	0.83
STG-3	7.40	STG-2 + STG-3 + bypass from SDDI#1 & SDDI#3	~4.0	0.29	4.28	1.24

~Approximate slope calculated in the vertical curve

2.3. Storm Drain System Modeling

The proposed storm drain systems were modeled using Water Surface Pressure Gradient for Windows (WSPG-W). A print-out of the WSPG-W models for interim and ultimate conditions are provided in Appendix C. The Q_{100} and hydraulic grade lines are shown on the improvement plans in Appendix D. Table 6 summarizes the WSPG-W model at the mainline manholes for interim and ultimate conditions.

The downstream end of the proposed storm drain is 48" RCP in Kettle Ridge Drive. The maximum velocity modeled is 33.77 ft/s and is observed in the ultimate condition downstream of SDMH#2. Where the modeled velocity exceeds 15 ft/s, the plans call for Class IV RCP instead of Class III RCP. Where the velocity exceeds 25 ft/s the plans call for sacrificial concrete.

Table 6 – WSPG-W Mainline Summary Table

SDMH#	WSPG-W Station	Q_{100}	ΣQ_{100}	HGL (Ft)	Velocity (ft/sec)
100-Interim Condition					
#1	154.19	0	164.07	3418.740	30.35
#2	516.52	0	164.07	3446.904	30.05
#3	658.64	3.65	160.42	3458.517	28.90
#4	774.19	0	160.42	3467.679	26.74
#5	1000.98	16.47	144.00	3485.993	11.46
100-Ultimate Condition					
#1	154.19	0	238.49	3419.178	33.33
#2	516.52	0	238.49	3447.362	32.73
#3	658.64	2.87	235.62	3459.013	31.29
#4	774.19	0	235.62	3468.217	28.96
#5	1000.98	10.62	225.00	3486.229	17.90

Appendices



Appendix A. Drainage Study References

A.1. Summerlin West Village 22 Master Conceptual Drainage Study

CITY OF LAS VEGAS			DATE:
INTER-OFFICE MEMORANDUM			January 23, 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 for – Update #2 Summerlin West Village 22			COPIES TO: VTN Nevada
Cross Streets:	I-215 Western Beltway & Summerlin Parkway		Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5005H.doc		Bart Anderson, P.E., DevCo
Parcel Number:	137-14-401-006, 137-23-101-002		CCRFCFCD
Zoning Action:	MDR-73901		CCPW
FEMA Flood Zone	YES	NO	X
Proposed Storm Drain	YES	X	NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	6/12/2018	6/28/2018 & 7/13/2018	Not Approved	\$400.00	49696: \$400
2 nd Submittal	7/31/2018	8/22/2018	Not Approved	\$400.00	497790: \$400
3 rd Submittal	11/5/2018	11/27/2018	Conditional Approval	\$400.00	500639: \$400
Memo Revision	12/3/2018	12/3/2018	Conditional Approval	N/C	N/C
CCRFCFCD	1/10/2019	1/10/2019	Concurrence Recv'd	N/C	N/C
4 th Submittal	2/12/2019	3/6/2019	Not Approved	\$100.00	503164: \$100
5 th Submittal	3/21/2019	4/4/2019	Conditional Approval	\$400.00	3057847: \$400
CCPW & CCRFCFCD	4/25/2019 & 5/23/2019	5/29/2019	Concurrence Received	N/C	N/C
6 th Submittal	11/13/2019	12/10/2019	Conditional Approval	\$100.00	3644006: \$100
Memo Revision	12/12/2019	12/12/2019	Conditional Approval	N/C	N/C
CCPW & CCRFCFCD	1/13/2020 & 1/16/2020	1/23/2020	Concurrence Recv'd	N/C	N/C
			TOTAL FEES (LDDRS):	\$1,800.00	

REMARKS:

6th Submittal: Update #2 to address Village 22 Overall Development Plan changes

4th & 5th Submittals: Update #1 & Addendum #1 to revise Village 22 in accordance to the Update of the latest overall Summerlin West Master Plan Drainage Study

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/14
AREA K-14

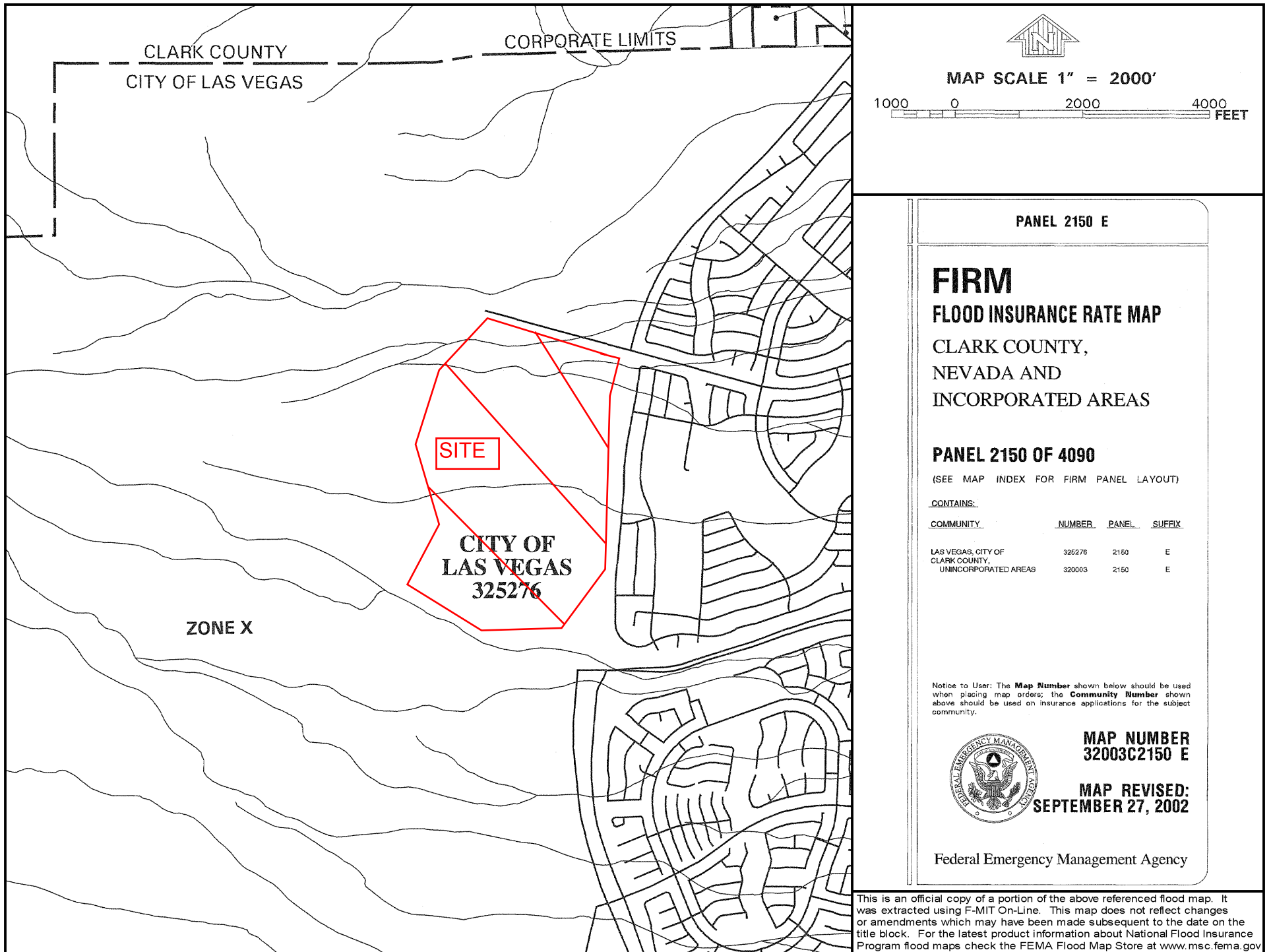


FIGURE 3

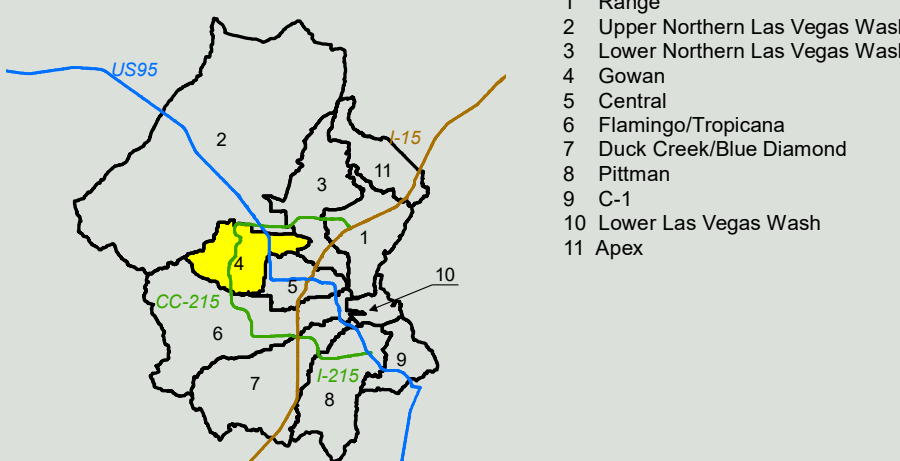


2018 Las Vegas Valley Master Plan Update

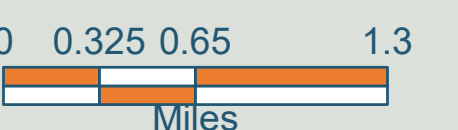
Figure W-4
Gowan Watershed

Legend

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

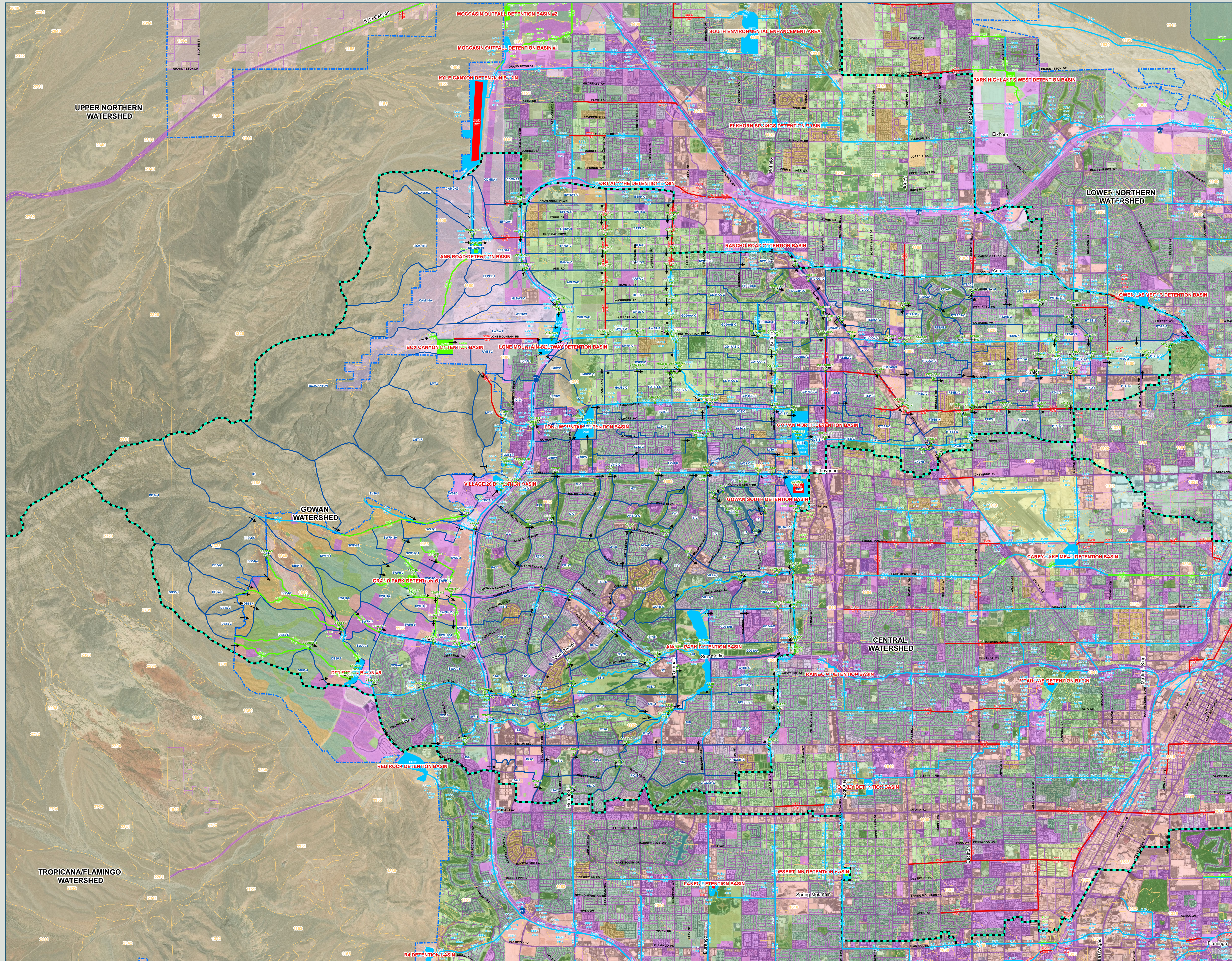


Scale: 1 inch = 0.65 mile



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Louis Berger



ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
APAD 0203	E	ANGEL PARK - ALTA DRIVE BRANCH						
	E	2: 7' X 5.5' RCB	1104	2200	CSWAA-1	GOW3A	6.95	5.28
0225	E	2: 7' X 5.5' RCB OUTLET	360	2137	SUMSDB	GOW3A	6.73	3.40
APBE 0022	E	ANGEL PARK - BELTWAY BRANCH						
	E	CONC CHNL 20"W 7'D 2:1 SS	1556	3366	CCSWFH15	GOW3A	3.39	1.81
	E	CONC CHNL 20"W 7'D 2:1 SS	1583	3366	CCSWFH15	GOW3A	3.39	2.77
	E	8' X 8' RCBC @ FAR HILLS	777	1048	CSWFH-15	GOW3A	0.59	2.32
	E	CONC CHNL 10"W 5'D 2:1 SS	1465	1048	CSWFH-15	GOW3A	0.59	1.88
	E	CONC CHNL 10"W 4'D 2:1 SS	1685	1048	CSWFH-15	GOW3A	0.59	0.80
	P0	8' X 6' RCB	5012	781	CSWFH-12	GOW3A	0.41	1.30
	P0	6' X 5' RCB	2858	606	CSWFH-11	GOW3A	0.31	3.00
APCH 0000	E	ANGEL PARK - CARRIAGE HILL BRANCH						
	E	8' X 6' RCB	152	399	CSWFH-14	GOW3A	0.21	0.87
	P0	72" RCP	1685	399	CSWFH-14	GOW3A	0.21	2.00
0031	P0	60" RCP	2008	206	SWFH-13	GOW3A	0.10	1.38
APD2 0002	E	ANGEL PARK - DESERT FOOTHILLS 2 BRANCH						
	E	7' X 6' RCB	883	674	SWAA-2	GOW3A	0.68	1.08
APDF 0000	P0	ANGEL PARK - DESERT FOOTHILLS BRANCH						
	P0	10' X 6' RCB	1788	1428	CSWFH-9	GOW3B	0.80	3.55
	P0	8' X 6' RCB	1813	968	CSWFH-8	GOW3A	1.80	2.00
	P0	6' X 4' RCB	1922	486	CSWFH-4	GOW3A	1.52	4.40
	P0	42" RCP	1076	141	GPDB	GOW3A	1.29	6.00
	P0	130 AC-FT GRAND PARK DETENTION BASIN		1543	CSWFH-3	GOW3A	1.29	
	P0	6' X 6' RCB	2977	853	SWFH-1	GOW3A	0.69	3.80
	P0	5' X 4' RCB	2197	509	SWFH-2	GOW3A	0.37	5.70
APFH 0000	E	ANGEL PARK - FAR HILLS BRANCH						
	E	2: 8' X 8' RCB	1070	2494	CCSWFH14	GOW3B	1.51	3.50
	E	2: 8' X 8' RCB	250	2149	CCSWFH9	GOW3B	1.30	4.19
	E	16' X 8' RCAP	1951	2149	CCSWFH-9	GOW3B	1.30	5.10
	E	8' X 6' RCB	1435	839	CSWFH-7	GOW3A	0.50	2.00
	E	8' X 6' RCB	2946	839	CSWFH-7	GOW3A	0.50	2.00
	P0	5' X 4' RCB	2497	456	SWFH-6	GOW3A	0.28	5.50
APM5 0000	E	DETENTION BASIN #5						
	P0	384 AC-FT DETENTION BASIN #5		6856	SUM5IN	GOW3A	6.73	
	P0	CONC CHNL 50"W 4.5'D 2:1 SS	2102	3634	CCDB54-7	GOW3A	4.13	5.20
	P0	CONC CHNL 50"W 4'D 2:1 SS	4180	3495	CDB55-7	GOW3A	2.60	5.80
	E	DIVERSION BERM WITH GABION BANK PROTECTION	1000	3634	CCDB54-7	GOW3A	4.13	1.30
	P0	CONC CHNL 80"W 4'D 2:1 SS	264	3634	CCDB54-7	GOW3A	4.13	1.30
	P0	CONC CHNL 50"W 3'D 2:1 SS	9922	1664	CDB54-4	GOW3A	0.81	6.80
	P0	CONC CHNL 100"W 3'D 2:1 SS	9075	2606	CDB54-7	GOW3A	3.31	7.00
	P0	CONC CHNL 30"W 3'D 2:1 SS	6695	1092	DB55-1	GOW3A	0.64	7.50
	P0	CONC CHNL 50"W 3'D 2:1 SS	6522	1729	CDB55-5	GOW3A	1.30	7.30
APSP 0183	E	ANGEL PARK - SUMMERLIN PARKWAY						
	E	CONC CHNL 10"W 6'D 2:1 SS	1680	884	C11B-1	GOW3A	0.84	1.70
GOB3 0000	E	GOWAN LONE MOUNTAIN SYST. 3 BELTWAY						
	E	66" RCP	1370	341	SV22-1	GOW3A	0.18	4.50
GOBE 0000	E	GOWAN LONE MOUNTAIN SYST. BELTWAY						
	E	20' X 10' RCBC @ ACCESS RD	30	1044	CSV22	GOW3A	0.67	5.67
	E	CONC CHNL 20"W 5'D 2:1 SS	1100	1044	CSV22	GOW3A	0.67	6.50
	E	CONC CHNL 11"W 6.8'D 0:1 SS	2143	1044	CSV22	GOW3A	0.67	6.50
	E	CONC CHNL 15"W 7.5'D 0:1 SS	487	1044	CSV22	GOW3A	0.67	3.93
	E	CONC CHNL 17"W 7.5'D 0:1 SS	844	1044	CSV22	GOW3A	0.67	0.76
	E	2: 10' X 9' RCBC @ LAKE MEAD	400	782	SV22-2	GOW3A	0.49	0.50
	E	CONC CHNL 20"W 9'D 2:1 SS	627	782	SV22-2	GOW3A	0.49	0.50
	E	CONC CHNL 20"W 6'D 2:1 SS	1021	782	SV22-2	GOW3A	0.49	0.50
	E	CONC CHNL 20"W 6'D 2:1 SS	638	782	SV22-2	GOW3A	0.49	0.50
	E	CONC CHNL 10"W 5.5'D 2:1 SS	1500	782	SV22-2	GOW3A	0.49	1.02
	E	CONC CHNL 10"W 5.5'D 2:1 SS	1500	782	SV22-2	GOW3A	0.49	1.02
GOL3 0010	E	GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3						
	E	CONC CHNL 20"W 10'D 0:1 SS	3037	3277	CRCLMT1R	GOW3A	7.31	2.78
	E	TRANSITION STRUCTURE	100	3277	CRCLMT1R	GOW3A	7.31	3.50
	E	20' X 6' RCBC @ CLIFF SHADOWS	350	1271	CRCSV22	GOW3A	4.99	2.44
0077	E	CONC CHNL 20"W 6'D 0:1 SS	1229	1271	CRCSV22	GOW3A	4.99	6.11

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
GOL3 0100	E	GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3						
	E	CONC CHNL 20"W 10'D 0:1 SS	200	1271	CRCSV22	GOW3A	4.99	5.67
	E	96" RCP OUTLET	670	666	DET26	GOW3A	4.31	0.29
	E	305 AC-FT VILLAGE 26 DETENTION BASIN		3615	VIL26IN	GOW3A	4.31	
	E	CONC CHNL 20"W 7.5'D 0:1 SS	2720	3615	VIL26IN	GOW3A	4.31	6.50
	E	CONC CHNL 20"W 8'D 0:1 SS	563	3615	VIL26IN	GOW3A	4.31	3.91
	E	14' X 14' RCB	890	3615	VIL26IN	GOW3A	4.31	0.88
	E	Dual 10' X 14' RCB	124	3615	VIL26IN	GOW3A	4.31	0.57
	P0	CONC CHNL 50"W 4'D 2:1 SS	4060	3524	CSV26-1	GOW3A	4.02	6.08
	P0	CONC CHNL 50"W 3.5'D 2:1 SS	6215	2281	30	GOW3A	2.44	7.95
	E	NATURAL WASH 363"W	4850	1410	SV26-1	GOW3A	1.59	22.50
	E	NATURAL WASH 450"W	7000	2281	30	GOW3A	2.44	8.50
GOL4 0000	E	GOWAN LONE MOUNTAIN SYSTEM-BRANCH 4						
	E	14' X 8' RCB	554	2243	CLMT1R	GOW3A	2.33	2.50
	E	2: 9' X 8' RCB	820	2243	CLMT1R	GOW3A	2.33	4.74
	E	SOIL CEMENT CHNL 60"W 8'D 3-4:1 SS	320	2243	CLMT1R	GOW3A	2.33	2.00
	E	SOIL CEMENT CHNL 42"W 6'D 3-4:1 SS	700	2243	CLMT1R	GOW3A	2.33	1.00

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

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

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

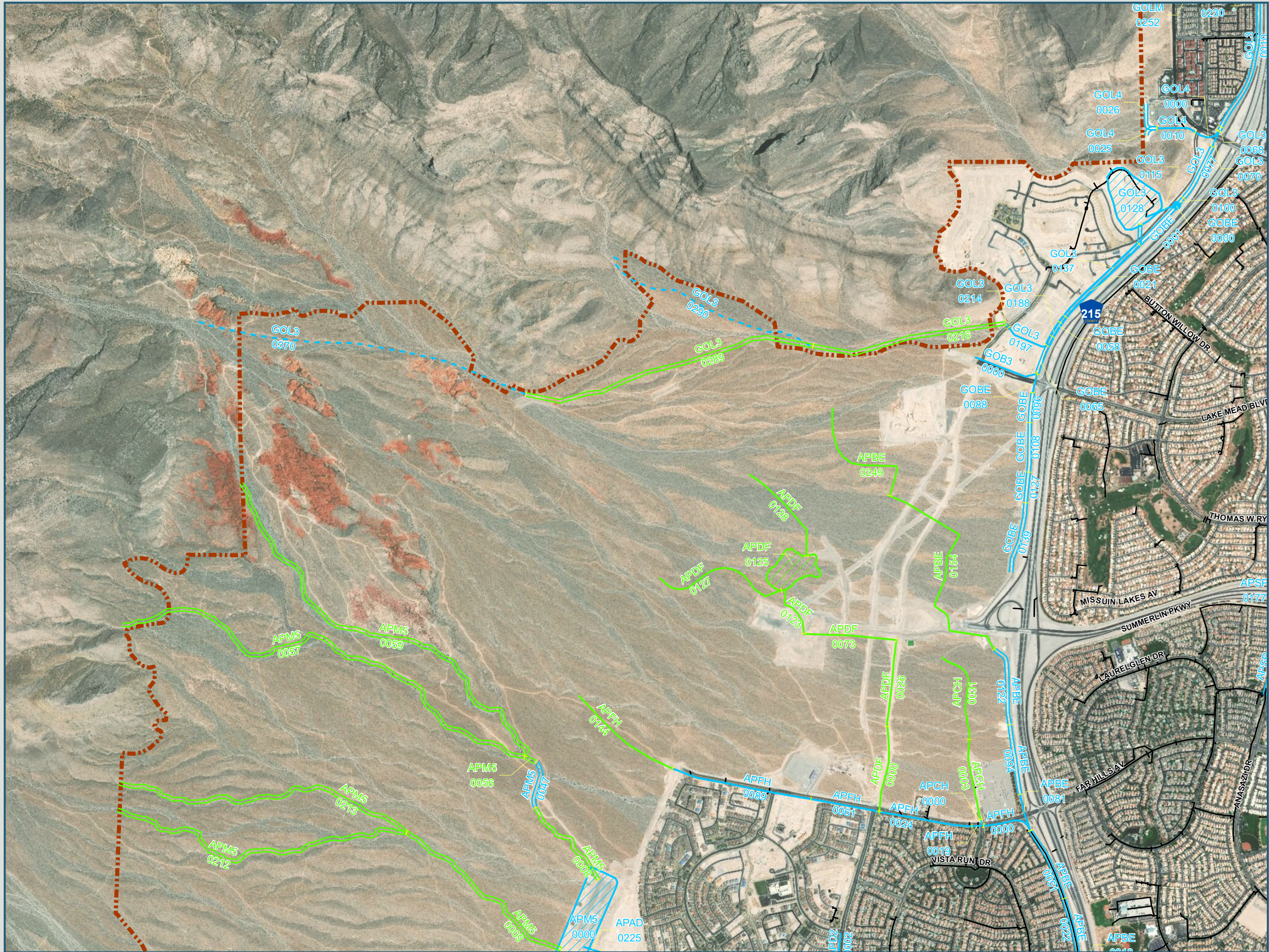


2018 LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FACILITY INVENTORY
FIGURE F-22

L E G E N D	ID (Facility Identifier)	AABB
	Parent Stream Name	
	Stream Name	
	Mile	0000
	Distance Above Confluence with Parent Stream (Miles)	
	Miles in Hundredths	
	Existing Facility.....E	Bottom Width..... W
	Proposed or Modified Facility..... P	Depth..... D
	Contingency Level	Side Slope, H:V..... SS
	Category A.....P	
	Category B.....P0	
	Construction Features	
	Cast in Place Concrete Pipe.....	CIPCP
	Corrugated Metal Arch Pipe Culvert.....	CMP
	Corrugated Metal Pipe Culvert.....	CMPC
	High Density Polyethylene.....	HDPE
	Horizontal Elliptical Reinforced Concrete Pipe.....	HERCP
	Reinforced Concrete Arch Pipe.....	RCAP
	Reinforced Concrete Arch Culvert.....	RCAC
	Reinforced Concrete Box.....	RCB
	Reinforced Concrete Box Culvert.....	RCBC
	Reinforced Concrete Pipe.....	RCP
	Reinforced Concrete Pipe Culvert.....	RCPC
	Storm Sewer Pipe.....	SSP





2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-22
FLOOD CONTROL FACILITIES

LEGEND

Ultimate Development Boundary

Existing Facilities

Category A Proposed Facilities

Category B Proposed Facilities

Local Existing Facilities

Detention Basin

Culvert or Bridge Crossing

Stormdrain

Lined Channel

Unlined Channel

Levee/Dike

Natural Wash/Floodway

ID-Mile Separator

Remove & Replace/Parallel Facilities

Category A

Channel

Stormdrain

Crossing

Category B

Channel

Stormdrain

Crossing

0 500 1,000 2,000 3,000

Feet

Scale: 1 inch = 2,000 feet

AerialSource:Esri World Imagery 2017

US95

I-15

CC-215

I-215

ATKINS

Member of the SNC-Lavalin Group

Louis Berger



FIGURE 4A - MPU Facilities

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
APAD		ANGEL PARK - ALTA DRIVE BRANCH						
0044	E	11' X 8' RCAP	1565	3140	CSWAA-3	ALLGOW4	8.26	4.24
0073	E	11' X 8' RCAP	2220	2917	CSWAA-2	ALLGOW3	7.68	3.50
0146	E	10' X 8' RCB	3010	2220	CSWAA-1	ALLGOW3	6.98	4.40
0203	E	2: 7' X 5.5' RCB	1136	2220	CSWAA-1	ALLGOW3	6.98	5.28
0225	E	2: 7' X 5.5' RCB Outlet	360	2149	SUMSDB	ALLGOW3	6.74	3.40
APBE		ANGEL PARK - BELTWAY BRANCH						
0013	E	3: 12' X 8' RCB	489	4060	CSWFH-9	ALLGOW3	2.65	6.50
0022	E	Conc Chnl 20"W 7'D 2:1 SS	1556	4060	CSWFH-9	ALLGOW3	2.65	1.81
0051	E	Conc Chnl 20"W 7'D 2:1 SS	1583	4060	CSWFH-9	ALLGOW3	2.65	2.77
0081	E	8' X 8' RCBC @ Far Hills	777	423	SWFH-9	ALLGOW3	0.17	2.32
0094	E	Conc Chnl 10"W 5'D 2:1 SS	1465	423	SWFH-9	ALLGOW3	0.17	1.88
0122	E	Conc Chnl 10"W 4'D 2:1 SS	1409	423	SWFH-9	ALLGOW3	0.17	0.80
APCH		ANGEL PARK - CARRIAGE HILL BRANCH						
0000	E	8' X 6' RCB	152	585	SWFH-8	ALLGOW3	0.29	0.87
0003	P0	8' X 7' RCB	1461	585	SWFH-8	ALLGOW3	0.29	2.39
0031	P0	8' X 5' RCB	896	585	SWFH-8	ALLGOW3	0.29	0.60
APD2		ANGEL PARK - DESERT FOOTHILLS 2 BRANCH						
0002	P0	7' X 7' RCB	964	948	SWAA-2	ALLGOW3	0.70	2.00
APD5		ANGEL PARK - DESERT FOOTHILLS 5 BRANCH						
0000	P0	8' X 6' RCB	685	1701	CSWFH-2	ALLGOW3	1.09	1.89
0013	P0	72" RCP	1436	1701	CSWFH-2	ALLGOW3	1.09	4.18
APD6		ANGEL PARK - DESERT FOOTHILLS 6 BRANCH						
0000	P0	6' X 6' RCB	2604	1076	CSWFH-6	ALLGOW3	0.56	6.15
APDF		ANGEL PARK - DESERT FOOTHILLS BRANCH						
0000	P0	12' X 10' RCB	1356	2897	CSWFH-7	ALLGOW3	1.81	2.20
0026	P0	12' X 10' RCB	2463	1962	CSWFH-3	ALLGOW3	1.25	1.62
0073	P0	10' X 8' RCB	2679	1962	CSWFH-3	ALLGOW3	1.25	4.10
0123	P0	6' X 5' RCB	5355	1701	CSWFH-2	ALLGOW3	1.09	6.53
APF2		ANGEL PARK - FAR HILLS 2 BRANCH						
0000	P0	8' X 6' RCB	1046	669	CSWFH-5	ALLGOW3	0.38	1.00
APFH		ANGEL PARK - FAR HILLS BRANCH						
0000	E	2: 8' X 8' RCB	995	3862	CSWFH-8	ALLGOW3	2.48	3.50
0019	E	2: 8' X 8' RCB	250	3392	CCSWFH-7	ALLGOW3	2.18	4.19
0024	E	16' X 8' RCAP	1943	3392	CCSWFH-7	ALLGOW3	2.18	5.10
0061	P0	8' X 6' RCB	1492	669	CSWFH-5	ALLGOW3	0.38	2.00
0089	P0	8' X 6' RCB	2902	669	CSWFH-5	ALLGOW3	0.38	2.00
0144	P0	7' X 6' RCB	1556	669	CSWFH-5	ALLGOW3	0.38	5.50
APM5		ANGEL PARK - MIDDLE 5 BRANCH						
0000	E	384 ac-ft Detention Basin #5		7001	SUM5IN	ALLGOW3	6.74	
0001	E	12,153 cfs PMF Spillway		12153	SUM5IN	ALLGOW3	6.74	
0008	P0	Conc Chnl 50"W 4.5'D 2:1 SS	2102	3725	CDB54-6R	ALLGOW3	4.30	5.20
0009	P0	Conc Chnl 50"W 4.5'D 2:1 SS	4180	3624	CDB55-8	ALLGOW3	2.45	5.80
0047	E	Diversion Berm with Gabion Bank Protection	1000	3725	CDB54-6R	ALLGOW3	4.30	1.30
0056	P0	Conc Chnl 80"W 4'D 2:1 SS	264	3725	CDB54-6R	ALLGOW3	4.30	1.30
0057	P0	Conc Chnl 50"W 3'D 2:1 SS	9922	1821	CDB54-4	ALLGOW3	1.01	6.80
0059	P0	Conc Chnl 100"W 3'D 2:1 SS	8923	2358	CDB54-5	ALLGOW3	2.45	7.00
0212	P0	Conc Chnl 30"W 3.5'D 2:1 SS	6695	1238	CDB55-2	ALLGOW3	0.74	7.50
0213	P0	Conc Chnl 50"W 2.5'D 2:1 SS	6522	1125	CDB55-5	ALLGOW3	0.62	7.30
APSP		ANGEL PARK - SUMMERLIN PARKWAY						
0135	E	Conc Chnl 10"W 6'D 2:1 SS	2030	1173	C8B-1	ALLGOW3	1.14	2.40
0177	E	9' X 8' RCBC @ Anasazi	330	867	C11B-1	ALLGOW3	0.84	1.70
0183	E	Conc Chnl 10"W 6'D 2:1 SS	1680	867	C11B-1	ALLGOW3	0.84	1.70
GO02		GOWAN SOUTH FACILITIES (CHEYENNE CHANNEL)						
0257	E	Conc Chnl 10"W 6.75'D 1.5:1 SS	4293	2577	CCJ-C	ALLGOW3	2.97	4.10
GOB2		GOWAN LONE MOUNTAIN SYST. 2 BELTWAY						
0000	P0	36" RCP Outlet	118	75	DET22	ALLGOW3	0.76	6.76
0001	P0	123 ac-ft Village 22 Detention Basin		1344	CSV22-DB	ALLGOW3	0.76	
0020	P0	8' X 7' RCB	657	1247	SV22-2	ALLGOW3	0.70	8.30
0033	P0	8' X 6' RCB	3359	1247	SV22-2	ALLGOW3	0.70	6.90
0096	P0	6' X 5' RCB	1332	1247	SV22-2	ALLGOW3	0.70	6.00

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
GOB3		GOWAN LONE MOUNTAIN SYST. 3 BELTWAY						
0000	P0	66" RCP	1877	530	SV22-3	ALLGOW3	0.28	6.60
0035	P0	54" RCP	965	530	SV22-3	ALLGOW3	0.28	6.40
GOBE		GOWAN LONE MOUNTAIN SYST. BELTWAY						
0000	E	20' X 10' RCBC @ Access Rd	30	958	CSV22-3	GW3SC	0.28	5.67
0001	E	Conc Chnl 20"W 5'D 2:1 SS	3355	958	CSV22-3	GW3SC	0.28	6.50
0065	E	Conc Chnl 20"W 6'D 2:1 SS	1220	958	CSV22-3	GW3SC	0.28	1.90
0088	E	2: 10'X9' RCBC @ Lake Mead	400	471	CDET22	ALLGOW3	0.96	0.50
0096	E	Conc Chnl 20"W 9'D 2:1 SS	627	471	CDET22	ALLGOW3	0.96	0.50
0108	E	Conc Chnl 20"W 6'D 2:1 SS	1021	471	CDET22	ALLGOW3	0.96	0.50
0127	E	Conc Chnl 20"W 6'D 2:1 SS	638	442	SV22-1	ALLGOW3	0.20	0.50
0139	E	Conc Chnl 10"W 5.5'D 2:1 SS	1500	442	SV22-1	ALLGOW3	0.20	1.02
GOL3		GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3						
0010	E	Conc Chnl 20"W 10'D 0:1 SS	3037	2946	CRCLMT1R	GW3SC	2.61	2.78
0068	E	Transition Structure	100	2946	CRCLMT1R	GW3SC	2.61	3.50
0070	E	20' X 6' RCBC @ Cliff Shadows	350	1162	CRCSV223	ALLGOW3	5.68	2.44
0077	E	Conc Chnl 20"W 6'D 0:1 SS	1229	1162	CRCSV223	ALLGOW3	5.68	6.11
0100	E	Conc Chnl 20"W 10'D 0:1 SS	200	1162	CRCSV223	ALLGOW3	5.68	5.67
0115	E	66" RCP Outlet	670	679	DET26	ALLGOW3	4.43	
0128	E	333 ac-ft Village 26 Detention Basin		3767	VIL26IN	ALLGOW3	4.43	
0137	P0	14' X 14' RCB	4335	3767	VIL26IN	ALLGOW3	4.43	0.50
0216	P0	Conc Chnl 50"W 4.5'D 2:1 SS	3761	3693	CSV26-1	ALLGOW3	4.15	6.08
0289	P0	Conc Chnl 50"W 3.5'D 2:1 SS	6215	2396	30	ALLGOW3	2.51	7.95
0290	E	Natural Wash 363"W	4850	1465	SV26-1	ALLGOW3	1.64	22.50
0370	E	Natural Wash 450"W	7000	2396	30	ALLGOW3	2.51	8.50
GOL4		GOWAN LONE MOUNTAIN SYSTEM-BRANCH 4						
0000	E	14' X 8' RCB	554	2257	CLMT1R	ALLGOW3	2.33	2.50
0010	E	2: 9' X 8' RCB	820	2257	CLMT1R	ALLGOW3	2.33	4.74
0025	E	Soil Cement Chnl 60"W 8'D 3-4:1 SS	320	2257	CLMT1R	ALLGOW3	2.33	2.00
0026	E	Soil Cement Chnl 42"W 6'D 3-4:1 SS	700	2257	CLMT1R	ALLGOW3	2.33	1.00

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

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

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



2013 LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FACILITY INVENTORY
FIGURE F - 24

L
E
G
E
N
D

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

Existing Facility.....E
Proposed or Modified Facility.....P
Contingency Level
Category B.....P0
Master Plan.....P1
Preliminary Design.....P2
Design.....P3

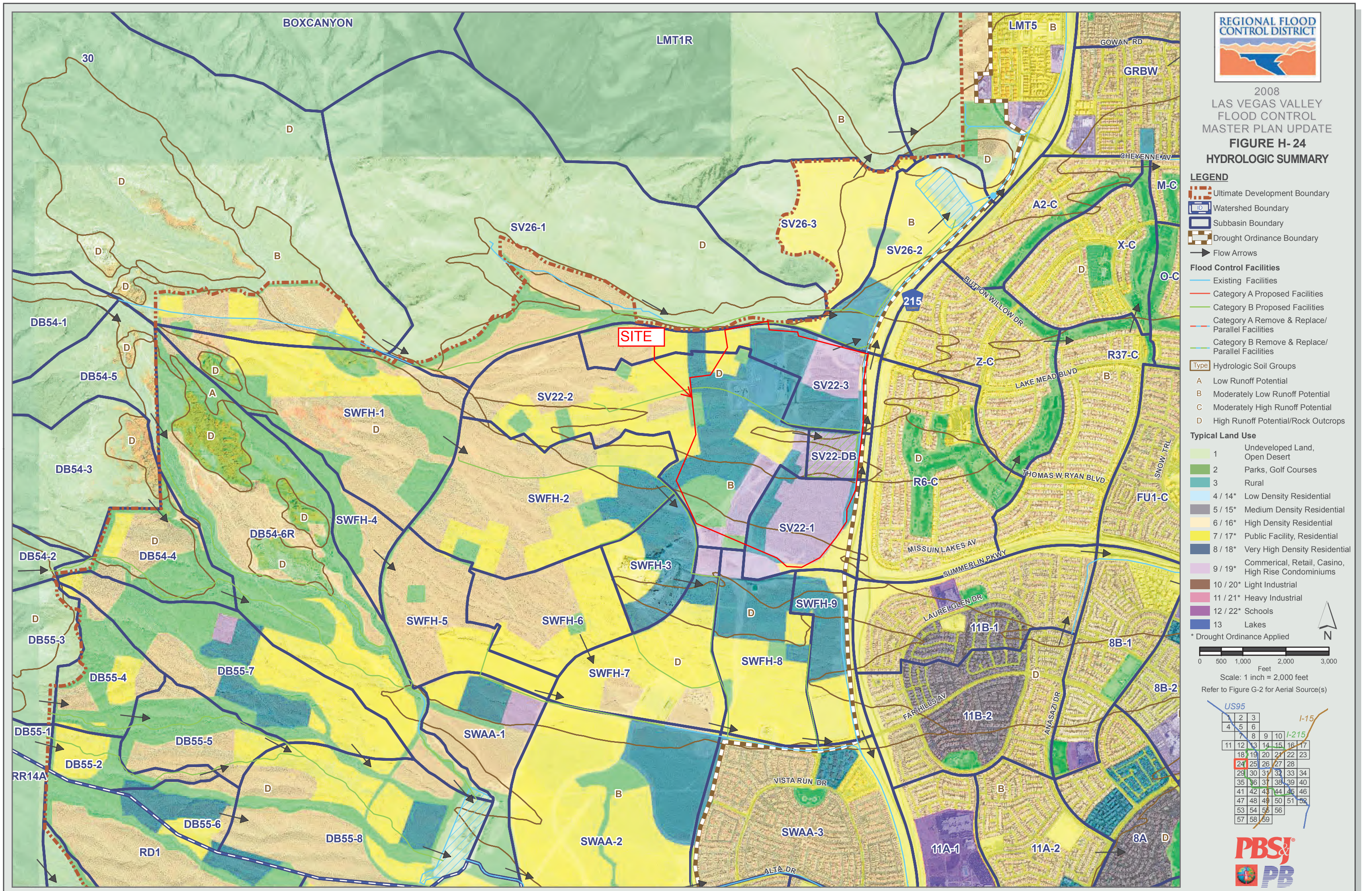
Bottom Width.....W

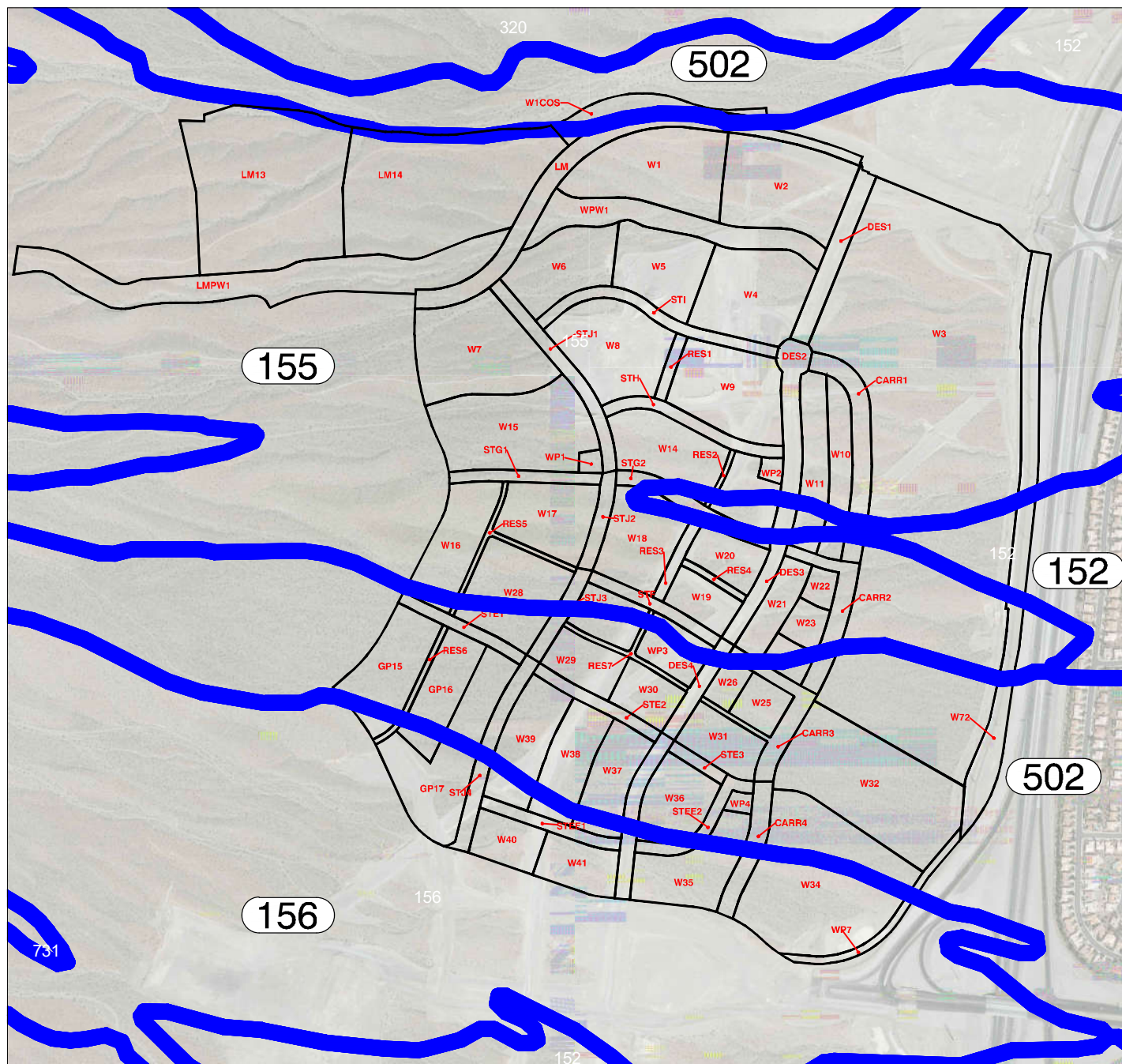
Depth.....D

Side Slope, H:V.....SS

Construction Features

Cast in Place Concrete Pipe.....	CIPCP	Reinforced Concrete Arch Culvert.....	RCAC
Corrugated Metal Arch Pipe Culvert.....	CMAP	Reinforced Concrete Box.....	RCB
Corrugated Metal Pipe Culvert.....	CMPC	Reinforced Concrete Box Culvert.....	RCBC
High Density Polyethylene.....	HDPE	Reinforced Concrete Pipe.....	RCP
Horizontal Elliptical Reinforced Concrete Pipe.....	HERCP	Reinforced Concrete Pipe Culvert.....	RCPC
Reinforced Concrete Arch Pipe.....	RCAP	Storm Sewer Pipe.....	SSP





LEGEND

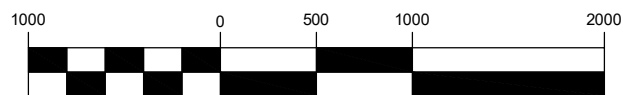
- SITE BOUNDARY
- 300** SOIL NUMBER
- SOIL BOUNDARY

NOTE:

1. This data was taken from the following website:
<http://soildatamart.nrcs.usda.gov>
2. This data is in state plane coordinates



GRAPHIC SCALE



1" = 1000'

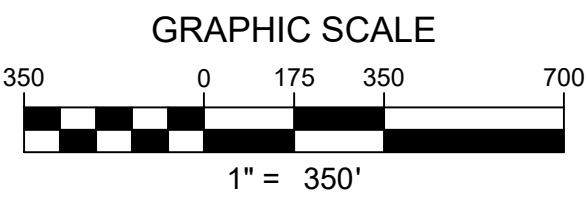
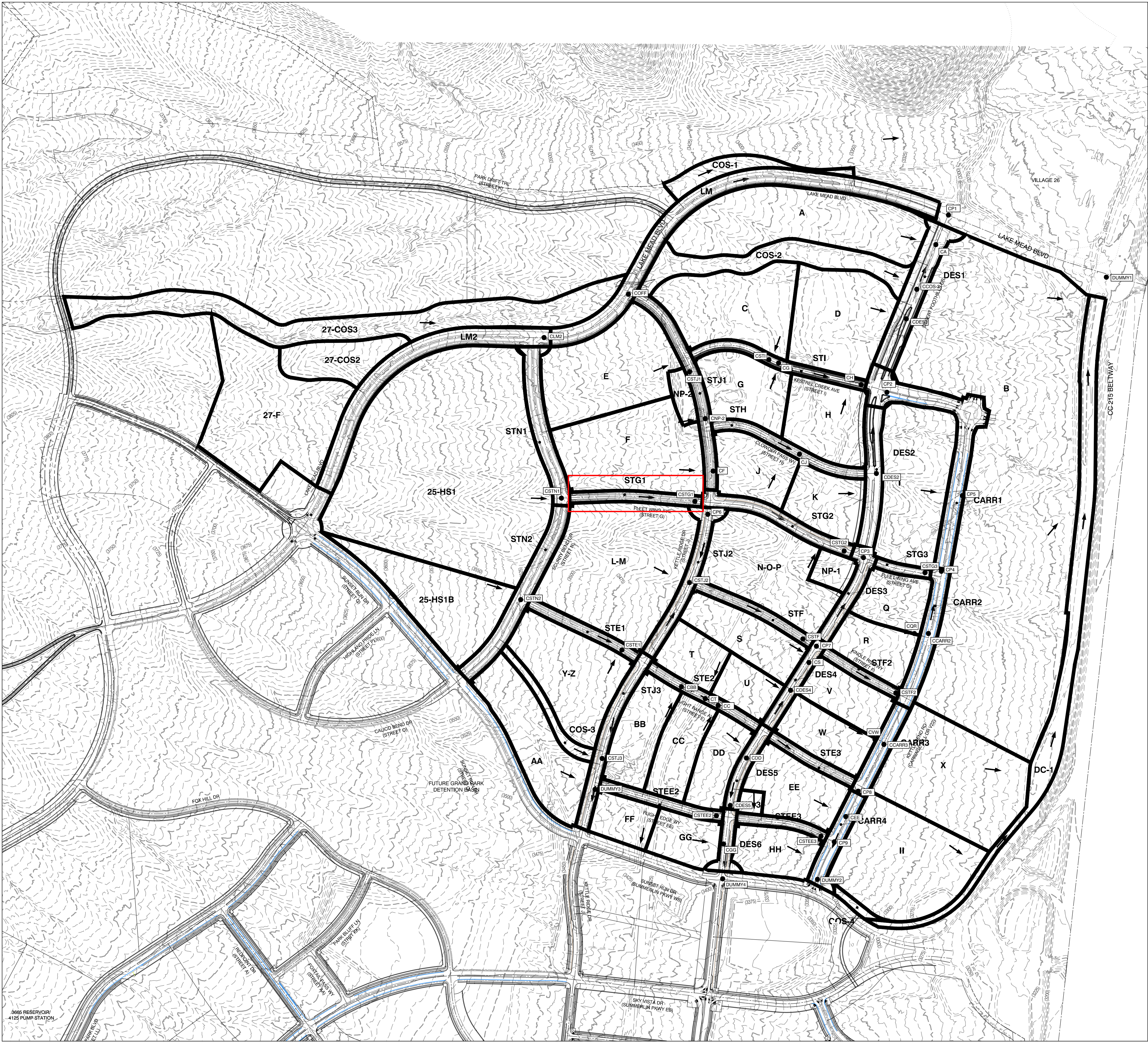
H:\7861\Village 22 Master\Drainage\A Figures\Figure 5A - Village 22 Soils Map.dwg

vtn
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NV 89146-5148

FIGURE 5: SOILS MAP

SUMMERLIN WEST VILLAGE 22

SCALE	HORZ. 1"=1000'
	VERT. n/a
W.O. NO.	7861
DRAWN BY:	AH
DATE:	MAY 2018
SHEET	OF



LEGEND

- BASIN BOUNDARY
- BASIN DESIGNATION
- CONCENTRATION POINT
- FLOW ARROW

ULTIMATE CONDITION HEC-1 SUMMARY TABLE					
BASIN ID	AREA (ac)	Q100 (CFS)	BASIN ID	AREA (ac)	Q100 (CFS)
LM	10.04	36	STN1	3.61	13
D	11.96	50	CSTN1	-	244
DES1	4.46	20	STG1	1.85	8
CDES1	-	70	CSTG1	-	229
COS-2	7.51	22	CP6	-	532
CCOS-2	-	89	LM	21.14	81
A	17.39	68	STJ2	3.10	13
CA	-	156	CSTJ2	-	612
CP1	-	191	STF	1.84	8
STI	2.42	11	CSTF	-	610
C	12.05	51	U	3.49	11
CSTI	-	62	DES4	1.77	8
G	7.05	30	CDES4	-	19
CG	-	92	S	3.01	10
H	7.64	33	CS	-	29
CH	-	124	CP7	-	639
STH	2.29	10	STF2	1.21	5
J	5.93	24	CSTF2	-	637
CJ	-	34	V	5.01	17
K	5.28	22	W	5.28	19
DES2	3.09	13	CVW	-	36
CDES2	-	68	CARR3	2.14	8
CP2	-	189	CCARR3	-	667
CARR1	6.95	29	STE3	1.36	6
I	13.44	38	CP8	-	673
N-O-P	14.52	49	EE	6.80	25
NP-1	1.73	6	CEE	-	689
STG2	2.86	13	NP3	0.70	2
CSTG2	-	68	STEE3	1.23	5
DES3	2.00	9	CSTEE3	-	7
CP3	-	77	CP9	-	205
STG3	0.72	3	HH	4.85	20
CSTG3	-	79	CARR4	-	10
Q	4.58	17	25-HS1B	-	48
R	4.97	20	STN2	-	19
CQR	-	37	CSTN2	-	67
CARR2	3.58	15	Y-Z	11.28	42
CCARR2	-	52	STE1	1.75	8
CP4	-	131	CSTE1	-	115
CP5	-	379	COS-3	1.70	4
II	16.03	61	STJ3	3.22	14
X	17.45	60	CSTJ3	-	126
B	80.77	304	AA	10.13	33
DC-1	12.59	36	STE2	-	8
COS-4	0.57	2	BB	6.29	23
COS-1	2.87	6	CBB	-	31
V27-F	19.13	83	T	4.02	13
V27-COS2	5.25	20	CT	-	44
LM2	7.23	28	CC	5.34	19
CLM2	-	132	CCC	-	63
27-COS3	17.46	53	DD	4.76	17
COFF	-	185	DDD	-	77
E	13.91	58	DES5	1.57	7
STJ1	3.52	15	CDES5	-	81
CSTJ1	-	255	STEE2	1.79	8
NP-2	1.34	5	CSTEE2	-	88
CNP-2	-	255	GG	4.98	21
F	14.22	59	CGG	-	109
CF	-	309	FF	3.49	15
25-HS1	49.49	211			

THE HOWARD HUGHES COMPANY, LLC
10801 WEST CHARLESTON BLVD. 3RD FLOOR
LAS VEGAS, NEVADA 89135

FIGURE 6
ULTIMATE CONDITION BASIN MAP

DRAWN BY: JYA
DESIGNED BY: JYA
CHECKED BY: JYA

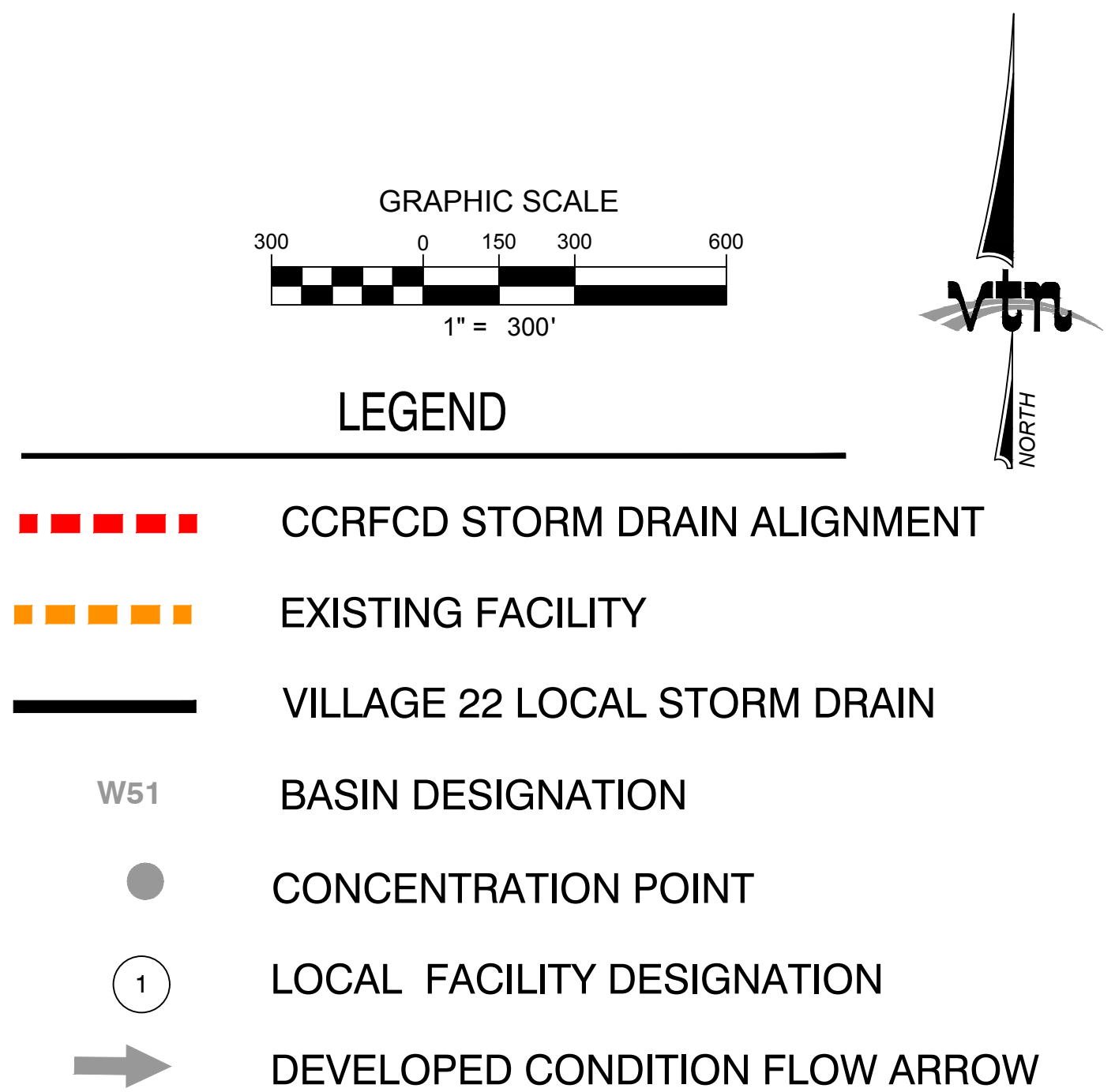
PROJECT NO: 2801
SHEET: 1 OF 2 SHEETS
DRAWING NO: H17861 Village 22 Master Drainage 06_UPLA_Figures/Figure 6 - Village 22 Drainage Basin Map.dwg

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH: (702) 893-7500 FAX: (702) 362-2897 WEB: WWW.VTNV.COM

SUMMERLIN WEST VILLAGE 22

SCALE: 1" = 350' HORIZ.
N/A VERT.

REVISION
BY: DATE
REV: 1



VILLAGE 22 LOCAL FLOOD PROTECTION FACILITIES											
Design Slope		Q100	Tributary Basin/CP	Velocity	Facility	Design Slope		Q100	Tributary Basin/CP	Velocity	Facility
Facility #	%	cfs		ft/s		%	cfs	ft/s			
4	5.4	36	LM	18.02	24" RCP	61	6.6	379	CP5	29.52	6x6' RCB
5	1.0	50	D	13.29	30" RCP	64	1.0	81	L-M	11.63	42" RCP
6	2.7	70	CDES1	15.60	30" RCP	65	6.9	31	CBB	18.97	30" RCP
7	2.0	22	COS-2	11.00	30" RCP	66	4.3	44	CT	17.48	30" RCP
8	2.9	89	CCOS-2	17.76	36" RCP	67	8.0	63	CCC	24.12	30" RCP
9	5.0	68	A	20.48	30" RCP	68	1.0	10	S	6.90	30" RCP
10	3.0	156	CA	20.48	42" RCP	69	1.0	11	U	7.08	30" RCP
11	N/A	191	CP1	N/A	EX 66" RCP**	70	2.1	19	CDES4	10.77	30" RCP
12A	1.6	53	V27-COS3	12.61	48" RCP	72	6.1	36	CVW	18.89	30" RCP
12B	2.6	185	COFF	20.31	54" RCP	74	7.7	6	STE3	12.27	30" RCP
13	2.0	58	E	13.47	30" RCP	77A	1.0	67	CSTN2	10.75	36" RCP
19	1.0	51	C	10.49	42" RCP	77B	5.0	244	CSTN1	28.12	48" RCP
20	6.0	62	CSTI	21.33	42" RCP	78	1.0	42	Y-Z	9.51	30" RCP
21	1.0	30	G	9.19	36" RCP	79	4.5	115	CSTE1	22.30	36" RCP
22	8.0	92	CG	26.39	42" RCP	79B	0.5	115	CSTE1	8.38	5x5' RCB
23	1.0	33	H	9.29	30" RCP	80	8.0	4	COS-3	11.01	30" RCP
24	8.0	124	CH	28.56	42" RCP	81	0.5	126	CSTJ3	8.56	5x5' RCB
25	1.5	5	NP-2	6.39	36" RCP	82	1.0	33	AA	9.29	30" RCP
27	1.0	59	F	10.65	36" RCP	83	1.0	23	BB	8.60	30" RCP
29	1.0	24	J	8.68	30" RCP	84	1.0	13	T	7.41	30" RCP
30	7.0	34	CJ	19.55	30" RCP	85	1.0	19	CC	8.19	30" RCP
35	1.0	22	K	8.50	30" RCP	86	1.0	17	DD	7.96	30" RCP
36	1.4	68	CDES2	12.78	42" RCP	87	1.0	77	CDD	11.52	42" RCP
37	3.9	189	CP2	24.25	54" RCP	88	1.0	15	FF	7.70	30" RCP
40	1.0	38	I	9.49	30" RCP	92	2.7	21	GG	12.13	30" RCP
41	3.5	131	CP4	21.14	42" RCP	93	1.0	25	EE	8.77	30" RCP
43	1.0	49	N-O-P	10.31	36" RCP	94	1.0	20	HH	8.30	30" RCP
44	6.8	68	CSTG2	23.10	36" RCP	95	1.0	61	II	10.96	42" RCP
45	1.0	6	NP-1	5.97	30" RCP	96	1.0	60	X	10.68	36" RCP
52	8.0	79	CSTG3	25.51	36" RCP	97	1.5	304	B	18.49	60" RCP
55	1.0	37	CQR	9.46	30" RCP	98	N/A	138	N/A	N/A	EX 48" RCP***
58	3.3	52	CCARR2	16.49	30" RCP	99	1.0	2	NP-3	8.55	30" RCP

*Replaces existing 30" RCP stub provided in Lake Mead Study
 **Existing 66" RCP per Lake Mead Blvd Study
 ***Existing Facility (Per Lake Mead Blvd Study) can accept 138 cfs and may be used for flexibility


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1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 23OCT19 TIME 13:10:22 *
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*
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
*
*****

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

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

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

1 HEC-1 INPUT PAGE 1

```

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
*** FREE ***
          *DIAGRAM
1         ID    ULTIMATE CONDITION HYDROLOGIC MODEL
2         ID    INPUT FILE DATE = OCTOBER 2019
3         ID    DESIGN STORM = 100-YEAR 6-HR STORM
4         ID    STORM DISTRIBUTION = SDN #3
5         ID    MODELED BY VTN (JYA)
6         ID
7         ID    *****
8         ID    * UPDATE #2 - SUMMERLIN WEST VILLAGE 22 *
9         ID    *****
10        ID
11        ID
12        ID
13        ID
14        ID    JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
15        ID
16        ID    100-YEAR, 6-HOUR STORM, SDN3
17        ID
18        IT      5      0      0      100
19        IO      5      0      0
20        IN      5      0      0
21        JR      PREC  1.00
          *
22        KK      LM
23        BA      0.0157
24        PB      3.41
25        PC      0      0.020  0.057  0.070  0.087  0.108  0.124  0.130  0.130  0.130
26        PC      0.130  0.130  0.130  0.133  0.140  0.142  0.148  0.158  0.172  0.181
27        PC      0.190  0.197  0.199  0.200  0.201  0.204  0.214  0.229  0.241  0.249
28        PC      0.251  0.256  0.270  0.278  0.281  0.283  0.295  0.322  0.352  0.409
29        PC      0.499  0.590  0.710  0.744  0.781  0.812  0.819  0.835  0.851  0.856
30        PC      0.860  0.868  0.876  0.888  0.910  0.926  0.937  0.950  0.970  0.976
31        PC      0.982  0.985  0.987  0.989  0.990  0.993  0.993  0.994  0.995  0.998
32        PC      0.998  0.999      1
33        LS      0      98.0
34        UD      0.118
          *
35        KK      D
36        BA      0.0187
37        PB      3.39
38        LS      0      95.0
39        UD      0.058
          *
40        KK      DES1
41        BA      0.0070
42        PB      3.39
43        LS      0      98.0
44        UD      0.058
          *

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LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
45	KK CDES1
46	KM COMBINE D AND DES1
47	HC 2 *
48	KK RCDES1
49	KM ROUTE CDES1 TO CCOS-2
50	RD 241 0.027 0.013 0 CIRC 2.5 *
51	KK COS-2
52	BA 0.0117
53	PB 3.41
54	LS 0 89.0
55	UD 0.142 *
56	KK CCOS-2
57	KM COMBINE CDES1 AND COS-2
58	HC 2 *
59	KK RCCOS-2
60	KM ROUTE CCOS-2 TO CA
61	RD 325 0.007 0.013 0 CIRC 3.0 *
62	KK A
63	BA 0.0272
64	PB 3.41
65	LS 0 95.0
66	UD 0.078 *
67	KK CA
68	KM COMBINE CCOS-2 AND A
69	HC 2 *
70	KK RCA
71	KM ROUTE CA TO CP1
72	RD 325 0.050 0.013 0 CIRC 3.5 *
73	KK CP1
74	KM COMBINE LM AND CA
75	HC 2 *

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
76	KK STI
77	KM KESTREL CREEK AVE
78	BA 0.0038
79	PB 3.41
80	LS 0 98.0
81	UD 0.050
	*
82	KK C
83	BA 0.0188
84	PB 3.41
85	LS 0 95.0
86	UD 0.054
	*
87	KK CSTI
88	KM COMBINE C AND STI
89	HC 2
	*
90	KK G
91	BA 0.0110
92	PB 3.41
93	LS 0 95.0
94	UD 0.056
	*
95	KK CG
96	KM COMBINE CSTI AND CG
97	HC 2
	*
98	KK RCG

99 KM ROUTE CG TO CH
100 RD 556 0.081 0.013 0 CIRC 3.5
*

101 KK H
102 BA 0.0119
103 PB 3.41
104 LS 0 95.0
105 UD 0.053
*

106 KK CH
107 KM COMBINE CG AND CH
108 HC 2
*

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HEC-1 INPUT

PAGE 4

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

109 KK RCH
110 KM ROUTE CH TO CP2
111 RD 255 0.093 0.013 0 CIRC 3.5
*

112 KK STH
113 KM CLOWDER PASS WAY
114 BA 0.0036
115 PB 3.41
116 LS 0 98.0
117 UD 0.050
*

118 KK J
119 BA 0.0093
120 PB 3.41
121 LS 0 92.0
122 UD 0.058
*

123 KK CJ
124 KM COMBINE J AND STH
125 HC 2
*

126 KK RCJ
127 KM ROUTE CJ TO CDES2
128 RD 637 0.080 0.013 0 CIRC 2.5
*

129 KK K
130 BA 0.0081
131 PB 3.40
132 LS 0 95.0
133 UD 0.050
*

134 KK DES2
135 BA 0.0048
136 PB 3.38
137 LS 0 98.0
138 UD 0.071
*

139 KK CDES2
140 KM COMBINE DES2, CJ, AND K
141 HC 3
*

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HEC-1 INPUT

PAGE 5

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

142 KK RCDES2
143 KM ROUTE CDES2 TO CP2
144 RD 643 0.014 0.013 0 CIRC 3.5
*

145 KK CP2
146 KM COMBINE CDES2 & CH
147 HC 2
*

148 KK RCP2
149 KM ROUTE CP2 TO CP5
150 RD 1226 0.039 0.013 0 CIRC 4.5
*

151 KK CARR1
152 BA 0.0109
153 PB 3.38

154 LS 0 98.0
155 UD 0.070
*

156 KK I
157 BA 0.0165
158 PB 3.38
159 LS 0 92.0
160 UD 0.083
*

161 KK N-O-P
162 BA 0.0227
163 PB 3.40
164 LS 0 90.3
165 UD 0.090
*

166 KK NP-1
167 BA 0.0027
168 PB 3.40
169 LS 0 89.0
170 UD 0.059
*

171 KK STG2
172 KM FLEET WING AVE
173 BA 0.0045
174 PB 3.40
175 LS 0 98.0
176 UD 0.050
*

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HEC-1 INPUT

PAGE 6

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

177 KK CSTG2
178 KM COMBINE N-O-P, NP-1 AND STG2
179 HC 3
*

180 KK DES3
181 BA 0.0031
182 PB 3.38
183 LS 0 98.0
184 UD 0.050
*

185 KK CP3
186 KM COMBINES CSTG2 & DES3
187 HC 2
*

188 KK RCP3
189 KM ROUTE CP3 TO CSTG3
190 RD 513 0.080 0.013 0 CIRC 3.0
*

191 KK STG3
192 BA 0.0011
193 PB 3.38
194 LS 0 98.0
195 UD 0.050
*

196 KK CSTG3
197 KM COMBINES CP3 AND STG
198 HC 2
*

199 KK Q
200 BA 0.0072
201 PB 3.38
202 LS 0 92.2
203 UD 0.069
*

204 KK R
205 BA 0.0078
206 PB 3.37
207 LS 0 93.2
208 UD 0.065
*

209 KK CQR
210 KM COMBINE R AND Q
211 HC 2
*

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HEC-1 INPUT

PAGE 7

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
212	KK CARR2
213	BA 0.0056
214	PB 3.37
215	LS 0 98.0
216	UD 0.064
	*
217	KK CCARR2
218	KM COMBINE CQR AND CARR2
219	HC 2
	*
220	KK RCCARR2
221	KM ROUTE CCARR2 TO CP4
222	RD 414 0.033 0.013 0 CIRC 2.5
	*
223	KK CP4
224	KM COMBINE CP3 AND CCARR2
225	HC 2
	*
226	KK RCP4
227	KM ROUTE CP4 TO CP5
228	RD 582 0.010 0.013 0 CIRC 3.5
	*
229	KK CP5
230	KM COMBINE CARR1, I, CP2 AND CP4
231	HC 4
	*
232	KK II
233	BA 0.0250
234	PB 3.37
235	LS 0 93.2
236	UD 0.072
	*
237	KK X
238	BA 0.0273
239	PB 3.37
240	LS 0 90.0
241	UD 0.080
	*
242	KK B
243	BA 0.1262
244	PB 3.36
245	LS 0 93.5
246	UD 0.077
	*

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HEC-1 INPUT

PAGE 8

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
247	KK DC-1
248	BA 0.0197
249	PB 3.35
250	LS 0 98
251	UD 0.257
	*
252	KK COS-4
253	BA 0.0009
254	PB 3.35
255	LS 0 88.0
256	UD 0.077
	*
257	KK DUMMY1A
258	KM REGIONAL FACILITY - BELTWAY CHANNEL NORTH
259	KM COMBINE II, X, B, DC1, AND COS-4
260	HC 5
	*
261	KK COS-1
262	BA 0.0045
263	PB 3.41
264	LS 0 79.8
265	UD 0.118
	*
266	KK DUMMY1
267	KM REGIONAL FACILITY - BELTWAY CHANNEL NORTH
268	KM COMBINE CP1, CP5, DUMMY1A, AND COS-1
269	HC 4

*
 270 KK 27-F
 271 BA 0.0299
 272 PB 3.48
 273 LS 0 94.2
 274 UD 0.050
 *

275 KK 27-COS2
 276 BA 0.0082
 277 PB 3.46
 278 LS 0 89.0
 279 UD 0.052
 *

280 KK LM2
 281 BA 0.0113
 282 PB 3.41
 283 LS 0 98.0
 284 UD 0.093
 *

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HEC-1 INPUT

PAGE 9

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

285 KK CLM2
 286 KM COMBINES OFFSITE V27 BASINS 27-F, V27-COS2, AND LM2
 287 HC 3
 *

288 KK 27-COS3
 289 BA 0.0273
 290 PB 3.47
 291 LS 0 89.0
 292 UD 0.113
 *

293 KK COFF
 294 KM COMBINES OFFSITE V27 BASINS
 295 KM COMBINE CLM2 AND V27-COS3
 296 HC 2
 *

297 KK RCOFF
 298 KM ROUTE COFF TO CSTJ1
 299 RD 744 0.058 0.013 0 CIRC 4.5
 *

300 KK E
 301 BA 0.0217
 302 PB 3.43
 303 LS 0 95.0
 304 UD 0.062
 *

305 KK STJ1
 306 KM KETTLE RIDGE
 307 BA 0.0055
 308 PB 3.43
 309 LS 0 98.0
 310 UD 0.069
 *

311 KK CSTJ1
 312 KM COMBINE COFF, E, AND STJ1
 313 HC 3
 *

314 KK RCSTJ1
 315 KM ROUTE COFF TO CSTJ1
 316 RD 380 0.005 0.013 0 CIRC 5
 *

317 KK NP-2
 318 BA 0.0021
 319 PB 3.43
 320 LS 0 89.0
 321 UD 0.058
 *

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HEC-1 INPUT

PAGE 10

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

322 KK CNP-2
 323 KM COMBINE CSTJ1 AND CNP-2
 324 HC 2
 *

325 KK RCNP-2
 326 KM ROUTE CNP-2 TO CF
 327 RD 390 0.005 0.013 0 DEEP 6
 *

328 KK F
 329 BA 0.0222
 330 PB 3.43
 331 LS 0 95.0
 332 UD 0.063
 *

333 KK CF
 334 KM COMBINE CNP-1 AND CF
 335 HC 2
 *

336 KK RCF
 337 KM ROUTE CF TO CP6
 338 RD 320 0.005 0.013 0 DEEP 6
 *

339 KK 25-HS1
 340 BA 0.0773
 341 PB 3.44
 342 LS 0 94.8
 343 UD 0.056
 *

344 KK STN1
 345 KM SCURRY BEND
 346 BA 0.0056
 347 PB 3.44
 348 LS 0 98.0
 349 UD 0.125
 *

350 KK CSTN1
 351 KM COMBINE 25-HS1 AND STN1
 352 HC 2
 *

353 KK RCSTN1
 354 KM ROUTE CSTN1 TO CSTG1
 355 RD 1010 0.000 0.013 0 CIRC 4.5
 *

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HEC-1 INPUT

PAGE 11

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

356 KK STG1
 357 BA 0.0029
 358 PB 3.42
 359 LS 0 98.0
 360 UD 0.050
 *

361 KK CSTG1
 362 KM COMBINE CSTN1 AND STG1
 363 HC 2
 *

364 KK CP6
 365 KM COMBINE CF AND CSTG1
 366 HC 2
 *

367 KK RCP6
 368 KM ROUTE CP6 TO CSTJ2
 369 RD 530 0.005 0.013 0 DEEP 6 0
 *

370 KK L-M
 371 BA 0.0330
 372 PB 3.42
 373 LS 0 94.4
 374 UD 0.084
 *

375 KK STJ2
 376 BA 0.0048
 377 PB 3.42
 378 LS 0 98.0
 379 UD 0.058
 *

380 KK CSTJ2
 381 KM COMBINE CP6, L-M AND STJ2
 382 HC 3
 *

383 KK RCSTJ2
 384 KM ROUTE CSTJ2 TO CSTF
 385 RD 1000 0.069 0.015 0 DEEP 6 0
 *
 386 KK STF
 387 BA 0.0029
 388 PB 3.40
 389 LS 0 98.0
 390 UD 0.050
 *

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HEC-1 INPUT

PAGE 12

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

391 KK CSTF
 392 KM COMBINE CSTJ2 AND CSTF
 393 HC 2
 *

394 KK U
 395 BA 0.0055
 396 PB 3.40
 397 LS 0 86.3
 398 UD 0.069
 *

399 KK DES4
 400 BA 0.0028
 401 PB 3.40
 402 LS 0 98.0
 403 UD 0.050
 *

404 KK CDES4
 405 KM COMBINE U AND DES4
 406 HC 2
 *

407 KK S
 408 BA 0.0047
 409 PB 3.40
 410 LS 0 87.9
 411 UD 0.088
 *

412 KK CS
 413 KM CDES4 AND S
 414 HC 2
 *

415 KK CP7
 416 KM COMBINE CSTF AND CS
 417 HC 2
 *

418 KK RCP7
 419 KM ROUTE CP7 TO CSTF2
 420 RD 710 0.066 0.015 0 DEEP 6 0
 *

421 KK STF2
 422 BA 0.0019
 423 PB 3.37
 424 LS 0 98.0
 425 UD 0.050
 *

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HEC-1 INPUT

PAGE 13

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

426 KK CSTF2
 427 KM COMBINE CP7 AND STF2
 428 HC 2
 *

429 KK RCSTF2
 430 KM ROUTE CSTF2 TO CCARR3
 431 RD 420 0.005 0.015 0 DEEP 8 0
 *

432 KK V
 433 BA 0.0078
 434 PB 3.37
 435 LS 0 90.0
 436 UD 0.075
 *

437 KK W
 438 BA 0.0083
 439 PB 3.40
 440 LS 0 90.0
 441 UD 0.074
 *
 442 KK CVW
 443 KM COMBINE W AND V
 444 HC 2
 *
 445 KK CARR3
 446 BA 0.0033
 447 PB 3.37
 448 LS 0 98.0
 449 UD 0.101
 *
 450 KK RCARR3
 451 KM ROUTE CCARR3 TO CP8
 452 RD 360 0.005 0.015 0 DEEP 8 0
 *
 453 KK CCARR3
 454 KM COMBINE STF2, CVW AND CARR3
 455 HC 3
 *
 456 KK STE3
 457 BA 0.0021
 458 PB 3.40
 459 LS 0 98.0
 460 UD 0.050
 *

1

HEC-1 INPUT

PAGE 14

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

461 KK CP8
 462 KM COMBINE STE3 AND CCARR3
 463 HC 2
 *
 464 KK RCP8
 465 KM ROUTE CP8 TO CEE
 466 RD 240 0.005 0.015 0 DEEP 8 0
 *
 467 KK EE
 468 BA 0.0106
 469 PB 3.39
 470 LS 0 90.2
 471 UD 0.068
 *
 472 KK CEE
 473 KM COMBINES CP8 AND EE
 474 HC 2
 *
 475 KK RCP8
 476 KM ROUTE CEE TO CP9
 477 RD 220 0.005 0.015 0 DEEP 8 0
 *
 478 KK NP-3
 479 BA 0.0011
 480 PB 3.39
 481 LS 0 80.5
 482 UD 0.080
 *
 483 KK STEE3
 484 BA 0.0019
 485 PB 3.39
 486 LS 0 98.0
 487 UD 0.050
 *
 488 KK CSTEE3
 489 KM COMBINES NP-3 AND CSTEE3
 490 HC 2
 *
 491 KK CP9
 492 KM COMBINES CSTEE3 AND CEE
 493 HC 2
 *

1

HEC-1 INPUT

PAGE 15

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

494 KK RCP9
495 KM ROUTE CP9 TO DUMMY2
496 RD 281 0.005 0.015 0 DEEP 8 0
*

497 KK HH
498 BA 0.0076
499 PB 3.39
500 LS 0 94.2
501 UD 0.058
*

502 KK CARR4
503 BA 0.0036
504 PB 3.37
505 LS 0 98.0
506 UD 0.059
*

507 KK DUMMY2
508 KM REGIONAL FACILITY - BELTWAY CHANNEL SOUTH
509 HC 3
*

510 KK 25-HS1B
511 BA 0.0182
512 PB 3.44
513 LS 0 92.2
514 UD 0.050
*

515 KK STN2
516 BA 0.0068
517 PB 3.44
518 LS 0 98.0
519 UD 0.065
*

520 KK CSTN2
521 KM COMBINE 25-HS1B AND STN2
522 HC 2
*

523 KK RCSTN2
524 KM ROUTE CSTN2 TO CSTE1
525 RD 1000 0.067 0.015 0 CIRC 3
*

526 KK Y-Z
527 BA 0.0176
528 PB 3.42
529 LS 0 92.2
530 UD 0.075
*

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HEC-1 INPUT

PAGE 16

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

531 KK STE1
532 BA 0.0027
533 PB 3.42
534 LS 0 98.0
535 UD 0.050
*

536 KK CSTE1
537 KM COMBINE CSTN2, Y-Z AND STE1
538 HC 3
*

539 KK RCSTE1
540 KM ROUTE CSTE1 TO CSTJ3
541 RD 980 0.005 0.015 0 DEEP 5 0
*

542 KK COS-3
543 BA 0.0027
544 PB 3.42
545 LS 0 83.2
546 UD 0.105
*

547 KK STJ3
548 BA 0.0050
549 PB 3.42
550 LS 0 98.0

551	UD	0.059	
	*		
552	KK	CSTJ3	
553	KM	COMBINE CSTE1, COS-3 AND STJ3	
554	HC	3	
	*		
555	KK	AA	
556	BA	0.0158	
557	PB	3.44	
558	LS	0	88.4
559	UD	0.088	
	*		
560	KK	DUMMY3	
561	KM	COMBINE CSTJ3 AND AA	
562	HC	2	
	*		
563	KK	STE2	
564	BA	0.0028	
565	PB	3.40	
566	LS	0	98.0
567	UD	0.050	
	*		

1

HEC-1 INPUT

PAGE 17

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

568	KK	BB	
569	BA	0.0098	
570	PB	3.42	
571	LS	0	91.1
572	UD	0.074	
	*		
573	KK	CBB	
574	HC	2	
	*		
575	KK	T	
576	BA	0.0063	
577	PB	3.42	
578	LS	0	86.3
579	UD	0.069	
	*		
580	KK	CT	
581	HC	2	
	*		
582	KK	CC	
583	BA	0.0083	
584	PB	3.42	
585	LS	0	90.7
586	UD	0.079	
	*		
587	KK	CCC	
588	HC	2	
	*		
589	KK	RCCC	
590	KM	ROUTE CCC TO CDD	
591	RD	570 0.005 0.015 0 CIRC 3	
	*		
592	KK	DD	
593	BA	0.0074	
594	PB	3.40	
595	LS	0	90.5
596	UD	0.075	
	*		
597	KK	CDD	
598	HC	2	
	*		

1

HEC-1 INPUT

PAGE 18

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

599	KK	RCDD	
600	KM	ROUTE CCDD TO CDESS	
601	RD	390 0.005 0.015 0 CIRC 3.5	
	*		
602	KK	DESS	
603	BA	0.0025	

604	PB	3.40							
605	LS	0	98.0						
606	UD	0.053							
	*								
607	KK	CDES5							
608	HC	2							
	*								
609	KK	RCDES5							
610	KM	ROUTE CDES5 TO CGG							
611	RD	280 0.005 0.015 0 CIRC 3.5							
	*								
612	KK	STEE2							
613	BA	0.0028							
614	PB	3.41							
615	LS	0	98.0						
616	UD	0.050							
	*								
617	KK	CSTEE2							
618	HC	2							
	*								
619	KK	GG							
620	BA	0.0078							
621	PB	3.41							
622	LS	0	94.2						
623	UD	0.055							
	*								
624	KK	CGG							
625	HC	2							
	*								
626	KK	FF							
627	BA	0.0055							
628	PB	3.41							
629	LS	0	94.2						
630	UD	0.050							
	*								

1

HEC-1 INPUT

PAGE 19

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

631	KK	DUMMY4
632	KM	COMBINE DUMMY3, FF, AND CGG
633	HC	3
	*	
634	ZZ	

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
22	LM	
	.	
35	.	D
	.	
40	.	DES1
	.	
	.	
45	.	CDES1.....
	.	V
	.	V
48	.	RCDES1
	.	
	.	
51	.	COS-2
	.	
	.	
56	.	CCOS-2.....
	.	V
	.	V
59	.	RCCOS-2
	.	
	.	
62	.	A
	.	
	.	
67	.	CA.....
	.	V
	.	V
70	.	RCA
	.	

73	CP1.....				
76		STI			
82				C	
87		CSTI.....			
90				G	
95		CG.....			
		V			
		V			
98		RCG			
101				H	
106		CH.....			
		V			
		V			
109		RCH			
112			STH		
118				J	
123			CJ.....		
			V		
			V		
126			RCJ		
129				K	
134					DES2
139			CDES2.....		
			V		
			V		
142			RCDES2		
145		CP2.....			
		V			
		V			
148		RCP2			
151			CARR1		
156				I	
161					N-O-P
166					NP-1
171					STG2
177					CSTG2.....
180					DES3
185					CP3.....
					V
					V
188					RCP3
191					STG3

196	.	.	.	.	CSTG3.....			
	.	.	.	.	.			
199	.	.	.	.	.	Q		
	.	.	.	.	.	.		
204	.	.	.	.	.	.	R	
	.	.	.	.	.	.	.	
209	.	.	.	.	.	CQR.....		
	.	.	.	.	.	.		
212	.	.	.	.	.	.	CARR2	
	.	.	.	.	.	.	.	
217	.	.	.	.	.	CCARR2.....		
	.	.	.	.	.	V		
	.	.	.	.	.	V		
220	.	.	.	.	.	RCCARR2		
	.	.	.	.	.	.		
223	.	.	.	.	.	CP4.....		
	.	.	.	.	.	V		
	.	.	.	.	.	V		
226	.	.	.	.	.	RCP4		
	.	.	.	.	.	.		
229	.	.	.	.	.	.		
	.	.	.	.	.	CP5.....		
	.	.	.	.	.	.		
232	.	.	.	.	.	II		
	.	.	.	.	.	.		
237	.	.	.	.	.	X		
	.	.	.	.	.	.		
242	.	.	.	.	.	B		
	.	.	.	.	.	.		
247	.	.	.	.	.	.	DC-1	
	.	.	.	.	.	.	.	
252	.	.	.	.	.	.	.	COS-4
	.	.	.	.	.	.	.	.
257	.	.	.	.	.	.	.	.
	.	.	.	.	.	DUMMY1A.....		
	.	.	.	.	.	.		
261	.	.	.	.	.	.	COS-1	
	.	.	.	.	.	.	.	
266	.	.	.	.	.	DUMMY1.....		
	.	.	.	.	.	.		
270	.	.	.	.	.	27-F		
	.	.	.	.	.	.		
275	.	.	.	.	.	27-COS2		
	.	.	.	.	.	.		
280	.	.	.	.	.	.	LM2	
	.	.	.	.	.	.	.	
285	.	.	.	.	.	CLM2.....		
	.	.	.	.	.	.		
288	.	.	.	.	.	27-COS3		
	.	.	.	.	.	.		
293	.	.	.	.	.	COFF.....		
	.	.	.	.	.	V		
	.	.	.	.	.	V		
297	.	.	.	.	.	RCOFF		
	.	.	.	.	.	.		
300	.	.	.	.	.	.	E	
	.	.	.	.	.	.	.	
305	.	.	.	.	.	.	STJ1	
	.	.	.	.	.	.	.	
311	.	.	.	.	.	CSTJ1.....		
	.	.	.	.	.	V		
	.	.	.	.	.	V		
314	.	.	.	.	.	RCSTJ1		
	.	.	.	.	.	.		
317	.	.	.	.	.	.	NP-2	
	.	.	.	.	.	.	.	
322	.	.	.	.	.	CNP-2.....		

	.	V	
	.	V	
325	.	RCNP-2	
	.	.	
	.	.	
328	.	.	F
	.	.	
	.	.	
333	.	CF.....	
	.	V	
	.	V	
336	.	RCF	
	.	.	
	.	.	
339	.	.	25-HS1
	.	.	
	.	.	
344	.	.	STN1
	.	.	
	.	.	
350	.	.	CSTN1.....
	.	V	
	.	V	
353	.	.	RCSTN1
	.	.	
	.	.	
356	.	.	STG1
	.	.	
	.	.	
361	.	.	CSTG1.....
	.	.	
	.	.	
364	.	CP6.....	
	.	V	
	.	V	
367	.	RCP6	
	.	.	
	.	.	
370	.	.	L-M
	.	.	
	.	.	
375	.	.	STJ2
	.	.	
	.	.	
380	.	.	CSTJ2.....
	.	V	
	.	V	
383	.	RCSTJ2	
	.	.	
	.	.	
386	.	.	STF
	.	.	
	.	.	
391	.	.	CSTF.....
	.	.	
	.	.	
394	.	.	U
	.	.	
	.	.	
399	.	.	DES4
	.	.	
	.	.	
404	.	.	CDES4.....
	.	.	
	.	.	
407	.	.	S
	.	.	
	.	.	
412	.	.	CS.....
	.	.	
	.	.	
415	.	.	CP7.....
	.	V	
	.	V	
418	.	RCP7	
	.	.	
	.	.	
421	.	.	STF2
	.	.	
	.	.	
426	.	.	CSTF2.....
	.	V	
	.	V	
429	.	RCSTF2	
	.	.	
	.	.	
432	.	.	V
	.	.	
	.	.	
437	.	.	W
	.	.	

442	.	.	.	CVW.....
	.	.	.	
445	.	.	.	CARR3
	.	.	.	V
	.	.	.	V
450	.	.	.	RCARR3
	.	.	.	
	.	.	.	
453	.	CCARR3.....	.	
	.	.	.	
	.	.	.	
456	.	.	STE3	
	.	.	.	
	.	.	.	
461	.	CP8.....	.	
	.	V	.	
	.	V	.	
464	.	RCP8	.	
	.	.	.	
	.	.	.	
467	.	.	EE	
	.	.	.	
	.	.	.	
472	.	CEE.....	.	
	.	V	.	
	.	V	.	
475	.	RCP8	.	
	.	.	.	
	.	.	.	
478	.	.	NP-3	
	.	.	.	
	.	.	.	
483	.	.	.	STEE3
	.	.	.	
	.	.	.	
488	.	.	CSTEE3.....	
	.	.	.	
	.	.	.	
491	.	CP9.....	.	
	.	V	.	
	.	V	.	
494	.	RCP9	.	
	.	.	.	
	.	.	.	
497	.	.	HH	
	.	.	.	
	.	.	.	
502	.	.	.	CARR4
	.	.	.	
	.	.	.	
507	.	DUMMY2.....	.	
	.	.	.	
	.	.	.	
510	.	.	25-HS1B	
	.	.	.	
	.	.	.	
515	.	.	.	STN2
	.	.	.	
	.	.	.	
520	.	.	CSTN2.....	
	.	.	V	
	.	.	V	
523	.	.	RCSTN2	
	.	.	.	
	.	.	.	
526	.	.	.	Y-Z
	.	.	.	
	.	.	.	
531	.	.	.	STE1
	.	.	.	
	.	.	.	
536	.	.	CSTE1.....	
	.	.	V	
	.	.	V	
539	.	.	RCSTE1	
	.	.	.	
	.	.	.	
542	.	.	.	COS-3
	.	.	.	
	.	.	.	
547	.	.	.	STJ3
	.	.	.	
	.	.	.	
552	.	.	CSTJ3.....	
	.	.	.	
	.	.	.	
555	.	.	.	AA
	.	.	.	
	.	.	.	


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560      .      .      DUMMY3.....
      .      .      .
563      .      .      .      STE2
      .      .      .      .
568      .      .      .      .      BB
      .      .      .      .      .
573      .      .      .      CBB.....
      .      .      .      .
575      .      .      .      .      T
      .      .      .      .      .
580      .      .      .      CT.....
      .      .      .      .
582      .      .      .      .      CC
      .      .      .      .      .
587      .      .      .      CCC.....
      .      .      .      V
      .      .      .      V
589      .      .      .      RCCC
      .      .      .      .
592      .      .      .      .      DD
      .      .      .      .      .
597      .      .      .      CDD.....
      .      .      .      V
      .      .      .      V
599      .      .      .      RCDD
      .      .      .      .
602      .      .      .      .      DESS
      .      .      .      .      .
607      .      .      .      CDESS.....
      .      .      .      V
      .      .      .      V
609      .      .      .      RCDESS
      .      .      .      .
612      .      .      .      .      STEE2
      .      .      .      .      .
617      .      .      .      CSTEE2.....
      .      .      .      .
619      .      .      .      .      GG
      .      .      .      .      .
624      .      .      .      CGG.....
      .      .      .      .
626      .      .      .      .      FF
      .      .      .      .      .
631      .      .      DUMMY4.....

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 23OCT19 TIME 13:10:22 *
*
*****

```

```

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

```

ULTIMATE CONDITION HYDROLOGIC MODEL
 INPUT FILE DATE = OCTOBER 2019
 DESIGN STORM = 100-YEAR 6-HR STORM
 STORM DISTRIBUTION = SDN #3
 MODELED BY VTN (JYA)

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*****
* UPDATE #2 - SUMMERLIN WEST VILLAGE 22 *
*****

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

100-YEAR, 6-HOUR STORM, SDN3

19 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 100 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 1 0 ENDING DATE
 NDTIME 0815 ENDING TIME
 ICENT 19 CENTURY MARK

 COMPUTATION INTERVAL .08 HOURS
 TOTAL TIME BASE 8.25 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					
+	LM	.02	1	FLOW	36.
				TIME	3.50
HYDROGRAPH AT					
+	D	.02	1	FLOW	50.
				TIME	3.50
HYDROGRAPH AT					
+	DES1	.01	1	FLOW	20.
				TIME	3.50
2 COMBINED AT					
+	CDES1	.03	1	FLOW	70.
				TIME	3.50
ROUTED TO					
+	RCDES1	.03	1	FLOW	69.
				TIME	3.50
HYDROGRAPH AT					
+	COS-2	.01	1	FLOW	22.
				TIME	3.58
2 COMBINED AT					
+	CCOS-2	.04	1	FLOW	89.
				TIME	3.50
ROUTED TO					
+	RCCOS-2	.04	1	FLOW	87.
				TIME	3.50
HYDROGRAPH AT					
+	A	.03	1	FLOW	68.
				TIME	3.50
2 COMBINED AT					
+	CA	.06	1	FLOW	156.
				TIME	3.50
ROUTED TO					
+	RCA	.06	1	FLOW	155.
				TIME	3.50

2 COMBINED AT					
+	CP1	.08	1	FLOW TIME	191. 3.50
HYDROGRAPH AT					
+	STI	.00	1	FLOW TIME	11. 3.50
HYDROGRAPH AT					
+	C	.02	1	FLOW TIME	51. 3.50
2 COMBINED AT					
+	CSTI	.02	1	FLOW TIME	62. 3.50
HYDROGRAPH AT					
+	G	.01	1	FLOW TIME	30. 3.50
2 COMBINED AT					
+	CG	.03	1	FLOW TIME	92. 3.50
ROUTED TO					
+	RCG	.03	1	FLOW TIME	91. 3.50
HYDROGRAPH AT					
+	H	.01	1	FLOW TIME	33. 3.50
2 COMBINED AT					
+	CH	.05	1	FLOW TIME	124. 3.50
ROUTED TO					
+	RCH	.05	1	FLOW TIME	123. 3.50
HYDROGRAPH AT					
+	STH	.00	1	FLOW TIME	10. 3.50
HYDROGRAPH AT					
+	J	.01	1	FLOW TIME	24. 3.50
2 COMBINED AT					
+	CJ	.01	1	FLOW TIME	34. 3.50
ROUTED TO					
+	RCJ	.01	1	FLOW TIME	33. 3.50
HYDROGRAPH AT					
+	K	.01	1	FLOW TIME	22. 3.50
HYDROGRAPH AT					
+	DES2	.00	1	FLOW TIME	13. 3.50
3 COMBINED AT					
+	CDES2	.03	1	FLOW TIME	68. 3.50
ROUTED TO					
+	RCDES2	.03	1	FLOW TIME	66. 3.50
2 COMBINED AT					
+	CP2	.07	1	FLOW TIME	189. 3.50
ROUTED TO					
+	RCP2	.07	1	FLOW TIME	184. 3.50
HYDROGRAPH AT					
+	CARR1	.01	1	FLOW TIME	29. 3.50
HYDROGRAPH AT					
+	I	.02	1	FLOW TIME	38. 3.50
HYDROGRAPH AT					
+	N-O-P	.02	1	FLOW TIME	49. 3.50

HYDROGRAPH AT +	NP-1	.00	1	FLOW TIME	6. 3.50
HYDROGRAPH AT +	STG2	.00	1	FLOW TIME	13. 3.50
3 COMBINED AT +	CSTG2	.03	1	FLOW TIME	68. 3.50
HYDROGRAPH AT +	DES3	.00	1	FLOW TIME	9. 3.50
2 COMBINED AT +	CP3	.03	1	FLOW TIME	77. 3.50
ROUTED TO +	RCP3	.03	1	FLOW TIME	76. 3.50
HYDROGRAPH AT +	STG3	.00	1	FLOW TIME	3. 3.50
2 COMBINED AT +	CSTG3	.03	1	FLOW TIME	79. 3.50
HYDROGRAPH AT +	Q	.01	1	FLOW TIME	17. 3.50
HYDROGRAPH AT +	R	.01	1	FLOW TIME	20. 3.50
2 COMBINED AT +	CQR	.01	1	FLOW TIME	37. 3.50
HYDROGRAPH AT +	CARR2	.01	1	FLOW TIME	15. 3.50
2 COMBINED AT +	CCARR2	.02	1	FLOW TIME	52. 3.50
ROUTED TO +	RCCARR2	.02	1	FLOW TIME	51. 3.50
2 COMBINED AT +	CP4	.05	1	FLOW TIME	131. 3.50
ROUTED TO +	RCP4	.05	1	FLOW TIME	127. 3.50
4 COMBINED AT +	CP5	.15	1	FLOW TIME	379. 3.50
HYDROGRAPH AT +	II	.03	1	FLOW TIME	61. 3.50
HYDROGRAPH AT +	X	.03	1	FLOW TIME	60. 3.50
HYDROGRAPH AT +	B	.13	1	FLOW TIME	304. 3.50
HYDROGRAPH AT +	DC-1	.02	1	FLOW TIME	36. 3.67
HYDROGRAPH AT +	COS-4	.00	1	FLOW TIME	2. 3.50
5 COMBINED AT +	DUMMY1A	.20	1	FLOW	454.

				TIME	3.50
HYDROGRAPH AT					
+	COS-1	.00	1	FLOW	6.
				TIME	3.58
4 COMBINED AT					
+	DUMMY1	.44	1	FLOW	1030.
				TIME	3.50
HYDROGRAPH AT					
+	27-F	.03	1	FLOW	83.
				TIME	3.50
HYDROGRAPH AT					
+	27-COS2	.01	1	FLOW	20.
				TIME	3.50
HYDROGRAPH AT					
+	LM2	.01	1	FLOW	28.
				TIME	3.50
3 COMBINED AT					
+	CLM2	.05	1	FLOW	132.
				TIME	3.50
HYDROGRAPH AT					
+	27-COS3	.03	1	FLOW	53.
				TIME	3.50
2 COMBINED AT					
+	COFF	.08	1	FLOW	185.
				TIME	3.50
ROUTED TO					
+	RCOFF	.08	1	FLOW	182.
				TIME	3.50
HYDROGRAPH AT					
+	E	.02	1	FLOW	58.
				TIME	3.50
HYDROGRAPH AT					
+	STJ1	.01	1	FLOW	15.
				TIME	3.50
3 COMBINED AT					
+	CSTJ1	.10	1	FLOW	255.
				TIME	3.50
ROUTED TO					
+	RCSTJ1	.10	1	FLOW	250.
				TIME	3.50
HYDROGRAPH AT					
+	NP-2	.00	1	FLOW	5.
				TIME	3.50
2 COMBINED AT					
+	CNP-2	.11	1	FLOW	255.
				TIME	3.50
ROUTED TO					
+	RCNP-2	.11	1	FLOW	250.
				TIME	3.50
HYDROGRAPH AT					
+	F	.02	1	FLOW	59.
				TIME	3.50
2 COMBINED AT					
+	CF	.13	1	FLOW	309.
				TIME	3.50
ROUTED TO					
+	RCF	.13	1	FLOW	303.
				TIME	3.50
HYDROGRAPH AT					
+	25-HS1	.08	1	FLOW	211.
				TIME	3.50
HYDROGRAPH AT					
+	STN1	.01	1	FLOW	13.
				TIME	3.58
2 COMBINED AT					
+	CSTN1	.08	1	FLOW	224.
				TIME	3.50
ROUTED TO					

+	RCSTN1	.08	1	FLOW TIME	220. 3.50
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HYDROGRAPH AT +	STG1	.00	1	FLOW TIME	8. 3.50
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2 COMBINED AT +	CSTG1	.09	1	FLOW TIME	229. 3.50
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2 COMBINED AT +	CP6	.21	1	FLOW TIME	532. 3.50
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ROUTED TO +	RCP6	.21	1	FLOW TIME	518. 3.50
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HYDROGRAPH AT +	L-M	.03	1	FLOW TIME	81. 3.50
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HYDROGRAPH AT +	STJ2	.00	1	FLOW TIME	13. 3.50
--------------------	------	-----	---	--------------	-------------

3 COMBINED AT +	CSTJ2	.25	1	FLOW TIME	612. 3.50
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ROUTED TO +	RCSTJ2	.25	1	FLOW TIME	602. 3.50
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HYDROGRAPH AT +	STF	.00	1	FLOW TIME	8. 3.50
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2 COMBINED AT +	CSTF	.25	1	FLOW TIME	610. 3.50
--------------------	------	-----	---	--------------	--------------

HYDROGRAPH AT +	U	.01	1	FLOW TIME	11. 3.50
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HYDROGRAPH AT +	DES4	.00	1	FLOW TIME	8. 3.50
--------------------	------	-----	---	--------------	------------

2 COMBINED AT +	CDES4	.01	1	FLOW TIME	19. 3.50
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HYDROGRAPH AT +	S	.00	1	FLOW TIME	10. 3.50
--------------------	---	-----	---	--------------	-------------

2 COMBINED AT +	CS	.01	1	FLOW TIME	29. 3.50
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2 COMBINED AT +	CP7	.27	1	FLOW TIME	639. 3.50
--------------------	-----	-----	---	--------------	--------------

ROUTED TO +	RCP7	.27	1	FLOW TIME	632. 3.50
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HYDROGRAPH AT +	STF2	.00	1	FLOW TIME	5. 3.50
--------------------	------	-----	---	--------------	------------

2 COMBINED AT +	CSTF2	.27	1	FLOW TIME	637. 3.50
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ROUTED TO +	RCSTF2	.27	1	FLOW TIME	623. 3.50
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HYDROGRAPH AT +	V	.01	1	FLOW TIME	17. 3.50
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HYDROGRAPH AT +	W	.01	1	FLOW TIME	19. 3.50
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2 COMBINED AT					
+	CVW	.02	1	FLOW TIME	36. 3.50
HYDROGRAPH AT					
+	CARR3	.00	1	FLOW TIME	8. 3.50
ROUTED TO					
+	RCARR3	.00	1	FLOW TIME	8. 3.50
3 COMBINED AT					
+	CCARR3	.29	1	FLOW TIME	667. 3.50
HYDROGRAPH AT					
+	STE3	.00	1	FLOW TIME	6. 3.50
2 COMBINED AT					
+	CP8	.29	1	FLOW TIME	673. 3.50
ROUTED TO					
+	RCP8	.29	1	FLOW TIME	664. 3.50
HYDROGRAPH AT					
+	EE	.01	1	FLOW TIME	25. 3.50
2 COMBINED AT					
+	CEE	.30	1	FLOW TIME	689. 3.50
ROUTED TO					
+	RCP8	.30	1	FLOW TIME	680. 3.50
HYDROGRAPH AT					
+	NP-3	.00	1	FLOW TIME	2. 3.50
HYDROGRAPH AT					
+	STEE3	.00	1	FLOW TIME	5. 3.50
2 COMBINED AT					
+	CSTEE3	.00	1	FLOW TIME	7. 3.50
2 COMBINED AT					
+	CP9	.30	1	FLOW TIME	688. 3.50
ROUTED TO					
+	RCP9	.30	1	FLOW TIME	678. 3.50
HYDROGRAPH AT					
+	HH	.01	1	FLOW TIME	20. 3.50
HYDROGRAPH AT					
+	CARR4	.00	1	FLOW TIME	10. 3.50
3 COMBINED AT					
+	DUMMY2	.32	1	FLOW TIME	708. 3.50
HYDROGRAPH AT					
+	25-HS1B	.02	1	FLOW TIME	48. 3.50
HYDROGRAPH AT					
+	STN2	.01	1	FLOW TIME	19. 3.50
2 COMBINED AT					
+	CSTN2	.03	1	FLOW TIME	67. 3.50
ROUTED TO					
+	RCSTN2	.03	1	FLOW TIME	65. 3.50
HYDROGRAPH AT					
+	Y-Z	.02	1	FLOW TIME	42. 3.50

HYDROGRAPH AT +	STE1	.00	1	FLOW TIME	8. 3.50
3 COMBINED AT +	CSTE1	.05	1	FLOW TIME	115. 3.50
ROUTED TO +	RCSTE1	.05	1	FLOW TIME	107. 3.50
HYDROGRAPH AT +	COS-3	.00	1	FLOW TIME	4. 3.50
HYDROGRAPH AT +	STJ3	.00	1	FLOW TIME	14. 3.50
3 COMBINED AT +	CSTJ3	.05	1	FLOW TIME	126. 3.50
HYDROGRAPH AT +	AA	.02	1	FLOW TIME	33. 3.50
2 COMBINED AT +	DUMMY3	.07	1	FLOW TIME	159. 3.50
HYDROGRAPH AT +	STE2	.00	1	FLOW TIME	8. 3.50
HYDROGRAPH AT +	BB	.01	1	FLOW TIME	23. 3.50
2 COMBINED AT +	CBB	.01	1	FLOW TIME	31. 3.50
HYDROGRAPH AT +	T	.01	1	FLOW TIME	13. 3.50
2 COMBINED AT +	CT	.02	1	FLOW TIME	44. 3.50
HYDROGRAPH AT +	CC	.01	1	FLOW TIME	19. 3.50
2 COMBINED AT +	CCC	.03	1	FLOW TIME	63. 3.50
ROUTED TO +	RCCC	.03	1	FLOW TIME	60. 3.50
HYDROGRAPH AT +	DD	.01	1	FLOW TIME	17. 3.50
2 COMBINED AT +	CDD	.03	1	FLOW TIME	77. 3.50
ROUTED TO +	RCDD	.03	1	FLOW TIME	74. 3.50
HYDROGRAPH AT +	DESS	.00	1	FLOW TIME	7. 3.50
2 COMBINED AT +	CDESS	.04	1	FLOW TIME	81. 3.50
ROUTED TO +	RCDESS	.04	1	FLOW TIME	80. 3.50
HYDROGRAPH AT +	STEE2	.00	1	FLOW	8.

				TIME	3.50
2 COMBINED AT					
+	CSTEE2	.04	1	FLOW TIME	88.3.50
HYDROGRAPH AT					
+	GG	.01	1	FLOW TIME	21.3.50
2 COMBINED AT					
+	CGG	.05	1	FLOW TIME	109.3.50
HYDROGRAPH AT					
+	FF	.01	1	FLOW TIME	15.3.50
3 COMBINED AT					
+	DUMMY4	.12	1	FLOW TIME	282.3.50

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	INTERPOLATED TO COMPUTATION PEAK	INTERVAL TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1	RATIO=	.00							
RCDSE1	MANE	.22	69.31	210.22	2.92	5.00	69.07	210.00	2.92
CONTINUITY SUMMARY (AC-FT) - INFLOW= .4002E+01 EXCESS= .0000E+00 OUTFLOW= .4002E+01 BASIN STORAGE= .1969E-04 PERCENT ERROR= .0									
FOR PLAN = 1	RATIO=	.00							
RCCOS-2	MANE	.47	87.71	210.20	2.72	5.00	87.19	210.00	2.72
CONTINUITY SUMMARY (AC-FT) - INFLOW= .5425E+01 EXCESS= .0000E+00 OUTFLOW= .5424E+01 BASIN STORAGE= .4464E-04 PERCENT ERROR= .0									
FOR PLAN = 1	RATIO=	.00							
RCA	MANE	.19	155.37	210.19	2.77	5.00	154.65	210.00	2.78
CONTINUITY SUMMARY (AC-FT) - INFLOW= .9561E+01 EXCESS= .0000E+00 OUTFLOW= .9561E+01 BASIN STORAGE= .1942E-04 PERCENT ERROR= .0									
FOR PLAN = 1	RATIO=	.00							
RCG	MANE	.29	91.58	210.20	2.89	5.00	91.06	210.00	2.89
CONTINUITY SUMMARY (AC-FT) - INFLOW= .5175E+01 EXCESS= .0000E+00 OUTFLOW= .5175E+01 BASIN STORAGE= .2873E-04 PERCENT ERROR= .0									
FOR PLAN = 1	RATIO=	.00							
RCH	MANE	.12	123.23	210.04	2.88	5.00	123.08	210.00	2.88
CONTINUITY SUMMARY (AC-FT) - INFLOW= .6989E+01 EXCESS= .0000E+00 OUTFLOW= .6989E+01 BASIN STORAGE= .1204E-04 PERCENT ERROR= .0									
FOR PLAN = 1	RATIO=	.00							
RCJ	MANE	.43	33.61	210.51	2.73	5.00	33.37	210.00	2.73
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1875E+01 EXCESS= .0000E+00 OUTFLOW= .1875E+01 BASIN STORAGE= .3567E-04 PERCENT ERROR= .0									
FOR PLAN = 1	RATIO=	.00							
RCDSE2	MANE	.73	67.25	210.43	2.84	5.00	66.40	210.00	2.85
CONTINUITY SUMMARY (AC-FT) - INFLOW= .3910E+01 EXCESS= .0000E+00 OUTFLOW= .3910E+01 BASIN STORAGE= .7532E-04 PERCENT ERROR= .0									
FOR PLAN = 1	RATIO=	.00							
RCP2	MANE	.73	186.67	210.84	2.87	5.00	184.26	210.00	2.87
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1091E+02 EXCESS= .0000E+00 OUTFLOW= .1091E+02 BASIN STORAGE= .8878E-04 PERCENT ERROR= .0									
FOR PLAN = 1	RATIO=	.00							
RCP3	MANE	.29	76.78	210.29	2.55	5.00	76.14	210.00	2.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4490E+01 EXCESS= .0000E+00 OUTFLOW= .4490E+01 BASIN STORAGE= .2690E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCCARR2 MANE .37 51.68 210.13 2.74 5.00 51.44 210.00 2.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3006E+01 EXCESS= .0000E+00 OUTFLOW= .3006E+01 BASIN STORAGE= .3196E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP4 MANE .66 129.07 210.69 2.64 5.00 127.48 210.00 2.64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7688E+01 EXCESS= .0000E+00 OUTFLOW= .7688E+01 BASIN STORAGE= .6725E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOFF MANE .38 183.88 210.27 2.65 5.00 182.24 210.00 2.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1084E+02 EXCESS= .0000E+00 OUTFLOW= .1084E+02 BASIN STORAGE= .4273E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCSTJ1 MANE .48 250.37 210.43 2.73 5.00 250.31 210.00 2.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1511E+02 EXCESS= .0000E+00 OUTFLOW= .1511E+02 BASIN STORAGE= .5607E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCNP-2 MANE .52 250.86 210.48 2.72 5.00 250.12 210.00 2.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1538E+02 EXCESS= .0000E+00 OUTFLOW= .1538E+02 BASIN STORAGE= .1047E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCF MANE .41 304.65 210.23 2.75 5.00 303.48 210.00 2.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1879E+02 EXCESS= .0000E+00 OUTFLOW= .1878E+02 BASIN STORAGE= .8389E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCSTN1 MANE .41 221.54 210.18 2.88 5.00 220.20 210.00 2.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1275E+02 EXCESS= .0000E+00 OUTFLOW= .1275E+02 BASIN STORAGE= .5014E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP6 MANE .59 520.09 210.36 2.81 5.00 517.62 210.00 2.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3204E+02 EXCESS= .0000E+00 OUTFLOW= .3203E+02 BASIN STORAGE= .1553E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCSTJ2 MANE .45 608.79 210.39 2.81 5.00 602.17 210.00 2.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3779E+02 EXCESS= .0000E+00 OUTFLOW= .3779E+02 BASIN STORAGE= .1206E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP7 MANE .32 635.65 210.19 2.80 5.00 631.67 210.00 2.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3994E+02 EXCESS= .0000E+00 OUTFLOW= .3994E+02 BASIN STORAGE= .8070E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCSTF2 MANE .50 626.08 210.22 2.80 5.00 622.83 210.00 2.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4028E+02 EXCESS= .0000E+00 OUTFLOW= .4027E+02 BASIN STORAGE= .1270E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCARR3 MANE 1.27 7.90 211.47 3.14 5.00 7.63 210.00 3.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5521E+00 EXCESS= .0000E+00 OUTFLOW= .5521E+00 BASIN STORAGE= .1050E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP8 MANE .28 665.68 210.11 2.78 5.00 664.00 210.00 2.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4321E+02 EXCESS= .0000E+00 OUTFLOW= .4320E+02 BASIN STORAGE= .7574E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP8 MANE .26 681.97 210.12 2.77 5.00 680.39 210.00 2.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4455E+02 EXCESS= .0000E+00 OUTFLOW= .4454E+02 BASIN STORAGE= .6454E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP9 MANE .33 679.63 210.08 2.77 5.00 677.90 210.00 2.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4497E+02 EXCESS= .0000E+00 OUTFLOW= .4496E+02 BASIN STORAGE= .8376E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCSTN2 MANE .70 65.57 210.88 2.76 5.00 65.03 210.00 2.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3685E+01 EXCESS= .0000E+00 OUTFLOW= .3685E+01 BASIN STORAGE= .6612E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCSTE1 MANE 1.78 110.49 211.63 2.72 5.00 107.44 210.00 2.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6575E+01 EXCESS= .0000E+00 OUTFLOW= .6571E+01 BASIN STORAGE= .3348E-03 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .00
RCCC MANE 1.13 61.16 210.84 2.44 5.00 59.99 210.00 2.44

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3534E+01 EXCESS= .0000E+00 OUTFLOW= .3533E+01 BASIN STORAGE= .1137E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCDD MANE .73 75.16 210.34 2.43 5.00 74.39 210.00 2.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4482E+01 EXCESS= .0000E+00 OUTFLOW= .4481E+01 BASIN STORAGE= .7532E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCDESS MANE .52 80.22 210.45 2.48 5.00 79.73 210.00 2.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4905E+01 EXCESS= .0000E+00 OUTFLOW= .4903E+01 BASIN STORAGE= .5246E-04 PERCENT ERROR= .0

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

- A.2. Update to the Summerlin West Village 22 Kettle Ridge Drive
(Street J) & Scurry Bend Drive (Street N) Rough Grade:
Fleet Wing Avenue (Street G) to Lake Mead Boulevard

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Update #1: Kettle Ridge Drive & Scurry Bend Drive Rough Grade : Fleet Wing Avenue to Lake Mead Boulevard Date: February 25, 2020

Location of Development: a) Descriptive (Cross Streets) North/South: Fleet Wing Avenue
East/West: Lake Mead Boulevard
b) Section: 23 and 14 Township: 20S Range: 59E
c) APN : 137-14-401-006, 137-23-101-002

Name of Owner: Howard Hughes Company, LLC
Telephone No.: (702) 791-4000 Fax No.: (702) 791-4450 E-Mail Address: chris.anderson@howardhughes.com
Address: 10801 West Charleston Blvd, Ste 300, Las Vegas, NV 89135

Contact Person-Name: Molly Anderson, PE Telephone No.: (702) 551-0330
* E-Mail Address: molly.anderson@atkinsglobal.com Fax No.: (702) 263-7200
Firm: Atkins
Address: 2270 Corporate Circle, Ste 200, Henderson, NV 89074

Type of Land Development/Land Disturbance Process:

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

- Total Owned Land Area: At Site: +/- 446 acres Being Developed/Disturbed: 35.89 acres
- Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ Yes** ☒ No
- Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☐ Yes** ☒ No
- Proposed type of development (Residential, Commercial, Etc.): Public - Roadway Improvements
- Approximate upstream land area which drains to the subject site: 225.54 acres
- Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: Master Conceptual Drainage Study for Summerlin West Village 22
- If known, please briefly identify the proposed discharge point(s) of runoff from the site: Existing CC-215 Western Beltway Channel
- Briefly describe your proposed schedule for the subject project: ASAP



Engineer's Seal

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

***New Required Field**

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

Revision	Date
Addendum #1	September 11, 2019

DS #5156

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Your reference: DS #5156

Albert Sung
City of Las Vegas Public Works
333 N. Rancho Dr, 7th Floor
Las Vegas, NV 89106

February 25, 2020

RE: UPDATE #1 TO THE TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 22 KETTLE RIDGE DRIVE (STREET J): FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD & SCURRY BEND DRIVE (STREET N) ROUGH GRADE: FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

Dear Albert,

This letter and the attached documents have been prepared as an *Update #1 to the Technical Drainage Study (TDS) for Summerlin West Village 22 Kettle Ridge Drive (Street J) Fleet Wing Avenue (Street G) to Lake Mead Boulevard & Scurry Bend Drive (Street N) Rough Grade: Fleet Wing Avenue (Street G) to Lake Mead Boulevard*.

In response to the comments on the Conditional Approval Letter:

Comment #1: From the *Sheet 18/39 to Sheet 21/39*, there are various proposed direct connection of lateral pipes to the 6'x6' RCB. However, the connection detail has not been provided. Provide as such in the next submittal.

The response on *Storm Drain Construction Note #9* refers the connection detail to Sheet 33 should be revised to Sheet 34.

Comment response: The connection detail callouts have been revised.

The following conditions are repeated until they are complete:

Comment #2: Drop inlets deeper than 10' require special structural design and structural calculations. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the *Building Department* for processing. The engineer must provide a copy of *Building Department* approval of the structures to *Flood Control* prior to the final acceptance of the drainage study.

Comment response: Structural details have been provided in this submittal for the deep drop inlets. Per coordination with Luis Morales of CLV Land Development, structural review will be concurrent with the Civil Improvement Plans. Atkins will provide approval letter of structural design to CLV Flood Control for final acceptance of drainage study.

Comment #3: The *Master Drainage Study Update* for *Summerlin West Planning Area* proposes a modification to internal flow patterns that alters the flow patterns to the *Beltway Channel* system downstream of the *Summerlin Parkway* interchange. The modification proposes a storm drain system within *Summerlin Village 22* area (Storm Drain F) that will collect flows from the Gowan channel tributary area and route them into the *Beltway Channel* (MPU Facility APBE 0122). This resulted in increased flows in the *Beltway Channel* segment between *Summerlin Parkway* and *Far Hills Boulevard*, i.e., mitigation measures are required for the impacted *Beltway Channel* segment.

A technical drainage study for the modification of the *Beltway Channel* has been submitted and has just been conditionally approved. The subject drainage study will not be approved prior to the construction bond of the *Beltway Channel Modification* project has been executed.

Comment response: The construction bond of the Beltway Channel Modification project has been executed. See receipt provided by VTN Nevada in Appendix B of originally Approved Technical Drainage Study (TDS) for Summerlin West Village 22 Kettle Ridge Drive (Street J) Fleet Wing Avenue (Street G) to Lake Mead Boulevard & Scurry Bend Drive (Street N) Rough Grade: Fleet Wing Avenue (Street G) to Lake Mead Boulevard.

Comment #4: The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District (CCRFCD)* master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

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

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

Comment response: This report will be submitted to CCRFCD for concurrence.

Comment #5: The project proposes to build temporary drainage facilities, i.e., berms/swales along the west side of *Scurry Bend Drive* and *Kettle Ridge Drive* and at the southern end of *Kettle Ridge Drive* for interim flood protection. Prior to final plan approval the developer must complete a maintenance and liability agreement for the interim drainage improvements (berms or channels) and post minimum maintenance bond of \$50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for constructing the facility and an exhibit that adequately shows the location and limits of the drainage facility to *City of Las Vegas Flood Control* for approval. Once the drainage study is conditionally approved, the engineer should contact the *City's Land Development Section* (229-6371) to begin the agreement process.

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

Comment response: Once this drainage study is conditionally approved, the report will be submitted to the Land Development section to begin the agreement process.

Comment #6: The drainage study and the subject improvement plans also proposed a debris basin along the west side of the *Western Beltway*. Acknowledge in the next submittal that the debris basin is a temporary facility and will be removed in the ultimate condition.

Since the debris basin is an interim facility, *Summerlin* or *Howard Hughes Company* will be solely responsible for the maintenance of the facility. A construction and maintenance bond for the debris basin must be prepared and executed prior to the approval of the improvement plans.

Comment response: Based on the Drainage Study and Improvement Plans for Kettle Bend Road by VTN, the flow from CP5 will be captured and routed within that storm drain system; therefore, the previously proposed debris basin has been eliminated.

Comment #7: The regional facility in *Kettle Ridge Drive* will be a public facility and will be maintained by the City. The improvement plans must be reviewed for maintenance and access concerns by *City Street & Sanitation Department* for their review and approval which must be secured prior to the subject drainage study approval. Contact *Mr. Matthew Meyer, Streets & Sanitation Manager* for guidance.

Comment response: The improvement plans were submitted to Mr. Meyer of the City Street & Sanitation Department on October 3, 2019.



Molly M. Anderson, PE (NV #24365)
 Senior Engineer

1. Update #1 Revisions

1.1. Hydrology

1.1.1. Interim Condition

The interim condition flows have been revised in two places due to recent relevant submittals for Summerlin West Village 22. The flow to the upstream end of the project has changed due to the revision in the nearby combination point from the Village 22 Master Conceptual Drainage Study #2. This flow decreased from 189 cfs to 185 cfs. See Village 22 Master Conceptual Drainage Study Update #2 reference information in **Appendix B.1**.

The interim condition flows have also been revised due to an increase in flow in the swale along the Scurry Bend Drive Rough Grade. INT-N was originally calculated to be 270 cfs, however with a more detailed analysis for Scurry Bend Drive Rough Grade, the flow in the “Pipe Outlet Swale” is 282 cfs. See Figure 4: Hydraulics Workmap in **Appendix B.2**. Revised Interim Condition Flows are shown in Table 1.

Table 1 – Revised Interim Condition Flows

HEC-1 Node	Tributary Area (sq mi)	Tributary Area (ac)	100-year Flow (cfs)
COFF*	0.08050	51.52	185
DI-DIV	0.08417	53.87	84
<i>CP1</i>	<i>0.19295</i>	<i>123.49</i>	<i>269</i>
INT-J1	0.01270	8.13	25
StrJ-1E	0.00093	0.59	3
StrJ-1W	0.00109	0.70	3
<i>CP2</i>	<i>0.20767</i>	<i>132.91</i>	<i>300</i>
INT-J2	0.02073	13.27	40
StrJ-2E	0.00071	0.46	2
StrJ-2W	0.00093	0.59	3
<i>CP3</i>	<i>0.23005</i>	<i>147.23</i>	<i>345</i>
INT-J3	0.02834	18.13	55
StrJ-3E	0.00062	0.39	2
StrJ-3W	0.00082	0.53	2
<i>CP4</i>	<i>0.25981</i>	<i>166.28</i>	<i>404</i>
INT-N**	0.15490	99.14	282
<i>CP5</i>	<i>0.41472</i>	<i>265.42</i>	<i>686</i>

*Referenced from the Summerlin West Village 22 Master Conceptual Drainage Study – Update #2

**Referenced from the Scurry Bend Rough Grade Technical Drainage Memo.

1.1.2. Ultimate Condition

Ultimate condition flows have also been revised due to the changes at the upstream end of the project site from the Summerlin West Village 22 Master Conceptual Drainage Study – Update #2. Results are summarized in Table 2 and are referenced in **Appendix B.1**.

Table 2 – Revised Ultimate Condition Flows

HEC-1 Node	Tributary Area (ac)	100-year Flow (cfs)
COFF*	51.52	185
DI-DIV	53.87	84
<i>CP1</i>	<i>123.49</i>	<i>269</i>
E*	13.91	58
StrJ-1E	0.59	3
StrJ-1W	0.70	3
<i>CP2</i>	<i>138.69</i>	<i>333</i>
NP-2*	1.34	5
StrJ-2E	0.46	2
StrJ-2W	0.59	3
<i>CP3</i>	<i>141.08</i>	<i>343</i>
F*	14.22	59
StrJ-3E	0.39	2
StrJ-3W	0.53	2
<i>CP4</i>	<i>156.22</i>	<i>406</i>
CSTG1*	54.95	229
<i>CP5</i>	<i>211.17</i>	<i>635</i>

*Referenced from the Summerlin West Village 22 Master Conceptual Drainage Study – Update #2

1.1.3. Interim vs. Ultimate Condition Mainline Comparison

Table 3 represents a comparison of the interim condition flows and the ultimate condition flows along the proposed mainline storm drain at each combination point. Since the interim condition flows are higher in some locations than the ultimate condition flows and are lower in other locations, both conditions must be re-run in WSPG-W.

Table 3 – Mainline Interim vs. Ultimate Condition Flows

Combination Point	Interim Condition 100-year Flow (cfs)	Ultimate Condition 100-year Flow (cfs)
CP1	269	269
CP2	300	333
CP3	345	343
CP4	404	406
CP5	686	635

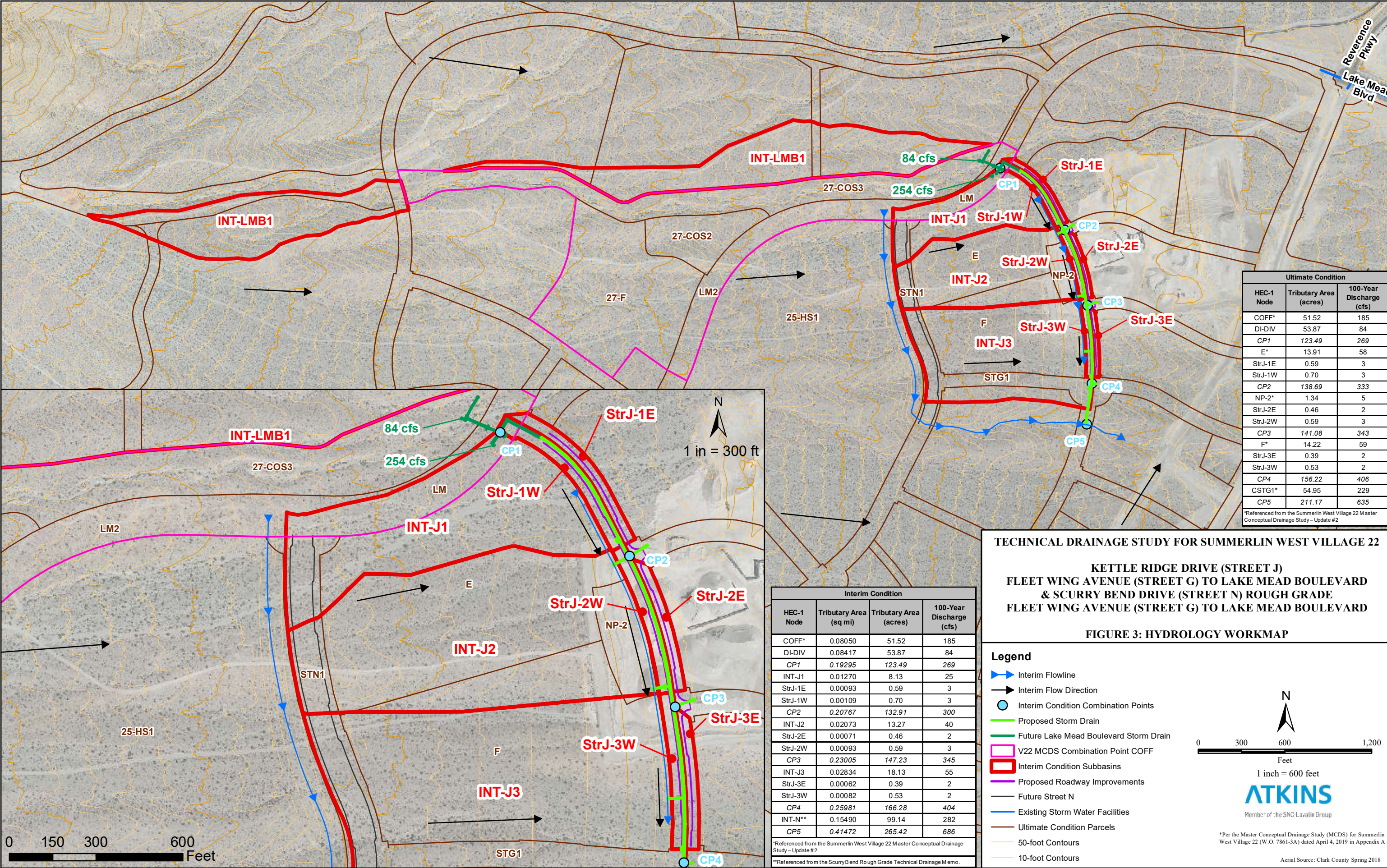
1.2. Hydraulics

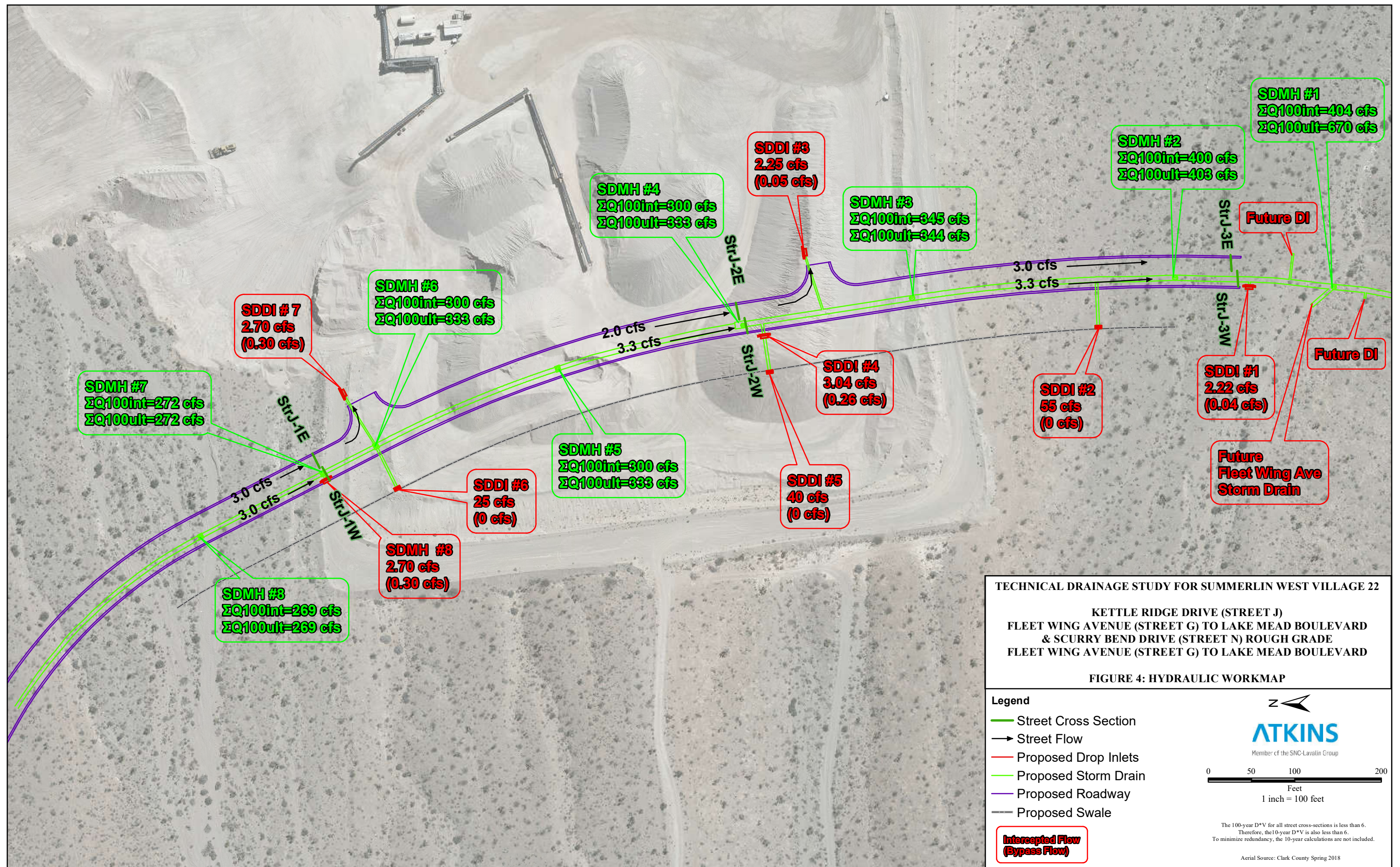
The debris basin is being removed with this proposed Update #1. The Kettle Bend Road – Sunset Run Drive to Kestrel Creek Avenue (DS#5204C) by VTN has been approved upstream of the debris basin. The storm drain was designed to take in the original CP5. Therefore, there will be no flow getting to the debris basin from the proposed Kettle Ridge Drive improvements and it can be removed from the improvement plans. Reference information is located in **Appendix B.3**.

The WSPG-W models for the proposed improvement plans were re-run for both conditions to analyze the revised flows. WSPG-W output is located in **Appendix C**. Updated WSPG-W summary information is located in Table 4.

Table 4 – WSPG-W Mainline Summary Table

SDMH#	Plan Station	WSPG- W Station	Interim Condition			Ultimate Condition		
			Q ₁₀₀	ΣQ ₁₀₀	HGL (ft)	Q ₁₀₀	ΣQ ₁₀₀	HGL (ft)
Upstream	73+57.28	18+70.76	269	269	3449.68	269	269	3449.34
SDMH #8	70+59.52	15+74.56	0	269	3432.49	0	269	3432.40
SDMH #7	69+00.53	14+15.57	3	272	3423.10	3	272	3423.07
SDMH #6	68+31.25	13+46.29	28	300	3419.12	61	333	3426.11
SDMH #5	66+01.36	11+30.70	0	300	3421.66	0	333	3422.36
SDMH #4	63+83.02	9+18.57	0	300	3418.65	0	333	3418.75
SDMH #3	61+81.97	7+18.03	45	345	3418.81	11	344	3418.89
SDMH #2	58+75.60	4+12.82	55	400	3415.94	59	403	3415.97
SDMH #1	56+90.93	2+26.86	4.1	404.1	3407.26	267	670	3412.90
Downstream	54+60	0	0.1	404.2	3411.74	0	670	3411.74





CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		October 30, 2019
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 V22 – Kettle Ridge Drive (Street J) and Scurry Bend Drive (Street N) Street Improvements (both from Lake Mead Blvd. to Fleet Wing Ave.)	
Cross Streets:	Lake Mead Boulevard & Desert Foothill Drive	COPIES TO: Atkins
File Number:	F:\Depot\DSMemos\DS5156C.doc	Howard Hughes Company, LLC
Parcel Number:	137-14-401-006 & 137-23-101-002	Bart Anderson, P.E., DevCo
Zoning Action:	N/A	CCRFC
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	7/16/2019	8/8/2019	Not Approved	\$400.00	3490122: \$400
2 nd Submittal	9/11/2019	9/25/2019	Not Approved	\$400.00	3563447: \$400
3 rd Submittal	10/16/2019	10/30/2019	See Comments Below	\$400.00	3612958: \$400
TOTAL FEES (LDDRS):				\$1,200.00	----

REMARKS:

***** The Conditional Approval of this Drainage Study is to allow the engineer/developer to submit the *Improvement Plans* to City Land Development Only**

***** Do not submit the Drainage Study to Clark County Regional Flood Control District (CCRFC) prior to the Structural Design and Calculations being approved by the City Building & Safety Department**

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

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

- Previous Comment:** From Sheet 18/39 to Sheet 21/39, there are various proposed direct connection of lateral pipes to the 6'x6' RCB. However, the connection detail has not been provided. Provide as such in the next submittal.

The response on Storm Drain Construction Note #9 refers the connection detail to Sheet 33 should be revised to **Sheet 34**.

The following conditions are repeated until they are complete:

2. Drop inlets deeper than 10' require special structural design and structural calculations. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the *Building Department* for processing. The engineer must provide a copy of *Building Department* approval of the structures to *Flood Control* prior to final acceptance of the *Improvement Plans*.
3. The *Master Drainage Study Update* for *Summerlin West Planning Area* proposes a modification to internal flow patterns that alters the flow patterns to the *Beltway Channel* system downstream of the *Summerlin Parkway* interchange. The modification proposes a storm drain system within *Summerlin Village 22* area (Storm Drain F) that will collect flows from the Gowan channel tributary area and route them into the *Beltway Channel* (MPU Facility APBE 0122). This resulted in increased flows in the *Beltway Channel* segment between *Summerlin Parkway* and *Far Hills Boulevard*, ie, mitigation measures are required for the impacted *Beltway Channel* segment.

A technical drainage study for the modification of the *Beltway Channel* has been submitted and has just been conditionally approved. The subject drainage study will not be approved prior to the construction bond of the *Beltway Channel Modification* project has been executed.

4. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

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

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

5. The project proposes to build temporary drainage facilities, ie, berms/swales along the west side of *Scurry Bend Drive* and *Kettle Ridge Drive* and at the southern end of *Kettle Ridge Drive* for interim flood protection. Prior to final plan approval the developer must complete a maintenance and liability agreement for the interim drainage improvements (berms or channels) and post a minimum maintenance bond of \$50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for constructing the facility and an exhibit that adequately shows the location and limits of the drainage facility to *City of Las Vegas Flood Control* for approval. Once the drainage study is conditionally approved, the engineer should contact the *City's Land Development Section* (229-6371) to begin the agreement process.

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

6. The drainage study and the subject improvement plans also proposed a debris basin along the west side of the *Western Beltway*. Acknowledge in the next submittal that the debris basin is a temporary facility and will be removed in the ultimate condition.

Since the debris basin is an interim facility, *Summerlin* or *Howard Hughes Company* will be solely responsible for the maintenance of the facility. A construction and maintenance bond for the debris basin must be prepared and executed prior to the approval of the improvement plans.

7. The regional facility in *Kettle Ridge Drive* will be a public facility and will be maintained by the City. The improvement plans must be reviewed for maintenance and access concerns by *City Streets & Sanitation Department* for their review and approval which must be secured prior to the subject drainage study approval. Contact *Mr. Matthew Meyer, Streets & Sanitation Manager* for guidance.

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

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



Sample Letter to
certify CD.pdf

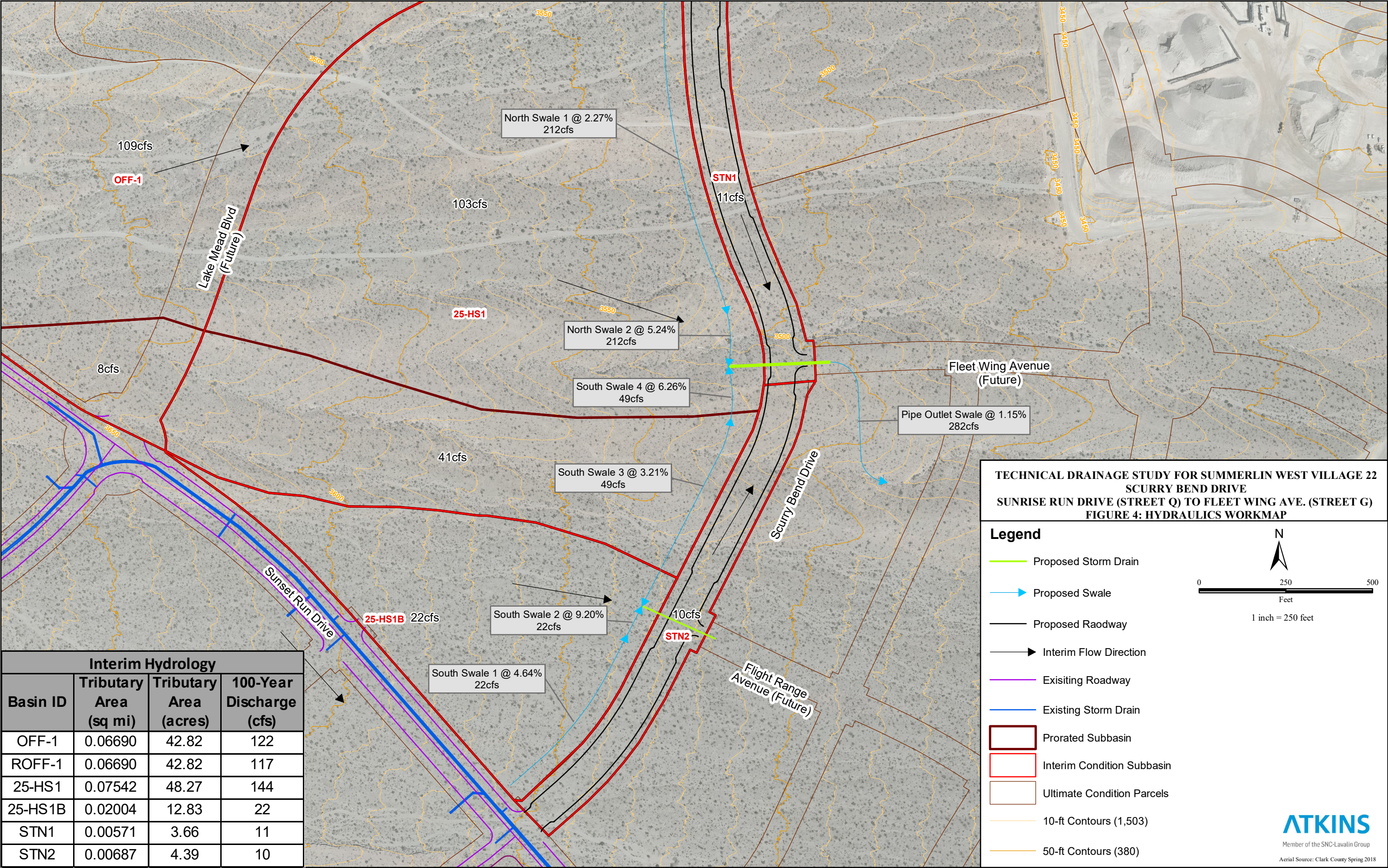
NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained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

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T/R/S: T20S/R59E/14

AREA K-14



- A.3. Summerlin West Village 22 Kettle Ridge Drive (Street J):
Kindle Rise Way (Street F) to Fleet Wing Avenue (Street G)
& Kindle Rise Way (Street F): Kettle Ridge Drive (Street J)
to Desert Foothills Drive

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Kettle Ridge Drive (Street J) & Kindle Rise Way (Street F) Date: April 2020
Location of Development: a) Descriptive (Cross Streets) North/South: Desert Foothills Drive
East/West: Fleet Wing Avenue
b) Section: 23 and 14 Township: 20S Range: 59E
c) APN: 137-14-401-006, 137-23-101-002

Name of Owner: Howard Hughes Company, LLC
Telephone No.: (702) 791-4000 Fax No.: (702) 791-4450 E-Mail Address: chris.anderson@howardhughes.com
Address: 10801 West Charleston Blvd, Ste 300, Las Vegas, NV 89135

Contact Person-Name: Molly Anderson, PE Telephone No.: (702) 551-0330
* E-Mail Address: molly.anderson@atkinsglobal.com Fax No.: (702) 263-7200
Firm: Atkins
Address: 2270 Corporate Circle, Ste 200, Henderson, NV 89074

Type of Land Development/Land Disturbance Process:

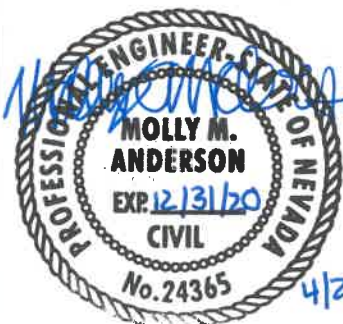
☐	Rezoning	☐	Subdivision Map	☐	Clearing and Grading Only
☐	Parcel Map	☐	Planned Unit Development	☐	Other (Please specify below)
☐	Large Parcel Map	☐	Building Permit	☒	Roadway Improvements

1. Total Owned Land Area: At Site: +/- 446 acres Being Developed/Disturbed: 6.02 acres
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.): Public - Roadway Improvements
5. Approximate upstream land area which drains to the subject site: None
6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: Update #2 to the Master Conceptual Drainage Study for Summerlin West Village 22
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Existing CC-215 Western Beltway Channel
8. Briefly describe your proposed schedule for the subject project: ASAP

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.**

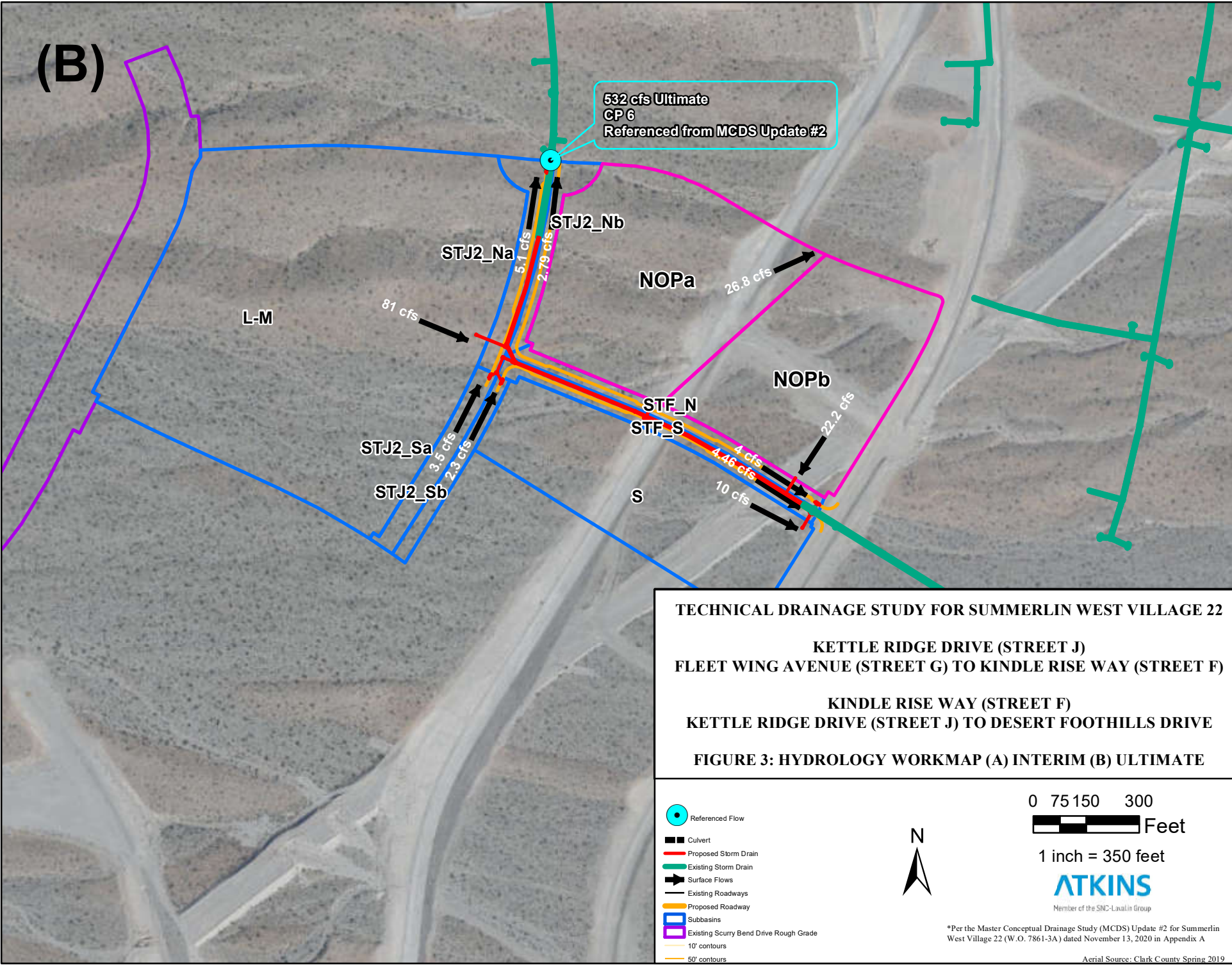
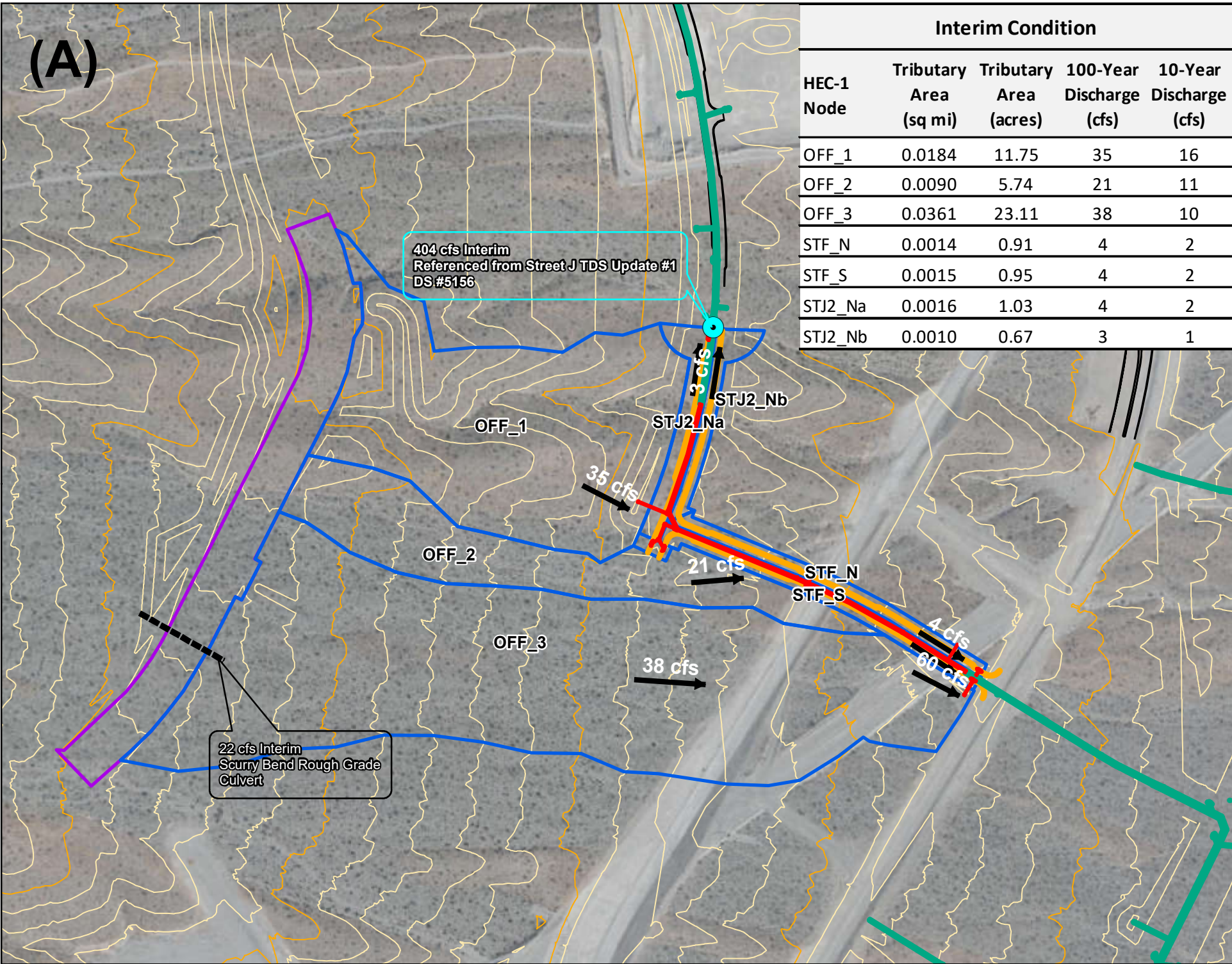


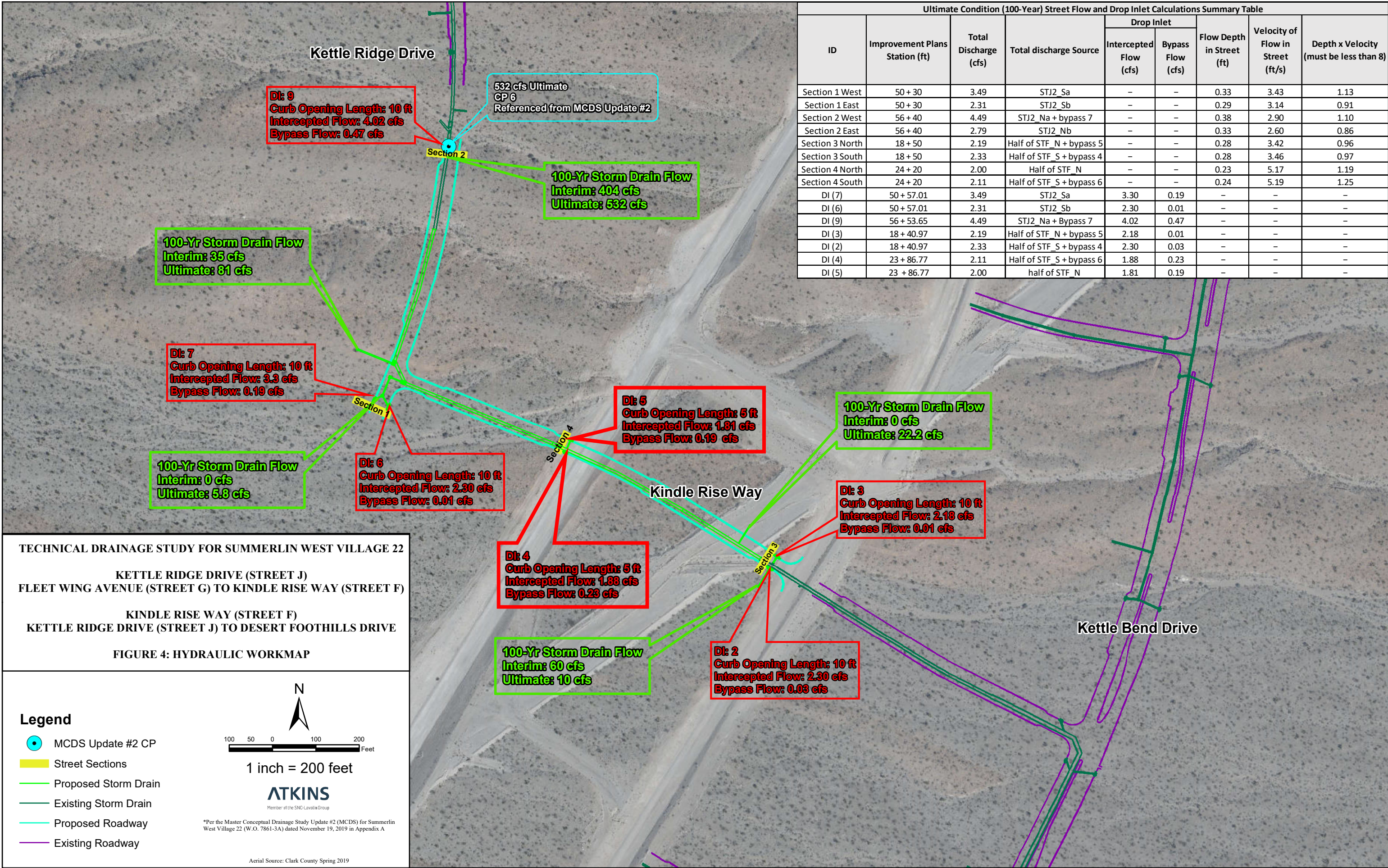
Engineer's Seal

Local Entity File No.

REFERENCE:

STANDARD FORM 1





Appendix B. Hydraulics Appendix

B.1. WSPG-W Model

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T1 Summerlin West Village 22
T2 KETTLE RIDGE: FLEET WING-KINDLE RISE/KINDLE RISE: KETTLE RIDGE-DESERT FOOTHILLS
SO 1871.99 3350.70 2
R 1872.99 3350.76 2 .013
JX 1931.05 3354.03 2 5 .013 22.200 3358.350 90.0 .000
R 2082.86 3362.59 2 .013 0.00 0.2 1
R 2386.86 3379.84 2 .013 0.00 9.8 0
JX 2387.86 3379.90 2 5 5.013 2.000 2.11 3384.2203384.22 90.0-90.0 .000
R 2420.76 3381.76 2 .013 0.000 00.0 1
REM SDMH#3
R 2784.75 3402.43 2 .013 0.000 07.5 0
R 2786.75 3402.44 2 .013 0.000 07.5 1
JX 2788.75 3402.45 2 3 .013 5.800 3407.45 0.0 .000
R 2790.75 3402.46 4 .013 0.000 15.0 0
R 2792.75 3402.47 4 .013 0.000 15.0 0
REM SDMH#6
R 2840.65 3402.71 4 .013 0.000 07.5 0
R 2842.65 3402.72 4 .013 0.000 07.5 1
JX 2844.65 3402.73 4 3 .013 81.00 3402.93 0.0 .000
R 2846.65 3402.74 4 .013 0.000 15.0 0
R 2848.65 3402.75 4 .013 0.000 15.0 0
REM ###
R 3163.75 3404.32 4 .013 0.000 10.0 1
SH 3163.76 3404.33 4
CD 2 2 0 .000 7.000 6.000 .000 .000 .00
CD 3 4 1 .000 3.000 .000 .000 .000 .00
CD 4 2 0 .000 10.000 6.000 .000 .000 .00
CD 5 4 1 .000 2.000 .000 .000 .000 .00
Q 532.00 .0

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PAGE 1

WATER SURFACE PROFILE LISTING

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Summerlin West Village 22

KETTLE RIDGE: FLEET WING-KINDLE RISE/KINDLE RISE: KETTLE RIDGE-DESERT FO

OT

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/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
1871.990	3350.700	3.177	3353.877	645.11	33.84	17.78	3371.66	.00	7.11	6.00	7.000	6.000	.00	0 .0
1.000	.0601					.0491	.05	3.18	3.35	2.95	.013	.00	.00	RECTANG
1872.990	3350.760	3.178	3353.938	645.11	33.83	17.77	3371.71	.00	7.11	6.00	7.000	6.000	.00	0 .0
JUNCT STR	.0563					.0521	3.02	3.18	3.34		.013	.00	.00	RECTANG
1931.050	3354.030	2.966	3356.996	622.91	35.00	19.02	3376.02	.00	6.94	6.00	7.000	6.000	.00	0 .0
151.810	.0564					.0544	8.26	2.97	3.58	2.94	.013	.00	.00	RECTANG
2082.860	3362.590	2.992	3365.582	622.91	34.70	18.69	3384.27	.00	6.94	6.00	7.000	6.000	.00	0 .0
112.601	.0567					.0528	5.95	2.99	3.53	2.93	.013	.00	.00	RECTANG
2195.461	3368.979	3.031	3372.010	622.91	34.26	18.22	3390.23	.00	6.94	6.00	7.000	6.000	.00	0 .0
191.399	.0567					.0489	9.35	3.03	3.47	2.93	.013	.00	.00	RECTANG
2386.860	3379.840	3.179	3383.019	622.91	32.66	16.56	3399.58	.00	6.94	6.00	7.000	6.000	.00	0 .0
JUNCT STR	.0598					.0463	.05	3.18	3.23		.013	.00	.00	RECTANG
2387.860	3379.900	3.135	3383.034	618.80	32.90	16.81	3399.84	.00	6.91	6.00	7.000	6.000	.00	0 .0
32.900	.0565					.0462	1.52	3.13	3.28	2.92	.013	.00	.00	RECTANG
2420.760	3381.760	3.170	3384.930	618.80	32.53	16.44	3401.37	.00	6.91	6.00	7.000	6.000	.00	0 .0
40.597	.0568					.0445	1.81	3.17	3.22	2.92	.013	.00	.00	RECTANG
2461.357	3384.066	3.225	3387.290	618.80	31.98	15.88	3403.18	.00	6.91	6.00	7.000	6.000	.00	0 .0
81.127	.0568					.0409	3.32	3.22	3.14	2.92	.013	.00	.00	RECTANG

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WATER SURFACE PROFILE LISTING

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Summerlin West Village 22

KETTLE RIDGE: FLEET WING-KINDLE RISE/KINDLE RISE: KETTLE RIDGE-DESERT FO

OT

*****																	*****
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/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			
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	
2542.484	3388.673	3.382	3392.054	618.80	30.50	14.44	3406.50	.00	6.91	6.00	7.000	6.000	.00	0	.0		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
55.509	.0568					.0361	2.00	3.38	2.92	2.92	.013	.00	.00	RECTANG			
2597.993	3391.825	3.547	3395.372	618.80	29.08	13.13	3408.50	.00	6.91	6.00	7.000	6.000	.00	0	.0		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
40.974	.0568					.0319	1.31	3.55	2.72	2.92	.013	.00	.00	RECTANG			
2638.966	3394.151	3.720	3397.871	618.80	27.72	11.93	3409.81	.00	6.91	6.00	7.000	6.000	.00	0	.0		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
31.574	.0568					.0282	.89	3.72	2.53	2.92	.013	.00	.00	RECTANG			
2670.540	3395.944	3.902	3399.846	618.80	26.43	10.85	3410.70	.00	6.91	6.00	7.000	6.000	.00	0	.0		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
24.972	.0568					.0249	.62	3.90	2.36	2.92	.013	.00	.00	RECTANG			
2695.512	3397.362	4.092	3401.454	618.80	25.20	9.86	3411.32	.00	6.91	6.00	7.000	6.000	.00	0	.0		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
20.063	.0568					.0220	.44	4.09	2.20	2.92	.013	.00	.00	RECTANG			
2715.574	3398.502	4.292	3402.793	618.80	24.03	8.97	3411.76	.00	6.91	6.00	7.000	6.000	.00	0	.0		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
16.255	.0568					.0195	.32	4.29	2.04	2.92	.013	.00	.00	RECTANG			
2731.829	3399.425	4.501	3403.926	618.80	22.91	8.15	3412.08	.00	6.91	6.00	7.000	6.000	.00	0	.0		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
13.205	.0568					.0173	.23	4.50	1.90	2.92	.013	.00	.00	RECTANG			
2745.034	3400.175	4.721	3404.896	618.80	21.85	7.41	3412.31	.00	6.91	6.00	7.000	6.000	.00	0	.0		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
10.697	.0568					.0153	.16	4.72	1.77	2.92	.013	.00	.00	RECTANG			
2755.731	3400.782	4.951	3405.733	618.80	20.83	6.74	3412.47	.00	6.91	6.00	7.000	6.000	.00	0	.0		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
8.589	.0568					.0136	.12	4.95	1.65	2.92	.013	.00	.00	RECTANG			

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PAGE 3

WATER SURFACE PROFILE LISTING

Date: 6-16-2020 Time:10:48:21

Summerlin West Village 22

KETTLE RIDGE: FLEET WING-KINDLE RISE/KINDLE RISE: KETTLE RIDGE-DESERT FO

OT

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/ 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
2764.320	3401.270	5.193	3406.463	618.80	19.86	6.12	3412.59	.00	6.91	6.00	7.000	6.000	.00	0 .0
6.787	.0568					.0121	.08	5.19	1.54	2.92	.013	.00	.00	RECTANG
2771.107	3401.655	5.447	3407.102	618.80	18.94	5.57	3412.67	.00	6.91	6.00	7.000	6.000	.00	0 .0
5.220	.0568					.0108	.06	5.45	1.43	2.92	.013	.00	.00	RECTANG
2776.327	3401.952	5.712	3407.664	618.80	18.05	5.06	3412.73	.00	6.91	6.00	7.000	6.000	.00	0 .0
3.840	.0568					.0096	.04	5.71	1.33	2.92	.013	.00	.00	RECTANG
2780.167	3402.170	5.991	3408.161	618.80	17.21	4.60	3412.76	.00	6.91	6.00	7.000	6.000	.00	0 .0
2.607	.0568					.0085	.02	5.99	1.24	2.92	.013	.00	.00	RECTANG
2782.774	3402.318	6.284	3408.601	618.80	16.41	4.18	3412.78	.00	6.91	6.00	7.000	6.000	.00	0 .0
1.495	.0568					.0076	.01	6.28	1.15	2.92	.013	.00	.00	RECTANG
2784.270	3402.403	6.590	3408.993	618.80	15.65	3.80	3412.80	.00	6.91	6.00	7.000	6.000	.00	0 .0
.480	.0568					.0068	.00	6.59	1.07	2.92	.013	.00	.00	RECTANG
2784.750	3402.430	6.913	3409.343	618.80	14.92	3.46	3412.80	.00	6.91	6.00	7.000	6.000	.00	0 .0
2.000	.0050					.0062	.01	6.91	1.00	7.65	.013	.00	.00	RECTANG
2786.750	3402.440	7.021	3409.461	618.80	14.69	3.35	3412.81	.00	6.91	6.00	7.000	6.000	.00	0 .0
JUNCT STR	.0050					.0055	.01	7.02	.98		.013	.00	.00	RECTANG
2788.750	3402.450	7.668	3410.118	613.00	13.32	2.76	3412.87	.00	6.87	6.00	10.000	6.000	.00	0 .0
2.000	.0050					.0049	.01	7.67	.85	7.58	.013	.00	.00	RECTANG

KK_U.OUT

FILE: KK_U5.WSW

W S P G W - CIVILDESIGN Version 14.08
Program Package Serial Number: 7271

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WATER SURFACE PROFILE LISTING

Date: 6-16-2020 Time:10:48:21

Summerlin West Village 22

KETTLE RIDGE: FLEET WING-KINDLE RISE/KINDLE RISE: KETTLE RIDGE-DESERT FO

OT

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/ 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
2790.750	3402.460	7.667	3410.127	613.00	13.33	2.76	3412.88	.00	6.87	6.00	10.000	6.000	.00	0 .0
2.000	.0050					.0049	.01	7.67	.85	7.58	.013	.00	.00	RECTANG
2792.750	3402.470	7.666	3410.136	613.00	13.33	2.76	3412.89	.00	6.87	6.00	10.000	6.000	.00	0 .0
47.900	.0050					.0049	.23	7.67	.85	7.58	.013	.00	.00	RECTANG
2840.650	3402.710	7.647	3410.357	613.00	13.36	2.77	3413.13	.00	6.87	6.00	10.000	6.000	.00	0 .0
2.000	.0050					.0049	.01	7.65	.85	7.58	.013	.00	.00	RECTANG
2842.650	3402.720	7.646	3410.366	613.00	13.36	2.77	3413.14	.00	6.87	6.00	10.000	6.000	.00	0 .0
JUNCT STR	.0050					.0038	.01	7.65	.85		.013	.00	.00	RECTANG
2844.650	3402.730	8.859	3411.589	532.00	10.01	1.56	3413.14	.00	6.25	6.00	10.000	6.000	.00	0 .0
2.000	.0050					.0026	.01	8.86	.59	6.74	.013	.00	.00	RECTANG
2846.650	3402.740	8.852	3411.592	532.00	10.02	1.56	3413.15	.00	6.25	6.00	10.000	6.000	.00	0 .0
2.000	.0050					.0026	.01	8.85	.59	6.74	.013	.00	.00	RECTANG
2848.650	3402.750	8.845	3411.595	532.00	10.02	1.56	3413.16	.00	6.25	6.00	10.000	6.000	.00	0 .0
115.966	.0050					.0028	.32	8.84	.59	6.75	.013	.00	.00	RECTANG
2964.616	3403.328	8.433	3411.761	532.00	10.51	1.72	3413.48	.00	6.25	6.00	10.000	6.000	.00	0 .0
117.797	.0050					.0031	.37	8.43	.64	6.75	.013	.00	.00	RECTANG
3082.413	3403.915	8.041	3411.956	532.00	11.03	1.89	3413.84	.00	6.25	6.00	10.000	6.000	.00	0 .0
81.337	.0050					.0034	.28	8.04	.69	6.75	.013	.00	.00	RECTANG

KK_U.OUT

FILE: KK_U5.WSW

W S P G W - CIVILDESIGN Version 14.08

PAGE 5

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING

Date: 6-16-2020 Time:10:48:21

Summerlin West Village 22

KETTLE RIDGE: FLEET WING-KINDLE RISE/KINDLE RISE: KETTLE RIDGE-DESERT FO

OT

```

*****
| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth
Station | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch
*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****
| | | | | | | | | | | | | | | |
3163.750 3404.320 7.789 3412.109 532.00 11.38 2.01 3414.12 .00 6.25 6.00 10.000 6.000 .00 0 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
.010 .0050 .0018 5.60 7.79 .72 6.75 .013 .00 .00 RECTANG
| | | | | | | | | | | | | | | |
3163.760 3404.330 7.789 3412.119 532.00 11.38 2.01 3414.13 .00 6.25 6.00 10.000 6.000 .00 0 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-

```


Appendix B. Hydrology Appendix

B.1 Parameters

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

TDS for Summerlin Village 22 West



Member of the SNC-Lavalin Group

Fleet Wing Avenue (Street G)
Kettle Ridge Drive (Street J) to Scurry Bend Drive (Street N)

BY: JLK
DATE: 9/15/2020

INTERIM CONDITION

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag
DESIG:	DEV./EX. (D or E)	CN	K	AREA Ac (3)	AREA Mi^2	INITIAL LENGTH Feet (4)	SLOPE % (5)	Ti Min (6)	TRAVEL LENGTH Feet (7)	SLOPE % (8)	V1 VELOCITY FPS (9a)	V2 VELOCITY FPS (9b)	Tt Min (10)	Min (13)	Min (14)	Tlag= 0.6Tc/60 Hours
(1)			(2)													
StN-1a	D	98.0	0.904	1.72	0.00269	30	2.0	1.5	584	2.3	3.0	4.6	3.0	4.6	13.4	0.046
StN-1b	D	98.0	0.904	1.74	0.00271	30	2.0	1.5	595	2.3	3.0	4.6	3.1	4.6	13.5	0.046
StN-2b	D	98.0	0.904	1.62	0.00252	30	2.0	1.5	555	3.2	3.6	5.5	2.5	4.0	13.3	0.050*
StN-2c	D	98.0	0.904	0.94	0.00146	30	2.0	1.5	315	3.2	3.6	5.5	1.5	3.0	11.9	0.050*
FWA-1	D	98.0	0.904	0.42	0.00066	19	2.0	1.2	365	7.8	5.6	8.5	1.1	2.3	12.1	0.050*
FWA-2	D	98.0	0.904	0.74	0.00116	19	2.0	1.2	621	7.8	5.6	8.5	1.7	2.9	13.6	0.050*
FWA-3	D	98.0	0.904	0.91	0.00143	19	2.0	1.2	986	7.8	5.6	8.5	2.4	3.6	15.6	0.050*
Tc = Ti + Tt Tlag = 0.6 Tc Ti = 1.8 (1.1 - K) L^{1/2} / S^{1/3} K = 0.0132 (CN) - 0.39 Tc Check = L/180+10 For the travel time (Tt) calculations, V1 applies to the first 500 feet of travel distance; V2 applies to the remaining travel distance. V1 = 14.8*(S/100)^{1/2} V2 = 29.4*(S/100)^{1/2} Developed Developed V1 = 20.2*(S/100)^{1/2} V2 = 30.6*(S/100)^{1/2}																
REFERENCE :														STANDARD FORM 4		

*Minimum recommended Tc for developed subbasins is 5 mins. A value of 0.05 was use for the Tlag where the calculated Tc was less than 5 mins.

**Minimum recommended Tc for undeveloped subbasins is 10 mins. A value of 0.10 was use for the Tlag where the calculated Tc was less than 10 mins.

B.2 HEC-1 Model

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 16SEP20 TIME 15:25:07
*

INT.OUT

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

```

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

```

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY, DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION

KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

HEC-1 INPUT

PAGE 1

LINE

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

*DIAGRAM

*** FREE ***

1 ID TECHNICAL DRAINAGE STUDY

2 ID SUMMERLIN VILLAGE 22 NORTH

3 ID FLEET WING AVENUE (STREET G): KETTLE RIDGE DRIVE (STREET J) TO SCURRY BEND DRI

4 ID DESIGN STORM 100-YEAR 6 HOUR

5 ID

6 ID JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES

7 ID

8 ID AREA (SQUARE MILES) DARF

9 ID

10 ID 0 - 0.5 0.99

11 ID Estimated 10-year 0.57

12 ID

13 IT 5 0 0 300

14 IO 5 0 0

15 IN 5 0 0

16 JR PREC 0.99 0.57

*

17 KK STN2B

18 KO 1

19 BA 0.00252

20 PB 3.44

21 PC 0.000 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130

22 PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181

23 PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249

24 PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409

25 PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856

26 PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976

27 PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998

28 PC 0.998 0.999 1.000

29 LS 0 98.0

30 UD 0.050

*

31 KK STN2C

32 BA 0.00146

33 PB 3.44

34 LS 0 98.0

35 UD 0.050

*

36 KK 25-HS1

37 BA 0.07542

38 PB 3.44

39 LS 0 87.5

40 UD 0.100

*

1

HEC-1 INPUT

PAGE 2

LINE

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

41 KK STN1A

42 BA 0.00269

43 PB 3.44

44 LS 0 98.0

45 UD 0.050

*

46 KK SBD-N

47 KO 1

```

48      HC      2
      *
49      KK      STN1B
50      BA 0.00271
51      PB      3.44
52      LS      0      98.0
53      UD 0.050
      *
54      KK      CFWA-W
55      KO      1
56      HC      4
      *
57      KK      FWA-1
58      BA 0.00066
59      PB      3.43
60      LS      0      98.0
61      UD 0.050
      *
62      KK      FWA-2
63      BA 0.00116
64      PB      3.43
65      LS      0      98.0
66      UD 0.050
      *
67      KK      FWA-3
68      BA 0.00142
69      PB      3.43
70      LS      0      98.0
71      UD 0.079
      *
72      KK      CFWA-E
73      KO      1
74      HC      4
      *
75      ZZ

```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```

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

17      STN2B
      .
31      .      STN2C
      .
36      .      .      25-HS1
      .
41      .      .      .      STN1A
      .
46      .      .      SBD-N.....
      .
49      .      .      .      STN1B
      .
54      CFWA-W.....
      .
57      .      FWA-1
      .
62      .      .      FWA-2
      .
67      .      .      .      FWA-3
      .
72      CFWA-E.....

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 16SEP20 TIME 15:25:07
*
*****

```

```

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

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TECHNICAL DRAINAGE STUDY
 SUMMERLIN VILLAGE 22 NORTH
 FLEET WING AVENUE (STREET G): KETTLE RIDGE DRIVE (STREET J) TO SCURRY BEND DRI
 DESIGN STORM 100-YEAR 6 HOUR

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES

INT.OUT

AREA (SQUARE MILES)

DARF

0 - 0.5

0.99

Estimated 10-year

0.57

14 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
 .99 .57

PEAK FLOW	TIME		6-HR	MAXIMUM AVERAGE FLOW	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
+	83.	3.50	(CFS)	10.	2.	2.	2.
			(INCHES)	1.022	1.023	1.023	1.023
			(AC-FT)	5.	5.	5.	5.
			CUMULATIVE AREA =	.09	SQ MI		

1

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION	
					RATIO 1 .99	RATIO 2 .57
HYDROGRAPH AT	STN2B	.00	1	FLOW	7.	4.
+				TIME	3.50	3.50
HYDROGRAPH AT	STN2C	.00	1	FLOW	4.	2.
+				TIME	3.50	3.50
HYDROGRAPH AT	25-HS1	.08	1	FLOW	144.	63.
+				TIME	3.50	3.50
HYDROGRAPH AT	STN1A	.00	1	FLOW	8.	4.
+				TIME	3.50	3.50
2 COMBINED AT	SBD-N	.08	1	FLOW	152.	67.
+				TIME	3.50	3.50
HYDROGRAPH AT	STN1B	.00	1	FLOW	8.	4.
+				TIME	3.50	3.50
4 COMBINED AT	CFWA-W	.08	1	FLOW	171.	78.
+				TIME	3.50	3.50
HYDROGRAPH AT	FWA-1	.00	1	FLOW	2.	1.
+				TIME	3.50	3.50
HYDROGRAPH AT	FWA-2	.00	1	FLOW	3.	2.
+				TIME	3.50	3.50
HYDROGRAPH AT	FWA-3	.00	1	FLOW	4.	2.
+						

				TIME	3.50	INT.OUT 3.50
+	4 COMBINED AT					
	CFWA-E	.09	1	FLOW	180.	83.
				TIME	3.50	3.50

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

Appendix C. Hydraulics Appendix

C.1 Drop Inlet Calculations

Worksheet for Combination Inlet On Grade - 1 Int

Project Description

Solve For Efficiency

Input Data

Discharge	4.51	ft ³ /s
Slope	0.07860	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	4.00	in
Local Depression Width	2.00	ft
Grate Width	1.50	ft
Grate Length	5.00	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	80.91	%
Intercepted Flow	3.65	ft ³ /s
Bypass Flow	0.86	ft ³ /s
Spread	7.09	ft
Depth	0.22	ft
Flow Area	0.58	ft ²
Gutter Depression	0.08	ft
Total Depression	0.41	ft
Velocity	7.74	ft/s
Splash Over Velocity	9.11	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.03	
Grate Flow Ratio	0.57	
Equivalent Cross Slope	0.16456	ft/ft
Active Grate Length	2.50	ft
Length Factor	0.24	
Total Interception Length	21.06	ft

Worksheet for Combination Inlet On Grade - 1 Int

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Combination Inlet On Grade - 2 Int

Project Description

Solve For Efficiency

Input Data

Discharge	10.00	ft ³ /s
Slope	0.04000	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	4.00	in
Local Depression Width	2.00	ft
Grate Width	1.50	ft
Grate Length	12.50	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	15.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	79.34	%
Intercepted Flow	7.93	ft ³ /s
Bypass Flow	2.07	ft ³ /s
Spread	11.64	ft
Depth	0.31	ft
Flow Area	1.44	ft ²
Gutter Depression	0.08	ft
Total Depression	0.41	ft
Velocity	6.96	ft/s
Splash Over Velocity	15.63	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.22	
Grate Flow Ratio	0.37	
Equivalent Cross Slope	0.11660	ft/ft
Active Grate Length	6.25	ft
Length Factor	0.30	
Total Interception Length	29.54	ft

Worksheet for Combination Inlet On Grade - 2 Int

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Combination Inlet On Grade - 3 Int

Project Description

Solve For Efficiency

Input Data

Discharge	11.00	ft ³ /s
Slope	0.04000	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	4.00	in
Local Depression Width	2.00	ft
Grate Width	1.50	ft
Grate Length	12.50	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	15.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	77.16	%
Intercepted Flow	8.49	ft ³ /s
Bypass Flow	2.51	ft ³ /s
Spread	12.11	ft
Depth	0.32	ft
Flow Area	1.55	ft ²
Gutter Depression	0.08	ft
Total Depression	0.41	ft
Velocity	7.11	ft/s
Splash Over Velocity	15.63	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.21	
Grate Flow Ratio	0.36	
Equivalent Cross Slope	0.11321	ft/ft
Active Grate Length	6.25	ft
Length Factor	0.28	
Total Interception Length	31.29	ft

Worksheet for Combination Inlet On Grade - 3 Int

Messages

Messages Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Combination Inlet On Grade - 1 Ult

Project Description

Solve For Efficiency

Input Data

Discharge	3.25	ft ³ /s
Slope	0.07860	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	4.00	in
Local Depression Width	2.00	ft
Grate Width	1.50	ft
Grate Length	5.00	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	88.39	%
Intercepted Flow	2.87	ft ³ /s
Bypass Flow	0.38	ft ³ /s
Spread	6.04	ft
Depth	0.20	ft
Flow Area	0.44	ft ²
Gutter Depression	0.08	ft
Total Depression	0.41	ft
Velocity	7.32	ft/s
Splash Over Velocity	9.11	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.03	
Grate Flow Ratio	0.64	
Equivalent Cross Slope	0.18024	ft/ft
Active Grate Length	2.50	ft
Length Factor	0.29	
Total Interception Length	17.37	ft

Worksheet for Combination Inlet On Grade - 1 Ult

Messages

Messages Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Combination Inlet On Grade - 2 Ult

Project Description

Solve For Efficiency

Input Data

Discharge	4.00	ft ³ /s
Slope	0.04000	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	4.00	in
Local Depression Width	2.00	ft
Grate Width	1.50	ft
Grate Length	12.50	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	15.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	96.68	%
Intercepted Flow	3.87	ft ³ /s
Bypass Flow	0.13	ft ³ /s
Spread	7.84	ft
Depth	0.24	ft
Flow Area	0.70	ft ²
Gutter Depression	0.08	ft
Total Depression	0.41	ft
Velocity	5.75	ft/s
Splash Over Velocity	15.63	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.28	
Grate Flow Ratio	0.53	
Equivalent Cross Slope	0.15440	ft/ft
Active Grate Length	6.25	ft
Length Factor	0.52	
Total Interception Length	16.99	ft

Worksheet for Combination Inlet On Grade - 2 Ult

Messages

Messages Grate Length should be within the
defined range of HEC-22's Chart 5
(approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Combination Inlet On Grade - 3 Ult

Project Description

Solve For Efficiency

Input Data

Discharge	8.00	ft ³ /s
Slope	0.04000	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	4.00	in
Local Depression Width	2.00	ft
Grate Width	1.50	ft
Grate Length	12.50	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	15.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	84.32	%
Intercepted Flow	6.75	ft ³ /s
Bypass Flow	1.25	ft ³ /s
Spread	10.61	ft
Depth	0.29	ft
Flow Area	1.21	ft ²
Gutter Depression	0.08	ft
Total Depression	0.41	ft
Velocity	6.63	ft/s
Splash Over Velocity	15.63	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.23	
Grate Flow Ratio	0.41	
Equivalent Cross Slope	0.12495	ft/ft
Active Grate Length	6.25	ft
Length Factor	0.34	
Total Interception Length	25.80	ft

Worksheet for Combination Inlet On Grade - 3 Ult

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

C.2 Normal Depth Calculations

Cross Section for Fleet Wing Avenue Section - 1 Int

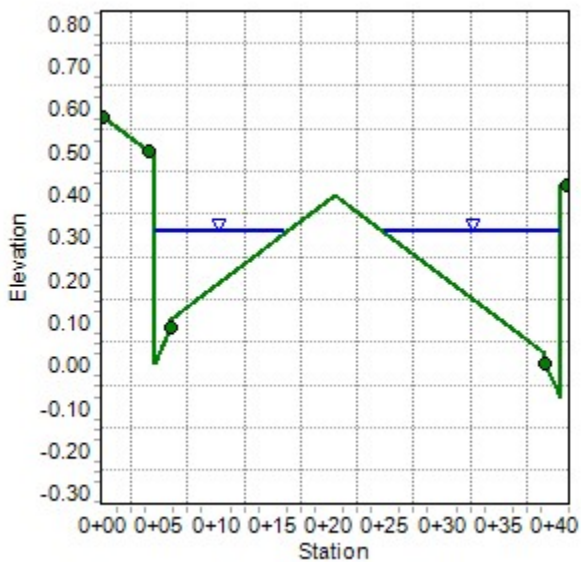
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04000	ft/ft
Normal Depth	0.39	ft
Discharge	21.00	ft ³ /s

Cross Section Image



Worksheet for Fleet Wing Avenue Section - 1 Int

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04000	ft/ft
Discharge	21.00	ft ³ /s
Section Definitions		

Station (ft)	Elevation (ft)
0+00.000	0.58
0+04.000	0.50
0+04.500	0.50
0+04.583	0.00
0+06.000	0.08
0+06.000	0.10
0+20.500	0.39
0+39.000	0.02
0+39.000	0.00
0+40.417	-0.08
0+40.500	0.42
0+41.000	0.42

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.000, 0.58)	(0+04.000, 0.50)	0.025
(0+04.000, 0.50)	(0+06.000, 0.08)	0.013
(0+06.000, 0.08)	(0+39.000, 0.00)	0.015
(0+39.000, 0.00)	(0+41.000, 0.42)	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 Fleet Wing Avenue Section - 1 Int

Results

Normal Depth		0.39	ft
Elevation Range	-0.08 to 0.58 ft		
Flow Area		3.87	ft ²
Wetted Perimeter		27.6956	ft
Hydraulic Radius		0.14	ft
Top Width		27.0592	ft
Normal Depth		0.39	ft
Critical Depth		0.51	ft
Critical Slope		0.00544	ft/ft
Velocity		5.43	ft/s
Velocity Head		0.46	ft
Specific Energy		0.84	ft
Froude Number		2.53	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.0000	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	0.51	ft
Channel Slope	0.04000	ft/ft
Critical Slope	0.00544	ft/ft

Cross Section for Fleet Wing Avenue Section - 2 Int

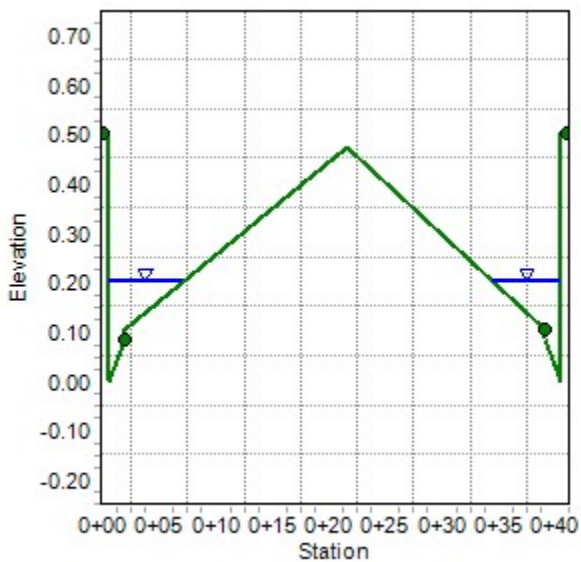
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.07860	ft/ft
Normal Depth	0.20	ft
Discharge	4.51	ft ³ /s

Cross Section Image



Worksheet for Fleet Wing Avenue Section - 2 Int

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.07860 ft/ft
Discharge 4.51 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.000	0.50
0+00.500	0.50
0+00.583	0.00
0+02.000	0.08
0+02.000	0.10
0+21.500	0.47
0+39.000	0.10
0+39.000	0.08
0+40.420	0.00
0+40.500	0.50
0+41.000	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.000, 0.50)	(0+02.000, 0.08)	0.013
(0+02.000, 0.08)	(0+39.000, 0.10)	0.015
(0+39.000, 0.10)	(0+41.000, 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 Fleet Wing Avenue Section - 2 Int

Results

Normal Depth		0.20	ft
Elevation Range	0.00 to 0.50 ft		
Flow Area		0.91	ft ²
Wetted Perimeter		12.8738	ft
Hydraulic Radius		0.07	ft
Top Width		12.4853	ft
Normal Depth		0.20	ft
Critical Depth		0.29	ft
Critical Slope		0.00659	ft/ft
Velocity		4.93	ft/s
Velocity Head		0.38	ft
Specific Energy		0.58	ft
Froude Number		3.21	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.0000	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	0.20	ft
Critical Depth	0.29	ft
Channel Slope	0.07860	ft/ft
Critical Slope	0.00659	ft/ft

Cross Section for Fleet Wing Avenue Section - 3 Int

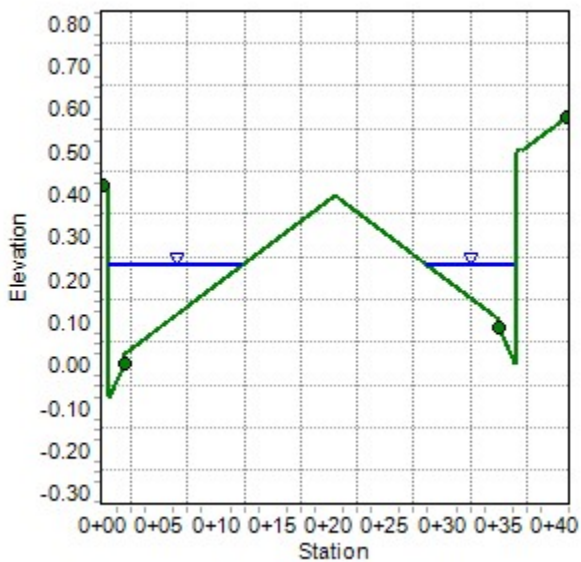
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04000	ft/ft
Normal Depth	0.31	ft
Discharge	9.93	ft ³ /s

Cross Section Image



Worksheet for Fleet Wing Avenue Section - 3 Int

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.04000 ft/ft
Discharge 9.93 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.000	0.42
0+00.500	0.42
0+00.583	-0.08
0+02.000	0.00
0+02.000	0.02
0+20.500	0.39
0+35.000	0.10
0+35.000	0.08
0+36.417	0.00
0+36.500	0.50
0+37.000	0.50
0+41.000	0.58

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.000, 0.42)	(0+02.000, 0.00)	0.013
(0+02.000, 0.00)	(0+35.000, 0.08)	0.015
(0+35.000, 0.08)	(0+41.000, 0.58)	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 Fleet Wing Avenue Section - 3 Int

Results

Normal Depth		0.31	ft
Elevation Range	-0.0800 to 0.5800 ft		
Flow Area		2.18	ft ²
Wetted Perimeter		20.3377	ft
Hydraulic Radius		0.11	ft
Top Width		19.8250	ft
Normal Depth		0.31	ft
Critical Depth		0.41	ft
Critical Slope		0.00605	ft/ft
Velocity		4.56	ft/s
Velocity Head		0.32	ft
Specific Energy		0.64	ft
Froude Number		2.43	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.0000	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	0.41	ft
Channel Slope	0.04000	ft/ft
Critical Slope	0.00605	ft/ft

Cross Section for Fleet Wing Avenue Section - 1 Ult

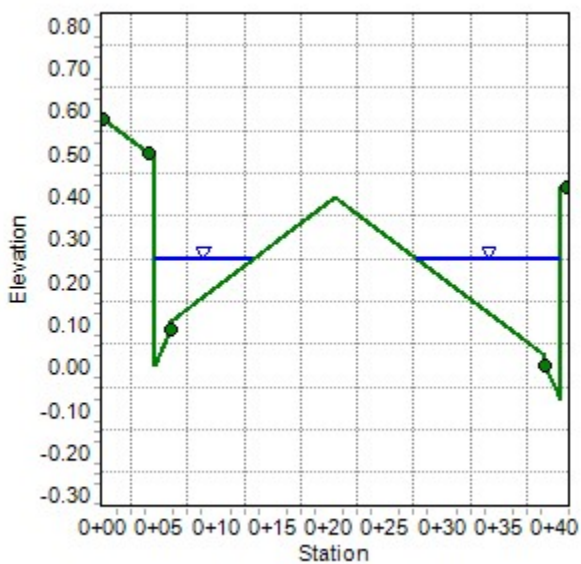
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04000	ft/ft
Normal Depth	0.33	ft
Discharge	12.00	ft ³ /s

Cross Section Image



Worksheet for Fleet Wing Avenue Section - 1 Ult

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04000	ft/ft
Discharge	12.00	ft ³ /s
Section Definitions		

Station (ft)	Elevation (ft)
0+00.000	0.58
0+04.000	0.50
0+04.500	0.50
0+04.583	0.00
0+06.000	0.08
0+06.000	0.10
0+20.500	0.39
0+39.000	0.02
0+39.000	0.00
0+40.417	-0.08
0+40.500	0.42
0+41.000	0.42

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.000, 0.58)	(0+04.000, 0.50)	0.025
(0+04.000, 0.50)	(0+06.000, 0.08)	0.013
(0+06.000, 0.08)	(0+39.000, 0.00)	0.015
(0+39.000, 0.00)	(0+41.000, 0.42)	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 Fleet Wing Avenue Section - 1 Ult

Results

Normal Depth		0.33	ft
Elevation Range	-0.0800 to 0.5800 ft		
Flow Area		2.52	ft ²
Wetted Perimeter		22.0289	ft
Hydraulic Radius		0.11	ft
Top Width		21.4878	ft
Normal Depth		0.33	ft
Critical Depth		0.43	ft
Critical Slope		0.00592	ft/ft
Velocity		4.76	ft/s
Velocity Head		0.35	ft
Specific Energy		0.68	ft
Froude Number		2.45	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.0000	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	0.33	ft
Critical Depth	0.43	ft
Channel Slope	0.04000	ft/ft
Critical Slope	0.00592	ft/ft

Cross Section for Fleet Wing Avenue Section - 2 Ult

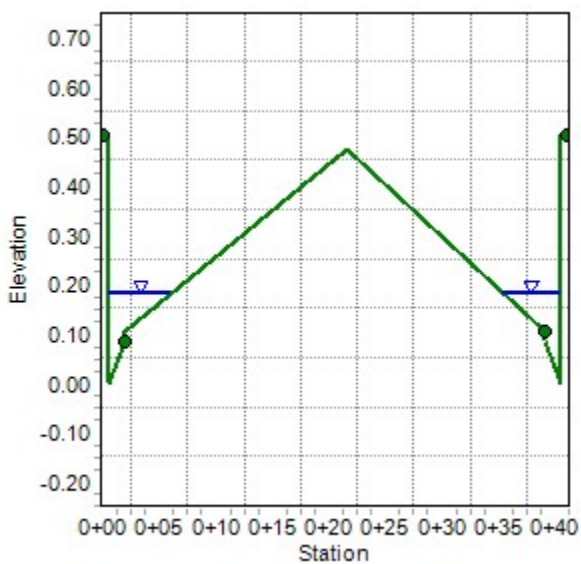
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.07860	ft/ft
Normal Depth	0.18	ft
Discharge	3.25	ft ³ /s

Cross Section Image



Worksheet for Fleet Wing Avenue Section - 2 Ult

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.07860 ft/ft
Discharge 3.25 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.000	0.50
0+00.500	0.50
0+00.583	0.00
0+02.000	0.08
0+02.000	0.10
0+21.500	0.47
0+39.000	0.10
0+39.000	0.08
0+40.420	0.00
0+40.500	0.50
0+41.000	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.000, 0.50)	(0+02.000, 0.08)	0.013
(0+02.000, 0.08)	(0+39.000, 0.10)	0.015
(0+39.000, 0.10)	(0+41.000, 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 Fleet Wing Avenue Section - 2 Ult

Results

Normal Depth		0.18	ft
Elevation Range	0.00 to 0.50 ft		
Flow Area		0.71	ft ²
Wetted Perimeter		11.0426	ft
Hydraulic Radius		0.06	ft
Top Width		10.6850	ft
Normal Depth		0.18	ft
Critical Depth		0.26	ft
Critical Slope		0.00680	ft/ft
Velocity		4.60	ft/s
Velocity Head		0.33	ft
Specific Energy		0.51	ft
Froude Number		3.15	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.0000	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	0.18	ft
Critical Depth	0.26	ft
Channel Slope	0.07860	ft/ft
Critical Slope	0.00680	ft/ft

Cross Section for Fleet Wing Avenue Section - 3 Ult

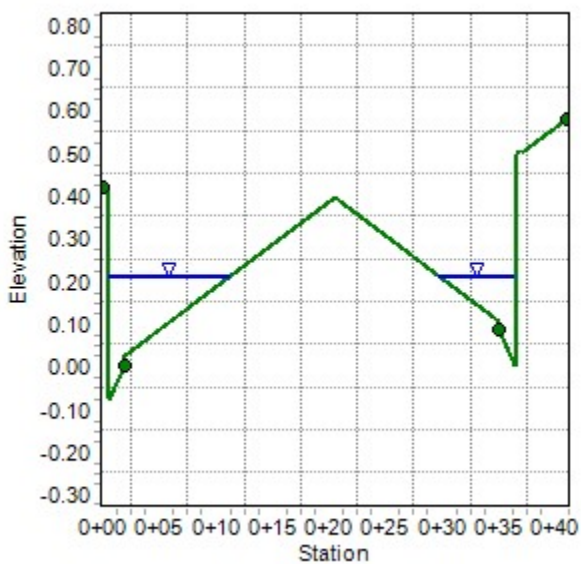
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04000	ft/ft
Normal Depth	0.29	ft
Discharge	7.40	ft ³ /s

Cross Section Image



Worksheet for Fleet Wing Avenue Section - 3 Ult

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04000	ft/ft
Discharge	7.40	ft ³ /s
Section Definitions		

Station (ft)	Elevation (ft)
0+00.000	0.42
0+00.500	0.42
0+00.583	-0.08
0+02.000	0.00
0+02.000	0.02
0+20.500	0.39
0+35.000	0.10
0+35.000	0.08
0+36.417	0.00
0+36.500	0.50
0+37.000	0.50
0+41.000	0.58

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.000, 0.42)	(0+02.000, 0.00)	0.013
(0+02.000, 0.00)	(0+35.000, 0.08)	0.015
(0+35.000, 0.08)	(0+41.000, 0.58)	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 Fleet Wing Avenue Section - 3 Ult

Results

Normal Depth		0.29	ft
Elevation Range	-0.0800 to 0.5800 ft		
Flow Area		1.73	ft ²
Wetted Perimeter		17.8948	ft
Hydraulic Radius		0.10	ft
Top Width		17.4230	ft
Normal Depth		0.29	ft
Critical Depth		0.37	ft
Critical Slope		0.00626	ft/ft
Velocity		4.28	ft/s
Velocity Head		0.28	ft
Specific Energy		0.57	ft
Froude Number		2.39	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.0000	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	0.29	ft
Critical Depth	0.37	ft
Channel Slope	0.04000	ft/ft
Critical Slope	0.00626	ft/ft

C.3 Interim Condition WSPG-W Model

FWW-INT.WSW

0

T1 SUMMERLIN WEST VILLAGE 22
T2 FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
T3 100-YEAR INTERIM CONTDITION
SO .0003405.720 1 3406.715
REM****CONNECTON TO KETTLE RIDGE DRIVE MAINLINE 6'X10' RCB
R 26.9003410.630 1 .013 .000 -13.655 0
R 27.9003410.746 1 .013 .000 -13.500 0
R 29.9003410.862 1 .013 .000 -13.500 0
R 31.9003410.920 1 .013 .000 .000 1
REM****FLEET WING DRIVE (DFD-KRD) SDMH#8
R 48.5003411.840 1 .013 .000 .000 0
REM****POINT OF CONNECTION TO STUB
R 148.1903416.760 1 .013 .000 .000 0
R 154.1903416.960 1 .013 .000 .000 1
REM****FLEET WING AVENUE SDMH#1
R 511.5203444.910 1 .013 .000 -3.709 0
R 516.5203445.110 1 .013 .000 .000 1
REM****FLEET WING AVENUE SDMH#2
R 653.6403456.500 1 .013 .000 .000 0
JX 656.1403456.600 1 2 .013 3.650 3456.700 72.7 .000
REM****FLEET WING AVENUE SDDI#1
R 658.6403456.700 1 .013 .000 -2.413 1
REM****FLEET WING AVENUE SDMH#3
R 769.1903465.550 1 .013 .000 .000 0
R 774.1903465.750 1 .013 .000 .843 1
REM****FLEET WING AVENUE SDMH#4
R 995.9803480.950 1 .013 .000 .000 0
JX 998.4803481.050 1 2 2.013 8.490 7.9303481.1503481.150 72.1-45.2 .000
REM****FLEET WING AVENUE SDDI#2 & SDDI#3
R 1000.9803481.150 1 .013 .000 .000 1
REM****FLEET WING AVENUE SDMH#5
SH 1000.9803481.150 1 3481.150
CD 1 4 1 .000 4.000 .000 .000 .000 .00
CD 2 4 1 .000 2.000 .000 .000 .000 .00
Q 144.000 .0

FWW-INT.OUT

FILE: FWW-INT.WSW

W S P G W - CIVILDESIGN Version 14.08
Program Package Serial Number: 7271

PAGE 1

WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time: 9:46:29

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)

100-YEAR INTERIM CONTDITION

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Height/FT	Base Wt 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
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
.000	3405.720	1.748	3407.468	164.07	31.09	15.01	3422.48	.00	3.69	3.97	4.000	.000	.00	1 .0
5.907	.1825					.0812	.48	1.75	4.75	1.41	.013	.00	.00	PIPE
5.907	3406.798	1.776	3408.574	164.07	30.44	14.39	3422.96	.00	3.69	3.97	4.000	.000	.00	1 .0
11.452	.1825					.0741	.85	1.78	4.61	1.41	.013	.00	.00	PIPE
17.359	3408.888	1.842	3410.731	164.07	29.02	13.08	3423.81	.00	3.69	3.99	4.000	.000	.00	1 .0
9.541	.1825					.0651	.62	1.84	4.30	1.41	.013	.00	.00	PIPE
26.900	3410.630	1.911	3412.541	164.07	27.67	11.89	3424.43	.00	3.69	4.00	4.000	.000	.00	1 .0
1.000	.1162					.0608	.06	1.91	4.00	1.59	.013	.00	.00	PIPE
27.900	3410.746	1.915	3412.661	164.07	27.61	11.84	3424.50	.00	3.69	4.00	4.000	.000	.00	1 .0
2.000	.0580					.0606	.12	1.91	3.99	1.94	.013	.00	.00	PIPE
29.900	3410.862	1.914	3412.776	164.07	27.62	11.84	3424.62	.00	3.69	4.00	4.000	.000	.00	1 .0
2.000	.0289					.0609	.12	1.91	3.99	2.40	.013	.00	.00	PIPE
31.900	3410.920	1.910	3412.830	164.07	27.70	11.91	3424.74	.00	3.69	4.00	4.000	.000	.00	1 .0
16.600	.0554					.0615	1.02	1.91	4.01	1.96	.013	.00	.00	PIPE
48.500	3411.840	1.903	3413.743	164.07	27.83	12.02	3425.77	.00	3.69	4.00	4.000	.000	.00	1 .0
45.175	.0494					.0644	2.91	1.90	4.04	2.03	.013	.00	.00	PIPE
93.675	3414.070	1.861	3415.930	164.07	28.65	12.75	3428.68	.00	3.69	3.99	4.000	.000	.00	1 .0
54.515	.0494					.0715	3.90	1.86	4.21	2.03	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)

100-YEAR INTERIM CONTDITION

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/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
148.190	3416.760	1.794	3418.554	164.07	30.05	14.02	3432.57	.00	3.69	3.98	4.000	.000	.00	1 .0
6.000	.0333					.0772	.46	1.79	4.52	2.29	.013	.00	.00	PIPE
154.190	3416.960	1.780	3418.740	164.07	30.35	14.31	3433.05	.00	3.69	3.98	4.000	.000	.00	1 .0
98.615	.0782					.0782	7.71	1.78	4.59	1.78	.013	.00	.00	PIPE
252.805	3424.674	1.780	3426.454	164.07	30.35	14.31	3440.76	.00	3.69	3.98	4.000	.000	.00	1 .0
258.715	.0782					.0764	19.78	1.78	4.59	1.78	.013	.00	.00	PIPE
511.520	3444.910	1.804	3446.713	164.07	29.84	13.82	3460.54	.00	3.69	3.98	4.000	.000	.00	1 .0
5.000	.0400					.0754	.38	1.80	4.47	2.17	.013	.00	.00	PIPE
516.520	3445.110	1.794	3446.904	164.07	30.04	14.01	3460.92	.00	3.69	3.98	4.000	.000	.00	1 .0
64.056	.0831					.0738	4.73	1.79	4.52	1.75	.013	.00	.00	PIPE
580.576	3450.431	1.825	3452.256	164.07	29.38	13.41	3465.66	.00	3.69	3.98	4.000	.000	.00	1 .0
73.064	.0831					.0673	4.92	1.82	4.37	1.75	.013	.00	.00	PIPE
653.640	3456.500	1.893	3458.393	164.07	28.02	12.19	3470.58	.00	3.69	3.99	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0660	.16	1.89	4.08		.013	.00	.00	PIPE
656.140	3456.600	1.822	3458.422	160.42	28.79	12.87	3471.30	.00	3.67	3.98	4.000	.000	.00	1 .0
2.500	.0399					.0692	.17	1.82	4.29	2.14	.013	.00	.00	PIPE
658.640	3456.700	1.817	3458.517	160.42	28.89	12.96	3471.48	.00	3.67	3.98	4.000	.000	.00	1 .0
60.782	.0801					.0664	4.03	1.82	4.31	1.75	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)

100-YEAR INTERIM CONTDITION

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/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		

719.422	3461.566	1.867	3463.433	160.42	27.89	12.08	3475.51	.00	3.67	3.99	4.000	.000	.00	1	.0	
49.768	.0801					.0594	2.96	1.87	4.09	1.75	.013	.00	.00	PIPE		
769.190	3465.550	1.937	3467.488	160.42	26.59	10.98	3478.47	.00	3.67	4.00	4.000	.000	.00	1	.0	
5.000	.0400					.0559	.28	1.94	3.81	2.14	.013	.00	.00	PIPE		
774.190	3465.750	1.932	3467.682	160.42	26.70	11.07	3478.75	.00	3.67	4.00	4.000	.000	.00	1	.0	
41.831	.0685					.0540	2.26	1.93	3.84	1.82	.013	.00	.00	PIPE		
816.021	3468.617	1.978	3470.595	160.42	25.90	10.41	3481.01	.00	3.67	4.00	4.000	.000	.00	1	.0	
43.988	.0685					.0487	2.14	1.98	3.67	1.82	.013	.00	.00	PIPE		
860.008	3471.632	2.053	3473.685	160.42	24.69	9.47	3483.15	.00	3.67	4.00	4.000	.000	.00	1	.0	
30.526	.0685					.0429	1.31	2.05	3.41	1.82	.013	.00	.00	PIPE		
890.535	3473.724	2.133	3475.856	160.42	23.54	8.61	3484.46	.00	3.67	3.99	4.000	.000	.00	1	.0	
22.791	.0685					.0379	.86	2.13	3.18	1.82	.013	.00	.00	PIPE		
913.326	3475.286	2.216	3477.502	160.42	22.45	7.82	3485.33	.00	3.67	3.98	4.000	.000	.00	1	.0	
17.755	.0685					.0334	.59	2.22	2.95	1.82	.013	.00	.00	PIPE		
931.081	3476.502	2.304	3478.807	160.42	21.40	7.11	3485.92	.00	3.67	3.95	4.000	.000	.00	1	.0	
14.203	.0685					.0295	.42	2.30	2.74	1.82	.013	.00	.00	PIPE		
945.284	3477.476	2.397	3479.873	160.42	20.41	6.47	3486.34	.00	3.67	3.92	4.000	.000	.00	1	.0	
11.548	.0685					.0261	.30	2.40	2.54	1.82	.013	.00	.00	PIPE		

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SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)

100-YEAR INTERIM CONTDITION

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/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
956.831	3478.267	2.496	3480.763	160.42	19.46	5.88	3486.64	.00	3.67	3.88	4.000	.000	.00	1 .0
9.477	.0685					.0232	.22	2.50	2.35	1.82	.013	.00	.00	PIPE
966.308	3478.917	2.600	3481.517	160.42	18.55	5.34	3486.86	.00	3.67	3.82	4.000	.000	.00	1 .0
7.803	.0685					.0206	.16	2.60	2.17	1.82	.013	.00	.00	PIPE
974.111	3479.451	2.712	3482.163	160.42	17.69	4.86	3487.02	.00	3.67	3.74	4.000	.000	.00	1 .0
6.407	.0685					.0183	.12	2.71	2.00	1.82	.013	.00	.00	PIPE
980.517	3479.890	2.832	3482.722	160.42	16.86	4.42	3487.14	.00	3.67	3.64	4.000	.000	.00	1 .0
5.207	.0685					.0164	.09	2.83	1.84	1.82	.013	.00	.00	PIPE
985.724	3480.247	2.962	3483.209	160.42	16.08	4.02	3487.22	.00	3.67	3.51	4.000	.000	.00	1 .0
4.137	.0685					.0147	.06	2.96	1.68	1.82	.013	.00	.00	PIPE
989.861	3480.531	3.104	3483.635	160.42	15.33	3.65	3487.28	.00	3.67	3.34	4.000	.000	.00	1 .0
3.135	.0685					.0132	.04	3.10	1.53	1.82	.013	.00	.00	PIPE
992.996	3480.746	3.262	3484.008	160.42	14.62	3.32	3487.33	.00	3.67	3.10	4.000	.000	.00	1 .0
2.117	.0685					.0121	.03	3.26	1.37	1.82	.013	.00	.00	PIPE
995.113	3480.891	3.445	3484.335	160.42	13.94	3.02	3487.35	.00	3.67	2.77	4.000	.000	.00	1 .0
.867	.0685					.0112	.01	3.44	1.20	1.82	.013	.00	.00	PIPE
995.980	3480.950	3.670	3484.620	160.42	13.29	2.74	3487.36	.00	3.67	2.20	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0104	.03	3.67	1.00		.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)

100-YEAR INTERIM CONTDITION

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*****
| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth
Station | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch
*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****
| | | | | | | | | | | | | | | |
998.480 3481.050 4.756 3485.806 144.00 11.46 2.04 3487.85 .00 3.55 .00 4.000 .000 .00 1 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
2.500 .0399 .0100 .03 4.76 .00 2.00 .013 .00 .00 PIPE
| | | | | | | | | | | | | | | |
1000.980 3481.150 4.783 3485.933 144.00 11.46 2.04 3487.97 .00 3.55 .00 4.000 .000 .00 1 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-

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FWW-INT-MH3-N.WSW

0

T1 SUMMERLIN WEST VILLAGE 22
T2 FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE
T3 100-YEAR INTERIM CONDITION - LATERAL 2
SO 658.6403456.700 1 3458.517
REM****FLEET WING AVENUE WEST LATERAL 2 - SDDI#3
R 685.1703458.950 1 .013 .000 .000 0
SH 685.1703458.950 1 3458.950
CD 1 4 1 .000 2.000 .000 .000 .000 .00
Q 3.650 .0

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SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE

100-YEAR INTERIM CONDITION - LATERAL 2

*****																	*****	
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/ 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				
*****																	*****	
658.640	3456.700	1.817	3458.517	3.65	1.22	.02	3458.54	.00	.67	1.15	2.000	.000	.00	1	.0			
	1.254	.0848				.0002	.00	1.82	.13	.32	.013	.00	.00	PIPE				
659.894	3456.806	1.709	3458.515	3.65	1.28	.03	3458.54	.00	.67	1.41	2.000	.000	.00	1	.0			
	1.023	.0848				.0003	.00	1.71	.16	.32	.013	.00	.00	PIPE				
660.916	3456.893	1.620	3458.513	3.65	1.34	.03	3458.54	.00	.67	1.57	2.000	.000	.00	1	.0			
	.890	.0848				.0003	.00	1.62	.18	.32	.013	.00	.00	PIPE				
661.806	3456.968	1.542	3458.510	3.65	1.40	.03	3458.54	.00	.67	1.68	2.000	.000	.00	1	.0			
	.795	.0848				.0003	.00	1.54	.20	.32	.013	.00	.00	PIPE				
662.601	3457.036	1.472	3458.507	3.65	1.47	.03	3458.54	.00	.67	1.76	2.000	.000	.00	1	.0			
	.720	.0848				.0003	.00	1.47	.22	.32	.013	.00	.00	PIPE				
663.321	3457.097	1.407	3458.504	3.65	1.54	.04	3458.54	.00	.67	1.83	2.000	.000	.00	1	.0			
	.660	.0848				.0004	.00	1.41	.24	.32	.013	.00	.00	PIPE				
663.981	3457.153	1.348	3458.500	3.65	1.62	.04	3458.54	.00	.67	1.87	2.000	.000	.00	1	.0			
	.607	.0848				.0004	.00	1.35	.26	.32	.013	.00	.00	PIPE				
664.588	3457.204	1.293	3458.497	3.65	1.70	.04	3458.54	.00	.67	1.91	2.000	.000	.00	1	.0			
	.562	.0848				.0005	.00	1.29	.28	.32	.013	.00	.00	PIPE				
665.150	3457.252	1.241	3458.492	3.65	1.78	.05	3458.54	.00	.67	1.94	2.000	.000	.00	1	.0			
	.521	.0848				.0006	.00	1.24	.31	.32	.013	.00	.00	PIPE				

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SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE

100-YEAR INTERIM CONDITION - LATERAL 2

*****																	*****	
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/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				
*****																	*****	
665.671	3457.296	1.192	3458.488	3.65	1.87	.05	3458.54	.00	.67	1.96	2.000	.000	.00	1	.0			
	.308	.0848				.0006	.00	1.19	.33	.32	.013	.00	.00	PIPE				
665.978	3457.322	1.146	3458.468	3.65	1.96	.06	3458.53	.00	.67	1.98	2.000	.000	.00	1	.0			
HYDRAULIC JUMP																		
665.978	3457.322	.340	3457.662	3.65	10.31	1.65	3459.31	.00	.67	1.50	2.000	.000	.00	1	.0			
	.104	.0848				.0616	.01	.34	3.74	.32	.013	.00	.00	PIPE				
666.082	3457.331	.352	3457.683	3.65	9.82	1.50	3459.18	.00	.67	1.52	2.000	.000	.00	1	.0			
	4.013	.0848				.0538	.22	.35	3.50	.32	.013	.00	.00	PIPE				
670.096	3457.671	.363	3458.035	3.65	9.37	1.36	3459.40	.00	.67	1.54	2.000	.000	.00	1	.0			
	2.953	.0848				.0470	.14	.36	3.28	.32	.013	.00	.00	PIPE				
673.048	3457.922	.376	3458.297	3.65	8.93	1.24	3459.54	.00	.67	1.56	2.000	.000	.00	1	.0			
	2.283	.0848				.0411	.09	.38	3.08	.32	.013	.00	.00	PIPE				
675.331	3458.115	.388	3458.504	3.65	8.51	1.13	3459.63	.00	.67	1.58	2.000	.000	.00	1	.0			
	1.822	.0848				.0359	.07	.39	2.88	.32	.013	.00	.00	PIPE				
677.153	3458.270	.401	3458.671	3.65	8.12	1.02	3459.69	.00	.67	1.60	2.000	.000	.00	1	.0			
	1.486	.0848				.0313	.05	.40	2.70	.32	.013	.00	.00	PIPE				
678.639	3458.396	.415	3458.811	3.65	7.74	.93	3459.74	.00	.67	1.62	2.000	.000	.00	1	.0			
	1.228	.0848				.0274	.03	.42	2.53	.32	.013	.00	.00	PIPE				

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SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE

100-YEAR INTERIM CONDITION - LATERAL 2

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/ 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		

679.867	3458.500	.429	3458.929	3.65	7.38	.85	3459.77	.00	.67	1.64	2.000	.000	.00	1	.0	
	1.023	.0848				.0239	.02	.43	2.37	.32	.013	.00	.00	PIPE		
680.890	3458.587	.444	3459.031	3.65	7.04	.77	3459.80	.00	.67	1.66	2.000	.000	.00	1	.0	
	.858	.0848				.0209	.02	.44	2.22	.32	.013	.00	.00	PIPE		
681.748	3458.660	.459	3459.118	3.65	6.71	.70	3459.82	.00	.67	1.68	2.000	.000	.00	1	.0	
	.719	.0848				.0183	.01	.46	2.08	.32	.013	.00	.00	PIPE		
682.468	3458.721	.475	3459.195	3.65	6.40	.64	3459.83	.00	.67	1.70	2.000	.000	.00	1	.0	
	.603	.0848				.0160	.01	.47	1.95	.32	.013	.00	.00	PIPE		
683.070	3458.772	.491	3459.262	3.65	6.10	.58	3459.84	.00	.67	1.72	2.000	.000	.00	1	.0	
	.503	.0848				.0140	.01	.49	1.82	.32	.013	.00	.00	PIPE		
683.573	3458.814	.508	3459.322	3.65	5.82	.53	3459.85	.00	.67	1.74	2.000	.000	.00	1	.0	
	.417	.0848				.0122	.01	.51	1.71	.32	.013	.00	.00	PIPE		
683.990	3458.850	.525	3459.375	3.65	5.55	.48	3459.85	.00	.67	1.76	2.000	.000	.00	1	.0	
	.341	.0848				.0107	.00	.53	1.60	.32	.013	.00	.00	PIPE		
684.332	3458.879	.543	3459.422	3.65	5.29	.43	3459.86	.00	.67	1.78	2.000	.000	.00	1	.0	
	.273	.0848				.0094	.00	.54	1.50	.32	.013	.00	.00	PIPE		
684.604	3458.902	.562	3459.464	3.65	5.04	.39	3459.86	.00	.67	1.80	2.000	.000	.00	1	.0	
	.214	.0848				.0082	.00	.56	1.40	.32	.013	.00	.00	PIPE		

FWW-INT-MH3-N.OUT

FILE: FWW-INT-MH3-N.WSW

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time: 11: 9:55

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE

100-YEAR INTERIM CONDITION - LATERAL 2

*****																		*****	
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/ 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	*****				
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****			
684.818	3458.920	.582	3459.502	3.65	4.81	.36	3459.86	.00	.67	1.82	2.000	.000	.00	1	.0				
	.159	.0848				.0072	.00	.58	1.31	.32	.013	.00	.00	PIPE					
684.976	3458.934	.602	3459.536	3.65	4.58	.33	3459.86	.00	.67	1.83	2.000	.000	.00	1	.0				
	.109	.0848				.0063	.00	.60	1.23	.32	.013	.00	.00	PIPE					
685.085	3458.943	.623	3459.566	3.65	4.37	.30	3459.86	.00	.67	1.85	2.000	.000	.00	1	.0				
	.064	.0848				.0055	.00	.62	1.15	.32	.013	.00	.00	PIPE					
685.149	3458.948	.645	3459.593	3.65	4.17	.27	3459.86	.00	.67	1.87	2.000	.000	.00	1	.0				
	.021	.0848				.0048	.00	.65	1.07	.32	.013	.00	.00	PIPE					
685.170	3458.950	.669	3459.619	3.65	3.96	.24	3459.86	.00	.67	1.89	2.000	.000	.00	1	.0				

FWW-INT-MH5-N.WSW

0

T1 SUMMERLIN WEST VILLAGE 22
T2 FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE
T3 100-YEAR INTERIM CONDITION - LATERAL 1
SO 1000.9803481.150 1 3485.933
REM*****FLEET WING AVENUE WEST LATERAL 1 - SDDI#3
R 1030.8003483.390 1 .013 .000 .000 0
SH 1030.8003483.390 1 3483.390
CD 1 4 1 .000 2.000 .000 .000 .000 .00
Q 8.490 .0

FWW-INT-MH5-N.OUT

FILE: FWW-INT-MH5-N.WSW

W S P G W - CIVILDESIGN Version 14.08

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time:10:52:49

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE

100-YEAR INTERIM CONDITION - LATERAL 1

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*****
| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth
Station | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch
*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****
| | | | | | | | | | | | | | |
1000.980 3481.150 4.783 3485.933 8.49 2.70 .11 3486.05 .00 1.04 .00 2.000 .000 .00 1 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
29.820 .0751 | | | | | .0014 .04 4.78 .00 .50 .013 .00 .00 PIPE
| | | | | | | | | | | | | | |
1030.800 3483.390 2.585 3485.975 8.49 2.70 .11 3486.09 .00 1.04 .00 2.000 .000 .00 1 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-

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FWW-INT-MH5-S.WSW

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T1 SUMMERLIN WEST VILLAGE 22
T2 FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE
T3 100-YEAR INTERIM CONDITION - LATERAL 1
SO 1000.9803481.150 1 3485.933
REM*****FLEET WING AVENUE WEST LATERAL 1 - SDDI#2
R 1012.8403483.230 1 .013 .000 .000 0
SH 1012.8403483.230 1 3483.230
CD 1 4 1 .000 2.000 .000 .000 .000 .00
Q 7.930 .0

FWW-INT-MH5-S.OUT

FILE: FWW-INT-MH5-S.WSW

W S P G W - CIVILDESIGN Version 14.08

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time:10:53: 9

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE

100-YEAR INTERIM CONDITION - LATERAL 1

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*****
| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth
Station | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch
*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****
| | | | | | | | | | | | | | | |
1000.980 3481.150 4.783 3485.933 7.93 2.52 .10 3486.03 .00 1.00 .00 2.000 .000 .00 1 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
11.860 .1754 .0012 .01 4.78 .00 .39 .013 .00 .00 PIPE
| | | | | | | | | | | | | | | |
1012.840 3483.230 2.718 3485.948 7.93 2.52 .10 3486.05 .00 1.00 .00 2.000 .000 .00 1 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-

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C.4 Ultimate Condition WSPG-W Model

FWW-Ult.WSW

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T1 SUMMERLIN WEST VILLAGE 22
T2 FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
T3 100-YEAR ULTIMATE CONTDITION
SO      .0003405.720  1                      3406.715
REM****CONNECTON TO KETTLE RIDGE DRIVE MAINLINE 6'X10' RCB
R      26.9003410.630  1      .013          .000 -13.655 0
R      27.9003410.746  1      .013          .000 -13.500 0
R      29.9003410.862  1      .013          .000 -13.500 0
R      31.9003410.920  1      .013          .000   .000 1
REM****FLEET WING DRIVE (DFD-KRD) SDMH#8
R      48.5003411.840  1      .013          .000   .000 0
REM****POINT OF CONNECTION TO STUB
R      148.1903416.760  1      .013          .000   .000 0
R      154.1903416.960  1      .013          .000   .000 1
REM****FLEET WING AVENUE SDMH#1
R      511.5203444.910  1      .013          .000  -3.709 0
R      516.5203445.110  1      .013          .000   .000 1
REM****FLEET WING AVENUE SDMH#2
R      653.6403456.500  1      .013          .000   .000 0
JX      656.1403456.600  1  2  .013      2.870      3456.700      72.7      .000
REM****FLEET WING AVENUE SDDI#1
R      658.6403456.700  1      .013          .000  -2.413 1
REM****FLEET WING AVENUE SDMH#3
R      769.1903465.550  1      .013          .000   .000 0
R      774.1903465.750  1      .013          .000   .843 1
REM****FLEET WING AVENUE SDMH#4
R      995.9803480.950  1      .013          .000   .000 0
JX      998.4803481.050  1  2  2.013      3.870      6.7503481.1503481.150 72.1-45.2      .000
REM****FLEET WING AVENUE SDDI#2 & SDDI#3
R      1000.9803481.150  1      .013          .000   .000 1
REM****FLEET WING AVENUE SDMH#5
SH      1000.9803481.380  1                      3481.380
CD      1  4      1      .000      4.000      .000      .000      .000      .00
CD      2  4      1      .000      2.000      .000      .000      .000      .00
Q              225.000      .0

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FWW-ULT.OUT

FILE: FWW-ULT.WSW

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WATER SURFACE PROFILE LISTING

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SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)

100-YEAR ULTIMATE CONDITON

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/ 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
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
.000	3405.720	2.193	3407.913	238.49	33.80	17.74	3425.65	.00	3.92	3.98	4.000	.000	.00	1 .0
.814	.1825					.0809	.07	2.19	4.47	1.73	.013	.00	.00	PIPE
.814	3405.869	2.198	3408.066	238.49	33.72	17.66	3425.72	.00	3.92	3.98	4.000	.000	.00	1 .0
14.242	.1825					.0759	1.08	2.20	4.46	1.73	.013	.00	.00	PIPE
15.056	3408.468	2.285	3410.752	238.49	32.15	16.05	3426.80	.00	3.92	3.96	4.000	.000	.00	1 .0
11.844	.1825					.0671	.79	2.28	4.14	1.73	.013	.00	.00	PIPE
26.900	3410.630	2.376	3413.006	238.49	30.66	14.59	3427.60	.00	3.92	3.93	4.000	.000	.00	1 .0
1.000	.1162					.0628	.06	2.38	3.84	1.97	.013	.00	.00	PIPE
27.900	3410.746	2.380	3413.126	238.49	30.60	14.54	3427.66	.00	3.92	3.93	4.000	.000	.00	1 .0
2.000	.0580					.0627	.13	2.38	3.83	2.44	.013	.00	.00	PIPE
29.900	3410.862	2.379	3413.241	238.49	30.62	14.56	3427.80	.00	3.92	3.93	4.000	.000	.00	1 .0
2.000	.0289					.0630	.13	2.38	3.83	3.20	.013	.00	.00	PIPE
31.900	3410.920	2.373	3413.293	238.49	30.71	14.64	3427.93	.00	3.92	3.93	4.000	.000	.00	1 .0
16.600	.0554					.0636	1.06	2.37	3.85	2.48	.013	.00	.00	PIPE
48.500	3411.840	2.363	3414.203	238.49	30.86	14.79	3428.99	.00	3.92	3.93	4.000	.000	.00	1 .0
35.635	.0494					.0658	2.35	2.36	3.88	2.58	.013	.00	.00	PIPE
84.135	3413.599	2.323	3415.921	238.49	31.51	15.42	3431.34	.00	3.92	3.95	4.000	.000	.00	1 .0
64.055	.0494					.0720	4.61	2.32	4.01	2.58	.013	.00	.00	PIPE

FWW-ULT.OUT

FILE: FWW-ULT.WSW

W S P G W - CIVILDESIGN Version 14.08
Program Package Serial Number: 7271

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WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time: 5:57:30

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)

100-YEAR ULTIMATE CONDITON

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/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
148.190	3416.760	2.234	3418.994	238.49	33.05	16.96	3435.95	.00	3.92	3.97	4.000	.000	.00	1 .0
6.000	.0333					.0774	.46	2.23	4.32	2.99	.013	.00	.00	PIPE
154.190	3416.960	2.218	3419.178	238.49	33.33	17.25	3436.43	.00	3.92	3.98	4.000	.000	.00	1 .0
35.175	.0782					.0782	2.75	2.22	4.38	2.22	.013	.00	.00	PIPE
189.365	3419.711	2.218	3421.930	238.49	33.33	17.25	3439.18	.00	3.92	3.98	4.000	.000	.00	1 .0
322.155	.0782					.0759	24.45	2.22	4.38	2.22	.013	.00	.00	PIPE
511.520	3444.910	2.261	3447.171	238.49	32.55	16.46	3463.63	.00	3.92	3.97	4.000	.000	.00	1 .0
5.000	.0400					.0741	.37	2.26	4.22	2.78	.013	.00	.00	PIPE
516.520	3445.110	2.251	3447.362	238.49	32.73	16.64	3464.00	.00	3.92	3.97	4.000	.000	.00	1 .0
49.309	.0831					.0731	3.60	2.25	4.26	2.18	.013	.00	.00	PIPE
565.829	3449.206	2.281	3451.487	238.49	32.22	16.12	3467.60	.00	3.92	3.96	4.000	.000	.00	1 .0
87.811	.0831					.0674	5.92	2.28	4.15	2.18	.013	.00	.00	PIPE
653.640	3456.500	2.372	3458.873	238.49	30.72	14.65	3473.52	.00	3.92	3.93	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0648	.16	2.37	3.85		.013	.00	.00	PIPE
656.140	3456.600	2.318	3458.918	235.62	31.21	15.12	3474.04	.00	3.92	3.95	4.000	.000	.00	1 .0
2.500	.0399					.0666	.17	2.32	3.98	2.76	.013	.00	.00	PIPE
658.640	3456.700	2.313	3459.013	235.62	31.29	15.20	3474.21	.00	3.92	3.95	4.000	.000	.00	1 .0
56.535	.0801					.0641	3.62	2.31	3.99	2.19	.013	.00	.00	PIPE

FWW-ULT.OUT

FILE: FWW-ULT.WSW

W S P G W - CIVILDESIGN Version 14.08
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WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time: 5:57:30

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)

100-YEAR ULTIMATE CONDITON

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/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
715.175	3461.226	2.377	3463.603	235.62	30.28	14.24	3477.84	.00	3.92	3.93	4.000	.000	.00	1 .0
54.015	.0801					.0579	3.13	2.38	3.79	2.19	.013	.00	.00	PIPE
769.190	3465.550	2.474	3468.024	235.62	28.87	12.94	3480.97	.00	3.92	3.89	4.000	.000	.00	1 .0
5.000	.0400					.0546	.27	2.47	3.51	2.76	.013	.00	.00	PIPE
774.190	3465.750	2.467	3468.217	235.62	28.96	13.02	3481.24	.00	3.92	3.89	4.000	.000	.00	1 .0
1.553	.0685					.0548	.09	2.47	3.53	2.29	.013	.00	.00	PIPE
775.744	3465.856	2.469	3468.325	235.62	28.94	13.00	3481.33	.00	3.92	3.89	4.000	.000	.00	1 .0
63.727	.0685					.0516	3.29	2.47	3.52	2.29	.013	.00	.00	PIPE
839.471	3470.224	2.572	3472.796	235.62	27.59	11.82	3484.62	.00	3.92	3.83	4.000	.000	.00	1 .0
42.447	.0685					.0458	1.94	2.57	3.26	2.29	.013	.00	.00	PIPE
881.918	3473.133	2.682	3475.815	235.62	26.31	10.75	3486.56	.00	3.92	3.76	4.000	.000	.00	1 .0
30.927	.0685					.0408	1.26	2.68	3.00	2.29	.013	.00	.00	PIPE
912.845	3475.252	2.800	3478.052	235.62	25.08	9.77	3487.82	.00	3.92	3.67	4.000	.000	.00	1 .0
23.654	.0685					.0364	.86	2.80	2.76	2.29	.013	.00	.00	PIPE
936.499	3476.874	2.927	3479.800	235.62	23.91	8.88	3488.68	.00	3.92	3.54	4.000	.000	.00	1 .0
18.591	.0685					.0326	.61	2.93	2.53	2.29	.013	.00	.00	PIPE
955.090	3478.148	3.065	3481.213	235.62	22.80	8.07	3489.29	.00	3.92	3.39	4.000	.000	.00	1 .0
14.802	.0685					.0293	.43	3.07	2.30	2.29	.013	.00	.00	PIPE

FWW-ULT.OUT

FILE: FWW-ULT.WSW

W S P G W - CIVILDESIGN Version 14.08
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WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time: 5:57:30

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)

100-YEAR ULTIMATE CONTDITION

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/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
969.892	3479.162	3.219	3482.381	235.62	21.74	7.34	3489.72	.00	3.92	3.17	4.000	.000	.00	1 .0
11.747	.0685					.0266	.31	3.22	2.07	2.29	.013	.00	.00	PIPE
981.640	3479.967	3.394	3483.361	235.62	20.73	6.67	3490.03	.00	3.92	2.87	4.000	.000	.00	1 .0
9.014	.0685					.0245	.22	3.39	1.84	2.29	.013	.00	.00	PIPE
990.654	3480.585	3.604	3484.189	235.62	19.76	6.07	3490.25	.00	3.92	2.39	4.000	.000	.00	1 .0
5.326	.0685					.0239	.13	3.60	1.56	2.29	.013	.00	.00	PIPE
995.980	3480.950	3.918	3484.868	235.62	18.84	5.51	3490.38	.00	3.92	1.13	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0243	.06	3.92	1.00		.013	.00	.00	PIPE
998.480	3481.050	4.869	3485.919	225.00	17.90	4.98	3490.90	.00	3.90	.00	4.000	.000	.00	1 .0
2.500	.0399					.0245	.06	4.87	.00	2.67	.013	.00	.00	PIPE
1000.980	3481.150	5.079	3486.229	225.00	17.90	4.98	3491.21	.00	3.90	.00	4.000	.000	.00	1 .0

FWW-ULT-MH3-N.WSW

0

T1 SUMMERLIN WEST VILLAGE 22
T2 FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE
T3 100-YEAR ULTIMATE CONDITION - LATERAL 2
SO 658.6403456.700 1 3459.013
REM****FLEET WING AVENUE WEST LATERAL 2 - SDDI#3
R 685.1703458.950 1 .013 .000 .000 0
SH 685.1703458.950 1 3458.950
CD 1 4 1 .000 2.000 .000 .000 .000 .00
Q 2.870 .0

FWW-ULT-MH3-N.OUT

FILE: FWW-ULT-MH3-N.WSW

W S P G W - CIVILDESIGN Version 14.08
Program Package Serial Number: 7271

PAGE 1

WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time: 6: 3:32

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE

100-YEAR ULTIMATE CONDITION - LATERAL 2

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/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
658.640	3456.700	2.313	3459.013	2.87	.91	.01	3459.03	.00	.59	.00	2.000	.000	.00	1 .0
3.698	.0848					.0002	.00	2.31	.00	.28	.013	.00	.00	PIPE
662.338	3457.013	2.000	3459.013	2.87	.91	.01	3459.03	.00	.59	.00	2.000	.000	.00	1 .0
2.163	.0848					.0001	.00	2.00	.00	.28	.013	.00	.00	PIPE
664.500	3457.197	1.815	3459.011	2.87	.96	.01	3459.03	.00	.59	1.16	2.000	.000	.00	1 .0
1.255	.0848					.0001	.00	1.81	.11	.28	.013	.00	.00	PIPE
665.755	3457.303	1.707	3459.010	2.87	1.00	.02	3459.03	.00	.59	1.41	2.000	.000	.00	1 .0
1.030	.0848					.0002	.00	1.71	.12	.28	.013	.00	.00	PIPE
666.786	3457.391	1.618	3459.009	2.87	1.05	.02	3459.03	.00	.59	1.57	2.000	.000	.00	1 .0
.899	.0848					.0002	.00	1.62	.14	.28	.013	.00	.00	PIPE
667.685	3457.467	1.540	3459.007	2.87	1.11	.02	3459.03	.00	.59	1.68	2.000	.000	.00	1 .0
.805	.0848					.0002	.00	1.54	.16	.28	.013	.00	.00	PIPE
668.490	3457.535	1.470	3459.005	2.87	1.16	.02	3459.03	.00	.59	1.77	2.000	.000	.00	1 .0
.733	.0848					.0002	.00	1.47	.17	.28	.013	.00	.00	PIPE
669.223	3457.597	1.406	3459.004	2.87	1.22	.02	3459.03	.00	.59	1.83	2.000	.000	.00	1 .0
.674	.0848					.0002	.00	1.41	.19	.28	.013	.00	.00	PIPE
669.897	3457.655	1.347	3459.001	2.87	1.28	.03	3459.03	.00	.59	1.88	2.000	.000	.00	1 .0
.624	.0848					.0003	.00	1.35	.21	.28	.013	.00	.00	PIPE

FWW-ULT-MH3-N.OUT

FILE: FWW-ULT-MH3-N.WSW

W S P G W - CIVILDESIGN Version 14.08
Program Package Serial Number: 7271

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WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time: 6: 3:32

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE

100-YEAR ULTIMATE CONDITION - LATERAL 2

*****																	*****	
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/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				
*****																	*****	
670.521	3457.708	1.292	3458.999	2.87	1.34	.03	3459.03	.00	.59	1.91	2.000	.000	.00	1	.0			
	.580	.0848				.0003	.00	1.29	.22	.28	.013	.00	.00	PIPE				
671.101	3457.757	1.240	3458.997	2.87	1.40	.03	3459.03	.00	.59	1.94	2.000	.000	.00	1	.0			
	.542	.0848				.0003	.00	1.24	.24	.28	.013	.00	.00	PIPE				
671.643	3457.803	1.191	3458.994	2.87	1.47	.03	3459.03	.00	.59	1.96	2.000	.000	.00	1	.0			
	.505	.0848				.0004	.00	1.19	.26	.28	.013	.00	.00	PIPE				
672.148	3457.845	1.145	3458.990	2.87	1.54	.04	3459.03	.00	.59	1.98	2.000	.000	.00	1	.0			
	.473	.0848				.0004	.00	1.15	.28	.28	.013	.00	.00	PIPE				
672.621	3457.885	1.101	3458.987	2.87	1.62	.04	3459.03	.00	.59	1.99	2.000	.000	.00	1	.0			
	.443	.0848				.0005	.00	1.10	.30	.28	.013	.00	.00	PIPE				
673.063	3457.923	1.060	3458.983	2.87	1.70	.04	3459.03	.00	.59	2.00	2.000	.000	.00	1	.0			
	.415	.0848				.0006	.00	1.06	.33	.28	.013	.00	.00	PIPE				
673.478	3457.958	1.021	3458.979	2.87	1.78	.05	3459.03	.00	.59	2.00	2.000	.000	.00	1	.0			
	.387	.0848				.0006	.00	1.02	.35	.28	.013	.00	.00	PIPE				
673.865	3457.991	.983	3458.974	2.87	1.87	.05	3459.03	.00	.59	2.00	2.000	.000	.00	1	.0			
	.067	.0848				.0007	.00	.98	.38	.28	.013	.00	.00	PIPE				
673.932	3457.997	.947	3458.944	2.87	1.96	.06	3459.00	.00	.59	2.00	2.000	.000	.00	1	.0			
HYDRAULIC JUMP																		

FWW-ULT-MH3-N.OUT

FILE: FWW-ULT-MH3-N.WSW

W S P G W - CIVILDESIGN Version 14.08
Program Package Serial Number: 7271

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WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time: 6: 3:32

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE

100-YEAR ULTIMATE CONDITION - LATERAL 2

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/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
673.932	3457.997	.323	3458.319	2.87	8.75	1.19	3459.51	.00	.59	1.47	2.000	.000	.00	1 .0
.670	.0848					.0473	.03	.32	3.26	.28	.013	.00	.00	PIPE
674.603	3458.054	.333	3458.387	2.87	8.34	1.08	3459.47	.00	.59	1.49	2.000	.000	.00	1 .0
1.998	.0848					.0413	.08	.33	3.06	.28	.013	.00	.00	PIPE
676.601	3458.223	.345	3458.568	2.87	7.95	.98	3459.55	.00	.59	1.51	2.000	.000	.00	1 .0
1.593	.0848					.0361	.06	.34	2.87	.28	.013	.00	.00	PIPE
678.194	3458.358	.356	3458.715	2.87	7.58	.89	3459.61	.00	.59	1.53	2.000	.000	.00	1 .0
1.297	.0848					.0315	.04	.36	2.69	.28	.013	.00	.00	PIPE
679.490	3458.468	.368	3458.836	2.87	7.23	.81	3459.65	.00	.59	1.55	2.000	.000	.00	1 .0
1.071	.0848					.0275	.03	.37	2.52	.28	.013	.00	.00	PIPE
680.561	3458.559	.381	3458.940	2.87	6.89	.74	3459.68	.00	.59	1.57	2.000	.000	.00	1 .0
.891	.0848					.0241	.02	.38	2.36	.28	.013	.00	.00	PIPE
681.452	3458.635	.393	3459.028	2.87	6.57	.67	3459.70	.00	.59	1.59	2.000	.000	.00	1 .0
.747	.0848					.0210	.02	.39	2.21	.28	.013	.00	.00	PIPE
682.198	3458.698	.407	3459.104	2.87	6.26	.61	3459.71	.00	.59	1.61	2.000	.000	.00	1 .0
.626	.0848					.0184	.01	.41	2.07	.28	.013	.00	.00	PIPE
682.824	3458.751	.421	3459.171	2.87	5.97	.55	3459.73	.00	.59	1.63	2.000	.000	.00	1 .0
.524	.0848					.0161	.01	.42	1.94	.28	.013	.00	.00	PIPE

FWW-ULT-MH3-N.OUT

FILE: FWW-ULT-MH3-N.WSW

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WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time: 6: 3:32

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE

100-YEAR ULTIMATE CONDITION - LATERAL 2

*****																	*****	
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/ I.D.	ZL	No Wth				
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch				
*****																	*****	
683.348	3458.795	.435	3459.230	2.87	5.69	.50	3459.73	.00	.59	1.65	2.000	.000	.00	1	.0			
	.436	.0848				.0140	.01	.43	1.82	.28	.013	.00	.00	PIPE				
683.785	3458.832	.450	3459.282	2.87	5.43	.46	3459.74	.00	.59	1.67	2.000	.000	.00	1	.0			
	.363	.0848				.0123	.00	.45	1.70	.28	.013	.00	.00	PIPE				
684.147	3458.863	.465	3459.328	2.87	5.18	.42	3459.74	.00	.59	1.69	2.000	.000	.00	1	.0			
	.296	.0848				.0107	.00	.47	1.59	.28	.013	.00	.00	PIPE				
684.443	3458.888	.481	3459.369	2.87	4.94	.38	3459.75	.00	.59	1.71	2.000	.000	.00	1	.0			
	.237	.0848				.0094	.00	.48	1.49	.28	.013	.00	.00	PIPE				
684.681	3458.908	.497	3459.406	2.87	4.71	.34	3459.75	.00	.59	1.73	2.000	.000	.00	1	.0			
	.184	.0848				.0082	.00	.50	1.40	.28	.013	.00	.00	PIPE				
684.864	3458.924	.515	3459.438	2.87	4.49	.31	3459.75	.00	.59	1.75	2.000	.000	.00	1	.0			
	.138	.0848				.0072	.00	.51	1.31	.28	.013	.00	.00	PIPE				
685.002	3458.936	.532	3459.468	2.87	4.28	.28	3459.75	.00	.59	1.77	2.000	.000	.00	1	.0			
	.095	.0848				.0063	.00	.53	1.22	.28	.013	.00	.00	PIPE				
685.097	3458.944	.551	3459.494	2.87	4.08	.26	3459.75	.00	.59	1.79	2.000	.000	.00	1	.0			
	.054	.0848				.0055	.00	.55	1.15	.28	.013	.00	.00	PIPE				
685.151	3458.948	.570	3459.518	2.87	3.89	.23	3459.75	.00	.59	1.81	2.000	.000	.00	1	.0			
	.019	.0848				.0048	.00	.57	1.07	.28	.013	.00	.00	PIPE				

FWW-ULT-MH3-N.OUT

FILE: FWW-ULT-MH3-N.WSW

W S P G W - CIVILDESIGN Version 14.08

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WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time: 6: 3:32

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE

100-YEAR ULTIMATE CONDITION - LATERAL 2

```

*****
| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth
Station | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
L/Elem | Ch Slope | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch
*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****
| | | | | | | | | | | | | | | |
685.170 3458.950 .591 3459.541 2.87 3.70 .21 3459.75 .00 .59 1.82 2.000 .000 .00 1 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-

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FWW-ULT-MH5-N.WSW

0

T1 SUMMERLIN WEST VILLAGE 22
T2 FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE
T3 100-YEAR ULTIMATE CONDITION - LATERAL 1
SO 1000.9803481.150 1 3486.229
REM*****FLEET WING AVENUE WEST LATERAL 1 - SDDI#3
R 1030.8003483.390 1 .013 .000 .000 0
SH 1030.8003483.390 1 3483.390
CD 1 4 1 .000 2.000 .000 .000 .000 .00
Q 6.750 .0

FWW-ULT-MH5-N.OUT

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W S P G W - CIVILDESIGN Version 14.08

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WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time: 6: 3:47

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE

100-YEAR ULTIMATE CONDITION - LATERAL 1

```

*****
| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth
Station | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch
*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****
| | | | | | | | | | | | | | | |
1000.980 3481.150 5.079 3486.229 6.75 2.15 .07 3486.30 .00 .92 .00 2.000 .000 .00 1 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
29.820 .0751 | | | | | .0009 .03 5.08 .00 .45 .013 .00 .00 PIPE
| | | | | | | | | | | | | | | |
1030.800 3483.390 2.866 3486.256 6.75 2.15 .07 3486.33 .00 .92 .00 2.000 .000 .00 1 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-

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FWW-ULT-MH5-S.WSW

T1 SUMMERLIN WEST VILLAGE 22
T2 FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE
T3 100-YEAR ULTIMATE CONDITION - LATERAL 1
SO 1000.9803481.150 1 3486.229
REM*****FLEET WING AVENUE WEST LATERAL 1 - SDDI#2
R 1012.8403483.230 1 .013 .000 .000 0
SH 1012.8403483.230 1 3483.230
CD 1 4 1 .000 2.000 .000 .000 .000 .00
Q 3.870 .0

FWW-ULT-MH5-S.OUT

FILE: FWW-ULT-MH5-S.WSW

W S P G W - CIVILDESIGN Version 14.08

PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING

Date: 9-16-2020 Time: 6: 4: 1

SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE - KETTLE RIDGE DRIVE TO SCURY BEND DRIVE

100-YEAR ULTIMATE CONDITION - LATERAL 1

```

*****
| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth
Station | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch
*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****
| | | | | | | | | | | | | | | |
1000.980 3481.150 5.079 3486.229 3.87 1.23 .02 3486.25 .00 .69 .00 .00 2.000 .000 .00 1 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-
11.860 .1754 .0003 .00 5.08 .00 .28 .013 .00 .00 PIPE
| | | | | | | | | | | | | | | |
1012.840 3483.230 3.002 3486.232 3.87 1.23 .02 3486.26 .00 .69 .00 .00 2.000 .000 .00 1 .0
-|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|- -|-

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Appendix D. Proposed Improvement Plans

Appendix E. CD-ROM

Atkins

2270 Corporate Circle
Suite 200
Henderson, NV 89074-7755

Tel: +1 702 263 7275/+1 800 483 6244

Fax: +1 702 263 7200

Direct: 702 551 0365

Janelle.klein@atkinsglobal.com

SHEET INDEX		
1	COVER SHEET	
2	LEGEND AND ABBREVIATIONS	
3	GENERAL NOTES	
4	HORIZONTAL CONTROL PLAN	
5	MASTER DRAINAGE PLAN	
6	MASTER WATER PLAN	
7	MASTER SEWER PLAN	
8	ROADWAY GRADING PLAN	SCURRY BEND DRIVE TO STA 35+00
9	ROADWAY PLAN AND PROFILE	SCURRY BEND DRIVE TO STA 35+00
10	ROADWAY GRADING PLAN	STA 35+00 TO STA 31+00
11	ROADWAY PLAN AND PROFILE	STA 35+00 TO STA 31+00
12	ROADWAY GRADING PLAN	STA 31+00 TO KETTLE RIDGE DRIVE
13	ROADWAY PLAN AND PROFILE	STA 31+00 TO KETTLE RIDGE DRIVE
14	STORM DRAIN LATERAL PROFILES	
15	WATER LATERAL PROFILES	
16	SANITARY SEWER LATERAL PROFILES	
17	STREETLIGHT PLAN	
18	SIGNAGE AND STRIPING PLAN	
19	TYPICAL SECTIONS	
20	WATER DETAILS	
21	STREETLIGHT DETAILS	

UTILITY NOTE

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.

CALL BEFORE YOU DIG: 1-800-642-2444

THIS PROPERTY MAY HAVE STATIC WATER PRESSURE IN EXCESS OF 80 PSI. THE UNIFORM PLUMBING CODE REQUIRES THAT INDIVIDUAL, ON-SITE (PRIVATE) PRESSURE REDUCING VALVES BE INSTALLED WHENEVER THE PRESSURE EXCEEDS 80 PSI. PRV'S ARE THE DEVELOPER'S RESPONSIBILITY AND WILL NOTE BE INSPECTED OR INCLUDED IN THE ACCEPTANCE OF THE LAS VEGAS VALLEY WATER DISTRICT FACILITIES.

NOTICE OF INTENT NOTE

NOTE: ALL LAND SURFACE AREA DISTURBANCES OVER 1 ACRE REQUIRE A STORMWATER DISCHARGE PERMIT ISSUED BY THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION (NDEP). A PHASED CONSTRUCTION UNIT IN A CONTIGUOUS SUBDIVISION IS CONSIDERED UNDER CONSTRUCTION UNTIL ALL STRIPPED SURFACE AREAS HAVE BEEN COVERED BY PAVING, BUILDING CONSTRUCTION OR PLANTING. A STORMWATER DISCHARGE PERMIT APPLICATION AND ASSOCIATED INFORMATION MAY BE DOWNLOADED FROM THE WEB SITE: [HTTP://WWW.STATE.NV.US/BWPC/STORM01.HTM](http://www.state.nv.us/bwpc/storm01.htm) PROJECTS THAT DISTURB MORE THAN ONE ACRE OF LAND MUST SUBMIT TO NDEP A "NOTICE OF INTENT" FOR INCLUSION UNDER STORMWATER PERMIT NO. NVR100000 ALONG WITH APPROPRIATE FILLING FEE.

NPDES PERMIT NOTE

THE ENGINEER SHOULD CONTACT THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION (NDEP) TO OBTAIN A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT PRIOR TO CONSTRUCTION. ALL CONSTRUCTION PROJECTS ONE ACRE OR LARGER MUST APPLY FOR THE PERMIT THROUGH NDEP. ALL QUESTIONS REGARDING THE NPDES PERMIT REQUIREMENTS SHOULD BE DIRECTED TO THE NDEP AT (775) 687-9429.

DISCLAIMER NOTE

EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

FEMA FLOOD ZONE INFORMATION

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C2150E, DATED 9/27/2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

PROPOSED RIGHT-OF-WAY ACREAGE
0.97 AC

PROPOSED DISTURBED AREA ACREAGE
3.56 AC

GEOTECHNICAL ENGINEER
PREPARED BY: NOVA GEOTECHNICAL & INSPECTION SERVICES
4480 W. HACIENDA AVENUE, SUITE 104, LAS VEGAS, NV 89118
PHONE: 702-873-3478
PROJECT NO.: G-18-126
DATED: DECEMBER 3, 2018
AND SUBSEQUENT UPDATE LETTER
DATED: DECEMBER 30, 2019

SUMMERLIN VILLAGE 22
IMPROVEMENT PLANS FOR:
FLEET WING AVENUE (STREET G)
KETTLE RIDGE DRIVE (STREET J) TO SCURRY BEND
DRIVE (STREET N) FUTURE SID PROJECT
APN: 137-23-201-001

OWNER /DEVELOPER

OWNER

CONTACT: KEVIN ORROCK
HOWARD HUGHES COMPANY LLC, A DELAWARE LIMITED LIABILITY COMPANY
10845 GRIFFITH PEAK DRIVE, SUITE 160
LAS VEGAS, NV 89135

ENGINEER / CONSULTANT

CIVIL

CONTACT: DAVID WILSON P.E.
ATKINS
2270 CORPORATE CIRCLE SUITE 200
HENDERSON, NEVADA 89074
(702) 263-7275

LOCATION MAP

VICINITY MAP

PROJECT SITE
APN 137-23-201-001

PROJECT LOCATION
APN 137-23-201-001

APPROVALS

HOWARD HUGHES COMPANY LLC, A DELAWARE LIMITED LIABILITY COMPANY

KEVIN T. ORROCK, VICE PRESIDENT

DATE

STEVEN FORD, P.E. #012175
CITY ENGINEER

DATE

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

CITY OF LAS VEGAS PLANNING DEPARTMENT

DATE

NOTE:
THIS PLAN CONFORMS TO THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.

LAS VEGAS FIRE AND RESCUE

DATE

CENTRAL TELEPHONE COMPANY d/b/a CENTURYLINK

DATE

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

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES

PROJECT NO. FIRST APPROVED DATE:

SHEETS:

NV ENERGY

DATE

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

SOUTHWEST GAS CORPORATION

DATE

COX COMMUNICATIONS OF LAS VEGAS, INC

DATE

BASIS OF BEARING

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 OF 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 PROJECTED AREA

2. GRID BEARINGS SHOWN HEREON (OR IMPLIED BY GRID COORDINATES) DO NOT EQUAL GEODETIC BEARINGS DUE TO MERIDIAN CONVERGENCE.

BENCHMARK

PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)

NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)

FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.

T21S,R59E,S03

LEGAL DESCRIPTION

BEING A PORTION OF LOT 2 AS SHOWN ON THE MAP THEREOF IN BOOK 123 OF PLATS, PAGE 08, OFFICIAL RECORDS, CITY OF LAS VEGAS CLARK COUNTY, NEVADA

DESIGNED BY:
L. MACACLAY

DRAWN BY:
G. HANSEN

CHECKED BY:
N. BARCOS

HORIZ.: NONE

VERT.: NONE

XXXXXXX
LXX-XXXXX
DATE:
AUGUST, 2020
DRAWING NO.
1/21

Call before you Dig
1-800-642-2444

Call before you Dig
1-702-432-5300

Call before you Dig
1-702-227-2929

NOT FOR CONSTRUCTION
90% SUBMITTAL

ATKINS

2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1702.263.7275
Fax: +1702.263.7200

SUMMERLIN®

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (STREET G)
KETTLE RIDGE DRIVE (STREET J) TO SCURRY BEND DRIVE (STREET N)

COVER SHEET

DESIGNED BY:
L. MACACLAY

DRAWN BY:
G. HANSEN

CHECKED BY:
N. BARCOS

HORIZ.: NONE

VERT.: NONE

XXXXXXX
LXX-XXXXX
DATE:
AUGUST, 2020
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NOT FOR CONSTRUCTION
90% SUBMITTAL

JOB NO. 100068235

CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA". LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; "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 CITY OF LAS VEGAS RECORDS SHALL BE SHOWN AS THEY EXIST. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE S. THE CONTRACTOR SHALL 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 DESIGNED TO CITY OF LAS VEGAS TITLE 18, CHAPTER 18.04.
 6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY ON 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 (1/2") 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. ALL TRANSITIONS TO BE SHOWN ON PLANS.
 12. ALL GRADING WORK SHALL CONFORM TO THE SOLS REPORT AS PREPARED BY THE (COMPANY, REPORT #, DATE) 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 STANDARD OF 1225-80 & 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 APPROXS, 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 WITH THE CITY ENGINEER AND THE DEPARTMENT OF PUBLIC WORKS.
 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 BANDING, 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. 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 THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION POINTS. THE STORM DRAIN MAP(S) SHALL ALSO PROVIDE THE HORIZONTAL AND VERTICAL LOCATION OF 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 THE LOCATION FROM THE DESCRIBED BENCHMARK, SHALL BE PROVIDED. THE HORIZONTAL AND VERTICAL LOCATION 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 CERTAINITIES OF ± 0.09 METERS (± 0.3 FEET) HORIZONTALLY AND VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR SANITARY 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 06/04/2018

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
 7. COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.
 8. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
 9. 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.
 10. 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.
 11. IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.
- REVISED 04/15/10

REVISED 04/15/10

PLAN CONCURRENCE NOTE

THE FOLLOWING SEPARATE VILLAGE 22 ROADWAY IMPROVEMENT PLANS ARE TO BE CONSTRUCTED CONCURRENTLY AND ARE SHOWN AS FUTURE (BY OTHERS):

1. KETTLE RIDGE DRIVE (STREET J) (FLEET WING AVE TO LAKE MEAD BLVD)
2. SUMMERLIN WEST VILLAGE 21 SUMMERLIN PARKWAY EXTENSION BY VTN
3. CONTRACT NO. C1554 SUMMERLIN VILLAGE 25 3665 ZONE NORTH PIPELINE PHASE II BY COWI
4. FLEET WING AVENUE (STREET G) (DESERT FOOTHILLS DR TO KETTLE RIDGE DR)
5. KETTLE RIDGE DRIVE/ KINDLE RISE WAY COUPLT
6. SCURRY BEND DRIVE (STREET N) ROUGH GRADE
7. SUMMERLIN VILLAGE 25 3665 ZONE NORTH PIPELINE PHASE I

CITY OF LAS VEGAS FIRE DEPARTMENT NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE #6631 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. IFC § 100.2.1.
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 FLOW AND PRESSURE. IFC § 331.0.2, IFC § 331.0.3, IFC § 331.0.4, IFC § 331.0.5, IFC § 331.0.6, IFC § 331.0.7, IFC § 331.0.8, IFC § 331.0.9, IFC § 331.0.10, IFC § 331.0.11, IFC § 331.0.12, IFC § 331.0.13, IFC § 331.0.14, IFC § 331.0.15, IFC § 331.0.16, IFC § 331.0.17, IFC § 331.0.18, IFC § 331.0.19, IFC § 331.0.20, IFC § 331.0.21, IFC § 331.0.22, IFC § 331.0.23, IFC § 331.0.24, IFC § 331.0.25, IFC § 331.0.26, IFC § 331.0.27, IFC § 331.0.28, IFC § 331.0.29, IFC § 331.0.30, IFC § 331.0.31, IFC § 331.0.32, IFC § 331.0.33, IFC § 331.0.34, IFC § 331.0.35, IFC § 331.0.36, IFC § 331.0.37, IFC § 331.0.38, IFC § 331.0.39, IFC § 331.0.40, IFC § 331.0.41, IFC § 331.0.42, IFC § 331.0.43, IFC § 331.0.44, IFC § 331.0.45, IFC § 331.0.46, IFC § 331.0.47, IFC § 331.0.48, IFC § 331.0.49, IFC § 331.0.50, IFC § 331.0.51, IFC § 331.0.52, IFC § 331.0.53, IFC § 331.0.54, IFC § 331.0.55, IFC § 331.0.56, IFC § 331.0.57, IFC § 331.0.58, IFC § 331.0.59, IFC § 331.0.60, IFC § 331.0.61, IFC § 331.0.62, IFC § 331.0.63, IFC § 331.0.64, IFC § 331.0.65, IFC § 331.0.66, IFC § 331.0.67, IFC § 331.0.68, IFC § 331.0.69, IFC § 331.0.70, IFC § 331.0.71, IFC § 331.0.72, IFC § 331.0.73, IFC § 331.0.74, IFC § 331.0.75, IFC § 331.0.76, IFC § 331.0.77, IFC § 331.0.78, IFC § 331.0.79, IFC § 331.0.80, IFC § 331.0.81, IFC § 331.0.82, IFC § 331.0.83, IFC § 331.0.84, IFC § 331.0.85, IFC § 331.0.86, IFC § 331.0.87, IFC § 331.0.88, IFC § 331.0.89, IFC § 331.0.90, IFC § 331.0.91, IFC § 331.0.92, IFC § 331.0.93, IFC § 331.0.94, IFC § 331.0.95, IFC § 331.0.96, IFC § 331.0.97, IFC § 331.0.98, IFC § 331.0.99, IFC § 331.0.100, IFC § 331.0.101, IFC § 331.0.102, IFC § 331.0.103, IFC § 331.0.104, IFC § 331.0.105, IFC § 331.0.106, IFC § 331.0.107, IFC § 331.0.108, IFC § 331.0.109, IFC § 331.0.110, IFC § 331.0.111, IFC § 331.0.112, IFC § 331.0.113, IFC § 331.0.114, IFC § 331.0.115, IFC § 331.0.116, IFC § 331.0.117, IFC § 331.0.118, IFC § 331.0.119, IFC § 331.0.120, IFC § 331.0.121, IFC § 331.0.122, IFC § 331.0.123, IFC § 331.0.124, IFC § 331.0.125, IFC § 331.0.126, IFC § 331.0.127, IFC § 331.0.128, IFC § 331.0.129, IFC § 331.0.130, IFC § 331.0.131, IFC § 331.0.132, IFC § 331.0.133, IFC § 331.0.134, IFC § 331.0.135, IFC § 331.0.136, IFC § 331.0.137, IFC § 331.0.138, IFC § 331.0.139, IFC § 331.0.140, IFC § 331.0.141, IFC § 331.0.142, IFC § 331.0.143, IFC § 331.0.144, IFC § 331.0.145, IFC § 331.0.146, IFC § 331.0.147, IFC § 331.0.148, IFC § 331.0.149, IFC § 331.0.150, IFC § 331.0.151, IFC § 331.0.152, IFC § 331.0.153, IFC § 331.0.154, IFC § 331.0.155, IFC § 331.0.156, IFC § 331.0.157, IFC § 331.0.158, IFC § 331.0.159, IFC § 331.0.160, IFC § 331.0.161, IFC § 331.0.162, IFC § 331.0.163, IFC § 331.0.164, IFC § 331.0.165, IFC § 331.0.166, IFC § 331.0.167, IFC § 331.0.168, IFC § 331.0.169, IFC § 331.0.170, IFC § 331.0.171, IFC § 331.0.172, IFC § 331.0.173, IFC § 331.0.174, IFC § 331.0.175, IFC § 331.0.176, IFC § 331.0.177, IFC § 331.0.178, IFC § 331.0.179, IFC § 331.0.180, IFC § 331.0.181, IFC § 331.0.182, IFC § 331.0.183, IFC § 331.0.184, IFC § 331.0.185, IFC § 331.0.186, IFC § 331.0.187, IFC § 331.0.188, IFC § 331.0.189, IFC § 331.0.190, IFC § 331.0.191, IFC § 331.0.192, IFC § 331.0.193, IFC § 331.0.194, IFC § 331.0.195, IFC § 331.0.196, IFC § 331.0.197, IFC § 331.0.198, IFC § 331.0.199, IFC § 331.0.200, IFC § 331.0.201, IFC § 331.0.202, IFC § 331.0.203, IFC § 331.0.204, IFC § 331.0.205, IFC § 331.0.206, IFC § 331.0.207, IFC § 331.0.208, IFC § 331.0.209, IFC § 331.0.210, IFC § 331.0.211, IFC § 331.0.212, IFC § 331.0.213, IFC § 331.0.214, IFC § 331.0.215, IFC § 331.0.216, IFC § 331.0.217, IFC § 331.0.218, IFC § 331.0.219, IFC § 331.0.220, IFC § 331.0.221, IFC § 331.0.222, IFC § 331.0.223, IFC § 331.0.224, IFC § 331.0.225, IFC § 331.0.226, IFC § 331.0.227, IFC § 331.0.228, IFC § 331.0.229, IFC § 331.0.230, IFC § 331.0.231, IFC § 331.0.232, IFC § 331.0.233, IFC § 331.0.234, IFC § 331.0.235, IFC § 331.0.236, IFC § 331.0.237, IFC § 331.0.238, IFC § 331.0.239, IFC § 331.0.240, IFC § 331.0.241, IFC § 331.0.242, IFC § 331.0.243, IFC § 331.0.244, IFC § 331.0.245, IFC § 331.0.246, IFC § 331.0.247, IFC § 331.0.248, IFC § 331.0.249, IFC § 331.0.250, IFC § 331.0.251, IFC § 331.0.252, IFC § 331.0.253, IFC § 331.0.254, IFC § 331.0.255, IFC § 331.0.256, IFC § 331.0.257, IFC § 331.0.258, IFC § 331.0.259, IFC § 331.0.260, IFC § 331.0.261, IFC § 331.0.262, IFC § 331.0.263, IFC § 331.0.264, IFC § 331.0.265, IFC § 331.0.266, IFC § 331.0.267, IFC § 331.0.268, IFC § 331.0.269, IFC § 331.0.270, IFC § 331.0.271, IFC § 331.0.272, IFC § 331.0.273, IFC § 331.0.274, IFC § 331.0.275, IFC § 331.0.276, IFC § 331.0.277, IFC § 331.0.278, IFC § 331.0.279, IFC § 331.0.280, IFC § 331.0.281, IFC § 331.0.282,

REVISÉ FEBRUARY 4, 2019

CITY OF LAS VEGAS TRAFFIC NOTES

1. ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.
2. THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.
3. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING CITY STREETS WHERE WARRANTED IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN CAD SIGNALS UNTIL PERMANENT SIGNS ARE INSTALLED.
4. WHEN A DESIGNATED "SUGGESTED ROUTE TO SCHOOL" IS ENCRoACHED UPON BY A CONSTRUCTION WORK ZONE AND/OR STARTED DURING FOR STUDENTS TO BE ASSISTED IN THE SAFE CROSSING THROUGH THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A QUALIFIED "CROSSING GUARD" THE GUARD SHALL BE PRESENT FOR THE FULL DURATION OF TIME THAT CHILDREN ARE LIKELY TO BE PRESENT.
5. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW TRAFFIC SIGNS SHALL UTILIZE TYPE II RETROREFLECTIVE SHEETING IN ACCORDANCE WITH CCAUSS 827.0716 AND SHALL BE COVERED WITH RETROREFLECTIVE PROTECTIVE OVERLAY FILM THAT IS A MATCHING COMPONENT TO, AND OF THE SAME MANUFACTURER AS THE RETROREFLECTIVE SHEETING TO WHICH IT IS APPLIED. STREET NAME SIGNS AND THE CONTRACTOR IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD TYPE AND OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT CITY STANDARDS.
7. WHEN A PROPOSED STREET LIGHT STANDARD IS LOCATED WITHIN FIVE (5') FEET OF ANY PROPOSED SIGN SHOWN ON THE PLANS TO BE MOUNTED ON A SIGNPOST, THE SIGN SHALL BE MOUNTED ON THE STREET LIGHT STANDARD AND THE SIGNPOST SHALL BE ELIMINATED.
8. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HERE UNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.
9. STREET SIGNS AND STOP SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF STREET NAME SIGNS.
10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND FLAGGERS TO INSURE THE SAFETY OF THE PUBLIC. PRIOR TO THE WORK THE CONTRACTOR SHALL HAVE A CERTIFIED ATSSA TRAFFIC CONTROL TECHNICIAN OR IMSA WORK ZONE SAFETY SPECIALIST SET UP, MAINTAIN AND/OR REMOVE ALL TRAFFIC CONTROL DEVICES IN THE CITY OF LAS VEGAS RIGHT OF WAY.
11. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE EXPEDITED TO COMPLETION SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA (BTC), IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP OR HAS AN ADVERSE EFFECT ON BUS SERVICE ON THAT STREET TO ARRANGE FOR TEMPORARY RELOCATION OF STOP.
13. GUARDS SHALL BE OBTAINED BY CONTACTING THE METROPOLITAN POLICE DEPARTMENT SPECIAL EVENTS UNIT (PHONE # 828-3442) WHO WILL PROVIDE OFFICERS PROPERLY TRAINED IN TRAFFIC CONTROL. FEES FOR THE USE OF THESE OFFICERS SHALL BE SET BY METRO AND WILL BE PAID BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR ALL ARRANGEMENTS WITH METRO.
14. ANY WORK WITHIN 300' OF A SIGNALIZED INTERSECTION WILL BE NIGHT WORK, UNLESS DIRECTED BY THE CITY OF LAS VEGAS TRAFFIC ENGINEER.
15. THE CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEERING DIVISION (TRANSPORTATION SECTION) THROUGH THE PROJECTS OFFICE PRIOR TO INITIATING PAVING TO RECEIVE DIRECTION FOR ANY PERMANENT OR TEMPORARY MODIFICATIONS TO THE PROJECTS. ALL PAVING, PAVEMENT MARKING, PAVEMENT TREATMENTS, MARKINGS AND SIGNING THAT ARE REQUIRED TO MATCH ADJACENT ROADWAY SEGMENTS, THE CONTRACTOR SHALL PROVIDE A DRAFTING FOR APPROVAL BY THE TRAFFIC ENGINEERING DIVISION DEPICTING ANY ADJUSTMENTS TO THE FINAL PAVING MARKINGS AND SIGNING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS, MARKINGS AND TRAFFIC CONTROL SIGNS SUCH THAT ADEQUATE TRANSITIONS AND LANE TERMINATIONS BETWEEN ADJACENT ROADWAY SEGMENTS ARE CONSTRUCTED.

REVISED JUNE 4, 2018

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 OPEN TRENCH AND PIPE INSTALLATION (UNIFORM STANDARD SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS) AND THE STANDARD SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR 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 "O" 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 LWWD 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") 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 MAINS REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

REVISÉ 04/15/10

CITY OF LAS VEGAS STREET LIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA," LATEST REVISION (LUSP) AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA" (USD), LATEST REVISION.
2. DESIGN PROFESSIONAL AND CONTRACTOR SHALL VERIFY CITY'S LATEST LED FIXTURE SPECIFICATIONS AND APPROVED FIXTURES PER CLV WEBSITE, UNDER BUILDING AND SAFETY FORMS, PRIOR TO ORDERING MATERIALS.
3. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS, ETC., LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF THE TRAFFIC AND CITY ENGINEER. ANY DEVIATION FROM THE PLAN LOCATION WILL REQUIRE COMPLIANCE WITH SECTION 623 OF THE USS.
4. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION IN ACCORDANCE WITH SECTION 623 G.01 OF THE USS.
5. ALL EMPTY CONDUIT SHALL HAVE AT LEAST ONE GREEN NO. 8B AWG WIRE INSTALLED AS TRACER WIRE IN ACCORDANCE WITH SECTION 623 G.02.01 OF THE USS PRIOR TO BACKFILLING AND FINAL INSPECTION.
6. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, SHALL LEAVE A MINIMUM CLEARANCE IN COMPLIANCE WITH USD NO. 320A WHEN POLE IS INSTALLED BEHIND SIDEWALK, AND SHALL AT NO TIME COMPLETELY ENCLOSE THE STREET LIGHTING POLE.
7. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TRAFFIC ENGINEERING DIVISION PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
8. SERVICE POINTS SHALL BE COORDINATED WITH NV ENERGY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICEPOINTS SHALL BE SHOWN ON THE PLANS.
9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREETLIGHTING CIPOL AND/OR POLE, THE CITY ENGINEER MUST BE NOTIFIED BEFORE THE DEVELOPER AND THE UTILITIES INVOLVED BEFORE STREETLIGHT BASES ARE INSTALLED. AT NO EXPENSE TO THE CITY OF LAS VEGAS.
10. THE CONTRACTOR SHALL FURNISH COMPLETE CONDUIT, WIRE, ETC. FROM SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON THE PLANS.

REVISÉ 6/4/2018 (LD VERSION)

LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE STORMWATER RUNOFF PREVENTION SYSTEM AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THE SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN CLARK COUNTY TITLE 24.40 AND IN THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVRI000000, 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 AREAS OF STORMWATER PREVENTION, SEDIMENT 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 THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVRI000000, 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.

SOUTHWEST GAS CORPORATION GENERAL NOTES

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 FACILITIES 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. AND/OR 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/OR STRUCTURES CONTACT 702-365-2099

ALL CIVIL IMPROVEMENT PLANS MUST INCLUDE SOUTHWEST GAS CORPORATION HIGH PRESSURE NOTES ON THE NOTES SHEET AND ALL SHEETS DEPICTING HIGH PRESSURE NATURAL GAS MAINS AS INDICATED BELOW:

CAUTION: HIGH PRESSURE GAS!!
CALL SOUTHWEST GAS AT 702-400-1789 FOR STANDBY WHEN EXCAVATING
OVER OR NEAR HIGH PRESSURE GAS LINES 48 HOURS PRIOR TO CONSTRUCTION

SOUTHWEST GAS CORPORATION

DATE _____

GRADING NOTES

1. INDICATED GRADES OTHER THAN TC, FG & GUTTER FL ARE ROUGH GRADES.
2. THE ROUGH GRADING PLANS SHALL BE ON THE JOB SITE AT ALL TIMES. THE ROUGH GRADING SHALL BE FINISHED IN CONFORMANCE WITH THE LINES AND GRADES SHOWN ON THE PLANS. THE GRADING QUANTITIES ARE BASED ON THE ELEVATION AND DETAILS SHOWN ON THE PLANS. ANY DEVIATIONS FROM THE PLAN WILL RESULT IN QUANTITY CHANGES.
3. SOILS REPORT PREPARED BY: NOVA GEOTECHNICAL & INSPECTION SERVICES 4480 W. HACIENDA AVENUE, SUITE 104, LAS VEGAS, NV 89118, PHONE: 702-873-3478, PROJECT NO. : G-18-76, DATED: DECEMBER 3, 2018, AND SUBSEQUENT UPDATE LETTER DATED: DECEMBER 30, 2019
4. EARTHWORK QUANTITIES (RAW):
 - CUT = 53,600 CUBIC YARDS
 - FILL = 1,400 CUBIC YARDS
- A. THE ABOVE QUANTITIES DO NOT REFLECT LOSSES DUE TO SUBSIDENCE OR SHRINKAGE.
- B. THE ABOVE QUANTITIES DO REFLECT USING NATIVE MATERIAL IN LIEU OF TYPE 1 GRAVEL BASE MATERIAL FOR STREET SECTIONS.
- C. THE ABOVE QUANTITIES DO NOT REFLECT ANY EARTHWORK WHICH MAY BE REQUIRED BY THE ENGINEER TO CONSTRUCT ADDITIONAL PROTECTIVE DITCHES OR BERMS NOT SHOWN ON THESE DRAWINGS.

GENERAL NOTES

1. THE CONTRACTOR SHALL NOTIFY ALL AFFECTED PUBLIC ENTITIES, THE PROJECT ENGINEER AND CLARK COUNTY AT LEAST 48 HOURS PRIOR TO THE COMMENCEMENT OF WORK.
2. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE CONTRACT DRAWINGS. ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE PROJECT ENGINEER.
3. 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 ISSUE; AND OTHER APPLICABLE CLARK COUNTY STANDARD SPECIFICATIONS, THE CONTROLLING AGENCY, THE "UNIFORM BUILDING CODE", AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE.
4. LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THE DRAWINGS WERE OBTAINED FROM INFORMATION RECEIVED FROM THE APPLICABLE UTILITY COMPANIES. NEITHER THE OWNER NOR ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES OR STRUCTURES NOT SHOWN, OR NOT IN THE LOCATION SHOWN ON THE DRAWINGS. CONTRACTOR TO VERIFY LOCATION OF UTILITIES PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR'S RESPONSIBILITY REGARDING UTILITIES SHALL BE AS REQUIRED UNDER SECTION 107.17 OF THE "UNIFORM STANDARD SPECIFICATIONS FOR CLARK COUNTY AREA, NEVADA" AND AS PROVIDED IN THE SPECIFICATIONS.
5. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES TO PROTECT EXISTING UTILITY LINES, STRUCTURES, AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE. ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE COUNTY ENGINEER OR OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
6. THE CONTRACTOR SHALL NOT REMOVE TREES, SHRUBS, LAWN, WALLS, FENCES, SIGNS, STRUCTURES, LIGHTS, OR ANY OTHER EXISTING IMPROVEMENTS OUTSIDE OF STREET RIGHT-OF-WAY, EXCEPT WHERE REQUIRED TO DO SO BY THE PROJECT ENGINEER OR CONTRACT ENGINEER. REPLACEMENT AND RECONSTRUCTION OF ALL EXISTING IMPROVEMENTS INCLUDING SPRINKLER SYSTEMS, LAWN, FENCES, WALLS, SIGNS, STEPS, SIDEWALKS, DRIVEWAYS, LAWN LIGHTS, AND ALL OTHER ITEMS APPLICABLE TO THIS CONTRACT SHALL BE REQUIRED BY THE PROJECT ENGINEER.
7. THE CONTRACTOR SHALL BACKFILL AND FINE GRADE ALL CUT OR FILL SLOPES TO MATCH EXISTING CONDITIONS TO THE SATISFACTION OF THE PROJECT ENGINEER. WHERE EXISTING LAWN ARE DAMAGED BY THE CONTRACTOR'S OPERATION, THE CONTRACTOR WILL SOLO THE AFFECTED AREA TO A CONDITION EQUAL TO OR BETTER THAN THAT WHICH EXISTED PRIOR TO CONSTRUCTION.
8. THE 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 TRANSITIONS TO BE AS SHOWN PER CONTRACT DRAWINGS.
9. 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. CHAPTER 225.500.
10. THE ACTUAL LOCATIONS OF SAW CUT LINES, LIMITS OF COLD MILLING, LIMITS OF DRIVEWAY TRANSITIONS, AND LAWN/GRASS REPAIR SHALL BE DETERMINED IN THE FIELD BY THE RESIDENT PROJECT REPRESENTATIVE.
11. THE ACTUAL LIMITS OF EXISTING OPEN GRADE REMOVAL AND UDACS APPLICATION SHALL BE DETERMINED IN THE FIELD BY THE RESIDENT PROJECT REPRESENTATIVE.
12. ALL STANDARD DRAWINGS REFERENCED IN THIS SET ARE BASED ON THE CURRENT "UNIFORM STANDARD DRAWINGS REVISION SET J-1997 RELEASE".
13. UNLESS OTHERWISE SHOWN ON THE CONTRACT DRAWINGS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OR RELOCATION OF ALL WATER SERVICES AND METERS WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON THE CONTRACT DRAWINGS.
14. THE CONTRACTOR SHALL MAINTAIN AN ONGOING REMOVAL PROCESS OF ALL SPILLAGE OF EXCAVATION MATERIAL ON ALL PAVED STREETS.
15. CURB AND GUTTER OF A GRADE OF LESS THAN 4/10 OF ONE PERCENT SHALL BE CONSTRUCTED BY FORMING. EACH JOINT SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION.
16. THE CONTRACTOR SHALL VERIFY IN THE FIELD ALL DIMENSIONS, EXISTING CONDITIONS AND POINTS OF CONNECTION WITH ADJOINING PROPERTY (PUBLIC AND PRIVATE). ANY DISCREPANCIES SHALL BE CALLED TO THE ATTENTION OF THE PROJECT ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
17. REMOVAL OR RELOCATION OF POWER POLES, TELEPHONE POLES, JOINTLY-OWNED POLES, AND APPURTENANCES WHICH INTERFERE WITH IMPROVEMENTS REQUIRED TO BE CONSTRUCTED UNDER THIS CONTRACT, SHALL BE THE RESPONSIBILITY OF THE RESPECTIVE UTILITY COMPANY. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH THE UTILITY COMPANIES FAR ENOUGH IN ADVANCE SO AS TO NOT IMPACT THE SCHEDULE.
18. COX COMMUNICATIONS SHALL BE RESPONSIBLE FOR THE VERTICAL OR HORIZONTAL ADJUSTMENT OF ALL CATV FACILITIES WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON THE CONTRACT DRAWINGS, UNLESS NOTED OTHERWISE.
19. NV ENERGY SHALL BE RESPONSIBLE FOR THE RELOCATION OF UNDERGROUND OR OVERHEAD POWER LINES THAT INTERFERE WITH THE REQUIRED IMPROVEMENTS AS SHOWN ON THE CONTRACT DRAWINGS.
20. EMBARGO SHALL BE RESPONSIBLE FOR THE VERTICAL OR HORIZONTAL ADJUSTMENT OF ALL TELEPHONE FACILITIES WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON CONTRACT DRAWINGS, UNLESS NOTED OTHERWISE.

LAS VEGAS VALLEY WATER DISTRICT (LVWD) NOTES

LVVWD PROJECT #0000
(REVISED 08/01/2017)

- NO WORK SHALL BEGIN UN TIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVMD. FOLLOW THE WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVMD COMMUNICATION SUPPORT CENTER (258-7171) TWO 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 LVVMD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
- ALL WORK SHALL CONFORM TO LVVMD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE 2010 EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). THE LATEST EDITION OF UDACS SHALL SUPERCEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
- ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
- A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVMD.
- ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVMD APPROVED SERVICE SADDLES.
- ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
- ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
- ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS.
- ALL WATER FACILITIES AND APPURTENANCES SHALL BE DISINFECTED, PRESSURE TESTED, AND HAVE AN ACCEPTABLE PASSING HEALTH WATER SAMPLE OBTAINED, PRIOR TO OPERATION AND USE.
- THE CONTRACTOR MUST OBTAIN ALL WORKING DAYS TWO (2) INCHES AND SMALLER FROM LVVMD CENTRAL STORES, TELEPH 258-3152 OR 258-3802 TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
- ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01 AND APPROVED THE LVVMD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO AFFECTED CUSTOMERS.
- ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVMD APPROVED PRODUCT'S LIST FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS BY SUBMITTING SHOP DRAWINGS.
- TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
- THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVMD) MUNICIPAL WATER FACILITIES WITHIN ALL STREET SHALL BE IN COMPLIANCE WITH THE UNIFORM STANDARD, INCLUDING THE PLACEMENT OF ASPHALT PAVING ST SURFACES. ANY REPAIR WORK DONE BY THE LVVMD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.

ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVMD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVMD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVMD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVMD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.

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

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES

PROJECT NO. 0000 FIRST APPROVED DATE:

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200



SUMMERLIN®

AGE 22
ET G)
ND DRIVE (STREET N)

SUMMERLIN WEST VILLA
FLEET WING AVENUE (STREET
KETTLE RIDGE DRIVE (STREET J) TO SCURRY BEND D

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XXXXXX LXX-XXXX	DESIGNED BY: L. MAMACLAY
DATE: AUGUST, 2020	DRAWN BY: G. HANSEN
DRAWING NO.	CHECKED BY: N. BARCOS
3 / 21	HORIZ.: NONE VERT.: NONE

Projects\Summ West\ Village 22\100068335 - V22 Fleet Wind (Kettle Ridge to Scurv Bend) Sheets\68235-03-NOTE-01.dwg LAYOUT: 3 GENERAL NOTES Aug 18, 2020 - 4:44PM

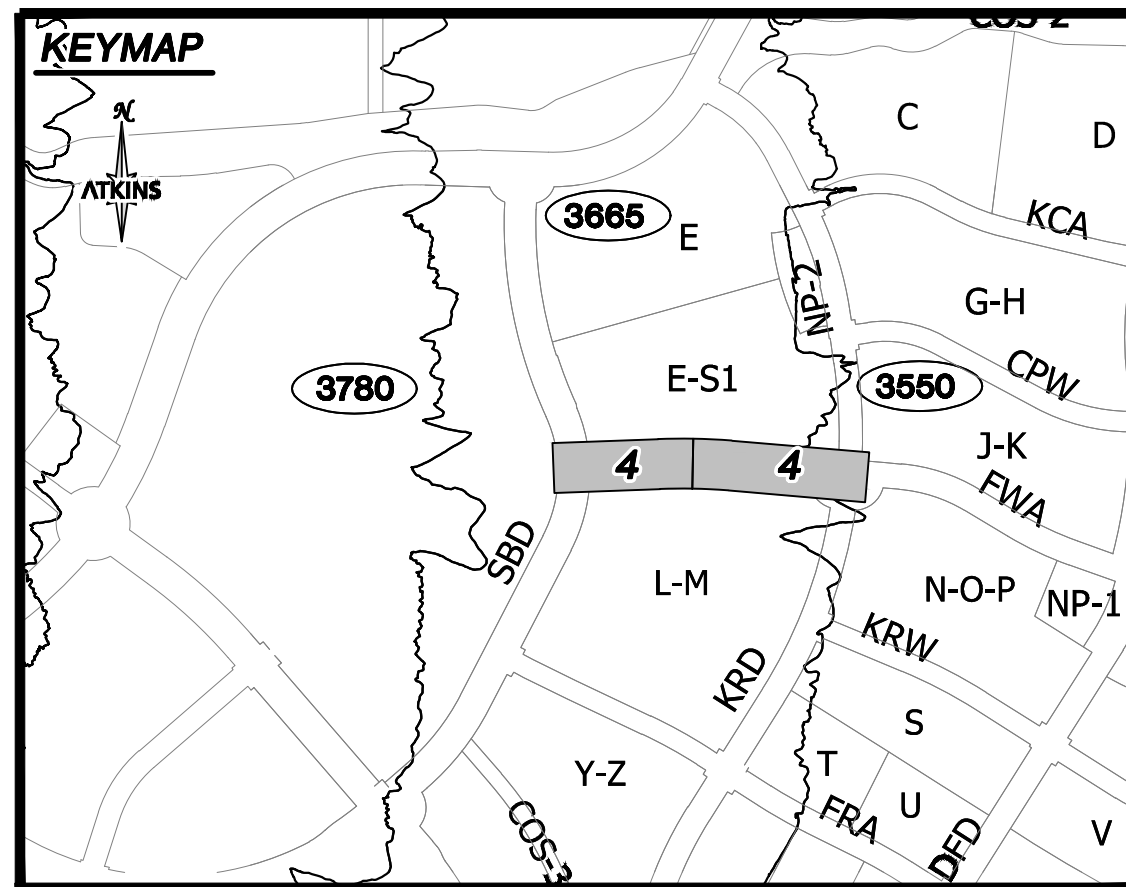
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ROADWAY NOTES

1. SEE SHEET 19 FOR TYPICAL SECTIONS, DETAILS
2. SEE SHEET 2 FOR ROADWAY ALIGNMENT ABBREVIATIONS

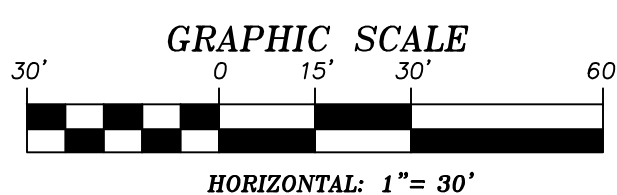
CENTERLINE CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C1	2500.00'	6°55'04"	301.85'	151.11'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C2	200.00'	41°0'18"	14.56'	7.28'
C3	200.01'	4°09'02"	14.49'	7.25'
C4	10.00'	36°52'12"	6.44'	3.33'
C5	10.00'	36°52'12"	6.44'	3.33'
C6	2520.50'	1°26'17"	63.26'	31.63'
C7	10.00'	37°00'24"	6.46'	3.35'
C8	10.00'	36°45'13"	6.41'	3.32'
C9	2516.50'	5°12'24"	228.68'	114.42'
C13	200.00'	41°0'18"	14.56'	7.28'
C14	200.01'	4°09'02"	14.49'	7.25'
C15	10.00'	36°52'12"	6.44'	3.33'
C16	10.00'	36°52'12"	6.44'	3.33'
C17	2479.40'	0°49'33"	35.73'	17.87'
C18	10.00'	36°43'54"	6.41'	3.32'
C19	10.00'	37°00'31"	6.46'	3.35'
C20	2483.50'	2°52'08"	124.35'	62.19'
C21	10.00'	37°00'31"	6.46'	3.35'
C22	10.00'	36°43'54"	6.41'	3.32'
C23	2479.50'	2°40'08"	115.50'	57.76'
C24	10.00'	36°52'12"	6.44'	3.33'
C25	10.00'	36°52'12"	6.44'	3.33'



UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTORS 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.

NOT FOR CONSTRUCTION
90% SUBMITTAL



BASIS OF BEARING

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.

BENCHMARK

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(REVISED 2008)
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XXXXXX	DESIGNED BY: L. MAMACLAY
LXX-XXXX	DRAWN BY: G. HANSEN
DATE: AUGUST, 2020	CHECKED BY: N. BARCOS
DRAWING NO.	HORIZ.: NONE
	VERT.: NONE
	4 / 21

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (STREET G)
KETTLE RIDGE DRIVE (STREET J) TO SCURRY BEND DRIVE (STREET N)

HORIZONTAL CONTROL PLAN

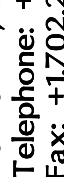


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Fax: +1702.263.7200

REVISIONS	
REV.	DESCRIPTION

[illegible]

JOB NO. 100068235



STORM DRAIN NOTES

1. SEE PROFILE SHEETS FOR CONSTRUCTION NOTES AND INFORMATION RELATED TO PIPE SIZE (INNER DIAMETER), MANHOLE BASE SIZE (INSIDE DIMENSIONS), AND DROP INLET LENGTHS (CURB OPENING).
2. ALL STORM DRAIN MATERIAL TO BE CLASS III REINFORCED CONCRETE PIPE, UNLESS OTHERWISE NOTED IN PROFILES.
3. CONTRACTOR TO PROVIDE 6" MINIMUM OF CLEARANCE BETWEEN OUTSIDE OF PIPE TO INSIDE WALL OF STORM DRAIN STRUCTURES.

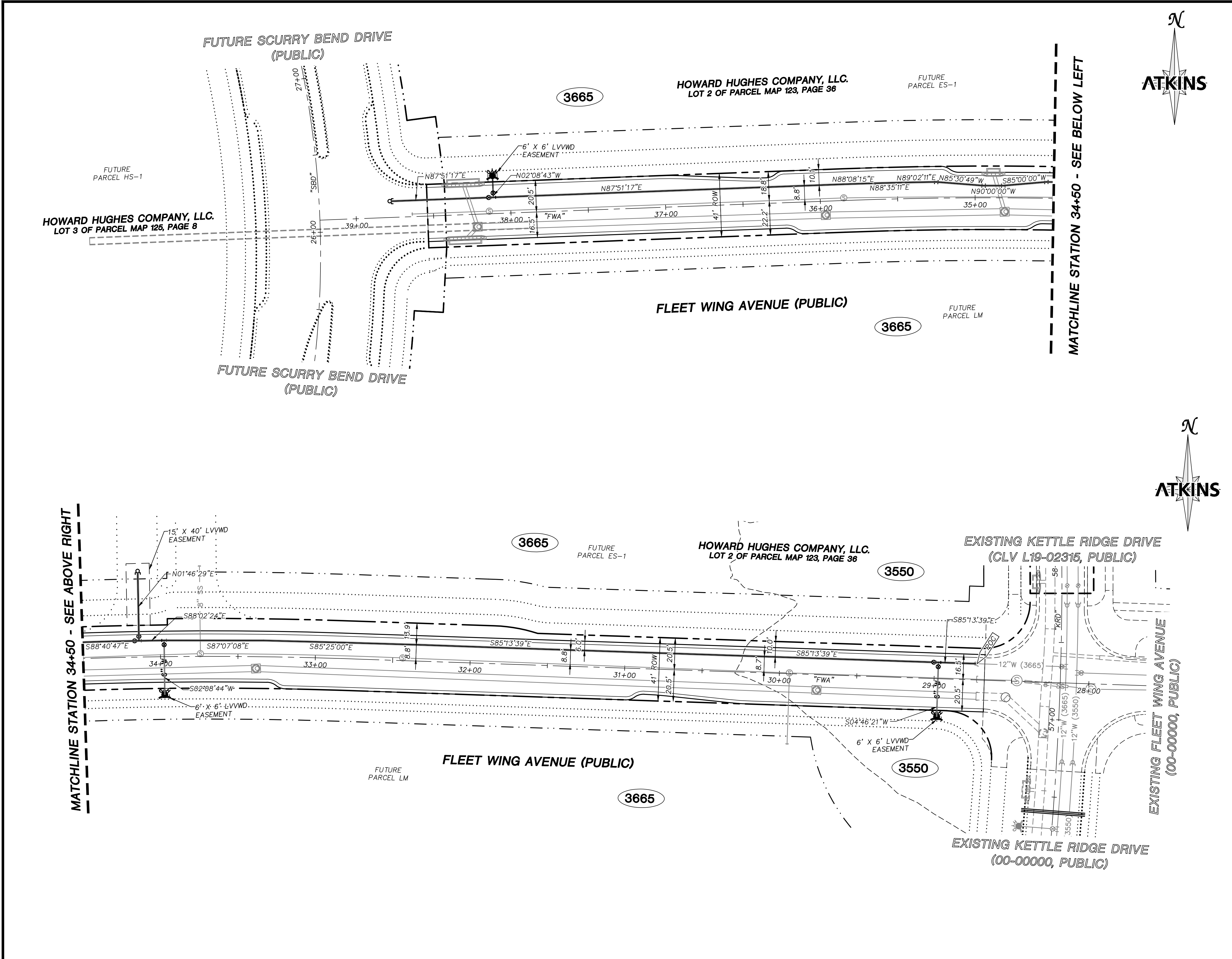
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SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (STREET G)
KETTLE RIDGE DRIVE (STREET J) TO SCURRY BEND DRIVE (STREET N)

MASTER DRAINAGE PLAN

XXXXXX	DESIGNED BY: L. MAMACLAY
LXX-XXXX	DRAWN BY: G. HANSEN
DATE: AUGUST, 2020	CHECKED BY: N. BARCOS
DRAWING NO.	HORIZ.: NONE
5 / 21	VERT.: NONE



SUMMARY OF QUANTITIES

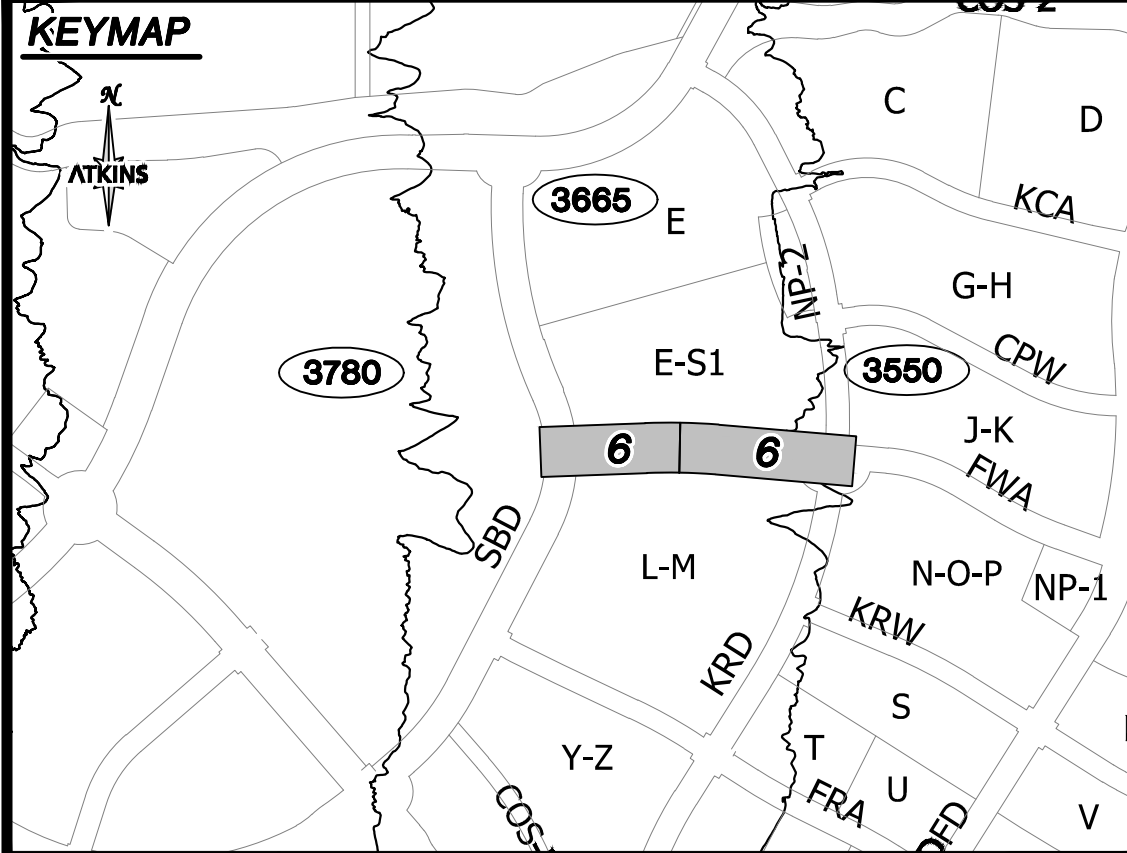
DESCRIPTION	QUANTITY	UNIT
WATER		
12" DUCTILE IRON WATER PIPE	1005	LF
6" FIRE HYDRANT ASSEMBLY	3	EA
GATE VALVE	3	EA
WATER TEE	4	EA
CAP	2	EA

MASTER PLAN NOTE
THIS SHEET IS FOR INFORMATIONAL PURPOSES ONLY. IT IS AN OVERALL REPRESENTATION OF THE UTILITY FOR REVIEW AND COORDINATION WITH OTHER PROJECT DETAILS WITHIN THIS PLAN SET.

WATER NOTES

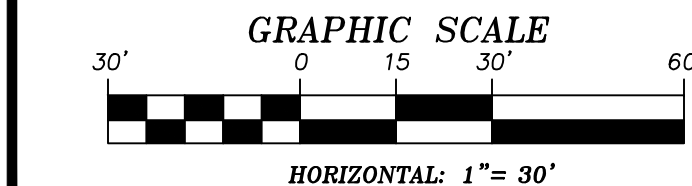
- SEE ROADWAY PLAN AND PROFILE SHEETS FOR CONSTRUCTION NOTES AND INFORMATION RELATED TO PIPE SIZE, LENGTH, AND SIZE OF FITTINGS.
- ALL 3550 PRESSURE ZONE WATER PIPE UNDER 24" DIAMETER, MATERIAL TO BE WATER QUALITY RATED AWWA C-900, UNLESS OTHERWISE NOTED IN PROFILES.
- ALL 3665 PRESSURE ZONE WATER PIPE 24" DIAMETER AND GREATER, PIPE MATERIAL TO BE WATER QUALITY RATED DUCTILE IRON PIPE UNLESS OTHERWISE NOTED IN PROFILES.
- ALL MEASUREMENTS ARE FROM CENTER OF FITTING TO CENTER OF FITTING.
- INSTALL PIPELINE MARKER BALLS IN TRENCH ABOVE EACH HORIZONTAL ELBOW FITTING PER UDACS PLATE #15.
- PROTECT IN PLACE AND ADJUST LVWD EXISTING FACILITIES TO FINISHED GRADE. ALL LVWD FACILITIES SHALL BE ACCESSIBLE AT ALL TIMES.
- SEE SHEET 20 FOR WATERLINE DETAILS.
- ALL DUCTILE IRON PIPE FITTINGS TO BE MECHANICALLY RESTRAINED PER UDACS 2.15.
- IN ROUGH GRADING AREAS, RIM ELEVATION FOR STRUCTURES IS SET AT 8.5" ABOVE ROUGH GRADE.
- WHERE WATERLINE PIPE CENTER RADIUS IS LESS THAN 1,150', CONTRACTOR TO INSTALL HORIZONTAL BENDS TO ACHIEVE EQUIVALENT CENTERLINE RADIUS AS NOTED ON THE PLANS.
- ALL DIP WATERLINE TO BE RESTRAINED.

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.



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NOT FOR CONSTRUCTION
90% SUBMITTAL



APPROVED FOR CONSTRUCTION
LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES
PROJECT NO. XXXXXX FIRST APPROVED DATE: _____

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

BENCHMARK
CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
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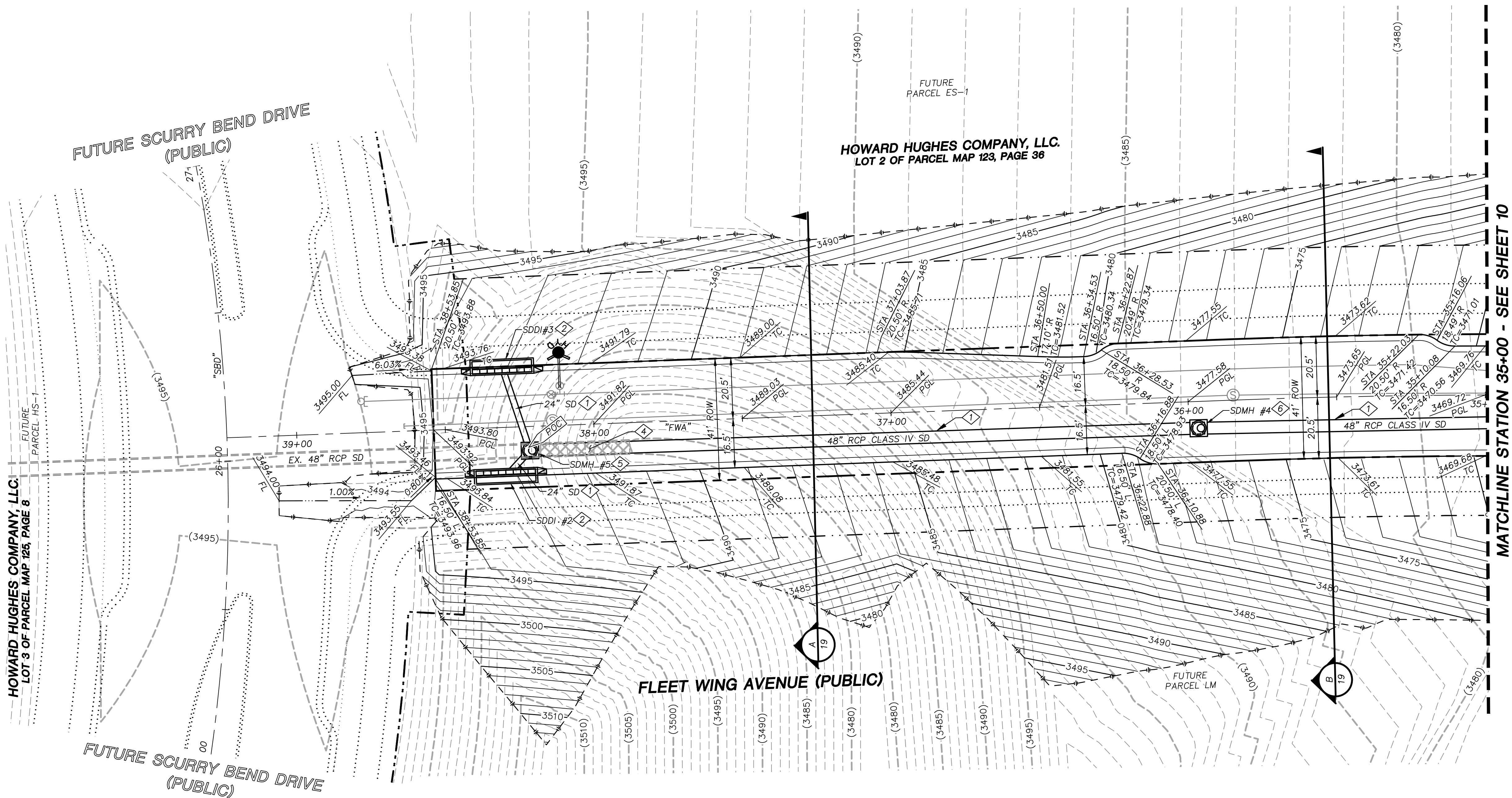
SUMMERLIN

MASTER WATER PLAN

DESIGNED BY: L. MAMACLAY
DRAWN BY: G. HANSEN
CHECKED BY: R. BARCOS
HORIZ.: NONE
VERT.: NONE

DATE: AUGUST, 2020
DRAWING NO. 6/21

JOB NO. 100068235



MATCHLINE STATION 35+00 - SEE SHEET 10

STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE ROADWAY PLAN AND PROFILE SHEETS FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
3. REMOVE CAP AND CONNECT TO EXISTING STORM DRAIN STUB
4. 38± LF EXISTING 48" STORM DRAIN TO BE REMOVED
5. INSTALL TYPE II SD MANHOLE PER CCAUSD #405.2
6. INSTALL TYPE III SD MANHOLE PER CCAUSD #406

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

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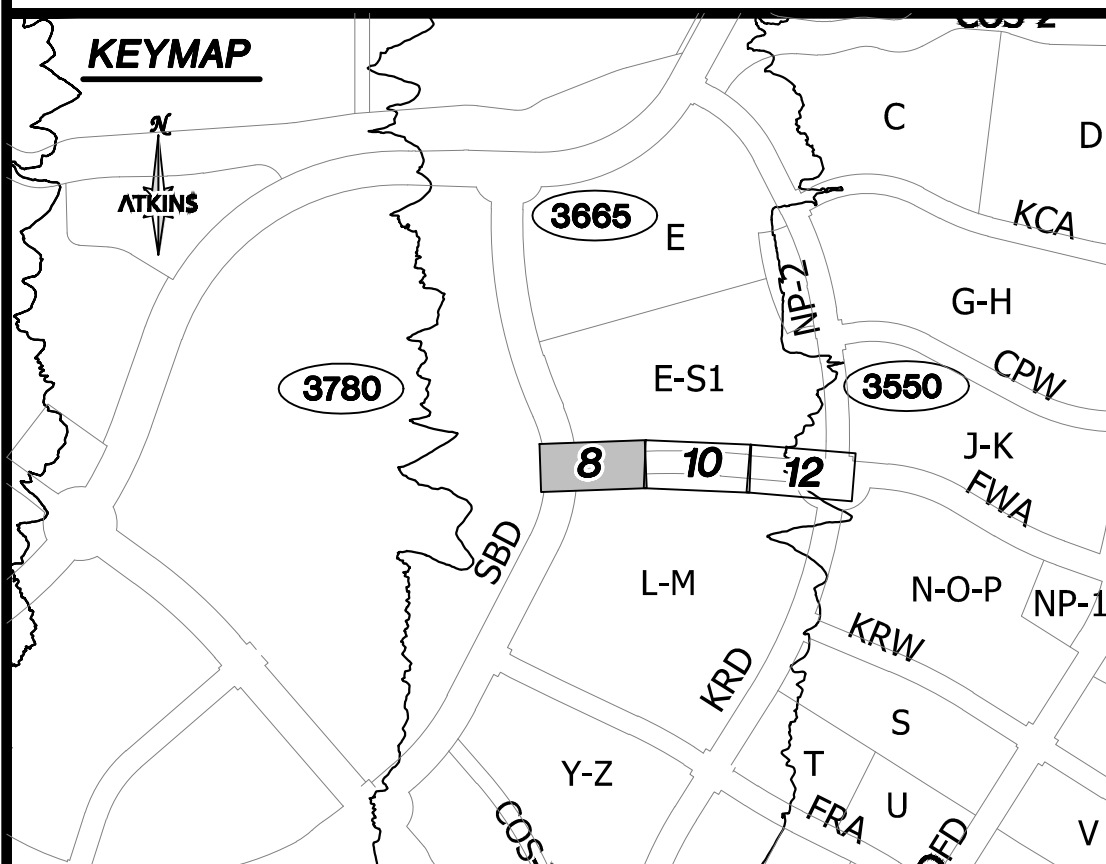
SUMMERLIN

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (STREET G)
KETTLE RIDGE DRIVE (STREET J) TO SCURRY BEND DRIVE (STREET N)

ROADWAY GRADING PLAN
SCURRY BEND DRIVE TO STA 35+00

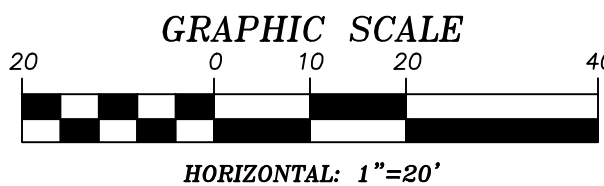
DESIGNED BY: L. MAMACLAY
DRAWN BY: G. HANSEN
CHECKED BY: R. BARCOS
DATE: AUGUST, 2020
DRAWING NO.: 8/21
HORIZ.: 1"=20'
VERT.: NONE

JOB NO. 100068235



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LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES
PROJECT NO. ---- FIRST APPROVED DATE: ----

GRADING PLAN CERTIFICATION

PAUL BATES PE#25673 DATE

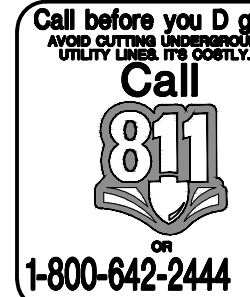
CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.
DS#XXX

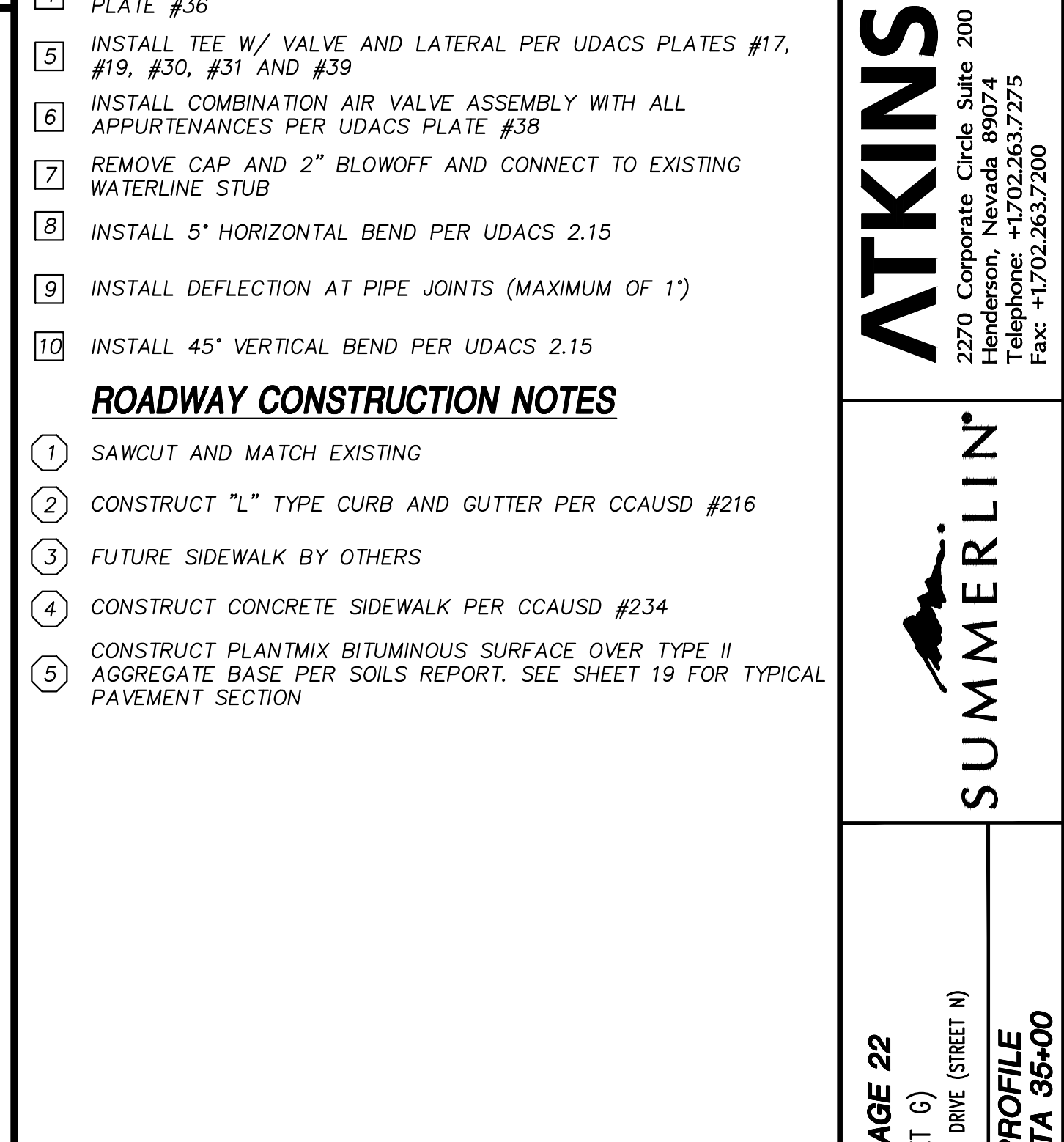
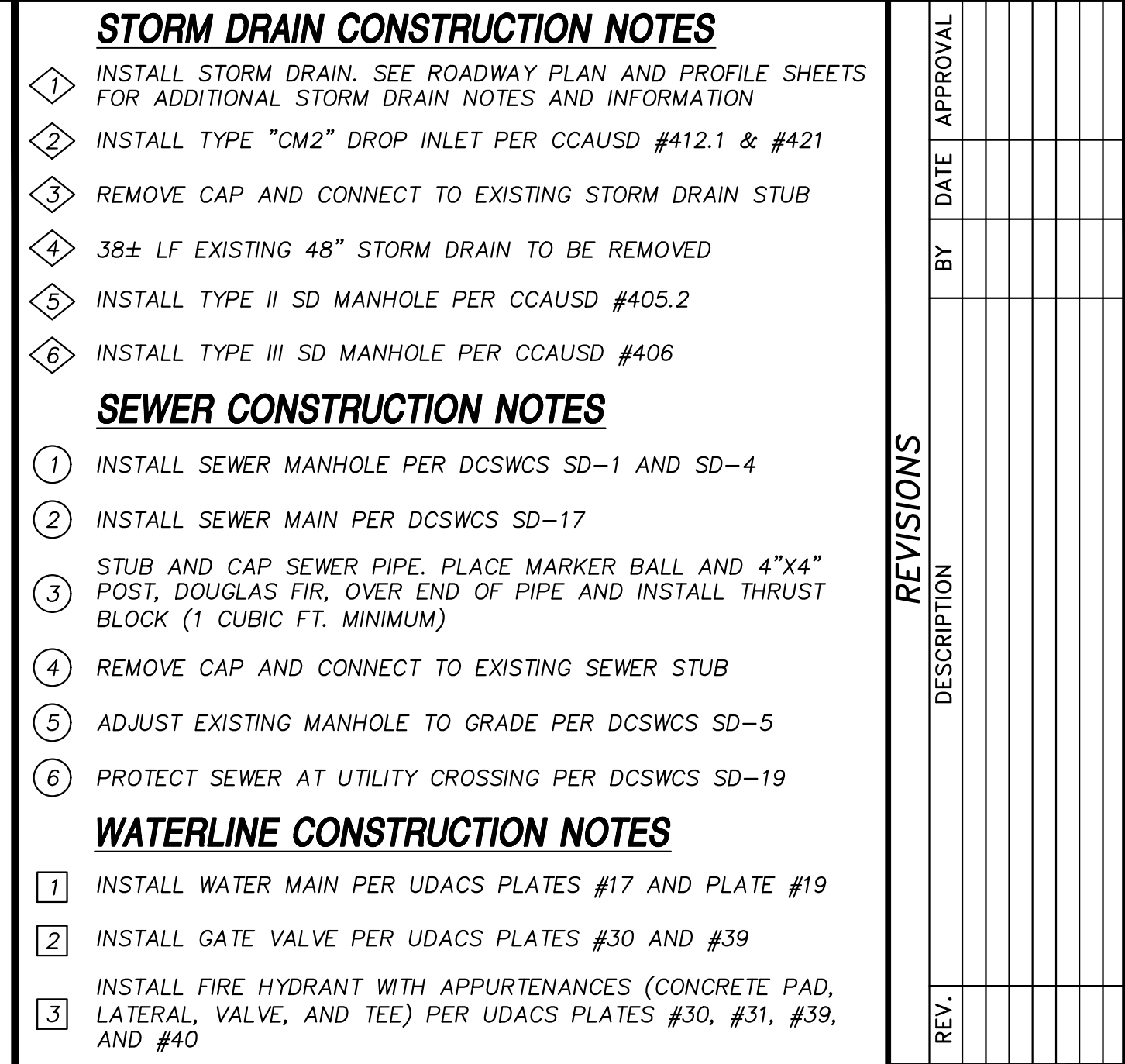
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T21S,R59E,S03





KEYMAP

ATKINS

3780

3665

3550

E-S1

L-M

Y-Z

C

D

KCA

G-H

CPW

J-K

FWA

N-O-P

NP-1

NP-2

KRQ

S

T

U

FRA

V

SBD

COS

9 11 13

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DESIGNED BY:
L. MACMAYL

DRAWN BY:
G. HANSEN

CHECKED BY:
M. BARGOS

DATE:
AUGUST, 2020

DRAWING NO.
XXXVXXXX
LXX-XXXXX

HORIZ. - NONE

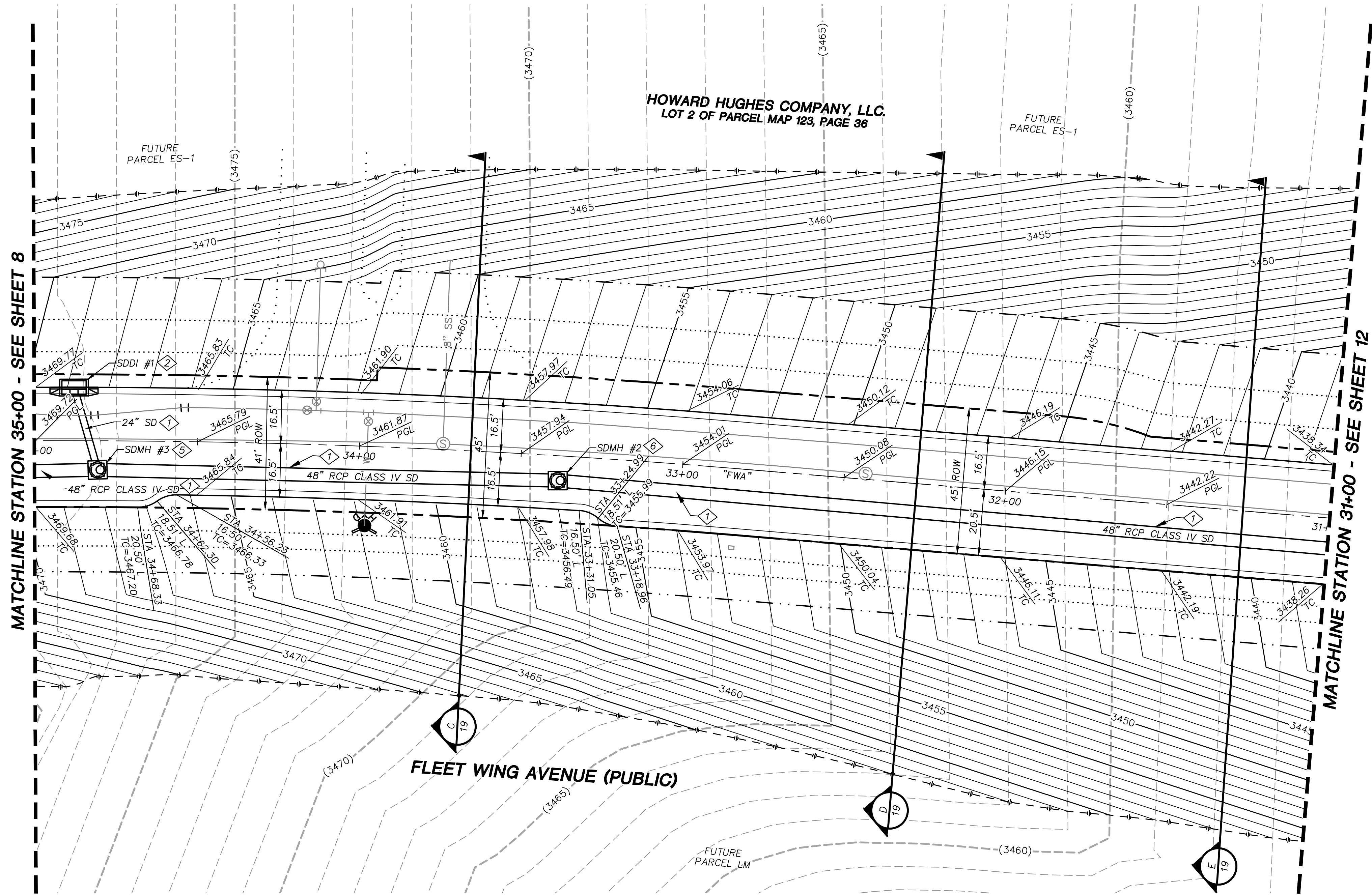
VERT. - NONE

9/21

SUMMERLIN WEST VILL
FLEET WING AVENUE (STREET J)
KETTLE RIDGE DRIVE (STREET J) TO SCURRY BE

**ROADWAY PLAN AND
SCURRY BEND DRIVE TO J**

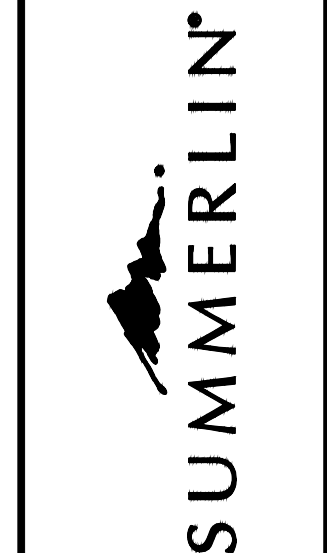
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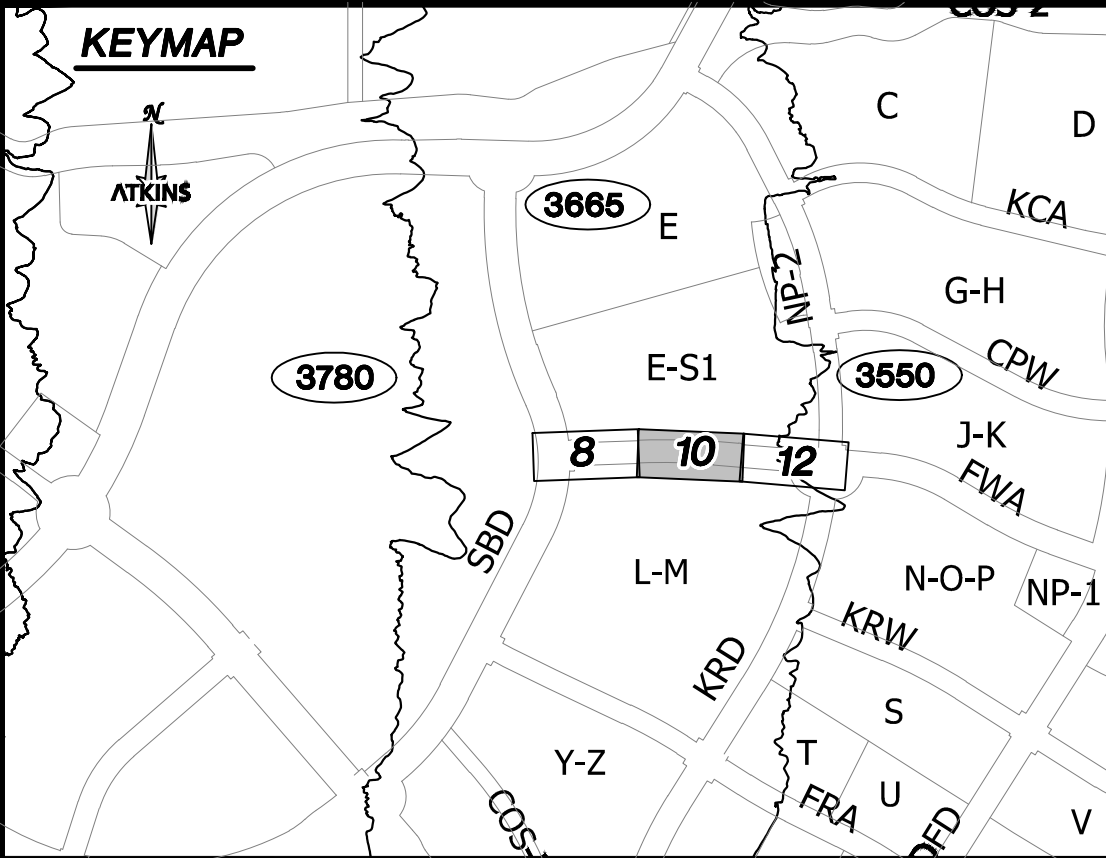
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REVISIONS	
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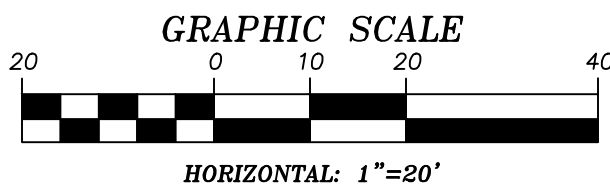


SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (STREET G)
KETTLE RIDGE DRIVE (STREET J) TO SOURRY BEND DRIVE (STREET N)
ROADWAY GRADING PLAN
STA 36+00 TO STA 31+00



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APPROVED FOR CONSTRUCTION
LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES
PROJECT NO. ---- FIRST APPROVED DATE: ----

GRADING PLAN CERTIFICATION
PAUL BATES PE#25673 DATE
CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.
DS#XXX

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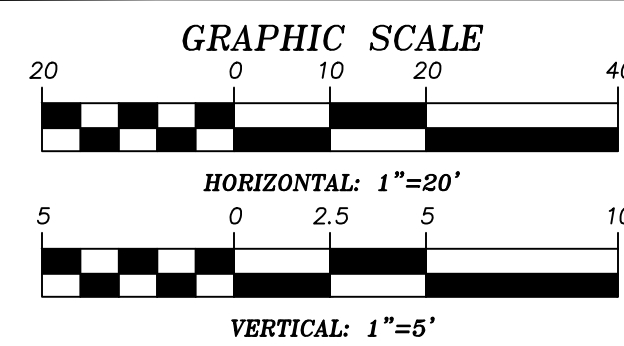
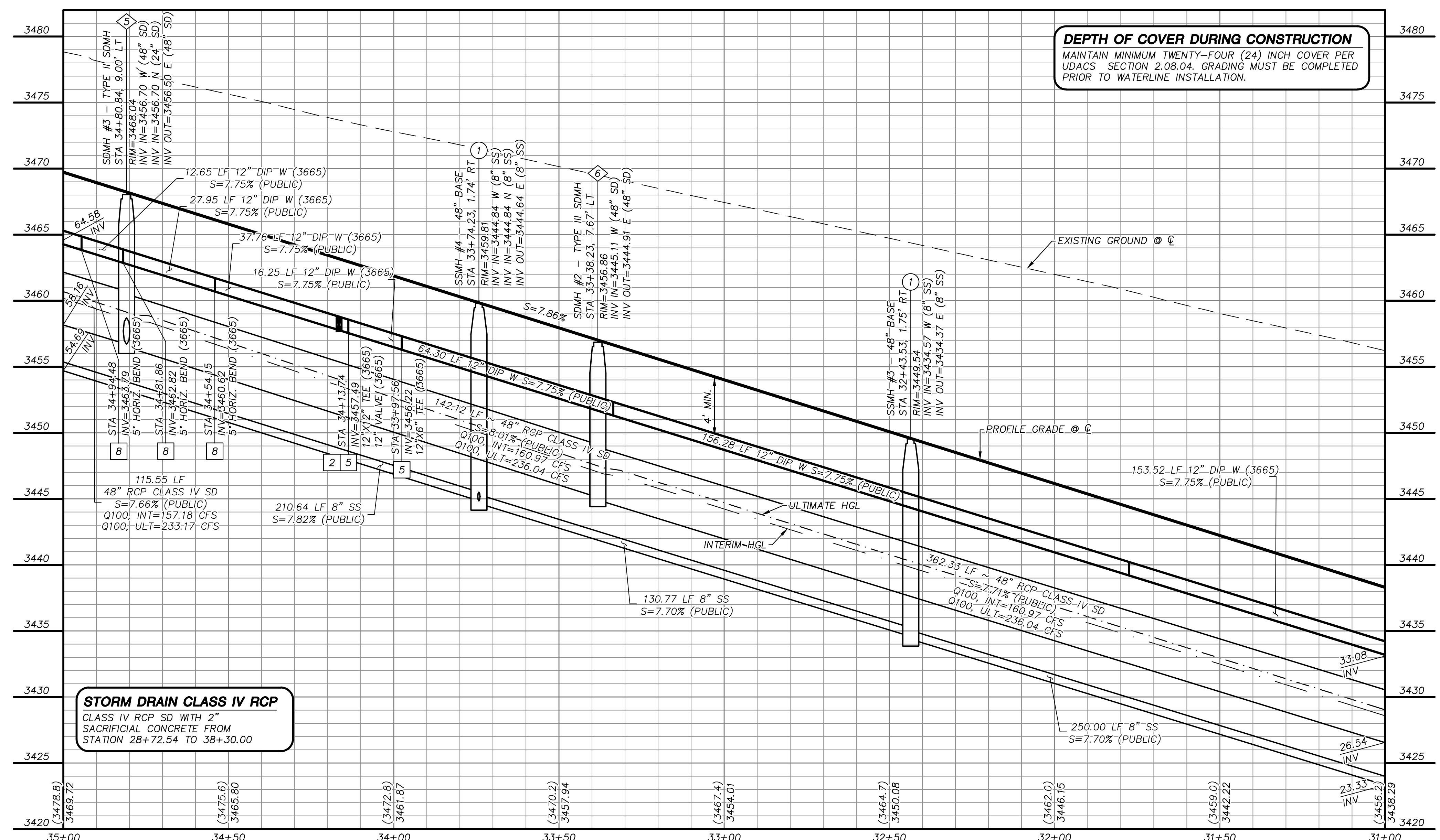
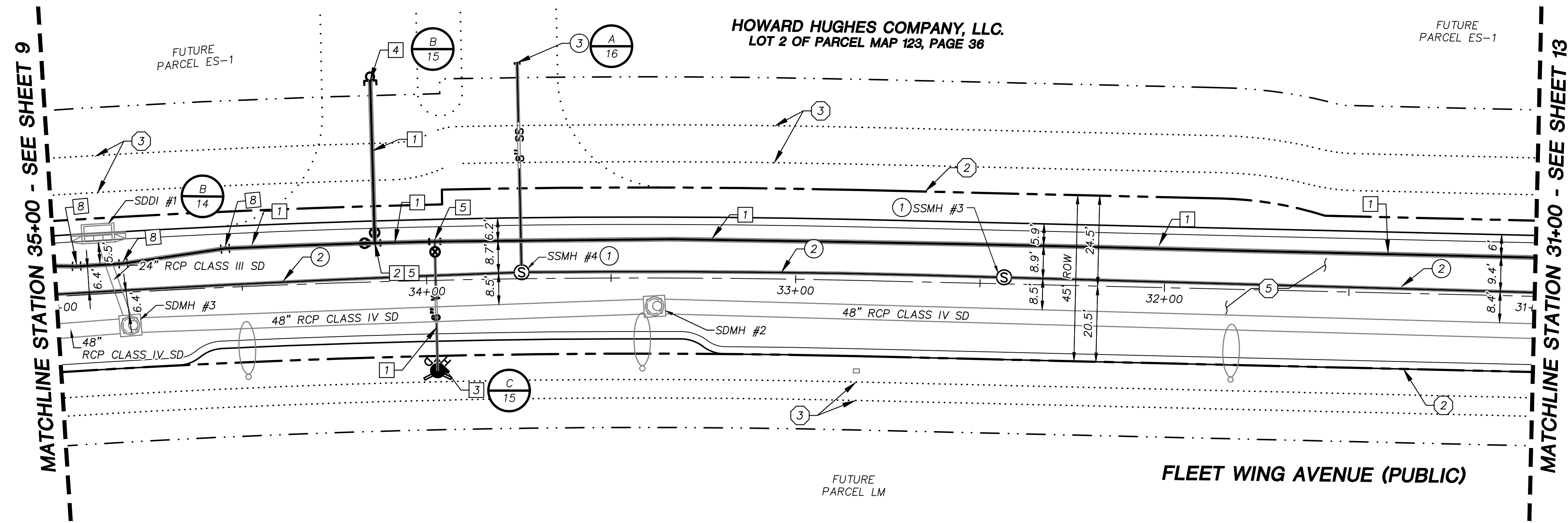
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DESIGNED BY: L. MAMACLAY	XXXXXX
DRAWN BY: G. HANSEN	LXX-XXXX
CHECKED BY: R. BARCOS	AUGUST, 2020
HORIZ.: 1"=20'	DRAWING NO.
VERT.: NONE	10/21

JOB NO. 100068235 X: \Projects\Summerlin West Village 22\100068235 - V22 Fleet Wing (Kettle Ridge to Sourry Bend)\



APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES

PROJECT NO. ----- FIRST APPROVED DATE: -----

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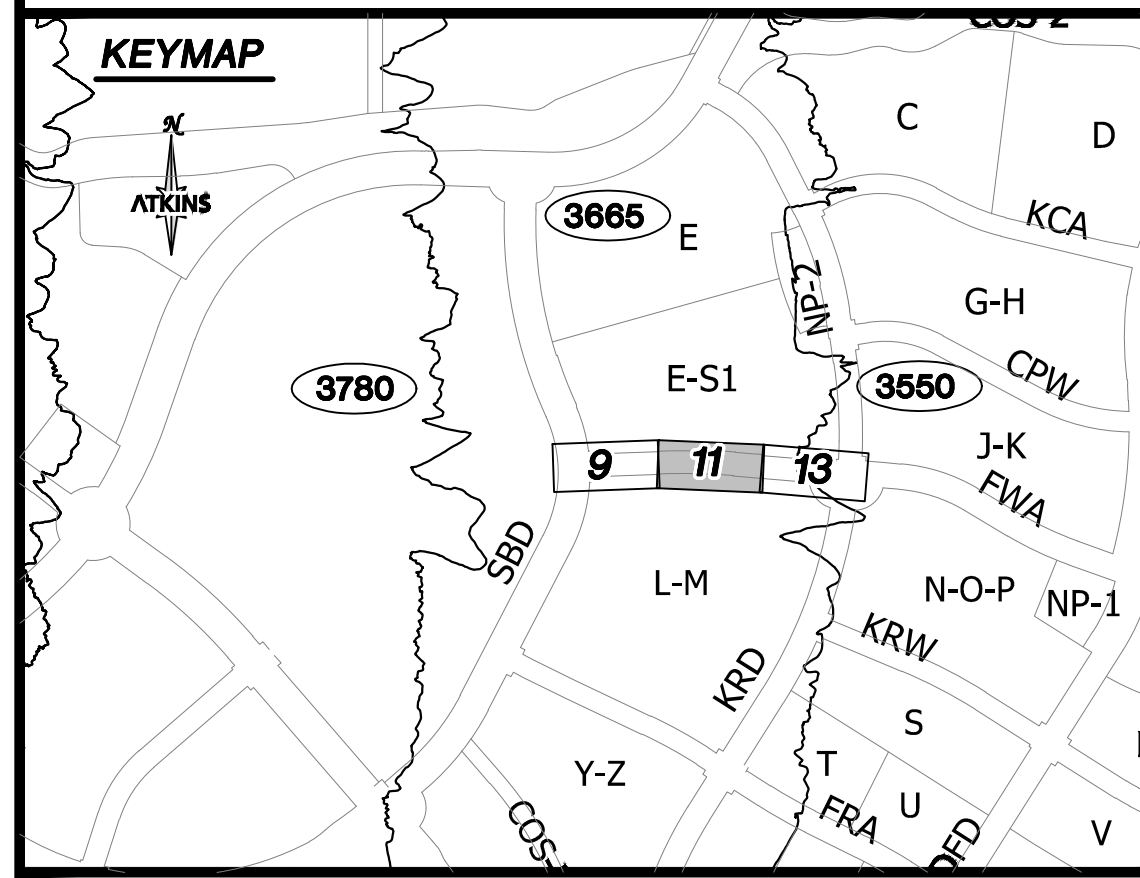
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- ### STORM DRAIN CONSTRUCTION NOTES
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 4. 38± LF EXISTING 48" STORM DRAIN TO BE REMOVED
 5. INSTALL TYPE II SD MANHOLE PER CCAUSD #405.2
 6. INSTALL TYPE III SD MANHOLE PER CCAUSD #406
- ### SEWER CONSTRUCTION NOTES
1. INSTALL SEWER MANHOLE PER DCSWCS SD-1 AND SD-4
 2. INSTALL SEWER MAIN PER DCSWCS SD-17
 3. STUB AND CAP SEWER PIPE. PLACE MARKER BALL AND 4"x4" POST, DOUGLAS FIR, OVER END OF PIPE AND INSTALL THRUST BLOCK (1 CUBIC FT. MINIMUM)
 4. REMOVE CAP AND CONNECT TO EXISTING SEWER STUB
 5. ADJUST EXISTING MANHOLE TO GRADE PER DCSWCS SD-5
 6. PROTECT SEWER AT UTILITY CROSSING PER DCSWCS SD-19
- ### WATERLINE CONSTRUCTION NOTES
1. INSTALL WATER MAIN PER UDACS PLATES #17 AND PLATE #19
 2. INSTALL GATE VALVE PER UDACS PLATES #30 AND #39
 3. INSTALL FIRE HYDRANT WITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40
 4. INSTALL CAP AND 2" MANUAL BLOWOFF ASSEMBLY PER UDACS PLATE #36
 5. INSTALL TEE W/ VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31 AND #39
 6. INSTALL COMBINATION AIR VALVE ASSEMBLY WITH ALL APPURTENANCES PER UDACS PLATE #38
 7. REMOVE CAP AND 2" BLOWOFF AND CONNECT TO EXISTING WATERLINE STUB
 8. INSTALL 5' HORIZONTAL BEND PER UDACS 2.15
 9. INSTALL DEFLECTION AT PIPE JOINTS (MAXIMUM OF 1')
 10. INSTALL 45° VERTICAL BEND PER UDACS 2.15
- ### ROADWAY CONSTRUCTION NOTES
1. SAWCUT AND MATCH EXISTING
 2. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
 3. FUTURE SIDEWALK BY OTHERS
 4. CONSTRUCT CONCRETE SIDEWALK PER CCAUSD #234
 5. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 19 FOR TYPICAL PAVEMENT SECTION



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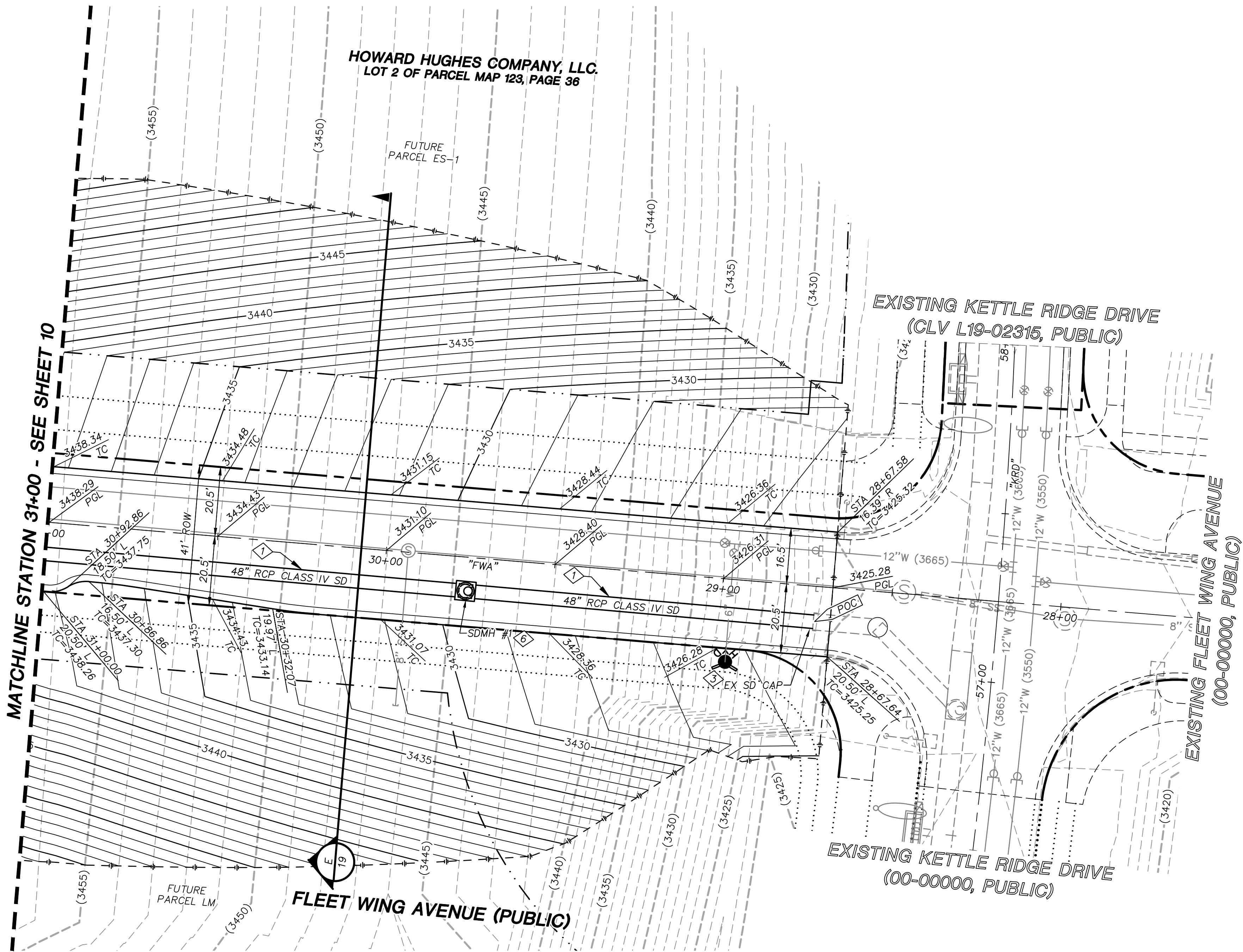
REVISIONS	
DESCRIPTION	BY DATE APPROVAL

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Fax: +1702.263.7200

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (STREET G)
KETTLE RIDGE DRIVE (STREET J) TO SOURRY BEND DRIVE (STREET N)
ROADWAY PLAN AND PROFILE
STA 35+00 TO STA 31+00

DESIGNED BY: L. MAMACLAY	DATE: AUGUST, 2020
DRAWN BY: G. HANSEN	DRAWING NO. 11/21
CHECKED BY: R. BARCOS	HORIZ.: NONE
VERT.: NONE	

JOB NO. 100068235



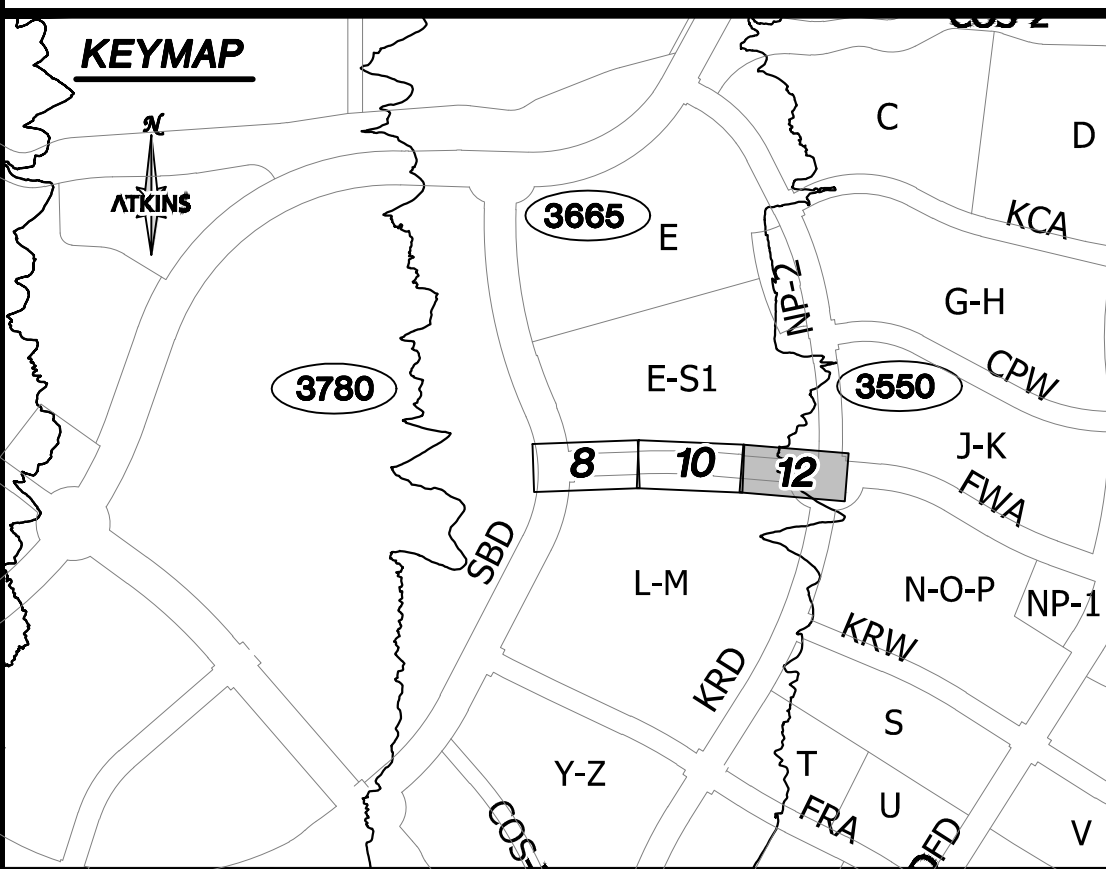
- STORM DRAIN CONSTRUCTION NOTES**
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 - 2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
 - 3. REMOVE CAP AND CONNECT TO EXISTING STORM DRAIN STUB
 - 4. 38± LF EXISTING 48" STORM DRAIN TO BE REMOVED
 - 5. INSTALL TYPE II SD MANHOLE PER CCAUSD #405.2
 - 6. INSTALL TYPE III SD MANHOLE PER CCAUSD #406

REVISIONS		DESCRIPTION	BY	DATE	APPROVAL
REV.					

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1702.263.775
Fax: +1702.263.700

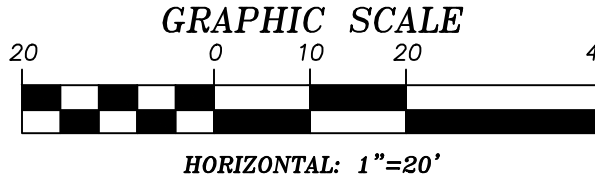


SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (STREET G)
KETTLE RIDGE DRIVE (STREET J) TO SOURRY BEND DRIVE (STREET N)
ROADWAY GRADING PLAN
STA 31+00 TO KETTLE RIDGE DRIVE



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NOT FOR CONSTRUCTION
90% SUBMITTAL



APPROVED FOR CONSTRUCTION
LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES
PROJECT NO. ---- FIRST APPROVED DATE: ----

GRADING PLAN CERTIFICATION
PAUL BATES PE#25673 DATE
CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.
DS#XXX

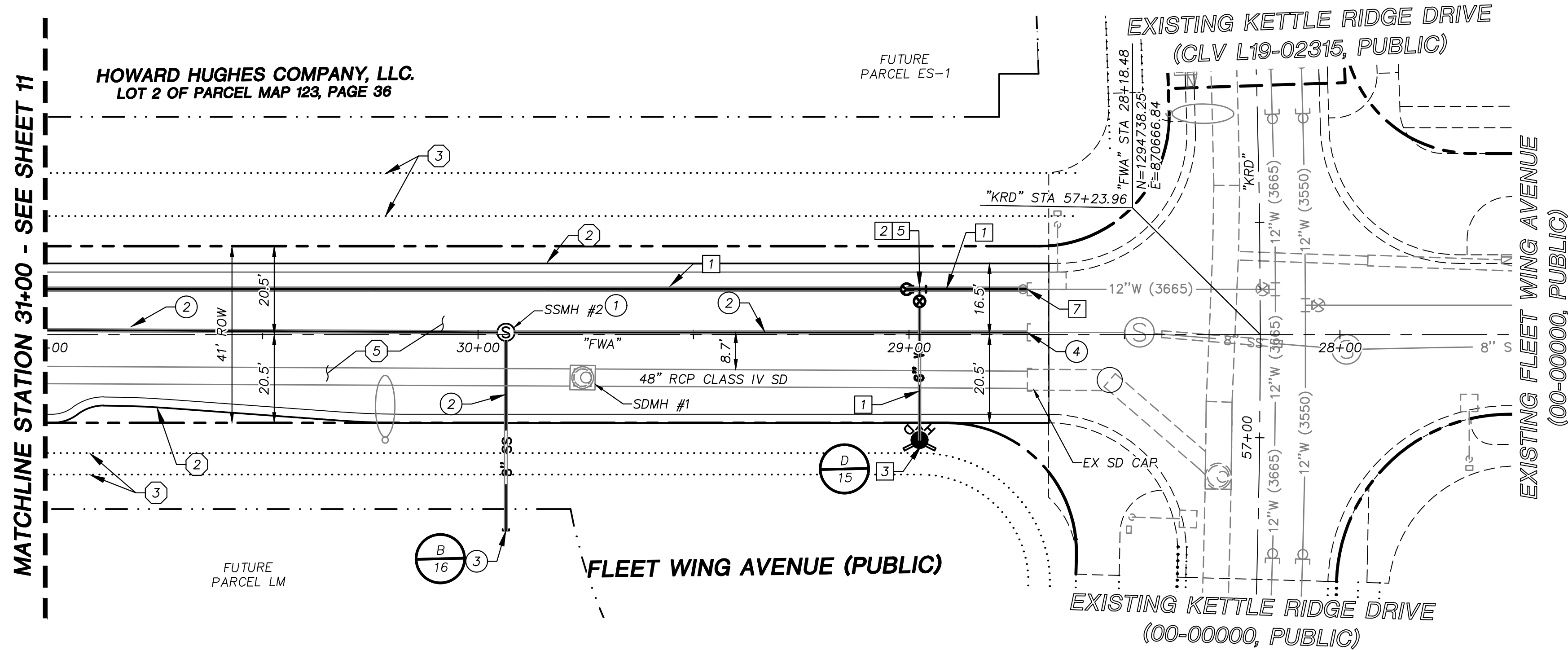
BASIS OF BEARING
GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NORS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.
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CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
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T21S,R59E,S03

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TOLL FREE 1-800-642-2444

Call before you Dig
Call 811
1-800-642-2444

CALL BEFORE YOU DIG
CALL 1-800-642-2444

DESIGNED BY: L. MAMACLAY	XXXXXX
DRAWN BY: G. HANSEN	LXX-XXXX
CHECKED BY: R. BARCOS	DATE: AUGUST, 2020
HORIZ.: 1"=20'	DRAWING NO. 12/21
VERT.: NONE	



STORM DRAIN CONSTRUCTION NOTES

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SEWER CONSTRUCTION NOTES

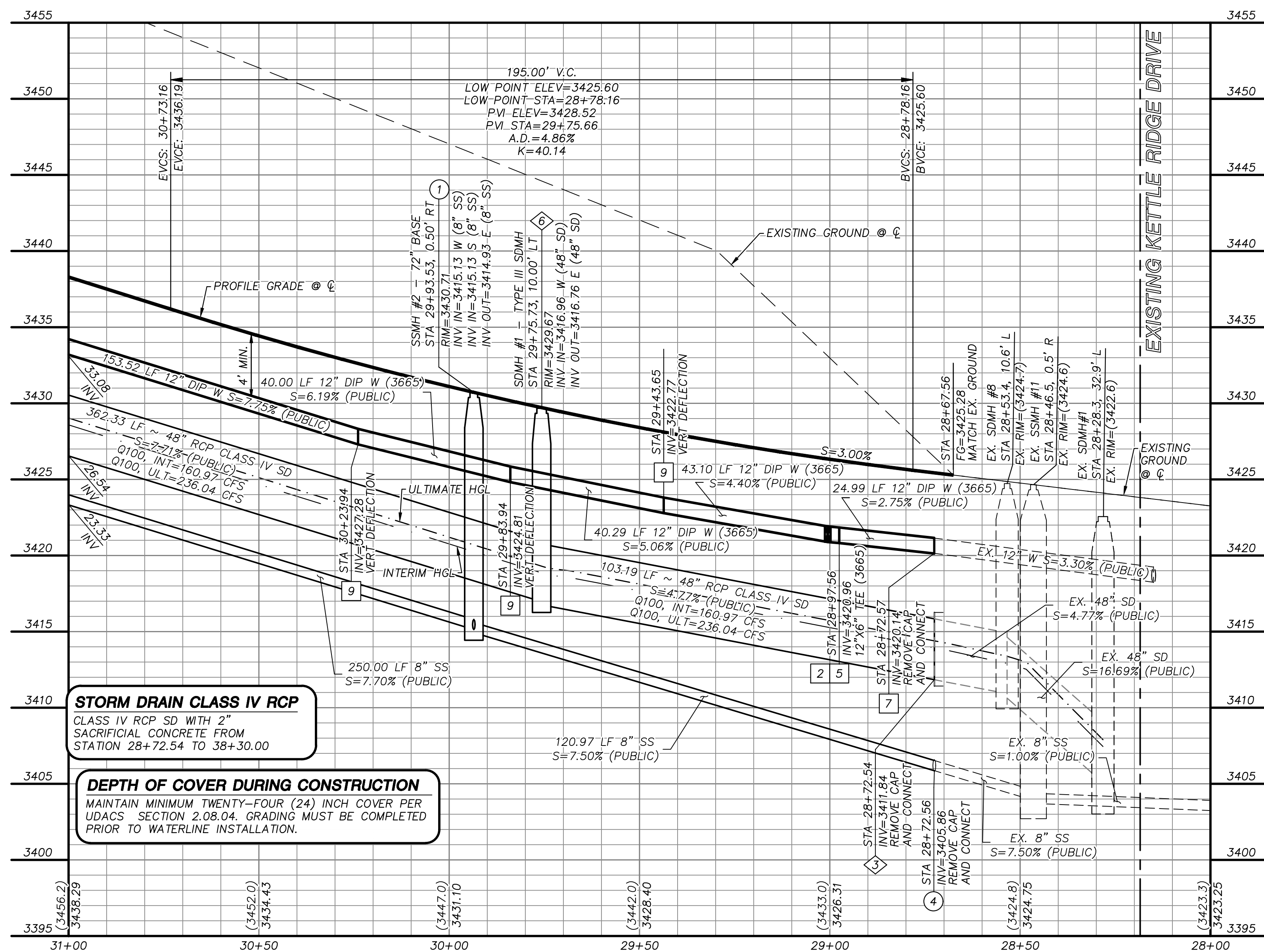
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6. PROTECT SEWER AT UTILITY CROSSING PER DCSWCS SD-19

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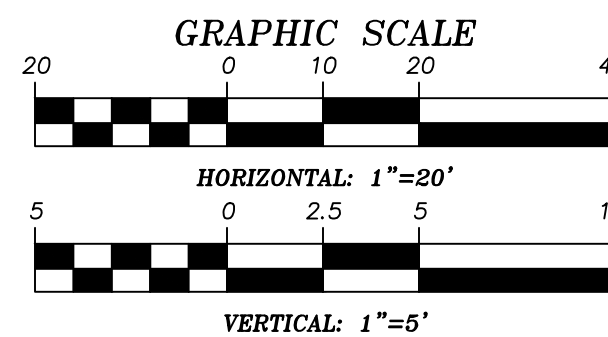
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4. CONSTRUCT CONCRETE SIDEWALK PER CCAUSD #234
5. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 19 FOR TYPICAL PAVEMENT SECTION



STORM DRAIN CLASS IV RCP
CLASS IV RCP SD WITH 2"
SACRIFICIAL CONCRETE FROM
STATION 28+72.54 TO 38+30.00

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.



APPROVED FOR CONSTRUCTION

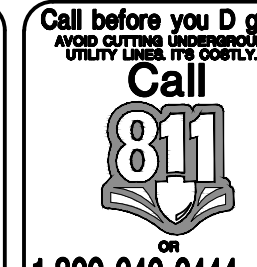
LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES
PROJECT NO. ---- FIRST APPROVED DATE: ----

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T21S, R95E, S03



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90% SUBMITTAL

DESIGNED BY:
L. MAMACLAY
DRAWN BY:
G. HANSEN
CHECKED BY:
R. BARCOS
HORIZ.: NONE
VERT.: NONE
DATE:
AUGUST, 2020
DRAWING NO.
13/21
JOB NO. 100068235

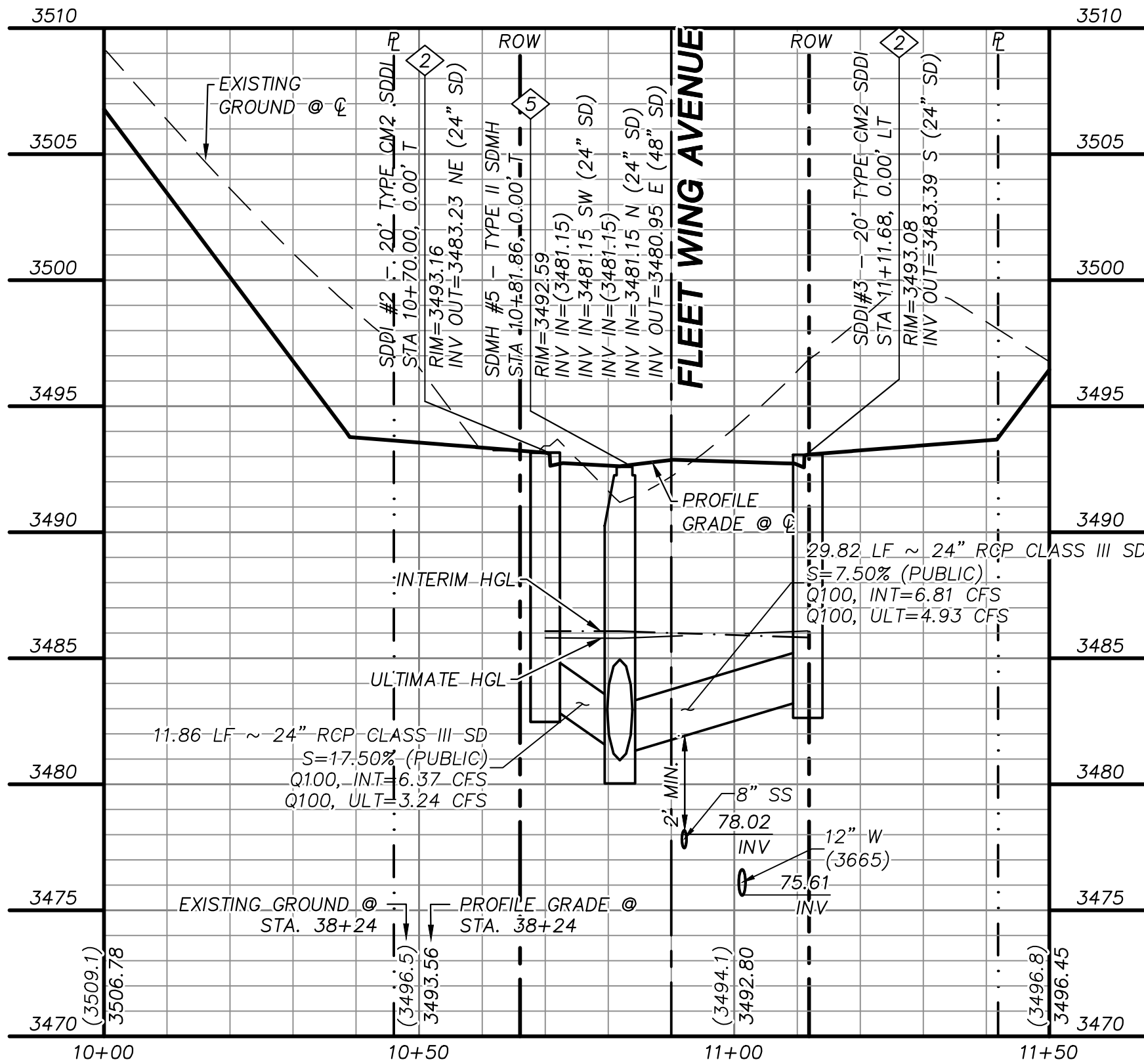
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FLEET WING AVENUE (STREET G)
KETTLE RIDGE DRIVE (STREET J) TO SOURRY BEND DRIVE (STREET N)
ROADWAY PLAN AND PROFILE
STA 31+00 TO KETTLE RIDGE DRIVE



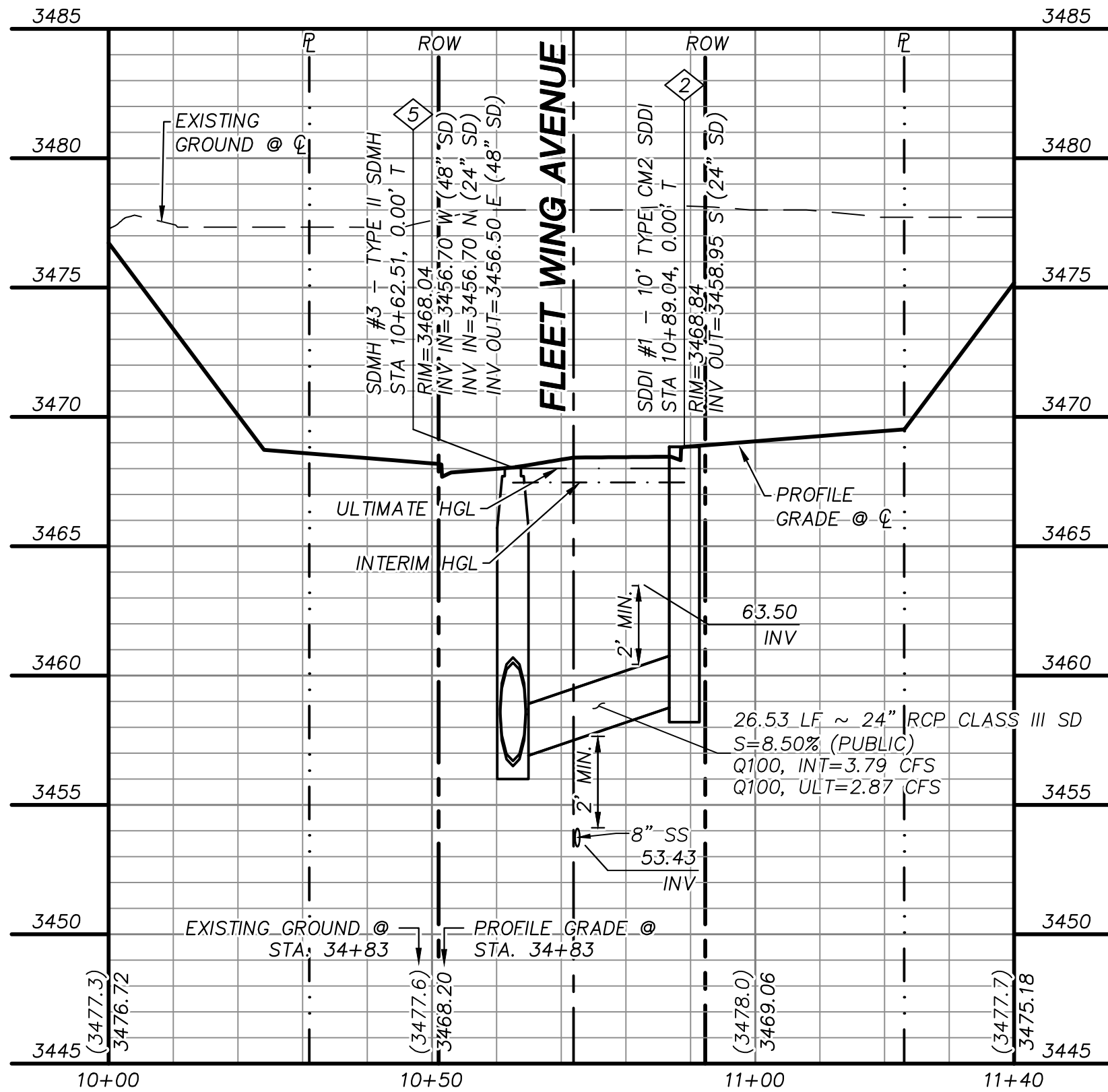
ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1702.263.7275
Fax: +1702.263.7200

REV.	DESCRIPTION	BY	DATE	APPROVAL

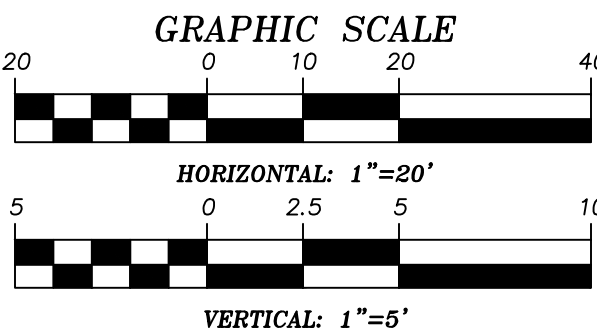
REVISIONS



STORM DRAIN LATERAL 1
"FWA" STA. 38+24 SEE SHEET 9



STORM DRAIN LATERAL 2
"FWA" STA. 34+83 SEE SHEET 11



APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES

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T21S,R59E,S03

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PREMIER AND AUTHORITY
OFFICE OF TRANSPORTATION

Call before you Dig
811
1-800-642-2444

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

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REV.	DESCRIPTION	REVISIONS		
		BY	DATE	APPROVAL

ATKINS

2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1702.263.7755
Fax: +1702.263.7200

SUMMERLIN

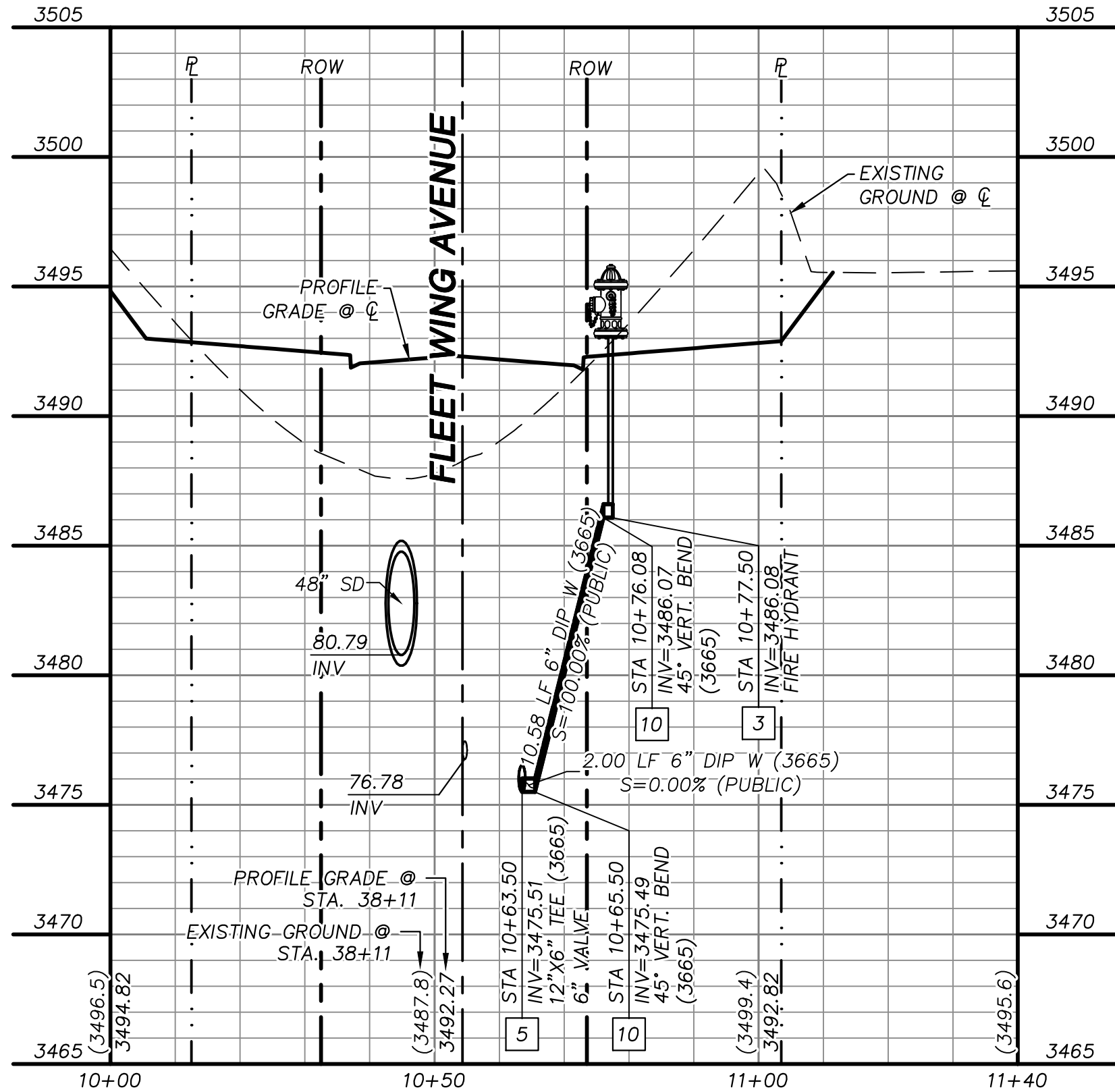
SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (STREET G)
KETTLE RIDGE DRIVE (STREET J) TO SOURRY BEND DRIVE (STREET N)

STORM DRAIN LATERAL PROFILES

DESIGNED BY: L. MAMACLAY
DRAWN BY: G. HANSEN
CHECKED BY: R. BARCOS
HORIZ.: NONE
VERT.: NONE

DATE: AUGUST, 2020
DRAWING NO. 14/21

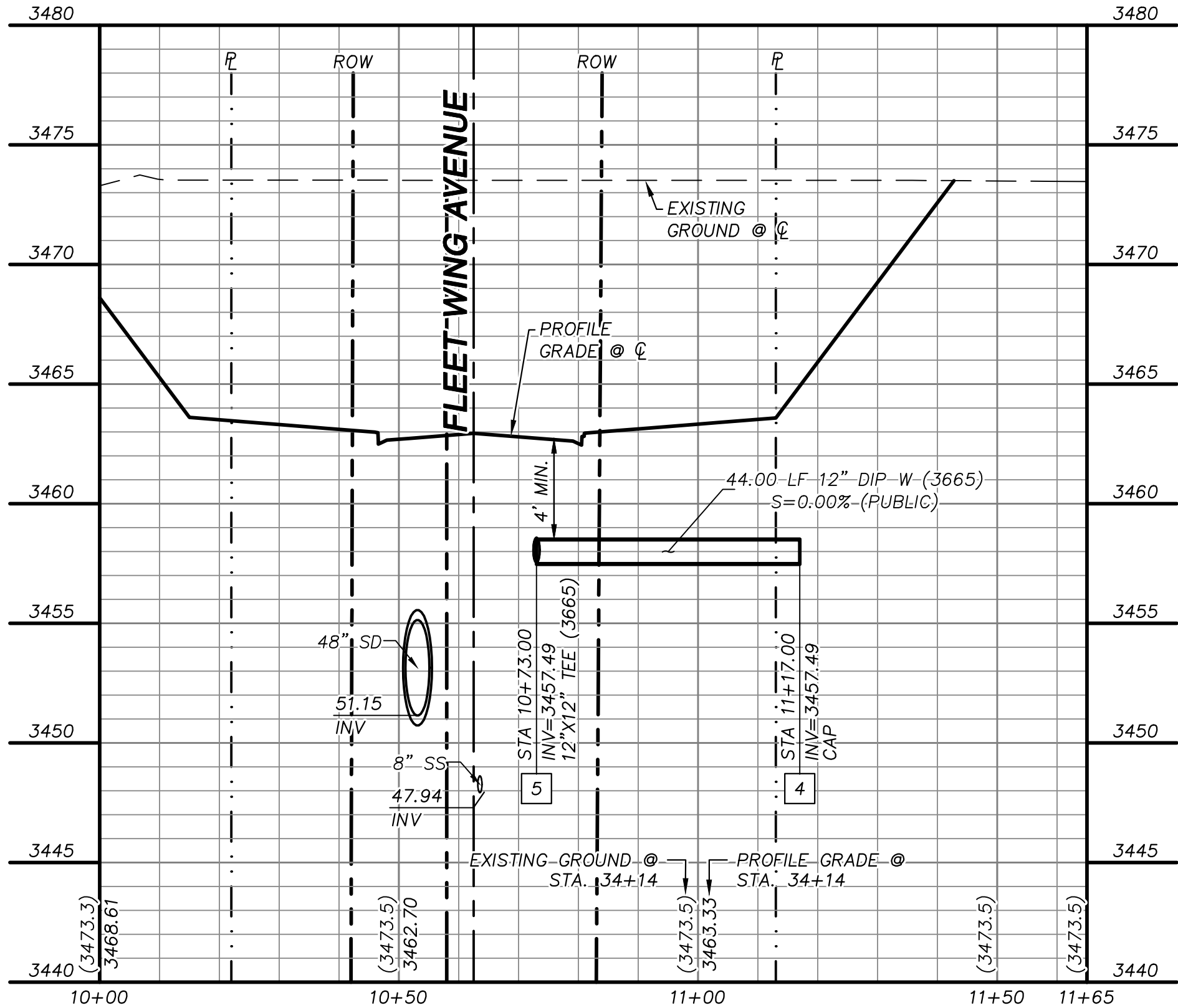
JOB NO. 100068235



WATER LATERAL 1

"FWA" STA. 38+11 SEE SHEET 9

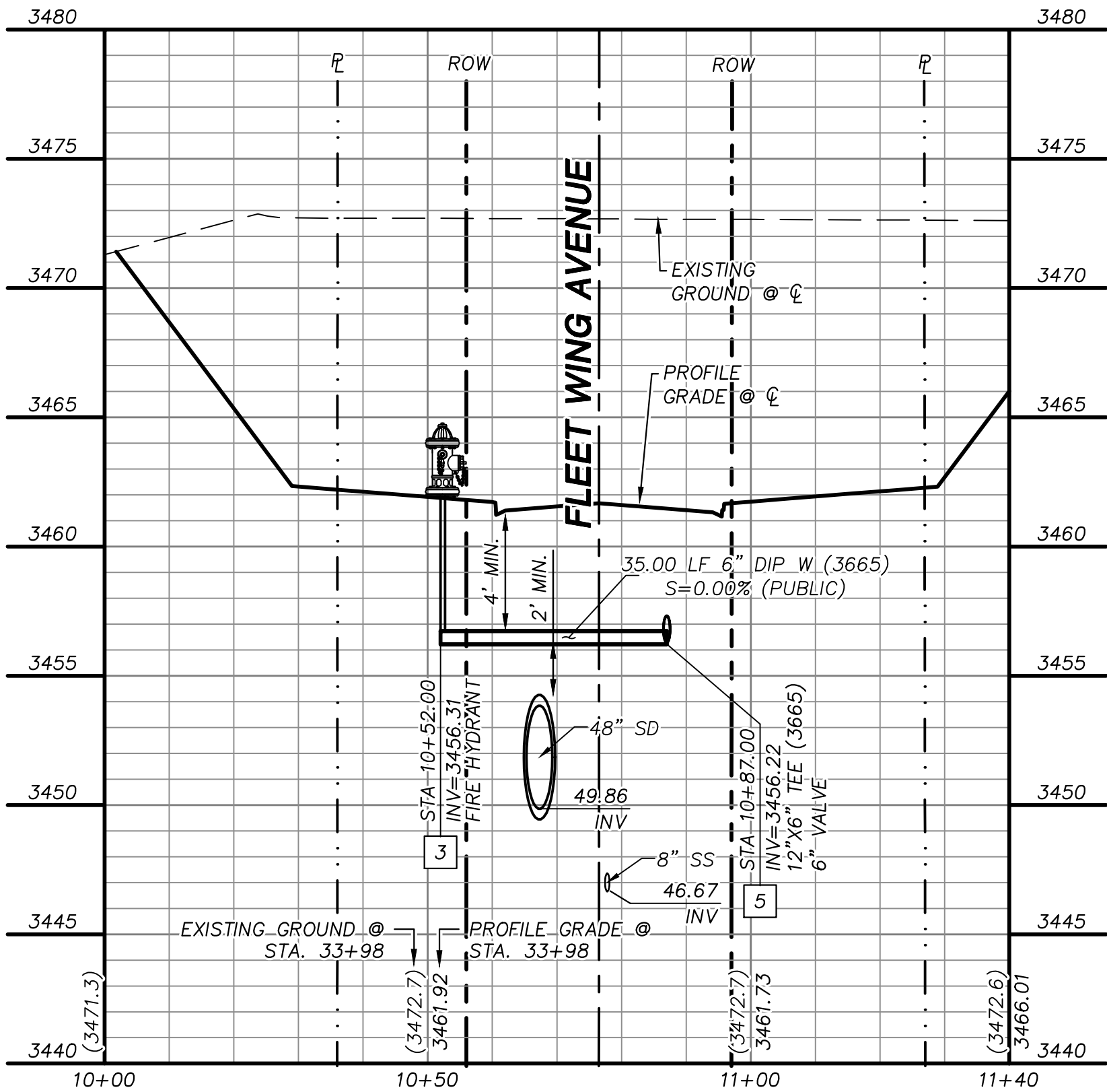
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WATER LATERAL 2

"FWA" STA. 34+14 SEE SHEET 11

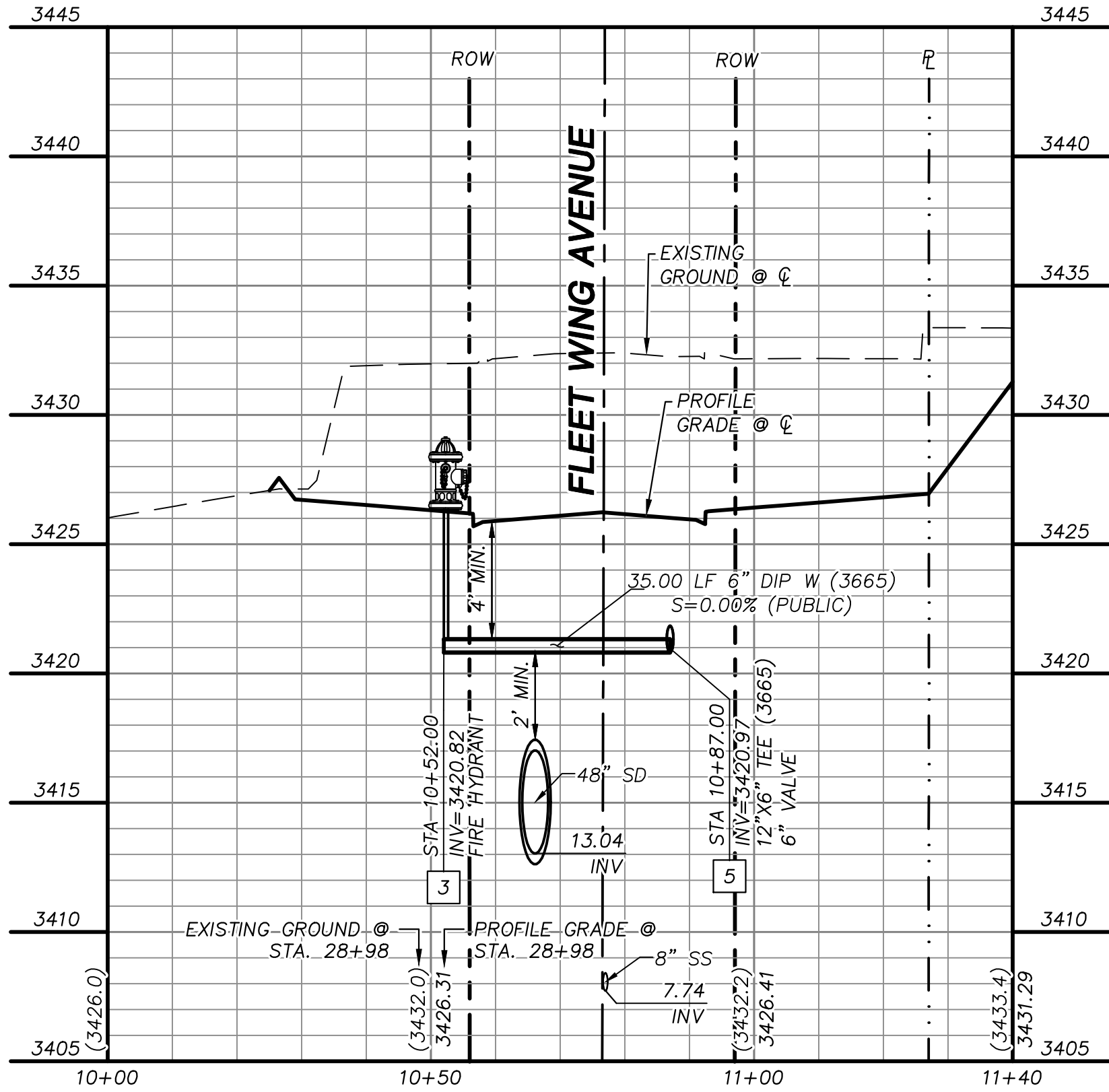
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WATER LATERAL 3

"FWA" STA. 33+98 SEE SHEET 11

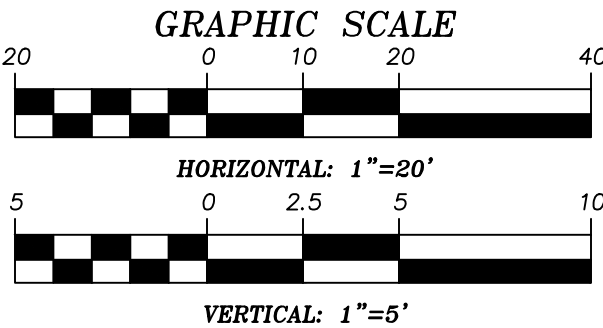
C
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WATER LATERAL 4

"FWA" STA. 28+98 SEE SHEET 13

D
15



APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES
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T21S,R59E,S03



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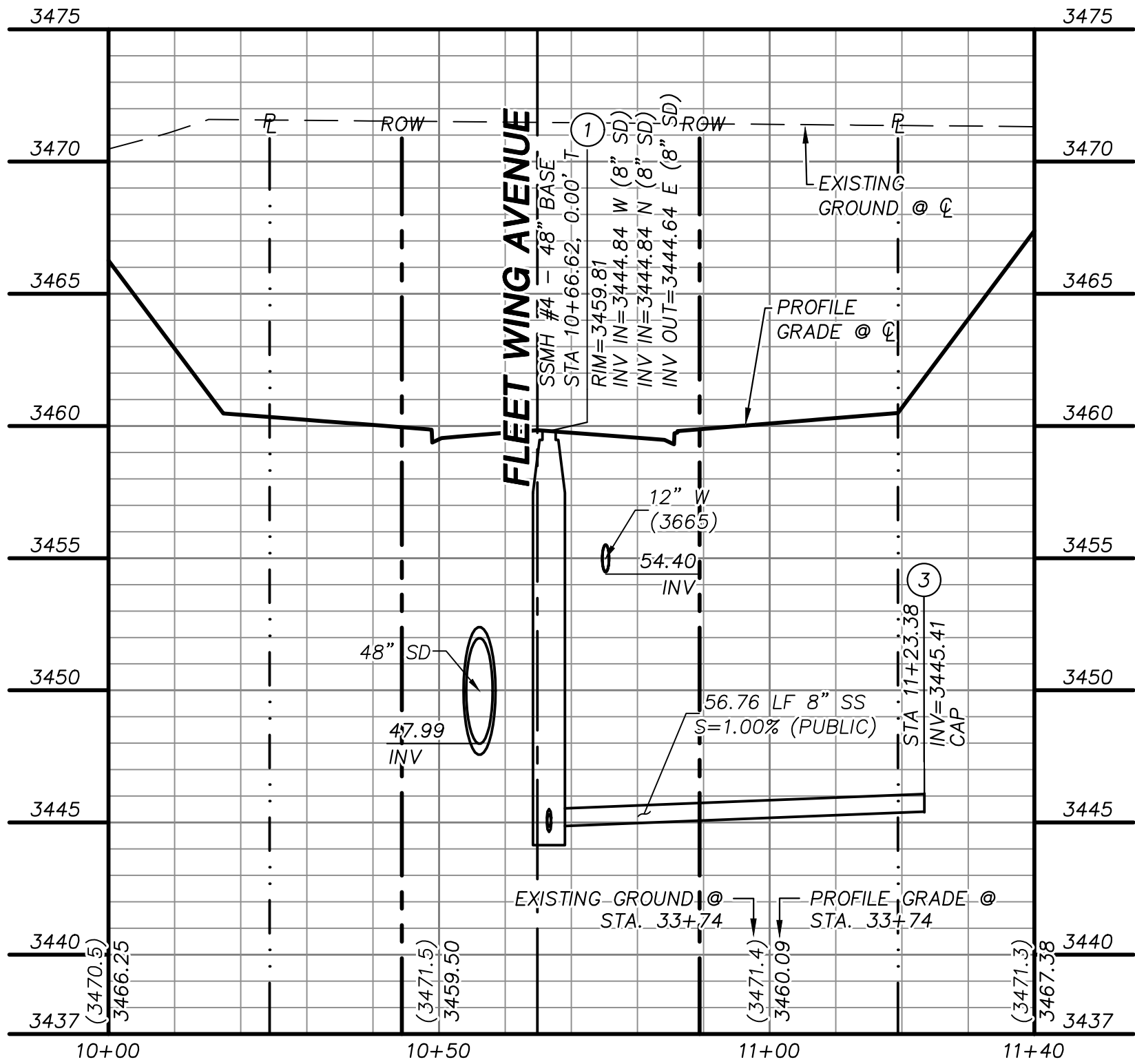
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WATER LATERAL PROFILES

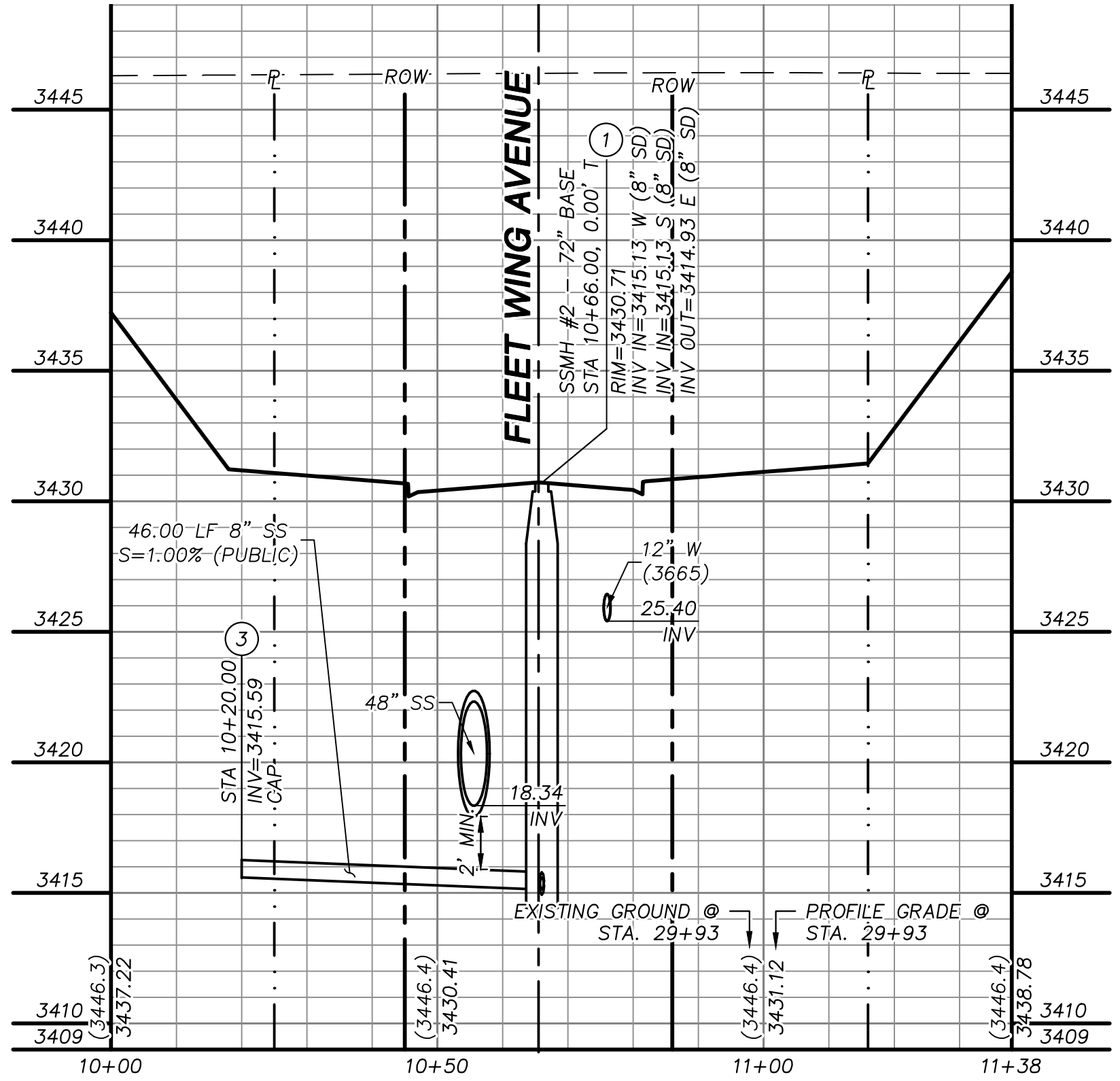
DESIGNED BY: L. MAMACLAY
DRAWN BY: G. HANSEN
CHECKED BY: R. BARCOS
HORIZ.: NONE
VERT.: NONE
DATE: AUGUST, 2020
DRAWING NO.: 15/21
JOB NO. 100068235



SANITARY SEWER LATERAL 1

"FWA" STA. 33+74 SEE SHEET 11

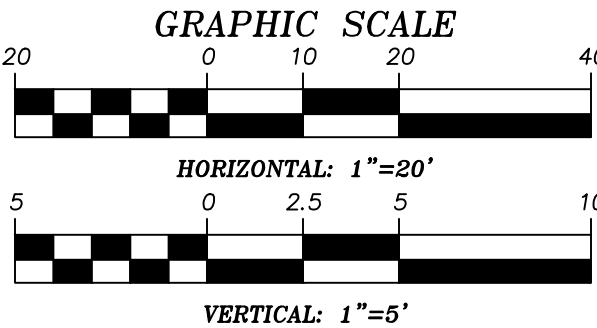
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16



SANITARY SEWER LATERAL 2

"FWA" STA. 29+93 SEE SHEET 13

B
16



APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES
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90% SUBMITTAL

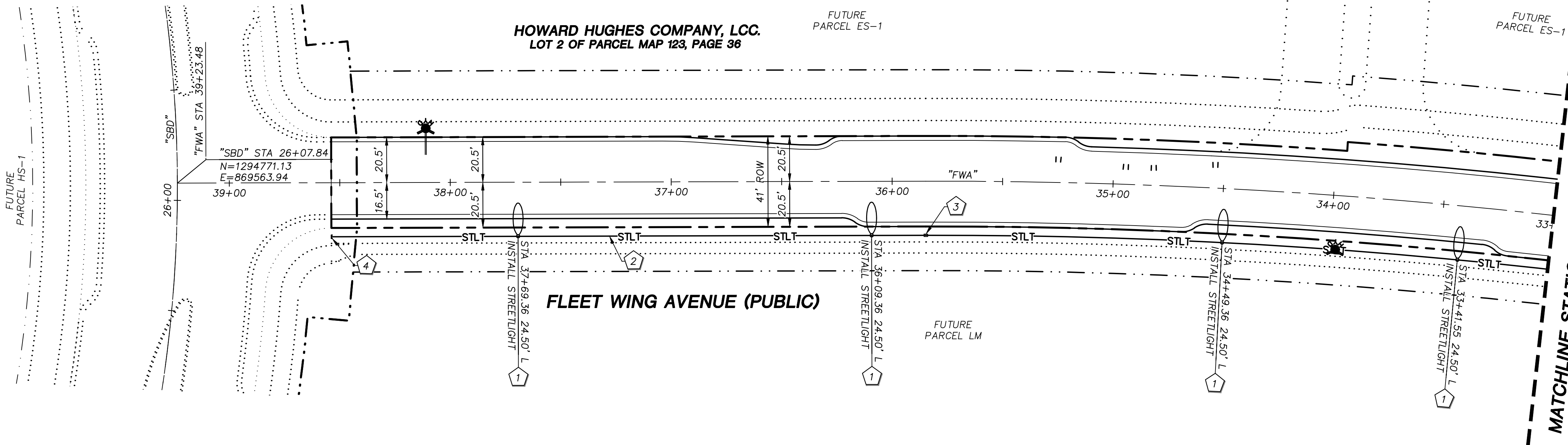
DESIGNED BY:		DRAWN BY:		CHECKED BY:		DATE:		DRAWING NO.		VERT.:	
L. MAMACLAY		G. HANSEN		R. BARCOS		AUGUST, 2020		16/21		NONE	
SUMMERLIN WEST VILLAGE 22		FLEET WING AVENUE (STREET G)		KETTLE RIDGE DRIVE (STREET J) TO SOURRY BEND DRIVE (STREET N)		SANITARY SEWER LATERAL PROFILES		JOB NO. 100068235		X:\Projects\Summerlin West Village 22\100068235 - V22 Fleet Wing (Kettle Ridge to Sourry Bend)\Sheets\68235-12-LATL-12.dwg	



ATKINS

HOWARD HUGHES COMPANY, LCC.
LOT 2 OF PARCEL MAP 123, PAGE 8

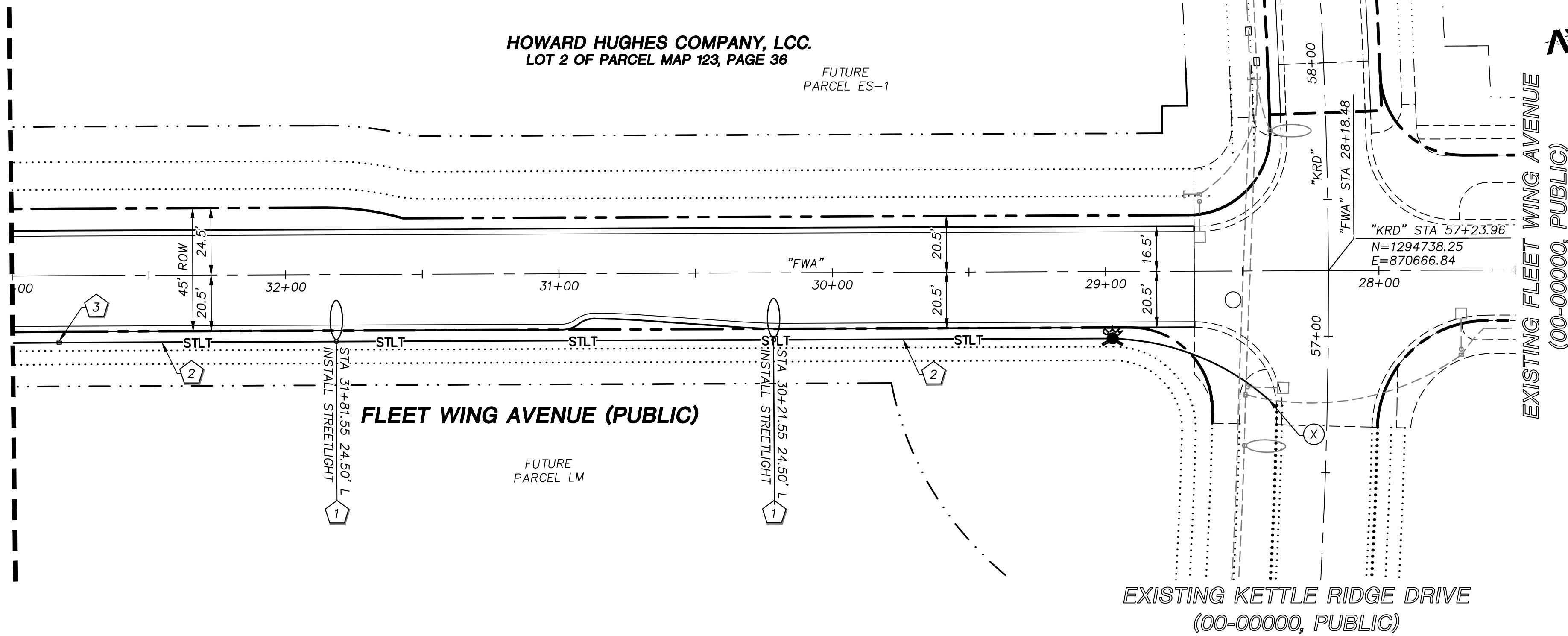
FUTURE SCURRY BEND DRIVE
(PUBLIC)



FUTURE SCURRY BEND DRIVE
(PUBLIC)

MATCHLINE STATION 33+00 - SEE ABOVE RIGHT

HOWARD HUGHES COMPANY, LCC.
LOT 2 OF PARCEL MAP 123, PAGE 36



EXISTING KETTLE RIDGE DRIVE
(00-00000, PUBLIC)



ATKINS

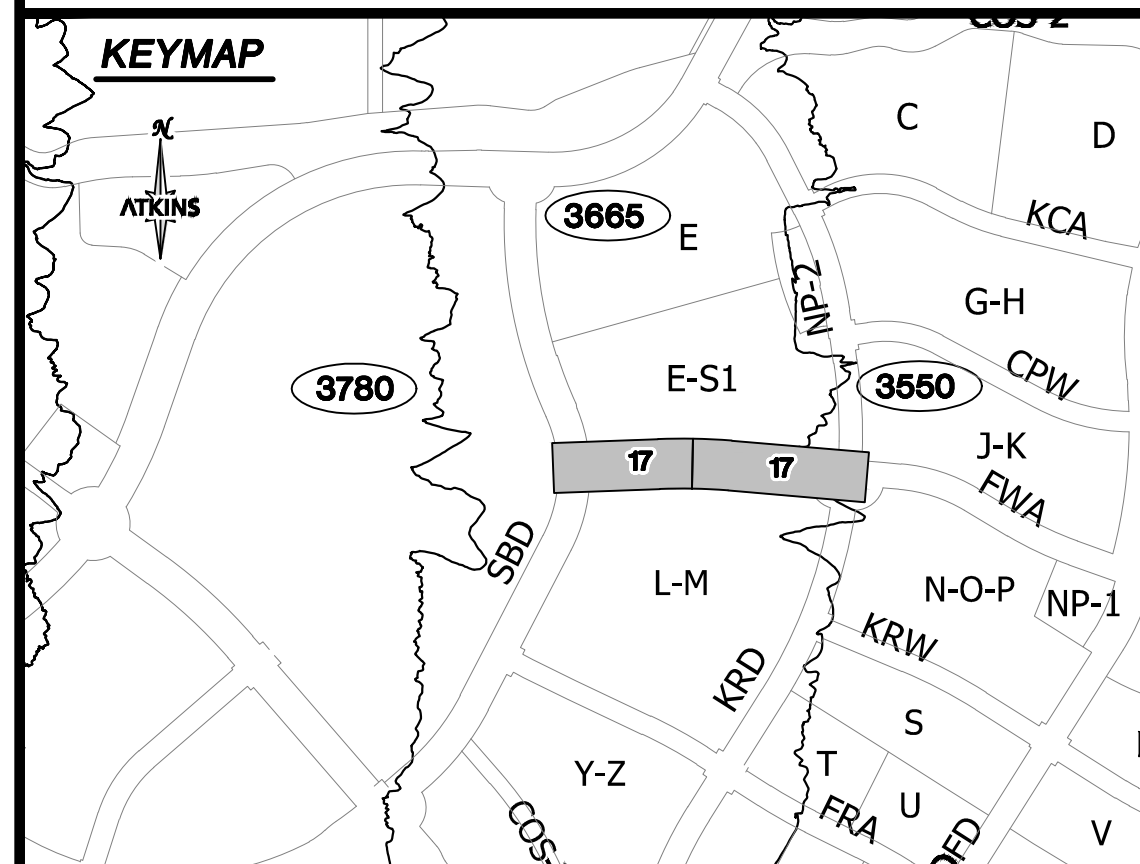
STREET LIGHTING CONSTRUCTION NOTES

1. INSTALL 100W SINGLE ARM TYPE 2 STREETLIGHT WITH LED LUMINAIRE PER SUMMERLIN STD DRAWING E-2, SEE SHEET 21 FOR TYPICAL LOCATION, AND CCAUSD #311, #316, AND #320.
2. INSTALL 1-1/4" STREETLIGHT CONDUIT WITH (2) #4 AND (1) #8 PER CCAUSD #501
3. INSTALL NO. 3-1/2 PULL BOX MARKED "STREETLIGHT" PER CCAUSD #705 (24)
4. STUB AND CAP CONDUIT 5' PAST EDGE OF CONSTRUCTION

SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
STREETLIGHTING		
TYPE 2 SINGLE ARM STREETLIGHT POLE ASSEMBLY	6	EA
NO. 3-1/2 PULL BOX	2	EA
1-1/4" STREETLIGHT CONDUIT WITH ALL WIRING	1,020	LF

- (X) INTERCEPT EXISTING CONDUIT AND CONNECT TO NEW PULL BOX.



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NOT FOR CONSTRUCTION
90% SUBMITTAL

STREET LIGHTING NOTES

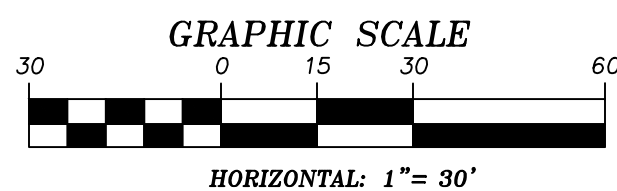
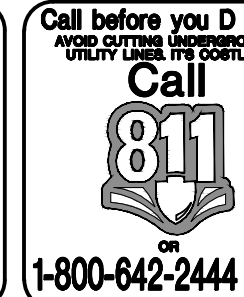
1. SEE SHEETS 21 FOR DETAILS & CCAUSD'S FOR STREETLIGHTING

BASIS OF BEARING

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

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03



REVISIONS

DESCRIPTION

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APPROVAL

REV.



HOWARD HUGHES COMPANY, LLC.
LOT 3 OF PARCEL MAP 125, PAGE 8
FUTURE
PARCEL FHS-1

FUTURE SCURRY BEND DRIVE
(PUBLIC)

HOWARD HUGHES COMPANY, LLC.
LOT 2 OF PARCEL MAP 123, PAGE 36

FUTURE
PARCEL ES-1

FUTURE
PARCEL ES-1

FUTURE SCURRY BEND DRIVE
(PUBLIC)

TYPE IIIA
BARRICADE

FLEET WING AVENUE (PUBLIC)

FUTURE
PARCEL LM

MATCHLINE STATION 33+00 - SEE BELOW LEFT

EXISTING KETTLE RIDGE DRIVE
(CLV L19-02315, PUBLIC)

HOWARD HUGHES COMPANY, LLC.
LOT 2 OF PARCEL MAP 123, PAGE 36

FUTURE
PARCEL ES-1



MATCHLINE STATION 33+00 - SEE ABOVE RIGHT

FLEET WING AVENUE (PUBLIC)

FUTURE
PARCEL LM

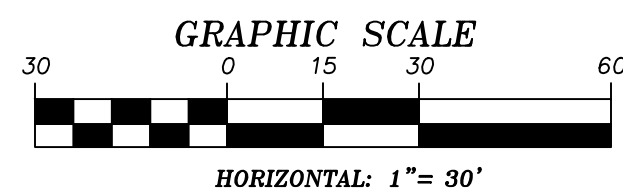
FLEET WING AVENUE



EXISTING KETTLE RIDGE DRIVE
(00-00000, PUBLIC)

EXISTING FLEET WING AVENUE
(00-00000, PUBLIC)

PARKING STALL DETAIL
N.T.S.



BASIS OF BEARING

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

BENCHMARK

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FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S.R59E.S03



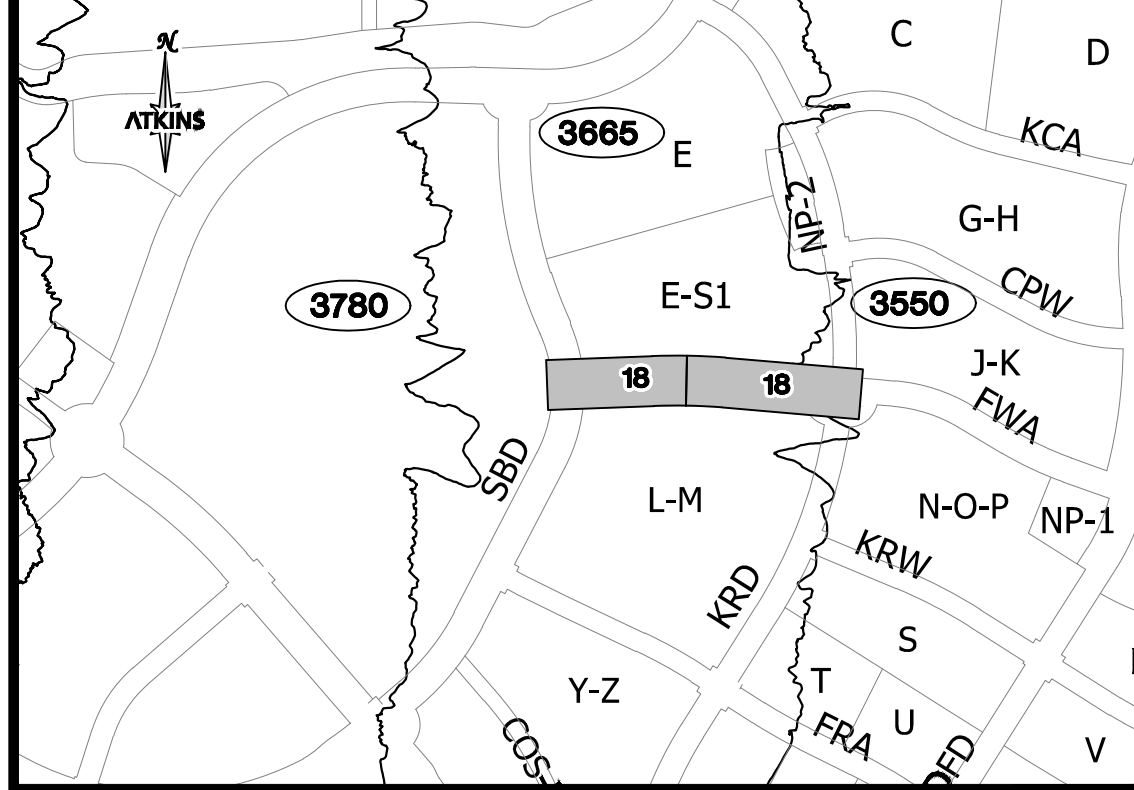
STRIPING AND SIGNAGE CONSTRUCTION NOTES

1. INSTALL SIGN(S) ON STREETLIGHT POLE
2. INSTALL SIGN(S) ON POST PER CCAUSD #249.1
3. INSTALL STREET NAME SIGN (D3-1) PER CCAUSD #250 ON TOP OF STOP SIGN
4. INSTALL 24" SOLID WHITE LINE PER CCAUSD #254 (TYPE 2 PMF)
5. INSTALL 6" SOLID WHITE LINE PER CCAUSD #244.9 (POLUREA LPM)
6. INSTALL 4"-WIDE WHITE LANE EDGE LINE USING TYPE II PAVEMENT MARKING FILM PER CCAUSD #244.5
7. INSTALL TYPE 1 CENTERLINE (RPM) PER CCAUSD #244
8. INSTALL TYPE 4 LANE LINE USING RAISED PAVEMENT MARKERS PER CCAUSD #246
9. INSTALL PARKING STALLS PER DETAIL A THIS SHEET, TO BE MAINTAINED BY SUMMERLIN HOA
10. INSTALL STRIPING PER ADA PARKING DETAIL ON SHEET 19
11. PAINT CURB 15' EITHER DIRECTION OF FIRE HYDRANT (30' MINIMUM) & PLACE BLUE REFLECTIVE PAVEMENT MARKER IN MIDDLE OF ADJACENT DRIVE LANE NEAREST TO HYDRANT
12. INSTALL PORTABLE TYPE IIIA BARRICADE PER CCAUSD #601
13. CONNECT TO EXISTING STREET LIGHT CONDUIT
14. INSTALL WHITE LANE-USE ARROW (TYPE 2 PMF) PER MUTCD FIGURE 3B-24
15. TYPICAL LANE DELINEATION IN TRANSITION SECTIONS PER CCAUSD #245

SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
SIGNAGE AND STRIPING		
TYPE 1 CENTERLINE	755	LF
6" WHITE STRIPE (PARKING STALLS)	120	LF
24" WHITE STRIPE (STOP BAR)	44	LF
STREET SIGNS	7	EA
PORTABLE TYPE IIIA BARRICADE	2	EA
TYPE 2 PMF WHITE LANE USE ARROW	6	EA

KEYMAP



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NOT FOR CONSTRUCTION
90% SUBMITTAL

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1702.263.7755
Fax: +1702.263.7200

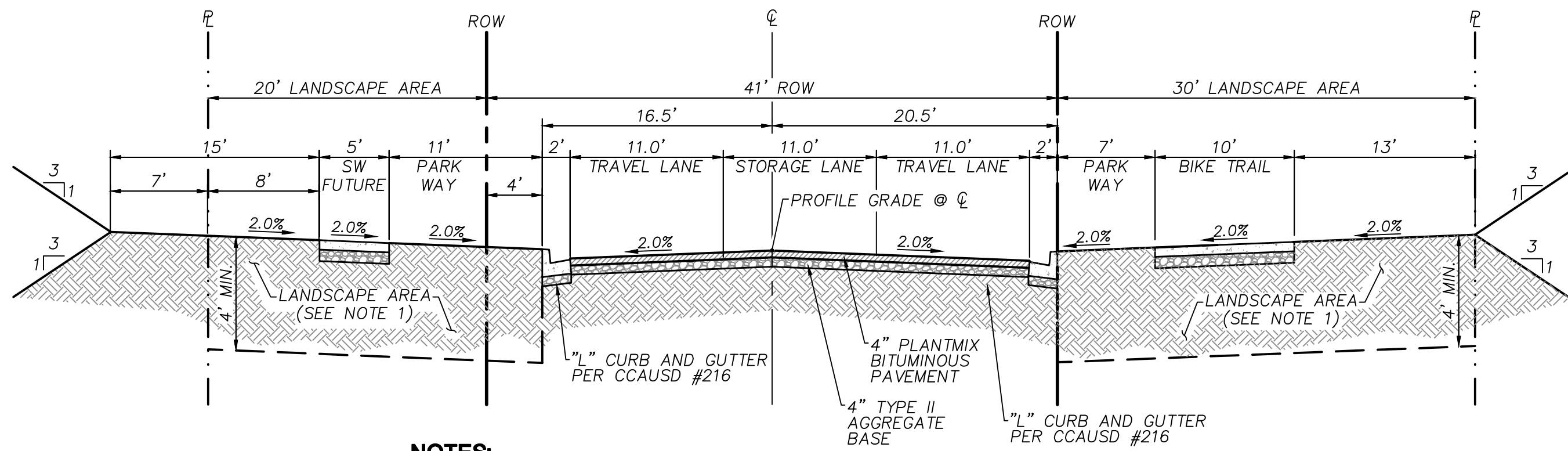
SUMMERLIN

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (STREET G)
KETTLE RIDGE DRIVE (STREET J) TO SCURRY BEND DRIVE (STREET N)

SIGNAGE AND STRIPING PLAN

DESIGNED BY: L. MAMACLAY
DRAWN BY: G. HANSEN
CHECKED BY: R. BARCOS
HORIZ.: NONE
VERT.: NONE

JOB NO. 100068235



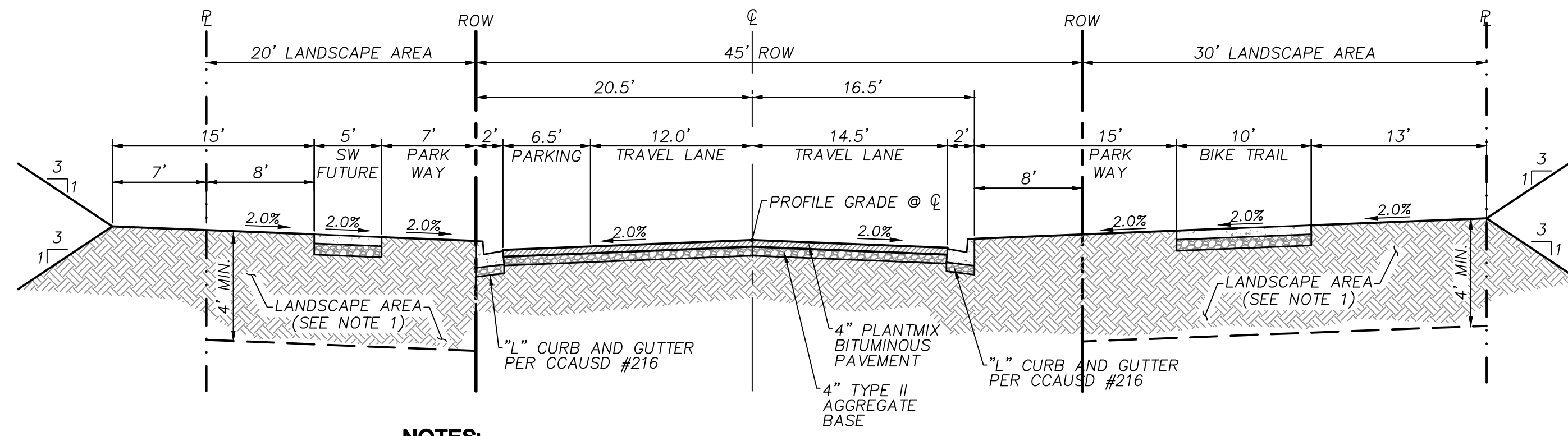
NOTES:

1. EXCAVATE BOTH SIDES TO DEPTH INDICATED PRIOR TO STREET IMPROVEMENTS. SIFT/SCREEN OUT ROCK AND DEBRIS GREATER THAN 6" FROM EXCAVATED MATERIAL, THEN BACKFILL TO 85% COMPACTION. FILL AS NECESSARY TO 2" BELOW THE FINISHED GRADE.

FLEET WING AVENUE - TYPICAL WITH SOUTH CURB EXTENSIONS

N.T.S.

19



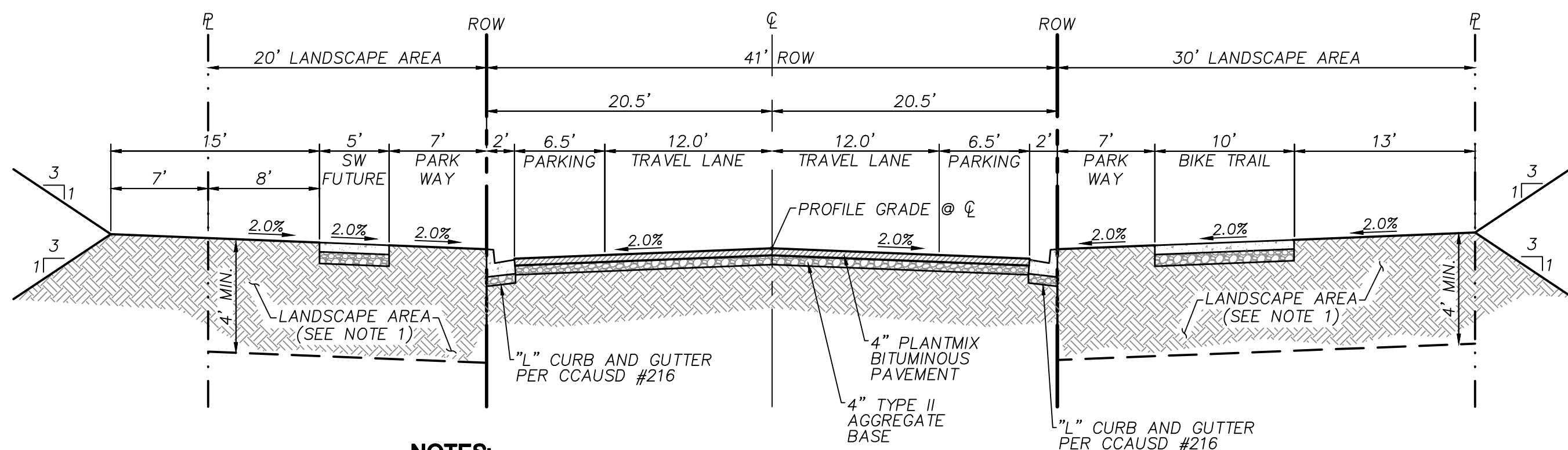
NOTES:

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FLEET WING AVENUE - TYPICAL WITH NORTH CURB EXTENSIONS

N.T.S.

19



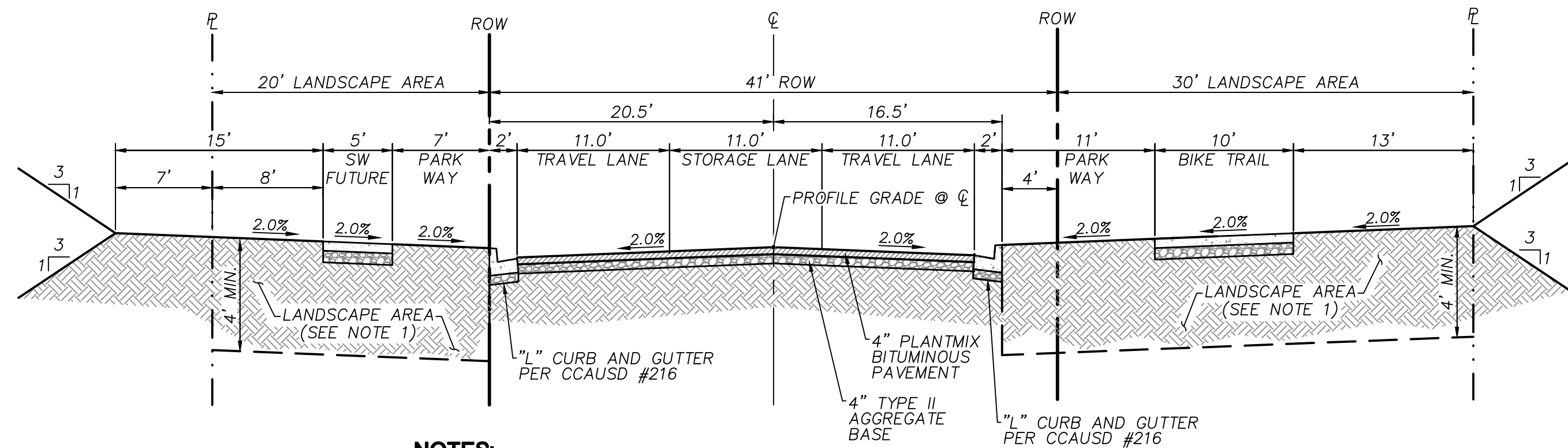
NOTES:

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FLEET WING AVENUE - TYPICAL

N.T.S.

19



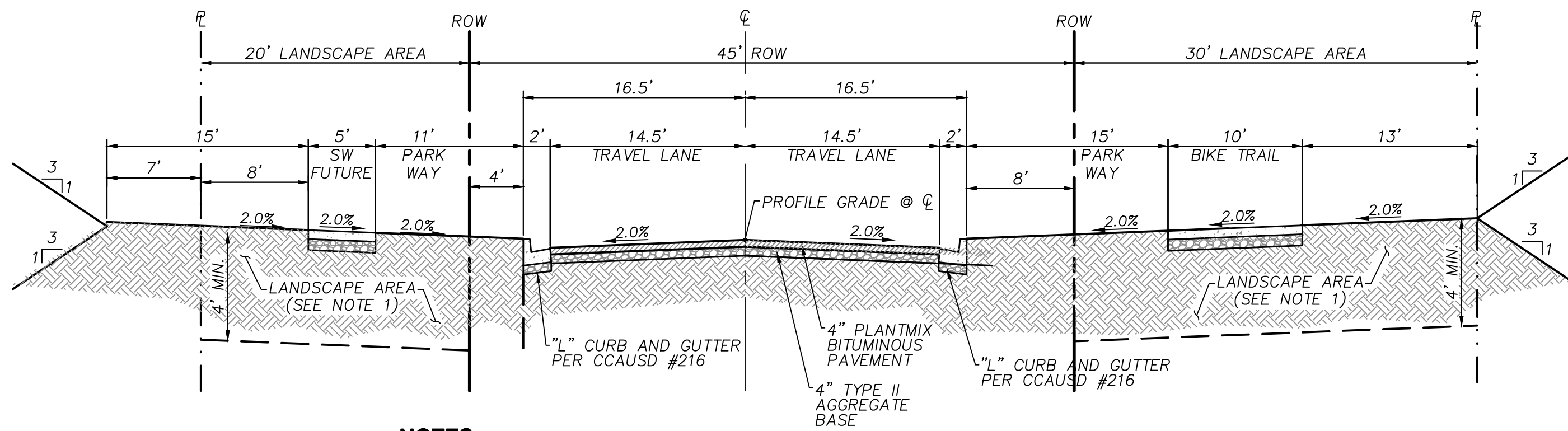
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FLEET WING AVENUE - TYPICAL WITH NORTH CURB EXTENSIONS

N.T.S.

19



NOTES:

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FLEET WING AVENUE - TYPICAL WITH CURB EXTENSIONS

N.T.S.

19

BASIS OF BEARING

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

BENCHMARK

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NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03



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NOT FOR CONSTRUCTION
90% SUBMITTAL

DESIGNED BY: L. MAMACLAY	DATE: AUGUST, 2020	DRAWING NO. 19/21
DRAWN BY: G. HANSEN	CHECKED BY: R. BARCOS	HORIZ.: NONE
VERT.: NONE		

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (STREET G)
KETTLE RIDGE DRIVE (STREET J) TO SOURRY BEND DRIVE (STREET N)

TYPICAL SECTIONS



ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1702.263.7275
Fax: +1702.263.7200

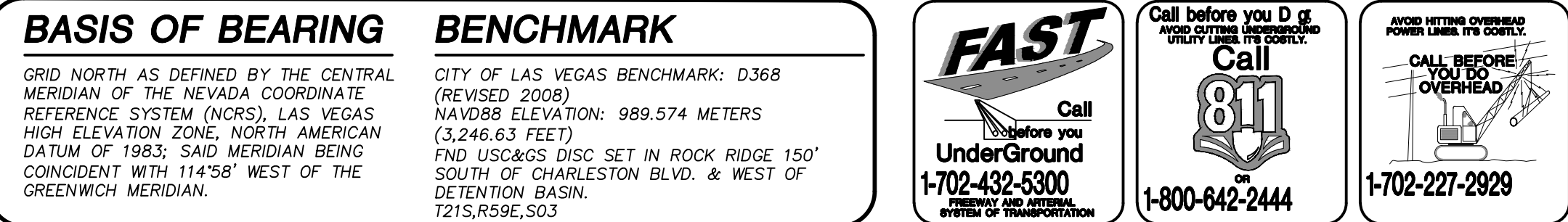
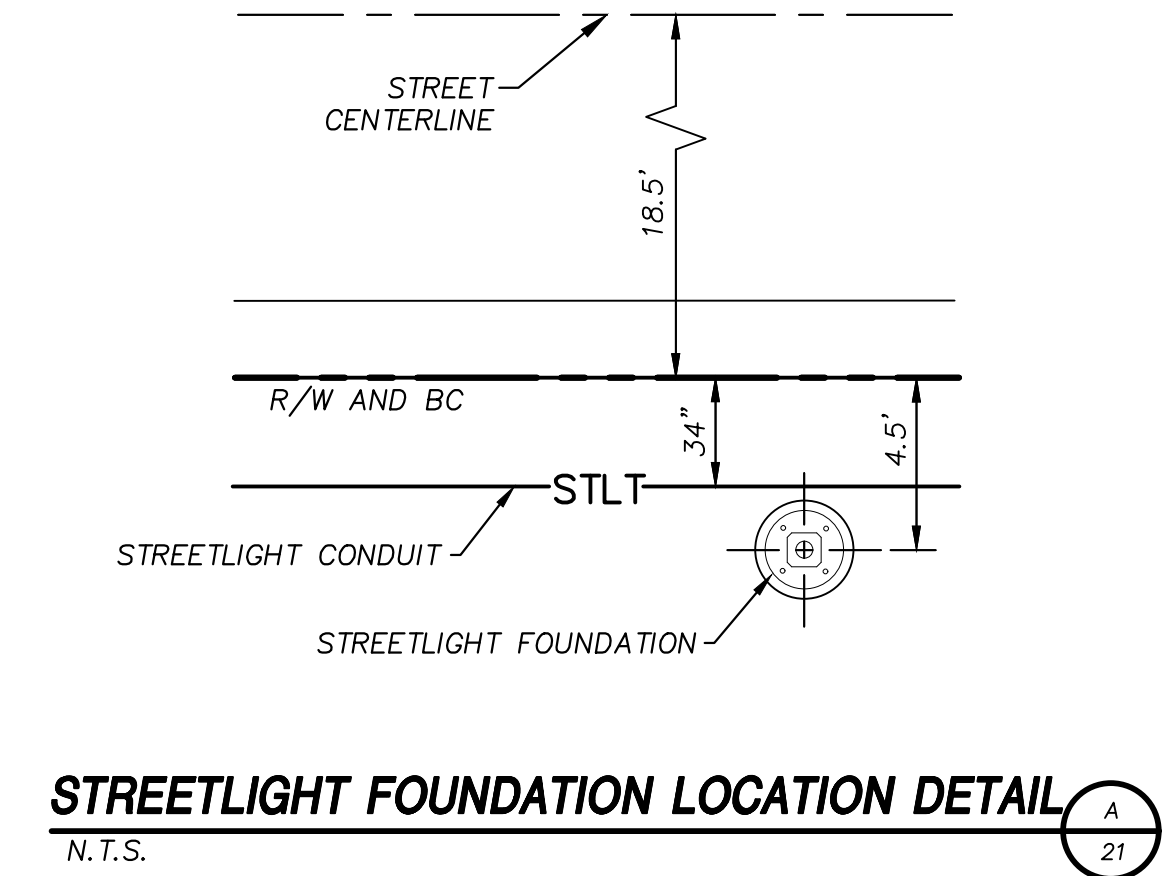
REV.	DESCRIPTION	BY	DATE	APPROVAL



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NOT FOR CONSTRUCTION
90% SUBMITTAL

DESIGNED BY: L. MACMILLAY D. HANSEN		SUMMERLIN®  SUMMERLIN WEST VILLAGE 22 FLEET WING AVENUE (STREET G) KETTLE RIDGE DRIVE (STREET J) TO SCURRY BEND DRIVE (STREET N) WATER DETAILS	 2270 Corporate Circle, Suite 200 Henderson, Nevada 89074 Telephone: +1702.263.7275 Fax: +1702.263.7200	REVISIONS				
CHECKED BY: N. BARCOS	DATE: 2020			REV.	DESCRIPTION	BY	DATE	APPROVAL
DRAWING NO:								
HORIZ.: 1"=20"								
VERT.: NONE								
JOB NO. 100068235	20/21							



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NOT FOR CONSTRUCTION
90% SUBMITTAL

DESIGNED BY: J. HANSEN DRAWN BY: G. HANSEN CHECKED BY: N. BARCOS HORIZ: NONE VERT: NONE		SUMMERLIN WEST VILLAGE 22 FLEET WING AVENUE (STREET G) KETTLE RIDGE DRIVE (STREET J) TO SOURRY BEND DRIVE (STREET H)		 SUMMERLIN®		 2270 Corporate Circle Suite 200 Henderson, Nevada 89074 Telephone: +1702.263.7275 Fax: +1702.263.7200		REVISIONS				
JOB NO. 100068235		LAX-XXXXX DATE: AUGUST, 2020 DRAUGHT NO.		21/21		REV.		DESCRIPTION		BY	DATE	APPROVAL